

**Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link –
Southern Connection Viaduct Section**

***Sixth Quarterly Environmental Monitoring &
Audit (EM&A) Report***

19 October 2015

Environmental Resources Management
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Contract No. HY/2012/07





Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section

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Sixth Quarterly Environmental Monitoring & Audit (EM&A) Report

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Client: Gammon		Project No: 0215660			
Summary: This document presents the Sixth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.		Date: 19 October 2015			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Mr Jovy Tam ET Leader			
	6 th Quarterly EM&A Report	VAR	JT	CAR	19/10/15
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p>			
		 			

Ref.: HYDHZMBEEM00_0_3497L.15

22 October 2015

AECOM
Supervising Officer's Representative's Office
780 Cheung Tung Road, Lantau, N.T.

By Fax (3691 2899) and By Post

Attention: Mr. Daniel Ip

Dear Mr. Ip,

**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**

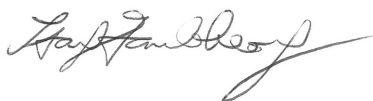
**Contract No. HY/2012/07 TM-CLKL Southern Connection Viaduct
Section
Sixth Quarterly EM&A Report (EP-354/2009/D)**

Reference is made to the Sixth Quarterly Environmental Monitoring and Audit (EM&A) Report (ET's ref.: "0215660_6th Qtr EM&A_20151002.doc" dated 19 Oct. 2015) certified by the ET Leader and provided to us via e-mail on 19 Oct. 2015.

We are pleased to inform you that we have no adverse comments on the captioned quarterly EM&A report.

Thank you for your attention. Please do not hesitate to contact the undersigned or the ENPO Leader Mr. Y. H. Hui should you have any queries.

Yours sincerely,



F. C. Tsang
Independent Environmental Checker
Tuen Mun – Chek Lap Kok Link

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
HyD – Mr. Matthew Fung (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Mr. Jovy Tam (By Fax: 2723 5660)
Gammon – Mr. Roy Leung (By Fax: 3520 0486)

Internal: DY, YH, LP, CL, ENPO Site

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\HYDHZMBEEM00_0_3497L.15.docx

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EXECUTIVE SUMMARY

Under *Contract No. HY/2012/07*, Gammon Construction Limited (GCL) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Southern Connection Viaduct Section of the Tuen Mun – Chek Lap Kok Link Project (TM-CLK Link Project) while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET). ENVIRON Hong Kong Ltd. was employed by the HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) in accordance with *Environmental Permit No. EP-354/2009/A*. Further applications for variation of environmental permit (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

The construction phase of the Contract commenced on 31 October 2013 and will be tentatively completed by 2018. The impact monitoring of the EM&A programme, including air quality, noise, water quality and marine ecological monitoring as well as environmental site inspections, commenced on 31 October 2013.

This is the sixth quarterly EM&A report presenting the EM&A works carried out during the period from 1 March to 31 May 2015 for the Southern Connection Viaduct Section in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, major activities in the reporting period included:

March 2015

Marine Works

- Construction of Pile caps at Viaducts B, C, D & E;
- Marine piling platform installation & uninstallation;
- Marine Piling at Viaducts C & E; and
- Additional marine ground investigation (GI) and laboratory testing.

Land-based Works

- Construction of pile cap superstructure of Viaduct B;
- Channel re-construction at Area 1;
- Land Piling at Viaducts B, C & D;
- Pre-drilling works at Viaduct A;
- Construction of pile cap at Viaducts B, C, D & E;
- Additional land GI, trial pits & lab testing;
- Utility surveys; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

April 2015

Marine Works

- Construction and installation of pile caps;
- Marine piling platform installation & uninstallation;
- Pier construction;
- Installation of launching gantry;
- Marine piling; and,
- Installation of pier head segment.

Land-based Works

- Construction and installation of pile caps;
- Pier construction;
- Drainage works;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Tree survey, felling and transplanting;
- Utility surveys; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

May 2015

Marine Works

- Construction and installation of pile caps;
- Marine piling platform installation & uninstallation;
- Pier construction;
- Installation of launching gantry;
- Marine piling and
- Installation of pier head segment.

Land-based Works

- Construction and installation of pile caps;
- Pier construction;
- Drainage works;
- Re-alignment of Cheung Tung Road;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Tree survey, felling and transplanting;
- Relocation of MTRC fence; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

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

24-hour TSP monitoring

17 sessions

1-hour TSP monitoring	17 sessions
Noise monitoring	17 sessions
Water quality monitoring	39 sessions
Dolphin monitoring	6 sessions
Joint Environmental site inspection	13 sessions

Breaches of Action and Limit Levels for Air Quality

No exceedance of Action and Limit Levels was recorded for air quality monitoring in the reporting period.

Breaches of Action and Limit Levels for Noise

No exceedance of Action and Limit Levels was recorded for construction noise monitoring in the reporting period.

Breaches of Action and Limit Levels for Water Quality

One (1) exceedance of Action Level for depth-averaged SS during mid-ebb tide was recorded for water quality monitoring in the reporting period.

Impact Dolphin Monitoring

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March and May 2015, no unacceptable impact from the construction activities of the TM-CLKL Southern Connection Viaduct Section on Chinese White Dolphins was noticeable from general observations during the dolphin monitoring in this reporting quarter. The exceedance is considered unlikely due to the works of this Project upon further investigation.

Daily marine mammal exclusion zone monitoring was undertaken during the period of marine works under this Contract. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when marine works were carried out outside the daylight hours under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded in the monitoring period during the exclusion zone monitoring.

Environmental Complaints, Non-compliance & Summons

No environmental complaint, notification of summons and successful prosecution was received in the reporting period.

Reporting Change

The landscape and visual impact mitigation measures was reported in a separated checklist instead of reported in the weekly checklist with other mitigation measures, and the status of landscape and visual impact mitigation measures are summarized in the EMIS of the EM&A Reports. A complete

proposal for Landscape and Visual (L&V) mitigation measures monitoring was submitted which was justified by the Environmental Team Leader (ETL) and the Independent Environmental Checker (IEC) had no adverse comment.

Upcoming Works for the Next Reporting Period

Works to be undertaken in the coming quarter include the following:

June 2015

Marine Works

- Construction and installation of pile caps;
- Uninstallation of marine piling platform;
- Pile cap installation;
- Pier construction;
- Launching gantry assembly;
- Marine piling and
- Installation of pier head segment

Land-based Works

- Construction and installation of pile caps;
- Pier construction;
- Pile cap installation;
- Re-alignment of Cheung Tung Road;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Relocation of MTRC fence; and
- Slope work of Slopes 9SE-B/C9 and 9SE-B/F85

July 2015

Marine Works

- Construction and installation of pile caps;
- Uninstallation of marine piling platform;
- Pile cap installation;
- Pier construction;
- Launching gantry assembly;
- Marine piling; and,
- Installation of pier head segment

Land-based Works

- Predrilling at Viaduct F;
- Construction and installation of pile caps;
- Pier construction;
- Pile cap installation;
- Re-alignment of Cheung Tung Road;

- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Relocation of MTRC fence; and,
- Slope work of Viaducts A & B

August 2015

Marine Works

- Construction and installation of pile caps;
- Uninstallation of marine piling platform;
- Pile cap installation;
- Pier construction;
- Launching gantry assembly;
- Marine piling and
- Installation of pier head segment

Land-based Works

- Predrilling at Viaduct F;
- Construction and installation of pile caps;
- Pier construction;
- Pile cap installation;
- Re-alignment of Cheung Tung Road;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Relocation of MTRC fence; and
- Slope work of Viaducts A & B.

Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are mainly associated with air quality, noise, marine water quality, marine ecology and waste management issue.

1.1 BACKGROUND

According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated increase in cross boundary traffic, developments in the Northwest New Territories (NWNT), and possible developments in North Lantau, including the Airport developments, the Lantau Logistics Park (LLP) and the Hong Kong – Zhuhai – Macao Bridge (HZMB). In order to cope with the anticipated traffic demand, two new road sections between NWNT and North Lantau – Tuen Mun – Chek Lap Kok Link (TM-CLKL) and Tuen Mun Western Bypass (TMWB) are proposed.

An Environmental Impact Assessment (EIA) of TM-CLKL (the Project) was prepared in accordance with the EIA Study Brief (No. *ESB-175/2007*) and the *Technical Memorandum of the Environmental Impact Assessment Process (EIAO-TM)*. The EIA Report was submitted under the Environmental Impact Assessment Ordinance (EIAO) in August 2009. Subsequent to the approval of the EIA Report (EIAO Register Number: *AEIAR-146/2009*), an Environmental Permit (*EP-354/2009*) for TM-CLKL was granted by the Director of Environmental Protection (DEP) on 4 November 2009, and EP variation (*EP-354/2009A*) was issued on 8 December 2010. Further applications for variation of environmental permit (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

Under *Contract No. HY/2012/07*, Gammon Construction Limited (GCL) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Southern Connection Viaduct Section of TM-CLKL (“the Contract”) while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET). ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) in accordance with *Environmental Permit No. EP-354/2009/A*.

The construction phase of the Contract commenced on 31 October 2013 and will be tentatively be completed by 2018. The impact monitoring phase of the EM&A programme, including air quality, noise, water quality and marine ecological monitoring as well environmental site inspections, commenced on 31 October 2013.

The general layout plan of the Contract components is presented in *Figures 1.1 & 1.2a to l*.

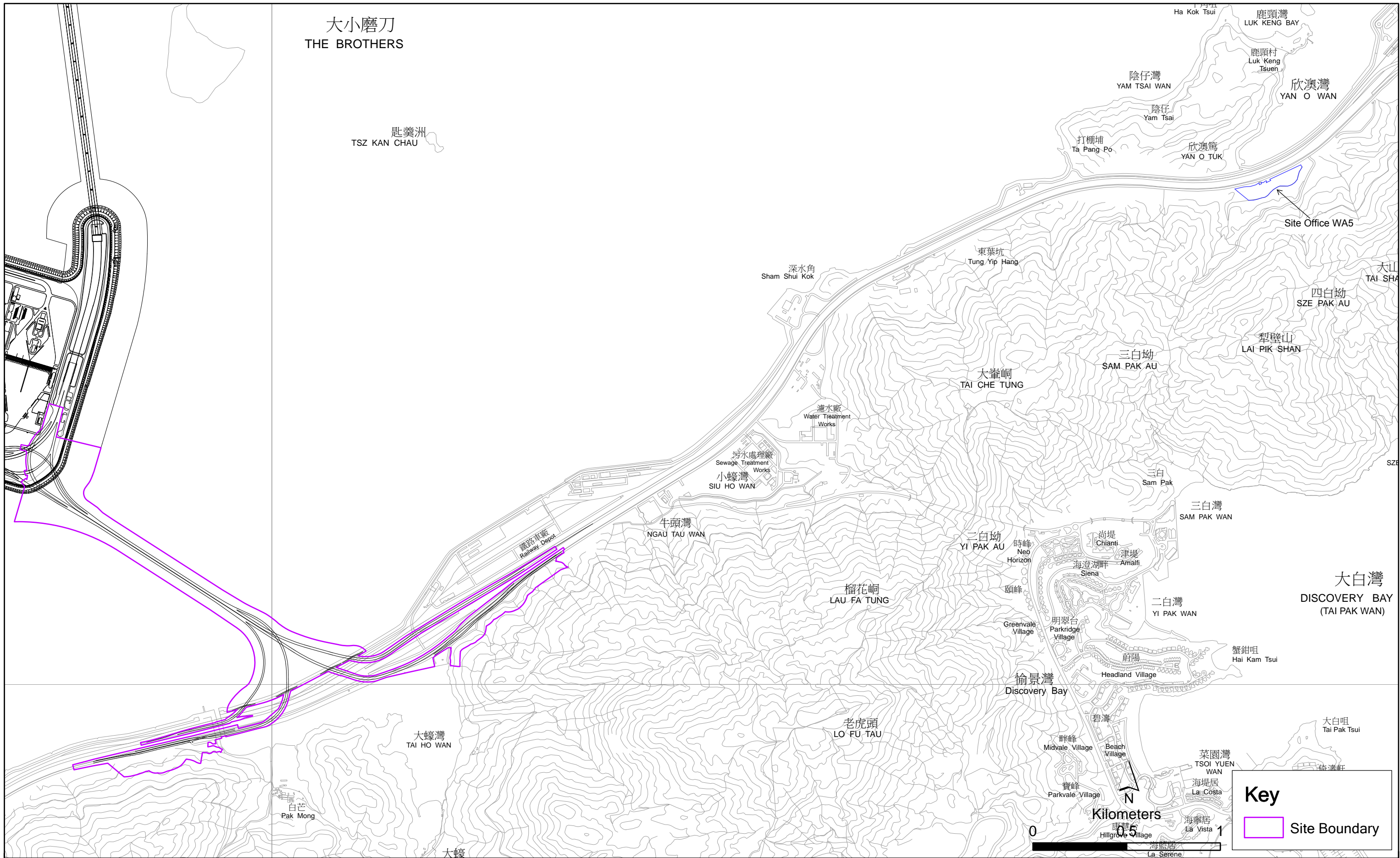
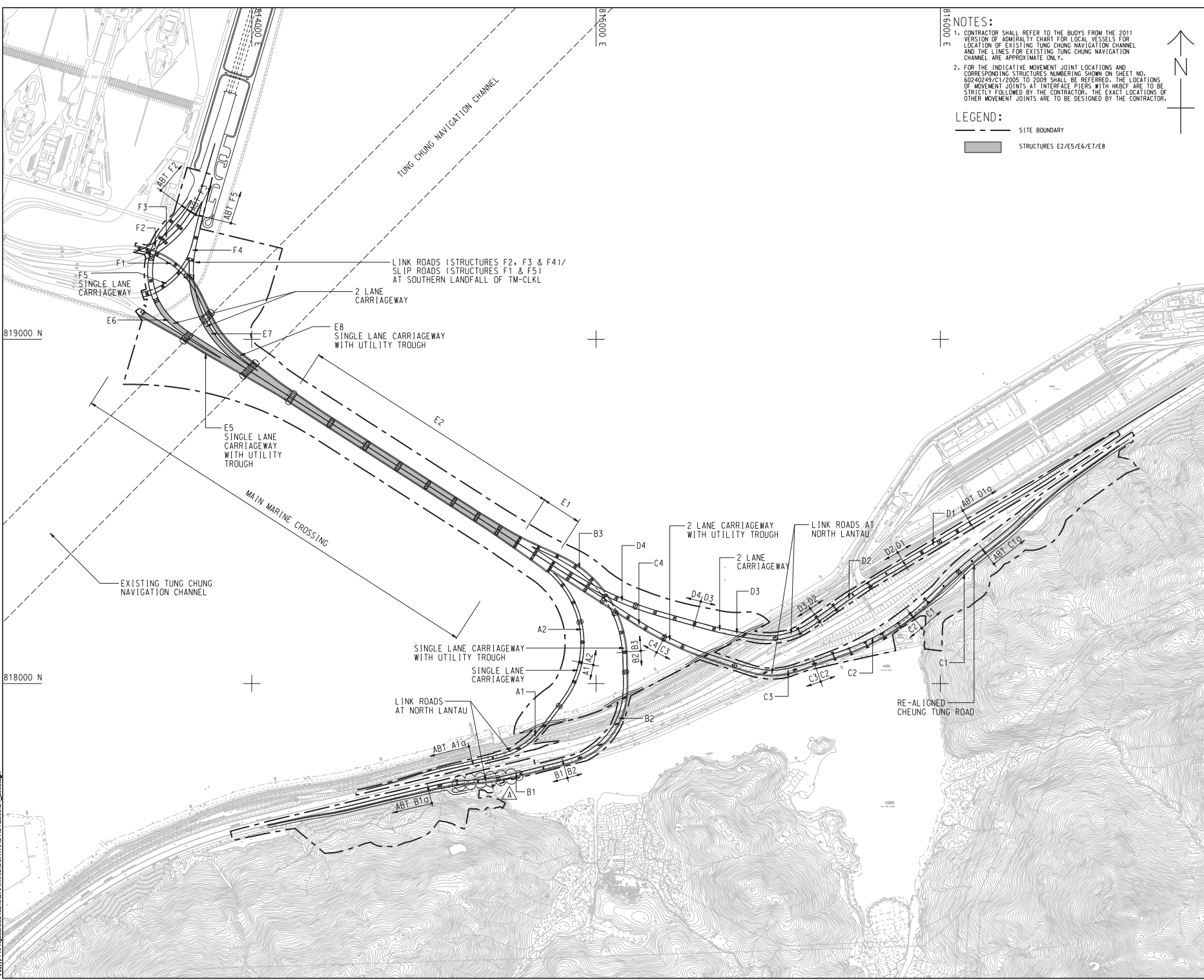


Figure 1.1

General Layout Plan of the Project

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 Path: P:\Projects\2012\02\240249\C1\2000.dgn
 Project Management: Hinkley
 Designer: LHM/BB
 Checker: SLYT
 Approver: CWN
 ISO AT 50mm x 61mm
 Only



NOTES:

- CONTRACTOR SHALL REFER TO THE BUOYS FROM THE 2011 VERSION OF ADMIRALTY CHART FOR LOCAL VESSELS FOR LOCATION OF EXISTING TUNG CHUNG NAVIGATION CHANNEL AND THE LINES FOR EXISTING TUNG CHUNG NAVIGATION CHANNEL ARE APPROXIMATE ONLY.
- FOR THE INDICATIVE MOVEMENT JOINT LOCATIONS AND CORRESPONDING STRUCTURES NUMBERING SHOWN ON SHEET NO. 60240249/C1/2005 TO 2009 SHALL BE REFERRED. THE LOCATIONS OF MOVEMENT JOINTS AT INTERFACE PIERS WITH HKBCF ARE TO BE STRICTLY FOLLOWED BY THE CONTRACTOR. THE EXACT LOCATIONS OF OTHER MOVEMENT JOINTS ARE TO BE DESIGNED BY THE CONTRACTOR.

LEGEND:

— SITE BOUNDARY

▬ STRUCTURES E2/E5/E6/E7/E8



AECOM

PROJECT
TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
TUEN MUN - CHEK LAP KOK LINK - SOUTHERN CONNECTION VIADUCT SECTION

CLIENT
路政署
HIGHWAYS DEPARTMENT
香港路政署工程管理部
Hong Kong - Zhuhai - Hainan Bridge
Hong Kong Project Management Office

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2a

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.

STATUS

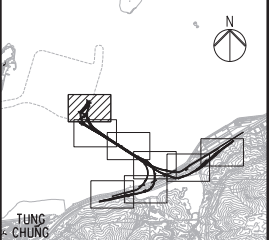
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KEY PLAN

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SHEET TITLE SOUTHERN CONNECTION GENERAL LAYOUT PLAN	
SHEET NUMBER 60240249/C1/2000A	

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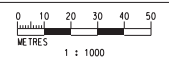


KEY PLAN

NOTES
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- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I.-STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I.-STATIONS :
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING

MATCH LINE
 FOR CONTINUATION
 SEE DRG J3518/P/OAP/04/01101



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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

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Client: **路政署 HIGHWAYS DEPARTMENT**
 路政署 香港特別行政區運輸局
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

Supervising Officer: **AECOM**
 Contractor: **Gammon**

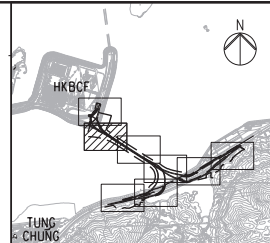
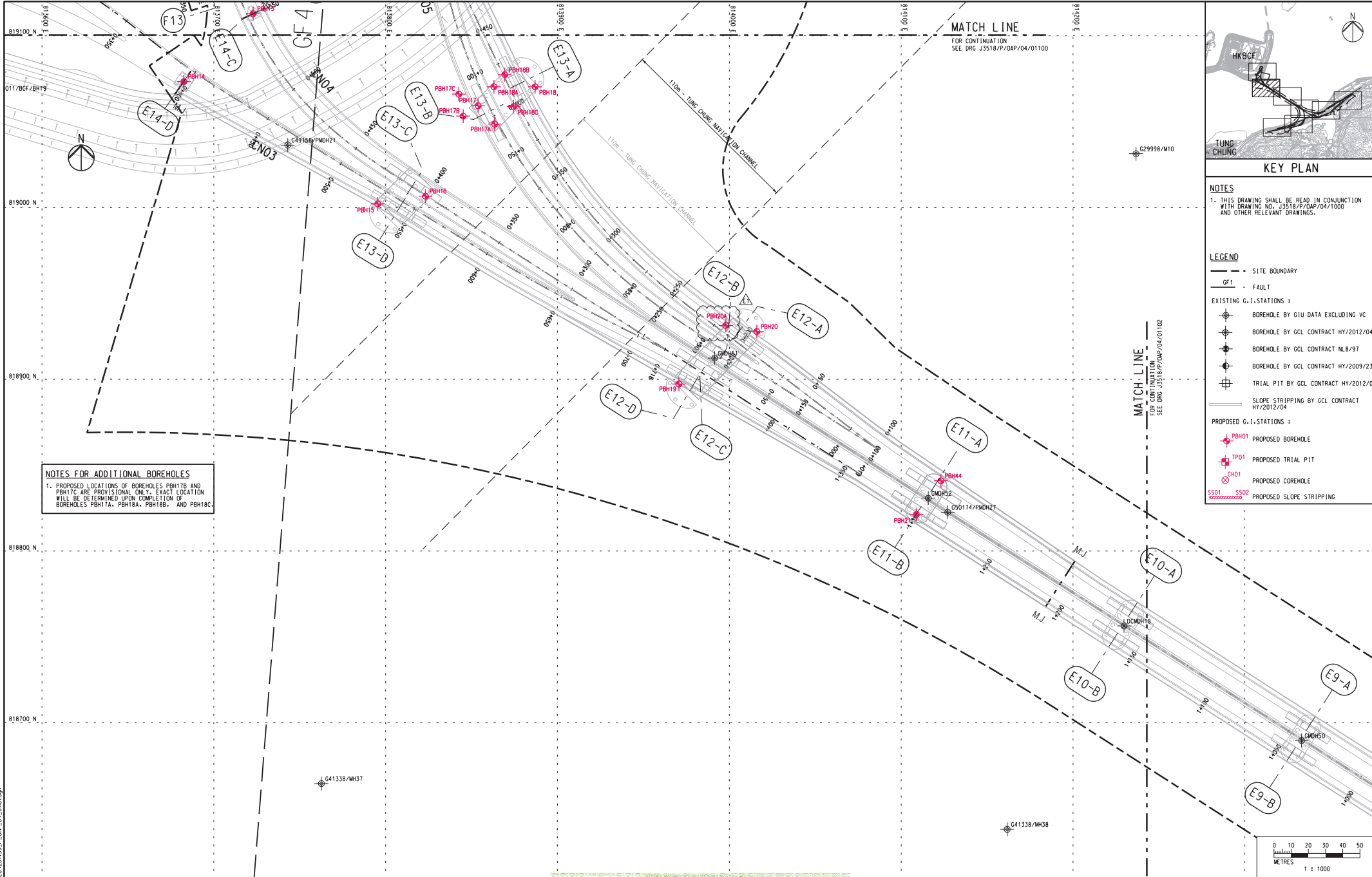
Project Title
Contract No. HY/2012/07
Tuen Mun - Chek Lap Kok Link
Southern Connection Viaduct Section

Originator: **ARUP**

Drawing title
Figure 1.2b

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- LEGEND**
- - - SITE BOUNDARY
 - GF1 - FAULT
 - EXISTING G.I. STATIONS:
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 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - ▬ SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS:
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING

NOTES FOR ADDITIONAL BOREHOLES
 1. PROPOSED LOCATIONS OF BOREHOLES PBH17B AND PBH17C ARE PROVISIONAL ONLY. EXACT LOCATION WILL BE DETERMINED UPON COMPLETION OF BOREHOLES PBH17A, PBH18A, PBH18B, AND PBH18C.

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Rev	Description	By	Date	Rev	Description	By	Date
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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				
D	SUBMISSION	RC	10/13				
E1	FOR INTERNAL REVIEW	RC	11/13				

Drawn	Date	Client
RL	07/13	HIGHWAYS DEPARTMENT

Checked	Approved	Scale
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Client: **HIGHWAYS DEPARTMENT**
 香港路政處
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

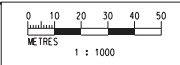
Supervising Officer: **AECOM**
 Contractor: **Gammon**

Project Title:
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

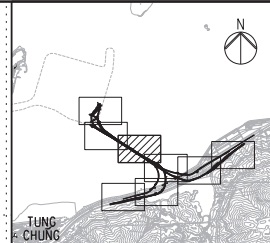
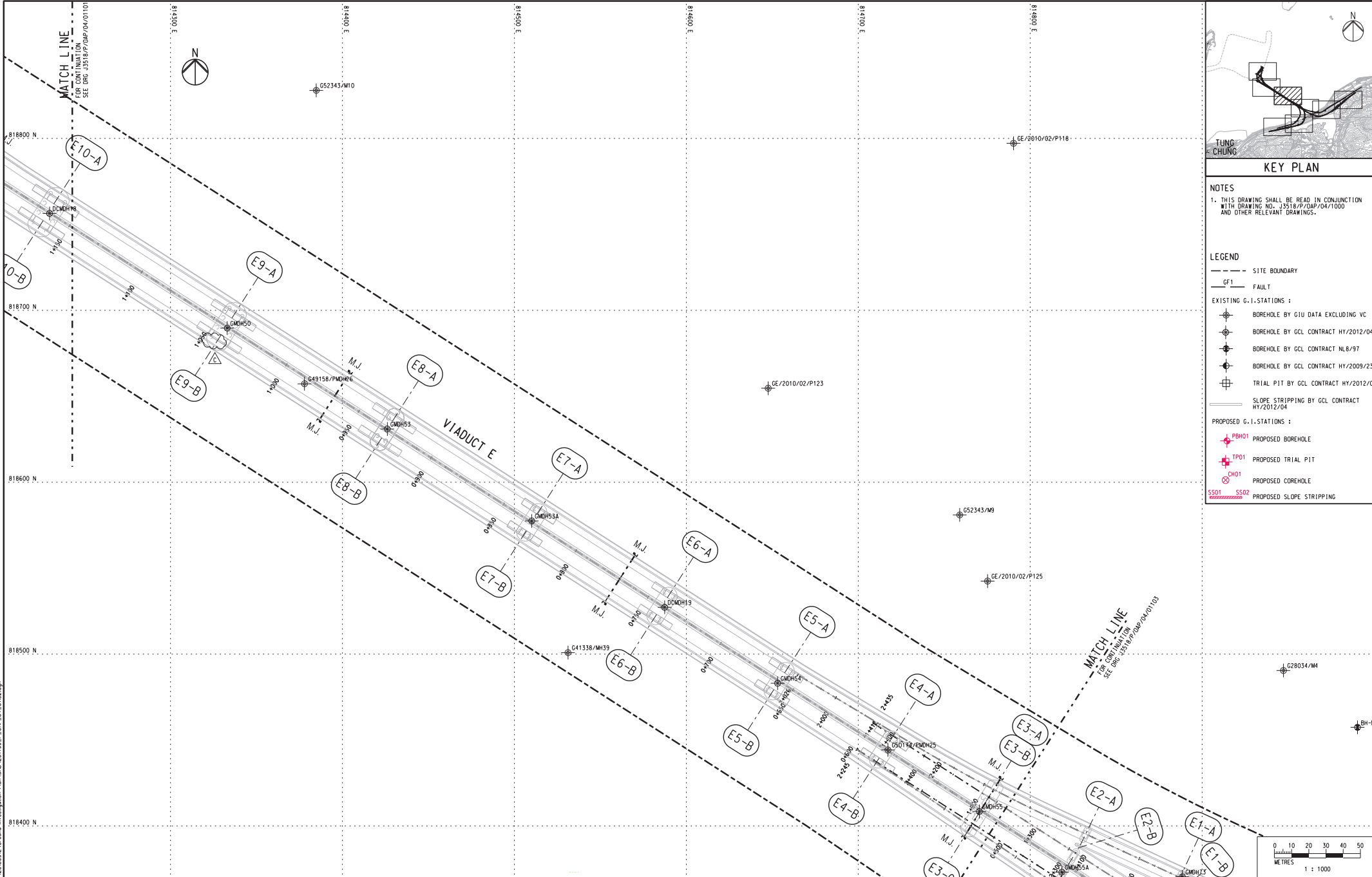
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Figure 1.2c

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- SITE BOUNDARY
 - GF1- FAULT

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 - ⊕ BOREHOLE BY GCL CONTRACT NL8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - SLOPE STRIPPING BY GCL CONTRACT HY/2012/04

PROPOSED G.I.-STATIONS :

 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING

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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

Checked	Approved
DS	DOP

Scale
1:1000 @ A1 / 1:2000 @ A3

Client

Supervising Officer

Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

Contractor

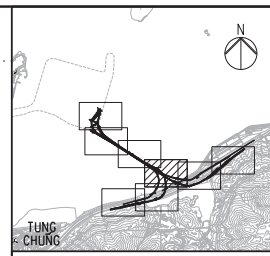
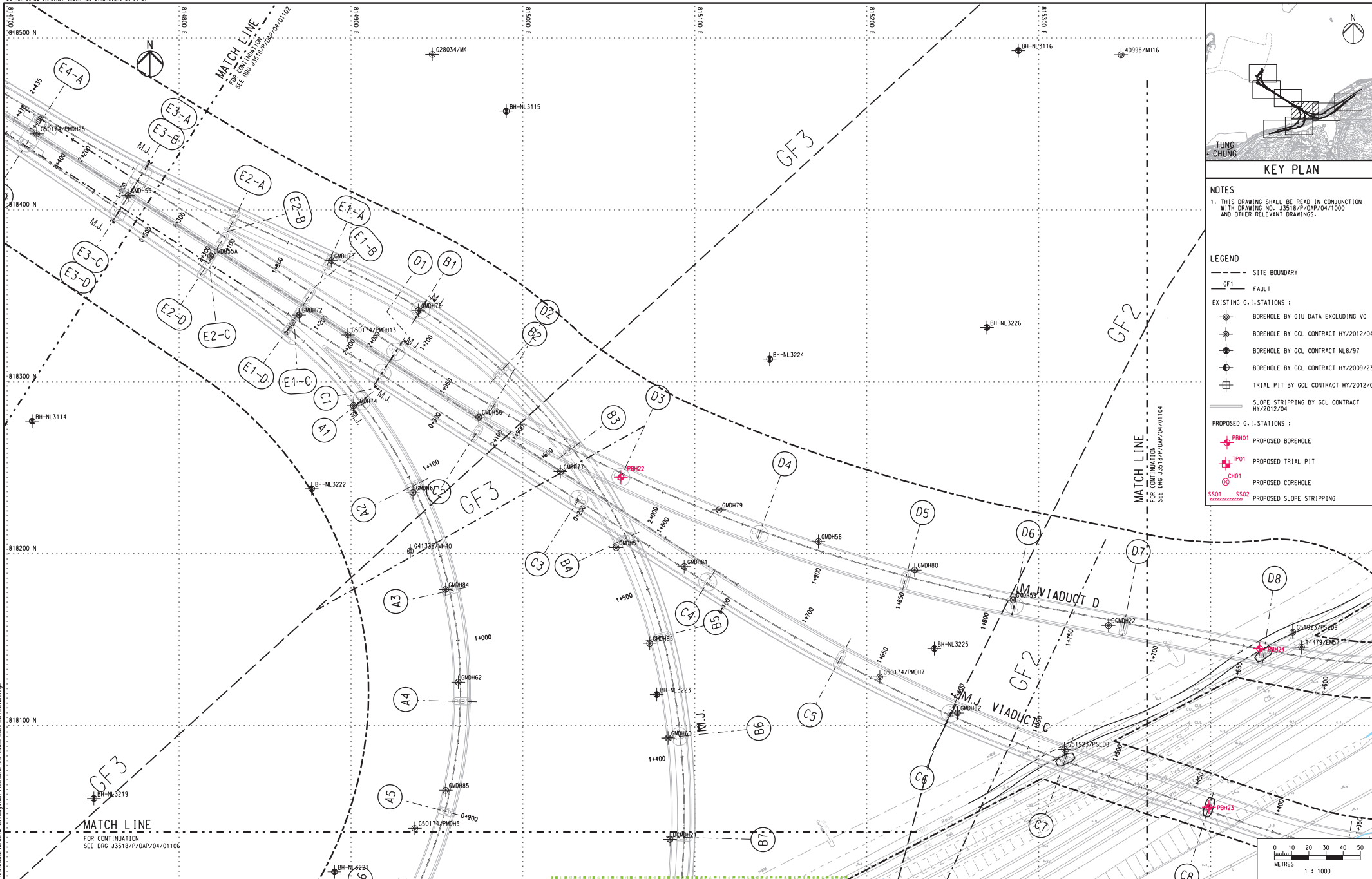
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Drawing title

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KEY PLAN

NOTES
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- LEGEND**
- SITE BOUNDARY
 - - - FAULT
 - EXISTING G.I. STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS :
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING



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C	SUBMISSION	RC	09/13				

Checked	Approved
DS	DOP

Scale
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Client

Supervising Officer

Project Title

Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

Contractor

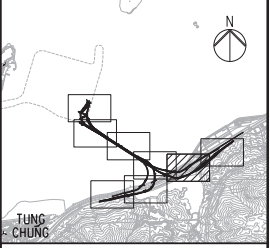
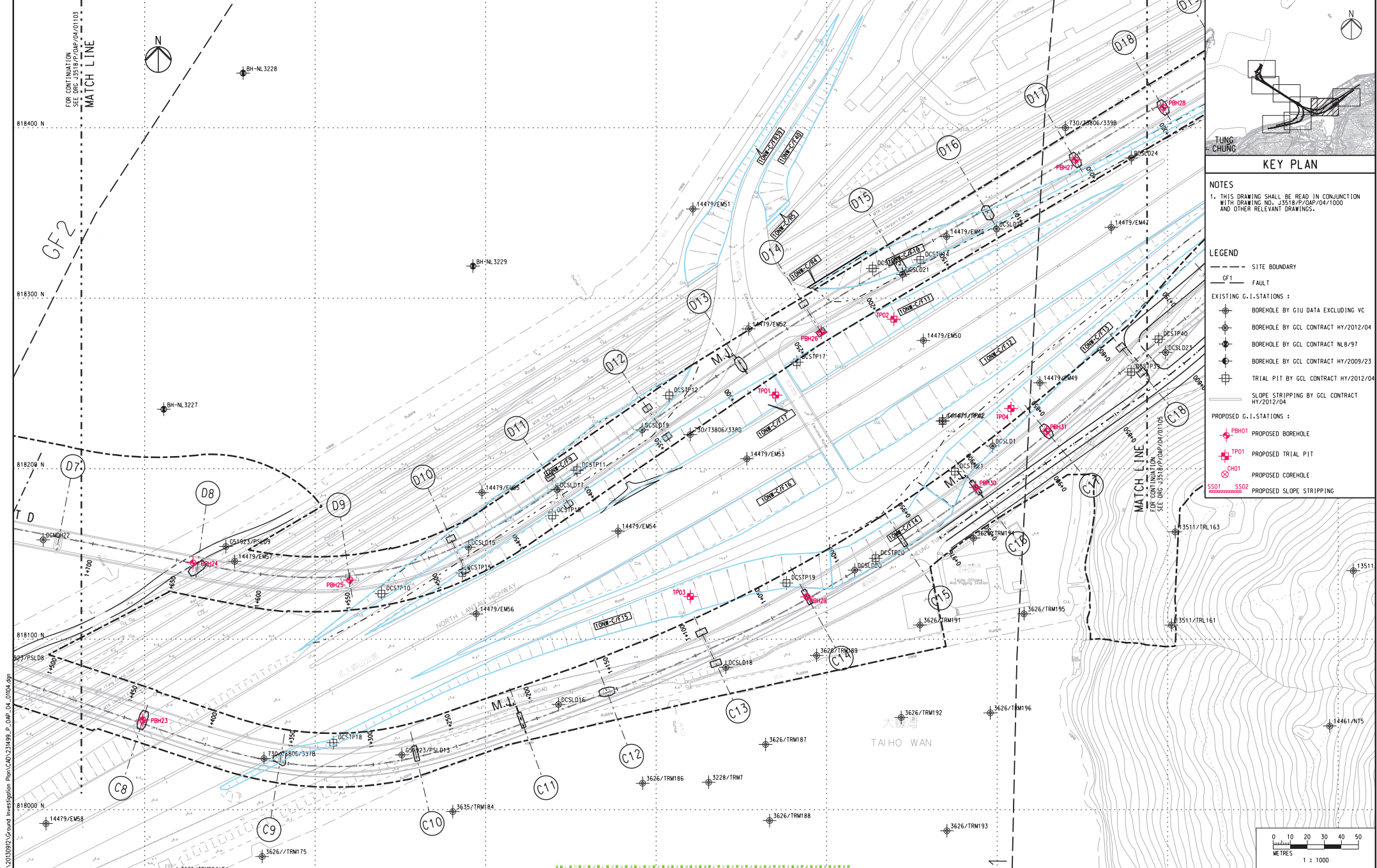
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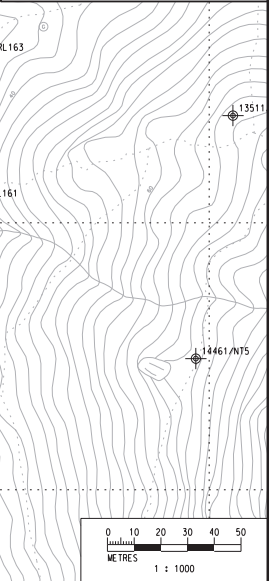
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KEY PLAN

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- LEGEND**
- - - SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I. STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL6/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS :
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING



Rev	Description	By	Date	Rev	Description	By	Date
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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

Checked	Approved
DS	DOP

Scale
1:1000 @ A1 / 1:2000 @ A3

Client
 路政署
 HIGWAYS DEPARTMENT
 港珠澳大橋香港工程總處
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

Supervising Officer
AECOM

Project Title
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

Contractor
Gammon

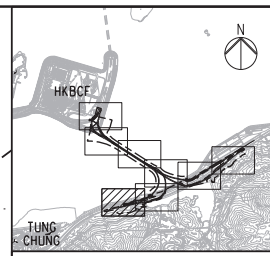
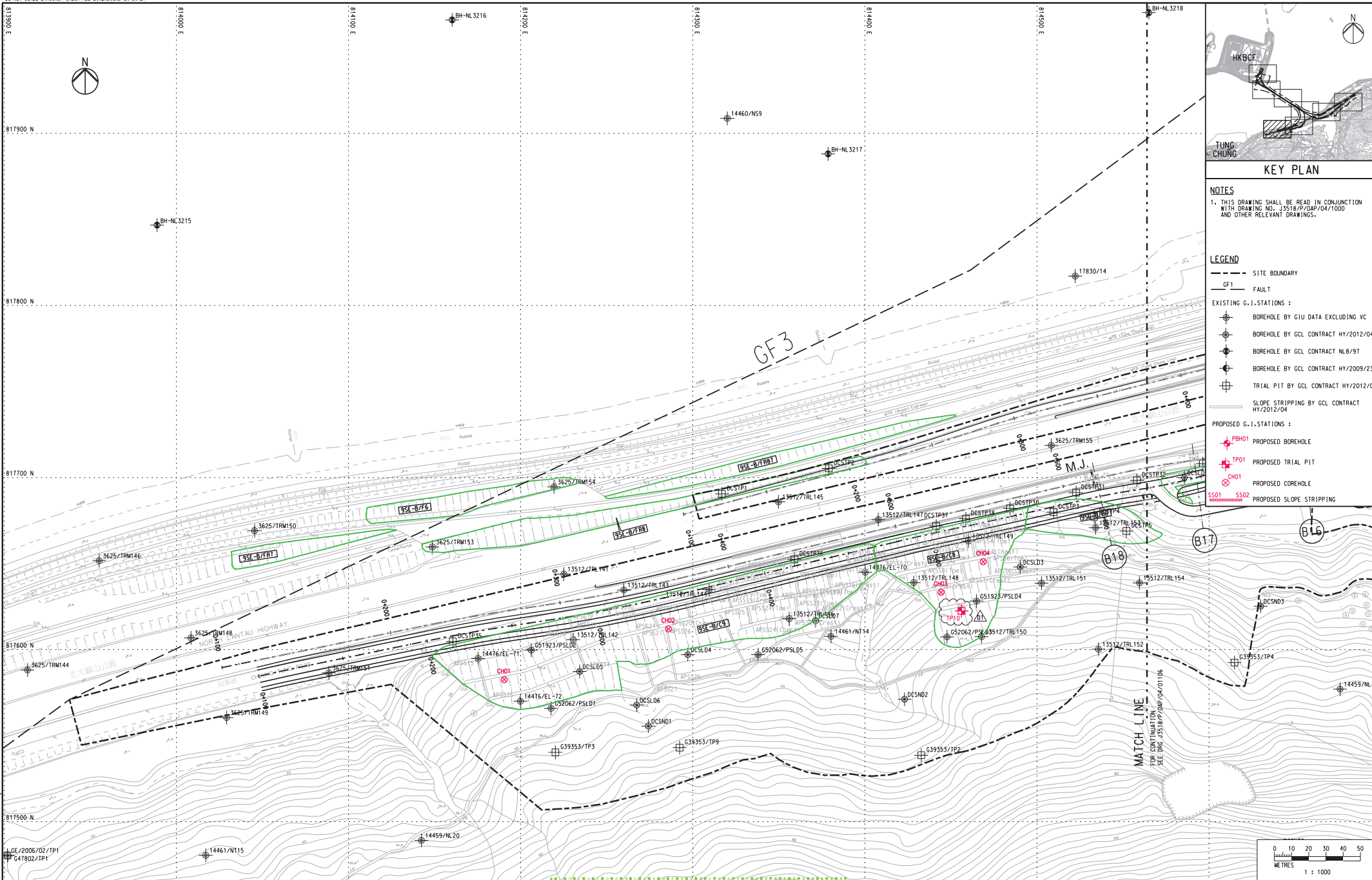
Originator
ARUP

Drawing title
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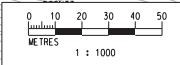
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- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I. STATIONS:
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL6/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS:
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING



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DATE: 2006/02/17
 BY: GAT802/TP1

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D1	FOR INTERNAL REVIEW	RC	11/13				

Drawn	Date	Client
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Checked	Approved	
DS	DOP	

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Client

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 HIGHWAYS DEPARTMENT
 港珠澳大桥香港工程管理局
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

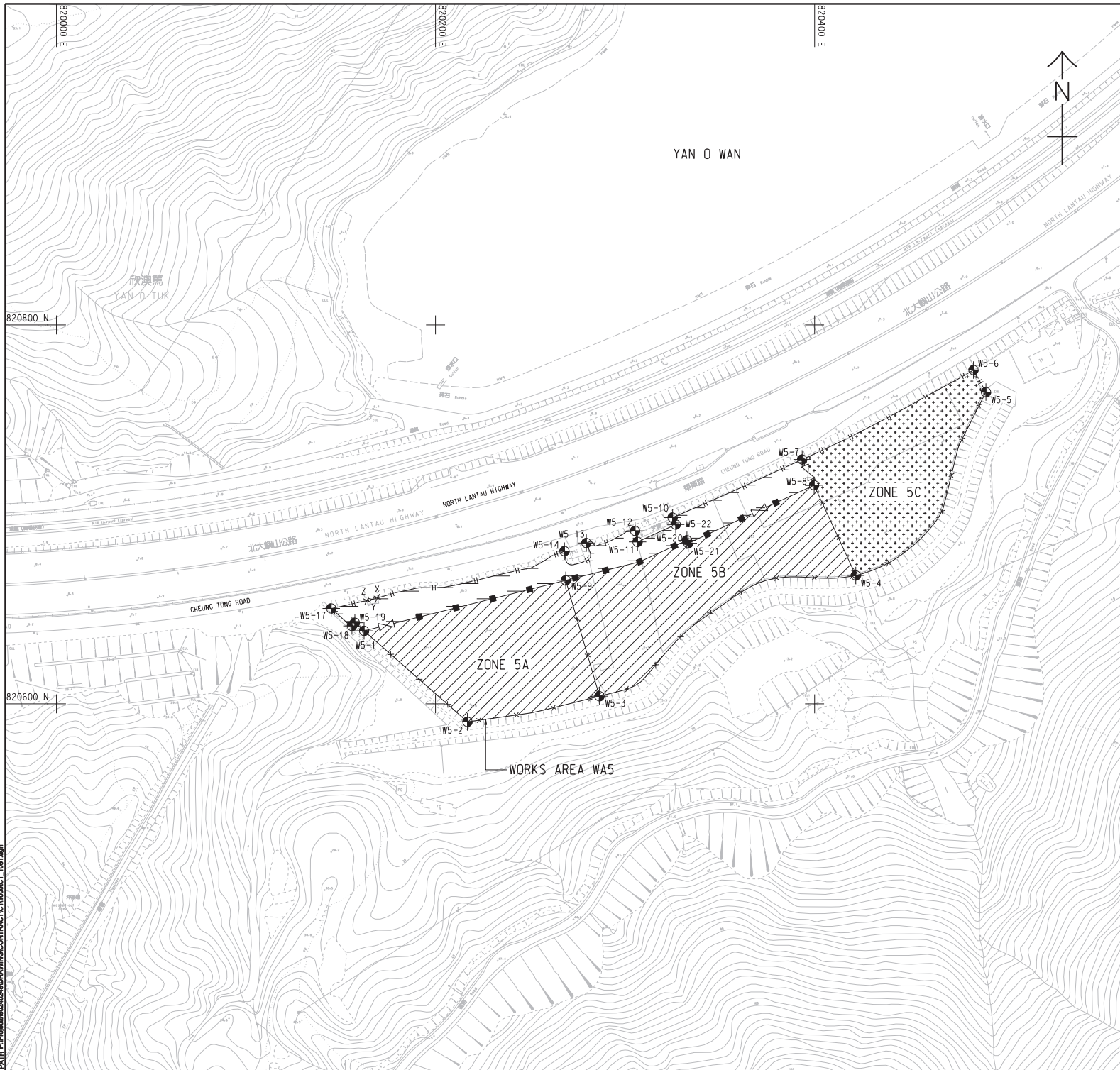
Project Title
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

Drawing title
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
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Contractor







Originator



NOTES:

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/1000.
- THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. T15 619. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
- DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6110 AND H6111 FOR DETAILS OF HOARDING.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
- CHAIN LINK FENCE SHALL BE ERECTED ALONG THE WORKS AREA BOUNDARY. THE ALIGNMENT AND EXTENT OF CHAIN LINK FENCE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
- THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
- NO STRUCTURES SHALL BE ERECTED OTHER THAN SUCH STRUCTURES NOT EXCEEDING TWO STOREYS IN HEIGHT, WHICH ARE APPROVED BY THE DISTRICT LANDS OFFICER AS BEING APPROPRIATE FOR THE USE OF THE SITE AS A WORKS AREA.
- THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
- THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARE-USED AMONG THE CONTRACTS OF TM-CLK RELATED CONTRACTS. THE AREAS HATCHED WITH  ARE TENTATIVELY ALLOCATED FOR THE USE OF THIS CONTRACT.
- THE COMMON AREA SHALL BE CONCRETE PAVED BY THE CONTRACTOR.

LEGEND:

-  WORKS AREA UNDER THIS CONTRACT
-  COMMON AREA (MAINTAINED UNDER THIS CONTRACT) TO BE SHARE-USED WITH OTHER CONTRACTS
-  WORKS AREA FOR THIS CONTRACT TO BE EARLY HANDED OVER BY THE CONTRACTOR.
-  HOARDING AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)
-  CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED BY OTHERS)
-  CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)

SETTING OUT COORDINATES OF WORKS AREA W5

POINT	COORDINATES	
	EASTING	NORTHING
W5-1	820162.308	820638.492
W5-2	820216.839	820590.455
W5-3	820286.496	820603.985
W5-4	820421.757	820667.742
W5-5	820490.425	820764.554
W5-6	820483.839	820776.180
W5-7	820393.451	820728.958
W5-8	820399.746	820715.343
W5-9	820268.674	820665.173
W5-10	820325.075	820698.276
W5-11	820306.587	820685.458
W5-12	820305.269	820691.287
W5-13	820279.580	820684.863
W5-14	820268.027	820680.572
X	820169.407	820655.859
Y	820166.601	820655.172
Z	820163.794	820654.484
W5-17	820144.957	820650.334
W5-18	820155.899	820641.093
W5-19	820157.432	820642.788
W5-20	820332.642	820686.314
W5-21	820333.350	820684.738
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ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.
1	OCT. 12	TENDER DRAWING	CWN

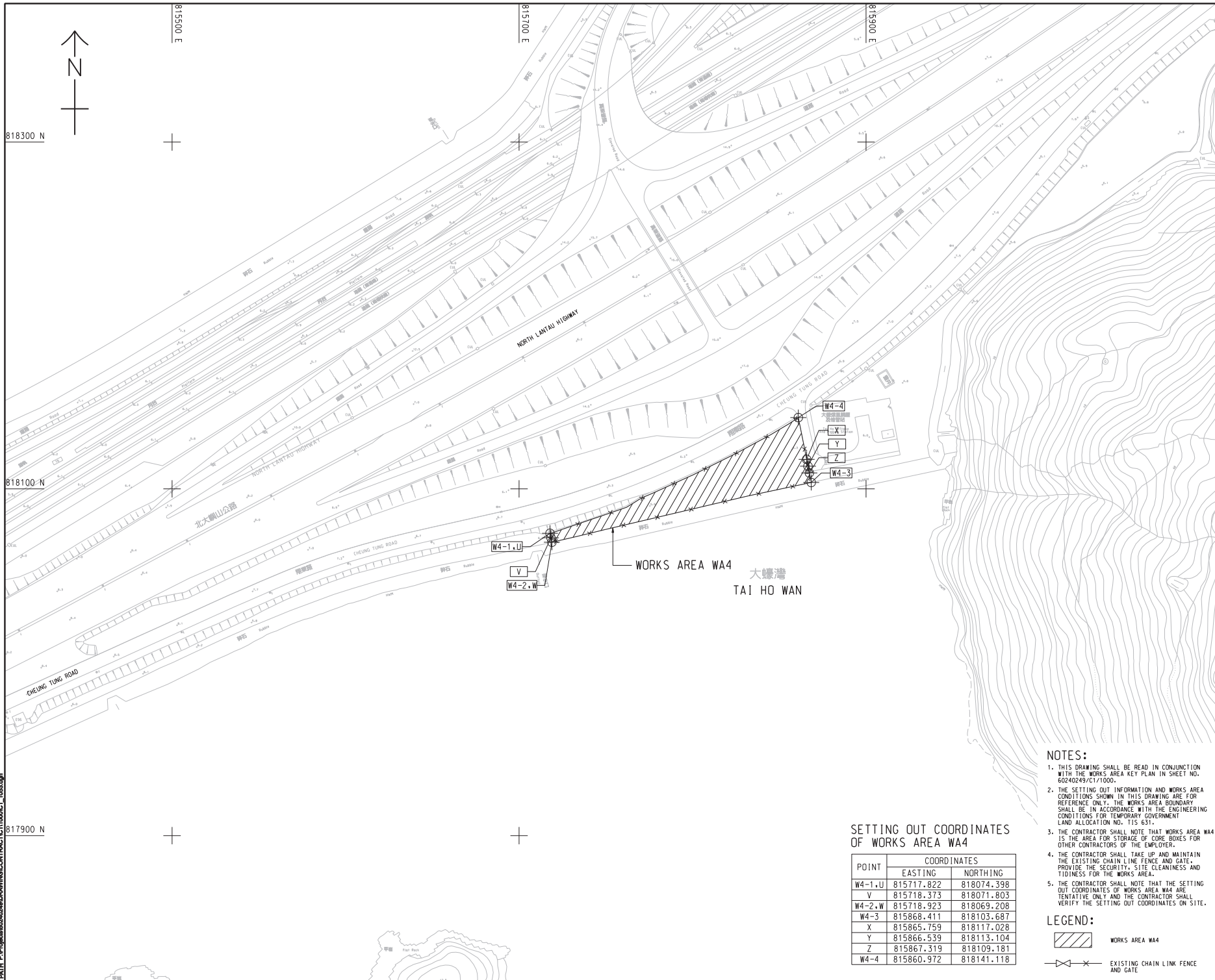
STATUS

SCALE	DIMENSION UNIT
A1:1000	METRES

KEY PLAN

Figure 1.2h

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WORKS AREA WA4
 大螺灣
 TAI HO WAN

SETTING OUT COORDINATES OF WORKS AREA WA4

POINT	COORDINATES	
	EASTING	NORTHING
W4-1,U	815717.822	818074.398
V	815718.373	818071.803
W4-2,W	815718.923	818069.208
W4-3	815868.411	818103.687
X	815865.759	818117.028
Y	815866.539	818113.104
Z	815867.319	818109.181
W4-4	815860.972	818141.118

- NOTES:**
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/100.
 - THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. T15 631.
 - THE CONTRACTOR SHALL NOTE THAT WORKS AREA WA4 IS THE AREA FOR STORAGE OF CORE BOXES FOR OTHER CONTRACTORS OF THE EMPLOYER.
 - THE CONTRACTOR SHALL TAKE UP AND MAINTAIN THE EXISTING CHAIN LINK FENCE AND GATE. PROVIDE THE SECURITY, SITE CLEANLINESS AND TIDINESS FOR THE WORKS AREA.
 - THE CONTRACTOR SHALL NOTE THAT THE SETTING OUT COORDINATES OF WORKS AREA WA4 ARE TENTATIVE ONLY AND THE CONTRACTOR SHALL VERIFY THE SETTING OUT COORDINATES ON SITE.

LEGEND:

WORKS AREA WA4

EXISTING CHAIN LINK FENCE AND GATE

AECOM

PROJECT
 TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
 TUEN MUN - CHEK LAP KOK LINK - SOUTHERN CONNECTION VIADUCT SECTION

CLIENT
 路政署 DEPARTMENT OF HIGHWAYS
 港務局 港務工程管理局
 Hong Kong + Zhuhai + Hainan Bridge
 Hong Kong Project Management Office

CONSULTANT
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS
 2/11/2012/16

Figure 1.2j

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.
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 METRES

KEY PLAN

PROJECT NO.
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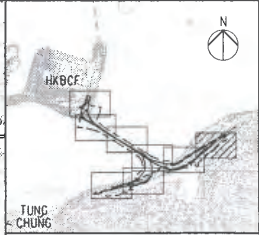
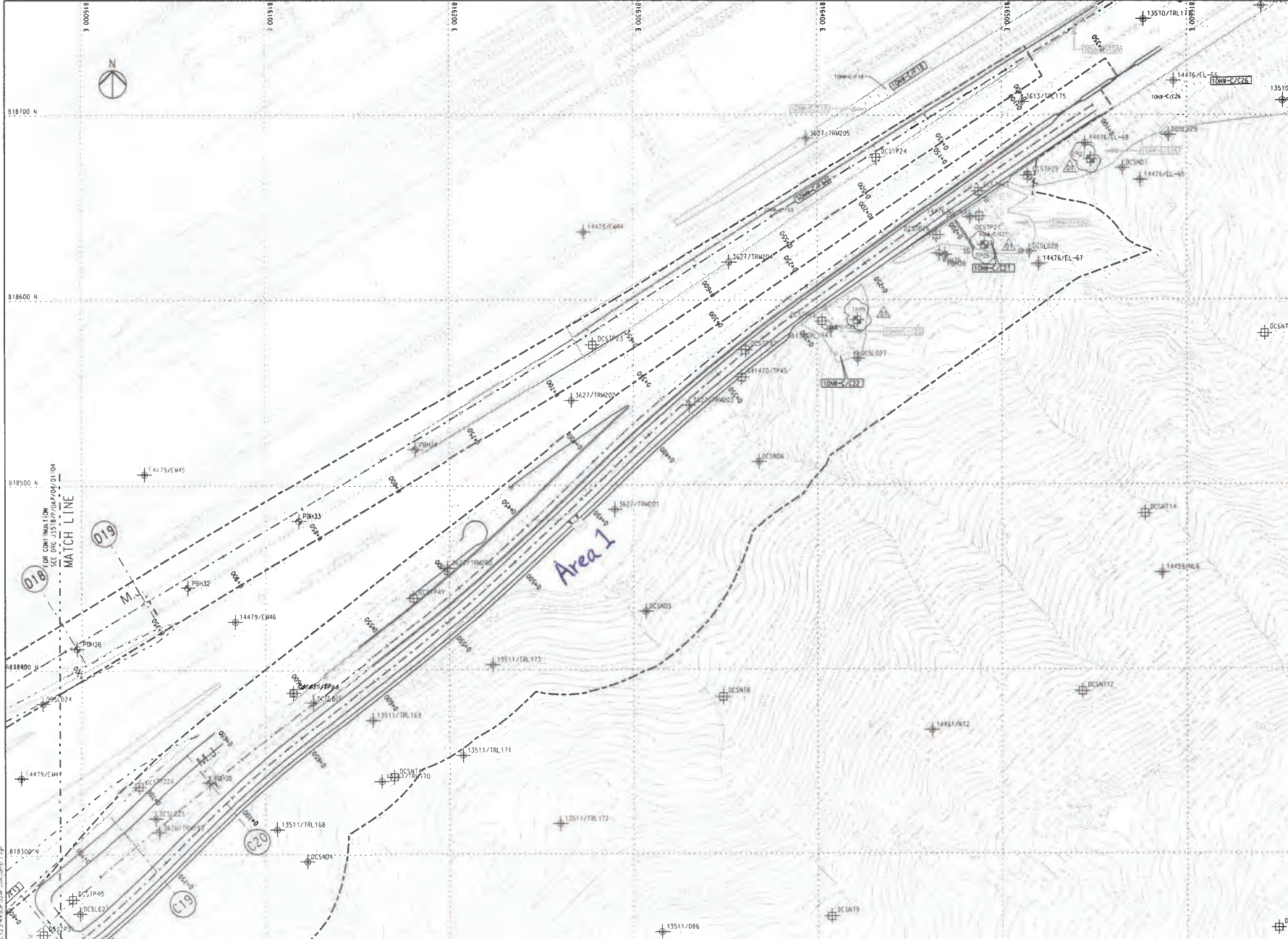
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SHEET NUMBER
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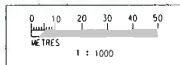
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- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
- EXISTING G.I. STATIONS :
- ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT N6.8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - ⊕ SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
- PROPOSED G.I. STATIONS :
- ⊕ BOREHOLE
 - ⊕ TRIAL PIT
 - ⊕ COREHOLE
 - ⊕ SLOPE STRIPPING



Rev	Description	By	Date	Rev	Description	By	Date
01	ISSUED FOR CONSTRUCTION	RL	31/7/13				
02	ISSUED FOR CONSTRUCTION	RL	27/7/13				
03	ISSUED FOR CONSTRUCTION	RL	29/7/13				
04	ISSUED FOR CONSTRUCTION	RL	19/7/12				

Drawn	Date	Client
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Checked <td>Approved <td>港珠澳大桥香港工程指挥部 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office</td> </td>	Approved <td>港珠澳大桥香港工程指挥部 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office</td>	港珠澳大桥香港工程指挥部 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office
DS	DOP	Supervising Officer

Client: 路政署 HIGHWAYS DEPARTMENT
 港珠澳大桥香港工程指挥部
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

Project Title: Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section

Contract No. HY/2012/07

Scale: 1:1000 @ A1 / 1:2000 @ A3

Supervising Officer: **AZCOM**

Contractor: **Gammon**

Originator: **ARUP**

Drawing title: **Figure 1.2k**

Drawing no. J3518/P/OAP/04/01105 Rev. D1

1.2 SCOPE OF REPORT

This is the Sixth Quarterly EM&A Report under the *Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section*. This report presents a summary of the environmental monitoring and audit works from 1 March to 31 May 2015.

1.3 ORGANIZATION STRUCTURE

The organization structure of the Contract is shown in *Appendix A*. The key personnel contact names and contact details are summarized in *Table 1.1* below.

Table 1.1 *Contact Information of Key Personnel*

Party	Position	Name	Telephone	Fax
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Daniel Ip	3553 3800	2492 2057
	Resident Engineer	Kingman Chan	3691 2950	3691 2899
ENPO / IEC (Ramboll Environ Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3547 2133	3465 2899
	IEC	Dr. F.C. Tsang	3547 2134	3465 2899
Contractor (Gammon Construction Limited)	Environmental Manager	Brian Kam	3520 0387	3520 0486
	Environmental Officer	Roy Leung	3520 0387	3520 0486
	24-hour Complaint Hotline		9738 4332	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

The construction phase of the Contract commenced on 31 October 2013. The rolling construction programme for the period of March to May 2015 is shown in *Appendix B*.

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

March 2015

Marine Works

- Construction of Pile caps at Viaducts B, C, D & E;
- Marine piling platform installation & uninstallation;
- Marine Piling at Viaducts C & E; and
- Additional marine ground investigation (GI) and laboratory testing.

Land-based Works

- Construction of pile cap superstructure of Viaduct B;
- Channel re-construction at Area 1;
- Land Piling at Viaducts B, C & D;
- Pre-drilling works at Viaduct A;
- Construction of pile cap at Viaducts B, C, D & E;
- Additional land GI, trial pits & lab testing;
- Utility surveys; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

April 2015

Marine Works

- Construction and installation of pile caps;
- Marine piling platform installation & uninstallation;
- Pier construction;
- Installation of launching gantry;
- Marine piling; and,
- Installation of pier head segment.

Land-based Works

- Construction and installation of pile caps;
- Pier construction;
- Drainage works;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Tree survey, felling and transplanting;
- Utility surveys; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

May 2015

Marine Works

- Construction and installation of pile caps;
- Marine piling platform installation & uninstallation;
- Pier construction;
- Installation of launching gantry;
- Marine piling and
- Installation of pier head segment.

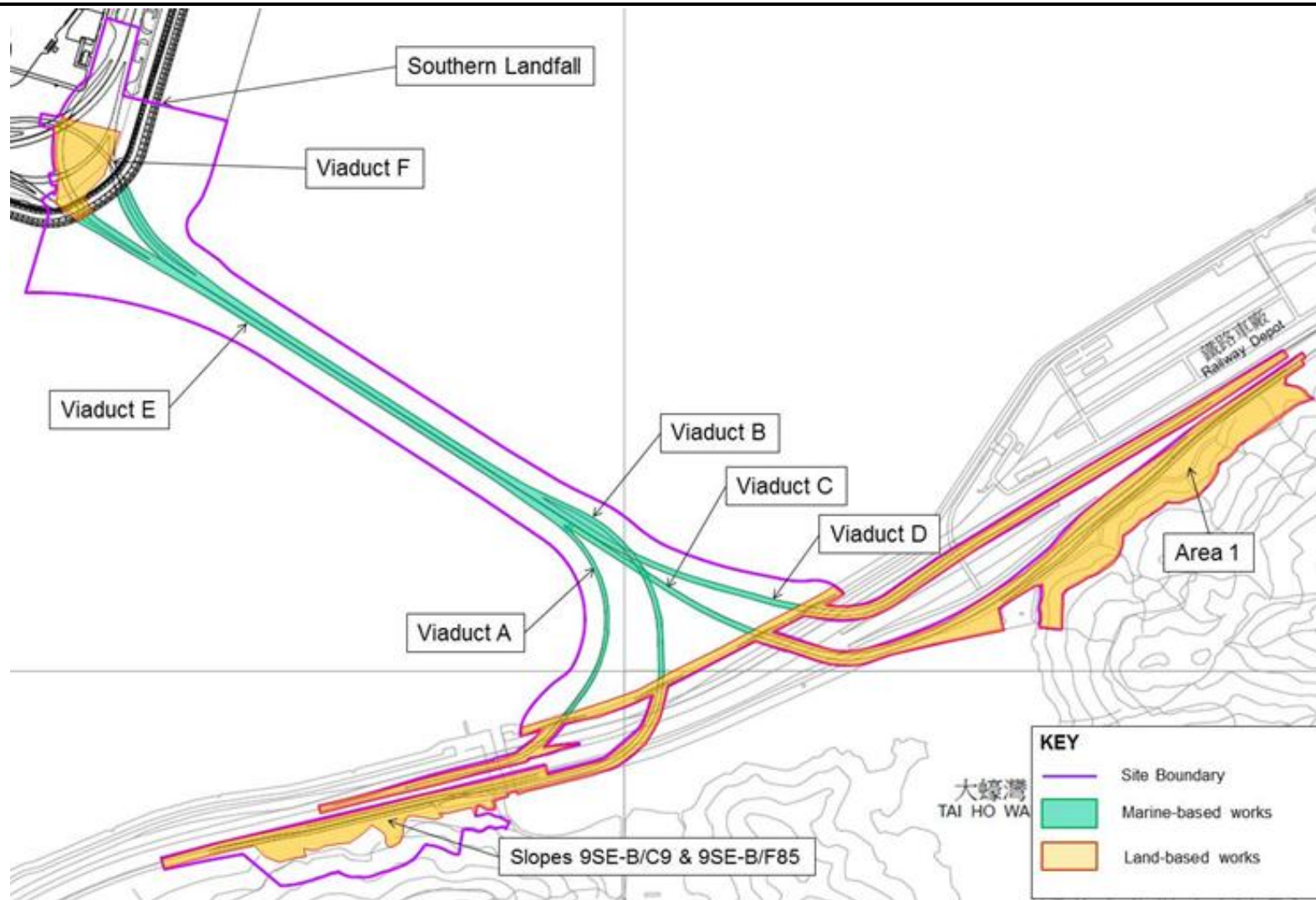
Land-based Works

- Construction and installation of pile caps;
- Pier construction;
- Drainage works;
- Re-alignment of Cheung Tung Road;
- Land piling;

- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Tree survey, felling and transplanting;
- Relocation of MTRC fence; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

The locations of the construction activities are shown in *Figure 1.3*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.4*.

Figure 1.3 Locations of Construction Activities in the Reporting Period



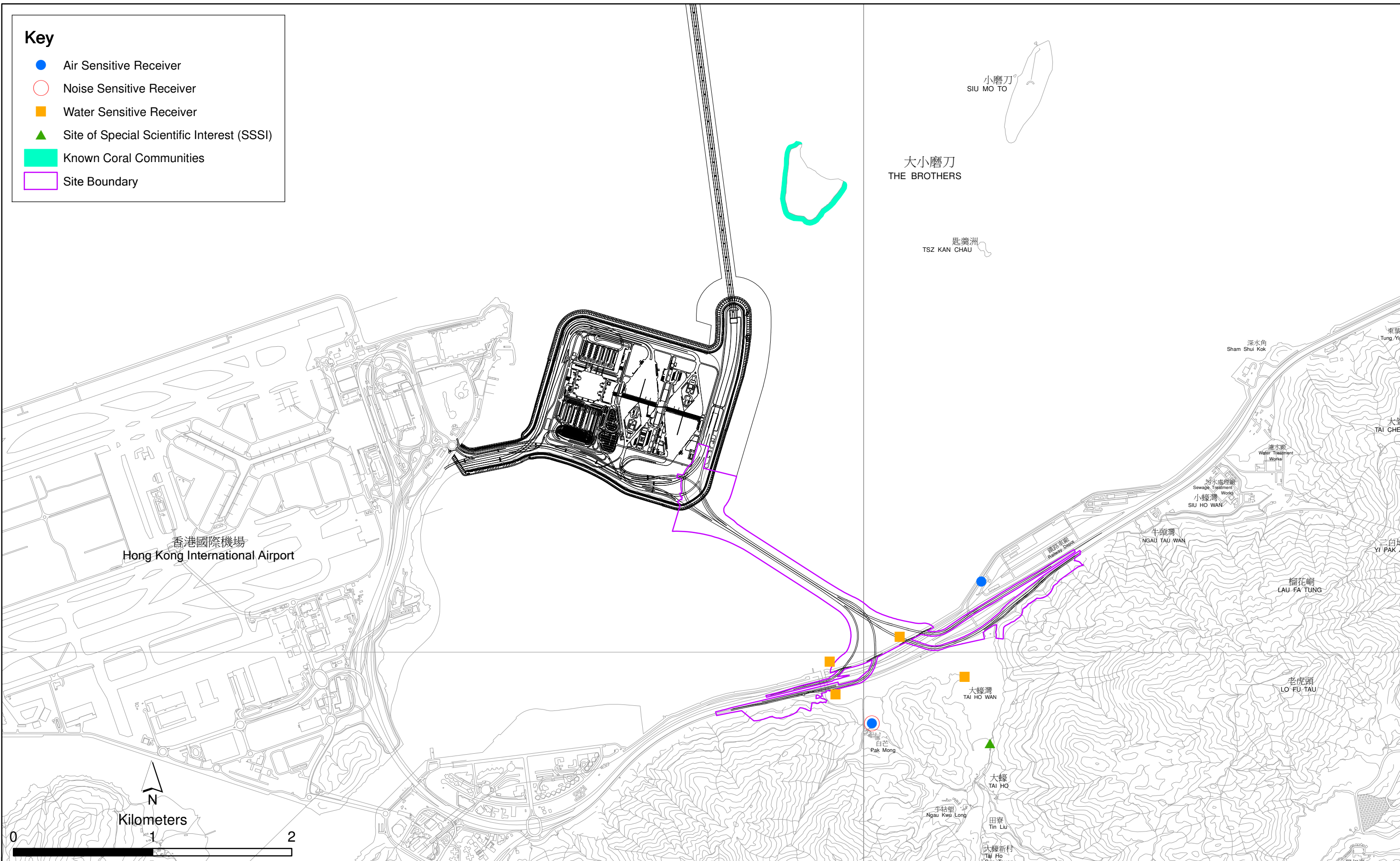


Figure 1.4

Environmental Sensitive Receivers in the Vicinity of Contract No. HY/2012/07
Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section

The environmental mitigation measures implementation schedule is presented in *Appendix C*.

1.5 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

The EM&A programme required environmental monitoring for air quality, noise, water quality and marine ecology as well as environmental site inspections for air quality, noise, water quality, waste management, marine ecology and landscape and visual impacts. The EM&A requirements and related findings for each component are described in the following sections, which include:

- Monitoring parameters;
- Monitoring schedules for the reporting months and forthcoming months;
- Action and Limit levels for all environmental parameters;
- Event Action Plan;
- Results and observations;
- Environmental mitigation measures, as recommended in the approved EIA Report; and
- Environmental requirement in contract documents.

The EM&A programme required environmental monitoring for air quality, noise, water quality and marine ecology as well as environmental site inspections for air quality, noise, water quality, waste management, marine ecology and landscape and visual impacts. The EM&A requirements and related findings for each component are summarized in the following sections.

2.1 AIR QUALITY

The baseline air quality monitoring undertaken by the Hong Kong - Zhuhai - Macao Bridge Hong Kong Projects (HKZMB) during October 2011 has included the two monitoring stations ASR9A and ASR9C for this project. Thus, the baseline monitoring results and Action/ Limit Level presented in HKZMB Baseline Monitoring Report ⁽¹⁾ are adopted for this Project.

2.1.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual, impact 1-hour TSP monitoring was conducted three (3) times every six (6) days while the highest dust impact was expected. Impact 24-hour TSP monitoring was carried out once every six (6) days. The Action and Limit Levels of the air quality monitoring is provided in *Appendix D*.

1-hour TSP and 24-hour TSP monitoring were conducted at 2 alternative air quality monitoring stations, ASR8A (Area 4) and ASR9 (Entrance of MTR Depot) during the reporting period in accordance with the requirement of the Updated EM&A Manual. The monitoring stations are indicated in *Figure 2.1* and details are presented in *Table 2.1*.

High Volume Samplers (HVSs) were used for carrying out 1-hour and 24-hour TSP monitoring during the reporting period. The HVS meets all requirements of the Updated EM&A Manual. Brand and model of the equipment are given in *Table 2.2*.

Wind data monitoring equipment was installed at Area 4 during the reporting period for logging wind speed and wind direction. The wind sensor was setup such that it was clear of obstructions or turbulence caused by building. The wind data monitoring equipment is recalibrated at least once every six months.

⁽¹⁾ Agreement No. CE 35/2011 (EP) Baseline Environmental Monitoring for Hong Kong - Zhuhai - Macao Bridge Hong Kong Projects - Investigation. Baseline Environmental Monitoring Report (Version C). Submitted on 8 March 2012 and subsequently approved by EPD.

Key

- Alternative Air Monitoring Station
- Site Boundary

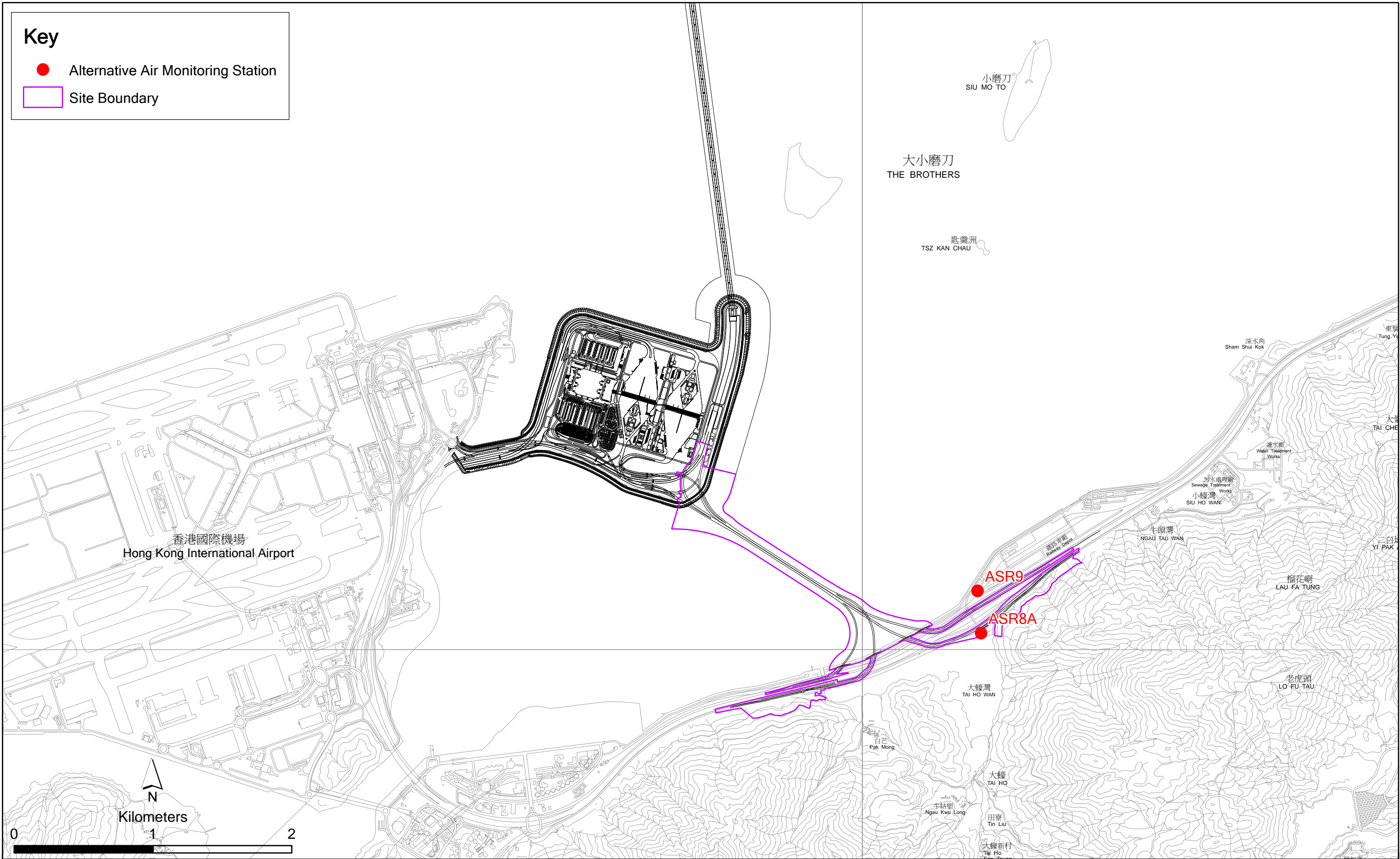


Figure 2.1

Locations of Air Quality Monitoring Stations

Table 2.1 *Locations of Impact Air Quality Monitoring Stations and Monitoring Dates in this Reporting Period*

Monitoring Station ⁽¹⁾	Monitoring Period	Location	Description	Parameters & Frequency
ASR8A	4, 10, 16, 19, 25 and 31 March 2015	Area 4	On ground at the Area 4	<ul style="list-style-type: none"> 1-hour Total Suspended
ASR9	6, 9, 15, 21, 27 and 30 April 2015 6, 12, 18, 21 and 27 May 2015	MTR Depot	On the ground nearby MTR Depot Entrance	<ul style="list-style-type: none"> Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times per day every 6 days 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour every 6 days

Note:

(1) Air Quality Monitoring Stations ASR9A and ASR9C at Siu Ho Wan MTRC Depot proposed in accordance with the Updated EM&A were relocated to ASR9 and ASR8A respectively.

Table 2.2 *Air Quality Monitoring Equipment*

Equipment	Brand and Model
High Volume Sampler (1-hour TSP and 24-hour TSP)	Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Sampler (Model No. TE-5170)
Wind Sensor	Global Water (Wind Speed Sensor: WE550; Wind Direction Sensor: WE570)
Wind Anemometer for calibration	Lutron (Model No. AM-4201)

2.1.2 Action & Limit Levels

The Action and Limit Levels of the air quality monitoring are provided in *Appendix D*. The Event and Action plan is presented in *Appendix J*.

2.1.3 Monitoring Schedule for the Reporting Quarter

The schedules for air quality monitoring in the reporting quarter are provided in *Appendix E*.

2.1.4 Results and Observations

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3* and *2.4*, respectively. Monitoring results are presented graphically in *Appendix F*. Detailed impact air quality monitoring results and meteorological information were reported in the *Seventeenth to Nineteenth Monthly EM&A Report*.

Table 2.3 *Summary of 1-hour TSP Monitoring Results in this Reporting Period*

Month	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
March 2015	ASR 8A	88	58 - 156	394	500

Month	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
April 2015	ASR 9	109	60 - 235	393	500
	ASR 8A	86	59 - 124	394	500
	ASR 9	112	59 - 217	393	500
May 2015	ASR 8A	64	49 - 149	394	500
	ASR 9	77	53 - 119	393	500

Table 2.4 *Summary of 24-hour TSP Monitoring Results in this Reporting Period*

Month	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
March 2015	ASR 8A	57	43 - 76	178	260
	ASR 9	77	54 - 101	178	260
April 2015	ASR 8A	56	50 - 60	178	260
	ASR 9	65	56 - 72	178	260
May 2015	ASR 8A	48	43 - 52	178	260
	ASR 9	56	46 - 71	178	260

The major dust sources in the reporting period include construction activities under the Contract as well as nearby traffic emissions.

In this reporting period, a total of seventeen (17) monitoring events were undertaken within the reporting period, in which no Action or Limit Level exceedance for 1-hour and 24-hour TSP for air quality was recorded during the reporting period.

2.2 NOISE MONITORING

The baseline noise monitoring undertaken by the Hong Kong - Zhuhai - Macao Bridge Hong Kong Projects (HKZMB) during the period of 18 October to 1 November 2011 has included the monitoring station NSR1 for this project. Thus, the baseline monitoring results and Action/ Limit Level presented in *HKZMB Baseline Monitoring Report* ⁽¹⁾ are adopted for this Project.

2.2.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual, impact noise monitoring should be conducted once per week during the construction phase of the Contract.

Noise monitoring was conducted at the alternative noise monitoring station, NSR1A (Pak Mong Village Pavilion) during the reporting period in accordance with the requirement of Updated EM&A Manual. *Figure 2.2* shows the location of the monitoring station. *Table 2.5* describes the details of the monitoring station.

Noise monitoring was performed using sound level meter at the designated monitoring station in the reporting quarter. The deployed sound level meter complies 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 meter at a known sound pressure level. Brand and model of the equipment is given in *Table 2.6*.

⁽¹⁾ Agreement No. CE 35/2011 (EP) Baseline Environmental Monitoring for Hong Kong - Zhuhai - Macao Bridge Hong Kong Projects - Investigation. Baseline Environmental Monitoring Report (Version C). Submitted on 8 March 2012 and subsequently approved by EPD.

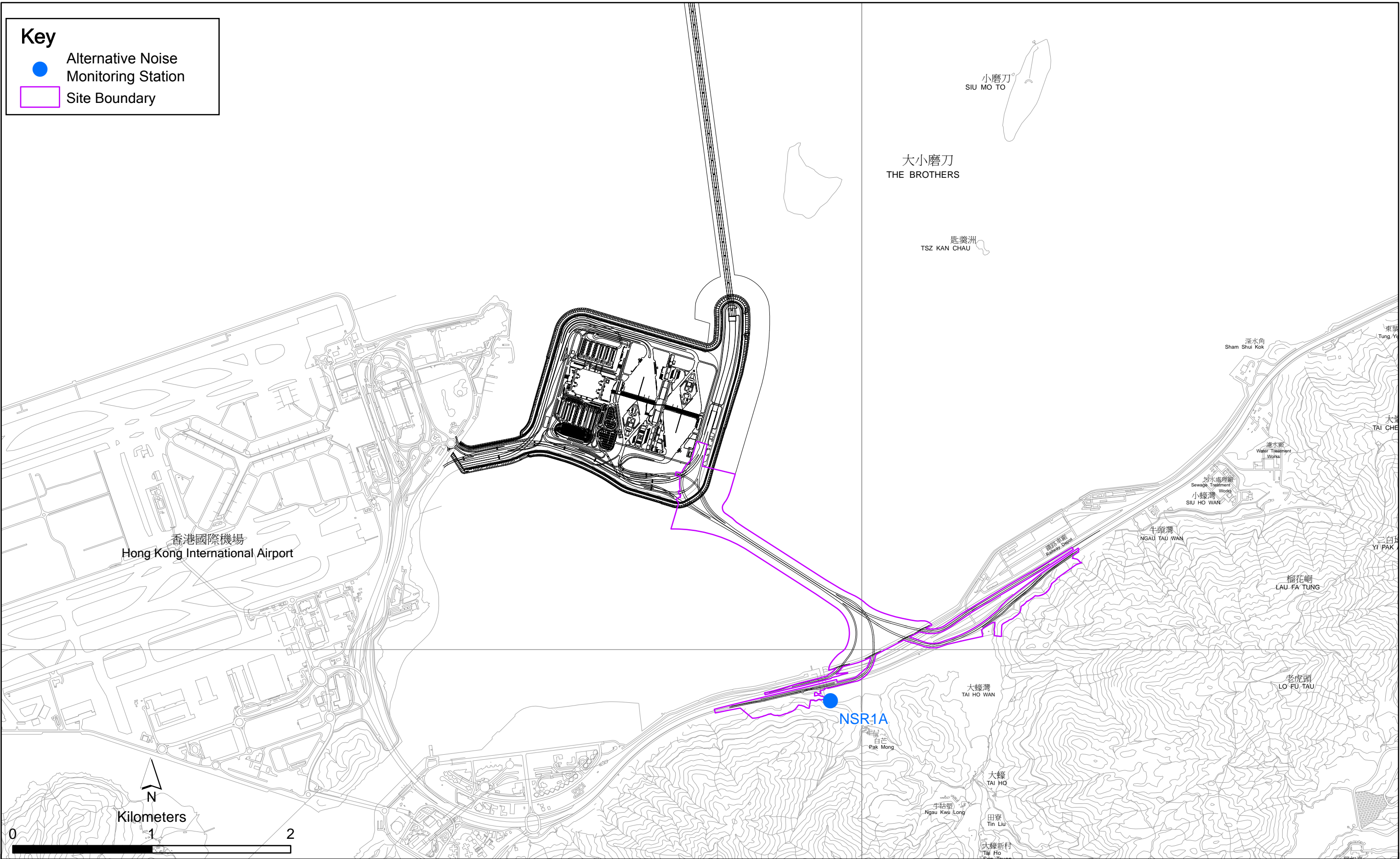


Figure 2.2

Location of Noise Monitoring Station

Table 2.5 *Location of Impact Noise Monitoring Station and Monitoring Dates in this Reporting Period*

Monitoring Station	Monitoring Period	Location	Parameters & Frequency
NSR1A	March to May 2015	Pak Mong Village Pavilion	<ul style="list-style-type: none"> 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 a week

Note:
 (1) Noise Monitoring Station NSR1 at Pak Mong Village proposed in accordance with the Updated EM&A was relocated to NSR1A.

Table 2.6 *Noise Monitoring Equipment*

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

2.2.2 Action and Limit Levels

The Action and Limit levels of the noise monitoring are provided in *Appendix D*. The Event and Action plan is presented in *Appendix J*.

2.2.3 Monitoring Schedule for the Reporting Quarter

The schedules for noise monitoring in the reporting quarter are provided in *Appendix E*.

2.2.4 Results and Observations

The monitoring results for noise monitoring are summarized in *Table 2.7*. Monitoring results are presented graphically in *Appendix G* and detailed impact noise monitoring results are reported in the *Seventeenth to Nineteenth Monthly EM&A Report*.

Table 2.7 *Summary of Construction Noise Monitoring Results at NSR1A in the Reporting Period*

Month	Average, dB(A), L_{eq} (30mins)	Range, dB(A), L_{eq} (30mins)	Limit Level, dB(A), L_{eq} (30mins)
March 2015	60	57 - 61	75
April 2015	60	57 - 61	75
May 2015	60	57 - 61	75

A total of seventeen (17) monitoring events were undertaken in the reporting period with no Action Level and Limit Level exceedance recorded at the monitoring station in the reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in *Appendix J*.

Major noise sources during the noise monitoring included construction activities, nearby traffic noise and aircraft noise.

2.3 WATER QUALITY MONITORING

The baseline water quality monitoring undertaken by the Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects (HKZMB) between 6 and 31 October 2011 has included all monitoring stations except SR4a for the Project. Thus, the baseline monitoring results except for station SR4a and Action/Limit Level presented in HKZMB Baseline Monitoring Report ⁽¹⁾ are adopted for this Project. Baseline water quality monitoring was conducted at station SR4a from 29 August to 24 September 2013.

2.3.1 Monitoring Requirements and Equipment

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. Impact water quality monitoring was undertaken three days per week during the construction period at seven water quality monitoring stations in accordance with the Updated EM&A Manual (*Figure 2.3; Table 2.8*).

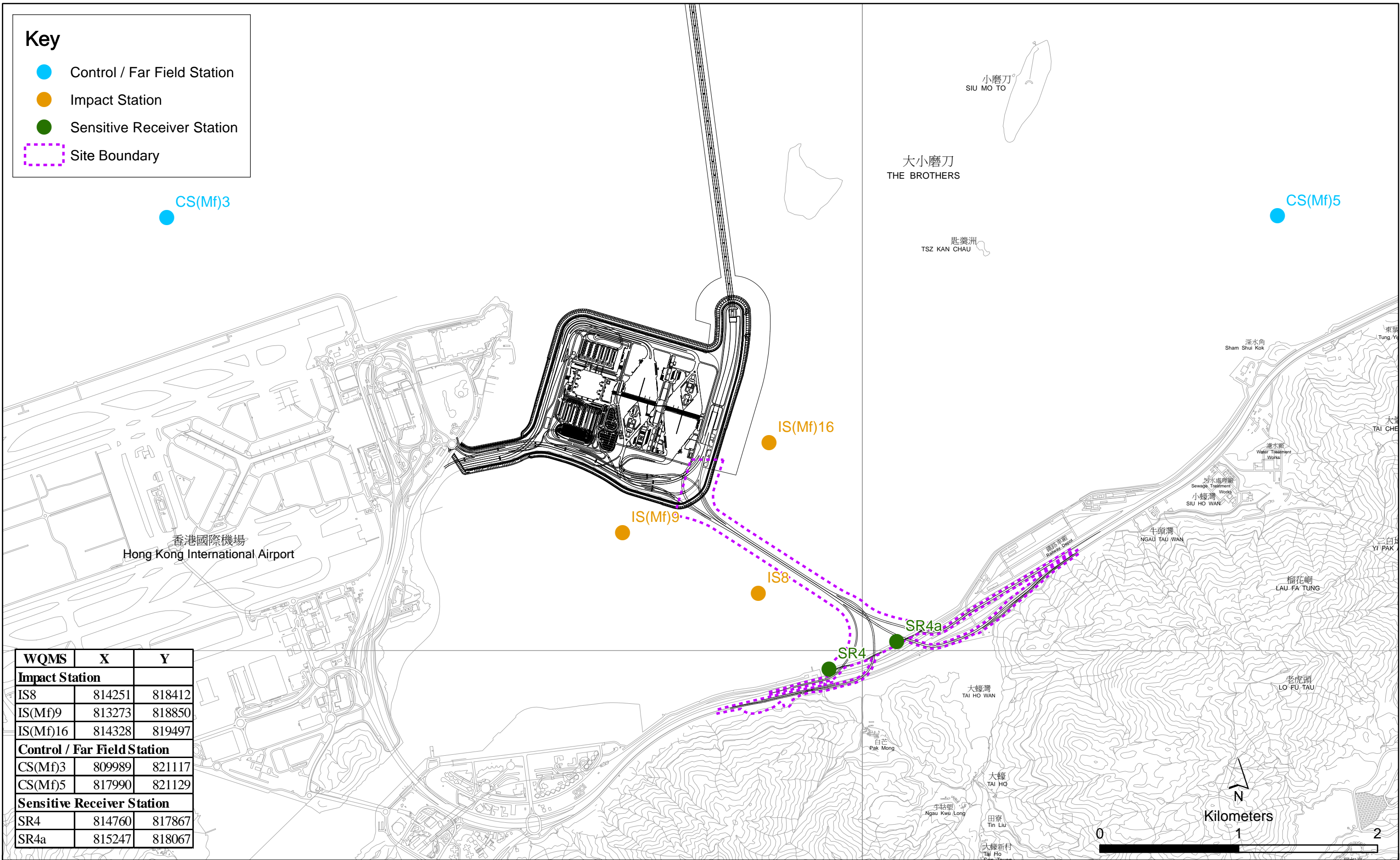
Table 2.8 *Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements*

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850	<ul style="list-style-type: none"> • Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) 	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. If the water depth is less than 3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497	<ul style="list-style-type: none"> • DO (mg/L and % of saturation) • SS (mg/L) 		
IS8	Impact Station(Close to HKBCF construction site)	814251	818412			
SR4	Sensitive receiver (Tai Ho Inlet)	814760	817867			
SR4a	Sensitive receiver	815247	818067			
CS(Mf)3	Control Station	809989	821117			
CS(Mf)5	Control Station	817990	821129			

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Key

- Control / Far Field Station
- Impact Station
- Sensitive Receiver Station
- Site Boundary



WQMS	X	Y
Impact Station		
IS8	814251	818412
IS(Mf)9	813273	818850
IS(Mf)16	814328	819497
Control / Far Field Station		
CS(Mf)3	809989	821117
CS(Mf)5	817990	821129
Sensitive Receiver Station		
SR4	814760	817867
SR4a	815247	818067

Figure 2.3

Locations of Water Quality Monitoring Stations

Station ID	Type	Coordinates Easting Northing	*Parameters, unit	Depth	Frequency
Notes: In addition to the parameters presented monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or works underway nearby were also recorded.					

Table 2.9 summarizes the equipment used in the impact water quality monitoring programme.

Table 2.9 Water Quality Monitoring Equipment

Equipment	Brand and Model
DO, Temperature meter and Salinity	YSI Pro2030
Turbidimeter	HACH Model 2100Q
pH meter	HANNA HI8314
Positioning Equipment	Koden913MK2 with KBG-3 DGPS antenna
Water Depth Detector	Speedtech Instrument SM-5
Water Sampler	Kemmerer 1520 (1520-C25) 2.2L with messenger

2.3.2 Action & Limit Levels

The Action and Limit Levels of the water quality monitoring are provided in *Appendix D*.

2.3.3 Monitoring Schedule for the Reporting Quarter

The schedules for water quality monitoring in the reporting quarter are provided in *Appendix E*.

2.3.4 Results and Observations

Impact water quality monitoring was conducted at all designated monitoring stations in the reporting period. Monitoring results are presented graphically in *Appendix H* and detailed impact water quality monitoring results were reported in the *Seventeenth to Nineteenth Monthly EM&A Reports*.

In this reporting period, a total of thirty-nine (39) monitoring events were undertaken. One (1) Action level exceedance of depth-averaged SS during mid-ebb tide was recorded on 19 May 2015 at monitoring station SR4a. Actions were taken in accordance with the Event Action Plan as presented in *Appendix J*. The exceedance was considered not related to this Contract upon further investigation.

Apart from the observed exceedance, there were some results of depth-averaged turbidity and depth averaged- SS higher than the corresponding Action Levels at the impact stations and sensitive receivers, but the results were lower than 120% of the upstream control at the same tide of the same

day (Table 2.10). As such, these observations were not regarded as exceedance. No action is thus required to be undertaken for these observations in accordance with the Event Action Plan (Appendix L).

Table 2.10 *Summary of WQM Results Breaching the Action Level without Exceedance*

Date	Tide	Parameter	Station
24 March 2015	Mid-ebb and mid-flood	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
28 March 2015	Mid-ebb and mid-flood	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
31 March 2015	Mid-ebb and mid-flood	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
2 April 2015	Mid-ebb	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
2 April 2015	Mid-flood	SS	IS(Mf)16 and IS8
7 April 2015	Mid-ebb	SS	IS(Mf)9, SR4 and SR4a
7 April 2015	Mid-flood	SS	SR4
28 April 2015	Mid-ebb	SS	IS8
14 May 2015	Mid-flood	Turbidity	IS8 and SR4
14 May 2015	Mid-ebb and mid-flood	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
16 May 2015	Mid-ebb and mid-flood	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
19 May 2015	Mid-ebb and mid-flood	SS	IS(Mf)16, IS(Mf)9, IS8, SR4 and SR4a
23 May 2015	Mid-ebb	SS	IS(Mf)16, IS(Mf)9, IS8 and SR4
23 May 2015	Mid-flood	SS	IS8 and SR4

2.4 DOLPHIN MONITORING

2.4.1 Monitoring Requirements

Impact dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins. In order to fulfil the EM&A requirements and make good use of available resources, the on-going impact line transect dolphin monitoring data collected by HyD's Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge. Hong Kong Link Road - Section between Scenic Hill and Hong Kong Boundary Crossing Facilities on the monthly basis is adopted to avoid duplicates of survey effort.

2.4.2 Monitoring Equipment

Table 2.11 summarises the equipment used for the impact dolphin monitoring.

Table 2.11 *Dolphin Monitoring Equipment*

Equipment	Model
Global Positioning System (GPS)	Garmin 18X-PC
Camera	Geo One Phottix Nikon D90 300m 2.8D fixed focus Nikon D90 20-300m zoom lens
Laser Binoculars	Infinitor LRF 1000
Marine Binocular	Bushell 7 x 50 marine binocular with compass and reticules
Vessel for Monitoring	65 foot single engine motor vessel with viewing platform 4.5m above water level

2.4.3 *Monitoring Parameter, Frequencies & Duration*

Dolphin monitoring should cover all transect lines in Northeast Lantau (NEL) and the Northwest Lantau (NWL) survey areas twice per month throughout the entire construction period. The monitoring data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong. In order to provide a suitable long-term dataset for comparison, identical methodology and line transects employed in baseline dolphin monitoring was followed in the impact dolphin monitoring.

2.4.4 *Monitoring Location*

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.4*. The co-ordinates of all transect lines are shown in *Table 2.12* below.

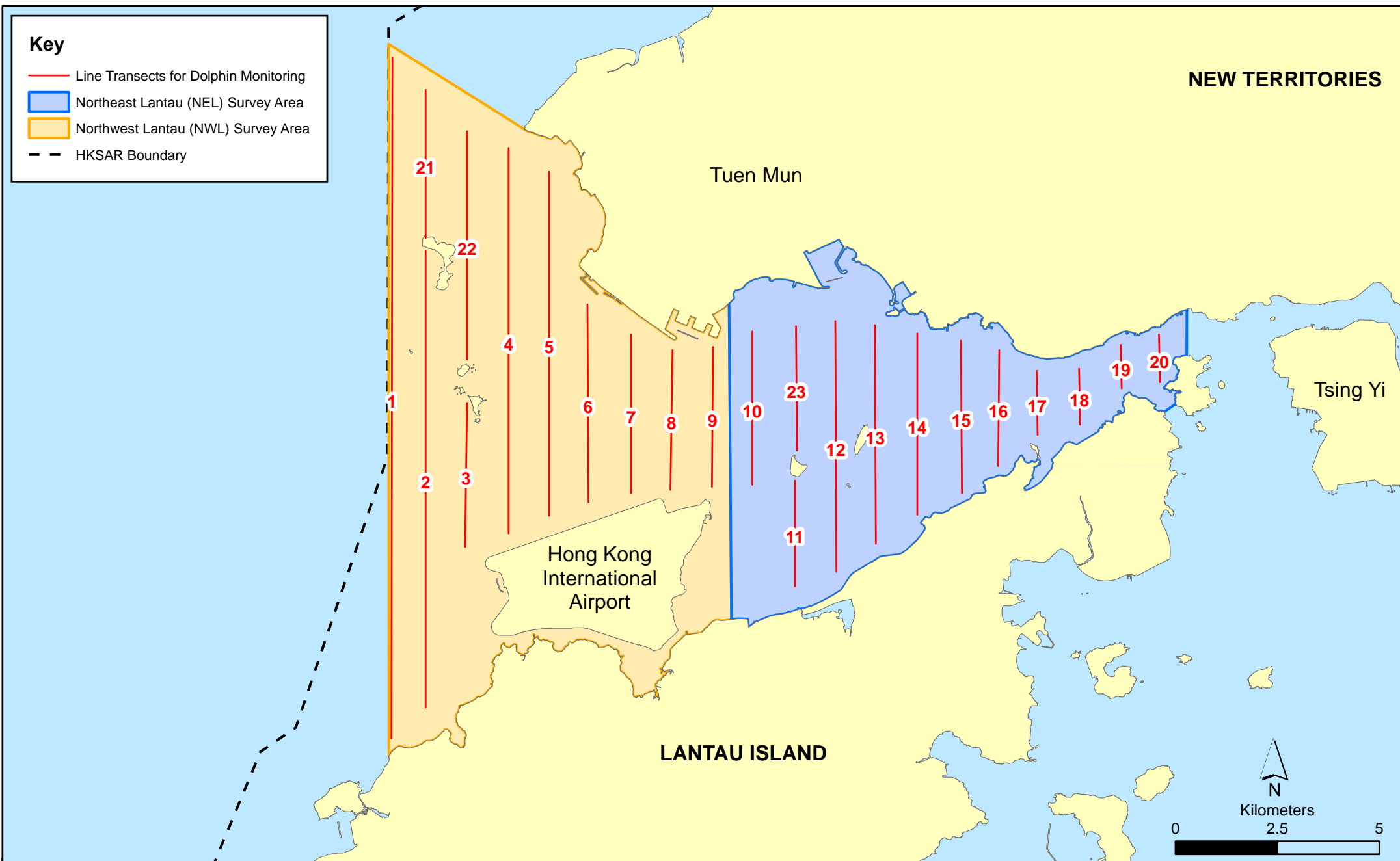


Figure 2.4

Layout of Transect Lines of Dolphin Monitoring in Northwest and Northeast Lantau Areas

Table 2.12 Impact Dolphin Monitoring Line Transect Co-ordinates

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	814577	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815457	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820690	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	820847	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	820892	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818449	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

2.4.5 Action & Limit Levels

The action and limit levels of dolphin impact monitoring are shown in *Appendix D*. The Event and Action plan is presented in *Appendix J*.

2.4.6 Monitoring Schedule for the Reporting Period

The dolphin monitoring schedules for the reporting period are shown in *Appendix E*.

2.4.7 Results & Observations

A total of 899.81 km of survey effort was collected, with 97.7% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). Among the two areas,

344.55 km and 555.26 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 655.32 km, while the effort on secondary lines was 244.49 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. The survey efforts are summarized in *Appendix I*.

During the six sets of monitoring surveys in March to May 2015, a total of seven groups of twenty-five (25) Chinese White Dolphins were sighted. Four (4) of the seven (7) dolphin sightings were made during on-effort search. Two (2) of the four (4) on-effort sightings were made on primary lines, while the other two were made on secondary lines. No sighting was made in the proximity of the Project's alignment. In this quarterly period, all dolphin groups were sighted in NWL, while none of them were sighted in NEL. Summary table of the dolphin sightings is shown in *Appendix I*.

Encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) in the reporting period with the results presented in *Tables 2.13* and *2.14*.

Table 2.13 Individual Survey Event Encounter Rates

Survey Area	Survey period	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
NEL	Set 1: 4 th & 11 th Mar 2015	0.0	0.0
	Set 2: 17 th & 26 th Mar 2015	0.0	0.0
	Set 3: 8 th & 10 th Apr 2015	0.0	0.0
	Set 4: 17 th & 22 nd Apr 2015	0.0	0.0
	Set 5: 4 th & 8 th May 2015	0.0	0.0
	Set 6: 14 th & 18 th May 2015	0.0	0.0
NWL	Set 1: 4 th & 11 th Mar 2015	1.42	9.93
	Set 2: 17 th & 26 th Mar 2015	0.00	0.00
	Set 3: 8 th & 10 th Apr 2015	1.40	4.20
	Set 4: 17 th & 22 nd Apr 2015	0.00	0.00
	Set 5: 4 th & 8 th May 2015	0.00	0.00
	Set 6: 14 th & 18 th May 2015	0.00	0.00

Note: Dolphin Encounter Rates are deduced from the six sets of surveys (two surveys in each set) in the reporting period in Northeast (NEL) and Northwest Lantau (NWL)

Table 2.14 *Quarterly Average Encounter Rates*

Survey Area	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	March - May 2015	September - November 2011	March - May 2015	September - November 2011
Northeast Lantau	0.00	6.00 ± 5.05	0.00	22.19 ± 26.81
Northwest Lantau	0.47 ± 0.73	9.85 ± 5.85	2.36 ± 4.07	44.66 ± 29.85

Note: encounter rates deduced from the baseline monitoring period (September - November 2011) have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions

Group size of Chinese White Dolphins ranged from one (1) to three (3) individuals per group in North Lantau region during March 2015 to May 2015. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in *Table 2.15*.

Table 2.15 *Comparison of Quarterly Average Encounter Rates*

	Average Dolphin Group Size	
	March - May 2015	September - November 2011
Overall	3.57 ± 2.82 (n = 7)	3.72 ± 3.13 (n = 66)
Northeast Lantau	0.00	3.18 ± 2.16 (n = 17)
Northwest Lantau	3.57 ± 2.82 (n = 7)	3.92 ± 3.40 (n = 49)

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March and May 2015. During this quarter of dolphin monitoring, no unacceptable impact from the activities of this Contract on Chinese White Dolphins was noticeable from the general observations.

Although the dolphins infrequently occurred along the alignment of TMCLKL Southern Connection Viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL, and many individuals have shifted away from the important habitat around the Brothers Islands.

It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related

works, and whether suitable mitigation measure can be applied to revert the situation.

2.4.8 Marine Mammal Exclusion Zone Monitoring

Daily marine mammal exclusion zone monitoring was undertaken during the period of marine works under this Contract. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when marine works were carried out outside the daylight hours under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded in the monitoring period during the exclusion zone monitoring.

2.5 EM&A SITE INSPECTION

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Thirteen (13) site inspections were carried out in the reporting quarter on 4, 11, 19 and 26 March 2015; 2, 9, 15, 22 and 30 April 2015; 8, 13, 20 and 28 May 2015.

Key observations during the site inspections in this reporting period are summarized in *Table 2.16*.

Table 2.16 *Specific Observations Identified during the Weekly Site Inspection in this Reporting Period*

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
4 March 2015	Pier E12 <ul style="list-style-type: none"> The updated dumping permit was not displayed. The checklist for wet sep was not displayed. The label of sediment at barge Kin Yip was not well displayed. Pier B1 <ul style="list-style-type: none"> An air compressor was not placed on decoupling pad. 	Pier E12 <ul style="list-style-type: none"> Dumping permit, checklist for wet sep and sediment label should be well displayed. Pier B1 <ul style="list-style-type: none"> The air compressor should be placed on decoupling pad.
11 March 2015	Area 1 <ul style="list-style-type: none"> A slope close to drainage was partially unpaved. Pier C14B <ul style="list-style-type: none"> Refuse was found placed next to drainage. Site Access 9B <ul style="list-style-type: none"> An old EP was displayed. 	Area 1 <ul style="list-style-type: none"> The unpaved slope should be covered by tarpaulin sheet Pier C14B <ul style="list-style-type: none"> Refuse or waste container should be placed away from drainage. Site Access 9B <ul style="list-style-type: none"> Only the most updated permit should be displayed.
19 March 2015	Seafront <ul style="list-style-type: none"> Refuse was found disposed improperly. Chemical containers were placed without drip tray. Pier ACD1 <ul style="list-style-type: none"> Some chemical containers were not placed in drip tray. 	Seafront <ul style="list-style-type: none"> Refuse should be cleaned up regularly. Chemical containers should be placed in drip tray. Pier ACD1 <ul style="list-style-type: none"> Chemical containers should be placed in drip tray.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
26 March 2015	Pak Mong <ul style="list-style-type: none"> Soil stockpile was not covered. Barge Gammon 38 (next to Pier E7) <ul style="list-style-type: none"> An air compressor was not placed on acoustic decoupling pad. 	Pak Mong <ul style="list-style-type: none"> Soil stockpile should be covered by tarpaulin sheet or watered. Barge Gammon 38 (next to Pier E7) <ul style="list-style-type: none"> Air compressor on marine platform should be placed on acoustic decoupling pad.
2 April 2015	Dockyard near Area 23 <ul style="list-style-type: none"> Drip trays were not plugged. Area 1 <ul style="list-style-type: none"> Soil stockpile was not covered. 	Dockyard near Area 23 <ul style="list-style-type: none"> Drip trays should be plugged. Area 1 <ul style="list-style-type: none"> Soil stockpile should be covered by tarpaulin sheet or watered to avoid dust emission.
9 April 2015	Pier E13AB <ul style="list-style-type: none"> The updated checklist for wetsep was not displayed. Pier E9 <ul style="list-style-type: none"> A generator was not placed on acoustic decoupling pad. 	Pier E13AB <ul style="list-style-type: none"> The updated checklist should be displayed at the wetsep. Pier E9 <ul style="list-style-type: none"> Operating generators on marine platform should be placed on acoustic decoupling pad.
15 April 2015	Slope B/F9 <ul style="list-style-type: none"> The exposed area was partially dry. Pier B14 <ul style="list-style-type: none"> The updated EP was not displayed. Pier D12 <ul style="list-style-type: none"> The updated EP was not displayed. A drip tray for generator was not plugged. 	Slope B/F9 <ul style="list-style-type: none"> Watering was applied immediately. Pier B14 <ul style="list-style-type: none"> The updated EP should be displayed. Pier D12 <ul style="list-style-type: none"> The updated EP should be displayed. The drip tray should be plugged.
22 April 2015	Seafront <ul style="list-style-type: none"> Some chemical containers were not placed in drip trip. Pier D3 <ul style="list-style-type: none"> Gutter was not properly installed. Pier E11 <ul style="list-style-type: none"> A generator was not placed on acoustic decoupling pad. 	Seafront <ul style="list-style-type: none"> Chemical containers should be placed in drip trip. Pier D3 <ul style="list-style-type: none"> Gutter should be properly installed. Pier E11 <ul style="list-style-type: none"> Generator on marine platform should be placed on acoustic decoupling pad.
30 April 2015	Pier ACD1 <ul style="list-style-type: none"> A drip tray for generator was placed without acoustic decoupling pad and containing stagnant water. A drip tray for generator was not plugged. 	Pier ACD1 <ul style="list-style-type: none"> Acoustic decoupling pad should be provided and stagnant water should be removed. A drip tray for generator should be plugged.
8 May 2015	Area 1 <ul style="list-style-type: none"> Some chemical containers were not placed in drip tray. Soil stockpile near drainage was not well covered. Site Access 4A <ul style="list-style-type: none"> Chemical waste storage was not secured properly. Pier D14B <ul style="list-style-type: none"> Refuse was accumulated in drainage. Pier D10 <ul style="list-style-type: none"> Checklist for wet sep was not displayed. 	Area 1 <ul style="list-style-type: none"> Chemical containers should be placed in drip tray. Soil stockpile should be well covered. Site Access 4A <ul style="list-style-type: none"> Chemical waste storage should be secured as appropriate. Pier D14B <ul style="list-style-type: none"> Refuse in drainage should be cleaned up. Pier D10 <ul style="list-style-type: none"> Checklist for wet sep should be displayed.
13 May 2015	Seafront <ul style="list-style-type: none"> Stagnant water was accumulated in drainage. Stagnant water was accumulated in a drip tray for generator. Gammon 39 (Pier E1) <ul style="list-style-type: none"> Excessive soil was accumulated on barge. 	Seafront <ul style="list-style-type: none"> Stagnant water in drainage and drip tray should be regularly cleaned up regularly. Gammon 39 (Pier E1) <ul style="list-style-type: none"> Excessive soil on barge should be cleaned up regularly.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
20 May 2015	Slope B/C8 <ul style="list-style-type: none"> • Tarpaulin sheet for rock drilling was not well covered. Slope B/C9 <ul style="list-style-type: none"> • Tarpaulin sheet for cement loading station was not well covered. 	Slope B/C8 & B/C9 <ul style="list-style-type: none"> • Tarpaulin sheet for rock drilling and cement loading station should be well covered.
28 May 2015	Pier E6 <ul style="list-style-type: none"> • Excessive soil was accumulated in gutter and the gutter was not properly installed.. 	Pier E6 <ul style="list-style-type: none"> • Gutter should be cleaned up regularly and properly installed.

The Contractor has rectified all of the observations identified during environmental site inspections in the reporting period.

2.6 WASTE MANAGEMENT STATUS

The Contractor has submitted application form for registration as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

Wastes generated during this reporting period include mainly construction wastes (inert and non-inert), imported fill, recyclable materials and marine sediments (Categories L & M). Reference has been made to the waste flow table prepared by the Contractor (*Appendix K*). The quantities of different types of wastes are summarized in *Table 2.17*.

Table 2.17 Quantities of Different Waste Generated in the Reporting Period

Month/ Year	Inert Construction Waste ^(a) (m ³)	Imported Fill (m ³)	Inert Construction Waste Re- used (m ³)	Non-inert Construction Waste ^(b) (kg)	Recyclable Materials ^(c) (kg)	Chemical Wastes (kg)	Marine Sediment (m ³)	
							Category L	Category M
March 2015	9,600	77	473	120,940	203	0	618	222
April 2015	7,694	32	2,261	133,630	105	0	0	0
May 2015	8,091	0	653	107,920	42	0	550	0
Total	25,385	109	3,387	362,490	350	0	1,168	222

Notes:

- (a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
- (b) Non-inert construction wastes include general refuse disposed at landfill.
- (c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

The Contractor was advised to properly maintain on site C&D materials and waste 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 was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.

For chemical waste containers, the Contractor was reminded to treat properly and store 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*.

2.7 ENVIRONMENTAL LICENSES AND PERMITS

The status of environmental licensing and permit is summarized in *Table 2.18* below.

Table 2.18 Summary of Environmental Licensing and Permit Status

License/Permit	License or Permit No.	Date of Issue	Date of Expiry	License/Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	15-Mar-15	N/A	HyD	Tuen Mun- Chek Lap Kok Link
Chemical Waste Producer Registration	5213-951-G2380-17	12-Jun-14	NA	GCL	Viaducts A, B, C, D & E
Chemical Waste Producer Registration	5213-961-G2380-13	10-Oct-13	NA	GCL	Area1 adjacent to Cheung Ting Road, Siu Ho Wan
Chemical Waste Producer Registration	5213-961-G2380-14	10-Oct-13	NA	GCL	Area 2 adjacent to Cheung Tung Road, Pak Mong Village
Chemical Waste Producer Registration	5213-974-G2588-03	04-Nov-13	NA	GCL	WA5 adjacent to Cheung Tung Road, Yan O
Construction Dust Notification	361571	05-Jul-13	NA	GCL	NA
Construction Dust Notification	362093	17-Jul-13	NA	GCL	For Area 23
Construction Noise Permit for night works and works in general holidays	GW-RS0078-15	28-Jan-15	29-Jul-15	GCL	For Plant mobilization using tractor with trailer
Construction Noise Permit for night works and works in general holidays	GW-RS0137-15	12-Feb-15	15-Aug-15	GCL	Pre-casted pile cap shell installation at E10-E13
Construction Noise Permit for night works and works in general holidays	GW-RS0212-15	02-Mar-15	04-Jun-15	GCL	Pier A8A9 Safety Fence Erection
Construction Noise Permit for night works and works in general holidays	GW-RS0225-15	13-Mar-15	12-May-15	GCL	TTA Case 009 Ch.2.1E-4.2E
Construction Noise Permit for night works and works in general holidays	GW-RS0266-15	20-Mar-15	30-Apr-15	GCL	B8 Pier Head Segment Erection and Formwork Installation
Construction Noise Permit for night works and works in general holidays	GW-RS0307-15	27-Mar-15	27-Sep-15	GCL	For Load unload at NLH near Viaduct D
Construction Noise Permit for night works and works in general holidays	GW-RS0326-15	30-Mar-15	31-May-15	GCL	B9-B16 Pier Head Segments Erection

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Construction Noise Permit for night works and works in general holidays	GW-RS0470-14	29-Apr-15	28-Oct-15	GCL	For Broad Permit
Construction Noise Permit for night works and works in general holidays	GW-RS0489-15	08-May-15	07-Aug-15	GCL	B8 Pier Head Temp Works Lifting
Construction Noise Permit for night works and works in general holidays	GW-RS0491-15	08-May-15	30-Jun-15	GCL	TTA Case 009 Ch.2.1E-4.2E
Construction Noise Permit for night works and works in general holidays	GW-RS1032-14	27-Mar-15	27-Sep-15	GCL	For Load unload at NLH near Viaduct D
Construction Noise Permit for night works and works in general holidays	GW-RS1225-14	31-Oct-14	02-May-15	GCL	For Broad Permit
Construction Noise Permit for night works and works in general holidays	GW-RS1406-15	30-Mar-15	31-May-15	GCL	B9-B16 Pier Head Segments Erection
Construction Noise Permit for night works and works in general holidays	GW-RW0093-15	26-Feb-15	26-Aug-15	GCL	General works at WA5
Construction Noise Permit	Nil	N/A	N/A	GCL	For Piling Works
Construction Waste Disposal Account	7017735	10-Jul-13	NA	GCL	NA
Construction Waste Disposal Account	7019470	03-Mar-14	NA	GCL	Vessel CHIT Account
Effluent Discharge License	WT00019017-2014	13-May-14	31-May-19	GCL	Marine Portion
Effluent Discharge License	WT00019018-2014	13-May-14	31-May-19	GCL	Land Portion
Marine Dumping Permit	EP/MD/15-248	27 Mar 2015	26 Apr 2015	GCL	For dumping Type I (Dedicated Site) and Type II sediment
Marine Dumping Permit	EP/MD/15-203	28 Jan 2015	27 Jul 2015	GCL	For dumping Type I sediment
Marine Dumping Permit	EP/MD/16-002	17 Apr 2015	26 May 2015	GCL	For dumping Type I (Dedicated Site) and Type II sediment
Marine Dumping Permit	EP/MD/16-020	22 May 2015	26 Jun 2015	GCL	For dumping Type I (Dedicated Site) and Type II sediment

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Marine Dumping Permit	EP/MD/15-257	2 Apr 2015	7 Oct 2015	GCL	For dumping Type I sediment

2.8 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

In response to the site audit findings, the Contractor has carried out corrective actions.

A summary of the Environmental Mitigation and Enhancement Measure Implementation Schedules (EMIS) is presented in *Appendix C*. The necessary mitigation measures were implemented properly for this Contract.

2.9 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

Results for 1-hour TSP, 24-hour TSP and construction noise complied with the Action/ Limit levels in the reporting period.

One (1) Action level exceedance of depth-averaged SS during mid-ebb tide was recorded on 19 May 2015 at monitoring station SR4a. Actions were taken in accordance with the Event Action Plan as presented in *Appendix J*. The exceedance was considered not related to this Contract upon further investigation.

The construction impact on depth-averaged SS was assessed by comparing the quarterly mean values of depth-averaged SS with the relevant ambient mean values. Except for IS(Mf)9 during mid-flood tide, results showed that the quarterly means of depth-averaged SS at all sampling stations during both mid-ebb and mid-flood tides were higher than the corresponding ambient means (*Table 2.19*). One-way ANOVA was conducted to examine whether there is significant difference of depth-averaged SS between ambient mean and quarterly mean. Apart from IS(Mf)16 ($F_{1,68} = 2.5$, $p = 0.12$) during mid-ebb tide, CS(Mf)3 ($F_{1,71} = 0.9$, $p = 0.35$), CS(Mf)5 ($F_{1,73} = 2.6$, $p = 0.11$) and IS8 ($F_{1,61} = 0.4$, $p = 0.54$) during mid-flood tide, statistically significant ($p < 0.05$) difference was detected for depth-averaged SS between ambient mean and quarterly mean at the other monitoring stations. The observed difference is due to the highly variable SS results at the corresponding upstream control stations in the reporting period, which is considered as natural fluctuation in the western waters of Hong Kong. The ET will monitor the trend of depth-averaged SS in the upcoming quarters to determine whether there is any change in water quality associated with this Project and further mitigation measures will be recommended if deemed necessary.

Table 2.19 *Comparison between Quarterly Mean and Ambient Mean Values of Depth-averaged Suspended Solids*

Station	Baseline Mean		Ambient Mean ^(a)		Quarterly Mean (March 2015 to May 2015)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS(Mf)3	9.2	12.8	12.0	16.6	19.9	19.2
CS(Mf)5	9.2	11.5	11.9	14.9	19.0	18.5
SR4	10.3	12.3	13.4	16.0	18.9	18.7
SR4a	9.1	9.8	11.9	12.7	18.4	18.0
IS8	11.3	13.5	14.6	17.6	19.2	19.0
IS(Mf)9	10.9	14.3	14.2	18.5	19.1	18.5
IS(Mf)16	11.4	10.3	14.8	13.4	18.9	18.5

Notes:

(a) Ambient mean value is defined as a 30% increase of the baseline mean value

One (1) Limit Level exceedance was recorded for impact dolphin monitoring in this reporting quarter. Following the review of the monitoring data and marine works details as per the procedure stipulated in the Event and Action Plan of the Updated EM&A Manual, there is no evidence showing that the sources of impact directly related to the construction works under this Contract that may have affected the dolphin usage in the North Lantau region. Investigation findings were detailed in *Appendix L*.

2.10 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.5*.

There was no complaint, notification of summons or successful prosecution recorded in the reporting period. Statistics on complaint, notification of summons of successful prosecution are summarized in *Appendix L*.



Figure 2.5 Environmental Complaint Handling Procedure

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER

As informed by the Contractor, the major works for the Contract in the coming quarter are summarized below:

June 2015

Marine Works

- Construction and installation of pile caps;
- Uninstallation of marine piling platform;
- Pile cap installation;
- Pier construction;
- Launching gantry assembly;
- Marine piling and
- Installation of pier head segment

Land-based Works

- Construction and installation of pile caps;
- Pier construction;
- Pile cap installation;
- Re-alignment of Cheung Tung Road;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Relocation of MTRC fence; and
- Slope work of Slopes 9SE-B/C9 and 9SE-B/F85

July 2015

Marine Works

- Construction and installation of pile caps;
- Uninstallation of marine piling platform;
- Pile cap installation;
- Pier construction;
- Launching gantry assembly;
- Marine piling; and,
- Installation of pier head segment

Land-based Works

- Predrilling at Viaduct F;
- Construction and installation of pile caps;
- Pier construction;
- Pile cap installation;

- Re-alignment of Cheung Tung Road;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Relocation of MTRC fence; and,
- Slope work of Viaducts A & B

August 2015

Marine Works

- Construction and installation of pile caps;
- Uninstallation of marine piling platform;
- Pile cap installation;
- Pier construction;
- Launching gantry assembly;
- Marine piling and
- Installation of pier head segment

Land-based Works

- Predrilling at Viaduct F;
- Construction and installation of pile caps;
- Pier construction;
- Pile cap installation;
- Re-alignment of Cheung Tung Road;
- Land piling;
- Pre-drilling works;
- Installation of pier head segment;
- Additional land GI, trial pits & lab testing;
- Relocation of MTRC fence; and
- Slope work of Viaducts A & B.

3.2 KEY ISSUES FOR THE COMING QUARTER

Potential environmental impacts arising from the above upcoming construction activities are mainly associated with air quality, noise, marine water quality, marine ecology and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality, noise, marine water quality and dolphin monitoring are scheduled to continue for the next reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress.

4.1 CONCLUSIONS

This Sixth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 March to 31 May 2015, in accordance with the Updated EM&A Manual and the requirements of the *Environmental Permit (EP-354/2009/D)*.

Neither Action Level nor Limit Level exceedances were observed for air quality and noise monitoring in this reporting period.

One (1) exceedance of Action Level for depth-averaged SS during mid-ebb tide was recorded for water quality monitoring on 19 May 2015.

A total of seven groups of twenty-five (25) Chinese White Dolphins were sighted during the six sets of survey from March to May 2015. Whilst one (1) Limit Level exceedance was recorded for the quarterly dolphin monitoring data between March to May 2015, no unacceptable impact from the activities of this Contract on Chinese White Dolphins was noticeable from the general observations. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

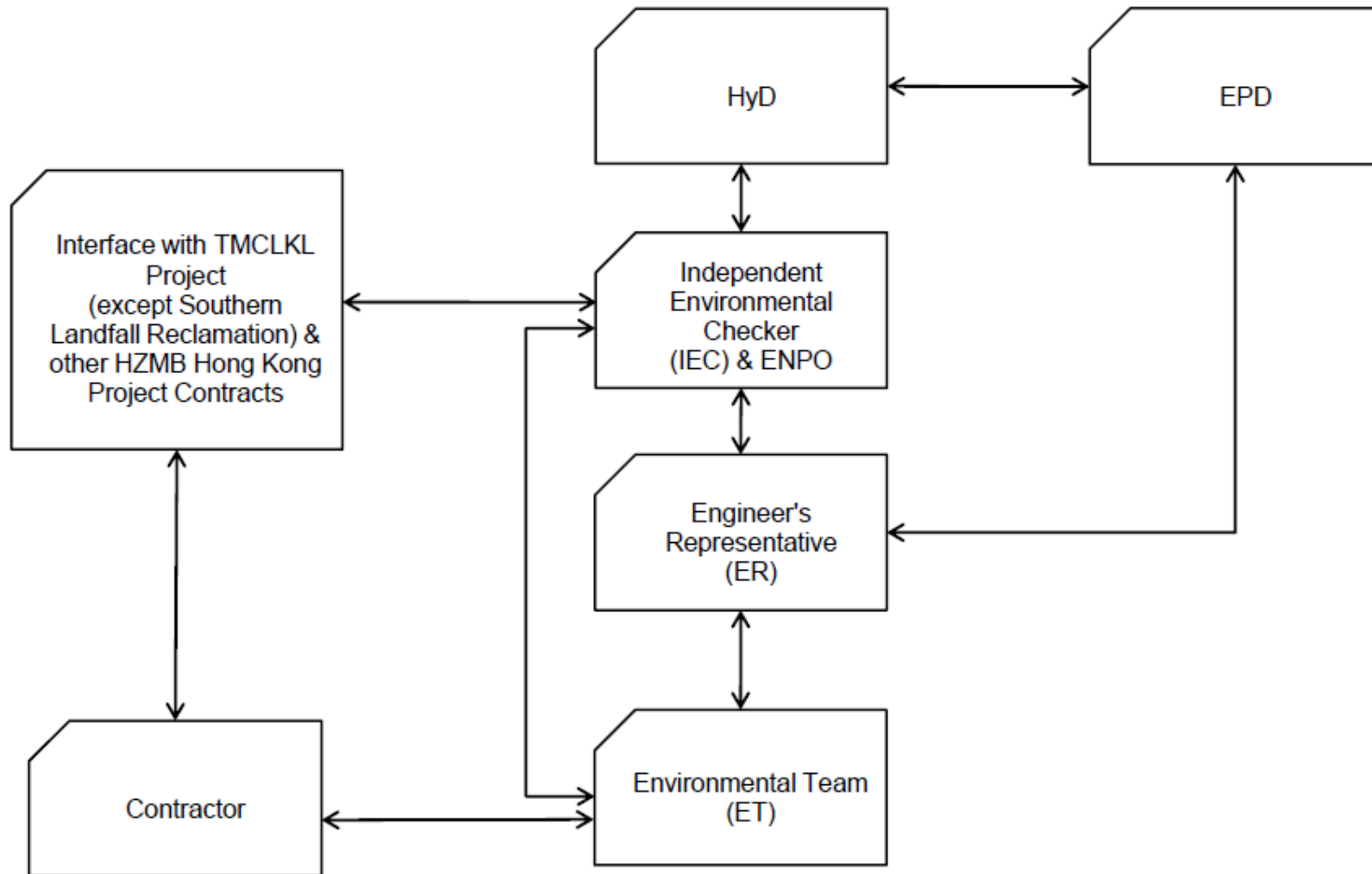
Environmental site inspection was carried out thirteen (13) times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

No environmental complaint, summons/ prosecution were received during the reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not recommended at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period. The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A

Project Organization for Environmental Works



↔ Line of Communication

Appendix B

Construction Programme for the Reporting Quarter

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration% Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015															
												March				April				May				June			
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08
HY/2012/07 - TM-CLK Link-SC [DWP rE] - Status Update 21-03-2015																											
Contract Key Dates																											
Possession Dates / Access Period																											
POS02	Portion A (Commencement of Works+499 days)	0	21-Mar-15*	0%	0		01-Nov-14		-139	0	0%	◆															
POS03	Portion B (Commencement of Works+619 days)	0	21-Mar-15*	0%	0		03-Mar-15		-18	307	0%	◆															
General Submissions																											
General Requirements																											
Temporary Works Design																											
PR00130	Unloading Jetty at HKBCF - Working Platform design and approval	90	02-Jun-14 A	10%	81	02-Jul-15	12-Nov-14	17-Feb-15	-105	15	10%	◆															
Land Works																											
PR00160	Propose/submit a performance review for piled fnds in accordance w/ ETWB TCW No. 4/20(101	26-May-14 A	80.2%	20	17-Apr-15	11-Jan-16	02-Feb-16	239	353	80%	◆															
Land GI Works																											
PR02204	SQR Sampling & Testing and Approval	110	14-Aug-14 A	68.18%	35	06-May-15	27-Nov-14	09-Jan-15	-92	2	68%	◆															
PR03110	Trial Pits along Cheung Tung Road	20	21-Oct-13 A	85%	3	24-Mar-15	27-Apr-18	30-Apr-18	917	5	85%	◆															
Additional Land GI																											
PR03200	PBH25, 29, 30, 31 (Piers D9, C14, C16, C17)	33	11-Jan-14 A	75.76%	8	30-Mar-15	21-Apr-18	30-Apr-18	912	912	75%	◆															
Design Submissions																											
Detailed Design (v18.8 18-08-14)																											
Ground Investigation																											
ARDD0009	Consultation with GEO	20	13-Aug-13 A	85%	3	25-Mar-15	14-Apr-15	16-Apr-15	16	42	85%	◆															
ARDD0010	IC/SO Approval of Ground Investigation Interpretative Report - AP03.00	75	13-Aug-13 A	40%	45	22-May-15	30-Jan-17	31-Mar-17	485	0	50%	◆															
ARDD0010-1	IC/SO Approval of Ground Investigation Interpretative Report - AP03.00	0		0%	0	22-May-15		31-Mar-17	485	0	0%	◆															
ARDD0013-2	Additional GI Fieldwork, Lab Testing and Permitting - Other areas	60	16-Jul-13 A	80%	12	07-Apr-15	13-Apr-18	30-Apr-18	799	799	90%	◆															
ARDD0017-2	IC/SO Approval of Additional GI Interpretative Report - AP03.00	75	29-Jan-14 A	40%	45	22-May-15	13-Feb-15	16-Apr-15	-26	0	30%	◆															
ARDD0017-4	IC/SO Approval of Additional GI Interpretative Report - AP03.00	0		0%	0	22-May-15		16-Apr-15	-26	0	0%	◆															
General Submissions																											
ARDD0037-1	Preparation of Seismic Performance Report Viaduct A,B,C,D - AP12.01	20	09-Apr-15	0%	20	06-May-15	23-Sep-15	20-Oct-15	119	0	0%	◆															
ARDD0037-2	IC/SO Approval of Seismic Performance Report Viaduct A,B,C,D - AP12.01	75	07-May-15	0%	75	19-Aug-15	21-Oct-15	02-Feb-16	119	222	0%	◆															
ARDD0037-4	Preparation of Seismic Performance Report Viaduct E - AP12.02	20	25-May-15	0%	20	19-Jun-15	23-Sep-15	20-Oct-15	87	0	0%	◆															
ARDD0037-7	Preparation of Seismic Performance Report Viaduct F - AP12.03	20	23-Mar-15	0%	20	17-Apr-15	23-Sep-15	20-Oct-15	132	0	0%	◆															
ARDD0037-8	IC/SO Approval of Seismic Performance Report Viaduct F - AP12.03	75	20-Apr-15	0%	75	31-Jul-15	21-Oct-15	02-Feb-16	132	0	0%	◆															
ARDD0042-2	IC/SO Approval of O&M Facility Provisions DDA - BP11.01	75	14-Jan-15 A	40%	45	22-May-15	19-Aug-15	20-Oct-15	107	0	50%	◆															
ARDD0042-4	IC/SO Approval of O&M Facility Provisions DDA - BP11.01	0		0%	0	22-May-15		20-Oct-15	107	65	0%	◆															
Viaduct E5 and E6																											
Viaduct Design																											
Viaduct E5 E6 Superstructure Optimisation																											
TGP0540	Viaduct E5 & E6 - Preparation of Optimised Bearing Schedule	15	23-Mar-15	0%	15	10-Apr-15	27-Mar-18	16-Apr-18	786	17	0%	◆															
TGP0550	Viaduct E5 & E6 - Preparation of Optimised Movement Joint Schedule	15	23-Mar-15	0%	15	10-Apr-15	10-Apr-18	30-Apr-18	796	796	0%	◆															
Associated Construction Milestones																											
ARDD0175	Viaduct E5 & E6 - DDA approval ready for Initial Segment Casting	0	18-Apr-15	0%	0		21-Apr-15		4	82	0%	◆															
Viaduct E7 & E8																											
Viaduct Design																											
Viaduct E7 E8 Superstructure Optimisation																											
TGP0740	Viaduct E7 & E8 - Preparation of Optimised Bearing Schedule	15	23-Mar-15	0%	15	10-Apr-15	27-Mar-18	16-Apr-18	786	17	0%	◆															
TGP0750	Viaduct E7 & E8 - Preparation of Optimised Movement Joint Schedule	15	23-Mar-15	0%	15	10-Apr-15	10-Apr-18	30-Apr-18	796	796	0%	◆															
Associated Construction Milestones																											
ARDD0220	Viaduct E7 & E8 - DDA approval ready for Initial Segment Casting	0	21-Mar-15	0%	0		22-Apr-15		33	111	0%	◆															
Viaduct E2																											

<ul style="list-style-type: none"> ■ Actual Work ■ Planned Bar ■ Critical Bar ◆ Milestone 	Project ID: J3518DWPrE-M22 Layout: J3518-DWP-3MRP Submission - M22_ Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.	Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 1 of 41 Pages) (Progress as of 21-Mar-15)	<table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td>09-Mar-15</td> <td></td> <td>DB</td> <td></td> </tr> <tr> <td>31-Mar-15</td> <td></td> <td>WY</td> <td></td> </tr> </table>	Date	Revision	Checked	Approved	09-Mar-15		DB		31-Mar-15		WY		DWG. No.: J3518/GCL/PGM/3MRP-M22
Date	Revision	Checked	Approved													
09-Mar-15		DB														
31-Mar-15		WY														

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																
												March			April			May			June							
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15
ARDD0604-2	IC/SO Approval of Slope Combined AIP/DDA - CP14.02	75	20-Apr-15	0%	75	31-Jul-15	26-Jun-15	08-Oct-15	49	0	0%																	
Waterworks, Drainage & Utility Diversions																												
ARDD0629	IC/SO Approval of Waterworks, Drainage & Utility DDA - BP20.01	75	22-Jul-14 A	90.67%	7	31-Mar-15	12-May-15	20-May-15	36	0	90%																	
ARDD0629-1	IC/SO Approval of Waterworks, Drainage & Utility DDA - BP20.01	0		0%	0	31-Mar-15		20-May-15	36	0	0%																	
ARDD0629-2	Gov't Approval of Submissions for Waterworks, Drainage & Utility Diversions	75	02-Jan-14 A	90.67%	7	31-Mar-15	13-Feb-15	23-Feb-15	-26	0	90%																	
ARDD0630-3	IC/SO Approval of Deck Drainage DDA - BP20.02	75	30-Jun-14 A	90.67%	7	31-Mar-15	23-Mar-17	31-Mar-17	523	0	90%																	
ARDD0630-4	IC/SO Approval of Deck Drainage DDA - BP20.02	0		0%	0	31-Mar-15		31-Mar-17	523	0	0%																	
Viaduct Approach Ramp Retaining Walls																												
Approach Ramp D																												
ARDD0652	Approach D - IC/SO Approval of Approach Ramp D DDA - DP23.01	75	25-Sep-14 A	89.33%	8	22-May-15	07-Apr-15	16-Apr-15	-26	0	90%																	
ARDD0652-1	Approach D - IC/SO Approval of Approach Ramp D DDA - DP23.01	0		0%	0	22-May-15		16-Apr-15	-26	0	0%																	
Approach Ramp C																												
ARDD0658	Approach C - IC/SO Approval of Approach Ramp C DDA - DP20.01	75	03-Oct-14 A	80%	15	10-Apr-15	24-Feb-15	17-Mar-15	-19	0	80%																	
ARDD0658-1	Approach C - IC/SO Approval of Approach Ramp C DDA - DP20.01	0		0%	0	10-Apr-15		17-Mar-15	-19	0	0%																	
Approach Ramp B																												
ARDD0664	Approach B - IC/SO Approval of Approach Ramp B DDA - DP21.01	75	14-Oct-14 A	89.33%	8	01-Apr-15	30-Dec-15	08-Jan-16	202	0	90%																	
ARDD0664-1	Approach B - IC/SO Approval of Approach Ramp B DDA - DP21.01	0		0%	0	01-Apr-15		08-Jan-16	202	230	0%																	
Approach A																												
ARDD0670	Approach A - IC/SO Approval of Approach Ramp A DDA - DP20.01	75	03-Oct-14 A	80%	15	10-Apr-15	21-Jul-15	10-Aug-15	86	0	80%																	
ARDD0670-1	Approach A - IC/SO Approval of Approach Ramp A DDA - DP20.01	0		0%	0	10-Apr-15		10-Aug-15	86	69	0%																	
Approach F																												
ARDD0676	Approach F - IC/SO Approval of Approach Ramp F DDA - DP24.01	75	23-Dec-14 A	49.33%	38	13-May-15	31-Mar-15	21-May-15	6	0	50%																	
ARDD0676-1	Approach F - IC/SO Approval of Approach Ramp F DDA - DP24.01	0		0%	0	13-May-15		08-Dec-15	149	32	0%																	
Viaduct Pavement																												
ARDD871	Viaduct Pavement - IC/SO Approval of AIP/DDA - BP02.01	75	27-Jun-14 A	100%	0	09-Mar-15 A					100%																	
ARDD871-1	Viaduct Pavement - IC/SO Approval of AIP/DDA - BP02.01	0		100%	0	09-Mar-15 A					100%																	
Signs, Markings and Street Furniture																												
ARDD0688	IC/SO Approval of Signs, Markings & Street Furniture DDA - BP03.01	75	16-Oct-14 A	100%	0	26-Feb-15 A					100%																	
ARDD0688-1	IC/SO Approval of Signs, Markings & Street Furniture DDA - BP03.01	0		100%	0	26-Feb-15 A					100%																	
Landscape																												
ARDD0700	IC/SO Approval of DDA for landscape works - BP22.01	75	15-Oct-14 A	60%	30	01-May-15	23-Nov-15	01-Jan-16	175	0	60%																	
ARDD0700-1	IC/SO Approval of DDA for landscape works - BP22.01	0		0%	0	01-May-15		01-Jan-16	175	0	0%																	
ARDD0701	Water Supply Application to WSD	0		0%	0	01-May-15		01-Jan-16	175	0	0%																	
ARDD0702	Gov't Approval of LVIA	40	04-May-15	0%	40	26-Jun-15	04-Jan-16	26-Feb-16	175	168	0%																	
Remaining Works																												
ARDD0704	Preparation of Remaining Works AIP - ZP01.00	30	23-Mar-15	0%	30	01-May-15	29-Aug-16	07-Oct-16	375	0	0%																	
ARDD0705	IC/SO Approval of Remaining Works AIP - ZP01.00	40	04-May-15	0%	40	26-Jun-15	10-Oct-16	02-Dec-16	375	0	0%																	
Segment Target Geometry And Erection Engineering																												
Viaduct A																												
ARDD0716	Viaduct A - Confirmation of Erection Sequence from Freyssinet	0		0%	0	23-Mar-15		05-Feb-15	-31	0	0%																	
ARDD0717	Viaduct A - Erection Sequence Analysis	20	23-Mar-15	0%	20	17-Apr-15	06-Feb-15	05-Mar-15	-31	0	0%																	
ARDD0718	Viaduct A - Target Geometry Analysis	20	20-Apr-15	0%	20	15-May-15	06-Mar-15	02-Apr-15	-31	0	0%																	
ARDD0719	Viaduct A - Segment Geometry Schedules	10	18-May-15	0%	10	29-May-15	03-Apr-15	16-Apr-15	-31	33	0%																	
Viaduct C																												
ARDD0721	Viaduct C - Confirmation of Erection Sequence from Freyssinet	0		0%	0	23-Mar-15		05-Jan-15	-55	0	0%																	
ARDD0722	Viaduct C - Erection Sequence Analysis	20	23-Mar-15	0%	20	17-Apr-15	05-Jan-15	02-Feb-15	-55	0	0%																	
ARDD0723	Viaduct C - Target Geometry Analysis	20	20-Apr-15	0%	20	15-May-15	02-Feb-15	02-Mar-15	-55	0	0%																	
ARDD0724	Viaduct C - Segment Geometry Schedules	10	18-May-15	0%	10	29-May-15	02-Mar-15	16-Mar-15	-55	5	0%																	

■ Actual Work
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■ Critical Bar
◆ Milestone

Project ID: J3518DWPrE-M22
 Layout: J3518-DWP-3MRP Submission - M22_
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 4 of 41 Pages)
(Progress as of 21-Mar-15)

Date	Revision	Checked	Approved
09-Mar-15		DB	
31-Mar-15		WY	

DWG. No.:
J3518/GCL/PGM/3MRP-M22

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																			
												March					April					May					June				
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15			
Precast Pile Caps																															
MBDC0130-8	D: Progressive Pile Cap Shell Manufacture & Delivery remaining shells	90	07-Dec-14 A	42.22%	52	27-May-15	09-Feb-15	17-Apr-15	-32	868	42.8%																				
Precast Deck Segments																															
MBDE0120	D: Commence Segment Casting on Approval of DDA	0	30-Apr-15	0%	0		21-Jan-15		-78	0	0%																				
MBDE0130-1	D: Commence Pier Head Segment Delivery	0	06-Jun-15	0%	0		03-Jul-15		21	0	0%																				
MBDE0130-5	D: Progressive Pier Head Segment Manufacture & Delivery	107	06-Jun-15	0%	107	13-Oct-15	03-Jul-15	07-Nov-15	21	23	0%																				
Viaduct C																															
Precast Pile Caps																															
MBCC0120	C: Commence Pile Cap Shell Casting on Approval of DDA	0	21-Mar-15	0%	0		17-Jan-15		-51	0	0%																				
MBCC0130	C: Commence Pile Cap Shell Delivery	0	22-May-15	0%	0		18-Mar-15		-51	0	0%																				
MBCC0130-1	C: Progressive Pile Cap Shell Manufacture & Delivery remaining shells	80	22-May-15	0%	80	26-Aug-15	18-Mar-15	27-Jun-15	-51	0	0%																				
PP7490	Production of initial Viaduct C Marine Precast Pile Cap Shells	38	21-Mar-15	0%	38	09-May-15	21-Jan-15	10-Mar-15	-48	0	0%																				
Viaduct A																															
Precast Pile Caps																															
MBAC0120	A: Commence Pile Cap Shell Casting on Approval of DDA	0	21-Mar-15	0%	0		02-Sep-15		133	0	0%																				
MBAC0130	A: Commence Pile Cap Shell Delivery	0	22-May-15	0%	0		11-Dec-15		168	30	0%																				
PP7570	Production of initial Viaduct A Marine Precast Pile Cap Shells	40	11-May-15	0%	40	27-Jun-15	02-Sep-15	20-Oct-15	95	0	0%																				
Parapets																															
MBEE0090	Approval of DDA to start Precast Parapets/Barriers Casting	0	01-Apr-15	0%	0		16-Oct-15		160	31	0%																				
PP6010	Procure Sub-Contractor for Precast Parapets/Barriers	40	21-Mar-15	0%	40	12-May-15	28-Aug-15	15-Oct-15	129	0	0%																				
PP6011	Precast Parapets/Barriers Detail Design & Procure Moulds	120	13-May-15	0%	120	05-Oct-15	16-Oct-15	11-Mar-16	129	0	0%																				
PP6011-02	Viaduct B - Precast Parapets/Barriers Production & Delivery	120	13-May-15	0%	120	05-Oct-15	12-Feb-16	09-Jul-16	224	62	0%																				
PP6011-03	Viaduct C - Precast Parapets/Barriers Production & Delivery	120	13-May-15	0%	120	05-Oct-15	16-Dec-15	17-May-16	180	0	0%																				
PP6011-04	Viaduct D - Precast Parapets/Barriers Production & Delivery	120	13-May-15	0%	120	05-Oct-15	10-Dec-15	10-May-16	175	0	0%																				
PP6011-05	Viaduct E - Precast Parapets/Barriers Production & Delivery	180	13-May-15	0%	180	15-Dec-15	16-Oct-15	27-May-16	129	173	0%																				
PP6011-06	Viaduct F - Precast Parapets/Barriers Production & Delivery	120	13-May-15	0%	120	05-Oct-15	28-Jan-16	27-Jun-16	214	275	0%																				
Materials																															
PP7010	Procure Sub-contractor for Signs & Street Furniture	90	21-Mar-15	0%	90	13-Jul-15	24-Jul-15	09-Nov-15	99	0	0%																				
H-Piles																															
PP7550	Procurement of Viaduct A Socketted H-Piles	70	21-Mar-15	0%	70	17-Jun-15	29-Jul-15	20-Oct-15	103	0	0%																				
Reinforcement																															
Bored Piles																															
PP7100	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct E5 & E6 Piles	185	07-Jul-14 A	40.54%	110	05-Aug-15	16-Oct-14	28-Feb-15	-128	810	40%																				
PP7170	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct E7 & E8 Piles	185	07-Jul-14 A	40.54%	110	05-Aug-15	15-Dec-14	05-May-15	-77	810	40%																				
PP7240	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct E2 Piles	106	15-Apr-14 A	50.94%	52	27-May-15	06-Dec-14	09-Feb-15	-84	133	50%																				
PP7380	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct D Piles	25	28-Jul-14 A	68%	8	30-Mar-15	08-Jun-15	16-Jun-15	61	6	68%																				
PP7460	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct C Piles	35	18-Aug-14 A	28.57%	25	23-Apr-15	10-Feb-15	14-Mar-15	-31	0	28%																				
PP7540	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct A Piles	21	12-Aug-14 A	14.29%	18	15-Apr-15	04-Feb-15	28-Feb-15	-35	6	14%																				
PP7620	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct F1 & F3 Piles	61	21-Mar-15	0%	61	06-Jun-15	17-Dec-14	04-Mar-15	-75	0	0%																				
PP7690	Rebar - Cut, Bend & Fabricate Pile Cage for Viaduct F2, F4 & F5 Piles	73	21-Mar-15	0%	73	22-Jun-15	14-Jan-15	16-Apr-15	-54	0	0%																				
Marine Pile Caps																															
PP7110	Rebar - Cut, Bend & Fabricate for Viaduct E5 & E6 Pile Caps	245	21-Mar-15	0%	245	16-Jan-16	16-Oct-14	14-Aug-15	-128	0	0%																				
PP7180	Rebar - Cut, Bend & Fabricate for Viaduct E7 & E8 Pile Caps	102	21-Mar-15	0%	102	27-Jul-15	15-Dec-14	24-Apr-15	-77	0	0%																				
PP7250	Rebar - Cut, Bend & Fabricate for Viaduct E2 Pile Caps	185	21-Mar-15	0%	185	04-Nov-15	06-Dec-14	27-Jul-15	-84	0	0%																				
PP7320	Rebar - Cut, Bend & Fabricate for Viaduct E1 Pile Caps	67	11-Dec-14 A	7.46%	62	08-Jun-15	26-Nov-14	09-Feb-15	-93	0	7%																				
PP7400	Rebar - Cut, Bend & Fabricate for Viaduct D Marine Pile Caps	47	18-Dec-14 A	6.38%	44	16-May-15	06-Mar-18	30-Apr-18	876	876	6%																				
PP7480	Rebar - Cut, Bend & Fabricate for Viaduct C Marine Pile Caps	42	10-Apr-15	0%	42	30-May-15	08-Mar-18	30-Apr-18	865	865	0%																				
PP7560	Rebar - Cut, Bend & Fabricate for Viaduct A Marine Pile Caps	36	23-Apr-15	0%	36	05-Jun-15	07-Sep-15	20-Oct-15	113	76	0%																				

■ Actual Work
■ Planned Bar
■ Critical Bar
◆ Milestone

Project ID: J3518DWPRe-M22
 Layout: J3518-DWP-3MRP Submission - M22_
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 8 of 41 Pages)
(Progress as of 21-Mar-15)

Date	Revision	Checked	Approved
09-Mar-15		DB	
31-Mar-15		WY	

DWG. No.:
J3518/GCL/PGM/3MRP-M22

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																			
												March					April					May					June				
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15			
Pier A4 (A2b)																															
Foundation Works																															
GFXX127	A4 (A2b) - Inst.Temp.Working Platform	12	26-Feb-15 A	100%	0	20-Mar-15 A					100%	[Gantt bar: 26-Feb-15 to 20-Mar-15]																			
GFXX128	A4 (A2b) - Pre-drilling (2 nos)	13	21-Mar-15	0%	13	09-Apr-15	17-Jun-15	03-Jul-15	69	0	0%	[Gantt bar: 21-Mar-15 to 03-Jul-15]																			
GFXX128-2	A4 (A2b) - Confirm Rockhead Levels	8	10-Apr-15	0%	8	18-Apr-15	04-Jul-15	13-Jul-15	69	28	0%	[Gantt bar: 10-Apr-15 to 13-Jul-15]																			
GFXX129	A4 (A2b) - Bored Piles (2.20m dia. x 2 nos)	90	23-May-15	0%	90	08-Sep-15	14-Jul-15	29-Oct-15	41	0	0%	[Gantt bar: 23-May-15 to 29-Oct-15]																			
Pier A5 (A2a)																															
Foundation Works																															
GFXX122	A5 (A2a) - Inst.Temp.Working Platform	13	06-Mar-15 A	27%	9	01-Apr-15	22-Jun-15	03-Jul-15	73	0	50%	[Gantt bar: 06-Mar-15 to 03-Jul-15]																			
GFXX123	A5 (A2a) - Pre-drilling (2 nos)	12	01-Apr-15	0%	12	20-Apr-15	04-Jul-15	17-Jul-15	73	0	0%	[Gantt bar: 01-Apr-15 to 17-Jul-15]																			
GFXX123-2	A5 (A2a) - Confirm Rockhead Levels	8	20-Apr-15	0%	8	29-Apr-15	18-Jul-15	27-Jul-15	73	32	0%	[Gantt bar: 20-Apr-15 to 27-Jul-15]																			
GFXX124	A5 (A2a) - Bored Piles (2.20m dia. x 2 nos)	90	08-Jun-15	0%	90	22-Sep-15	28-Jul-15	12-Nov-15	41	0	0%	[Gantt bar: 08-Jun-15 to 12-Nov-15]																			
Pier A6 (A1f)																															
Foundation Works																															
GFXX118	A6 (A1f) - Pre-drilling (3 nos)	12	03-Mar-15 A	100%	0	11-Mar-15 A					100%	[Gantt bar: 03-Mar-15 to 11-Mar-15]																			
GFXX118-2	A6 (A1f) - Confirm Rockhead Levels	8	21-Mar-15	0%	8	30-Mar-15	06-Jul-15	14-Jul-15	83	41	0%	[Gantt bar: 21-Mar-15 to 14-Jul-15]																			
GFXX119	A6 (A1f) - Bored Piles (1.80m dia. x 3 nos)	90	23-May-15	0%	90	08-Sep-15	15-Jul-15	30-Oct-15	42	0	0%	[Gantt bar: 23-May-15 to 30-Oct-15]																			
Bridge A1																															
Pier A7 (A1e)																															
Foundation Works																															
GFXX113	A7 (A1e) - Pre-drilling (2 nos)	12	12-Feb-15 A	100%	0	25-Feb-15 A					100%	[Gantt bar: 12-Feb-15 to 25-Feb-15]																			
GFXX113-2	A7 (A1e) - Confirm Rockhead Levels	8	26-Feb-15 A	100%	0	06-Mar-15 A					100%	[Gantt bar: 26-Feb-15 to 06-Mar-15]																			
GFXX114	A7 (A1e) - Bored Piles (2.20m dia. x 2 nos)	90	26-Feb-15 A	22.22%	70	17-Jun-15	19-Sep-15	12-Dec-15	148	0	20%	[Gantt bar: 26-Feb-15 to 12-Dec-15]																			
GFXX115	A7 (A1e) - Sonic & Interface Coring	12	18-Jun-15	0%	12	03-Jul-15	14-Dec-15	29-Dec-15	148	0	0%	[Gantt bar: 18-Jun-15 to 29-Dec-15]																			
Pier A8 (A1d)																															
Preliminary Works for Land Piling																															
GFXX281	A8 (A1d) - Mobilise & Set up grouting equipment	24	12-Mar-15 A	100%	0	13-Mar-15 A					100%	[Gantt bar: 12-Mar-15 to 13-Mar-15]																			
GFXX281-1	A8 (A1d) - Pre-grouting Works	24	13-Mar-15 A	50%	12	08-Apr-15	17-Apr-18	30-Apr-18	908	0	50%	[Gantt bar: 13-Mar-15 to 30-Apr-18]																			
PA080020	A8 (A1d) - Erect MTR protective fence / Remove existing fence	12	26-Feb-15 A	100%	0	10-Mar-15 A					100%	[Gantt bar: 26-Feb-15 to 10-Mar-15]																			
PA080050	A8 (A1d) - Complete Civil Preparation Works for piling to commence	0		0%	0	08-Apr-15		30-Apr-18	851	851	0%	[Milestone: 08-Apr-15]																			
Socketted H-Pile installation																															
GFXX297-1	A8 (A1d) - Confirm Rockhead Levels	8	21-Mar-15	0%	8	30-Mar-15	10-Jul-15	18-Jul-15	87	87	0%	[Gantt bar: 21-Mar-15 to 18-Jul-15]																			
Pier A9 (A1c)																															
Preliminary Works for Land Piling																															
GFXX281-2	A9 (A1c) - Pre-grouting Works	24	21-Mar-15 A	0%	24	22-Apr-15	29-Mar-18	30-Apr-18	896	0	0%	[Gantt bar: 21-Mar-15 to 30-Apr-18]																			
PA090030	A09 (A1c) - Erect MTR protective fence	12	16-Mar-15 A	100%	0	19-Mar-15 A					100%	[Gantt bar: 16-Mar-15 to 19-Mar-15]																			
PA090050	A9 (A1c) - Set up piling platform	24	29-Jan-15 A	100%	0	04-Mar-15 A					100%	[Gantt bar: 29-Jan-15 to 04-Mar-15]																			
PA090060	A9 (A1c) - Complete civil preparation works for piling to commence	0		0%	0	22-Apr-15		30-Apr-18	840	840	0%	[Milestone: 22-Apr-15]																			
Socketted H-Pile installation																															
GFXX293	A9 (A1c) - Install SH Pile (11 no.)	120	30-May-15	0%	120	22-Oct-15	15-Sep-15	12-Feb-16	90	0	0%	[Gantt bar: 30-May-15 to 12-Feb-16]																			
Pier A10 (A1b)																															
Preliminary Works for Land Piling																															
GFXX281-3	A10 (A1b) - Pregroutings Works	24	21-Feb-15 A	100%	0	21-Feb-15 A					100%	[Gantt bar: 21-Feb-15 to 21-Feb-15]																			
PA100040	A10 (A1b) - Install Geo. Instru. & Baseline Monitoring	36	09-Feb-15 A	100%	0	21-Feb-15 A					100%	[Gantt bar: 09-Feb-15 to 21-Feb-15]																			
PA100050	A10 (A1b) - Set up piling platform	24	09-Feb-15 A	100%	0	21-Feb-15 A					100%	[Gantt bar: 09-Feb-15 to 21-Feb-15]																			
PA100060	A10 (A1b) - Complete civil preparation works for piling to commence	0		0%	0	21-Mar-15		30-Apr-18	863	863	0%	[Milestone: 21-Mar-15]																			
Socketted H-Pile installation																															
GFXX286-3	A10 (A1b) - Confirm Rockhead Levels	8	21-Mar-15	0%	8	30-Mar-15	21-Apr-18	30-Apr-18	912	912	0%	[Gantt bar: 21-Mar-15 to 30-Apr-18]																			

<ul style="list-style-type: none"> █ Actual Work █ Planned Bar █ Critical Bar ◆ Milestone 	Project ID: J3518DWPRe-M22 Layout: J3518-DWP-3MRP Submission - M22_ Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.	Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 12 of 41 Pages) (Progress as of 21-Mar-15)	<table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td>09-Mar-15</td> <td></td> <td>DB</td> <td></td> </tr> <tr> <td>31-Mar-15</td> <td></td> <td>WY</td> <td></td> </tr> </table>	Date	Revision	Checked	Approved	09-Mar-15		DB		31-Mar-15		WY		DWG. No.: J3518/GCL/PGM/3MRP-M22
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Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																			
												March					April					May					June				
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15			
GFX288	A10 (A1b) - Install SH Pile (8 no.)	120	11-Mar-15 A	15%	102	27-Jul-15	19-Jun-15	20-Oct-15	71	0	15%																				
Pier A11 (A1a) & Abutment A																															
Preliminary Works for Land Piling																															
GFX281-4	A11 (A1a) - Pregrouting Works	24	22-Feb-15 A	100%	0	22-Feb-15 A					100%																				
PA110050	A11 (A1a) - Set up piling platform	24	09-Feb-15 A	100%	0	27-Feb-15 A					100%																				
PA110060	A11 (A1a) - Completion of civil preparation works for piling to commence	0		0%	0	21-Mar-15		28-Apr-15	27	0	0%																				
Socketted H-Pile installation																															
GFX286-4	A11 (A1a) - Confirm Rockhead Levels	8	21-Mar-15	0%	8	30-Mar-15	09-Jun-15	17-Jun-15	62	41	0%																				
GFX287	A11 (A1a) - Install SH Pile (6 no.)	149	23-May-15	0%	149	19-Nov-15	18-Jun-15	14-Dec-15	21	0	0%																				
Viaduct B																															
Bridge B3																															
Pier B2 (B3e)																															
Pier Head Segments																															
SB3E0380	B2 (B3e) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	19-Feb-15 A	100%	0	28-Feb-15 A					100%																				
Pier B3 (B3d)																															
Pier Head Segments																															
SB3D0372	B3 (B3d) - Pier Head Segment Lift & Fix (1 seg)	2	25-Feb-15 A	100%	0	25-Feb-15 A					100%																				
SB3D0374	B3 (B3d) - Pier Head Segment Diaphragm - Rebar	13	09-Mar-15 A	100%	0	13-Mar-15 A					100%																				
SB3D0376	B3 (B3d) - Pier Head Segment Diaphragm - Formwork & Prep for Concreting	8	11-Mar-15 A	100%	0	13-Mar-15 A					100%																				
SB3D0378	B3 (B3d) - Pier Head Segment Diaphragm - Concreting	2	13-Mar-15 A	100%	0	13-Mar-15 A					100%																				
SB3D0380	B3 (B3d) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	14-Mar-15 A	100%	0	20-Mar-15 A					100%																				
Pier B4 (B3c)																															
Pier Works																															
SB3C0340	B4 (B3c) - Type 4B Pier Head Curing/Striking of Forms/Remove Scaffolding	6	18-Feb-15 A	100%	0	02-Mar-15 A					100%																				
Pier Head Segments																															
SB3C0370	B4 (B3c) - Pier Head Segment - Temporary Platform	6	06-Mar-15 A	100%	0	10-Mar-15 A					100%																				
SB3C0372	B4 (B3c) - Pier Head Segment Lift & Fix (1 seg)	2	20-Mar-15 A	100%	0	20-Mar-15 A					100%																				
SB3C0374	B4 (B3c) - Pier Head Segment Diaphragm - Rebar	12	21-Mar-15	0%	12	08-Apr-15	02-Mar-15	16-Mar-15	-17	0	0%																				
SB3C0376	B4 (B3c) - Pier Head Segment Diaphragm - Formwork & Prep for Concreting	8	09-Apr-15	0%	8	18-Apr-15	16-Mar-15	25-Mar-15	-17	0	0%																				
SB3C0378	B4 (B3c) - Pier Head Segment Diaphragm - Concreting	2	20-Apr-15	0%	2	21-Apr-15	25-Mar-15	27-Mar-15	-17	0	0%																				
SB3C0380	B4 (B3c) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	22-Apr-15	0%	6	29-Apr-15	08-Apr-15	16-Apr-15	-11	0	0%																				
Pier B5 (B3b)																															
Pier Works																															
SB3B0340	B5 (B3b) - Type 4B Pier Head Curing/Striking of Forms/Remove Scaffolding	6	13-Feb-15 A	100%	0	25-Feb-15 A					100%																				
Pier Head Segments																															
SB3B0370	B5 (B3b) - Pier Head Segment - Temporary Platform	6	02-Mar-15 A	100%	0	09-Mar-15 A					100%																				
SB3B0372	B5 (B3b) - Pier Head Segment Lift & Fix (1 seg)	2	18-Mar-15 A	100%	0	18-Mar-15 A					100%																				
SB3B0374	B5 (B3b) - Pier Head Segment Diaphragm - Rebar	12	21-Mar-15	0%	12	08-Apr-15	23-Mar-15	10-Apr-15	2	0	0%																				
SB3B0376	B5 (B3b) - Pier Head Segment Diaphragm - Formwork & Prep for Concreting	8	09-Apr-15	0%	8	18-Apr-15	10-Apr-15	21-Apr-15	2	0	0%																				
SB3B0378	B5 (B3b) - Pier Head Segment Diaphragm - Concreting	2	20-Apr-15	0%	2	21-Apr-15	21-Apr-15	24-Apr-15	2	0	0%																				
SB3B0380	B5 (B3b) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	22-Apr-15	0%	6	29-Apr-15	02-May-15	09-May-15	8	0	0%																				
Pier B6 (B3a)																															
Pier Works																															
SB3A0310	B6 (B3a) - Type 4B-MJ Pier Head Rebarwork	5	23-Feb-15 A	100%	0	12-Mar-15 A					100%																				
SB3A0320	B6 (B3a) - Type 4B-MJ Pier Head Formwork & Prep for Concreting	5	13-Mar-15 A	50%	3	24-Mar-15	13-Feb-15	16-Feb-15	-28	0	70%																				
SB3A0330	B6 (B3a) - Type 4B-MJ Pier Head Concreting	1	24-Mar-15	0%	1	25-Mar-15	17-Feb-15	17-Feb-15	-28	0	0%																				
SB3A0340	B6 (B3a) - Type 4B-MJ Pier Head Curing/Striking of Forms/Remove Scaffolding	6	25-Mar-15	0%	6	01-Apr-15	18-Feb-15	27-Feb-15	-28	0	0%																				
SB3A0350	B6 (B3a) - Type 4B-Bearing Plinth	6	25-Mar-15	0%	6	01-Apr-15	18-Feb-15	27-Feb-15	-28	0	0%																				

<ul style="list-style-type: none"> ■ Actual Work ■ Planned Bar ■ Critical Bar ◆ Milestone 	Project ID: J3518DWPPrE-M22 Layout: J3518-DWP-3MRP Submission - M22_ Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.	Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 13 of 41 Pages) (Progress as of 21-Mar-15)	<table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td>09-Mar-15</td> <td></td> <td>DB</td> <td></td> </tr> <tr> <td>31-Mar-15</td> <td></td> <td>WY</td> <td></td> </tr> </table>	Date	Revision	Checked	Approved	09-Mar-15		DB		31-Mar-15		WY		DWG. No.: J3518/GCL/PGM/3MRP-M22
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												March					April					May					June				
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15			
Pier C10 (C3b)																															
Foundation Works																															
GFXX418	C10 (C3b) - Bored Pile (2.20m dia. x 2 nos)	51	19-Jan-15 A	75%	13	09-Apr-15	29-Jun-15	14-Jul-15	78	0	75%																				
GFXX421-2	C10 (C3b) - Sonic & Interface Coring Tests	12	06-Jun-15	0%	12	19-Jun-15	05-Aug-15	18-Aug-15	49	0	0%																				
Pier C11 (C3a)																															
Foundation Works																															
GFXX416	C11 (C3a) - Bored Pile (2.00m dia. x 2 nos)	45	24-Jan-15 A	95%	2	24-Mar-15	30-Mar-17	01-Apr-17	602	91	95%																				
GFXX421-3	C11 (C3a) - Sonic & Interface Coring Tests	12	12-Mar-15 A	30%	8	31-Mar-15	01-Sep-15	10-Sep-15	133	0	30%																				
Bridge C2																															
Pier C12 (C2f)																															
Foundation Works																															
GFXX412	C12 (C2f) - Bored Pile (2.00m dia. x 2 nos)	66	21-Jan-15 A	71%	19	17-Apr-15	14-Sep-15	08-Oct-15	144	0	71%																				
GFXX413	C12 (C2f) - Sonic & Interface Coring Tests	12	17-Apr-15	0%	12	02-May-15	24-Oct-15	06-Nov-15	156	12	0%																				
GFXX422-4	C12 (C2f) - Selection of bored pile for Full Depth Coring	24	17-Apr-15	0%	24	16-May-15	09-Oct-15	06-Nov-15	144	0	0%																				
GFXX422-8	C12 (C2f) - Bored Pile Full Depth Coring & Testing	24	16-May-15	0%	24	15-Jun-15	07-Nov-15	04-Dec-15	144	0	0%																				
Pier C13 (C2e) Portal																															
Socketted H-Pile Installation																															
GFXX399-4	C13 (C2e) - Selction of pile for Loading Test	24	21-Mar-15	0%	24	22-Apr-15	22-Aug-15	18-Sep-15	124	0	0%																				
GFXX399-6	C13 (C2e) - Loading Test for pre-bored H-pile	36	23-Apr-15	0%	36	05-Jun-15	19-Sep-15	03-Nov-15	124	0	0%																				
Pile Cap Works																															
SC2ER090	C13B (C2e-R) - Pile cap Excavation / ELS	18	06-Jun-15	0%	18	04-Jul-15	04-Nov-15	24-Nov-15	111	0	0%																				
Pier C14 (C2d)																															
Socketted H-Pile Installation																															
GFXX381-2	C14 (C2d) - Install SH Pile (12 nr)	60	07-Jan-15 A	100%	0	28-Feb-15 A					100%																				
Pier C15 (C2c)																															
Socketted H-Pile Installation																															
GFXX381-3	C15 (C2c) - Install SH Pile (13 nr)	60	19-Jan-15 A	100%	0	21-Mar-15 A					100%																				
Pier C16 (C2b)																															
Foundation Works																															
GFXX408	C16 (C2b) - Bored Pile (2.00m dia. x 2 nos)	52	13-May-15	0%	52	16-Jul-15	17-Aug-15	17-Oct-15	78	0	0%																				
Bridge C1																															
Pier C17 (C2a)																															
Foundation Works																															
GFXX406	C17 (C2a) - Bored Pile (2.00m dia. x 2 nos)	52	09-Apr-15	0%	52	11-Jun-15	15-Jul-15	12-Sep-15	78	0	0%																				
GFXX409-2	C17 (C2a) - Sonic & Interface Coring Tests	12	11-Jun-15	0%	12	26-Jun-15	10-Nov-15	23-Nov-15	124	0	0%																				
Pier C18 (C3d) Portal																															
Pile Cap Works																															
SC1ER090	C18B (C1e-R) - Pile cap Excavation / ELS	18	09-Mar-15 A	80%	4	25-Mar-15	04-May-16	09-May-16	310	0	80%																				
SC1ER092	C18B (C1e-R)- Pile cap Pile breakdown to cut-off etc	4	25-Mar-15	0%	4	30-Mar-15	09-May-16	13-May-16	310	37	0%																				
SC1ER100	C18B (C1e-R)- Pile cap Blinding	1	23-May-15	0%	1	23-May-15	13-May-16	16-May-16	272	0	0%																				
SC1ER110	C18B (C1e-R)- Pile cap Formwork	3	30-May-15	0%	3	02-Jun-15	21-May-16	25-May-16	272	0	0%																				
SC1ER120	C18B (C1e-R)- Pile cap Rebarwork	4	26-May-15	0%	4	29-May-15	16-May-16	21-May-16	272	0	0%																				
SC1ER122	C18B (C1e-R)- Pile cap Kicker Formwork	2	05-Jun-15	0%	2	06-Jun-15	01-Jun-16	06-Jun-16	277	4	0%																				
SC1ER130	C18B (C1e-R)- Pile cap Concreting	1	04-Jun-15	0%	1	04-Jun-15	25-May-16	27-May-16	272	0	0%																				
SC1ER140	C18B (C1e-R) - Pile cap Curing & Striking of Forms incl. CJ prep	6	05-Jun-15	0%	6	13-Jun-15	27-May-16	06-Jun-16	273	0	0%																				
Pier Works																															
SC1EL150	C18A (C1e-L) - Pier Scaffolding (1st Lift)	3	21-Mar-15	0%	3	24-Mar-15	31-May-16	03-Jun-16	329	0	0%																				
SC1EL160	C18A (C1e-L) - Pier Rebarwork (1st Lift)	3	25-Mar-15	0%	3	27-Mar-15	04-Jun-16	08-Jun-16	329	0	0%																				

Actual Work
 Planned Bar
 Critical Bar
 Milestone

Project ID: J3518DWPRe-M22
 Layout: J3518-DWP-3MRP Submission - M22_
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 20 of 41 Pages)
(Progress as of 21-Mar-15)

Date	Revision	Checked	Approved
09-Mar-15		DB	
31-Mar-15		WY	

DWG. No.:
J3518/GCL/PGM/3MRP-M22

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration% Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																			
												March					April					May					June				
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15			
Pier D17 (D1d)																															
Pile Cap Works																															
SD1D0092	D17 (D1d) - Pile cap Pile breakdown to cut-off etc.	4	14-Feb-15 A	100%	0	11-Mar-15 A					100%																				
SD1D0110	D17 (D1d) - Pile cap Formwork	3	12-Mar-15 A	100%	0	13-Mar-15 A					100%																				
SD1D0120	D17 (D1d) - Pile cap Rebarwork	4	20-Mar-15 A	0%	4	25-Mar-15	25-Apr-18	30-Apr-18	859	859	0%																				
SD1D0122	D17 (D1d) - Pile cap Kicker Formwork	2	23-Mar-15	0%	2	24-Mar-15	31-Mar-17	01-Apr-17	564	130	0%																				
SD1D0130	D17 (D1d) - Pile cap Concreting	1	21-Mar-15	0%	1	21-Mar-15	11-Mar-17	11-Mar-17	548	0	0%																				
SD1D0140	D17 (D1d) - Pile cap Curing & Striking of Forms incl. CJ prep	6	23-Mar-15	0%	6	28-Mar-15	23-Apr-18	30-Apr-18	856	856	0%																				
Pier Works																															
SD1D0150	D17 (D1d) - Type 5B-B Pier Scaffolding (1st Lift)	2	11-Mar-15 A	100%	0	13-Mar-15 A					100%																				
SD1D0160	D17 (D1d) - Type 5B-B Pier Rebarwork (1st Lift)	3	21-Mar-15	0%	3	24-Mar-15	13-Aug-15	15-Aug-15	103	0	0%																				
SD1D0170	D17 (D1d) - Type 5B-B Pier Formwork & Prep for Concreting (1st Lift)	3	25-Mar-15	0%	3	27-Mar-15	17-Aug-15	19-Aug-15	103	0	0%																				
SD1D0180	D17 (D1d) - Type 5B-B Pier Concreting (1st Lift)	1	28-Mar-15	0%	1	28-Mar-15	21-Aug-15	21-Aug-15	103	0	0%																				
SD1D0182	D17 (D1d) - Type 5B-B Pier Curing & Striking of Forms incl. CJ prep (1st Lift)	2	30-Mar-15	0%	2	31-Mar-15	22-Aug-15	24-Aug-15	103	0	0%																				
SD1D0190	D17 (D1d) - Type 5B-B Pier Head Scaffolding	3	01-Apr-15	0%	3	08-Apr-15	25-Aug-15	27-Aug-15	103	0	0%																				
SD1D0200	D17 (D1d) - Type 5B-B Pier Head Rebarwork	4	09-Apr-15	0%	4	13-Apr-15	28-Aug-15	01-Sep-15	103	0	0%																				
SD1D0210	D17 (D1d) - Type 5B-B Pier Head Formwork & Prep for Concreting	4	14-Apr-15	0%	4	18-Apr-15	02-Sep-15	05-Sep-15	103	0	0%																				
SD1D0220	D17 (D1d) - Type 5B-B Pier Head Concreting	1	20-Apr-15	0%	1	20-Apr-15	07-Sep-15	07-Sep-15	103	0	0%																				
SD1D0310	D17 (D1d) - Type 5B-B Pier Head Curing/Striking of Forms/Remove Scaffolding	6	21-Apr-15	0%	6	28-Apr-15	08-Sep-15	15-Sep-15	103	0	0%																				
SD1D0320	D17 (D1d) - Type 5B-B Pier Backfilling Works	4	29-Apr-15	0%	4	04-May-15	16-Sep-15	21-Sep-15	103	6	0%																				
Pier Head Segments																															
SD1D0370	D17 (D1d) - Pier Head Segment - Temporary Platform	6	13-May-15	0%	6	19-May-15	22-Sep-15	29-Sep-15	97	88	0%																				
Pier D18 (D1c)																															
Pier Works																															
SD1C0150	D18 (D1c) - Type 5B-B Pier Scaffolding (1st Lift)	2	11-Mar-15 A	100%	0	13-Mar-15 A					100%																				
SD1C0160	D18 (D1c) - Type 5B-B Pier Rebarwork (1st Lift)	3	17-Mar-15 A	100%	0	20-Mar-15 A					100%																				
SD1C0170	D18 (D1c) - Type 5B-B Pier Formwork & Prep for Concreting (1st Lift)	3	20-Mar-15 A	65%	1	23-Mar-15	14-Sep-15	15-Sep-15	129	0	0%																				
SD1C0180	D18 (D1c) - Type 5B-B Pier Concreting (1st Lift)	1	23-Mar-15	0%	1	24-Mar-15	16-Sep-15	16-Sep-15	129	0	0%																				
SD1C0182	D18 (D1c) - Type 5B-B Pier Curing & Striking of Forms incl. CJ prep (1st Lift)	2	24-Mar-15	0%	2	26-Mar-15	18-Sep-15	19-Sep-15	129	0	0%																				
SD1C0190	D18 (D1c) - Type 5B-B Pier Head Scaffolding	3	26-Mar-15	0%	3	30-Mar-15	21-Sep-15	23-Sep-15	129	0	0%																				
SD1C0200	D18 (D1c) - Type 5B-B Pier Head Rebarwork	4	30-Mar-15	0%	4	08-Apr-15	24-Sep-15	29-Sep-15	129	0	0%																				
SD1C0210	D18 (D1c) - Type 5B-B Pier Head Formwork & Prep for Concreting	4	08-Apr-15	0%	4	13-Apr-15	30-Sep-15	05-Oct-15	129	0	0%																				
SD1C0220	D18 (D1c) - Type 5B-B Pier Head Concreting	1	13-Apr-15	0%	1	14-Apr-15	06-Oct-15	06-Oct-15	129	0	0%																				
SD1C0310	D18 (D1c) - Type 5B-B Pier Head Curing/Striking of Forms/Remove Scaffolding	6	14-Apr-15	0%	6	22-Apr-15	07-Oct-15	13-Oct-15	129	0	0%																				
SD1C0320	D18 (D1c) - Type 5B-B Pier Backfilling Works	4	22-Apr-15	0%	4	28-Apr-15	15-Oct-15	19-Oct-15	129	11	0%																				
Pier Head Segments																															
SD1C0370	D18 (D1c) - Pier Head Segment - Temporary Platform	6	13-May-15	0%	6	19-May-15	20-Oct-15	27-Oct-15	118	88	0%																				
Pier D19 (D1b) & Abutment D																															
Pile Cap Works																															
SD1B0092	D19 (D1b) - Pile Breakdown to cut-off etc.	7	02-Mar-15 A	100%	0	05-Mar-15 A					100%																				
SD1B0110	D19 (D1b) - Pile cap Formwork	3	07-Mar-15 A	100%	0	10-Mar-15 A					100%																				
SD1B0120	D19 (D1b) - Pile cap Rebarwork	7	17-Mar-15 A	100%	0	19-Mar-15 A					100%																				
SD1B0122	D19 (D1b) - Pile cap Kicker Formwork	3	23-Mar-15	0%	3	25-Mar-15	19-Dec-15	22-Dec-15	204	3	0%																				
SD1B0130	D19 (D1b) - Pile cap Concreting	1	21-Mar-15	0%	1	21-Mar-15	15-Dec-15	15-Dec-15	201	0	0%																				
SD1B0140	D19 (D1b) - Pile cap Curing & Striking of Forms incl. CJ prep	6	23-Mar-15	0%	6	28-Mar-15	16-Dec-15	22-Dec-15	201	0	0%																				
Pier Works																															
SD1B0150	D19 (D1b) - Pier/Pier Head Scaffolding	4	30-Mar-15	0%	4	02-Apr-15	23-Dec-15	29-Dec-15	201	0	0%																				
SD1B0160	D19 (D1b) - Pier/Pier Head Rebarwork	6	08-Apr-15	0%	6	14-Apr-15	30-Dec-15	06-Jan-16	201	0	0%																				

<ul style="list-style-type: none"> ■ Actual Work ■ Planned Bar ■ Critical Bar ◆ Milestone 	Project ID: J3518DWPRe-M22 Layout: J3518-DWP-3MRP Submission - M22_ Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.	Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 28 of 41 Pages) (Progress as of 21-Mar-15)	<table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> <tr> <td>09-Mar-15</td> <td></td> <td>DB</td> <td></td> </tr> <tr> <td>31-Mar-15</td> <td></td> <td>WY</td> <td></td> </tr> </table>	Date	Revision	Checked	Approved	09-Mar-15		DB		31-Mar-15		WY		DWG. No.: J3518/GCL/PGM/3MRP-M22
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Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015													
												March					April				May			June	
												23	02	09	16	23	30	06	13	20	27	04	11	18	25
GFXX089	E12 (E5b/E6b/E7b/E8b) - Bored Piles (2.5m dia. x 14 nr) 25% in total	151	09-Jul-14 A	80.13%	30	29-Apr-15	10-Apr-15	16-May-15	14	0	90%														
GFXX091	E12 (E5b/E6b/E7b/E8b) - Sonic & Interface Coring	12	30-Apr-15	0%	12	14-May-15	16-May-15	01-Jun-15	14	0	0%														
GFXX091	E12 (E5b/E6b/E7b/E8b Dolphins only) - Sonic & Interface Coring	12	06-Jun-15	0%	12	19-Jun-15	09-Feb-17	22-Feb-17	499	0	0%														
GFXX092	E12 (E5b/E6b/E7b/E8b) - Dismantle Removable Piling Platform in Pier E12	6	15-May-15	0%	6	21-May-15	01-Jun-15	08-Jun-15	14	0	0%														
E13A, E13B, E13C & E13D (E8c/E7c/E6c/E5c)																									
Foundation Works - E13																									
Foundation Works - E13A (E8c) & E13B (E7c)																									
GFXX101	E13A/B (E8c/E7c) - Bored Piles (2.5m dia. x 10 nr)	172	27-Dec-14 A	27.91%	124	21-Aug-15	16-Jun-15	13-Nov-15	69	0	20%														
GFXX101	E13A/B (E8c/E7c) - Bored Piles (2.5m dia. x 10 nr) 50% in total	172	27-Dec-14 A	27.91%	124	21-Aug-15	16-Jun-15	13-Nov-15	69	0	20%														
GFXX101	E13A/B (E8c/E7c) - Bored Piles (2.5m dia. x 10 nr) 50% in total	172	27-Dec-14 A	27.91%	124	21-Aug-15	16-Jun-15	13-Nov-15	69	0	20%														
Foundation Works - E13C (E6c) & E13D (E5c)																									
GFXX095	E13C/D (E6c/E5c) - Bored Piles (2.50m dia. x 10 nr)	128	23-Aug-14 A	39.06%	78	27-Jun-15	24-Dec-14	01-Apr-15	-68	0	40%														
GFXX095	E13C/D (E6c/E5c) - Bored Piles (2.50m dia. x 10 nr) 50% in total	128	23-Aug-14 A	39.06%	78	27-Jun-15	24-Dec-14	01-Apr-15	-68	0	40%														
GFXX095	E13C/D (E6c/E5c) - Bored Piles (2.50m dia. x 10 nr) 50% in total	128	23-Aug-14 A	39.06%	78	27-Jun-15	24-Dec-14	01-Apr-15	-68	0	40%														
E14A, E14B, E14C & E14D (E8d/E7d/E6d/E5d)																									
Foundation Works - E14																									
GFXX545	Mobilization & Assembling Bored Pile Plant & Equipment for Viaducts in HKBCF	5	21-Mar-15	0%	5	26-Mar-15	01-Nov-14	07-Nov-14	-113	0	0%														
Foundation Works - E14A (E8d)																									
GFXX544	E14A (E8d) - Pre-drilling for Piles (4 nos)	24	29-May-15	0%	24	26-Jun-15	02-Apr-15	05-May-15	-43	0	0%														
Foundation Works - E14B (E7d)																									
GFXX544	E14B (E7d) - Pre-drilling for Piles (3 nos)	24	29-May-15	0%	24	26-Jun-15	19-Mar-15	20-Apr-15	-55	0	0%														
Foundation Works - E14C (E6d)																									
GFXX544	E14C (E6d) - Pre-drilling for Piles (3 nos)	30	02-Apr-15	0%	30	12-May-15	17-Nov-14	20-Dec-14	-111	0	0%														
GFXX544	E14C (E6d) - Confirm Rockhead levels	8	13-May-15	0%	8	21-May-15	22-Dec-14	02-Jan-15	-111	0	0%														
GFXX547	E14C (E6d) - Bored Piles (2.20m dia. x 3 nos)	93	22-May-15	0%	93	10-Sep-15	03-Jan-15	29-Apr-15	-111	0	0%														
Foundation Works - E14D (E5d)																									
GFXX544	E14D (E5d) - Pre-drilling for Piles (4 nos)	30	02-Apr-15	0%	30	12-May-15	07-Nov-14	12-Dec-14	-118	0	0%														
GFXX544	E14D (E5d) - Confirm Rockhead levels	8	13-May-15	0%	8	21-May-15	12-Dec-14	22-Dec-14	-118	0	0%														
GFXX546	E14D (E5d) - Bored Piles (2.20m dia. x 4 nos)	102	22-May-15	0%	102	21-Sep-15	22-Dec-14	02-May-15	-118	0	0%														
Viaduct F																									
Viaduct F1																									
General F1																									
Milestones																									
GFXX553-8	F2 (F1c) - Start date for piling	0	09-May-15	0%	0		17-Apr-15		-18	72	0%														
GFXX553-9	F3 (F1d) - Start date for piling	0	09-May-15	0%	0		12-Sep-15		105	84	0%														
F1 (F1b)																									
Foundation Works																									
GFXX553-1	F1 (F1b) - Pre-drilling for Piles (2 nos)	24	29-Apr-15	0%	24	28-May-15	16-Feb-15	18-Mar-15	-55	0	0%														
GFXX553-4	F1 (F1b) - Confirm Rockhead Levels	8	29-May-15	0%	8	06-Jun-15	24-Apr-15	04-May-15	-28	60	0%														
F2 (F1c)																									
Foundation Works																									
GFXX553-2	F2 (F1c) - Pre-drilling for Piles (2 nos)	24	27-Mar-15	0%	24	28-Apr-15	05-Dec-14	05-Jan-15	-90	0	0%														
GFXX553-5	F2 (F1c) - Confirm Rockhead Levels	8	29-Apr-15	0%	8	08-May-15	06-Jan-15	14-Jan-15	-90	0	0%														
GFXX556	F2 (F1c) - Bored Piles (2.20m dia. x 2 nos)	72	09-May-15	0%	72	04-Aug-15	15-Jan-15	16-Apr-15	-90	0	0%														
F3 (F1d)																									
Foundation Works																									
GFXX553-3	F3 (F1d) - Pre-drilling for Piles (2 nos)	24	27-Mar-15	0%	24	28-Apr-15	08-Dec-14	07-Jan-15	-88	0	0%														
GFXX553-6	F3 (F1d) - Confirm Rockhead Levels	8	29-Apr-15	0%	8	08-May-15	08-Jan-15	16-Jan-15	-88	0	0%														

Actual Work
 Planned Bar
 Critical Bar
 Milestone

Project ID: J3518DWPRe-M22
 Layout: J3518-DWP-3MRP Submission - M22_
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 36 of 41 Pages)
(Progress as of 21-Mar-15)

Date	Revision	Checked	Approved
09-Mar-15		DB	
31-Mar-15		WY	

DWG. No.:
J3518/GCL/PGM/3MRP-M22

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																																									
												March					April					May					June																										
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15																									
Milestones Ready for PH Segment Erection																																																					
B200010-1	Pier B12 (B2a) ready for Viaduct B2 PH segment erection	0		0%	0	20-Apr-15		04-Jul-15	52	4	0%																																										
B200020-1	Pier B11 (B2b) ready for Viaduct B2 PH segment erection	0		0%	0	09-Apr-15		06-May-15	21	0	0%																																										
B200030-1	Pier B10 (B2c) ready for Viaduct B2 PH segment erection	0		0%	0	28-Apr-15		09-Apr-15	-13	1	0%																																										
B200040-1	Pier B9 (B2d) ready for Viaduct B2 PH segment erection	0		0%	0	11-Apr-15		06-Mar-15	-27	1	0%																																										
B200050-1	Pier B8 (B2e) ready for Viaduct B2 PH segment erection	0		0%	0	02-Apr-15		02-Feb-15	-48	1	0%																																										
B200060-1	Pier B7 (B2f) ready for Viaduct B2 PH segment erection	0		0%	0	31-Mar-15		12-Jan-15	-64	0	0%																																										
B200070-1	Pier B6 (B3a) ready for Viaduct B2 PH segment erection	0		0%	0	01-Apr-15		27-Feb-15	-28	0	0%																																										
Milestones Ready for Deck Segment Erection																																																					
B200010	Pier B12 (B2a) ready for Viaduct B2 deck segment erection	0		0%	0	19-May-15		23-Jul-15	45	134	0%																																										
B200020	Pier B11 (B2b) ready for Viaduct B2 deck segment erection	0		0%	0	28-May-15		07-Jul-15	27	116	0%																																										
B200060	Pier B7 (B2f) ready for Viaduct B2 deck segment erection	0		0%	0	22-May-15		05-Mar-15	-58	31	0%																																										
B200070	Pier B6 (B3a) ready for Viaduct B2 deck segment erection	0		0%	0	25-Apr-15		17-Mar-15	-28	62	0%																																										
Bridge B1 Superstructure																																																					
Milestones																																																					
Milestones Ready for PH Segment Erection																																																					
B100050-1	Pier B14 (B1f) ready for Viaduct B1 PH segment erection	0		0%	0	02-Apr-15		24-Jun-15	55	0	0%																																										
B100060-1	Pier B13 (B1g) ready for Viaduct B1 PH segment erection	0		0%	0	16-Apr-15		26-May-15	29	0	0%																																										
B100070-1	Pier B12 (B2a) ready for Viaduct B1 PH segment erection	0		0%	0	20-Apr-15		29-Jun-15	48	0	0%																																										
Milestones Ready for Deck Segment Erection																																																					
B100030	Pier B16 (B1d) ready for Viaduct B1 deck segment erection	0		0%	0	29-Apr-15		04-Mar-17	515	449	0%																																										
B100040	Pier B15 (B1e) ready for Viaduct B1 deck segment erection	0		0%	0	18-May-15		12-Sep-15	86	175	0%																																										
B100050	Pier B14 (B1f) ready for Viaduct B1 deck segment erection	0		0%	0	30-May-15		24-Aug-15	61	150	0%																																										
B100060	Pier B13 (B1g) ready for Viaduct B1 deck segment erection	0		0%	0	10-Jun-15		30-Jul-15	35	124	0%																																										
B100070	Pier B12 (B2a) ready for Viaduct B1 deck segment erection	0		0%	0	19-May-15		15-Aug-15	63	152	0%																																										
Viaduct C Superstructure																																																					
Bridge C3 Superstructure																																																					
Milestones																																																					
Milestones Ready for PH Segment Erection																																																					
C300030-1	Pier C9 (C3c) ready for Viaduct C3 PH segment erection	0		0%	0	16-Jun-15		30-Jan-16	177	0	0%																																										
Bridge C1 Superstructure																																																					
Milestones																																																					
Milestones Ready for PH Segment Erection																																																					
C100010-1	Pier C20 (C1c) ready for Viaduct C1 PH segment erection	0		0%	0	25-Apr-15		16-Nov-16	431	0	0%																																										
C100020-1	Pier C19 (C1d) ready for Viaduct C1 PH segment erection	0		0%	0	17-Apr-15		28-Nov-16	447	0	0%																																										
Viaduct D Superstructure																																																					
Bridge D3 Superstructure																																																					
Milestones																																																					
Milestones Ready for PH Segment Erection																																																					
D300060-1	Pier D1 (D4f) ready for Viaduct D3 PH segment erection	0		0%	0	11-May-15		24-Jul-15	52	0	0%																																										
Bridge D2 Superstructure																																																					
Milestones																																																					
Milestones Ready for PH Segment Erection																																																					
D200050-1	Pier D9 (D3c) ready for Viaduct D2 PH segment erection	0		0%	0	18-Jun-15		08-Sep-15	62	0	0%																																										
Bridge D1 Superstructure																																																					
Milestones																																																					
Milestones Ready for PH Segment Erection																																																					
D100010-1	Pier D19 (D1b) ready for Viaduct D1 PH segment erection	0		0%	0	05-May-15		23-Jan-16	201	5	0%																																										

■ Actual Work
■ Planned Bar
■ Critical Bar
◆ Milestone

Project ID: J3518DWPrE-M22
 Layout: J3518-DWP-3MRP Submission - M22_
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 39 of 41 Pages)
(Progress as of 21-Mar-15)

Date	Revision	Checked	Approved
09-Mar-15		DB	
31-Mar-15		WY	

DWG. No.:
J3518/GCL/PGM/3MRP-M22

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2015																
												March					April					May					June	
												23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15
SWVB3110	9SE-B/F9 - Install Geo. Instru. & Baseline Monitoring	30	22-Jan-15 A	0%	30	02-May-15	20-Mar-18	30-Apr-18	833	833	50%	[Gantt bar: 22-Jan-15 to 02-May-15]																
SWVB3120A	Rockfall Fence Construction	57	20-Jan-15 A	45.61%	31	04-May-15	25-Feb-17	01-Apr-17	536	527	70%	[Gantt bar: 20-Jan-15 to 01-Apr-17]																
Slope 9SE-B/F85																												
SWVB4020	9SE-B/F85 - Filling & forming slope	18	28-Mar-15	0%	18	24-Apr-15	01-Aug-15	24-Aug-15	88	0	0%	[Gantt bar: 24-Apr-15 to 24-Aug-15]																
SWVB4030	9SE-B/F85 - Form UC	12	25-Apr-15	0%	12	09-May-15	19-Oct-15	03-Nov-15	130	0	0%	[Gantt bar: 09-May-15 to 03-Nov-15]																
SWVB4035	9SE-B/F85 - Install Geo. Instru. & Baseline Monitoring	30	11-May-15	0%	30	24-Jun-15	04-Nov-15	08-Dec-15	130	0	0%	[Gantt bar: 24-Jun-15 to 08-Dec-15]																
Re-alignment of Cheung Tung Road adjacent to Viaduct C																												
West Portion																												
RW61000	Realign CTR (West of Abut. C) - Site Clearance	42	03-Sep-14 A	76.19%	10	01-Apr-15	15-Jan-15	26-Jan-15	-53	32	75%	[Gantt bar: 03-Sep-14 to 26-Jan-15]																
RW61010	Realign CTR (West of Abut. C) - Road drainage works	60	15-Jan-15 A	38.33%	37	24-Jun-15	09-Mar-15	27-Apr-15	-40	18	40%	[Gantt bar: 15-Jan-15 to 27-Apr-15]																
RW61020	Realign CTR (West of Abut. C) - Utility diversion	90	19-May-15	0%	90	18-Sep-15	09-Mar-15	11-Jul-15	-53	0	0%	[Gantt bar: 18-Sep-15 to 11-Jul-15]																
RW61082	Realign CTR (West of Abut. C) - Road formation	48	20-Nov-14 A	31.25%	33	18-May-15	16-Dec-14	26-Jan-15	-85	0	30%	[Gantt bar: 18-May-15 to 26-Jan-15]																
RW61084	Realign CTR (West of Abut. C) - Retaining Wall C1	48	13-Oct-14 A	75%	12	08-Apr-15	05-Dec-14	18-Dec-14	-85	0	75%	[Gantt bar: 08-Apr-15 to 18-Dec-14]																
East Portion																												
RW60000	Realign CTR (East of Abut. C) - Site Clearance	54	01-Dec-14 A	18.52%	44	20-May-15	03-Dec-14	26-Jan-15	-87	0	18%	[Gantt bar: 20-May-15 to 26-Jan-15]																
RW60005	Realign CTR (East of Abut. C) - Road formation	66	22-May-15	0%	66	21-Aug-15	27-Jan-15	22-Apr-15	-87	0	0%	[Gantt bar: 21-Aug-15 to 22-Apr-15]																
Emergency Gates G6 & G7																												
RP10070	Construct Expressway Fence /Beam Barriers betw new Gates G6 & G7	24	30-Oct-14 A	25%	18	16-Apr-15	07-Apr-18	30-Apr-18	845	845	25%	[Gantt bar: 16-Apr-15 to 30-Apr-18]																
ESS Sub-Station																												
RP10020	Construct new ESS-C Sub.Stn. adjacent to Viaduct C	48	30-Jun-14 A	85.42%	7	28-Mar-15	21-Apr-18	30-Apr-18	856	856	85%	[Gantt bar: 28-Mar-15 to 30-Apr-18]																
RP10030	Inst.Eqpt. & Testing / commissioning of new ESS	60	16-Mar-15 A	50%	30	02-May-15	27-Jan-15	05-Mar-15	-43	0	0%	[Gantt bar: 02-May-15 to 05-Mar-15]																
RP10040	Removal of equipment in existing ESS	30	04-May-15	0%	30	13-Jun-15	06-Mar-15	14-Apr-15	-43	0	0%	[Gantt bar: 13-Jun-15 to 14-Apr-15]																
RP10050	Demolish the existing ESS	6	15-Jun-15	0%	6	24-Jun-15	16-Apr-15	22-Apr-15	-43	44	0%	[Gantt bar: 24-Jun-15 to 22-Apr-15]																
Natural Terrain Hazard Mitigation Works																												
NTHM Works - West Portion																												
Check Dam no. 1 (CD1)																												
GFXX497	Predrilling Works for Check Dams	25	21-Mar-15	0%	25	25-Apr-15	04-May-15	05-Jun-15	30	0	0%	[Gantt bar: 25-Apr-15 to 05-Jun-15]																
GFXX499	CD1 - Mobilization of rig for MiniPile	6	18-Apr-15	0%	6	25-Apr-15	29-May-15	05-Jun-15	30	0	0%	[Gantt bar: 25-Apr-15 to 05-Jun-15]																
GFXX500	CD1 - Installation of MiniPile (13nos.)	52	27-Apr-15	0%	52	09-Jul-15	06-Jun-15	17-Aug-15	30	0	0%	[Gantt bar: 09-Jul-15 to 17-Aug-15]																
Watermains & All Assoc Works from Tung Chung to Southern Landfall																												
WM00030	Trial trench works for watermains along existing CTR	157	26-May-14 A	75.16%	39	14-May-15	14-Mar-16	05-May-16	272	66	75%	[Gantt bar: 14-May-15 to 05-May-16]																
WM00120	Lay DN450 Fresh Water Main along re-aligned CTR (app. 500 m at 12m/day)	48	10-Jun-15	0%	48	14-Aug-15	18-Jun-15	21-Aug-15	5	0	0%	[Gantt bar: 14-Aug-15 to 21-Aug-15]																

<ul style="list-style-type: none"> ■ Actual Work ■ Planned Bar ■ Critical Bar ◆ Milestone 	Project ID: J3518DWPrE-M22 Layout: J3518-DWP-3MRP Submission - M22_ Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.	Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 41 of 41 Pages) (Progress as of 21-Mar-15)	Date	Revision	Checked	Approved	DWG. No.: J3518/GCL/PGM/3MRP-M22
			09-Mar-15		DB		
			31-Mar-15		WY		

Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

(In reference to CINOTECH (2011) Agreement No.
CE35/2011 EP Baseline Environmental Monitoring for
Hong Kong-Zhuhai-Macao Bridge Tuen Mun-Chek Lap
Kok Link - Investigation. Updated EM&A Manual for
Tuen Mun-Chek Lap Kok Link)

*Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link
Southern Connection Viaduct Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
AIR QUALITY									
4.8.1	3.8	An effective watering programme of eight daily watering with complete coverage, is estimated to reduce by 50%. This is recommended for all areas in order to reduce dust levels to a minimum;	All areas / throughout construction period	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		↔
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		↔
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓
NOISE									
5.11	Section 4	Noise monitoring	All existing representative sensitive receivers / during North Lantau Viaduct construction	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
<i>General Marine Works</i>									
6.10	-	Bored piling to be undertaken within a metal casing.	Marine viaducts of TM-CLKL and HKLR/ bored piling	Contractor	TM-EIAO		Y		✓
6.10	-	Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
6.10	-	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.10	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.10	-	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		↔
6.10	-	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.10	-	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.10	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
<i>Temporary Staging work</i>									
	5.2	Regular inspection for the accumulation of floating refuse and collection of floating refuse if required	During temporary staging works	Contractor			Y		✓
	5.2	Provision of temporary drainage system on the temporary staging for collection of construction site runoff to allow appropriate treatment before discharge into the sea	During temporary staging works	Contractor			Y		✓
	5.2	Wastewater generated from construction works such as bored / drilling water will be collected, treated, neutralized and de-silted through silt trap or sedimentation tank before disposal	During temporary staging works	Contractor			Y		✓
	5.2	One additional water quality monitoring station is	During temporary	Contractor			Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		proposed at station SR4a In case elevated SS or turbidity is identified during the water quality monitoring, the source of pollution will be tracked down and be removed as soon as possible. In case depletion of dissolved oxygen is identified, artificial aeration will be arranged at the monitoring station SR4a,	staging works						
<i>Land Works</i>									
6.10	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
6.10	-	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		<>
6.10	5.8	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for offsite disposal.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		<>
6.10	-	The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	All areas/ throughout construction period	Contractor	TM-EIAO Waste Disposal Ordinance		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
6.10	-	All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		<>
6.10	-	Surface run-off from bunded areas should pass through oil/ grease traps prior to discharge to the stormwater system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Roadside gullies to trap silt and grit shall be provided prior to discharging the stormwater into the marine environment. The sumps will be maintained and cleaned at regular intervals.	Roadside/ design and operation	Design Consultant/ Contractor	TM-EIAO	Y		Y	✓
6.10	Section 5	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All areas/ throughout construction period	Contractor	EM&A Manual		Y		✓
<i>Water Quality Monitoring</i>									
6.10	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period. One year operation phase water quality monitoring at designated stations	Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, through-out marine construction period, post construction and monthly operational phase water quality monitoring for a year.	Contractor	EM&A Manual		Y	Y	✓
ECOLOGY									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/ Detailed Design/ during construction works/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3	Specification for bored piling monitoring	Detailed Design	Design Consultant	TMEIA	Y			n/a
8.14	6.3	Implement any recommendations of the bored piling monitoring	Southern marine viaduct/ Throughout	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
			construction during bored piling						
8.14	6.3,6.5	Avoidance of peak CWD calving season in May and June for driving of metal caissons during bored piling works	Southern marine viaduct/ May and June during bored piling	Contractor	TMEIA		Y		✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All marine bored piling and temporary staging works areas/Detailed Design/ during all marine bored piling and temporary staging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600 m ² in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/ towards end of construction period	TM-CLKL/ HKBCF Design Consultant/ TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	n/a To be enforced by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/ during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for marine bored piling and the whole lifespan of temporary staging works.	All areas/ Detailed Design/ during marine bored piling and temporary staging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Tai Ho Wan (donor site) and Yam Tsui Wan (receptor site) /Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		n/a
8.15	6.5	Audit coral translocation success	Yam Tsui Wan (receptor site)/Post translocation	Contractor	TMEIA		Y		✓
7.13	6.5	Undertaken gabion wall works in Stream NL1 in the dry season	North Lantau slope works/dry	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
			season/construction phase						
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		n/a. To be approved by AFCD/LCSD
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
10.9	7.6	Round angle, patterned finishes, and oval shaped pier were considered in the viaduct design, and further details will be developed under ACABAS submission (DM3)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Details of the street furniture will be developed in the detailed design stage (DM4)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Existing trees on boundary of the Project Area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at Tree Removal Application stage) (CM1)							
10.9	7.6	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme (CM2)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓ Implemented as the Contract Specification
10.9	7.6	Hillside and roadside screen planting to proposed roads, associated structures and slope works (CM3).	All areas/detailed design/ during construction/post construction	Design Consultant/	TMEIA	Y	Y		✓
10.9	7.6	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone) (CM4)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Recycle/Reuse all felled trees and vegetation, e.g.	All areas/detailed	Design	TMEIA	Y	Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		mulching (CM9)	design/ during construction	Consultant/ Contractor					
10.9	7.6	Compensatory tree planting shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006 (CM10).	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		n/a
10.9	7.6	Re-vegetation of affected woodland/shrubland with native species (OM1)	All areas/detailed design/ during construction/ during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by AFCD/HyD/ L CSD
10.9	7.6	Tall buffer screen tree / shrub / climber planting should be incorporated to soften hard engineering structures and facilities (OM2)	All areas/detailed design/ during construction/ during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a To be implemented by HyD/LCSD
10.9	7.6	Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the local context, and minimises potential negative landscape and visual impacts. Lighting units should be directional and minimise unnecessary light spill (OM3)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD/LCSD
10.9	7.6	Structure, ornamental tree / shrub / climber planting should be provided along roadside amenity strips, central dividers and newly formed slopes to enhance the townscape quality and further greenery enhancement (OM4)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD/LCSD
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and	All areas/detailed design/ during	Design Consultant/	TMEIA	Y	Y	Y	n/a. To be

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		finishes	construction / during operation	Contractor					implemented by HyD
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓
12.6		The Contractor shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. A recording system for the amount of waste generated, recycled and disposed (locations) should be established.	Contract mobilisation	Contractor	TMEIA, Works Branch Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material		Y		✓
12.6		The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Contract mobilisation	Contractor	TMEIA, Land (Miscellaneous Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.	Contract Mobilisation	Contractor	TMEIA		Y		✓
12.6	8.1	The extent of cutting operation should be optimised where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
12.6	8.1	Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The site and surroundings shall be kept tidy and litter free.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	No waste shall be burnt on site.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.	Detailed Design	Design Consultant	TMEIA	Y			n/a
12.6	8.1	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.	All areas / throughout construction period	Contractor	TMEIA		Y		↔
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The Contractor should recycle as many C&D	All areas / throughout	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	construction period						
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: <ul style="list-style-type: none"> - suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; - Having a capacity of <450L unless the specifications have been approved by the EPD; and - Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. Clearly labelled and used solely for the storage of chemical wastes; - Enclosed with at least 3 sides; - Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest; - Adequate ventilation; - Sufficiently covered to prevent rainfall entering 	All areas / throughout construction period	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		(water collected within the bund must be tested and disposed of as chemical waste, if necessary); and - Incompatible materials are adequately separated.							
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.							
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		n/a

Notes:

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Status:

- ✓ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by Contractor
- Δ Deficiency of Mitigation Measures but rectified by Contractor
- n/a Not Applicable in Reporting Period

Appendix D

Summary of Action and Limit Levels

Table D1 *Action and Limit Levels for 1-hour and 24-hour TSP*

Parameters	Action	Limit
24 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR9A/ ASR8A = 178 ASR9C/ ASR8/ ASR9 = 178	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR9A/ ASR8A = 394 ASR9C/ ASR8/ ASR9 = 393	500

Table D2 *Action and Limit Levels for Construction Noise (0700-1900 hrs of normal weekdays)*

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)

Table D3 *Action and Limit Levels for Water Quality*

Parameter	Action Level#	Limit Level#
DO in mg/L ^(a)	<u>Surface and Middle</u> 5.0 mg/L	<u>Surface and Middle</u> 4.2 mg/L
	<u>Bottom</u> 4.7 mg/L	<u>Bottom</u> 3.6 mg/L
Turbidity in NTU (Depth-averaged ^{(b), (c)})	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data, i.e., 27.5 NTU	130% of upstream control station at the same tide of the same day and 99%-ile of baseline data, i.e., 47.0 NTU
SS in mg/L (Depth-averaged ^{(b), (c)})	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data, i.e., 23.5 mg/L	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L

Notes:

Baseline data: data from HKZMB Baseline Water Quality Monitoring between 6 and 31 October 2011.

- (a) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (b) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths
- (c) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (d) All figures given in the table are used for reference only, and EPD may amend the figures whenever it is considered as necessary

Parameter	Action Level#	Limit Level#
(e)	The 1%-ile of baseline data for surface and middle DO is 4.2 mg/L, whilst for bottom DO is 3.6 mg/L.	

Table D4 *Action and Limit Levels for Impact Dolphin Monitoring*

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 70% of baseline & ANI < 70% of baseline	STG < 70% of baseline & ANI < 70% of baseline
Limit Level	[STG < 40% of baseline & ANI < 40% of baseline] and STG < 40% of baseline & ANI < 40% of baseline	
Notes:		
1.	STG means quarterly encounter rate of number of dolphin sightings, which is 6.00 in NEL and 9.85 in NWL during the baseline monitoring period	
2.	ANI means quarterly encounter rate of total number of dolphins, which is 22.19 in NEL and 44.66 in NWL during the baseline monitoring period	
3.	For North Lantau Social Cluster, AL will be trigger if NEL or NWL fall below the criteria; LL will be triggered if both NEL and NWL fall below the criteria.	

Table D5 *Derived Value of Action Level (AL) and Limit Level (LL)*

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 4.2 & ANI < 15.5	STG < 6.9 & ANI < 31.3
Limit Level	[STG < 2.4 & ANI < 8.9] and [STG < 3.9 & ANI < 17.9]	

Appendix E

EM&A Monitoring Schedules

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 31 March 2015)**

Alternative Noise Monitoring at Pak Mong Village Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Mar	02-Mar	03-Mar	04-Mar	05-Mar	06-Mar	07-Mar
			Noise Impact Monitoring			
08-Mar	09-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar
		Noise Impact Monitoring				
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
Noise Impact Monitoring				Noise Impact Monitoring		
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar
			Noise Impact Monitoring			
29-Mar	30-Mar	31-Mar				
		Noise Impact Monitoring				

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 31 March 2015)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Mar	02-Mar	03-Mar	04-Mar	05-Mar	06-Mar	07-Mar
			1-hr TSP Monitoring 24-hr TSP Monitoring			
08-Mar	09-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar
		1-hr TSP Monitoring 24-hr TSP Monitoring				
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
1-hr TSP Monitoring 24-hr TSP Monitoring				1-hr TSP Monitoring 24-hr TSP Monitoring		
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar
			1-hr TSP Monitoring 24-hr TSP Monitoring			
29-Mar	30-Mar	31-Mar				
		1-hr TSP Monitoring 24-hr TSP Monitoring				

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 30 April 2015)**

Alternative Noise Monitoring at Pak Mong Village Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Apr	02-Apr	03-Apr	04-Apr
05-Apr	06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr
	Noise Impact Monitoring			Noise Impact Monitoring		
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr
			Noise Impact Monitoring			
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
		Noise Impact Monitoring				
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr		
	Noise Impact Monitoring			Noise Impact Monitoring		

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 30 April 2015)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Mar	02-Mar	03-Mar	01-Apr	02-Apr	03-Apr	04-Apr
05-Apr	06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr
			1-hr TSP Monitoring 24-hr TSP Monitoring			
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
		1-hr TSP Monitoring 24-hr TSP Monitoring				
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr		
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 31 May 2015)**

Alternative Noise Monitoring at Pak Mong Village Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					P. Holiday 01-May	02-May
03-May	04-May	05-May	06-May	07-May	08-May	09-May
			Noise Impact Monitoring			
10-May	11-May	12-May	13-May	14-May	15-May	16-May
		Noise Impact Monitoring				
17-May	18-May	19-May	20-May	21-May	22-May	23-May
	Noise Impact Monitoring			Noise Impact Monitoring		
24-May	P. Holiday 25-May	26-May	27-May	28-May	29-May	30-May
			Noise Impact Monitoring			
31-May						

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 31 May 2015)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					P. Holiday 01-May	02-May
03-May	04-May	05-May	06-May	07-May	08-May	09-May
			1-hr TSP Monitoring 24-hr TSP Monitoring			
10-May	11-May	12-May	13-May	14-May	15-May	16-May
		1-hr TSP Monitoring 24-hr TSP Monitoring				
17-May	18-May	19-May	20-May	21-May	22-May	23-May
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
24-May	P. Holiday 25-May	26-May	27-May	28-May	29-May	30-May
			1-hr TSP Monitoring 24-hr TSP Monitoring			
31-May						

**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (March 15)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Mar	02-Mar	03-Mar	04-Mar	05-Mar	06-Mar	07-Mar
		WQM Mid-Ebb 12:12 (10:27 - 13:57) Mid-Flood 17:39 (15:54 - 19:24)		WQM Mid-Ebb 13:02 (11:17 - 14:47) Mid-Flood 18:53 (17:08 - 20:38)		WQM Mid-Flood 8:08 (06:23 - 09:53) Mid-Ebb 13:56 (12:11 - 15:41)
08-Mar	09-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar
		WQM Mid-Flood 9:21 (07:36 - 11:06) Mid-Ebb 15:35 (13:50 - 17:20)		WQM Mid-Flood 10:21 (08:36 - 12:06) Mid-Ebb 17:05 (15:20 - 18:50)		WQM Mid-Flood 11:56 (10:11 - 13:41) Mid-Ebb 19:27 (17:42 - 21:12)
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
		WQM Mid-Ebb 11:04 (09:19 - 12:49) Mid-Flood 16:16 (14:31 - 18:01)		WQM Mid-Ebb 12:27 (10:42 - 14:12) Mid-Flood 18:08 (16:23 - 19:53)		WQM Mid-Flood 7:40 (05:55 - 09:25) Mid-Ebb 13:45 (12:00 - 15:30)
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar
		WQM Mid-Flood 9:17 (07:32 - 11:02) Mid-Ebb 15:53 (14:08 - 17:38)		WQM Mid-Flood 10:27 (08:42 - 12:12) Mid-Ebb 17:35 (15:50 - 19:20)		WQM Mid-Flood 7:36 (05:51 - 09:21) Mid-Ebb 20:18 (18:33 - 22:03)
29-Mar	30-Mar	31-Mar				
		WQM Mid-Ebb 11:21 (09:36 - 13:06) Mid-Flood 16:46 (15:01 - 18:31)				

**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (April 15)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Apr	02-Apr	03-Apr	04-Apr
				WQM Mid-Ebb 12:11 (10:26 - 13:56) Mid-Flood 18:08 (16:23 - 19:53)		WQM Mid-Ebb 13:04 (11:19 - 14:49) Mid-Flood 19:21 (17:36 - 21:06)
05-Apr	06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr
		WQM Mid-Flood 8:15 (06:30 - 10:00) Mid-Ebb 14:36 (12:51 - 16:21)		WQM Mid-Flood 9:14 (07:29 - 10:59) Mid-Ebb 15:53 (14:08 - 17:38)		WQM Mid-Flood 10:29 (08:44 - 12:14) Mid-Ebb 17:40 (15:55 - 19:25)
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr
		WQM Mid-Ebb 9:53 (08:08 - 11:38) Mid-Flood 14:57 (13:12 - 16:42)		WQM Mid-Ebb 11:25 (09:40 - 13:10) Mid-Flood 17:08 (15:23 - 18:53)		WQM Mid-Ebb 12:43 (10:58 - 14:28) Mid-Flood 18:57 (17:12 - 20:42)
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
		WQM Mid-Flood 8:08 (06:23 - 09:53) Mid-Ebb 14:48 (13:03 - 16:33)		WQM Mid-Flood 9:16 (07:31 - 11:01) Mid-Ebb 16:16 (14:27 - 17:57)		WQM Mid-Flood 10:33 (08:48 - 12:18) Mid-Ebb 17:57 (16:12 - 19:42)
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr		
		WQM Mid-Ebb 10:07 (08:22 - 11:52) Mid-Flood 15:25 (13:40 - 17:10)		WQM Mid-Ebb 11:14 (09:29 - 12:59) Mid-Flood 17:11 (15:26 - 18:56)		

**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (May 15)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Apr	02-Apr	01-May	02-May
						WQM Mid-Ebb 12:11 (10:26 - 13:56) Mid-Flood 18:33 (16:48 - 20:18)
03-May	04-May	05-May	06-May	07-May	08-May	09-May
		WQM Mid-Ebb 13:44 (11:59 - 15:29) Mid-Flood 20:33 (18:48 - 22:18)		WQM Mid-Flood 8:15 (06:30 - 10:00) Mid-Ebb 14:57 (13:12 - 16:42)		WQM Mid-Flood 9:32 (07:47 - 11:17) Mid-Ebb 16:28 (14:43 - 18:13)
10-May	11-May	12-May	13-May	14-May	15-May	16-May
		WQM Mid-Ebb 8:22 (06:37 - 10:07) Mid-Flood 13:17 (11:32 - 15:02)		WQM Mid-Ebb 10:18 (08:33 - 12:03) Mid-Flood 15:58 (14:13 - 17:43)		WQM Mid-Ebb 11:44 (09:59 - 13:29) Mid-Flood 18:00 (16:15 - 19:45)
17-May	18-May	19-May	20-May	21-May	22-May	23-May
		WQM Mid-Ebb 13:48 (12:03 - 15:33) Mid-Flood 20:45 (19:00 - 22:30)		WQM Mid-Flood 8:14 (06:29 - 09:59) Mid-Ebb 15:12 (13:27 - 16:57)		WQM Mid-Flood 9:27 (07:42 - 11:12) Mid-Ebb 16:35 (14:50 - 18:20)
24-May	25-May	26-May	27-May	28-May	29-May	30-May
		WQM Mid-Flood 12:39 (10:54 - 14:24) Mid-Ebb 19:16 (17:31 - 21:01)		WQM Mid-Ebb 10:00 (08:15 - 11:45) Mid-Flood 15:51 (14:06 - 17:36)		WQM Mid-Ebb 11:11 (09:26 - 12:56) Mid-Flood 17:35 (15:50 - 19:20)

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 March 2015)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Mar	02-Mar	03-Mar	04-Mar	05-Mar	06-Mar	07-Mar
			Impact Dolphin Monitoring			
08-Mar	09-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar
			Impact Dolphin Monitoring			
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
		Impact Dolphin Monitoring				
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar
				Impact Dolphin Monitoring		
29-Mar	30-Mar	31-Mar				

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 30 April 2015)**

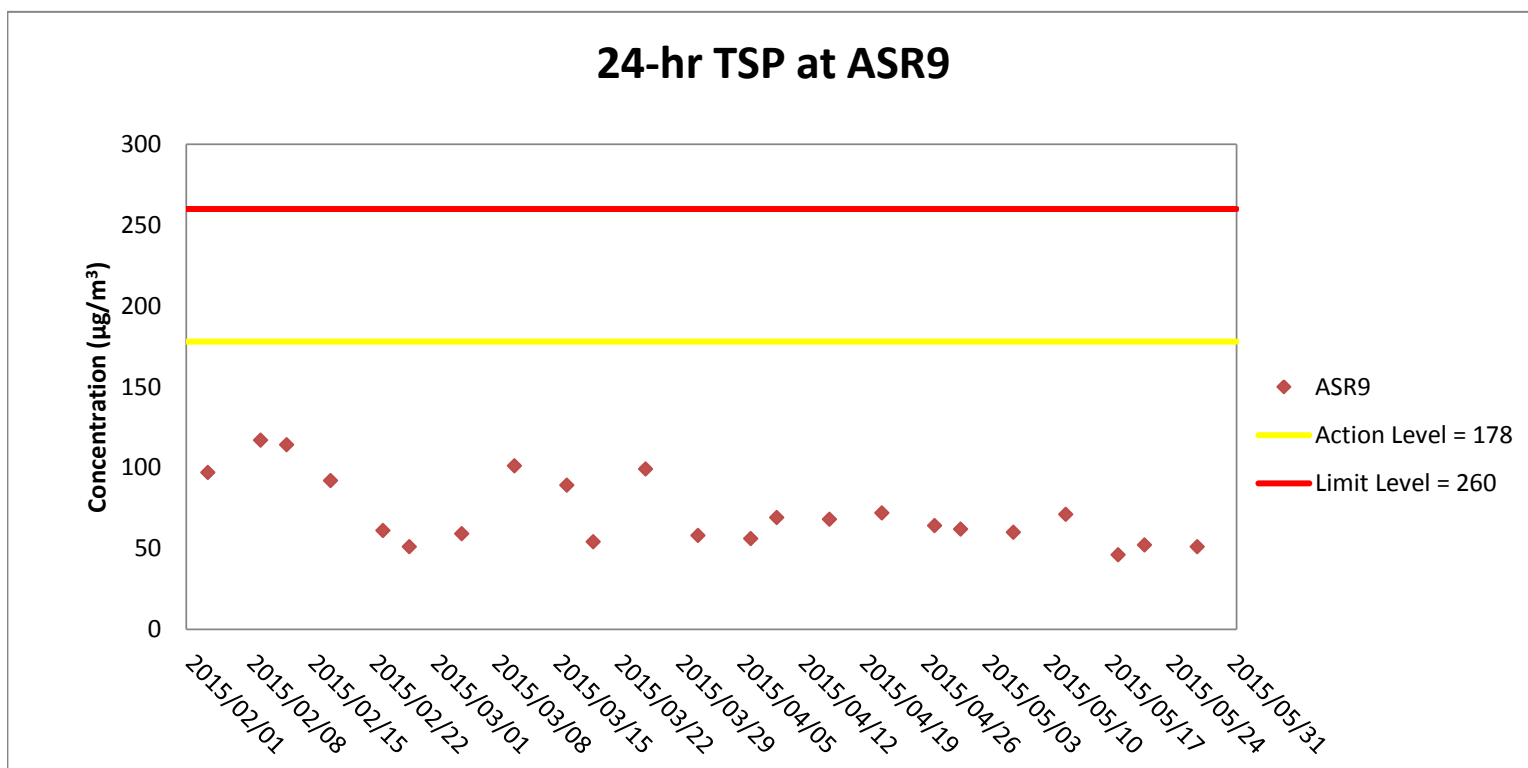
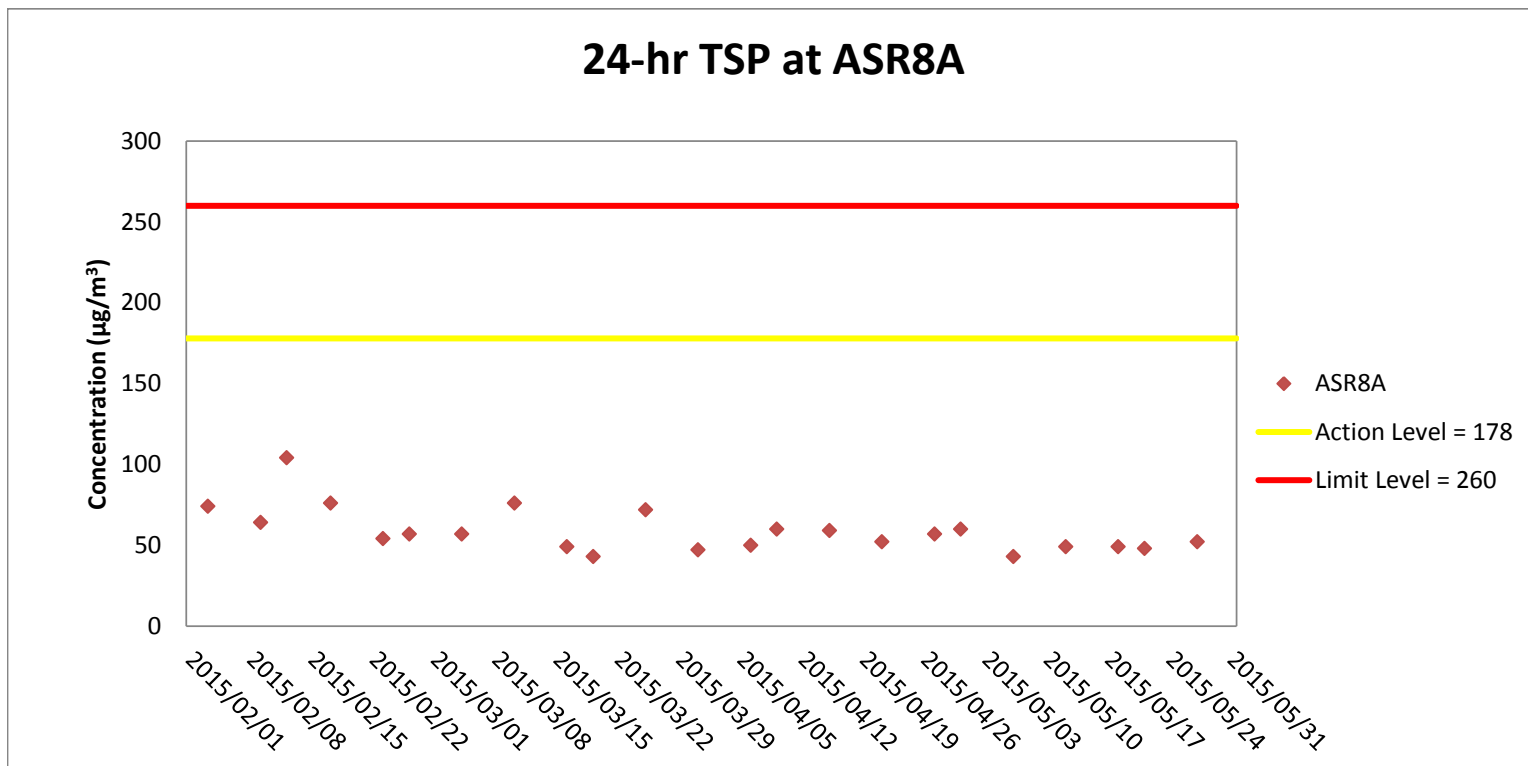
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Apr	02-Apr	03-Apr	04-Apr
05-Apr	06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr
			Impact Dolphin Monitoring		Impact Dolphin Monitoring	
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr
					Impact Dolphin Monitoring	
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
			Impact Dolphin Monitoring			
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr		

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 May 2015)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01-May	02-May
03-May	04-May	05-May	06-May	07-May	08-May	09-May
	Impact Dolphin Monitoring				Impact Dolphin Monitoring	
10-May	11-May	12-May	13-May	14-May	15-May	16-May
				Impact Dolphin Monitoring		
17-May	18-May	19-May	20-May	21-May	22-May	23-May
	Impact Dolphin Monitoring					
24-May	25-May	26-May	27-May	28-May	29-May	30-May
31-May						

Appendix F

Impact Air Quality
Monitoring Graphical
Presentation



Weather condition within the reporting period varied between sunny to rainy.

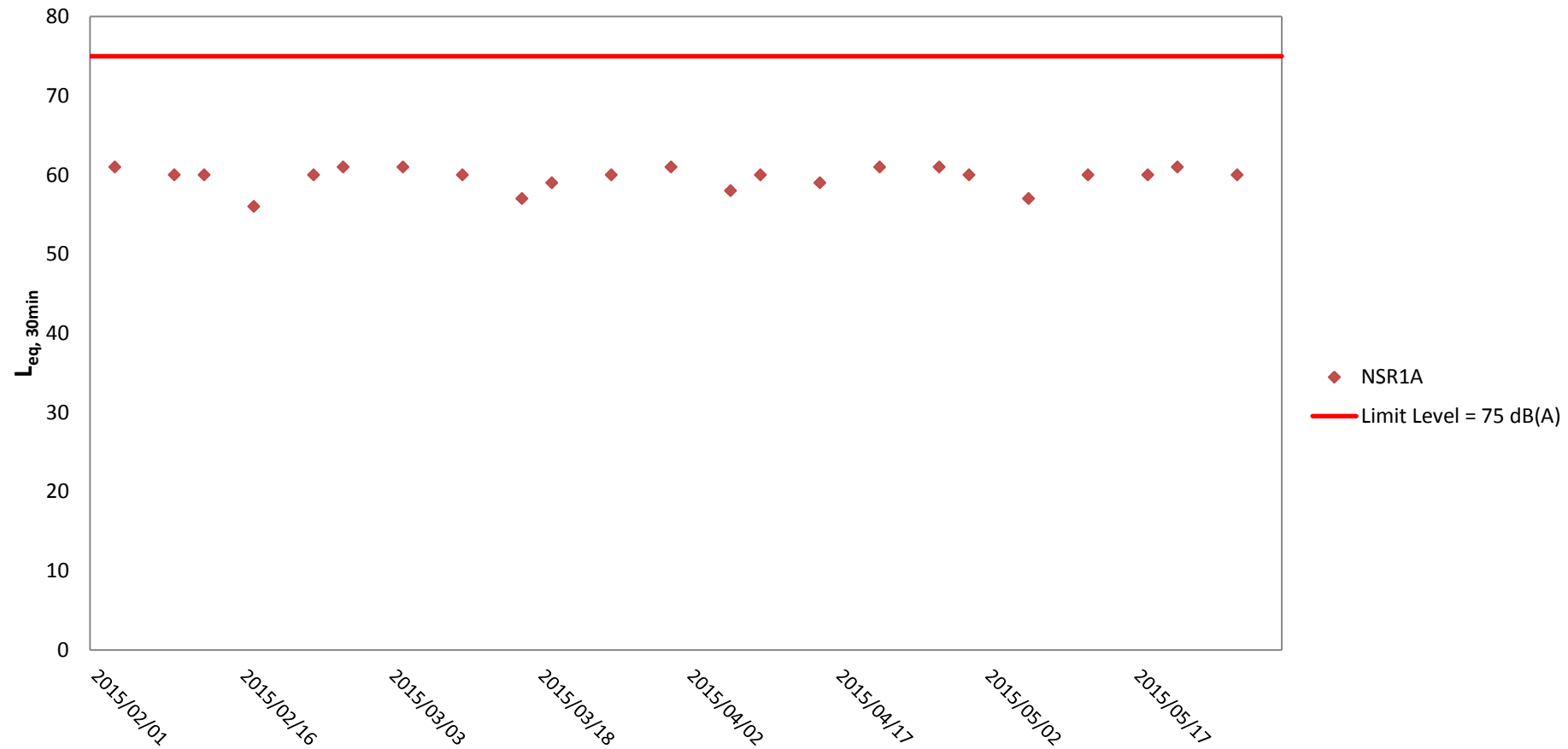
Major construction works undertaken within the reporting period include Construction and installation of pile caps; Pier construction; Drainage works; Re-alignment of Cheung Tung Road; Land piling; Pre-drilling works; Installation of pier head segment; Additional land GI, trial pits & lab testing; Tree survey, felling and transplanting; Relocation of MTRC fence; and Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing.

Appendix G

Impact Noise Monitoring Graphical Presentation

Noise Monitoring Results at NSR 1A ($L_{eq, 30min}$)



Weather condition within the reporting period varied between sunny to rainy.

Major construction works undertaken within the reporting period include Construction and installation of pile caps; Pier construction; Drainage works; Re-alignment of Cheung Tung Road; Land piling; Pre-drilling works; Installation of pier head segment; Additional land GI, trial pits & lab testing; Tree survey, felling and transplanting; Relocation of MTRC fence; and Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing.

Appendix H

Impact Water Quality Monitoring Graphical Presentation

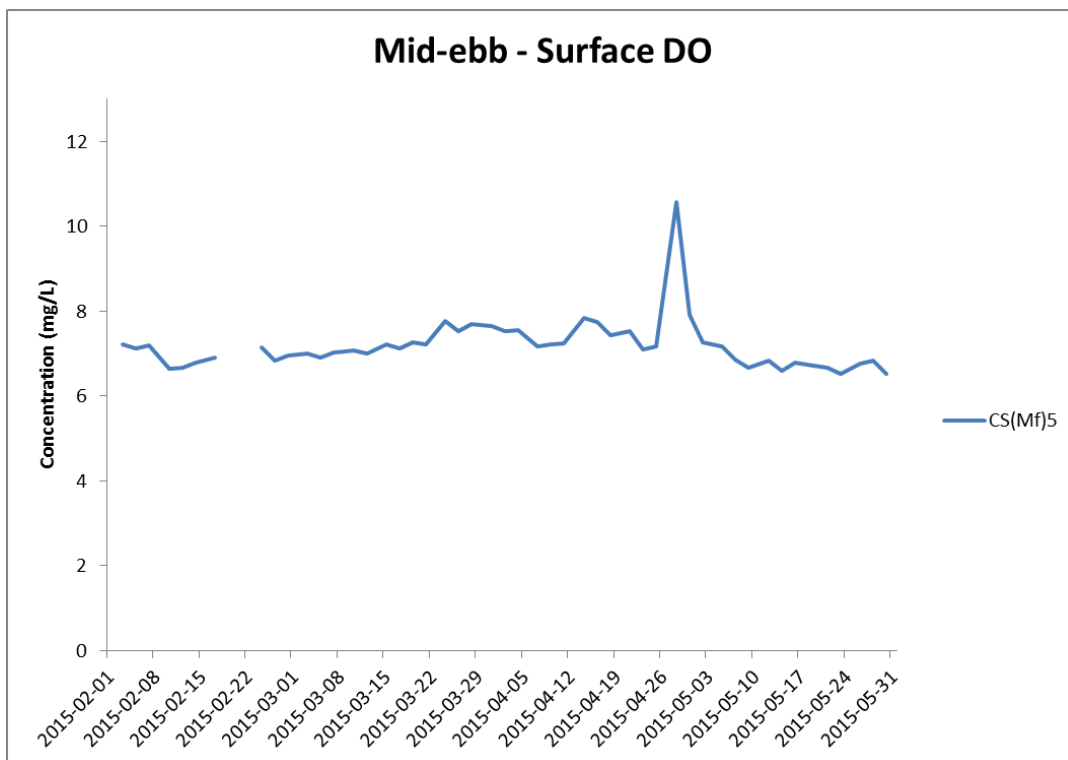
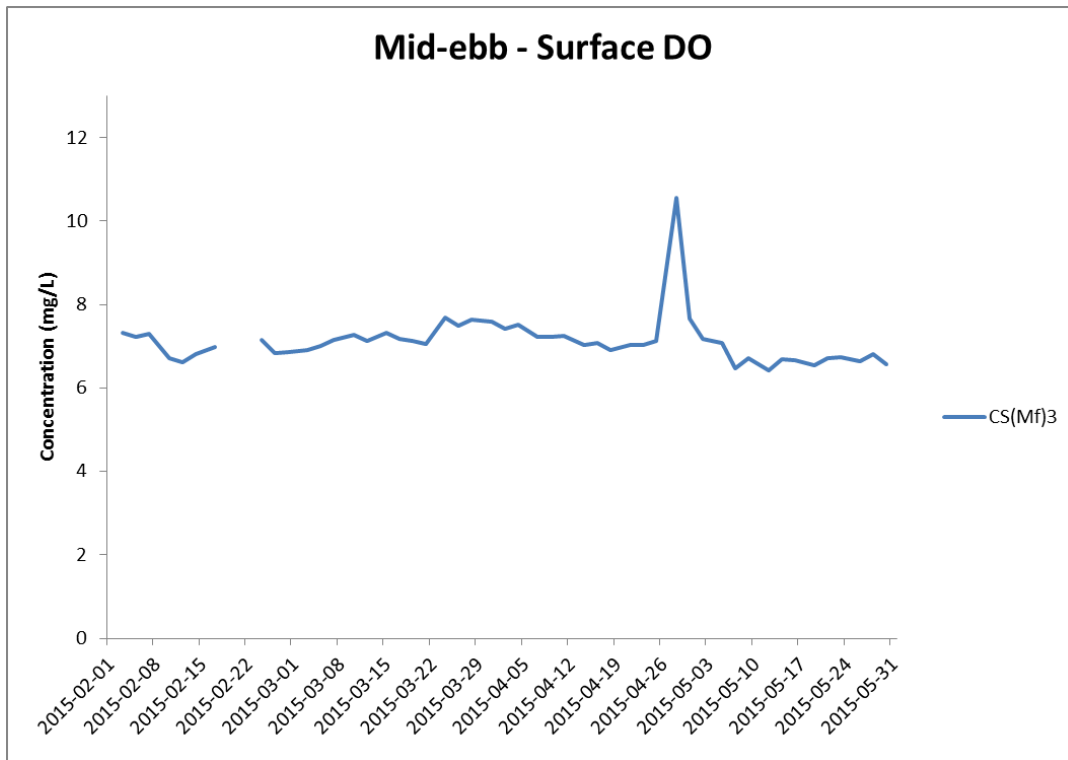


Figure H1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



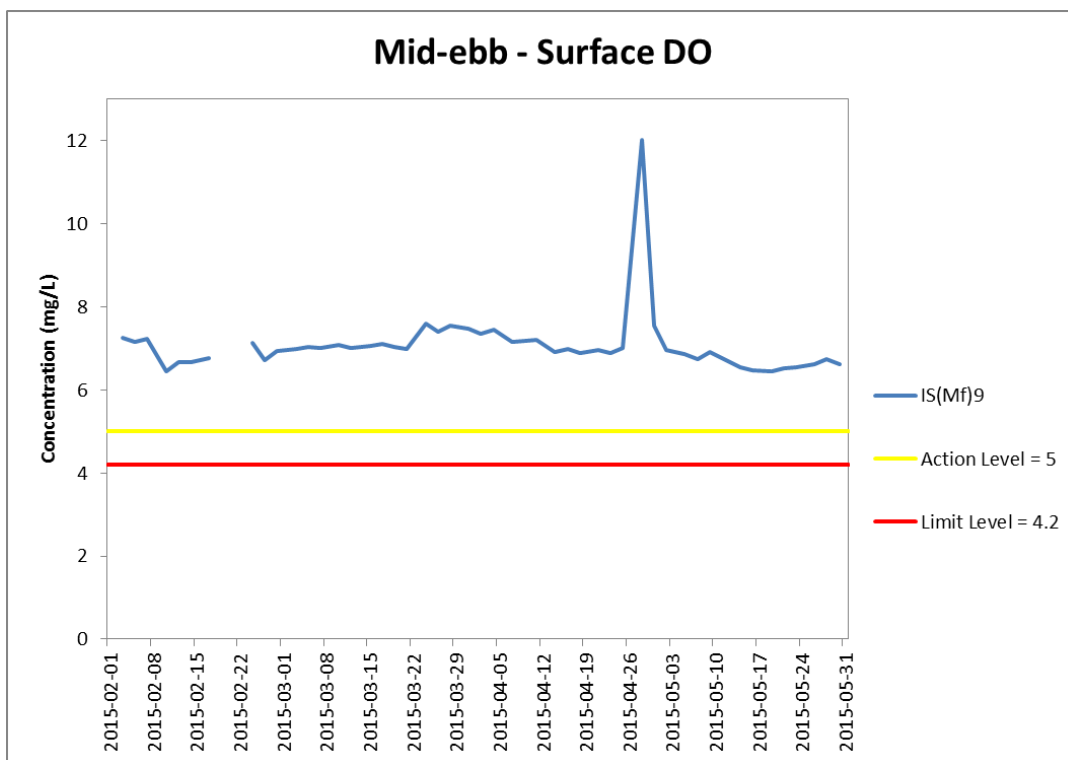
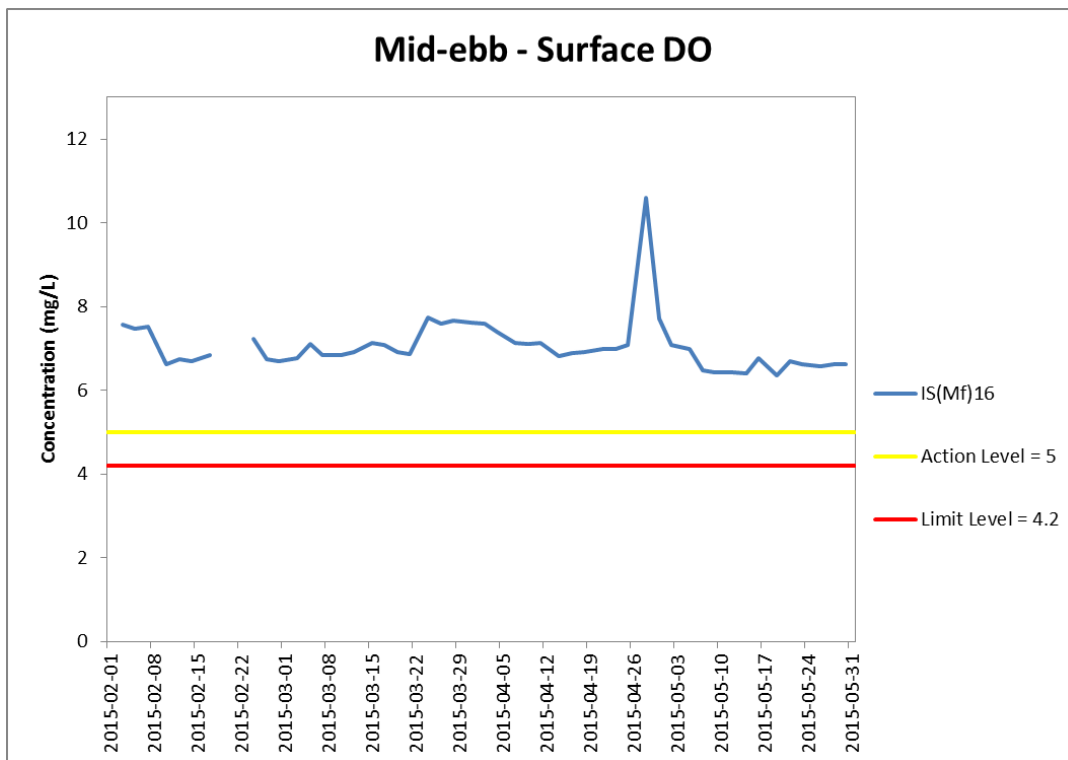


Figure H2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



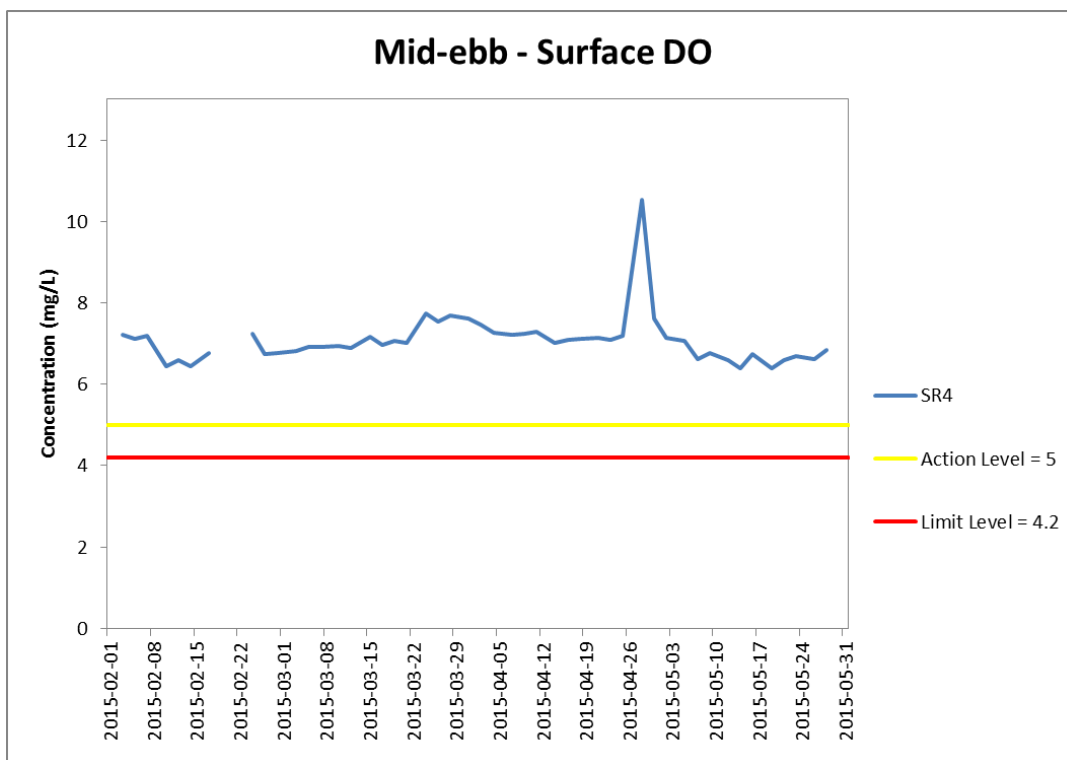
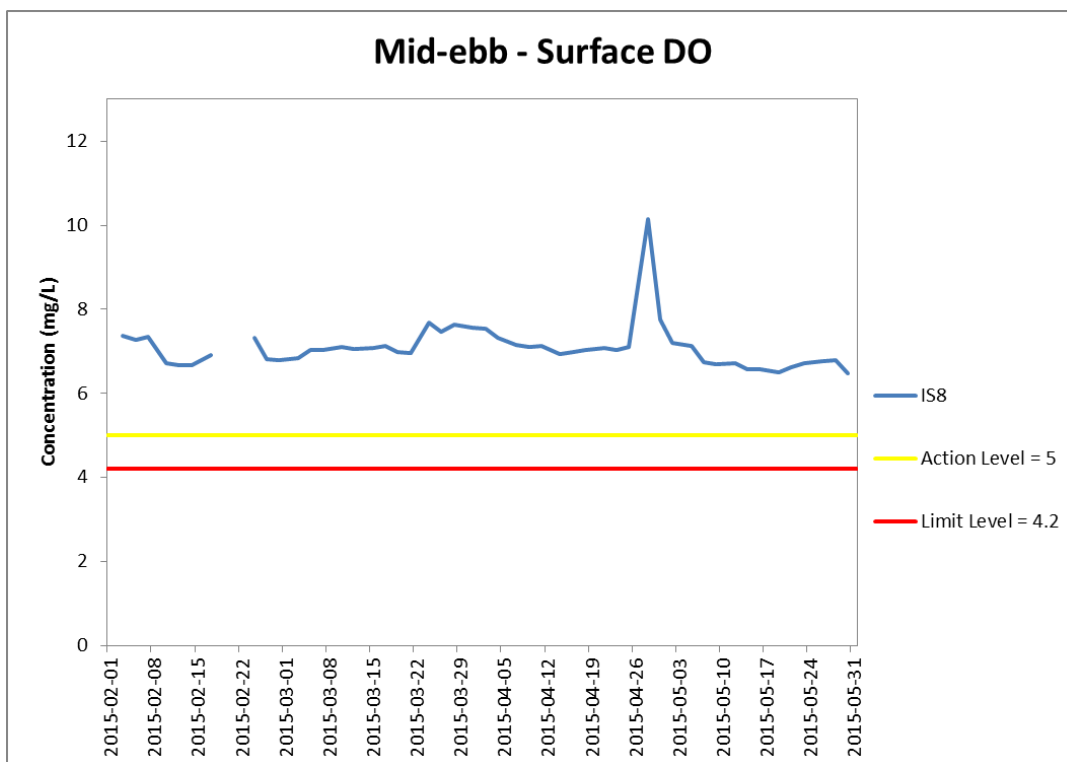


Figure H3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



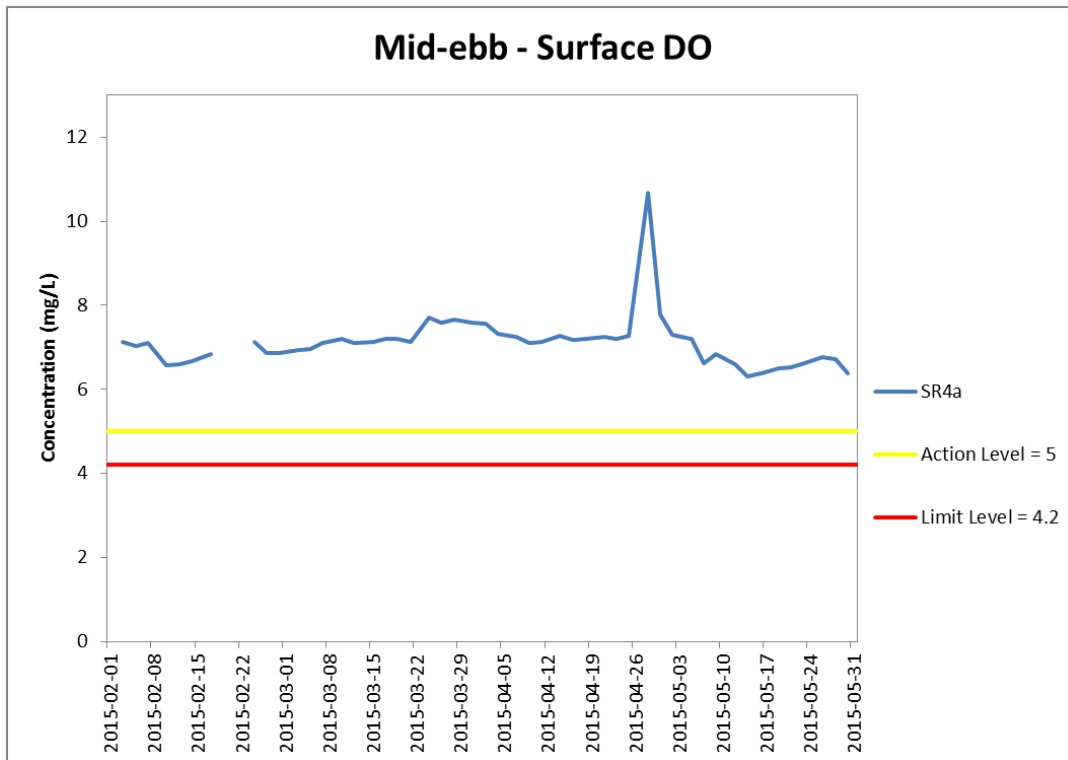


Figure H4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



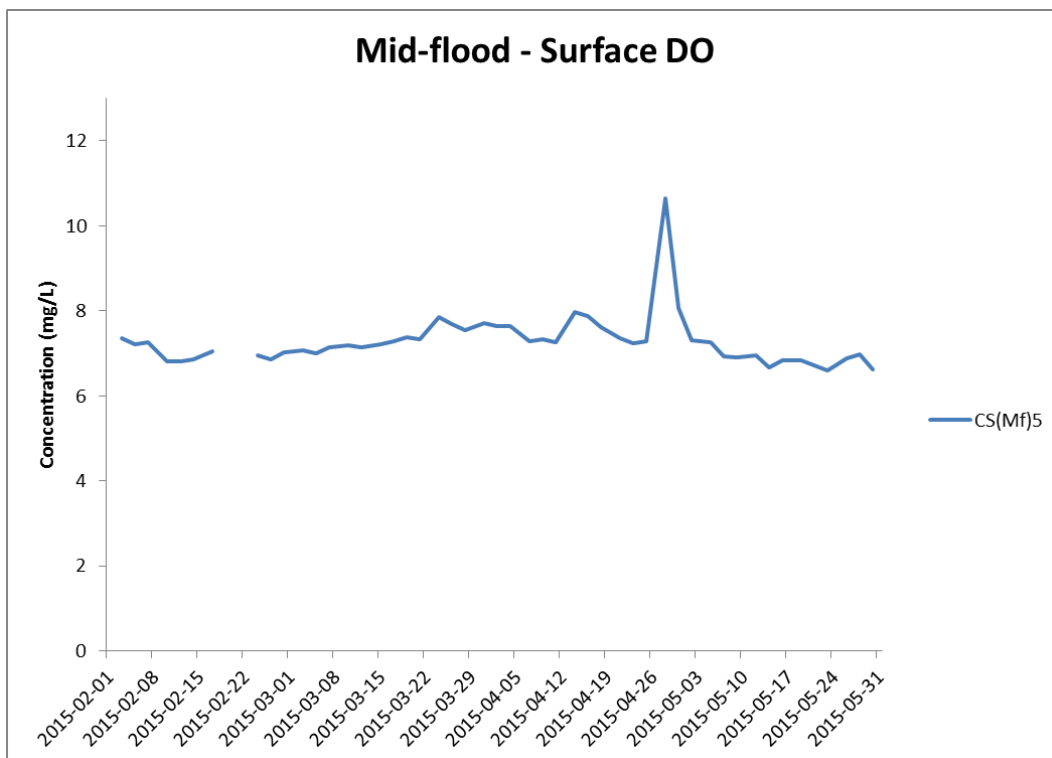
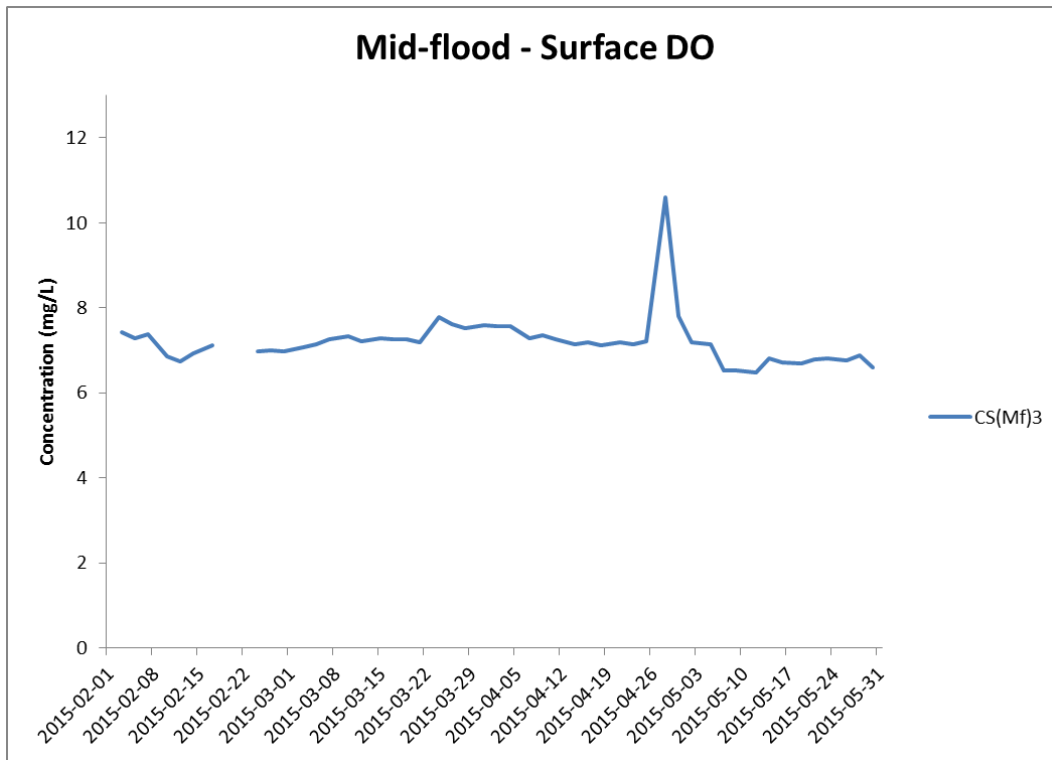


Figure H5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



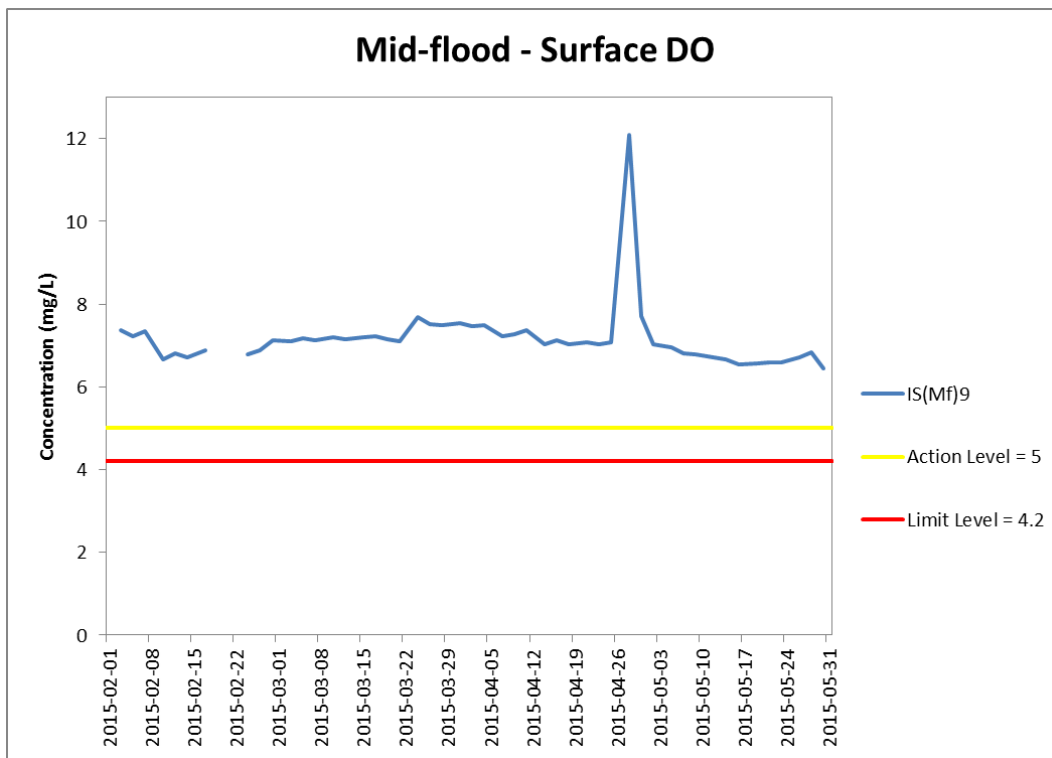
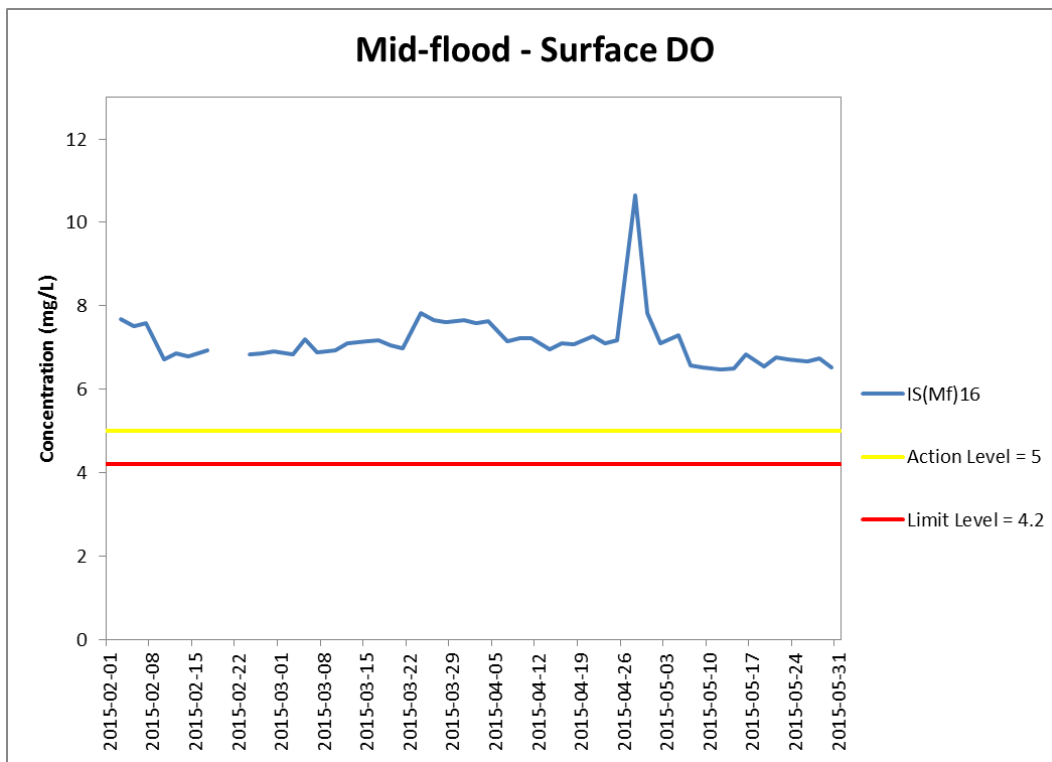


Figure H6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



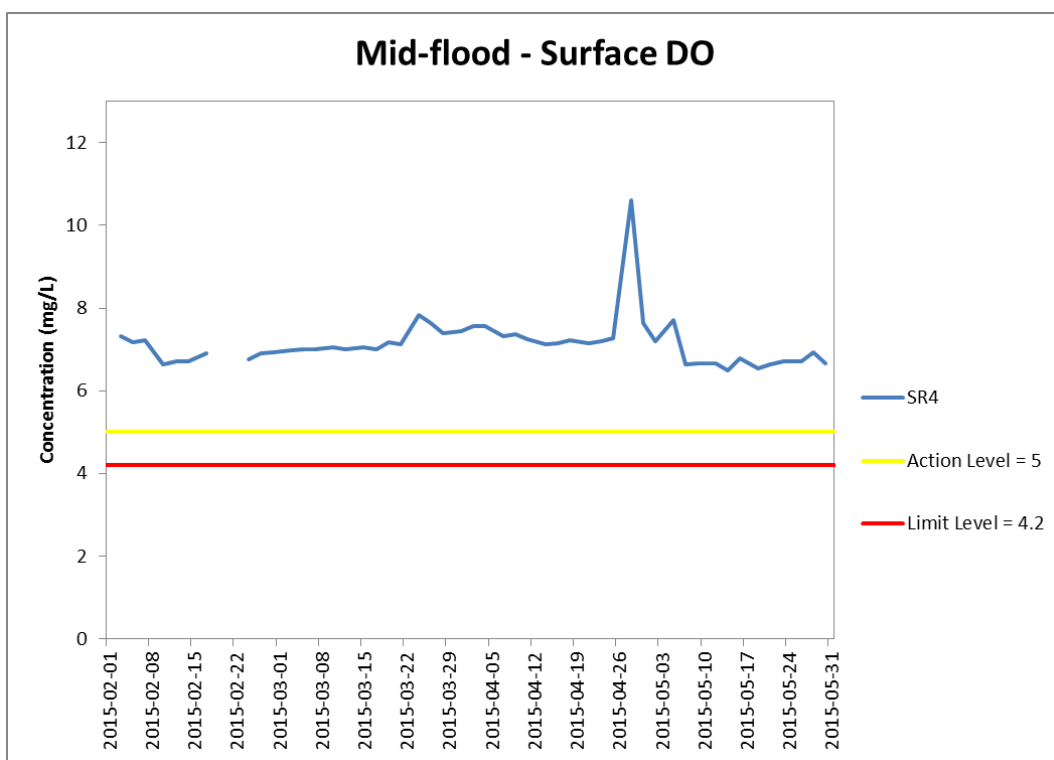
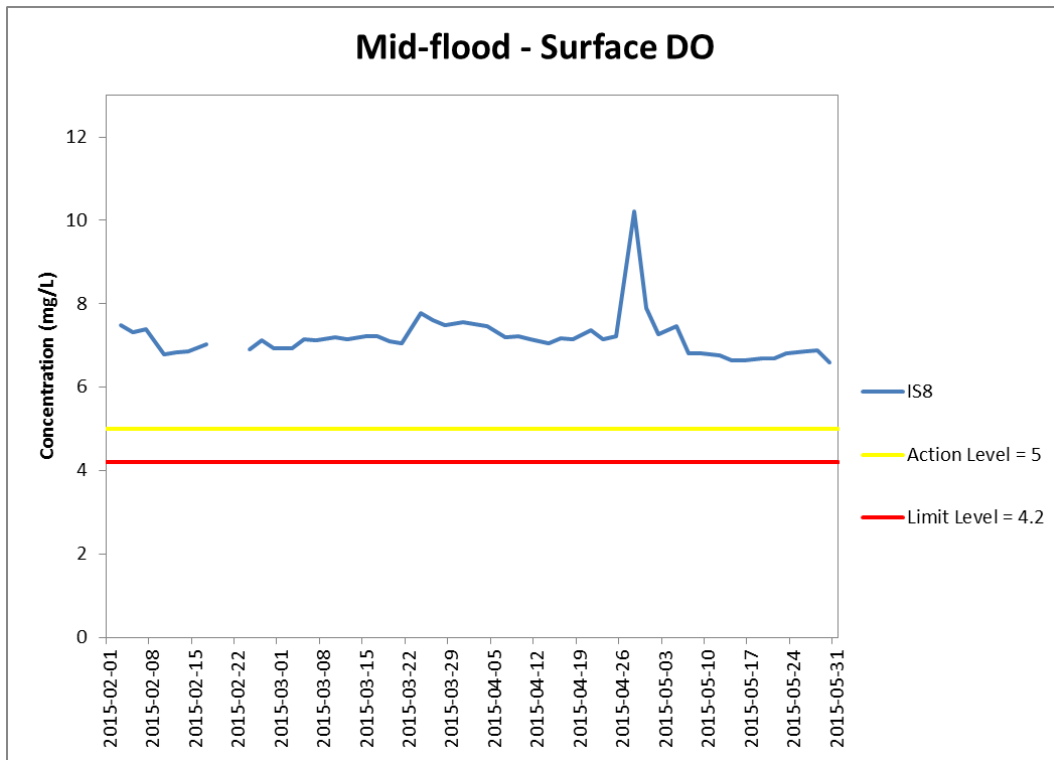


Figure H7 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



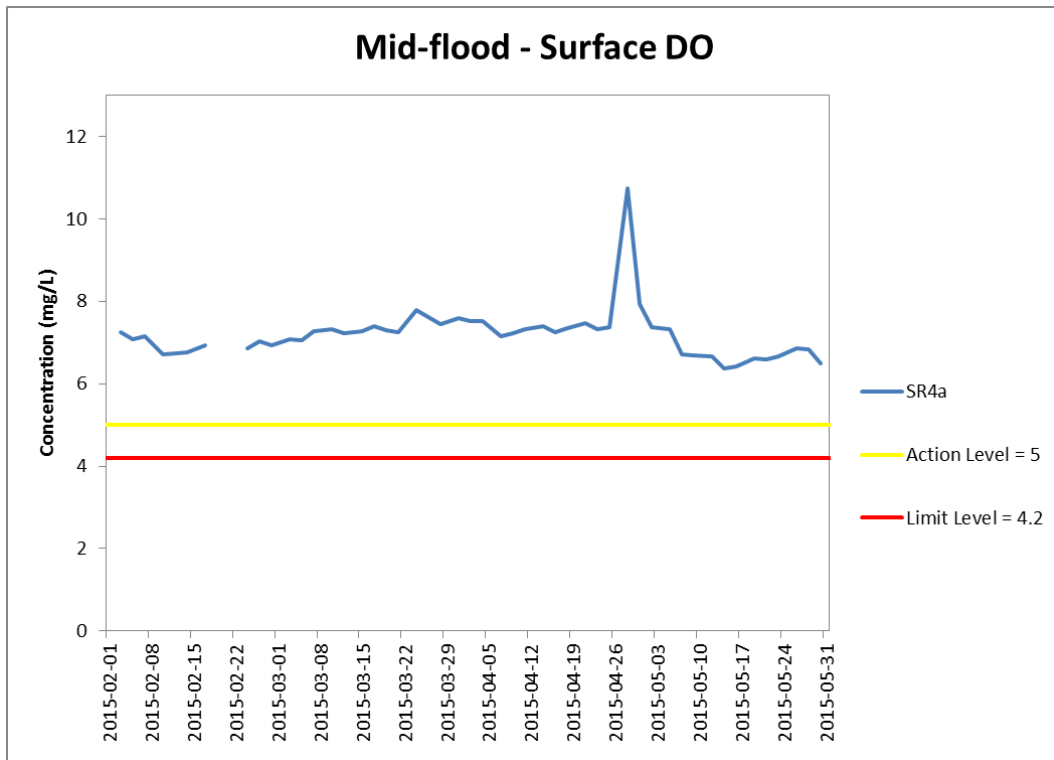


Figure H8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



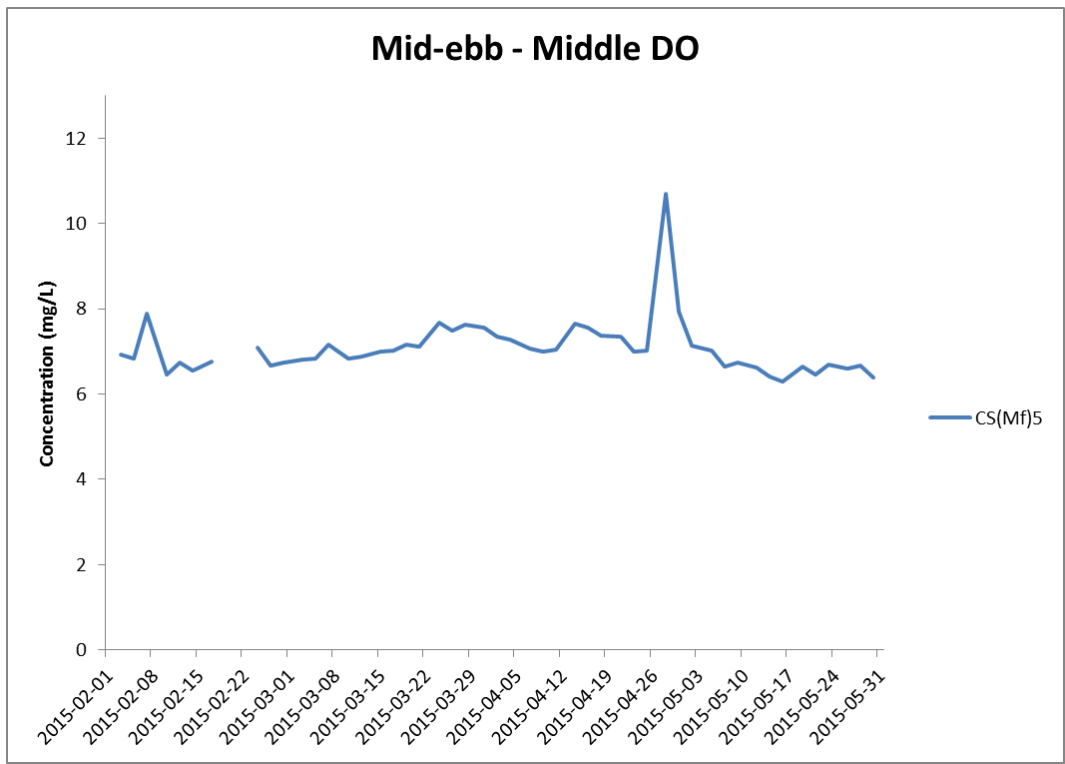
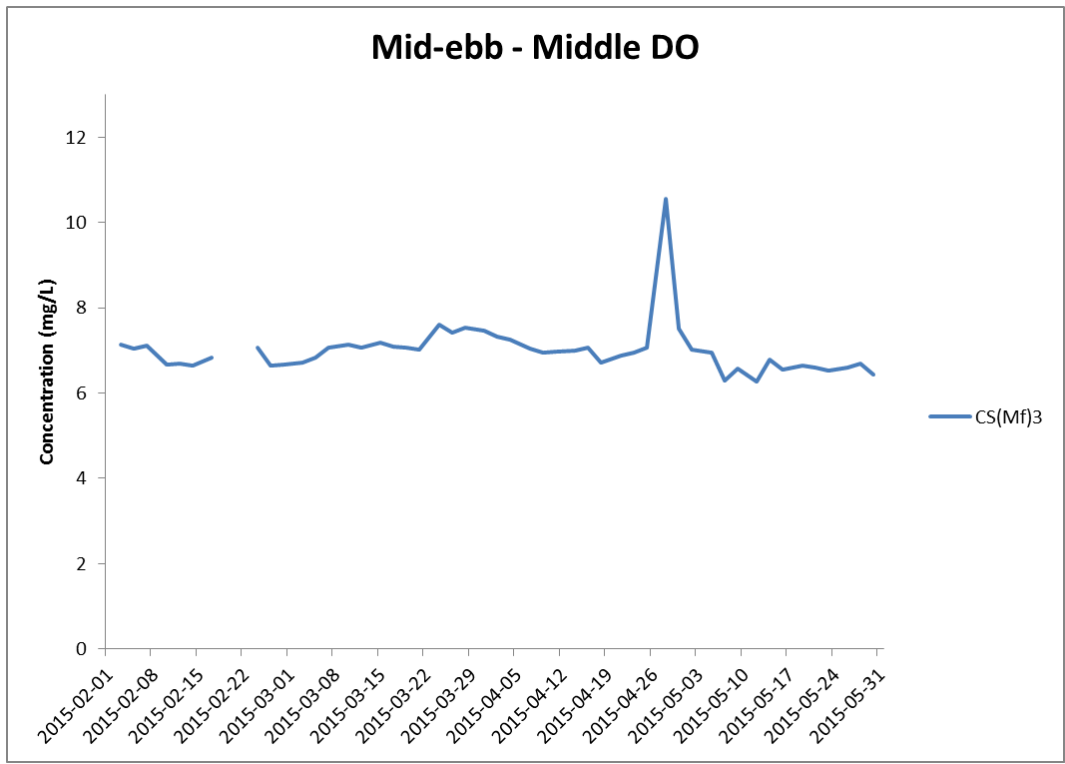


Figure H9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

Environmental Resources Management



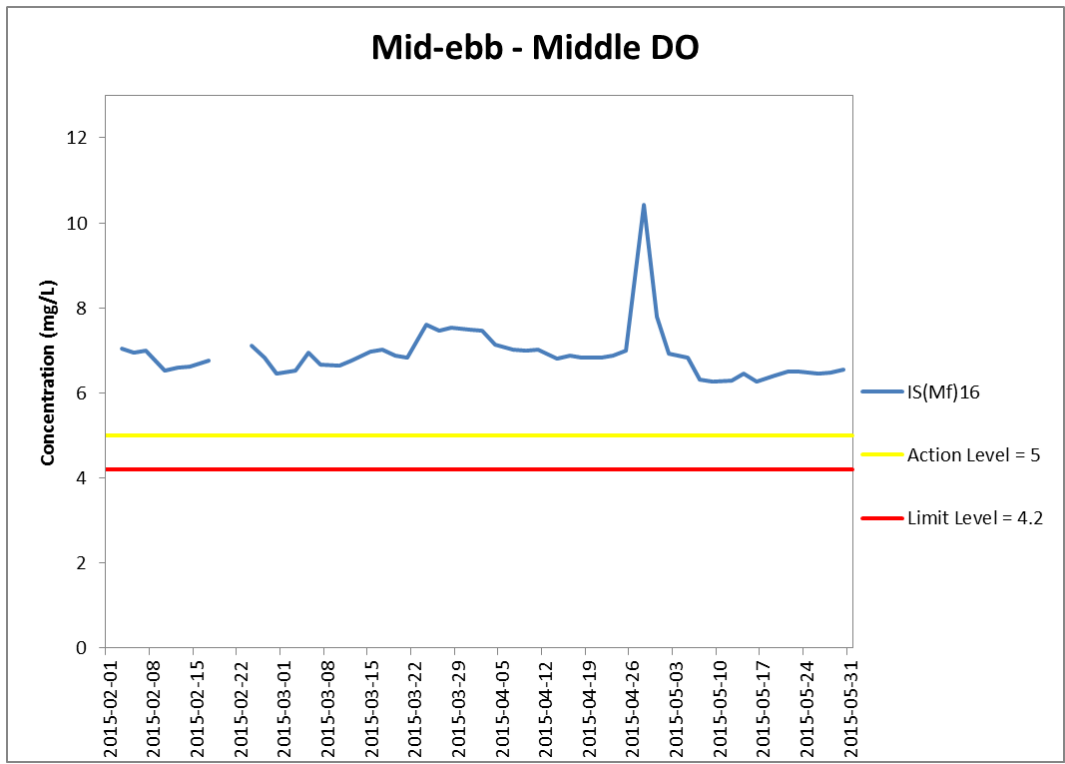


Figure H10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 February and 31 May 2015 at IS(Mf)16.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



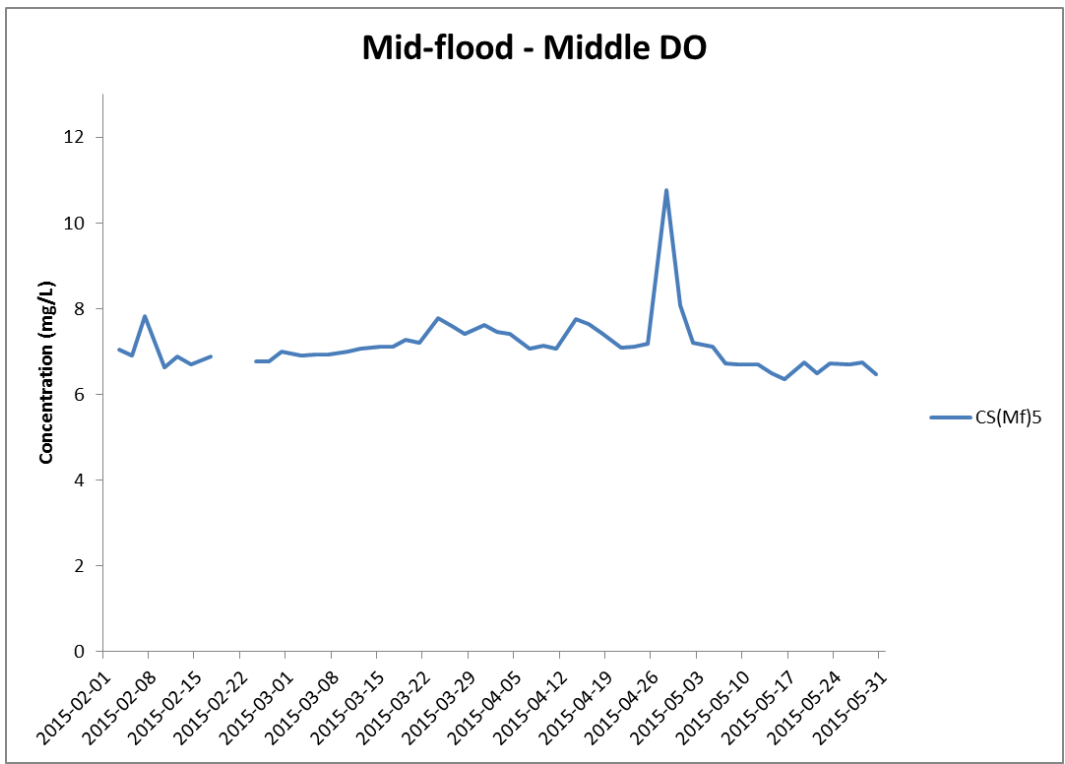
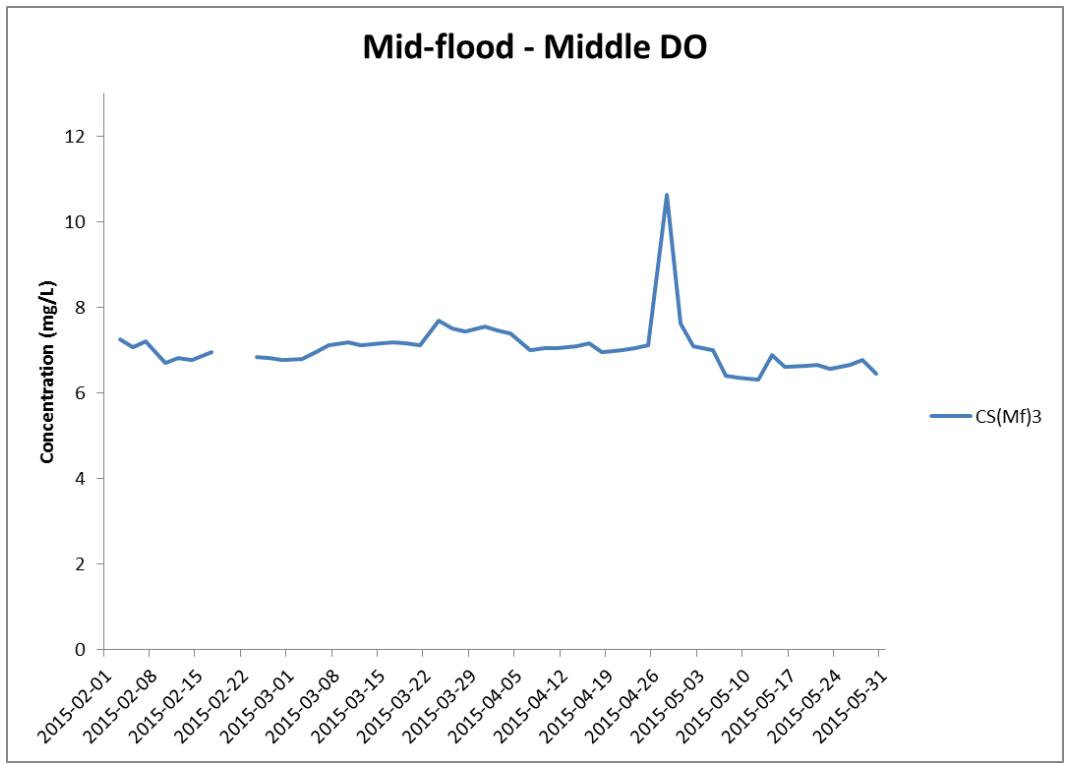


Figure H11 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



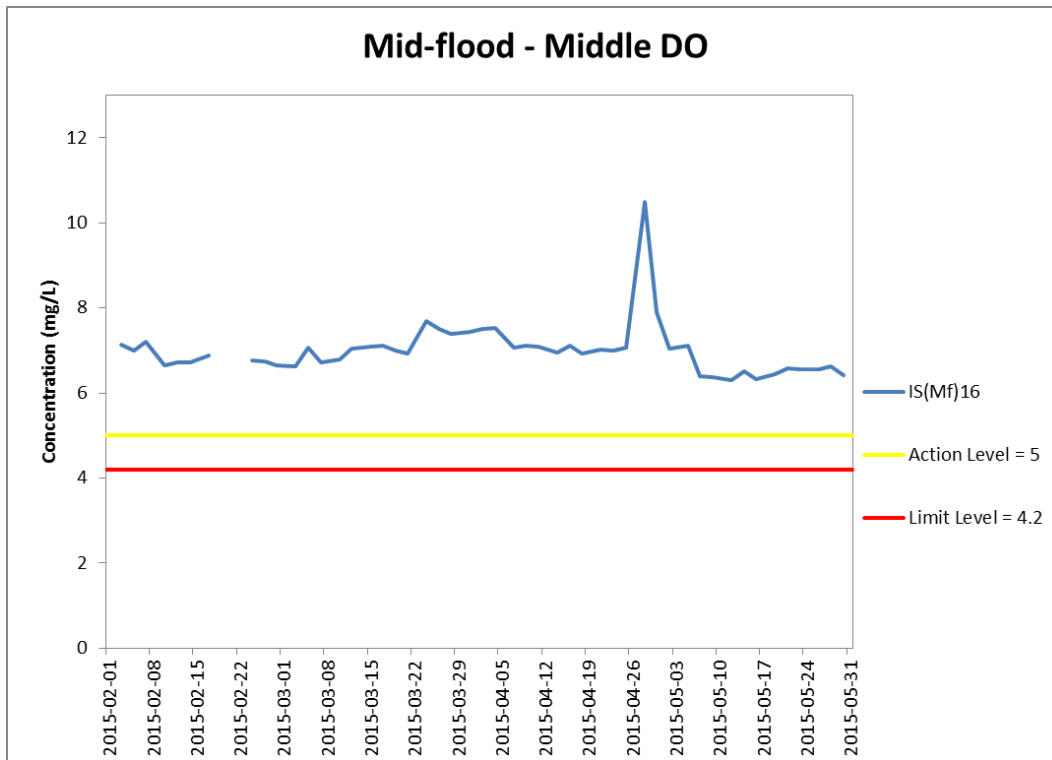


Figure H12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 February and 31 May 2015 at IS(Mf)16.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



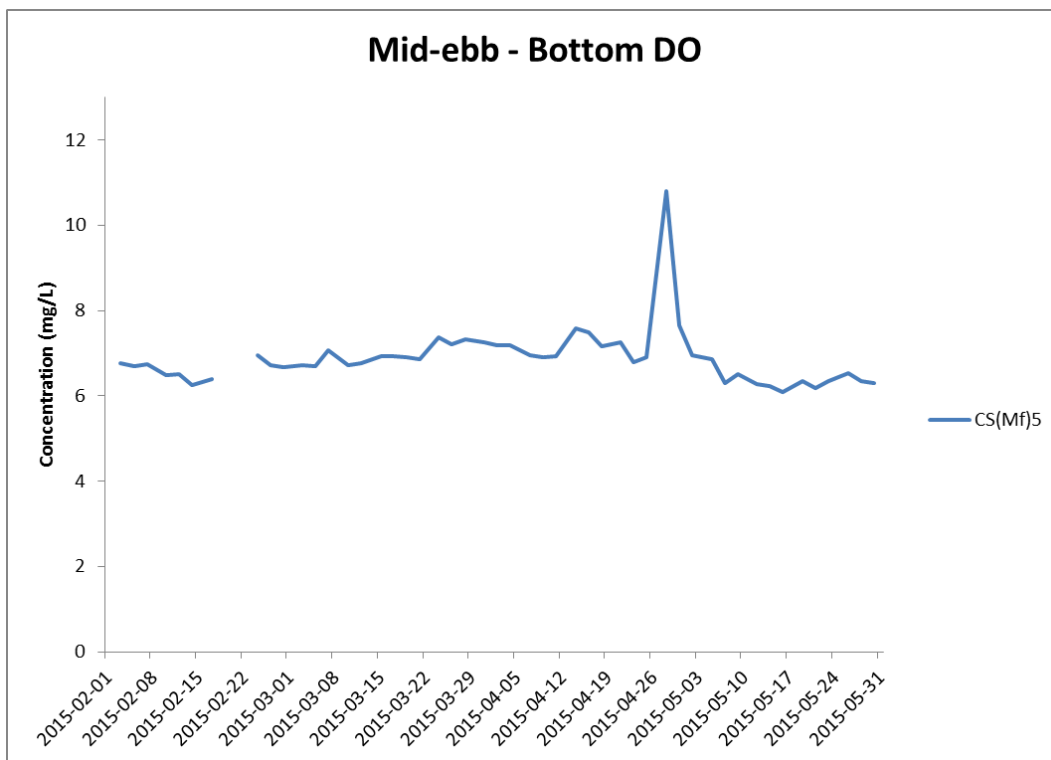
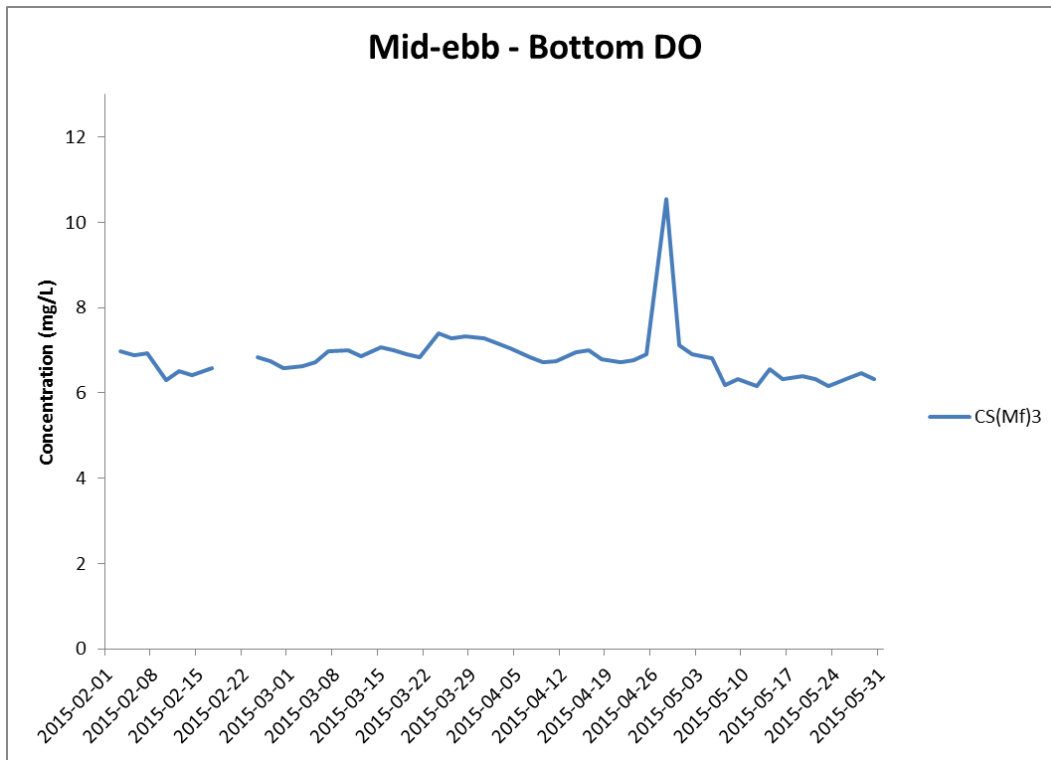


Figure H13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



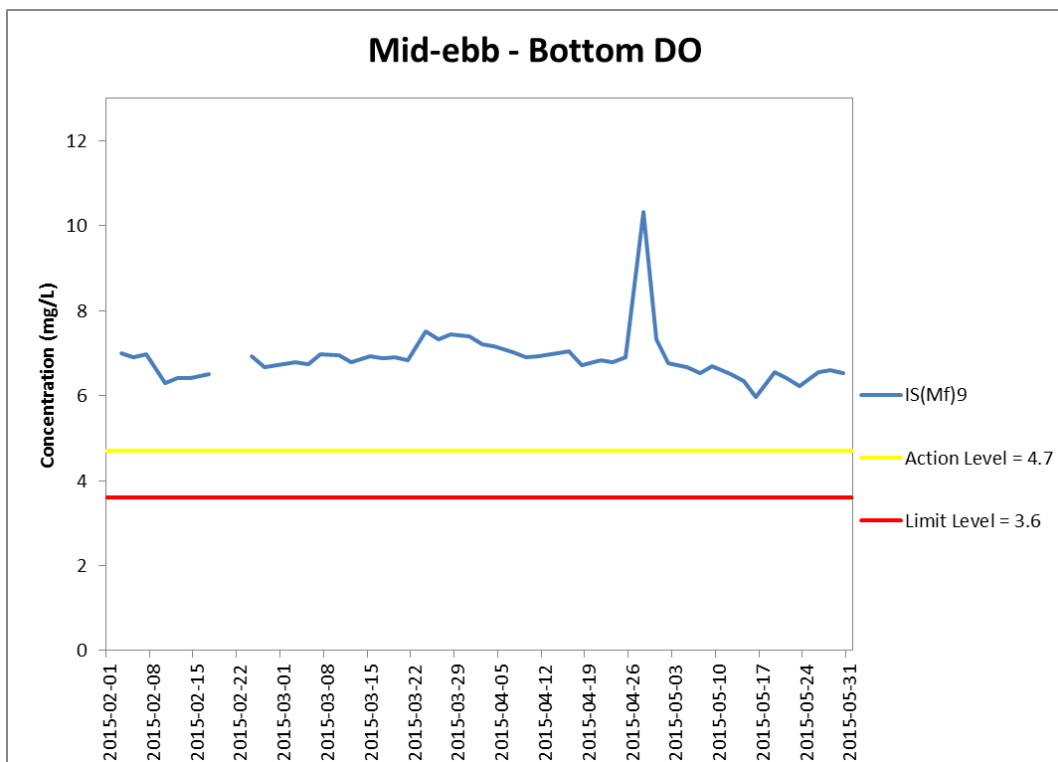
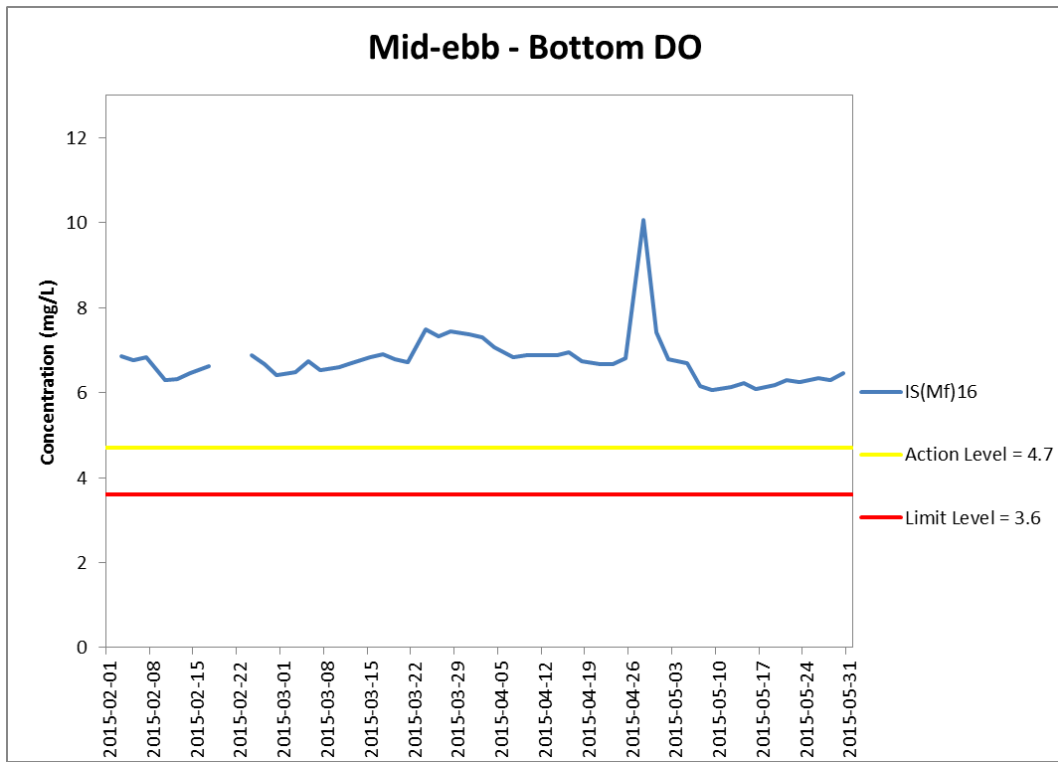


Figure H14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



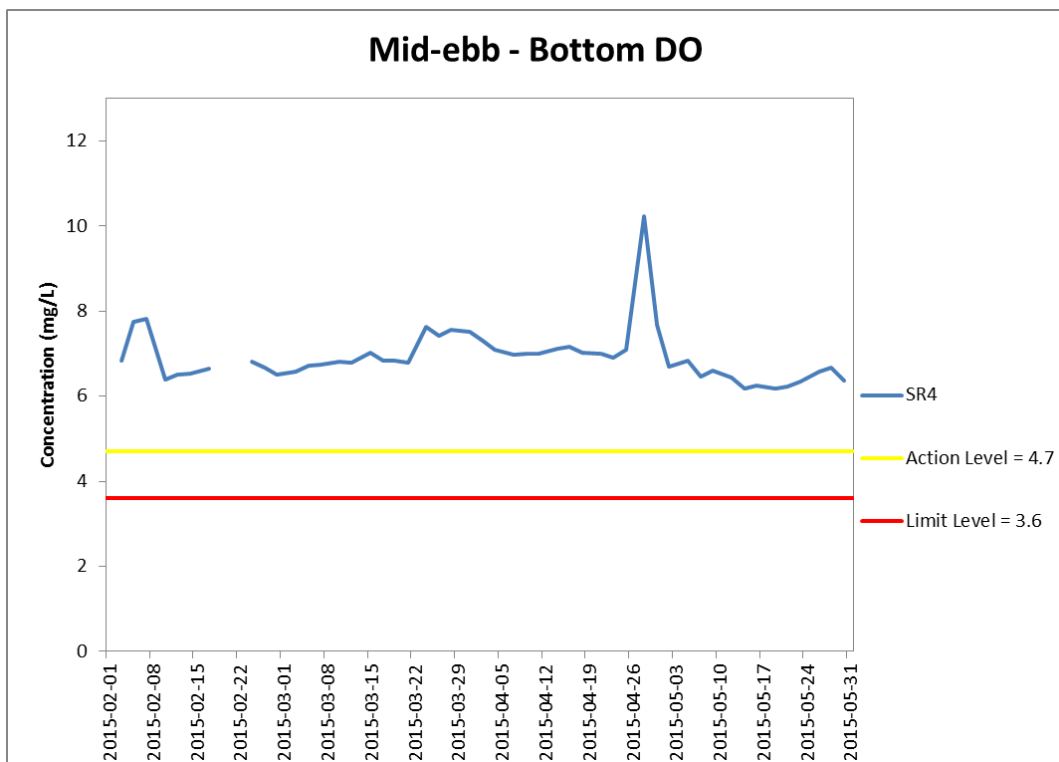
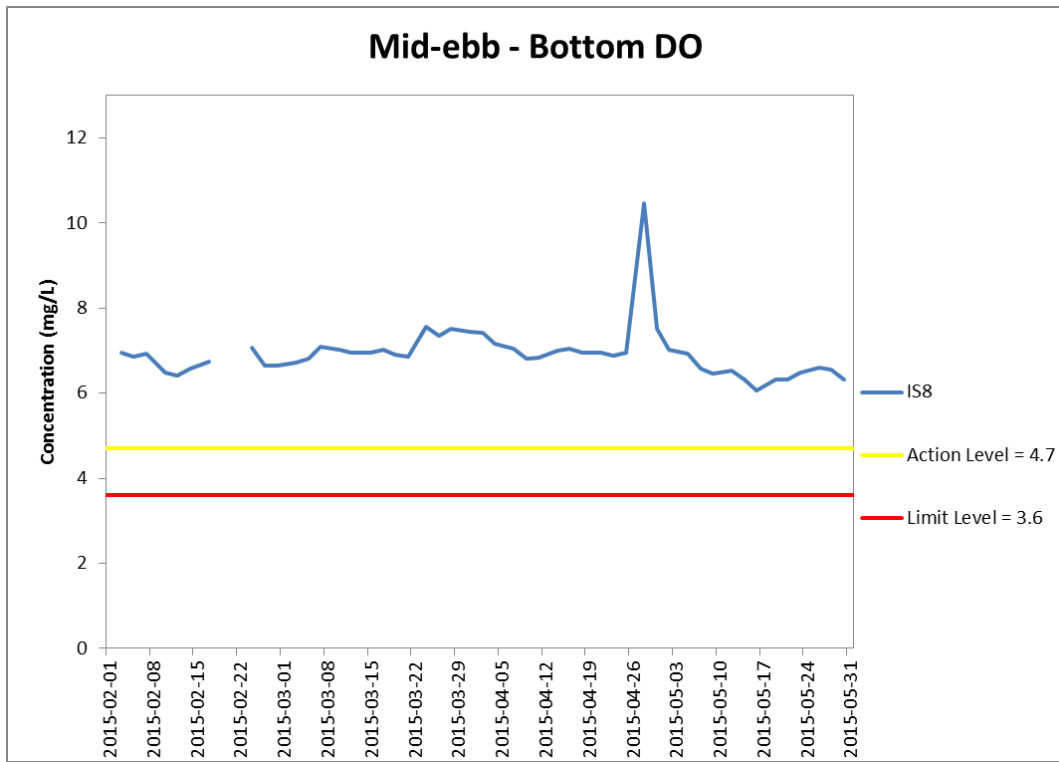


Figure H15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



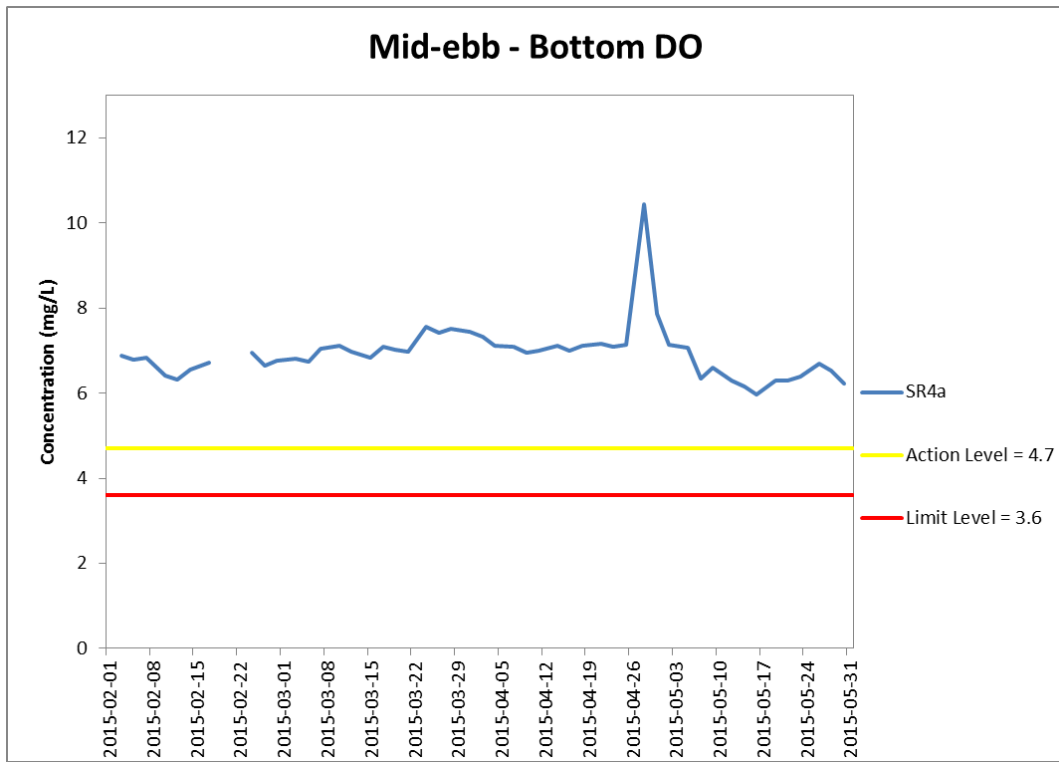


Figure H16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



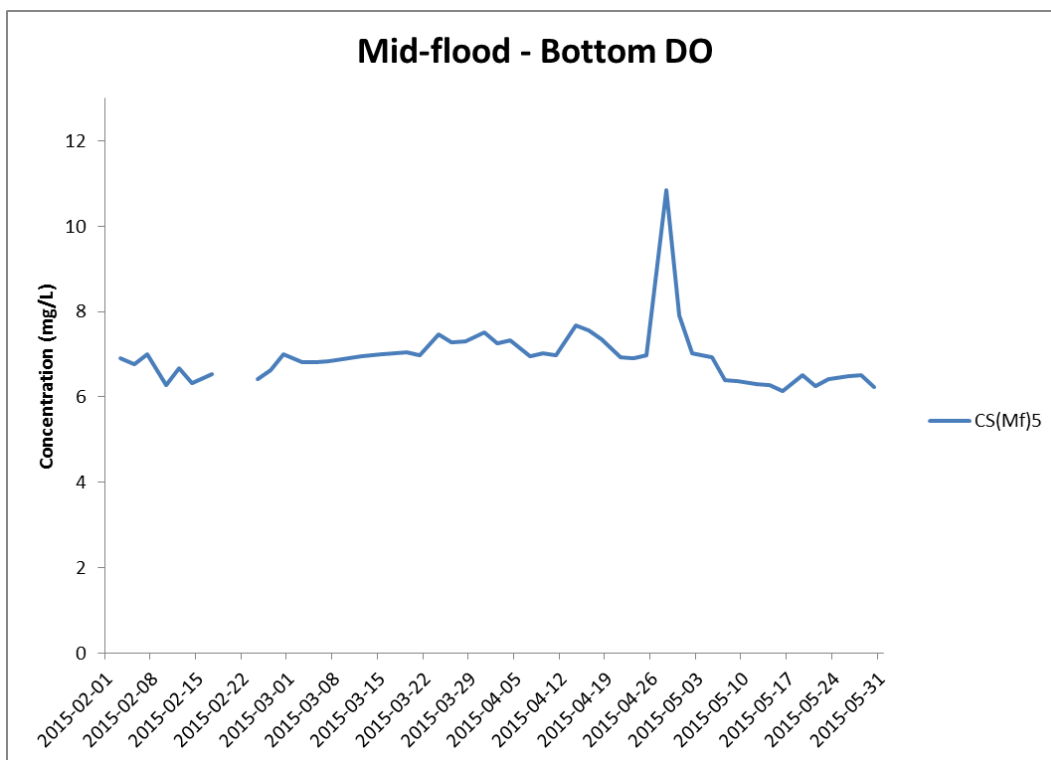
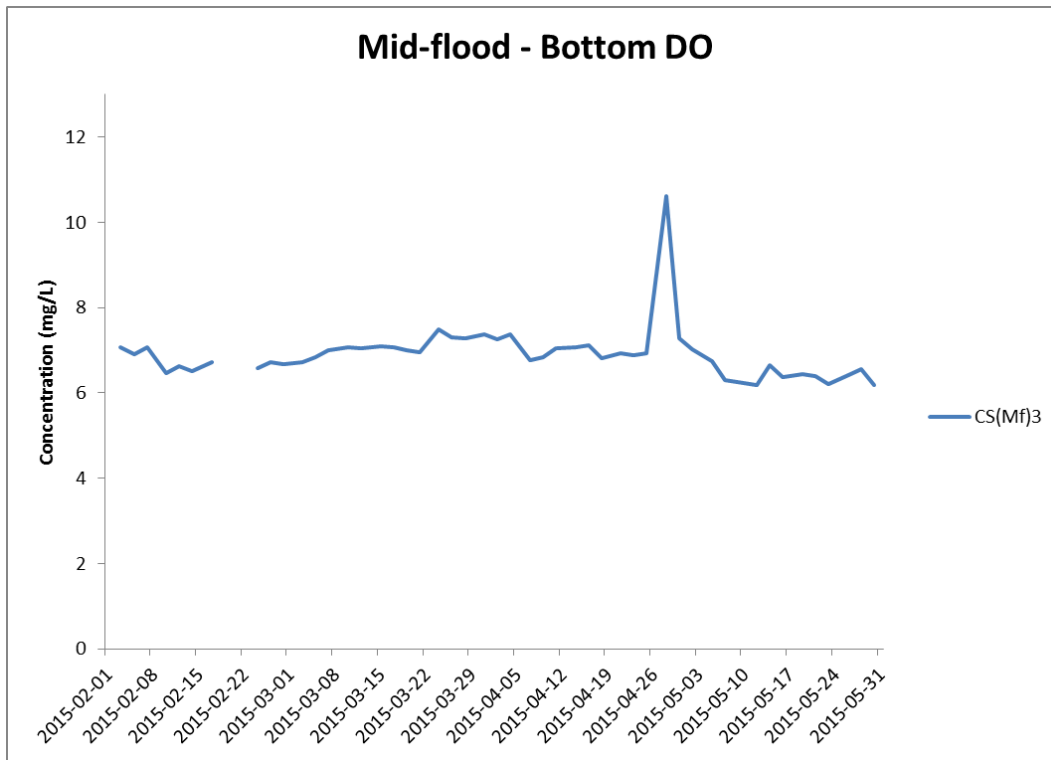


Figure H17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



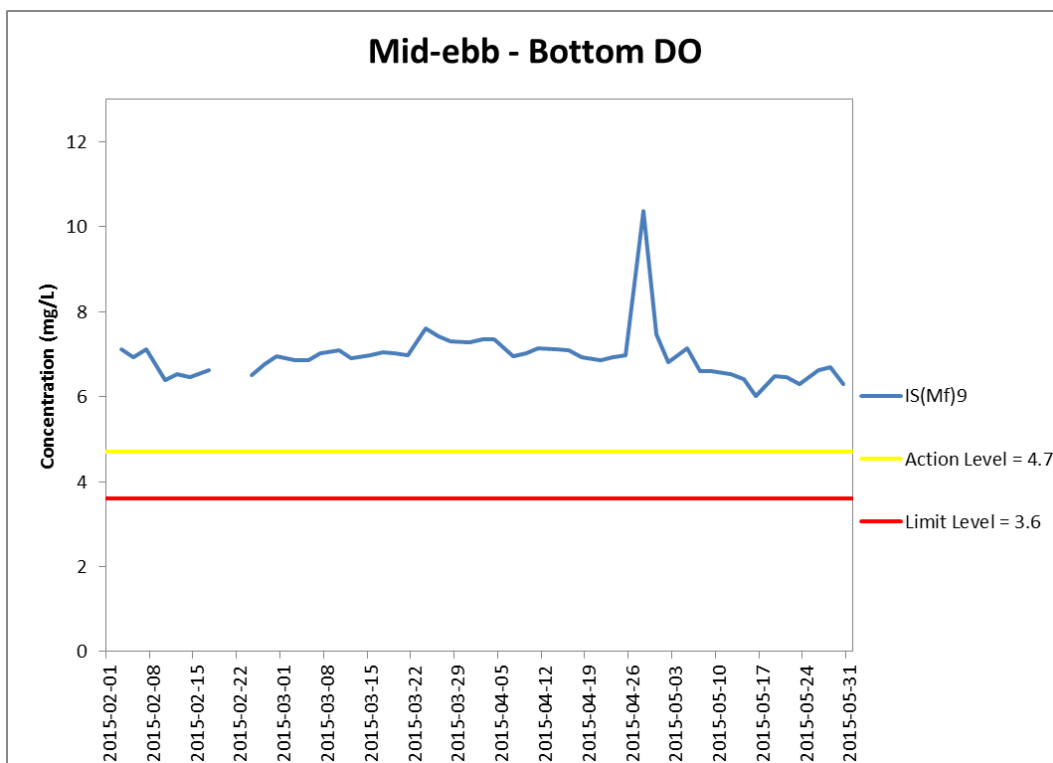
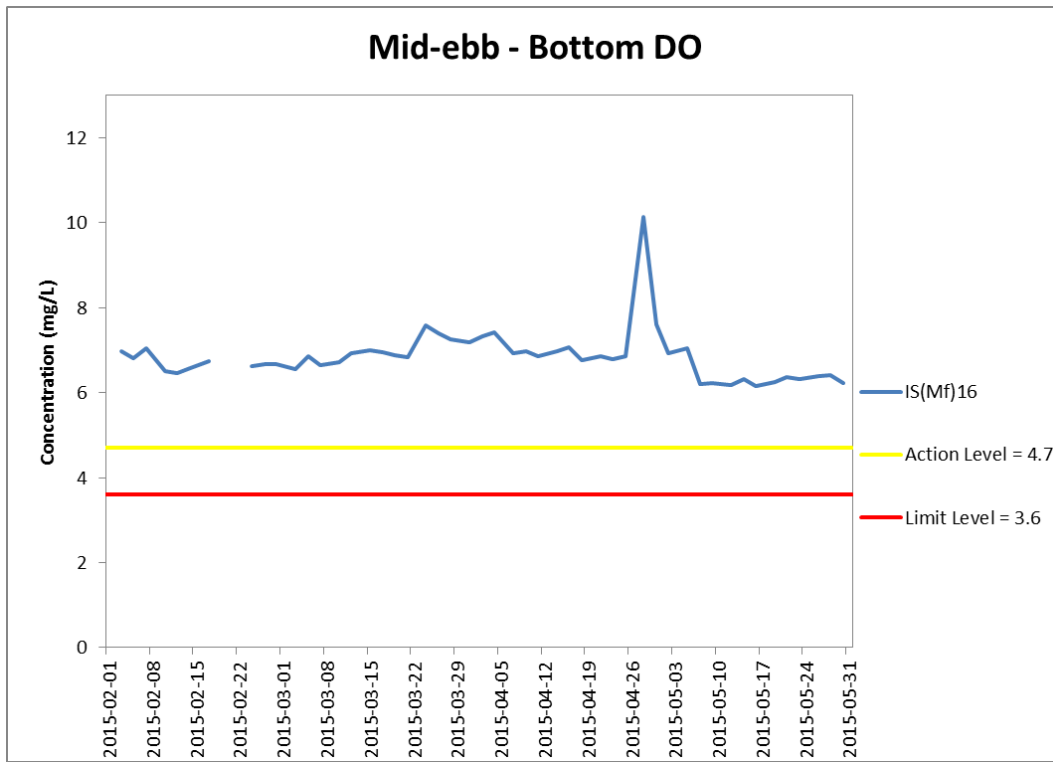


Figure H18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



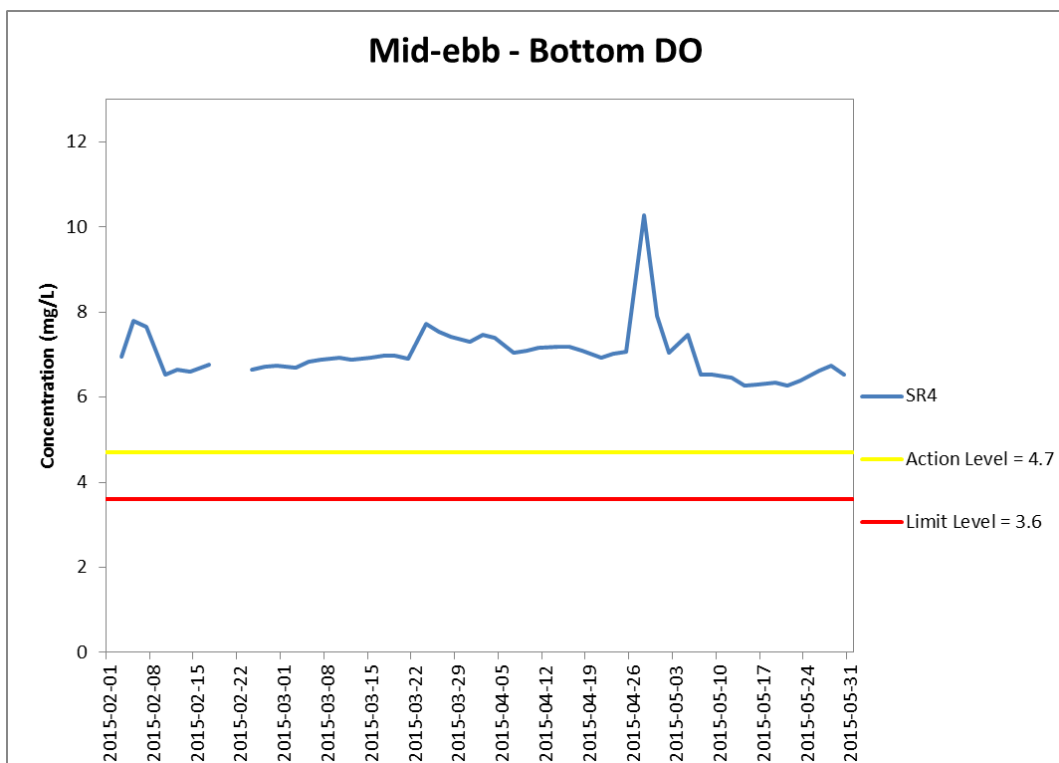
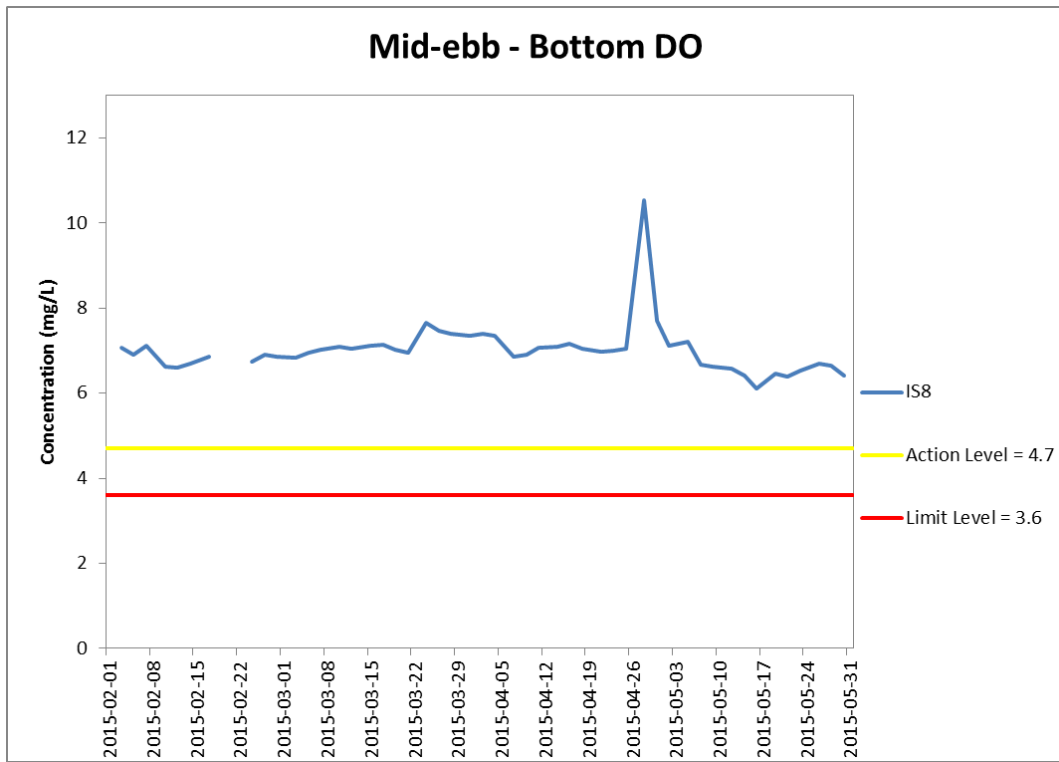


Figure H19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



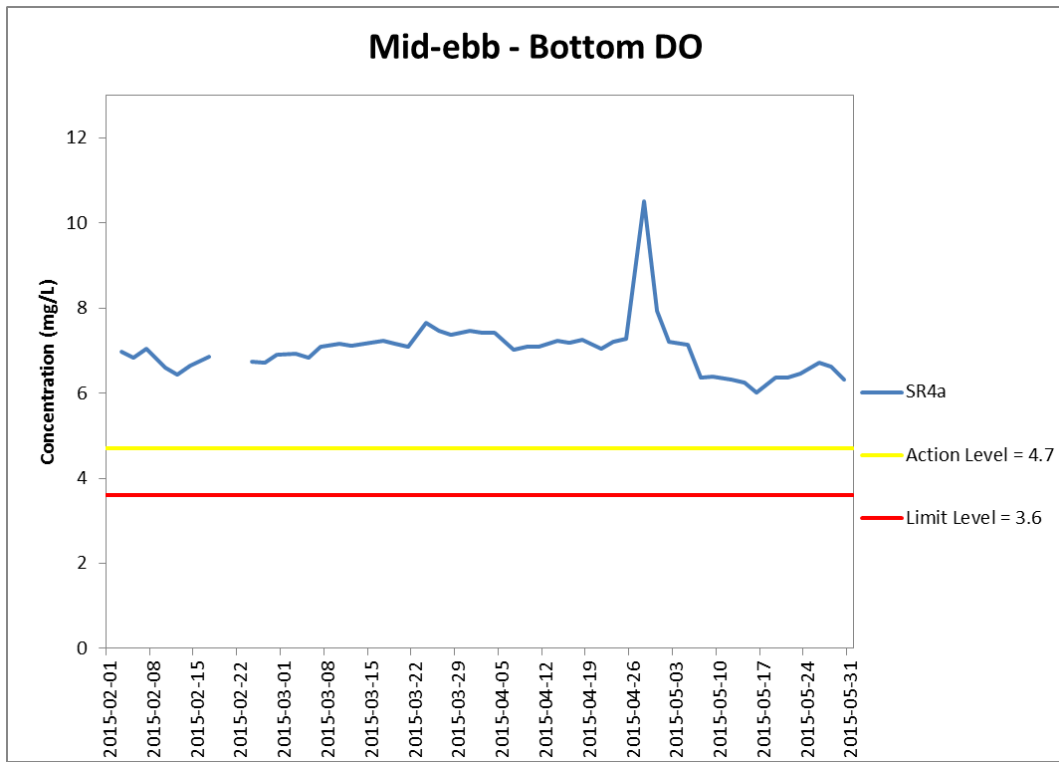


Figure H20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



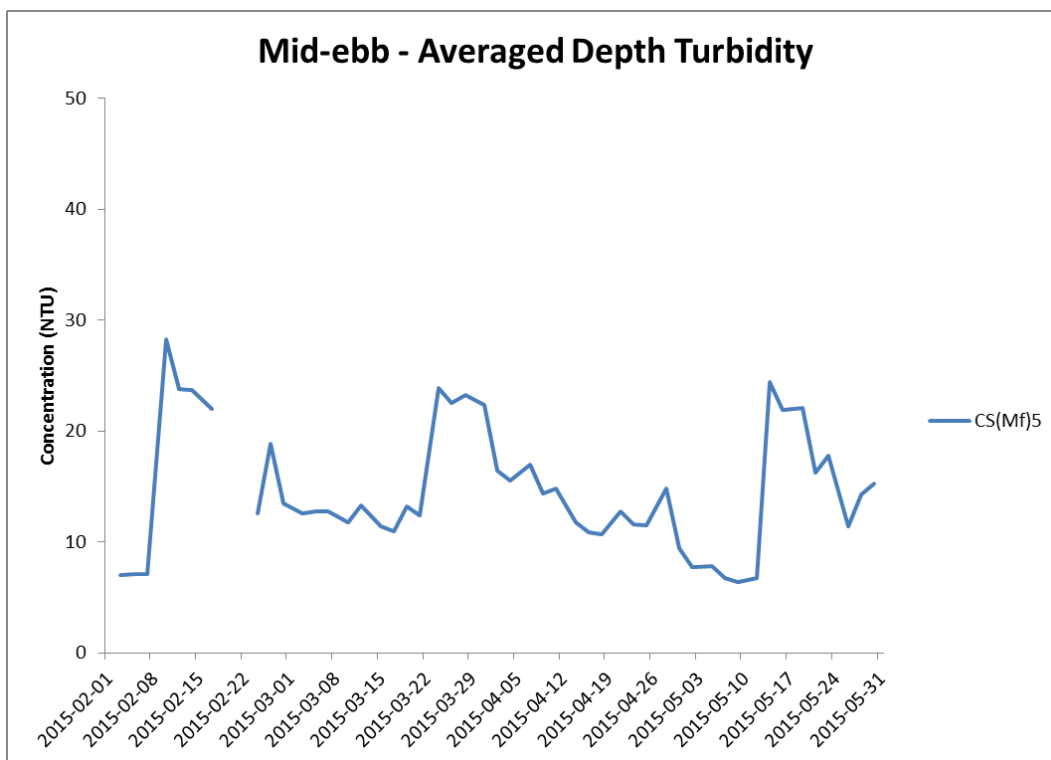
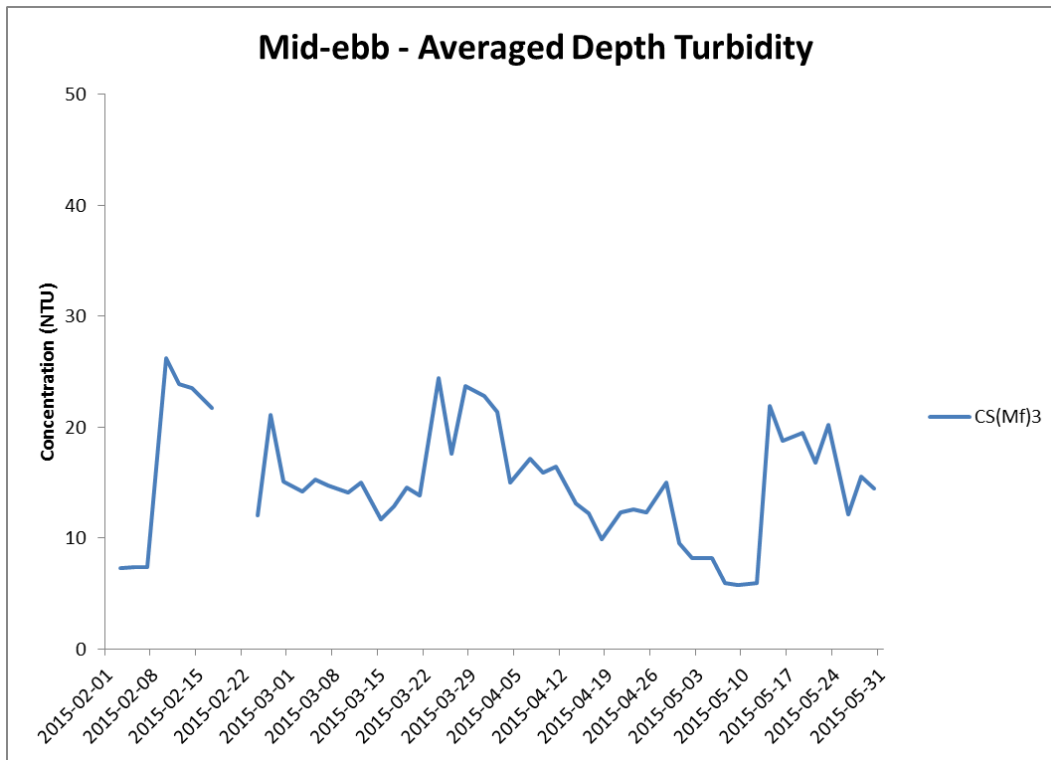
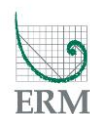


Figure H21 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



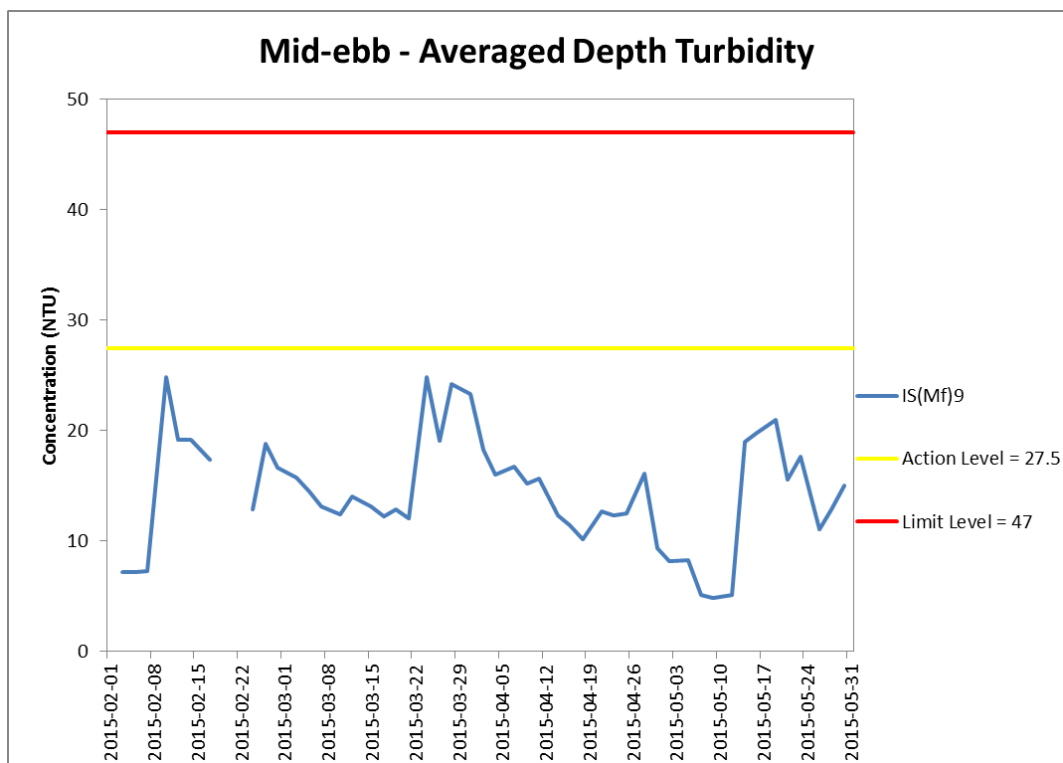
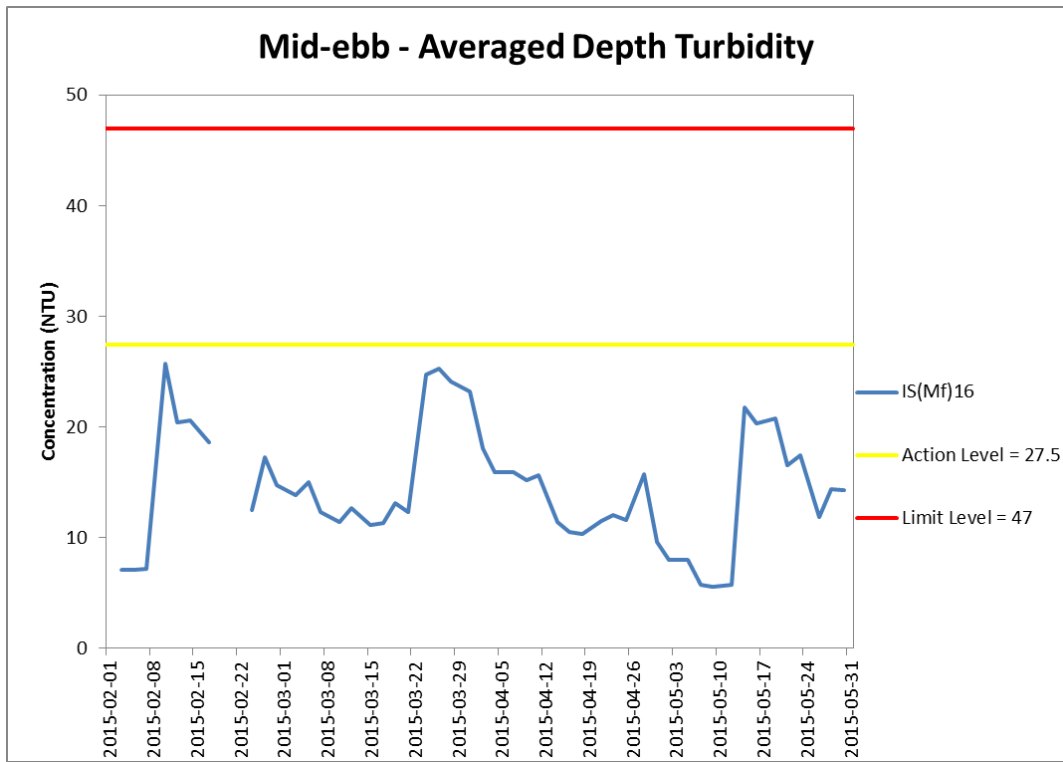


Figure H22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



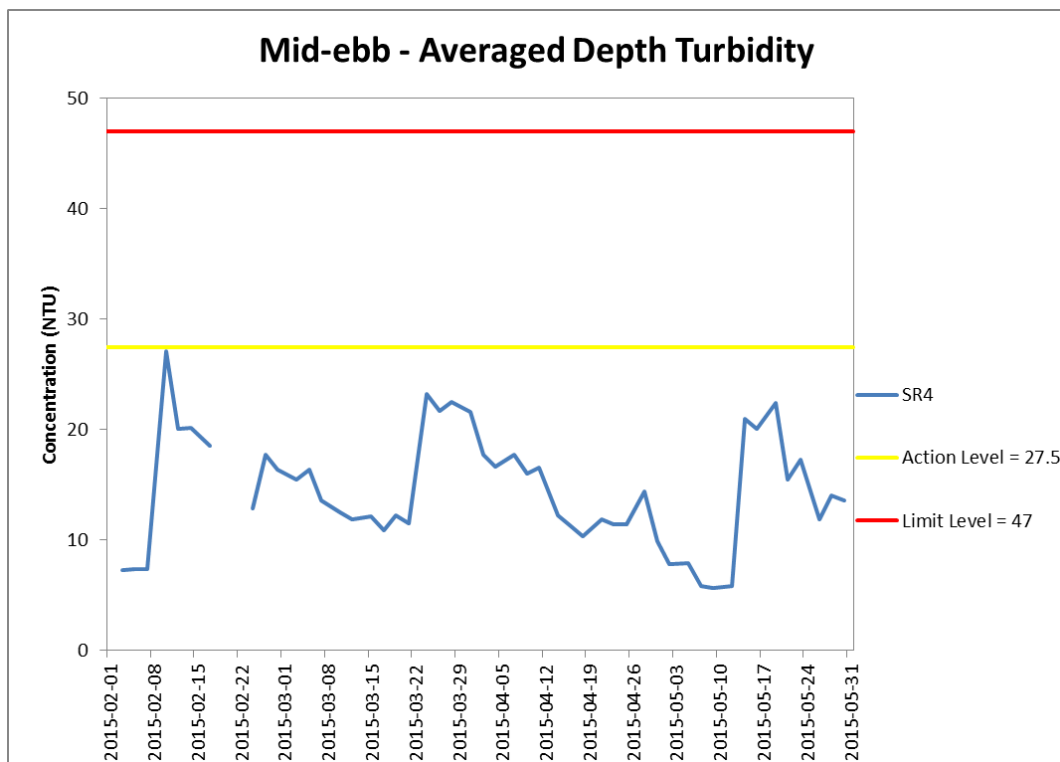
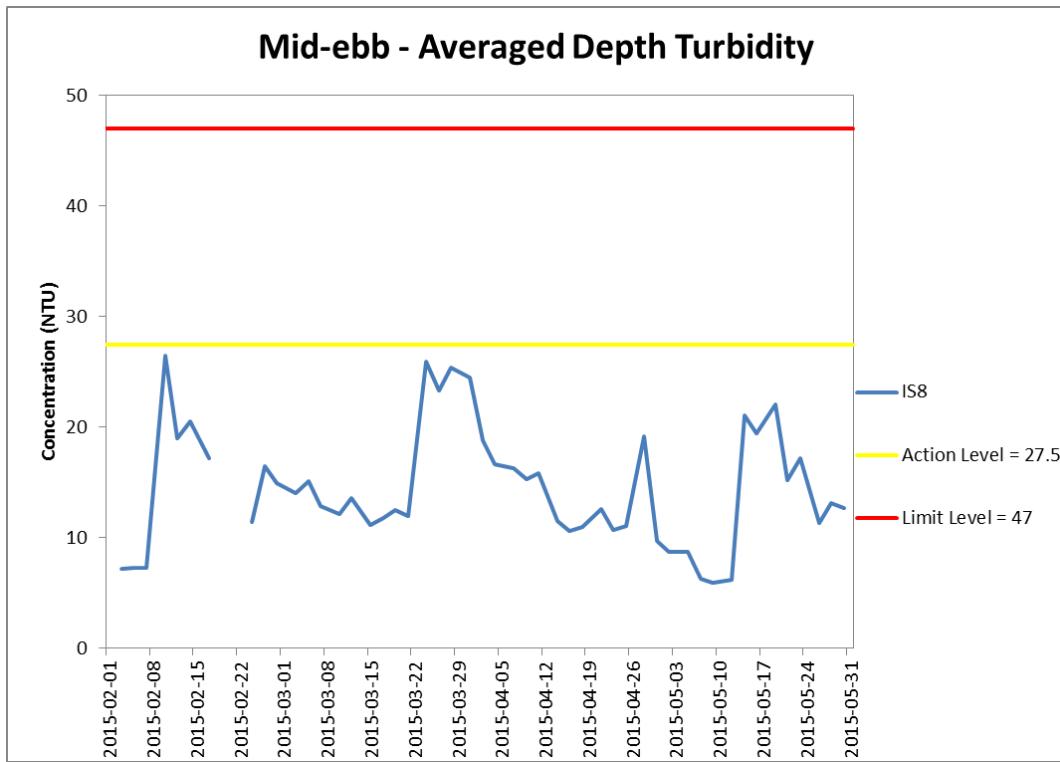


Figure H23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



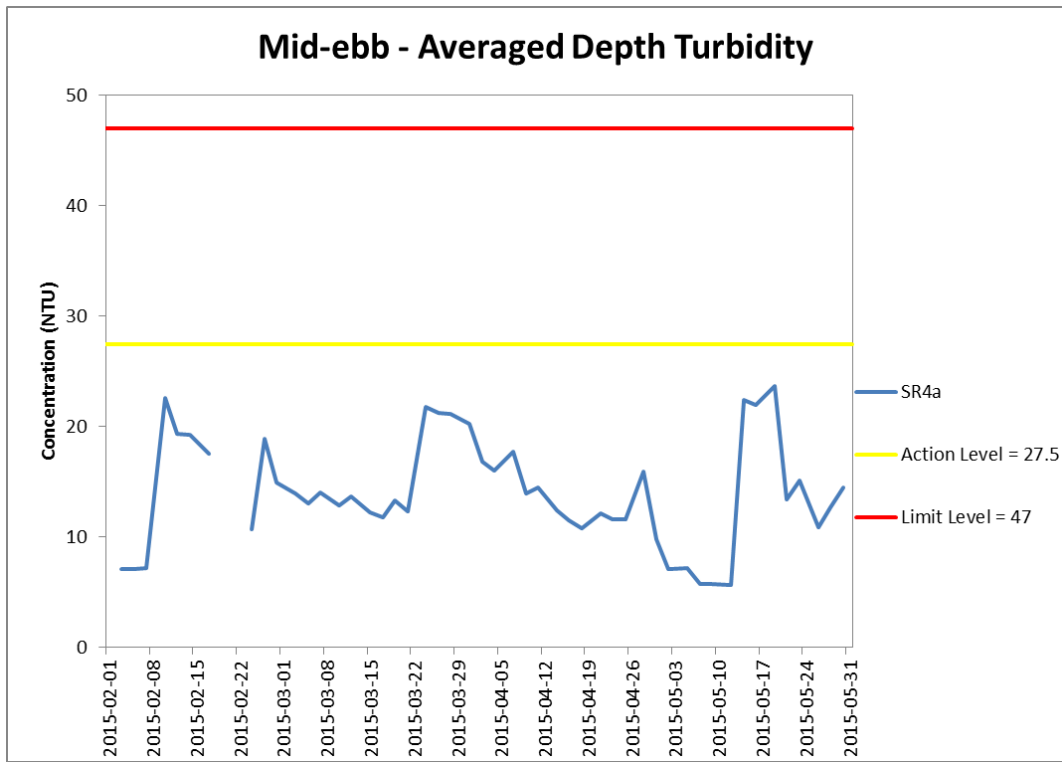


Figure H24 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
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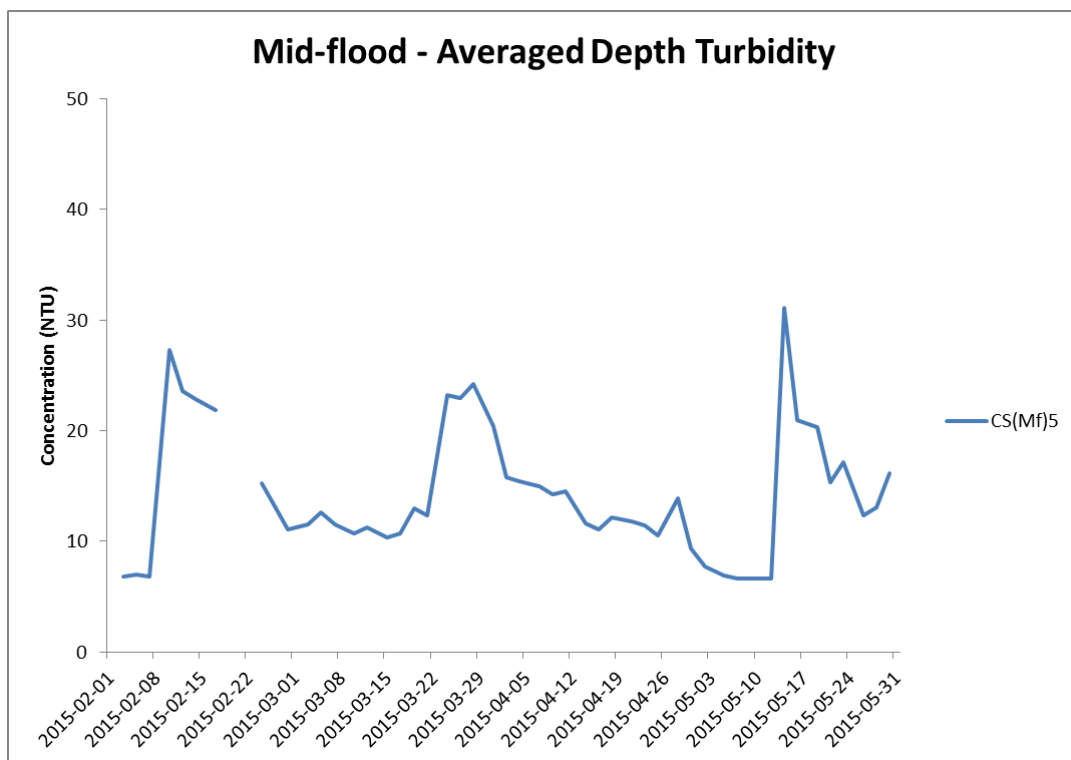
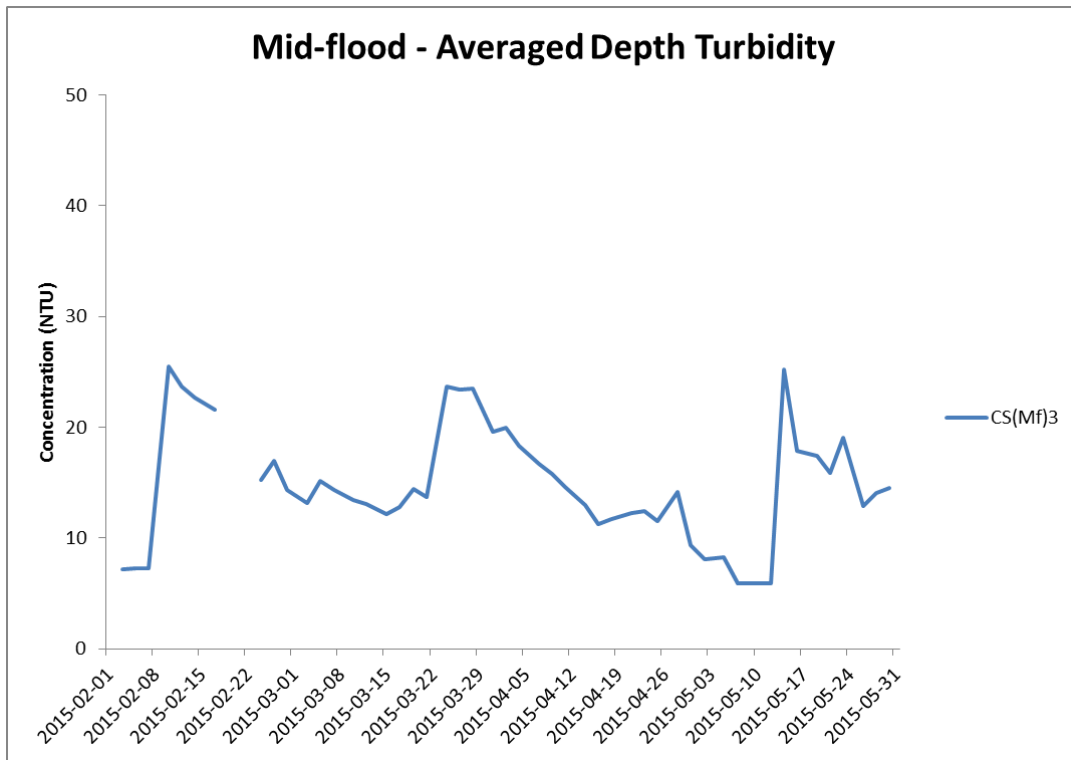


Figure H25 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(MF)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
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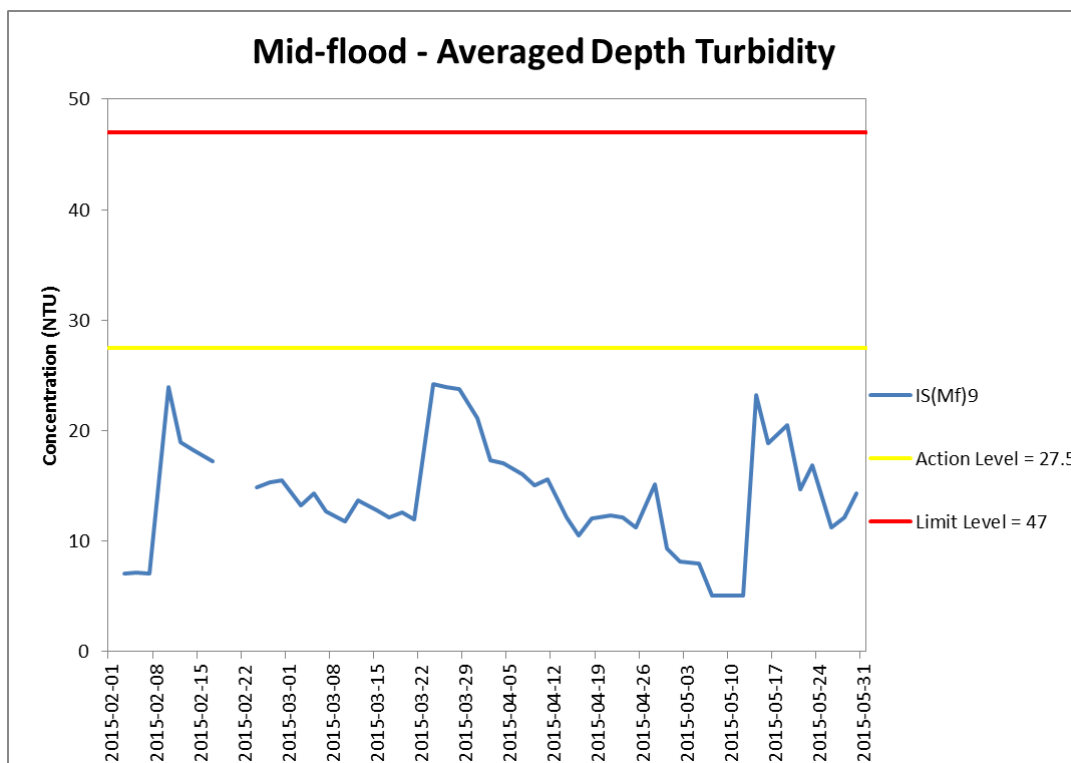
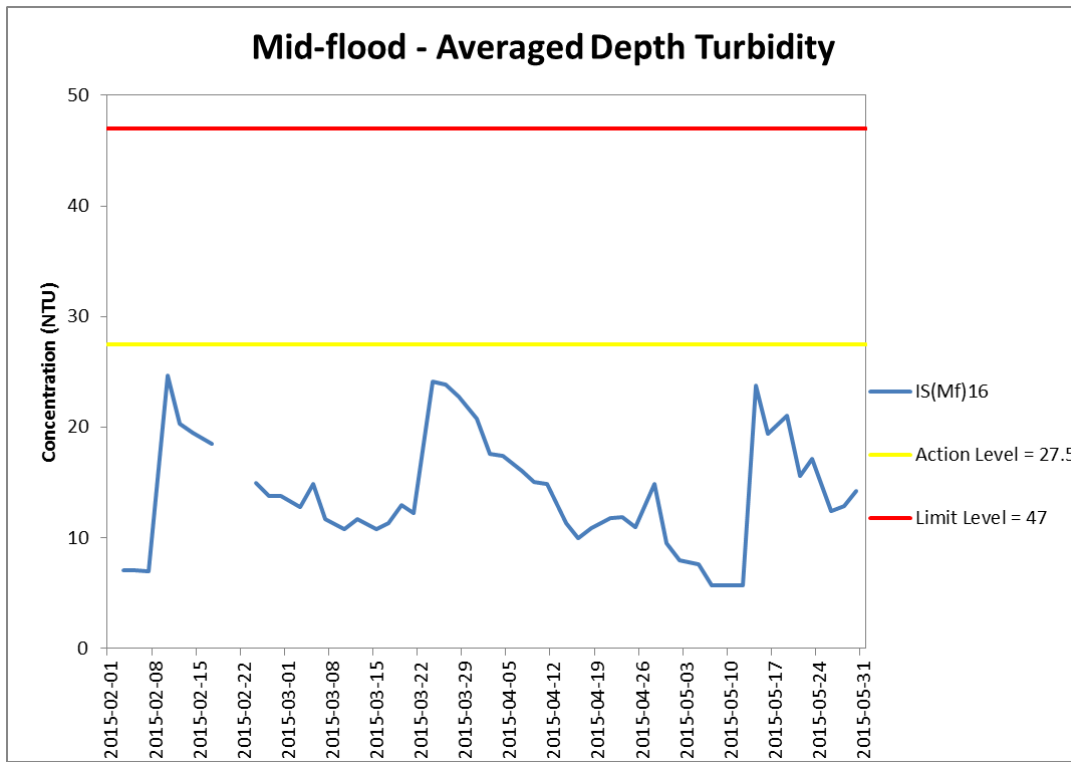


Figure H26 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
Management**



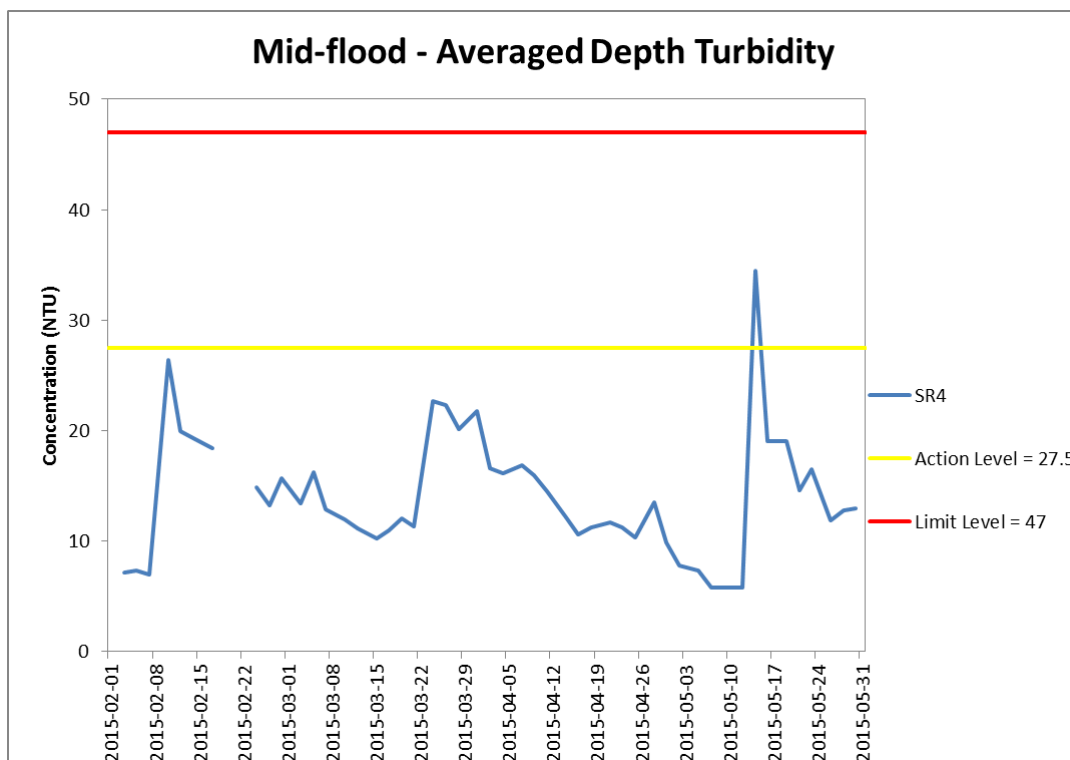
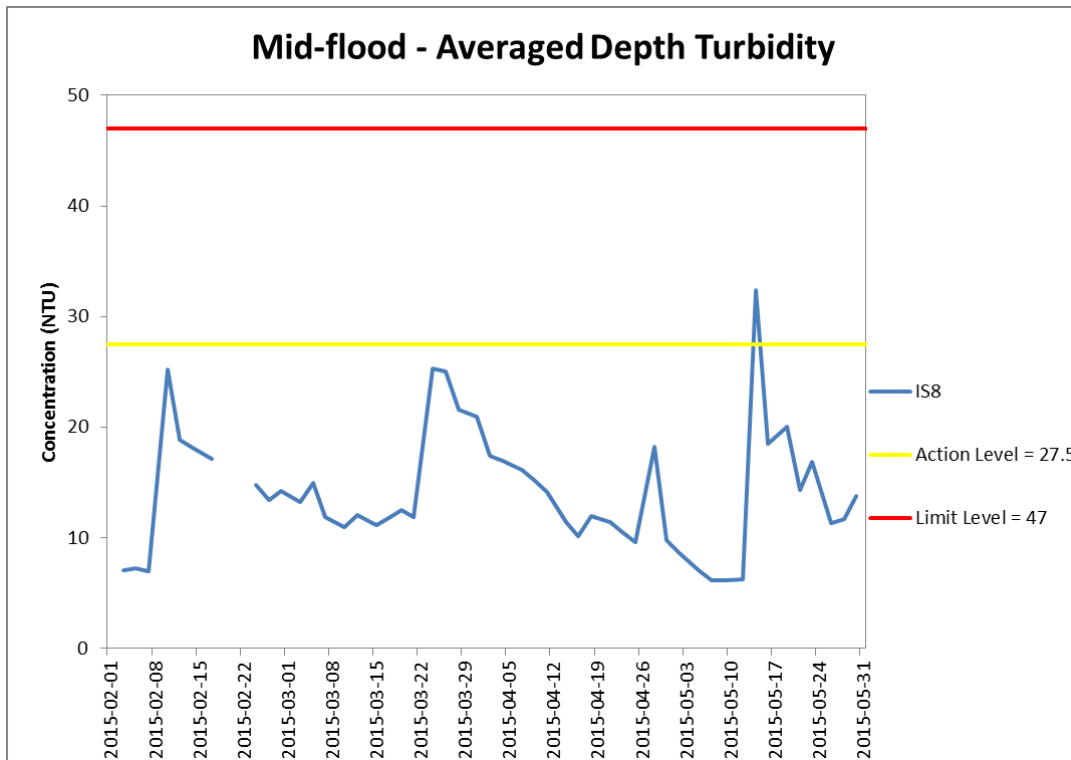


Figure H27 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstillation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. The result higher than Action Level were not considered as exceedance as it was not higher than 120% of the upstream control station on the same day at same tide.

**Environmental
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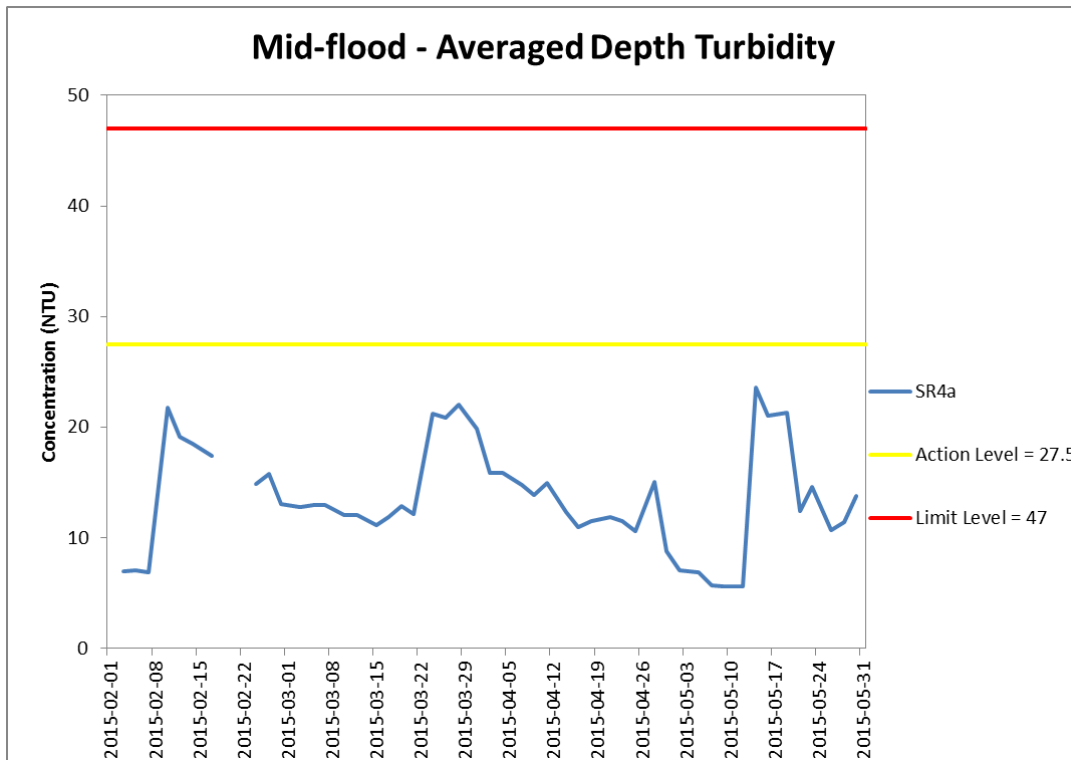


Figure H28 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
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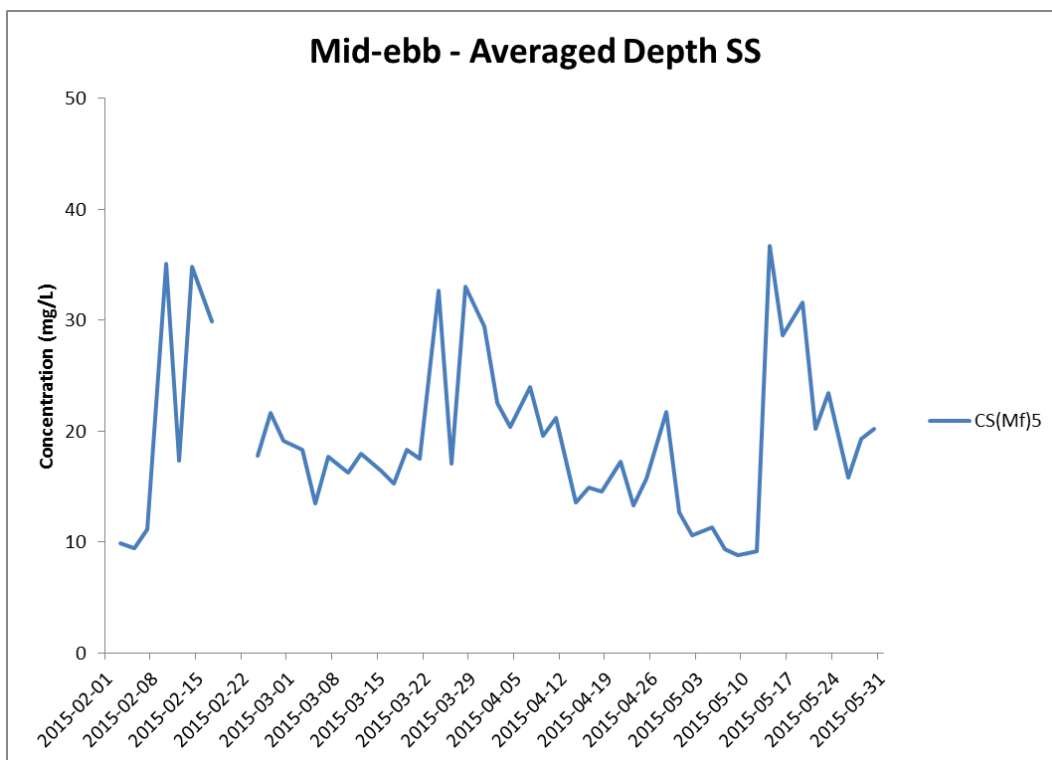
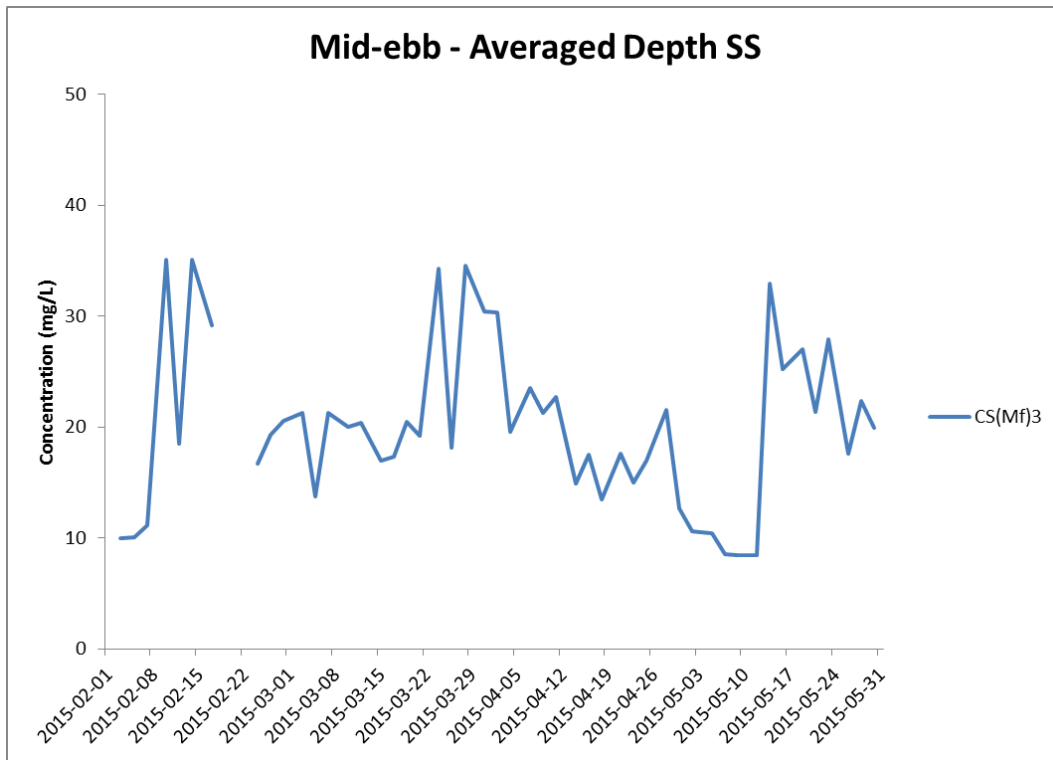


Figure H29 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
Resources
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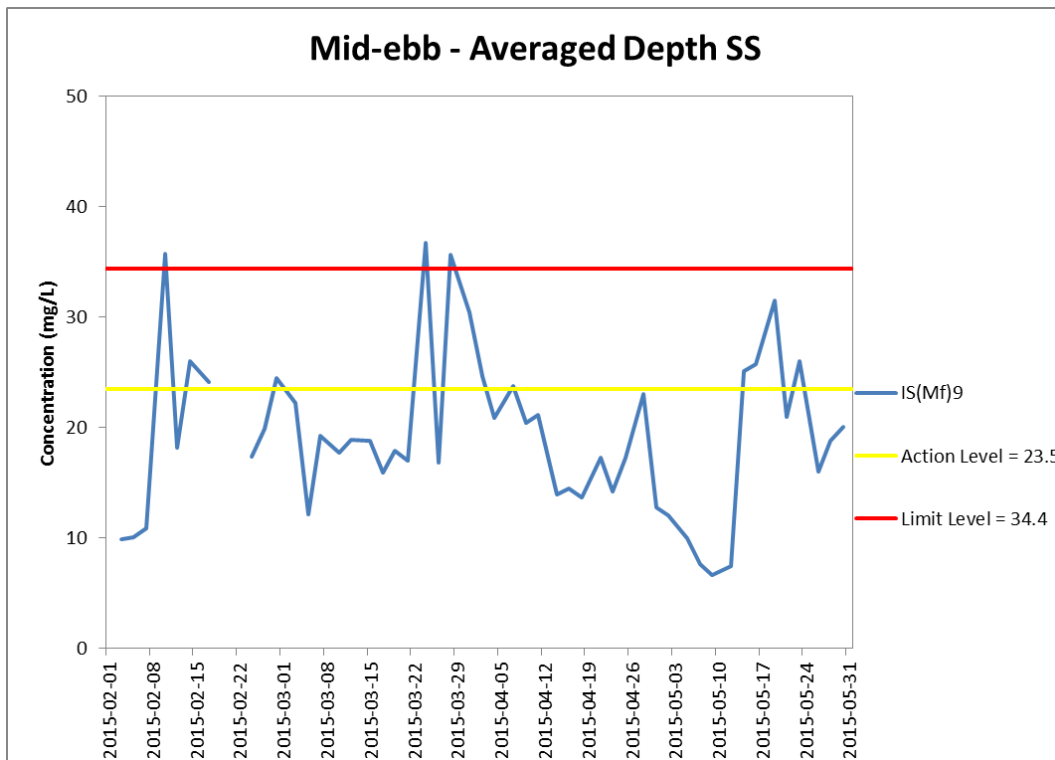
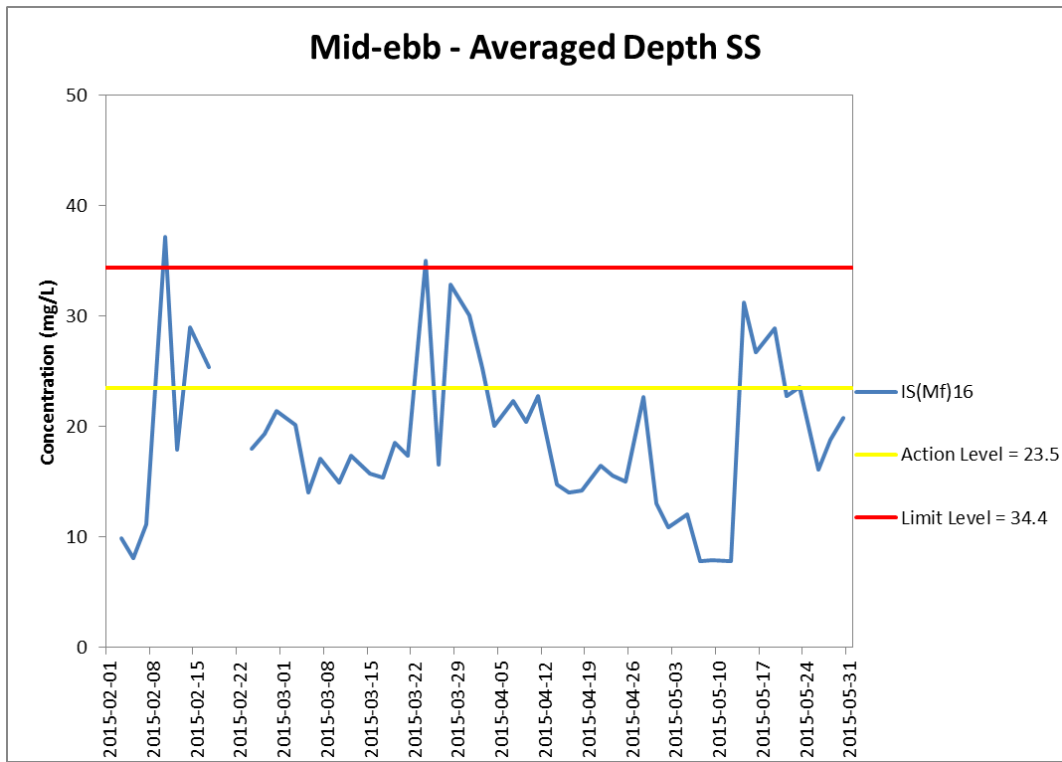


Figure H30 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstillation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. The SS results higher than Action / Limit Levels were not considered as exceedances as the results were not higher than 120% of upstream control station.

**Environmental
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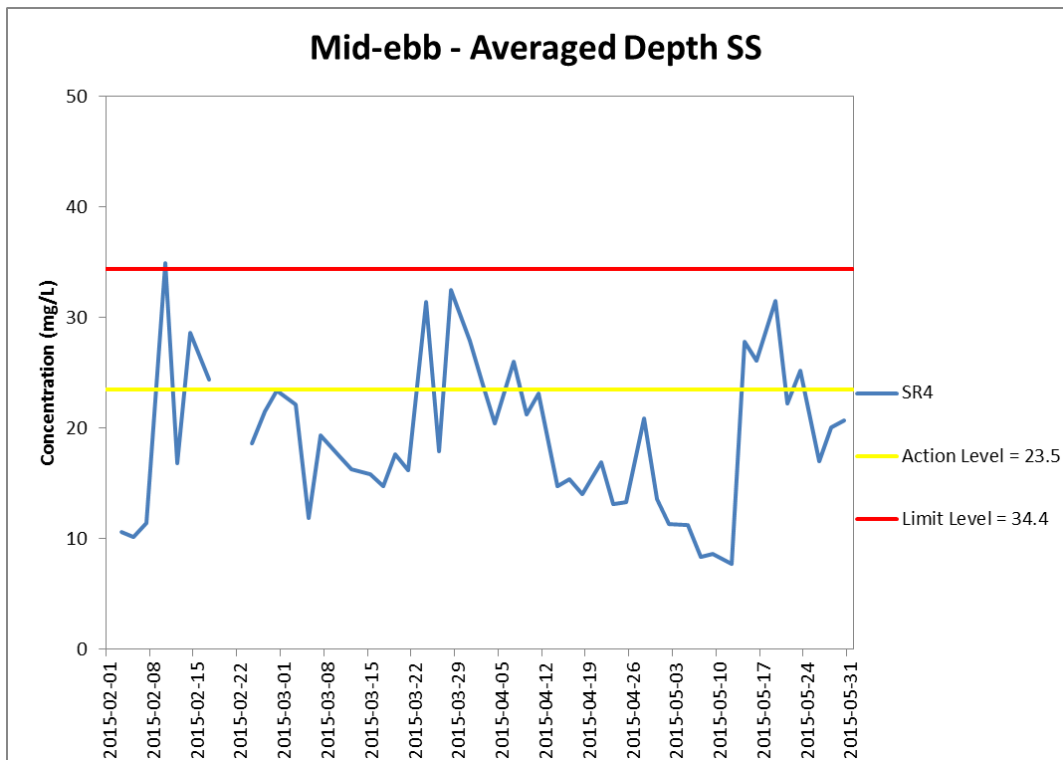
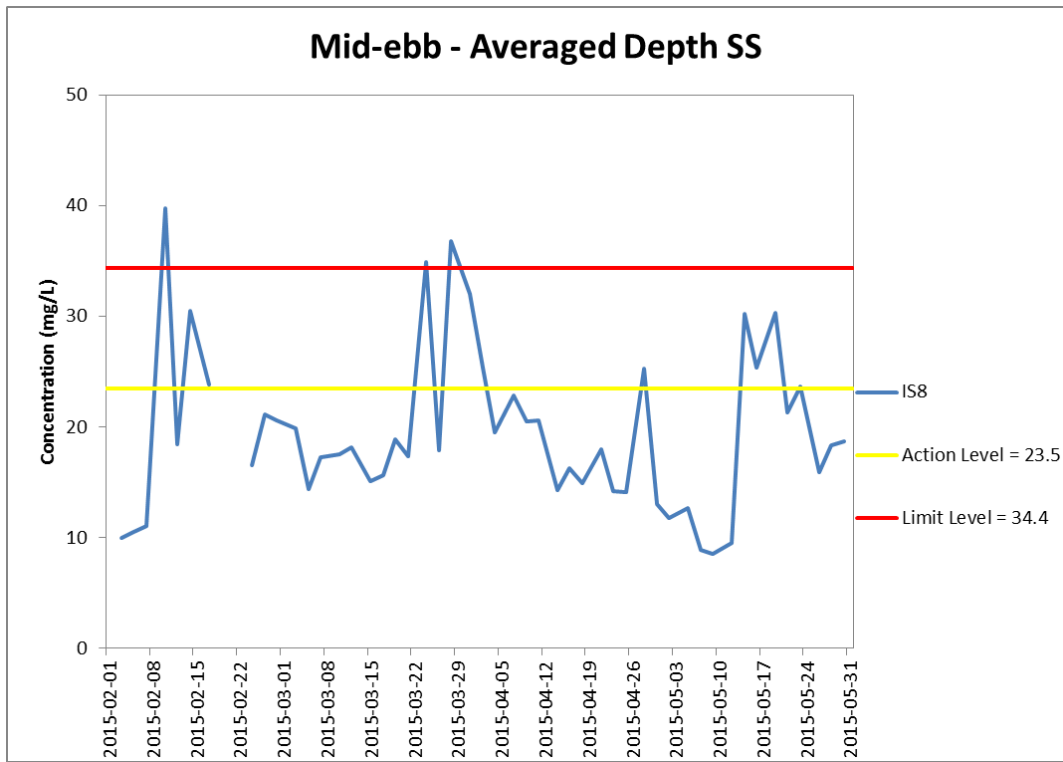


Figure H31 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. The SS results higher than Action / Limit Levels were not considered as exceedances as the results were not higher than 120% of upstream control station.

**Environmental
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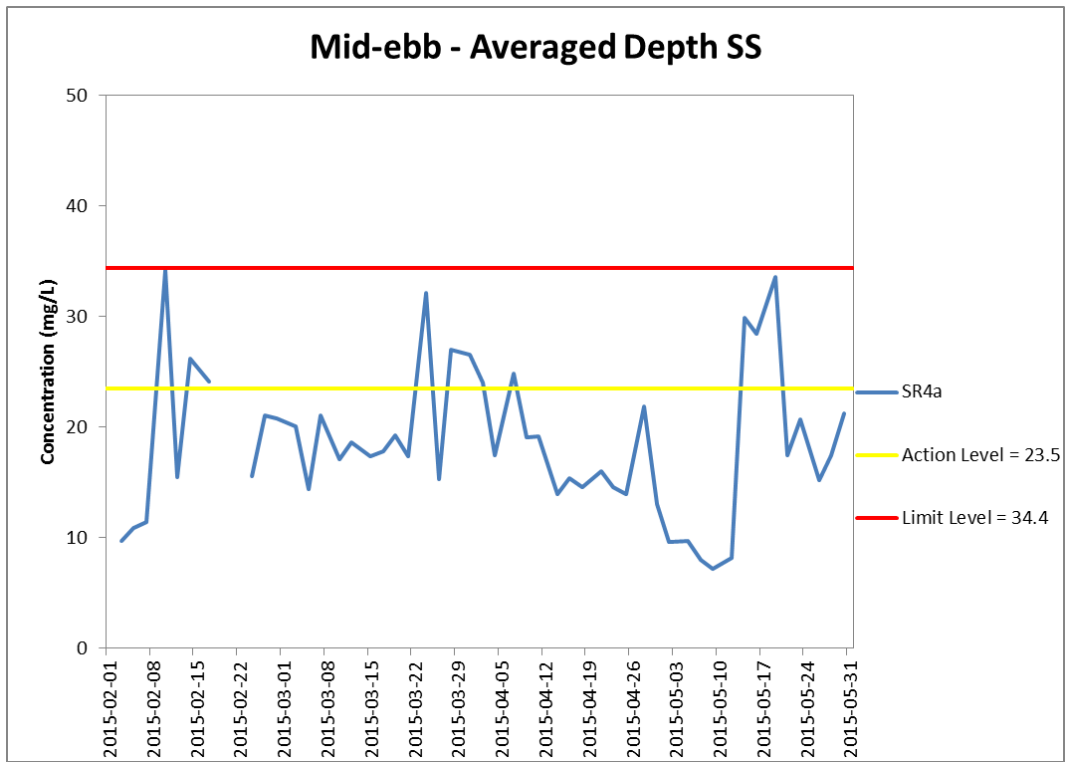


Figure H32 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. Apart from 19 May, the SS results higher than Action / Limit Levels were not considered as exceedances as the results were not higher than 120% of upstream control station.

**Environmental
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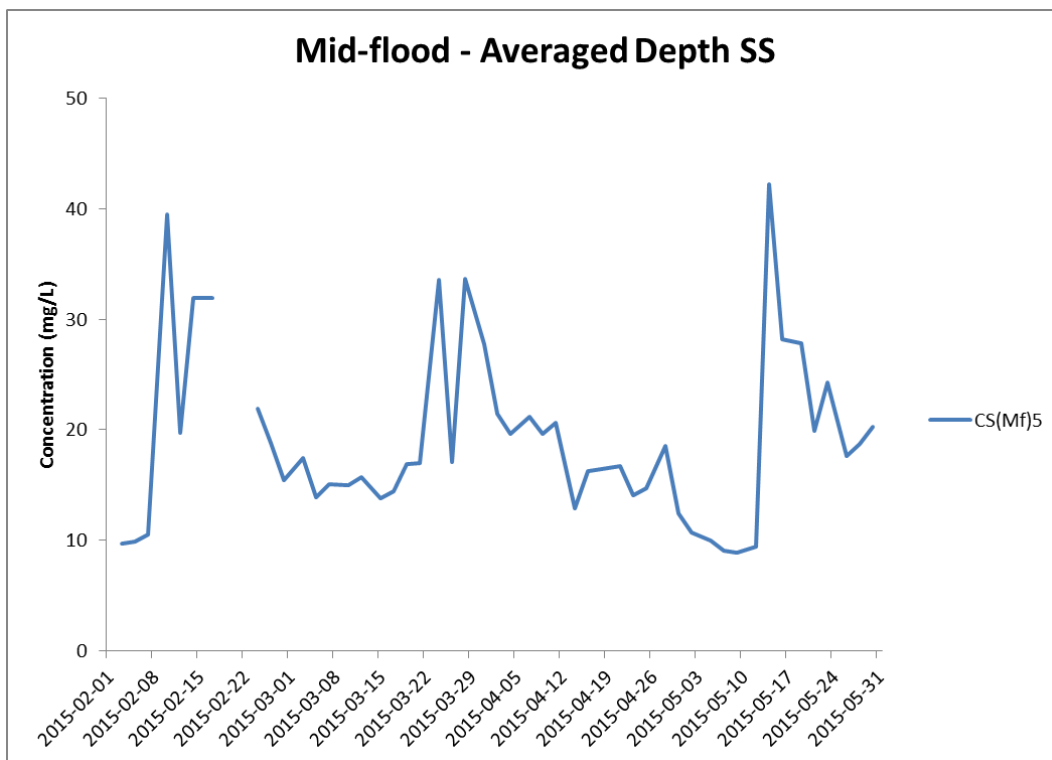
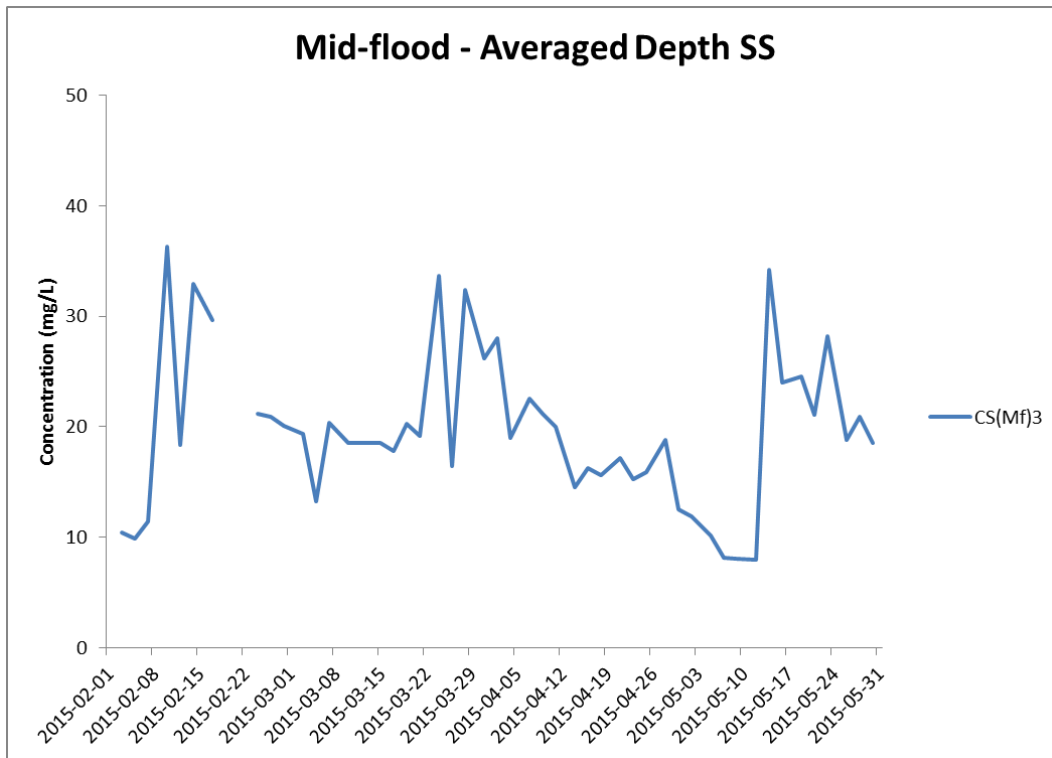


Figure H33 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2015 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015.

**Environmental
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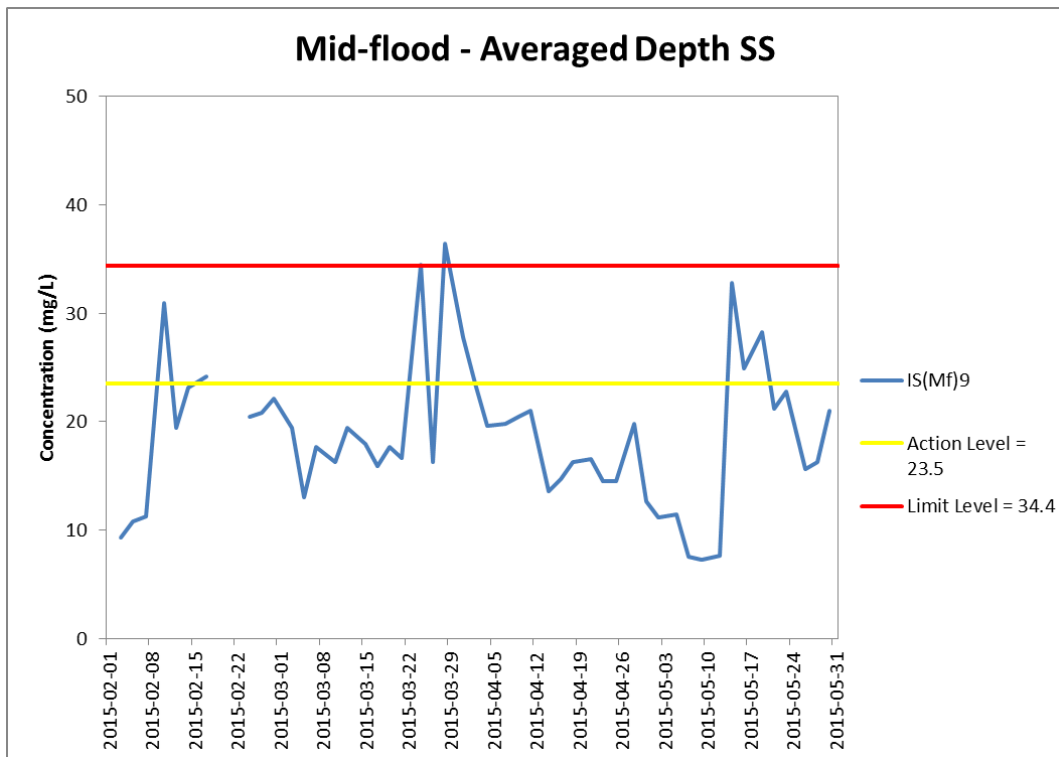
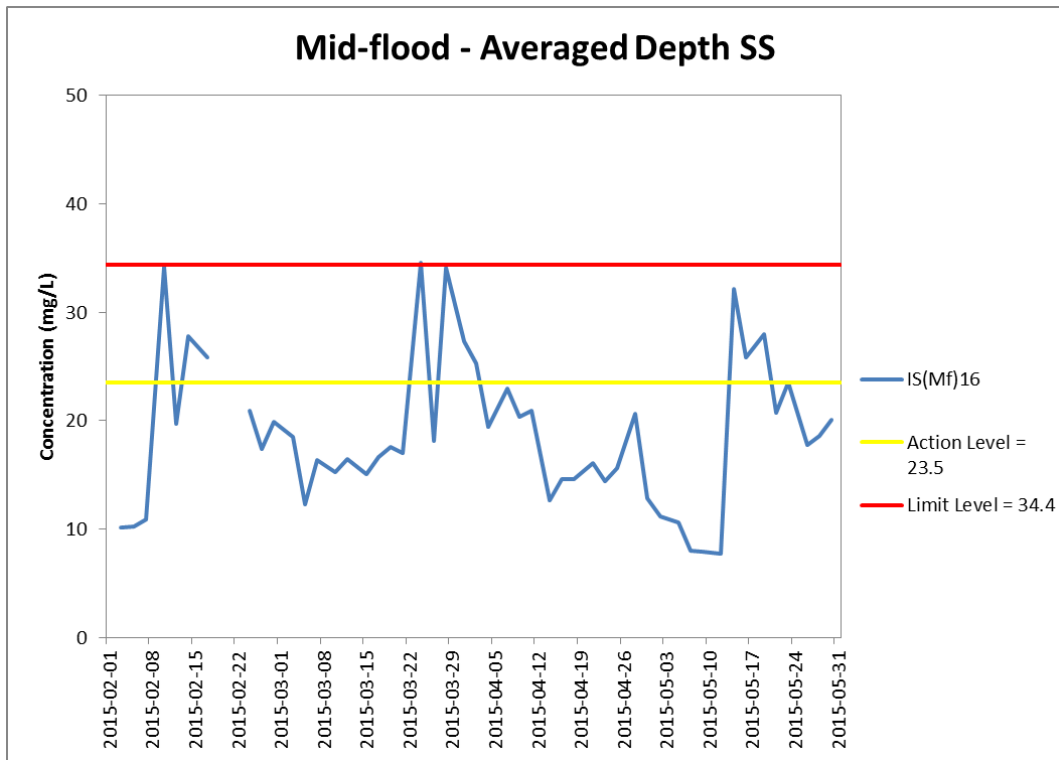


Figure H34 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2015 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. The SS results higher than Action / Limit Levels were not considered as exceedances as the results were not higher than 120% of upstream control station.

**Environmental
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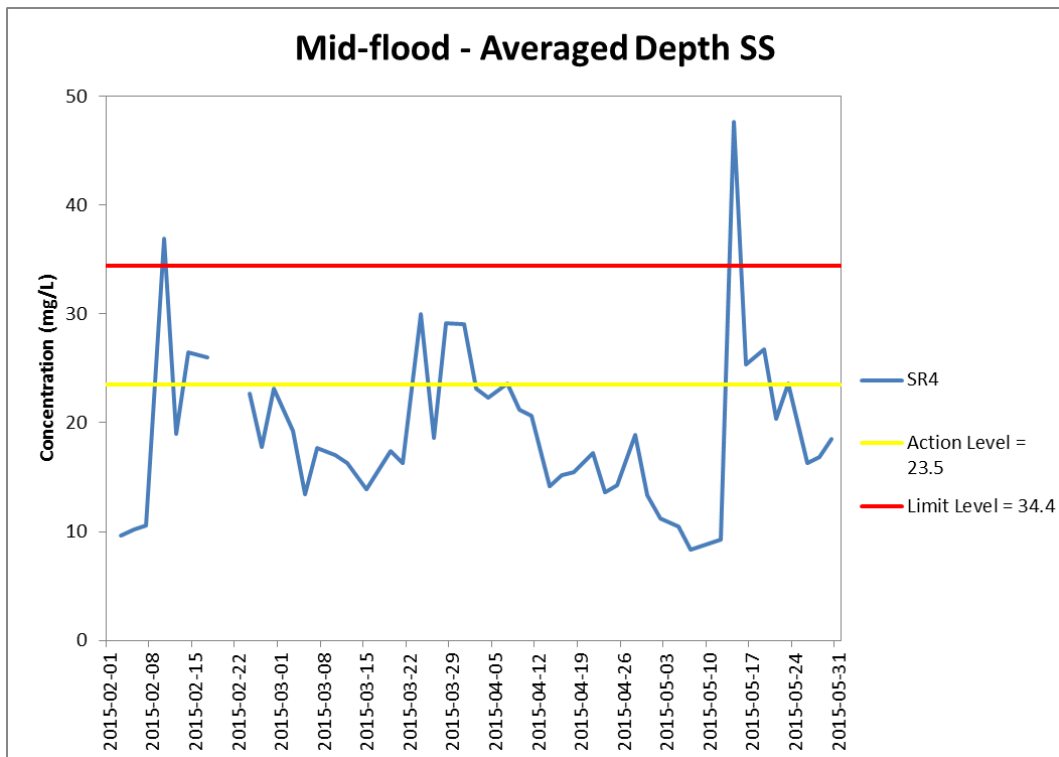
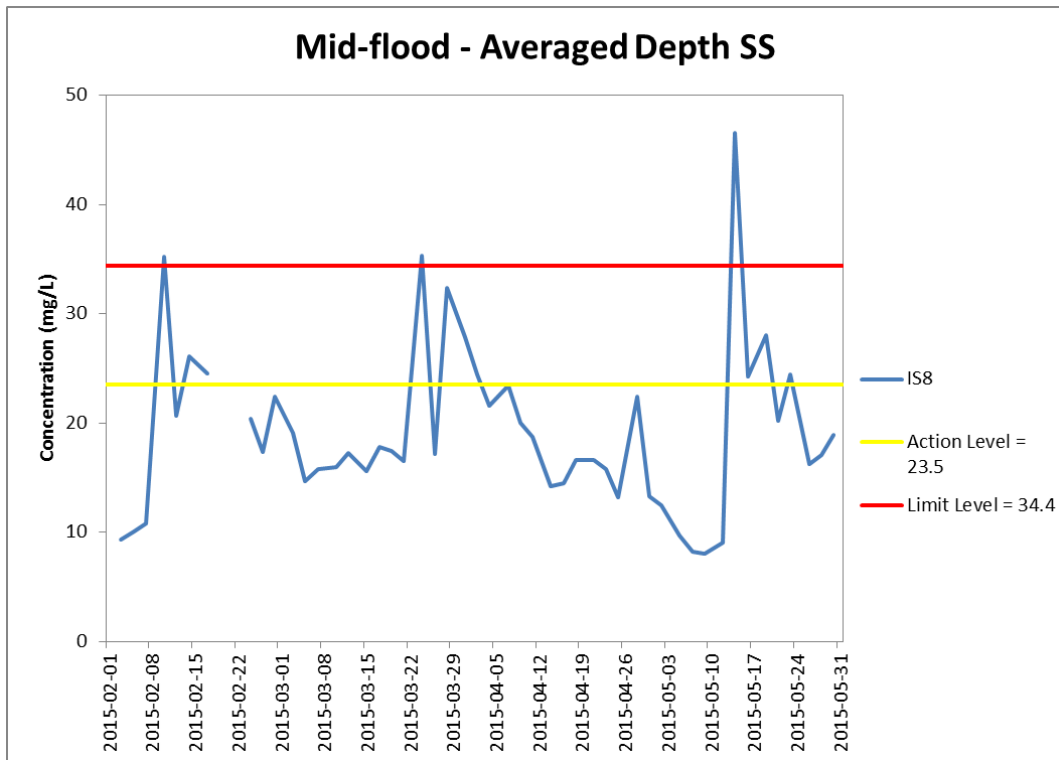


Figure H35 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2015 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. The SS results higher than Action / Limit Levels were not considered as exceedances as the results were not higher than 120% of upstream control station.

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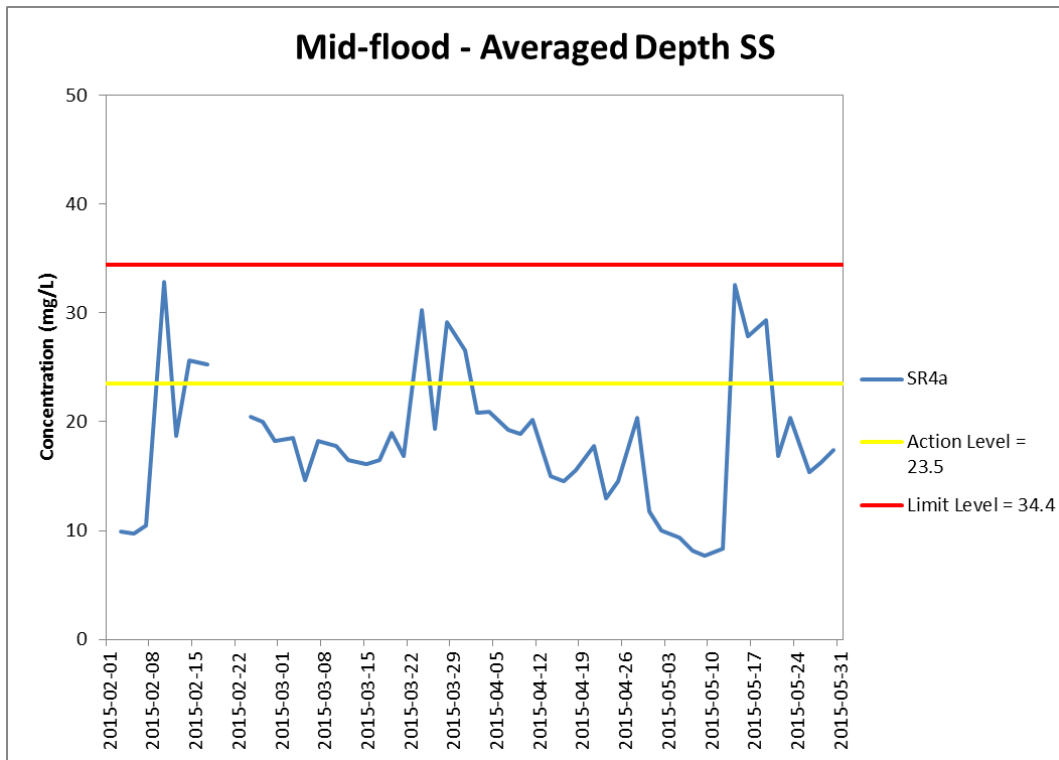


Figure H36 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2015 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period. Marine works within the reporting period include Construction of Pile caps at Viaducts; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. No marine works was undertaken on 19 and 21 February 2015. The SS results higher than Action / Limit Levels were not considered as exceedances as the results were not higher than 120% of upstream control station.

**Environmental
Resources
Management**



Appendix I

Impact Dolphin Monitoring Survey Results

CONTRACT NO. HY/2012/07

**Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link
(Southern Connection Viaduct Section)
Dolphin Quarterly Monitoring**

*6th Quarterly Progress Report (March-May 2015)
submitted to Gammon Construction Limited*

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1. Introduction

- 1.1. The Tuen Mun-Chek Lap Kok Link (TM-CLKL) comprises a 1.6 km long dual 2-lane viaduct section between the Hong Kong Boundary Crossing Facilities (HKBCF) and the North Lantau Highway and associated roads at Tai Ho. Gammon Construction Limited (hereinafter called the “Contractor”) was awarded as the main contractor of “Contract No. HY/2012/07 – Hong Kong-Zhuhai-Macao Bridge Tuen Mun-Chek Lap Kok Link – Southern Connection Viaduct Section”.
- 1.2. According to the updated Environmental Monitoring and Audit (EM&A) Manual (for TM-CLKL), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas as in AFCD annual marine mammal monitoring programme. However, as such surveys have been undertaken by the HKLR03 and HKBCF projects in the same areas (i.e. NWL and NEL), a combined monitoring approach is recommended by the Highways Department, that the TM-CLKL EM&A project can utilize the monitoring data collected by HKLR03 or HKBCF project to avoid any redundancy in monitoring effort. Such exemption for the dolphin monitoring will end upon the completion of the dolphin monitoring carried out by HKLR03 contract as well as the TM-CLKL Northern Connection Sub-Sea Tunnel Section (HY/2012/08)
- 1.3. In November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by Gammon Construction Limited as the dolphin specialist for the TM-CLKL Southern Viaduct Section EM&A project. He is responsible for the dolphin monitoring study, including the data collection on Chinese White Dolphins during the construction phase (i.e. impact period) of the TM-CLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas.
- 1.4. During the construction period of HKLR, the dolphin specialist would be in charge of reviewing and collating information collected by HKLR03 dolphin monitoring programme to

examine any potential impacts of TM-CLKL construction works on the dolphins.

- 1.5. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional mitigation measures will be recommended as necessary.
- 1.6. This report is the sixth quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Gammon Construction Limited, summarizing the results of the surveys findings during the period of March to May 2015, utilizing the survey data collected by HKLR03 project.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

- 2.1.1. According to the requirement of the updated EM&A manual, dolphin monitoring programme should cover all transect lines in NEL and NWL survey areas (see Figure 1) twice per month throughout the entire construction period. The co-ordinates of all transect lines conducted during the HKLR03 dolphin monitoring surveys are shown in Table 1.

Table 1 Co-ordinates of transect lines conducted by HKLR03 project

Line No.		Easting	Northing		Line No.	Easting	Northing	
1	Start Point	804671	814577		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805475	815457		14	Start Point	817537	820220
2	End Point	805477	826654		14	End Point	817537	824613
3	Start Point	806464	819435		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	819771		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	820220		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	820466		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	820690		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	820847		20	Start Point	823477	823402
8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	820892		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562

10	Start Point	813525	820872		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818449		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807					
12	End Point	815542	824882					

- 2.1.2. The HKLR03 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 16 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2013, 2014). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.
- 2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines was labeled as “secondary” survey effort. According to HKCRP long-term dolphin monitoring data, encounter rates of Chinese white dolphins deduced from effort and sighting data collected

along primary and secondary lines were similar in NEL and NWL survey areas. Therefore, both primary and secondary survey effort were presented as on-effort survey effort in this report.

2.2. Photo-identification Work

- 2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the HKLR03 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 2.2.2. A professional digital camera (*Canon* EOS 7D or 60D model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. Data Analysis

- 2.3.1. Distribution Analysis – The line-transect survey data was integrated with the Geographic Information System (GIS) in order to visualize and interpret different spatial and temporal patterns of dolphin distribution using sighting positions. Location data of dolphin groups were plotted on map layers of Hong Kong using a desktop GIS (ArcView[®] 3.1) to examine their distribution patterns in details. The dataset was also stratified into different subsets to examine distribution patterns of dolphin groups with different categories of group sizes, young calves and activities.
- 2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey effort conducted during each month of monitoring survey. Only data

collect under Beaufort 3 or below condition would be used for the encounter rate analyses. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in North Lantau), which was also compared with the one deduced from the six events during the baseline period (i.e. six sets of line-transect surveys in North Lantau).

Secondly, the encounter rates were calculated using both primary and secondary survey effort collected under Beaufort 3 or below condition as in AFCD long-term monitoring study. The encounter rate of sightings and dolphins were deduced by dividing the total number of on-effort sightings (STG) and total number of dolphins (ANI) by the amount of survey effort for the present quarterly period.

- 2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km² grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km²) and dolphin densities (total number of dolphins from on-effort sightings per km²) were then calculated for each 1 km by 1 km grid with the aid of GIS. Sighting density grids and dolphin density grids were then further normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid was calculated by examining the survey coverage on each line-transect survey to determine how many times the grid was surveyed during the study period. For example, when the survey boat traversed through a specific grid 50 times, 50 units of survey effort were counted for that grid. With the amount of survey effort calculated for each grid, the sighting density and dolphin density of each grid were then normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort sightings per 100 units of survey effort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of dolphins per 100 units of survey effort. Among the 1-km² grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and DPSE in each 1-km² grid within the study area:

$$\text{SPSE} = ((S / E) \times 100) / \text{SA}\%$$
$$\text{DPSE} = ((D / E) \times 100) / \text{SA}\%$$

where S = total number of on-effort sightings
D = total number of dolphins from on-effort sightings
E = total number of units of survey effort
SA% = percentage of sea area

- 2.3.4. Behavioural analysis – When dolphins were sighted during vessel surveys, their behaviour was observed. Different activities were categorized (i.e. feeding, socializing, traveling, and milling/resting) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.
- 2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month impact phase monitoring period were obtained from the dolphin sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView[®] 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

3. Monitoring Results

3.1. *Summary of survey effort and dolphin sightings*

- 3.1.1. During the period of March to May 2015, six sets of systematic line-transect vessel surveys were conducted under the HKLR03 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.2. From these HKLR03 surveys, a total of 899.81 km of survey effort was collected, with 97.7% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). Among the two areas, 344.55 km and 555.26 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.1.3. The total survey effort conducted on primary lines was 655.32 km, while the effort on secondary lines was 244.49 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. Summary table of the survey effort is shown in Appendix I.
- 3.1.4. During the six sets of HKLR03 monitoring surveys in March to May 2015, a total of seven groups of 25 Chinese White Dolphins were sighted. Four of the seven dolphin sightings were made during on-effort search. Two of the four on-effort sightings were made on primary lines, while the other two were made on secondary lines. In this quarterly period, all dolphin groups were sighted in NWL, while none of them were sighted in NEL. A summary table of the dolphin sightings is shown in Appendix II.

3.2. *Distribution*

- 3.2.1. Distribution of dolphin sightings made during monitoring surveys in March to May 2015 is shown in Figure 1. These sightings made in the present quarter were scattered to the western end of the NWL survey area, with no particular concentration (Figure 1). No dolphin was sighted at all in NEL survey area.
- 3.2.2. Notably, none of the dolphin groups were sighted in the vicinity of TMCLKL southern viaduct or northern landfall section, as well as the HKLR03/HKBCF reclamation sites (Figure 1). However, a lone individual was sighted adjacent to the HKLR09 alignment (Figure 1).
- 3.2.3. Sighting distribution of the present impact phase monitoring period (March to May 2015) was compared to the one during the baseline monitoring period (September to November 2011). In the present quarter, dolphins have completely avoided the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past quarters, which has resulted in extremely low to zero dolphin encounter rate in this area.
- 3.2.4. In NWL survey area, dolphin occurrence was also drastically different between the baseline and impact phase quarters. During the present impact monitoring period, much fewer dolphins occurred throughout this survey area than during the baseline period, when many of the dolphin sightings were concentrated between Lung Kwu Chau and Black Point, around Sha Chau, near Pillar Point and to the west of the Chek Lap Kok Airport (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the three quarterly periods of spring months in 2013, 2014 and 2015 (Figure 2). Among the three spring periods, no dolphin sighting was made in NEL in 2014 and 2015, while there were a few sightings made there in 2013 (Figure 2). The near absence of dolphins in this quarter in NEL was probably more related to the seasonal occurrence that has been consistently recorded in the past.
- 3.2.6. On the other hand, dramatic changes in dolphin distribution in NWL waters have observed in the spring months during the three-year period. In 2013, dolphin regularly occurred throughout the NWL survey area, with higher concentration around Sha Chau and Lung Kwu Chau as well as near Black Point. In 2014, dolphin still occurred around Lung Kwu Chau at a high level, but less frequently in the middle portion of North Lantau region. In 2015, they rarely occurred in NWL survey area with scattered sightings without any particular concentration. The temporal trend indicated that dolphin usage in the NWL region has greatly diminished during the spring months of the past few years.

3.3. *Encounter rate*

- 3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) for each set of the HKLR03 surveys in

NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of HKLR03 surveys were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during March-May 2015

SURVEY AREA	DOLPHIN MONITORING DATES	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
Northeast Lantau	Set 1 (4 & 11 Mar 2015)	0.00	0.00
	Set 2 (17 & 26 Mar 2015)	0.00	0.00
	Set 3 (8 & 10 Apr 2015)	0.00	0.00
	Set 4 (17 & 22 Apr 2015)	0.00	0.00
	Set 5 (4 & 8 May 2015)	0.00	0.00
	Set 6 (14 & 18 May 2015)	0.00	0.00
Northwest Lantau	Set 1 (4 & 11 Mar 2015)	1.42	9.93
	Set 2 (17 & 26 Mar 2015)	0.00	0.00
	Set 3 (8 & 10 Apr 2015)	1.40	4.20
	Set 4 (17 & 22 Apr 2015)	0.00	0.00
	Set 5 (4 & 8 May 2015)	0.00	0.00
	Set 6 (14 & 18 May 2015)	0.00	0.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (March-May 2015) and baseline monitoring period (September – November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	March-May 2015	September - November 2011	March-May 2015	September - November 2011
Northeast Lantau	0.00	6.00 \pm 5.05	0.00	22.19 \pm 26.81
Northwest Lantau	0.47 \pm 0.73	9.85 \pm 5.85	2.36 \pm 4.07	44.66 \pm 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 0.75 sightings and 3.91 dolphins per 100 km of survey effort respectively, while the encounter

rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

- 3.3.3. In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were zero, and such low occurrence of dolphins in NEL have been consistently recorded in the past nine quarters (Table 4). It is a serious concern that dolphin occurrence in NEL in the nine quarters (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) have been exceptionally low when compared to the baseline period (Table 4). Dolphins have almost vacated from NEL waters since January 2014, with only one group of four dolphins sighted since then.
- 3.3.4. Moreover, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period were also much lower (reductions of 95.2% and 94.7% respectively) than the ones recorded in the 3-month baseline period, indicating a dramatic decline in dolphin usage of this survey area during the present impact phase period (Table 5).
- 3.3.5. Even within the same spring quarters, the dolphin encounter rates in NWL during spring 2015 were small fractions of the ones recorded in spring 2013 and 2014 (Table 5).

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from all quarters of HKLR03 impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; the encounter rates in spring months were highlighted in blue; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	6.00 \pm 5.05	22.19 \pm 26.81
December 2012-February 2013 (Impact)	3.14 \pm 3.21	6.33 \pm 8.64
March-May 2013 (Impact)	0.42 \pm 1.03	0.42 \pm 1.03
June-August 2013 (Impact)	0.88 \pm 1.36	3.91 \pm 8.36
September-November 2013 (Impact)	1.01 \pm 1.59	3.77 \pm 6.49
December 2013-February 2014 (Impact)	0.45 \pm 1.10	1.34 \pm 3.29
March-May 2014 (Impact)	0.00	0.00
June-August 2014 (Impact)	0.42 \pm 1.04	1.69 \pm 4.15
September-November 2014 (Impact)	0.00	0.00
December 2014-February 2015 (Impact)	0.00	0.00
March-May 2015 (Impact)	0.00	0.00

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from all quarters of HKLR03 impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; the encounter rates in spring months were highlighted in blue; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	9.85 \pm 5.85	44.66 \pm 29.85
December 2012-February 2013 (Impact)	8.36 \pm 5.03	35.90 \pm 23.10
March-May 2013 (Impact)	7.75 \pm 3.96	24.23 \pm 18.05
June-August 2013 (Impact)	6.56 \pm 3.68	27.00 \pm 18.71
September-November 2013 (Impact)	8.04 \pm 1.10	32.48 \pm 26.51
December 2013-February 2014 (Impact)	8.21 \pm 2.21	32.58 \pm 11.21
March-May 2014 (Impact)	6.51 \pm 3.34	19.14 \pm 7.19
June-August 2014 (Impact)	4.74 \pm 3.84	17.52 \pm 15.12
September-November 2014 (Impact)	5.10 \pm 4.40	20.52 \pm 15.10
December 2014-February 2015 (Impact)	2.91 \pm 2.69	11.27 \pm 15.19
March-May 2015 (Impact)	0.47 \pm 0.73	2.36 \pm 4.07

- 3.3.6. Notably, the first eight consecutive quarters have triggered the Action Levels under the Event and Action Plan, while the previous and present quarters have both triggered the Limit Levels. As discussed recently in Hung (2014), the dramatic decline in dolphin usage of NEL waters in 2012 and 2013 (including the declines in abundance, encounter rate and habitat use in NEL, as well as shifts of individual core areas and ranges away from NEL waters) was possibly related to the HZMB construction works that were commenced in 2012. It appeared that such noticeable decline has already extended to NWL waters progressively in 2013 and 2014.
- 3.3.7. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.3.8. For the comparison between the baseline period and the present quarter (tenth quarter of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0015 and 0.0139 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarters in both dolphin encounter rates of STG and ANI.

- 3.3.9. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. first ten quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0004 and 0.0001 respectively. Even if the alpha value is set at 0.01, significant differences were detected in both the average dolphin encounter rates of STG and ANI (i.e. between the two periods and the locations).
- 3.3.10. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in NEL and NWL waters in the present quarterly period, and such low occurrence has been consistently documented in previous quarters. This raises serious concern, as the decline in dolphin usage in North Lantau waters could possibly link to the HZMB-related construction activities.
- 3.3.11. To ensure the continuous usage of North Lantau waters by the dolphins, every possible measure should be implemented by the contractors and relevant authorities to minimize all disturbances to the dolphins.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from one to eight individuals per group in North Lantau region during March to May 2015. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

Table 6. Comparison of average dolphin group sizes from impact monitoring period (March – May 2015) and baseline monitoring period (September – November 2011) (Note: \pm denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	March – May 2015	September – November 2011
Overall	3.57 \pm 2.82 (n = 7)	3.72 \pm 3.13 (n = 66)
Northeast Lantau	0.00	3.18 \pm 2.16 (n = 17)
Northwest Lantau	3.57 \pm 2.82 (n = 7)	3.92 \pm 3.40 (n = 49)

- 3.4.2. The average dolphin group sizes in NWL waters during March to May 2015 were slightly smaller than the ones recorded during the three-month baseline period (Table 6). Five of the seven groups were composed of 1-3 individuals only, while none of the dolphin groups had more than 10 individuals.
- 3.4.3. Distribution of dolphins with larger group sizes (five individuals or more per group) during the present quarter is shown in Figure 3, with comparison to the one in baseline period. During the spring of 2015, distribution of the two larger dolphin groups were

located near Black Point and to the west of the airport (Figure 3). This distribution pattern was drastically different from the baseline period, when the larger dolphin groups were distributed more evenly in NWL waters with a few more sighted in NEL waters (Figure 3).

3.5. *Habitat use*

3.5.1. From March to May 2015, there was no particular habitat that was heavily utilized by Chinese White Dolphins in North Lantau waters, as only four grids recorded the presence of dolphins during on-effort search (Figures 4a and 4b). As in previous quarters, none of the grids in NEL recorded the presence of dolphins in the present quarter. Moreover, all grids near HKLR03/HKBCF reclamation sites, HKLR09 or TMCLKL alignment did not record any presence of dolphins during on-effort search in the present quarterly period.

3.5.2. It should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will be collected throughout the impact phase monitoring programme.

3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has dramatically diminished during the present impact monitoring period (Figure 5). During the baseline period, nine grids between Siu Mo To and Shum Shui Kok recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins during the present impact phase period (Figure 5).

3.5.4. The density patterns between the baseline and impact phase monitoring periods were also very different in NWL, with higher dolphin usage around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. However, these once-highly utilized habitats in the past only recorded rare presence of dolphins during the present impact phase period (Figure 5).

3.6. *Mother-calf pairs*

3.6.1. During the present quarterly period, no young calf (i.e. unspotted calf or unspotted juvenile) was sighted for the second consecutive quarter among the eleven quarters of impact phase monitoring.

3.6.2. This absence of young calves is also in stark contrast to their regular occurrence during the baseline period. Their absence should be of a serious concern, and the occurrence of calves should be closely monitored in the upcoming quarters.

3.7. *Activities and associations with fishing boats*

3.7.1. Three dolphin sightings were associated with feeding activities, while only one sighting of dolphin was associated with socializing activity during the three-month study period.

3.7.2. The percentage of sightings associated with feeding activities during the present quarter (42.9%) was much higher than the one recorded during the baseline period (11.6%). On

the other hand, the percentage of socializing activities during the present impact phase monitoring period (14.3%) was slightly higher than the one recorded during the baseline period (5.4%). However, the higher percentages of both feeding and socializing activities were probably due to the overall small sample size of dolphin sightings. Notably, none of the seven dolphin groups were engaged in traveling or milling/resting behaviour.

- 3.7.3. Distribution of dolphins engaged in feeding and socializing activities during the present three-month period is shown in Figure 6. The three sightings of feeding activities were located near Black Point, to the north of the airport platform and near HKLR09 alignment adjacent to Sham Wat respectively (Figure 6). The lone sighting associated with socializing activity was located near Black Point as well (Figure 6). Distribution of dolphin sightings associated with these activities during the impact phase was very different from the distribution pattern of these activities during the baseline period (Figure 6).
- 3.7.4. As in the past monitoring quarters, none of the seven dolphin groups was found to be associated with an operating fishing vessel in North Lantau waters during the present impact phase period. The extremely rare events of fishing boat association in the present and previous quarters were consistently found, and were likely related to the recent trawl ban being implemented in December 2012 in Hong Kong waters.
- 3.8. *Summary of photo-identification works*
- 3.8.1. From March to May 2015, over 800 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, 16 individuals sighted 18 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these 18 re-sightings were made in NWL.
- 3.8.3. The majority of identified individuals were sighted only once during the three-month period, with the exception of two individuals (NL136 and NL284) being sighted thrice.
- 3.8.4. Two of these 16 individuals (NL123 and NL285) were also sighted in West Lantau waters during the HKLR09 monitoring surveys during the same three-month period (i.e. March-May 2015), but the locations of their re-sightings in NWL and WL were not too far apart even though they were separated by the HKLR09 bridge alignment.
- 3.8.5. Three recognized females (NL104, NL123 and NL202) were accompanied with calves during their re-sightings. All three mothers were frequently sighted with their calves throughout the HKLR03 impact phase monitoring period since October 2012.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the 16 individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.
- 3.9.2. All identified dolphins sighted in this quarter were ranged primarily in NWL, but have

avoided the NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as during the baseline period.

- 3.9.3. Notably, a mother-calf pair (i.e. NL123 and NL285) sighted in NWL and NEL waters consistently in the past have extended their range use to WL waters in the present quarter. It should be further monitored to examine whether there has been any consistent shifts of home ranges of some individuals from North Lantau to West Lantau, which could also possibly be related to the HZMB-related construction works.

4. Conclusion

- 4.1. During this quarter of dolphin monitoring, no adverse impact from the activities of the TMCLKL construction project on Chinese White Dolphins was noticeable from general observations.
- 4.2. Although the dolphins infrequently occurred along the alignment of TMCLKL southern connection viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL, and many individuals have shifted away from the important habitat around the Brothers Islands.
- 4.3. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

5. References

- Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.
- Hung, S. K. 2013. Monitoring of Marine Mammals in Hong Kong waters: final report (2012-13). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department, 168 pp.
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- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

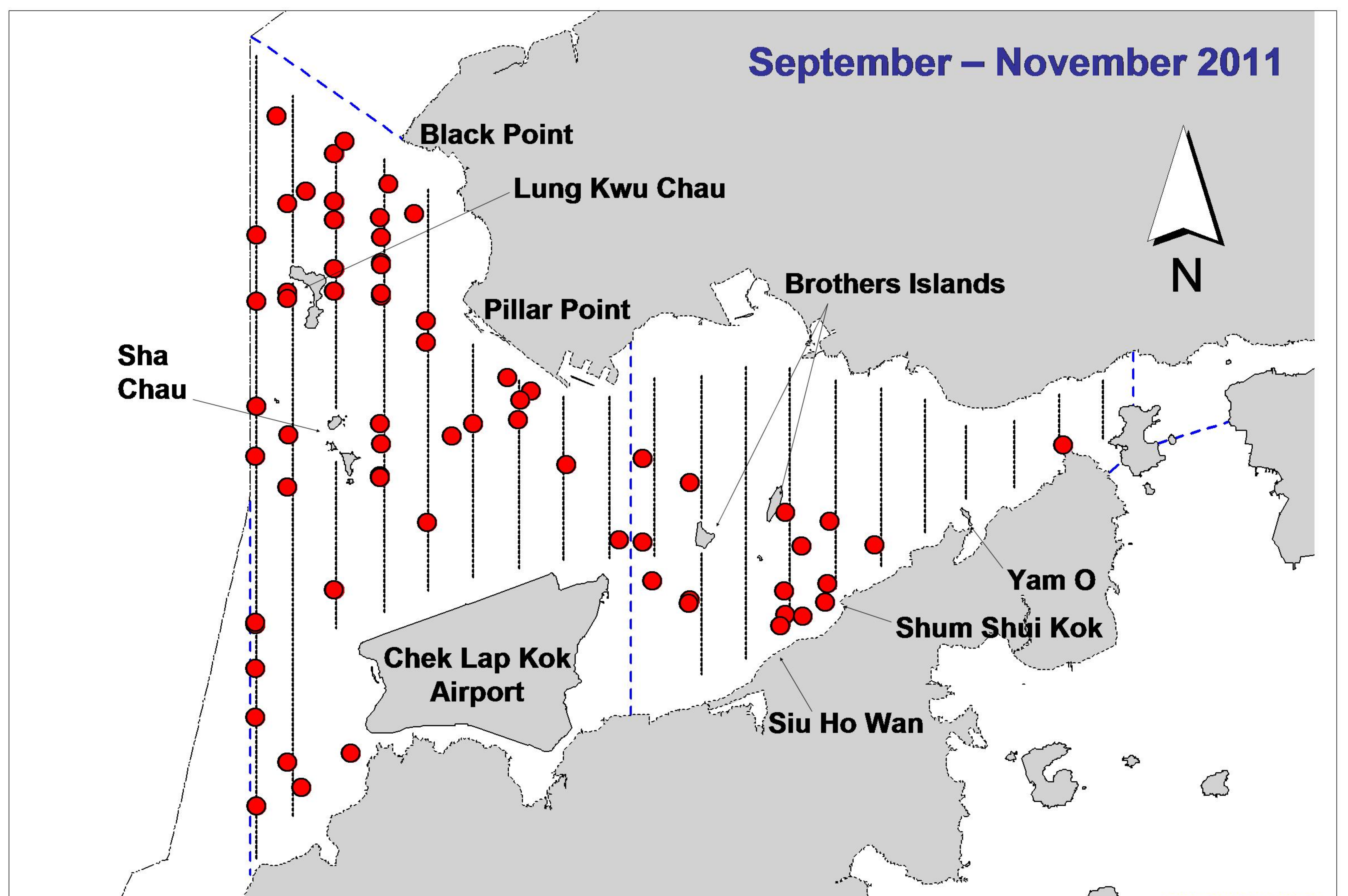
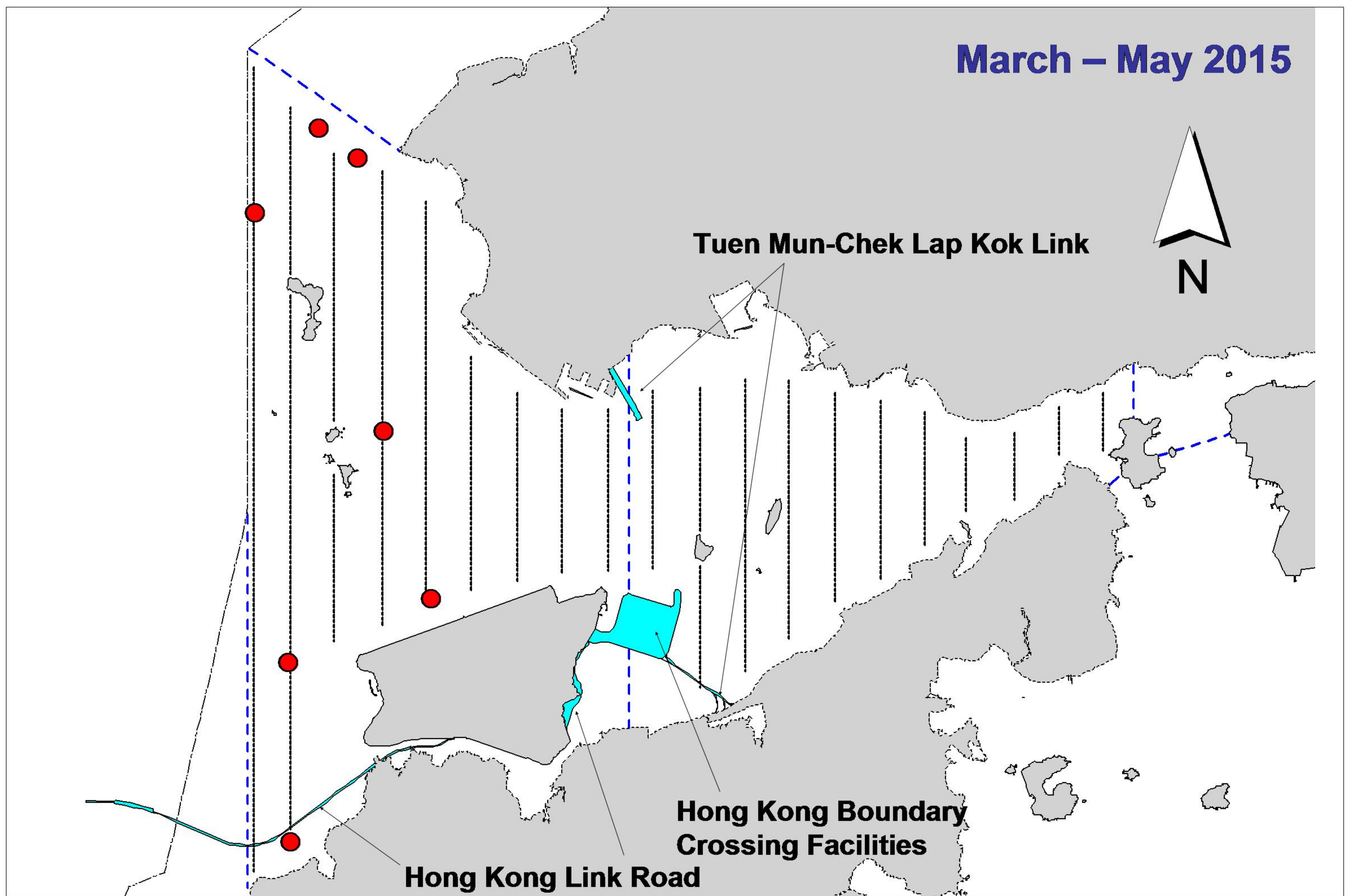


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

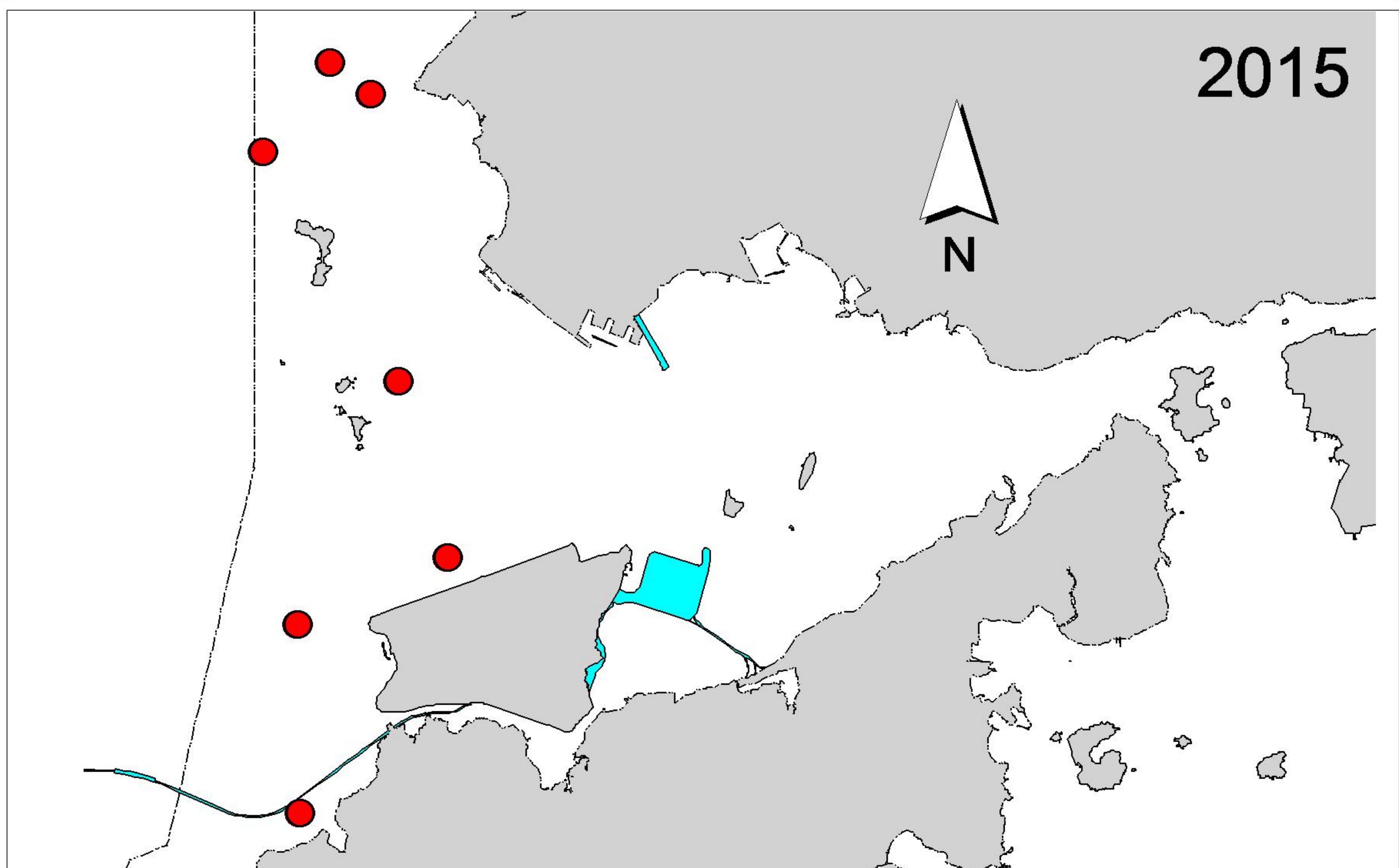
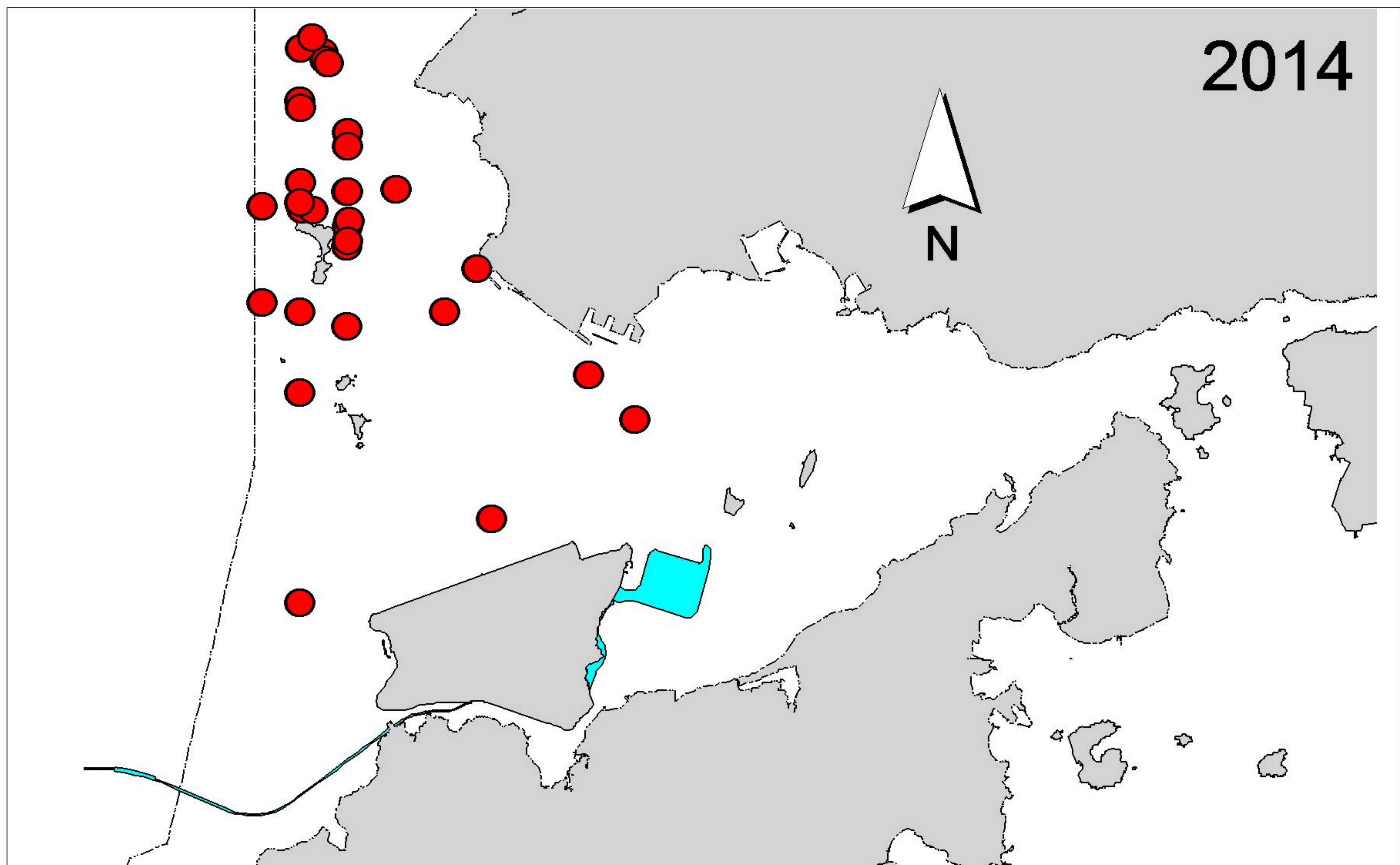
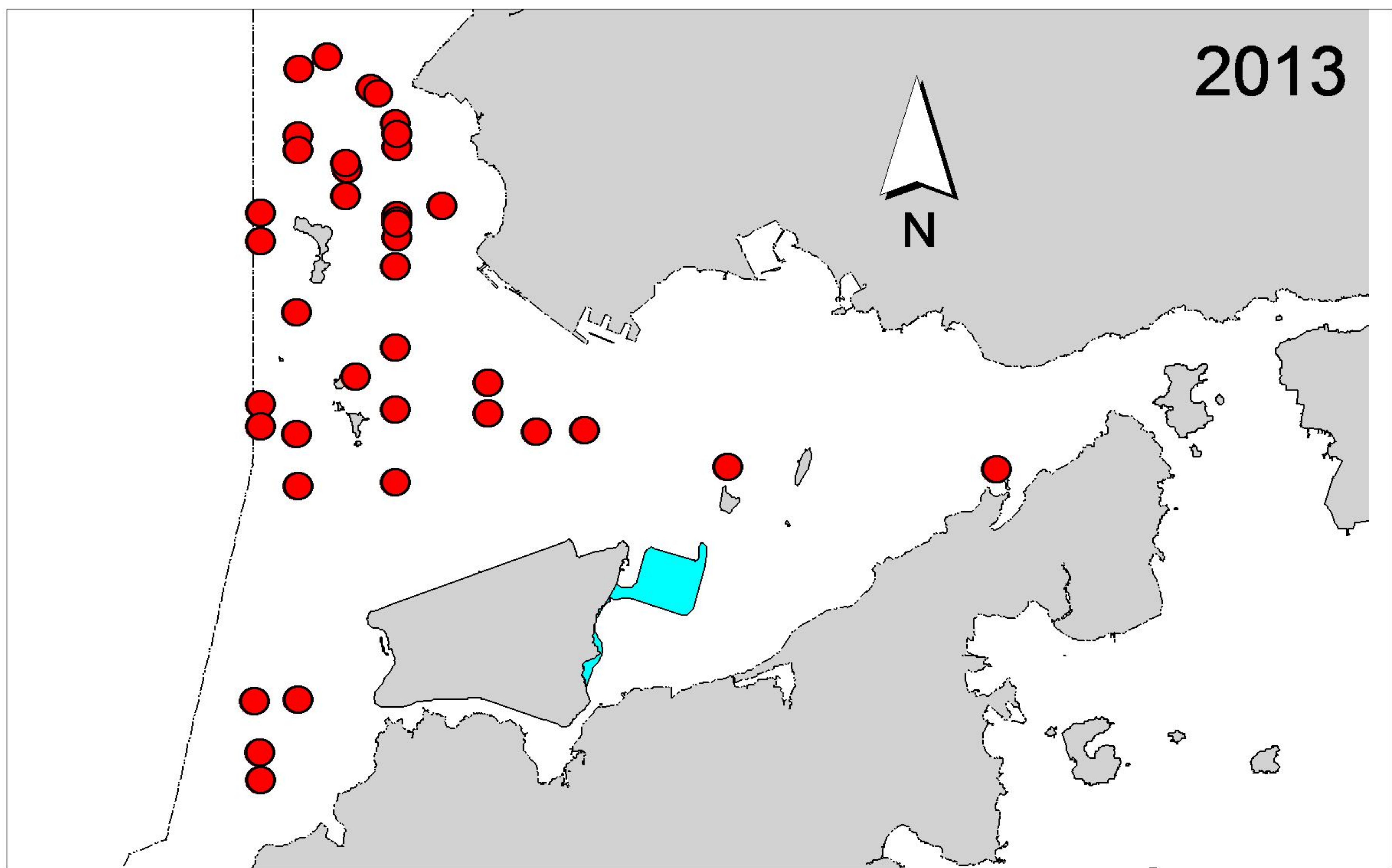


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the same spring quarters of HKLR03 impact phase in 2013-15

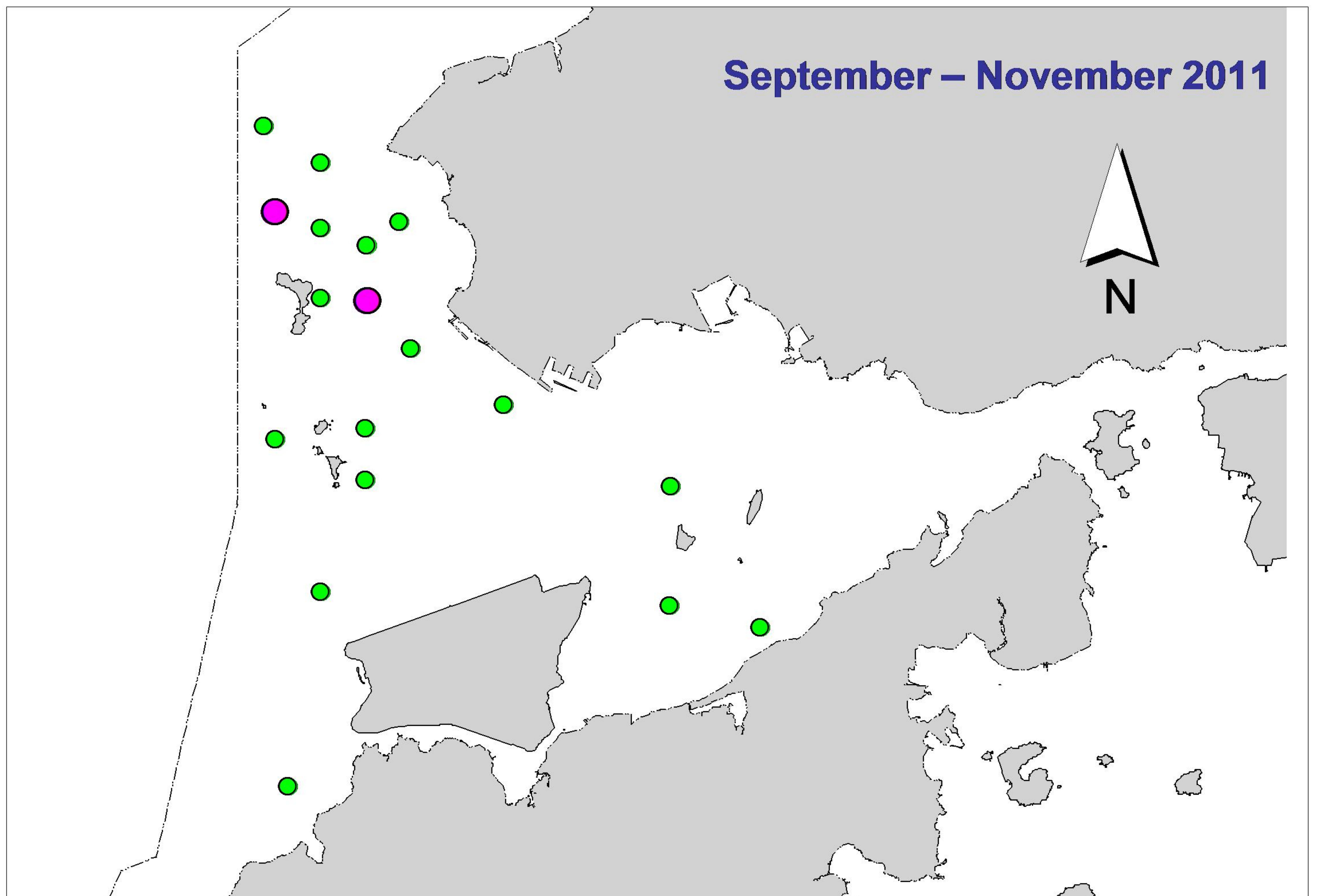
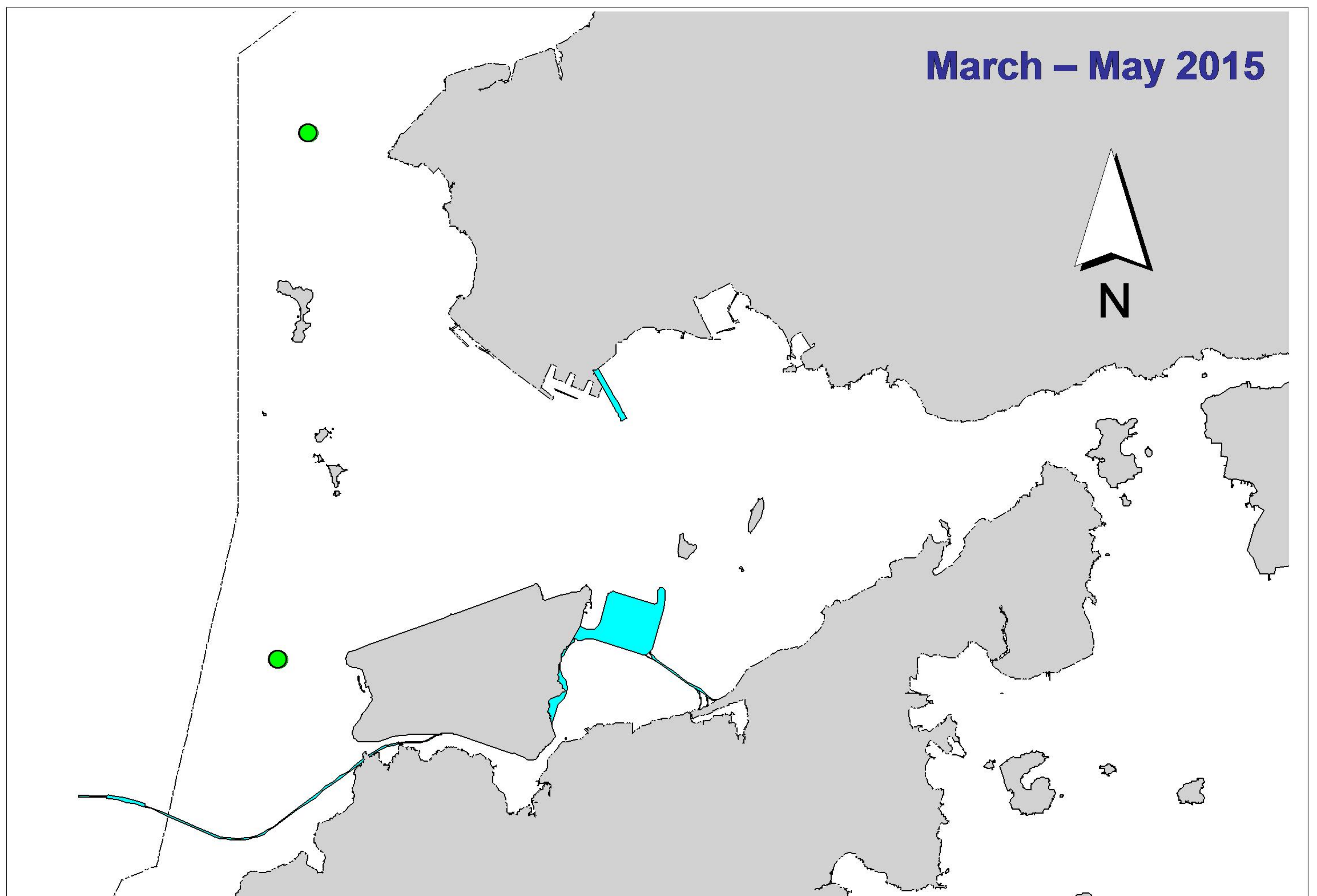


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

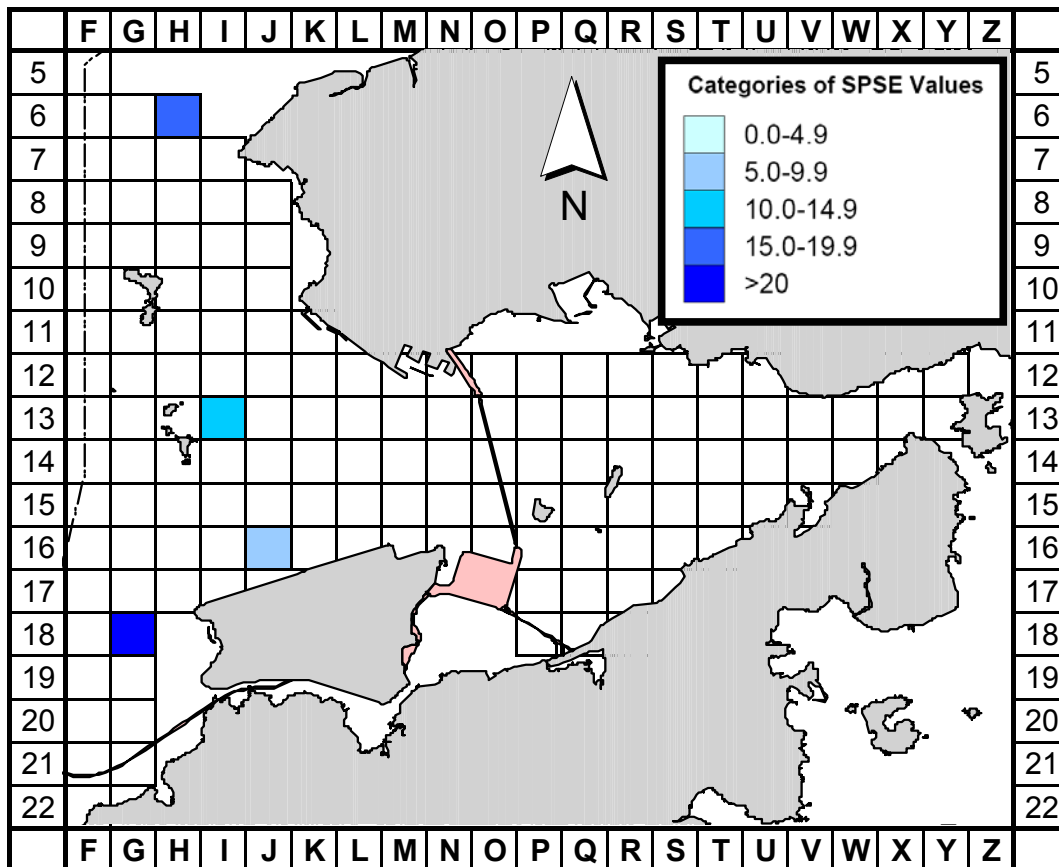


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Mar-May 15) (SPSE = no. of on-effort sightings per 100 units of survey effort)

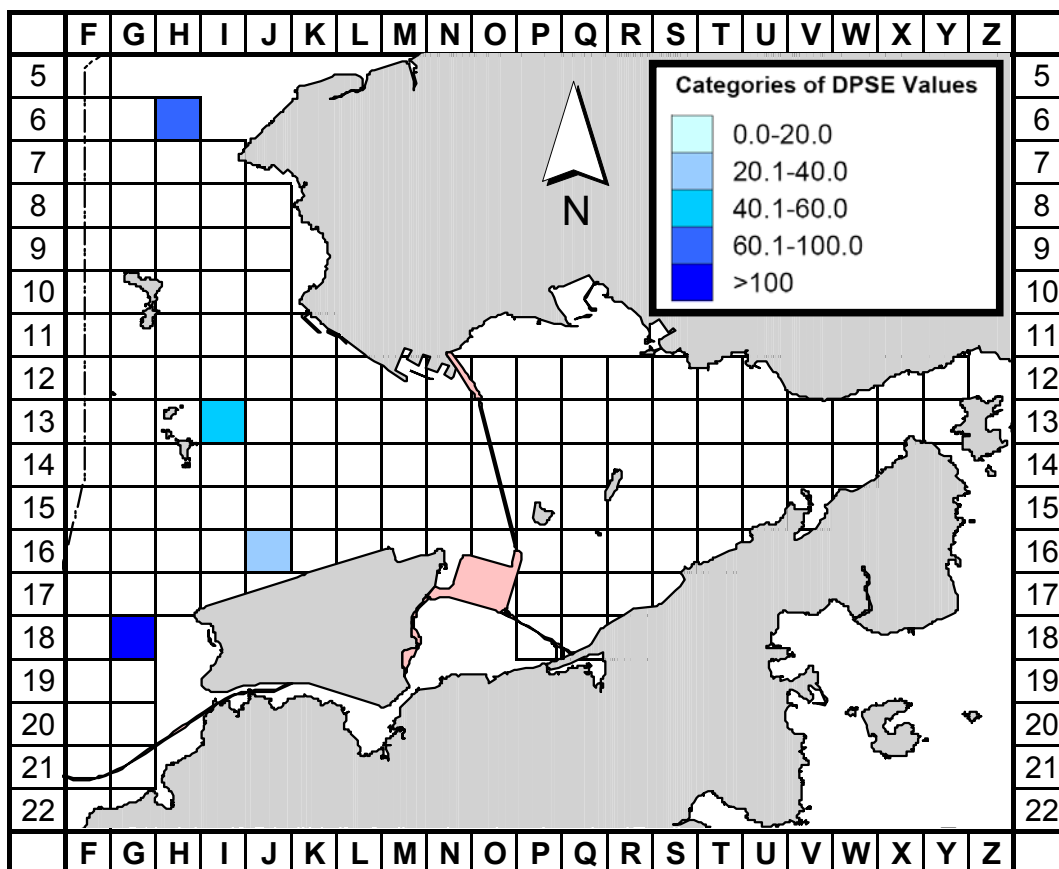


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Mar-May 15) (DPSE = no. of dolphins per 100 units of survey effort)

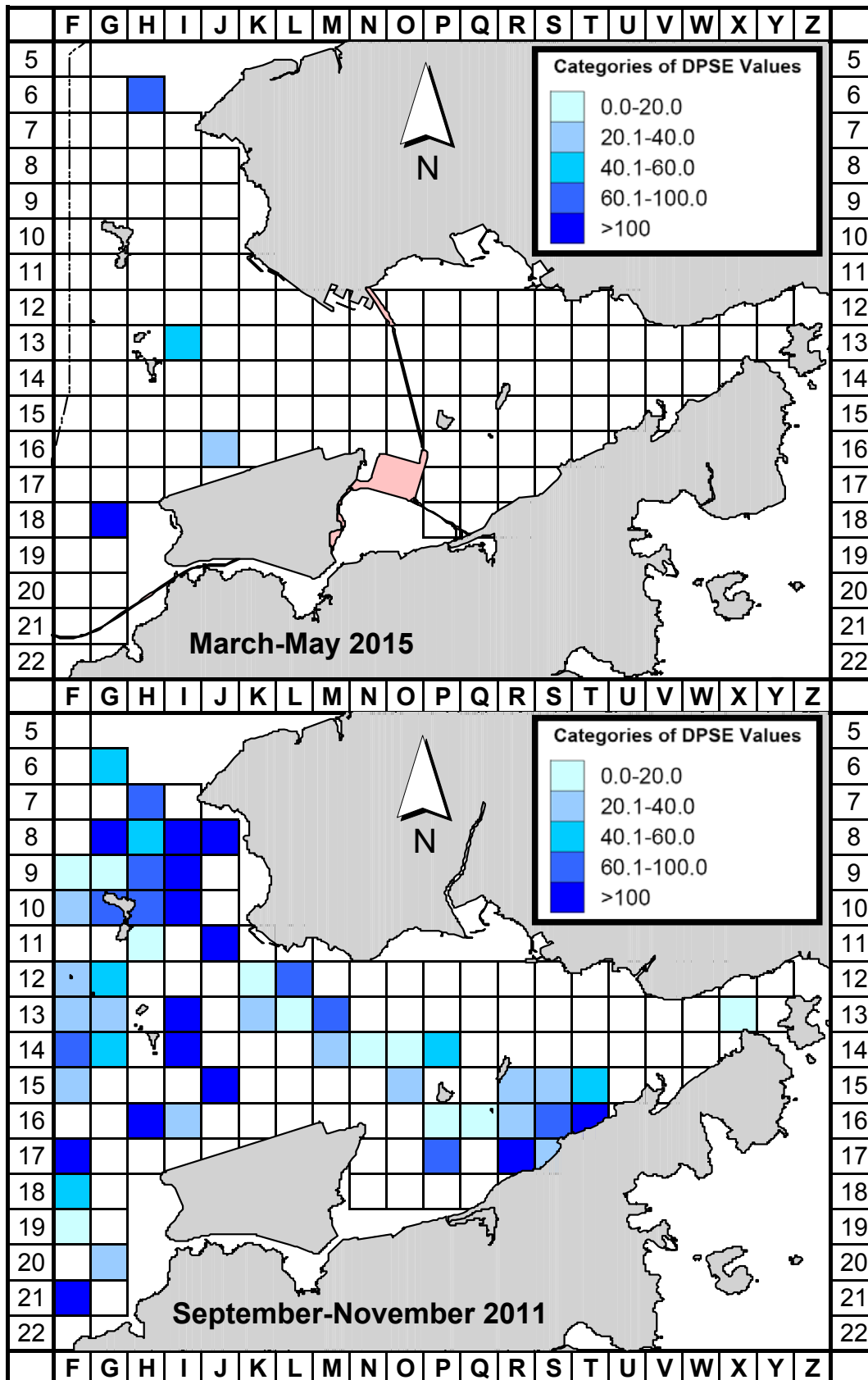


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (March-May 2015) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

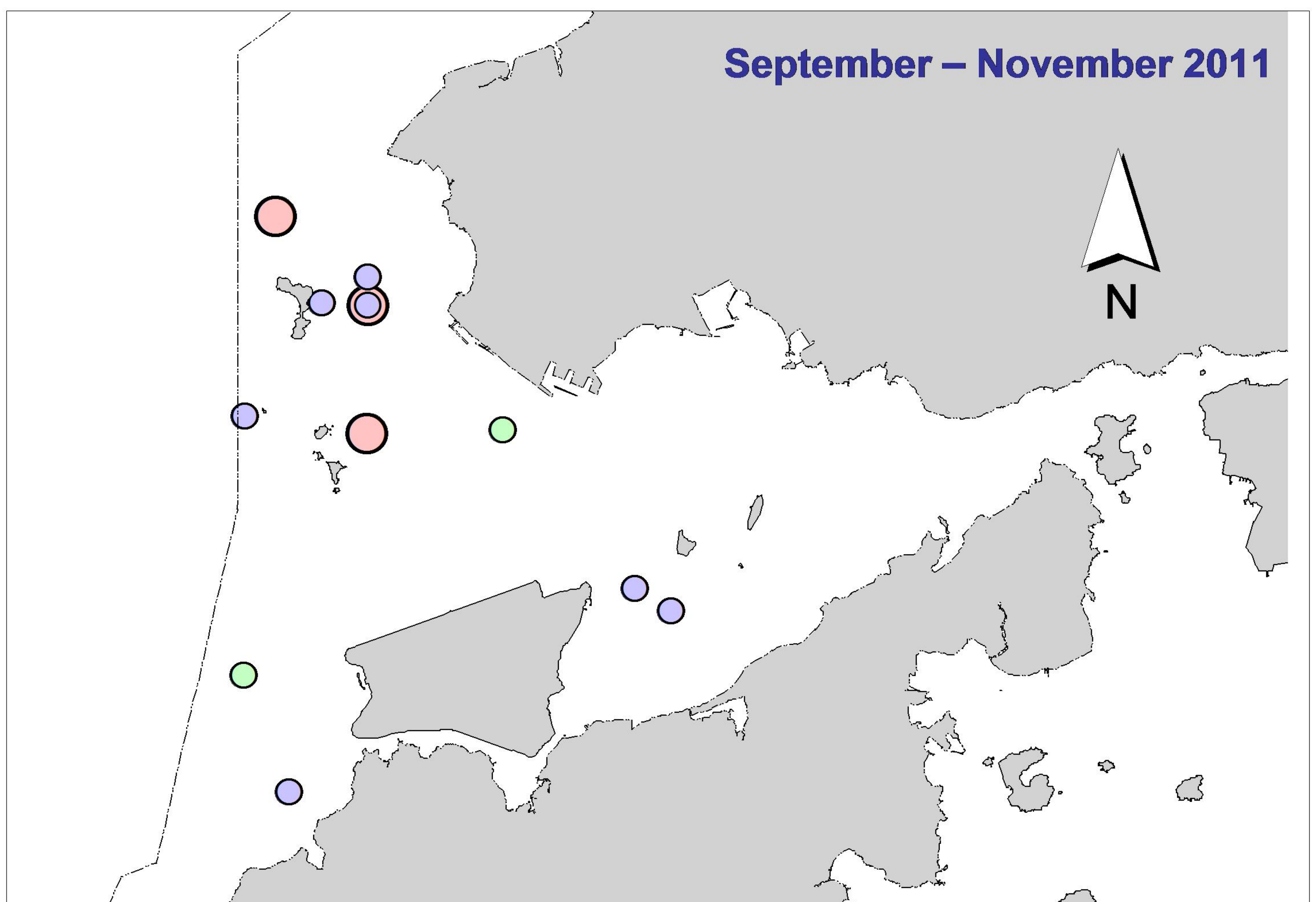
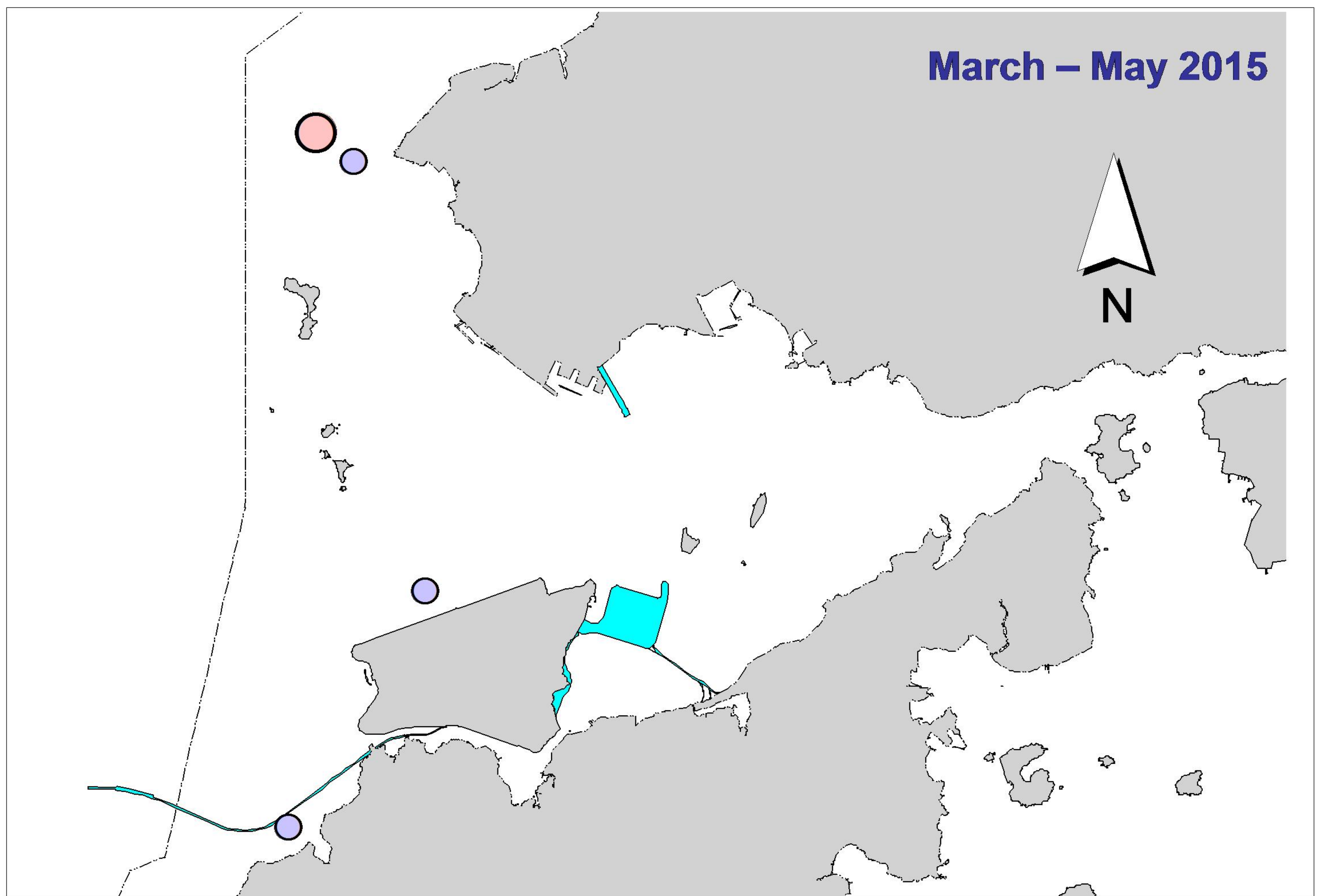


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (March-May 2015)

(Abbreviations: BEAU = Beaufort Sea State; P = Primary Line Effort; S = Secondary Line Effort)

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
4-Mar-15	NW LANTAU	1	1.07	SPRING	STANDARD31516	HKLR	P
4-Mar-15	NW LANTAU	2	12.71	SPRING	STANDARD31516	HKLR	P
4-Mar-15	NW LANTAU	3	25.62	SPRING	STANDARD31516	HKLR	P
4-Mar-15	NW LANTAU	4	1.40	SPRING	STANDARD31516	HKLR	P
4-Mar-15	NW LANTAU	2	8.00	SPRING	STANDARD31516	HKLR	S
4-Mar-15	NW LANTAU	3	3.30	SPRING	STANDARD31516	HKLR	S
4-Mar-15	NW LANTAU	4	1.00	SPRING	STANDARD31516	HKLR	S
4-Mar-15	NE LANTAU	2	5.38	SPRING	STANDARD31516	HKLR	P
4-Mar-15	NE LANTAU	3	12.87	SPRING	STANDARD31516	HKLR	P
4-Mar-15	NE LANTAU	2	3.40	SPRING	STANDARD31516	HKLR	S
4-Mar-15	NE LANTAU	3	5.39	SPRING	STANDARD31516	HKLR	S
11-Mar-15	NW LANTAU	2	25.99	SPRING	STANDARD31516	HKLR	P
11-Mar-15	NW LANTAU	3	5.09	SPRING	STANDARD31516	HKLR	P
11-Mar-15	NW LANTAU	2	7.53	SPRING	STANDARD31516	HKLR	S
11-Mar-15	NE LANTAU	2	20.05	SPRING	STANDARD31516	HKLR	P
11-Mar-15	NE LANTAU	2	10.95	SPRING	STANDARD31516	HKLR	S
17-Mar-15	NW LANTAU	2	3.26	SPRING	STANDARD31516	HKLR	P
17-Mar-15	NW LANTAU	3	36.14	SPRING	STANDARD31516	HKLR	P
17-Mar-15	NW LANTAU	4	0.80	SPRING	STANDARD31516	HKLR	P
17-Mar-15	NW LANTAU	2	2.20	SPRING	STANDARD31516	HKLR	S
17-Mar-15	NW LANTAU	3	10.40	SPRING	STANDARD31516	HKLR	S
17-Mar-15	NE LANTAU	2	14.63	SPRING	STANDARD31516	HKLR	P
17-Mar-15	NE LANTAU	3	1.97	SPRING	STANDARD31516	HKLR	P
17-Mar-15	NE LANTAU	1	1.94	SPRING	STANDARD31516	HKLR	S
17-Mar-15	NE LANTAU	2	7.69	SPRING	STANDARD31516	HKLR	S
17-Mar-15	NE LANTAU	3	0.68	SPRING	STANDARD31516	HKLR	S
26-Mar-15	NW LANTAU	1	20.26	SPRING	STANDARD31516	HKLR	P
26-Mar-15	NW LANTAU	2	10.63	SPRING	STANDARD31516	HKLR	P
26-Mar-15	NW LANTAU	2	6.76	SPRING	STANDARD31516	HKLR	S
26-Mar-15	NE LANTAU	1	11.38	SPRING	STANDARD31516	HKLR	P
26-Mar-15	NE LANTAU	2	8.40	SPRING	STANDARD31516	HKLR	P
26-Mar-15	NE LANTAU	1	4.32	SPRING	STANDARD31516	HKLR	S
26-Mar-15	NE LANTAU	2	6.2	SPRING	STANDARD31516	HKLR	S
8-Apr-15	NE LANTAU	2	14.22	SPRING	STANDARD31516	HKLR	P
8-Apr-15	NE LANTAU	3	5.10	SPRING	STANDARD31516	HKLR	P
8-Apr-15	NE LANTAU	1	0.50	SPRING	STANDARD31516	HKLR	S
8-Apr-15	NE LANTAU	2	9.09	SPRING	STANDARD31516	HKLR	S
8-Apr-15	NE LANTAU	3	0.99	SPRING	STANDARD31516	HKLR	S
8-Apr-15	NW LANTAU	2	4.96	SPRING	STANDARD31516	HKLR	P
8-Apr-15	NW LANTAU	3	25.95	SPRING	STANDARD31516	HKLR	P
8-Apr-15	NW LANTAU	4	0.84	SPRING	STANDARD31516	HKLR	P
8-Apr-15	NW LANTAU	2	2.29	SPRING	STANDARD31516	HKLR	S
8-Apr-15	NW LANTAU	3	5.26	SPRING	STANDARD31516	HKLR	S
10-Apr-15	NW LANTAU	2	14.40	SPRING	STANDARD31516	HKLR	P
10-Apr-15	NW LANTAU	3	26.10	SPRING	STANDARD31516	HKLR	P
10-Apr-15	NW LANTAU	2	9.40	SPRING	STANDARD31516	HKLR	S
10-Apr-15	NW LANTAU	3	4.20	SPRING	STANDARD31516	HKLR	S
10-Apr-15	NE LANTAU	2	15.44	SPRING	STANDARD31516	HKLR	P
10-Apr-15	NE LANTAU	3	1.30	SPRING	STANDARD31516	HKLR	P
10-Apr-15	NE LANTAU	2	10.06	SPRING	STANDARD31516	HKLR	S
17-Apr-15	NW LANTAU	2	4.84	SPRING	STANDARD31516	HKLR	P

Appendix I. (cont'd)

(Abbreviations: BEAU = Beaufort Sea State; P = Primary Line Effort; S = Secondary Line Effort)

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
17-Apr-15	NW LANTAU	3	29.76	SPRING	STANDARD31516	HKLR	P
17-Apr-15	NW LANTAU	4	5.8	SPRING	STANDARD31516	HKLR	P
17-Apr-15	NW LANTAU	2	0.3	SPRING	STANDARD31516	HKLR	S
17-Apr-15	NW LANTAU	3	7.6	SPRING	STANDARD31516	HKLR	S
17-Apr-15	NW LANTAU	4	4.8	SPRING	STANDARD31516	HKLR	S
17-Apr-15	NE LANTAU	2	3.60	SPRING	STANDARD31516	HKLR	P
17-Apr-15	NE LANTAU	3	11.51	SPRING	STANDARD31516	HKLR	P
17-Apr-15	NE LANTAU	4	2.21	SPRING	STANDARD31516	HKLR	P
17-Apr-15	NE LANTAU	2	4.41	SPRING	STANDARD31516	HKLR	S
17-Apr-15	NE LANTAU	3	5.07	SPRING	STANDARD31516	HKLR	S
22-Apr-15	NE LANTAU	2	20.00	SPRING	STANDARD31516	HKLR	P
22-Apr-15	NE LANTAU	2	10.90	SPRING	STANDARD31516	HKLR	S
22-Apr-15	NW LANTAU	1	3.24	SPRING	STANDARD31516	HKLR	P
22-Apr-15	NW LANTAU	2	25.27	SPRING	STANDARD31516	HKLR	P
22-Apr-15	NW LANTAU	3	3.37	SPRING	STANDARD31516	HKLR	P
22-Apr-15	NW LANTAU	2	7.07	SPRING	STANDARD31516	HKLR	S
22-Apr-15	NW LANTAU	3	0.85	SPRING	STANDARD31516	HKLR	S
4-May-15	NW LANTAU	2	18.60	SPRING	STANDARD31516	HKLR	P
4-May-15	NW LANTAU	3	13.60	SPRING	STANDARD31516	HKLR	P
4-May-15	NW LANTAU	2	2.30	SPRING	STANDARD31516	HKLR	S
4-May-15	NW LANTAU	3	4.80	SPRING	STANDARD31516	HKLR	S
4-May-15	NE LANTAU	1	3.54	SPRING	STANDARD31516	HKLR	P
4-May-15	NE LANTAU	2	10.73	SPRING	STANDARD31516	HKLR	P
4-May-15	NE LANTAU	3	5.40	SPRING	STANDARD31516	HKLR	P
4-May-15	NE LANTAU	2	8.13	SPRING	STANDARD31516	HKLR	S
4-May-15	NE LANTAU	3	2.70	SPRING	STANDARD31516	HKLR	S
8-May-15	NW LANTAU	2	7.57	SPRING	STANDARD31516	HKLR	P
8-May-15	NW LANTAU	3	33.53	SPRING	STANDARD31516	HKLR	P
8-May-15	NW LANTAU	2	2.30	SPRING	STANDARD31516	HKLR	S
8-May-15	NW LANTAU	3	11.20	SPRING	STANDARD31516	HKLR	S
8-May-15	NE LANTAU	2	4.55	SPRING	STANDARD31516	HKLR	P
8-May-15	NE LANTAU	3	12.74	SPRING	STANDARD31516	HKLR	P
8-May-15	NE LANTAU	2	6.25	SPRING	STANDARD31516	HKLR	S
8-May-15	NE LANTAU	3	3.66	SPRING	STANDARD31516	HKLR	S
14-May-15	NE LANTAU	2	12.61	SPRING	STANDARD31516	HKLR	P
14-May-15	NE LANTAU	3	4.43	SPRING	STANDARD31516	HKLR	P
14-May-15	NE LANTAU	2	9.96	SPRING	STANDARD31516	HKLR	S
14-May-15	NW LANTAU	2	5.56	SPRING	STANDARD31516	HKLR	P
14-May-15	NW LANTAU	3	34.27	SPRING	STANDARD31516	HKLR	P
14-May-15	NW LANTAU	4	0.60	SPRING	STANDARD31516	HKLR	P
14-May-15	NW LANTAU	2	8.17	SPRING	STANDARD31516	HKLR	S
14-May-15	NW LANTAU	3	4.80	SPRING	STANDARD31516	HKLR	S
18-May-15	NW LANTAU	2	5.11	SPRING	STANDARD31516	HKLR	P
18-May-15	NW LANTAU	3	24.12	SPRING	STANDARD31516	HKLR	P
18-May-15	NW LANTAU	4	3.40	SPRING	STANDARD31516	HKLR	P
18-May-15	NW LANTAU	2	2.20	SPRING	STANDARD31516	HKLR	S
18-May-15	NW LANTAU	3	4.70	SPRING	STANDARD31516	HKLR	S
18-May-15	NE LANTAU	2	15.10	SPRING	STANDARD31516	HKLR	P
18-May-15	NE LANTAU	3	4.30	SPRING	STANDARD31516	HKLR	P
18-May-15	NE LANTAU	2	10.80	SPRING	STANDARD31516	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (March-May 2015)

(Abbreviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Line)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
04-Mar-15	1	1009	1	NW LANTAU	2	ND	OFF	HKLR	815213	805485	SPRING	NONE	
11-Mar-15	1	1347	1	NW LANTAU	2	ND	OFF	HKLR	829495	806976	SPRING	NONE	
11-Mar-15	2	1519	7	NW LANTAU	2	258	ON	HKLR	818956	805421	SPRING	NONE	P
26-Mar-15	1	1201	3	NW LANTAU	2	21	ON	HKLR	820290	808597	SPRING	NONE	S
08-Apr-15	1	1309	3	NW LANTAU	3	142	ON	HKLR	823791	807532	SPRING	NONE	P
10-Apr-15	1	1103	2	NW LANTAU	2	ND	OFF	HKLR	828359	804688	SPRING	NONE	
22-Apr-15	1	1432	8	NW LANTAU	2	354	ON	HKLR	830139	806113	SPRING	NONE	S

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in March-May 2015

ID#	DATE	STG#	AREA
CH34	11/03/15	1	NW LANTAU
NL49	11/03/15	2	NW LANTAU
NL104	22/04/15	1	NW LANTAU
NL123	11/03/15	2	NW LANTAU
NL136	11/03/15	2	NW LANTAU
	08/04/15	1	NW LANTAU
NL153	22/04/15	1	NW LANTAU
NL165	11/03/15	2	NW LANTAU
NL202	22/04/15	1	NW LANTAU
NL236	22/04/15	1	NW LANTAU
NL261	26/03/15	1	NW LANTAU
NL272	26/03/15	1	NW LANTAU
NL284	11/03/15	2	NW LANTAU
	26/03/15	1	NW LANTAU
NL285	11/03/15	2	NW LANTAU
NL286	22/04/15	1	NW LANTAU
NL307	22/04/15	1	NW LANTAU
WL178	04/03/15	1	NW LANTAU

Appendix IV. Sixteen individual dolphins that were identified during March-May 2015 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)

NL136



NL153



NL165



NL202



Appendix IV. (cont'd)



Appendix IV. (cont'd)

NL285



NL286



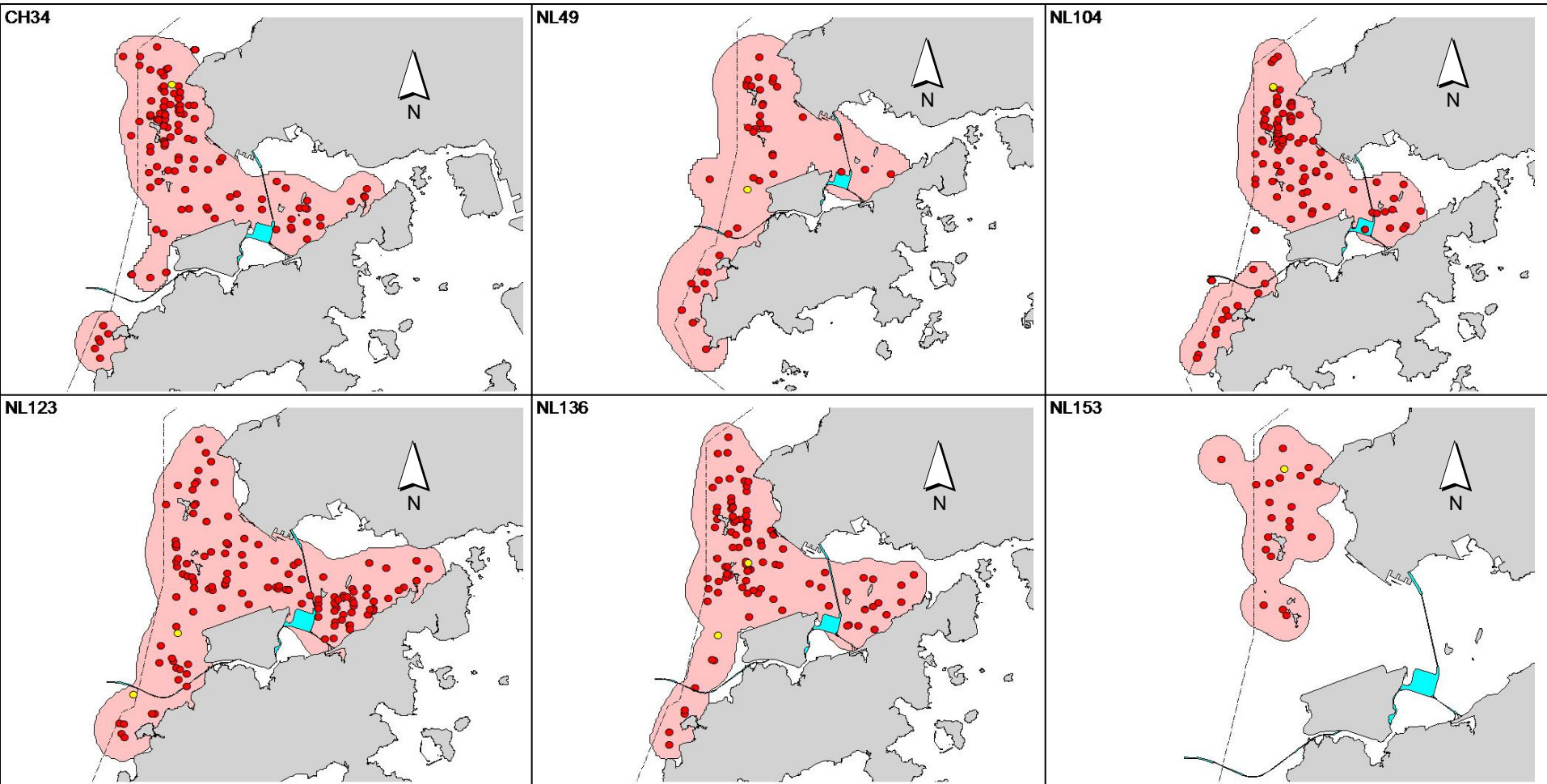
NL307



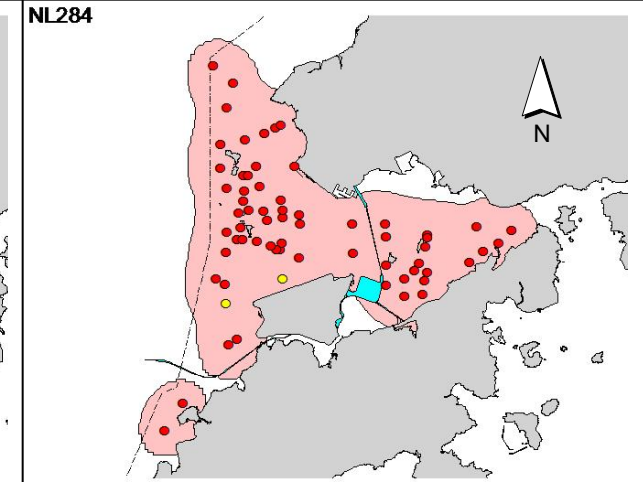
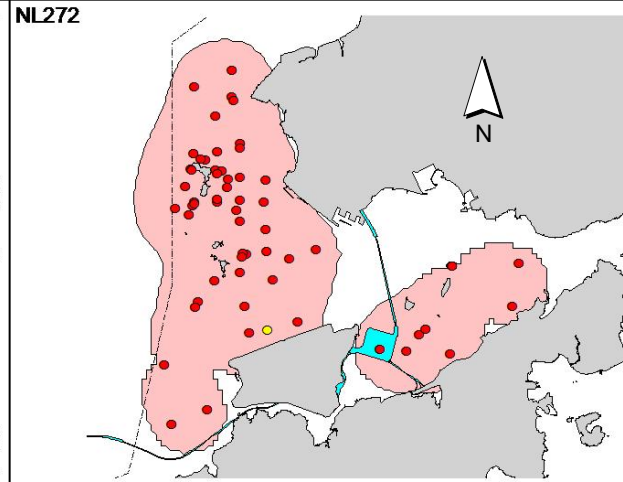
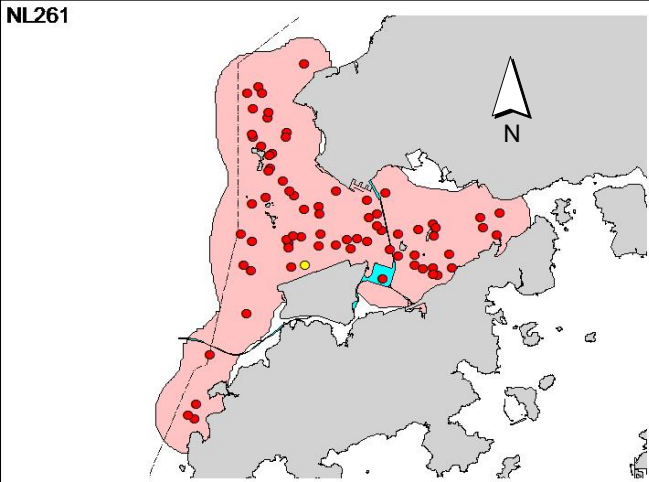
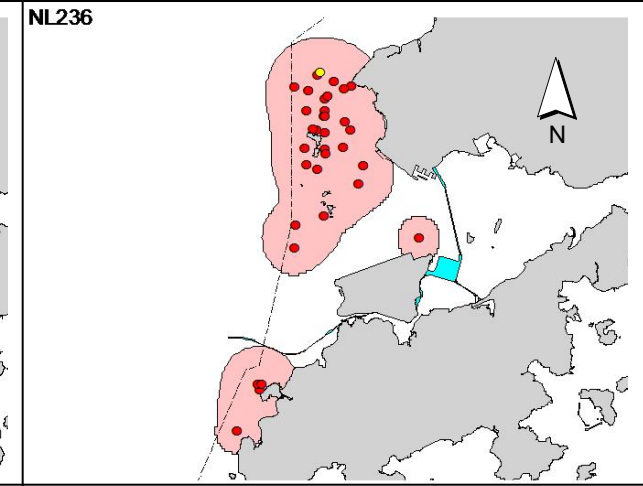
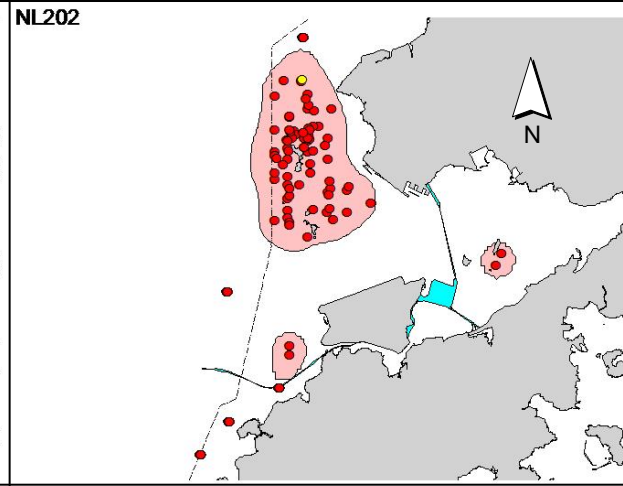
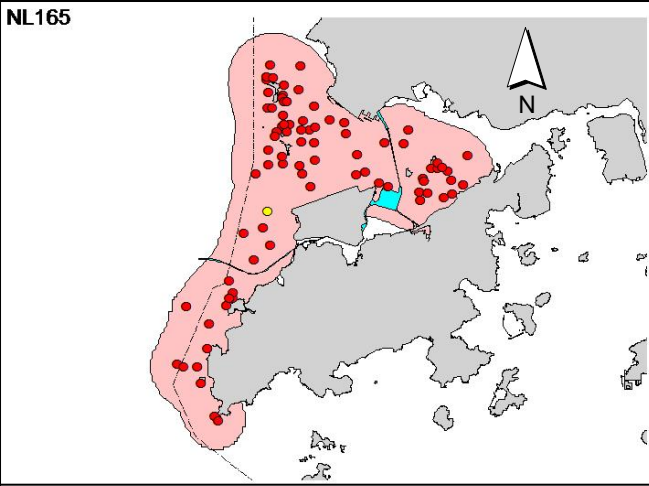
WL178



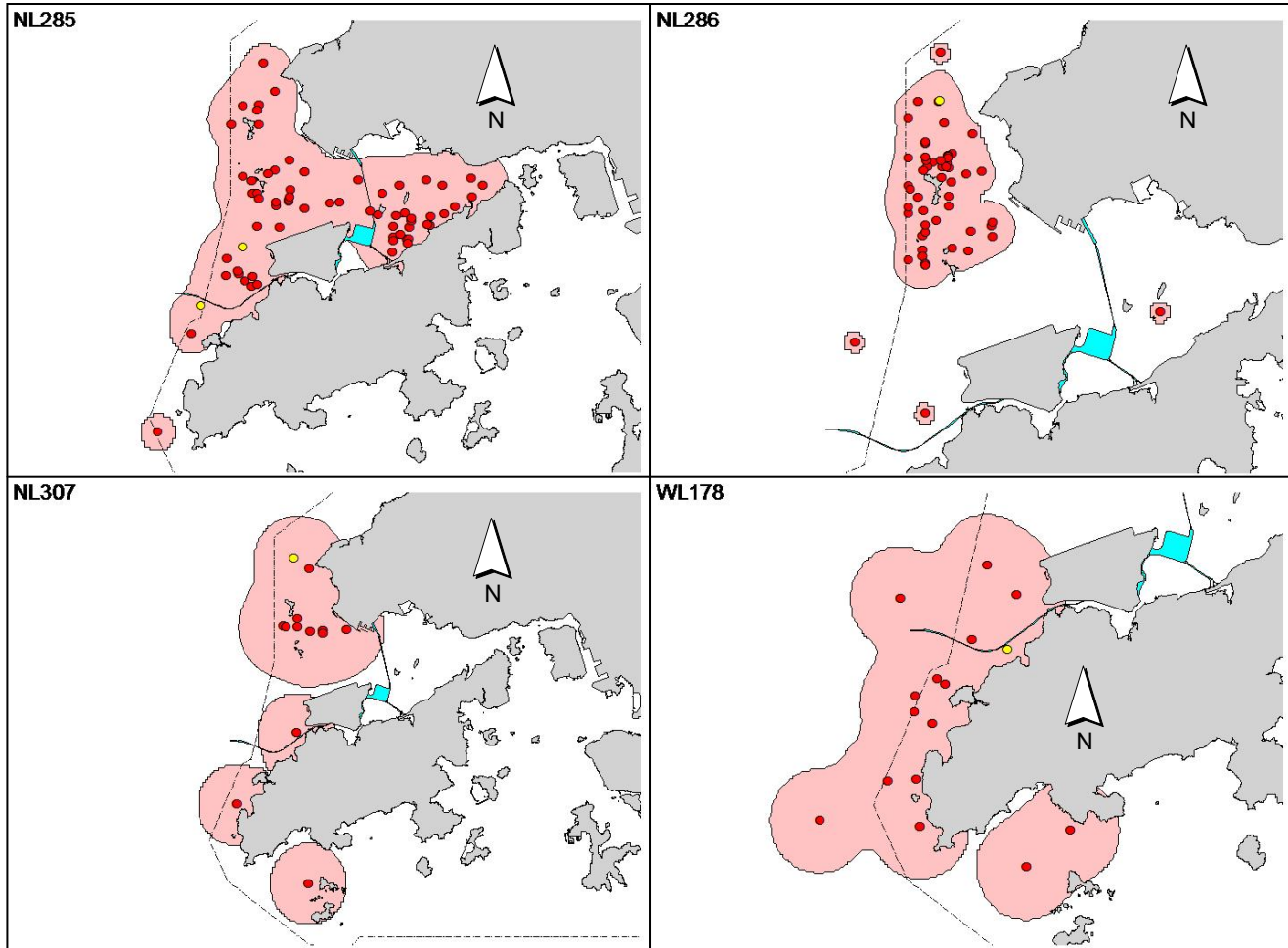
Appendix V. Ranging patterns (95% kernel ranges) of 16 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicates sightings made in March-May 2015)



Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix J

Event Action Plan

Appendix J1 Event/ Action Plan for Air Quality

EVENT	ET ⁽¹⁾	ACTION		
		IEC ⁽¹⁾	SOR ⁽¹⁾	Contractor
Action Level				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Discuss with the IEC and the Contractor on remedial actions required. 6. If exceedance continues, arrange meeting with the IEC and the SOR. 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check the Contractor's working method. 3. Discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Submit proposals for remedial actions to IEC within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate

ACTION				
EVENT	ET ⁽¹⁾	IEC ⁽¹⁾	SOR ⁽¹⁾	Contractor
Limit Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the SOR and the DEP. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results.	1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. Discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	1. Notify the IEC, the SOR, the DEP and the Contractor. 2. Identify the source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 7. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and	1. Discuss amongst the SOR, ET and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

the SOR informed of the results.

8. If exceedance stops cease
additional monitoring.

Appendix J2 Event/ Action Plan for Construction Noise

ACTION					
EVENT	ET	IEC	SOR	Contractor	
Action Level	<ol style="list-style-type: none"> 1. Notify the IEC and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the SOR accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals 	
Limit Level	<ol style="list-style-type: none"> 1. Notify the IEC, the SOR, the DEP and the Contractor. 2. Identify the source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform the IEC, the SOR and the DEP the causes & actions taken for the exceedances. 7. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst the SOR, the ET and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated. 	

Appendix J3 **Event/ Action Plan for Water Quality**

Event	ET Leader	IEC	SOR	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in situ measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor and SOR; Check monitoring data, all plant, equipment and Contractor's working methods. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working methods. 	<ol style="list-style-type: none"> Confirm receipt of notification of non-compliance in writing; Notify Contractor. 	<ol style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> Repeat measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor, SOR and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, SOR and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Action level; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working method; Discuss with ET and Contractor on possible remedial actions; Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly; Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Ensure mitigation measures are properly implemented; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Inform the Supervising Officer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment and consider changes of working methods; Submit proposal of additional mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat measurement on next day of exceedance to confirm findings; Identify source(s) of impact; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working method; Discuss with ET and Contractor 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Discuss with IEC, ET and Contractor on the proposed 	<ol style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice;

Event	ET Leader	IEC	SOR	Contractor
	3. Inform IEC, contractor, SOR and EPD;	on possible remedial actions;	mitigation measures;	
	4. Check monitoring data, all plant, equipment and Contractor's working methods;	3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly.	3. Request Contractor to review the working methods.	3. Check all plant and equipment and consider changes of working methods;
	5. Discuss mitigation measures with IEC, SOR and Contractor;			4. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR.
	1. Repeat measurement on next day of exceedance to confirm findings;	1. Check monitoring data submitted by ET and Contractor's working method;	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;	1. Take immediate action to avoid further exceedance;
Limit level being exceeded by two or more consecutive sampling days	2. Identify source(s) of impact;	2. Discuss with ET and Contractor on possible remedial actions;	2. Request Contractor to critically review the working methods;	2. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR;
	3. Inform IEC, contractor, SOR and EPD;		3. Make agreement on the mitigation measures to be implemented;	3. Implement the agreed mitigation measures;
	4. Check monitoring data, all plant, equipment and Contractor's working methods;	3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly;	4.	4. Resubmit proposals of mitigation measures if problem still not under control;
	5. Discuss mitigation measures with IEC, SOR and Contractor;	4. Supervise the implementation of mitigation measures.	5. Ensure mitigation measures are properly implemented;	5. As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.
	6. Ensure mitigation measures are implemented;		6.	
	7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days;		7. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	

Appendix J4 **Implementation of Event-Action Plan for Dolphin Monitoring**

Event	ET Leader	IEC	SOR	Contractor
Action Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor. 	<ol style="list-style-type: none"> 1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If SOR is satisfied with the proposal of any other measures, SOR to signify the agreement in writing on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.

Event	ET Leader	IEC	SOR	Contractor
Limit Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary; 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures; 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise ER/SOR of the results and findings accordingly; 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly. 	<ol style="list-style-type: none"> 1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures; 2. If ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures; 3. Supervise the implementation of additional monitoring and/or any other mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures; 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary; 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

Appendix J5 *Event and Action Plan on Dolphin Acoustic Behaviour*

EVENT	ACTION			
	ET Leader	IEC	SO	Contractor
<u>Action Level</u>				
With the numerical values presented in <i>Table 5.7 of Baseline Monitoring Report</i> , when any of the response variable for dolphin acoustic behaviour recorded in the construction phase monitoring is 20% lower or higher than that recorded in the baseline monitoring (see <i>Table 5.8 of Baseline Monitoring Report</i>), or when there is a difference of 20% in dolphin acoustic signal detection at nighttime period at Site C1 only, the action level should be triggered	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

EVENT	ACTION			
	ET Leader	IEC	SO	Contractor
<p><u>Limit Level</u></p> <p>With the numerical values presented in <i>Table 5.7 of Baseline Monitoring Report</i>, when any of the response variable for dolphin acoustic behaviour recorded in the construction phase monitoring is 40% lower or higher than that recorded in the baseline monitoring (see <i>Table 5.8 of Baseline Monitoring Report</i>), or when there is a difference of 40% in dolphin acoustic signal detection at nighttime at Site C1 only, the limit level should be triggered</p>	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 7. Discuss additional dolphin monitoring and any other potential mitigation measures (eg consider to temporarily stop relevant portion of construction activity) with the IEC and Contractor. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 3. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise ER accordingly. 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Office, DEP – Director of Environmental Protection

Appendix K

Quarterly Summary of Waste Flow Table

Contract No. : HY/2012/07

**Tuen Mun Chek Lap Kok Link – Southern Connection Viaduct Section
Monthly Summary Waste Flow Table for 2015 (Year)**

Month/Material	Actual Quantities of Inert C&D Materials Generation						Actual Quantities of C&D wastes Generation						Actual Quantities of Recyclables Generation			
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fills	Imported Fill	Marine Sediment, Cat. L	Marine Sediment, Cat. Mp	Marine Sediment, Cat. Mf	Marine Sediment, Cat. H	Chemical Waste	General Refuse	Metals	Felled trees	Paper/ cardboard packaging	Plastics
Unit	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	
Jan	13.578	0.081	0.990	-	12.474	0.115	0.178	0.229	0.258	-	132.170	-	-	0.091	-	
Feb	6.233	0.148	0.461	-	5.759	0.014	0.801	0.110	0.223	0.400	141.020	-	-	0.112	-	
Mar	10.149	0.220	0.473	-	9.600	0.077	0.618	0.073	0.149	-	120.940	-	-	0.203	-	
Apr	9.986	0.410	2.261	-	7.694	0.032	-	-	-	-	133.630	-	-	0.105	-	
May	8.743	0.177	0.653	-	8.091	-	0.550	-	-	-	107.920	-	-	0.042	-	
Jun	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SUB-TOTAL	48.691	1.036	4.836	-	43.616	0.238	2.147	0.412	0.630	0.400	635.680	-	0.000	0.553	-	
Jul	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aug	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sep	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Oct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nov	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dec	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL	48.691	1.036	4.836	-	43.616	0.238	2.147	0.412	0.630	0.400	635.680	-	-	0.553	-	

Notes :

- 1 - The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- 2 - Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- 3 - Broken concrete for recycling into aggregates.
- 4 - Assumed 5 kg per damaged water-filled barrier.
- 5 - Disposed as Public Fills includes Hard Rock and Large Broken Concrete.

Appendix L

Cumulative Statistics on
Exceedances, Complaints,
Notifications of Summons
and Successful Prosecutions

Appendix L1 Cumulative Statistics on Exceedances

		Total No. recorded in this quarter	Total No. recorded since project commencement
1-Hr TSP	Action	0	0
	Limit	0	0
24-Hr TSP	Action	0	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	1	2
	Limit	0	0
Impact Dolphin Monitoring	Action	0	7
	Limit	1	2

Appendix L2 Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This quarter	0	0	0
Total No. received since project commencement	2	0	0

Email
message

**Environmental
Resources
Management**

To ENVIRON – Hong Kong, Limited (ENPO)

16/F Berkshire House,
25 Westlands Road
Quarry Bay, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link – Southern
Connection Viaduct Section

Subject Notification of Exceedance for Marine Water
Quality Impact Monitoring

Date 3 June 2015



Dear Sir/ Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

Action Level Exceedance:
0215660_19 May 2015_ SS_E_Station SR4a

Recorded on 19 May 2015.

Regards,

Mr Jovy Tam
Environmental Team Leader

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ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/07
 TUEN MUN – CHEK LAP KOK LINK –
 SOUTHERN CONNECTION VIADUCT SECTION

Marine Water Quality Impact Monitoring

Notification of Exceedance

Log No.	0215660_19 May 2015_ SS_E_Station SR4a [Total No. of Exceedances = 1]	
Date	19 May 2015 (Measured) 21 May 2015 (<i>In situ</i> results received by ERM) 26 May 2015 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3	
Parameter(s) with Exceedance(s)	Depth-averaged Suspended Solids (SS)	
Action Levels	SS	95%-ile of baseline data (23.5 mg/L) and 120% of upstream control station on same day at same tide (32.5 mg/L)
Limit Levels	SS	99%-ile of baseline data (34.4 mg/L) and 130% of upstream control station on same day at same tide (35.2 mg/L)
Measured Levels	Action Level Exceedance was observed at SR4a (33.6 mg/L) during mid-ebb tide.	
Works Undertaken (at the time of monitoring event)	<p>Marine works on 19 May 2015 at the nearby marine platforms were:</p> <ul style="list-style-type: none"> • Soil grabbing at Pier A5; • Iron typing and pile cap construction works at platforms of Viaduct C. <p>There were no bored piling works at the nearby marine platforms of Viaducts B, C and D. The aforesaid works were suspended before sampling at mid-ebb tide (12:03 to 15:33) due to adverse weather.</p>	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance of depth-averaged SS at SR4a during mid-ebb tide is unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> • The marine works nearby monitoring station SR4a had been suspended before sampling at SR4a (13:39). • Elevated SS levels were also observed in all monitoring stations on the same day which may be resulting from heavy rainfall on 19 May 2015. Apart from SR4a during mid-ebb tide, the SS levels in other monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides. • The depth-averaged turbidity and dissolved oxygen levels in all monitoring stations on during both mid-ebb and mid-flood tides were in compliance with the Action and Limit Levels. • The gutters of the nearby marine platforms were checked and in function. There was also no waste water runoff recorded. • No malpractice was observed during the sampling process. 	
Actions Taken / To Be Taken	No immediate action is considered necessary. The contractor is reminded to properly implement the mitigation measures stipulated in EM&A Manual. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results, locations of water quality monitoring stations and rainfall distribution on 19 May 2015 are attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Weather	Stat	Level	Water Depth	Lev Cod	Replicate	Start Time	Temp v	pH v	Sal v	DO v	Turb v	SS v
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)5	Surface	1	1	1	19:00	26.1	6.93	20.5	6.81	20.4	27.8
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)5	Surface	1	1	2	19:00	26	6.96	20.4	6.86		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)5	Middle	6.6	2	1	19:00	26.3	7.04	21.2	6.73		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)5	Middle	6.6	2	2	19:00	26.2	7.08	21.3	6.76		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)5	Bottom	12.2	3	1	19:00	26.4	7.1	21.8	6.5		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)5	Bottom	12.2	3	2	19:00	26.5	7.08	21.9	6.52		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4a	Surface	1	1	1	19:19	26.2	7.11	20.3	6.63	21.3	29.4
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4a	Surface	1	1	2	19:19	26.1	7.07	20.4	6.58		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4a	Middle		2	1	19:19						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4a	Middle		2	2	19:19						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4a	Bottom	3.8	3	1	19:19	26.3	6.93	20.4	6.38		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4a	Bottom	3.8	3	2	19:19	26.2	6.99	20.5	6.34		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4	Surface	1	1	1	19:33	26.1	6.89	20.5	6.53	19.1	26.7
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4	Surface	1	1	2	19:33	26	6.84	20.6	6.57		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4	Middle		2	1	19:33						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4	Middle		2	2	19:33						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4	Bottom	3.3	3	1	19:33	26.2	6.73	20.6	6.32		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	SR4	Bottom	3.3	3	2	19:33	26.1	6.75	20.6	6.37		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS8	Surface	1	1	1	19:46	26.2	6.74	20.4	6.67	20.1	28.1
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS8	Surface	1	1	2	19:46	26.1	6.76	20.3	6.71		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS8	Middle		2	1	19:46						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS8	Middle		2	2	19:46						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS8	Bottom	3.1	3	1	19:46	26.1	6.81	20.3	6.48		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS8	Bottom	3.1	3	2	19:46	26.2	6.77	20.3	6.42		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)16	Surface	1	1	1	20:01	26.2	6.63	20.4	6.56	21.0	28.0
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)16	Surface	1	1	2	20:01	26.2	6.68	20.3	6.52		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)16	Middle	5.3	2	1	20:01	26.4	6.79	20.6	6.43		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)16	Middle	5.3	2	2	20:01	26.3	6.8	20.5	6.47		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)16	Bottom	9.6	3	1	20:01	26.6	6.87	21.1	6.28		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)16	Bottom	9.6	3	2	20:01	26.5	6.92	21.2	6.22		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)9	Surface	1	1	1	20:19	26.2	6.89	20.6	6.56	20.5	28.3
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)9	Surface	1	1	2	20:19	26.1	6.9	20.5	6.59		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)9	Middle		2	1	20:19						
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)9	Middle		2	2	20:19						

Project	Works	Date (yyyy-mm-dd)	Tide	Weather	Stat	Level	Water Depth	Lev Cod	Replicate	Start Time	Temp v	pH v	Sal v	DO v	Turb v	SS v
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)9	Bottom	4.4	3	1	20:19	26.1	6.86	20.8	6.49		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	IS(Mf)9	Bottom	4.4	3	2	20:19	26.1	6.85	20.8	6.47		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)3	Surface	1	1	1	20:38	26.1	7.04	20.7	6.67	17.4	24.5
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)3	Surface	1	1	2	20:38	26	7.07	20.8	6.71		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)3	Middle	6.3	2	1	20:38	25.9	7.11	20.5	6.62		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)3	Middle	6.3	2	2	20:38	26	7.13	20.6	6.65		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)3	Bottom	11.6	3	1	20:38	26.3	6.96	21.8	6.47		
TMCLKL	HY/2012/07	2015-05-19	Mid-Flood	Cloudy	CS(Mf)3	Bottom	11.6	3	2	20:38	26.4	6.98	21.9	6.41		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)3	Surface	1	1	1	12:03	26.4	6.98	20.6	6.54	19.5	27.1
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)3	Surface	1	1	2	12:03	26.4	7.01	20.5	6.56		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)3	Middle	6.1	2	1	12:03	26.4	6.94	20.9	6.66		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)3	Middle	6.1	2	2	12:03	26.5	6.96	21	6.63		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)3	Bottom	11.2	3	1	12:03	26.6	6.87	21.3	6.38		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)3	Bottom	11.2	3	2	12:03	26.7	6.9	21.4	6.41		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4a	Surface	1	1	1	13:39	26.6	7.01	20.1	6.52	23.7	33.6
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4a	Surface	1	1	2	13:39	26.6	6.97	20.2	6.48		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4a	Middle		2	1	13:39						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4a	Middle		2	2	13:39						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4a	Bottom	3.2	3	1	13:39	26.6	6.86	20.7	6.27		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4a	Bottom	3.2	3	2	13:39	26.6	6.89	20.6	6.31		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4	Surface	1	1	1	13:21	26.6	6.78	20.2	6.41	22.4	31.6
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4	Surface	1	1	2	13:21	26.6	6.8	20.3	6.39		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4	Middle		2	1	13:21						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4	Middle		2	2	13:21						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4	Bottom	3	3	1	13:21	26.6	6.67	20.6	6.18		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	SR4	Bottom	3	3	2	13:21	26.5	6.7	20.5	6.16		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS8	Surface	1	1	1	13:05	26.5	6.72	20.1	6.53	22.0	30.4
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS8	Surface	1	1	2	13:05	26.6	6.76	20.2	6.49		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS8	Middle		2	1	13:05						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS8	Middle		2	2	13:05						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS8	Bottom	2.9	3	1	13:05	26.5	6.75	20.4	6.35		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS8	Bottom	2.9	3	2	13:05	26.4	6.79	20.4	6.31		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)16	Surface	1	1	1	12:43	26.5	6.78	20.2	6.38		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)16	Surface	1	1	2	12:43	26.5	6.8	20.2	6.34		

Project	Works	Date (yyyy-mm-dd)	Tide	Weather	Stat	Level	Water Depth	Lev Cod	Replicate	Start Time	Temp v	pH v	Sal v	DO v	Turb v	SS v
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)16	Middle	5	2	1	12:43	26.5	6.74	20.4	6.41	20.8	28.9
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)16	Middle	5	2	2	12:43	26.4	6.77	20.5	6.42		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)16	Bottom	8.9	3	1	12:43	26.6	6.82	20.8	6.2		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)16	Bottom	8.9	3	2	12:43	26.7	6.79	20.7	6.17		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)9	Surface	1	1	1	12:26	26.4	6.84	20.4	6.47	21.0	31.5
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)9	Surface	1	1	2	12:26	26.5	6.87	20.4	6.44		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)9	Middle		2	1	12:26						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)9	Middle		2	2	12:26						
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)9	Bottom	4	3	1	12:26	26.5	6.79	20.7	6.53		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	IS(Mf)9	Bottom	4	3	2	12:26	26.5	6.81	20.8	6.56		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)5	Surface	1	1	1	13:55	26.6	6.89	20.2	6.74	22.1	31.6
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)5	Surface	1	1	2	13:55	26.5	6.85	20.3	6.7		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)5	Middle	6.5	2	1	13:55	26.5	6.93	20.8	6.63		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)5	Middle	6.5	2	2	13:55	26.5	6.9	23.9	6.65		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)5	Bottom	11.9	3	1	13:55	26.6	6.96	21.6	6.34		
TMCLKL	HY/2012/07	2015-05-19	Mid-Ebb	Cloudy	CS(Mf)5	Bottom	11.9	3	2	13:55	26.7	6.99	21.5	6.36		

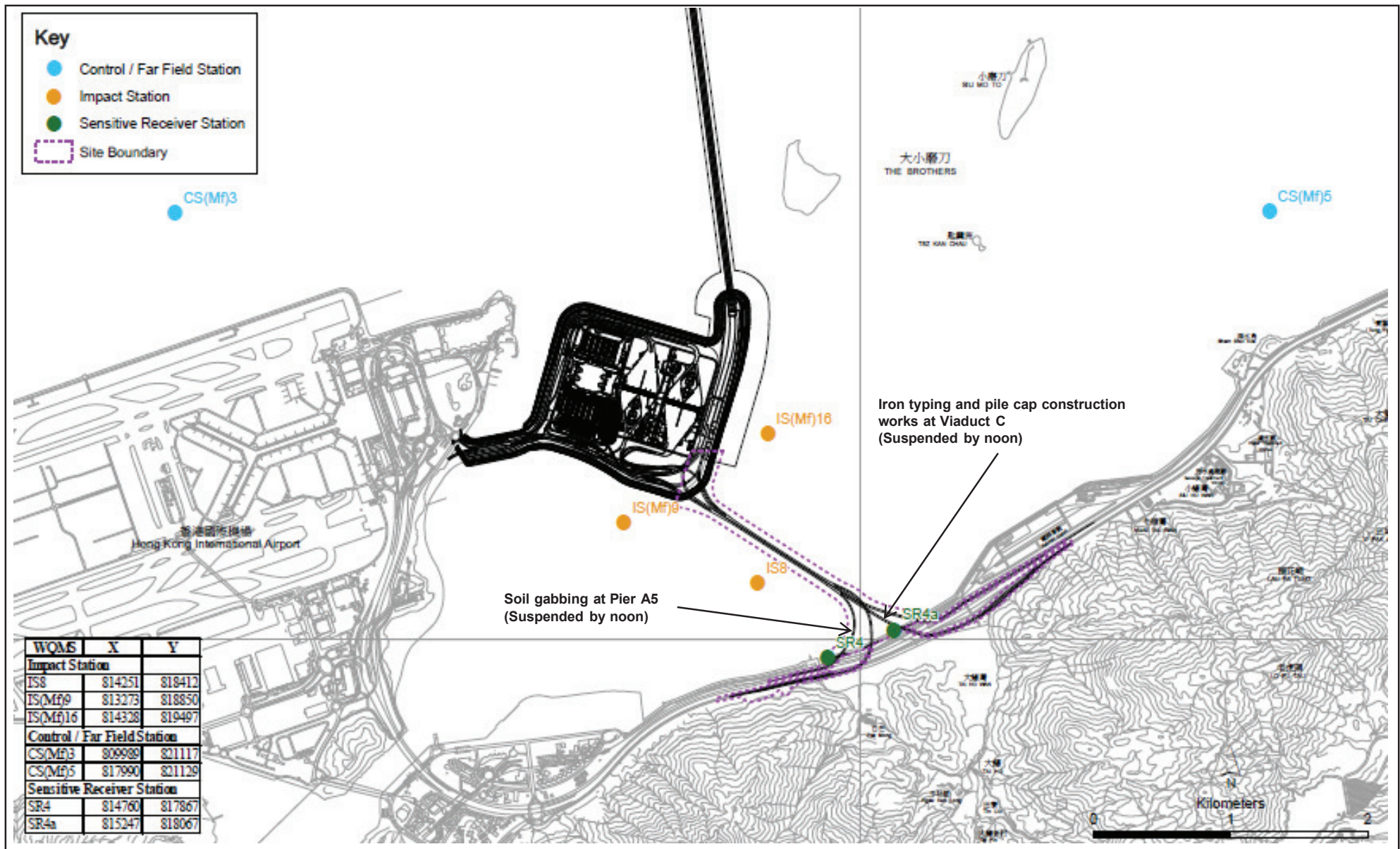


Figure 1

HY/2012/07 TM-CLKL Southern Connection Viaduct Section
 Water Quality Monitoring Stations and Marine Works nearby SR4a Undertaken on 19 May 2015

Date 2/6/2015

Environmental
 Resources
 Management



**Total Rainfall on 19-May-2015
(based on raingauges and radar data)**

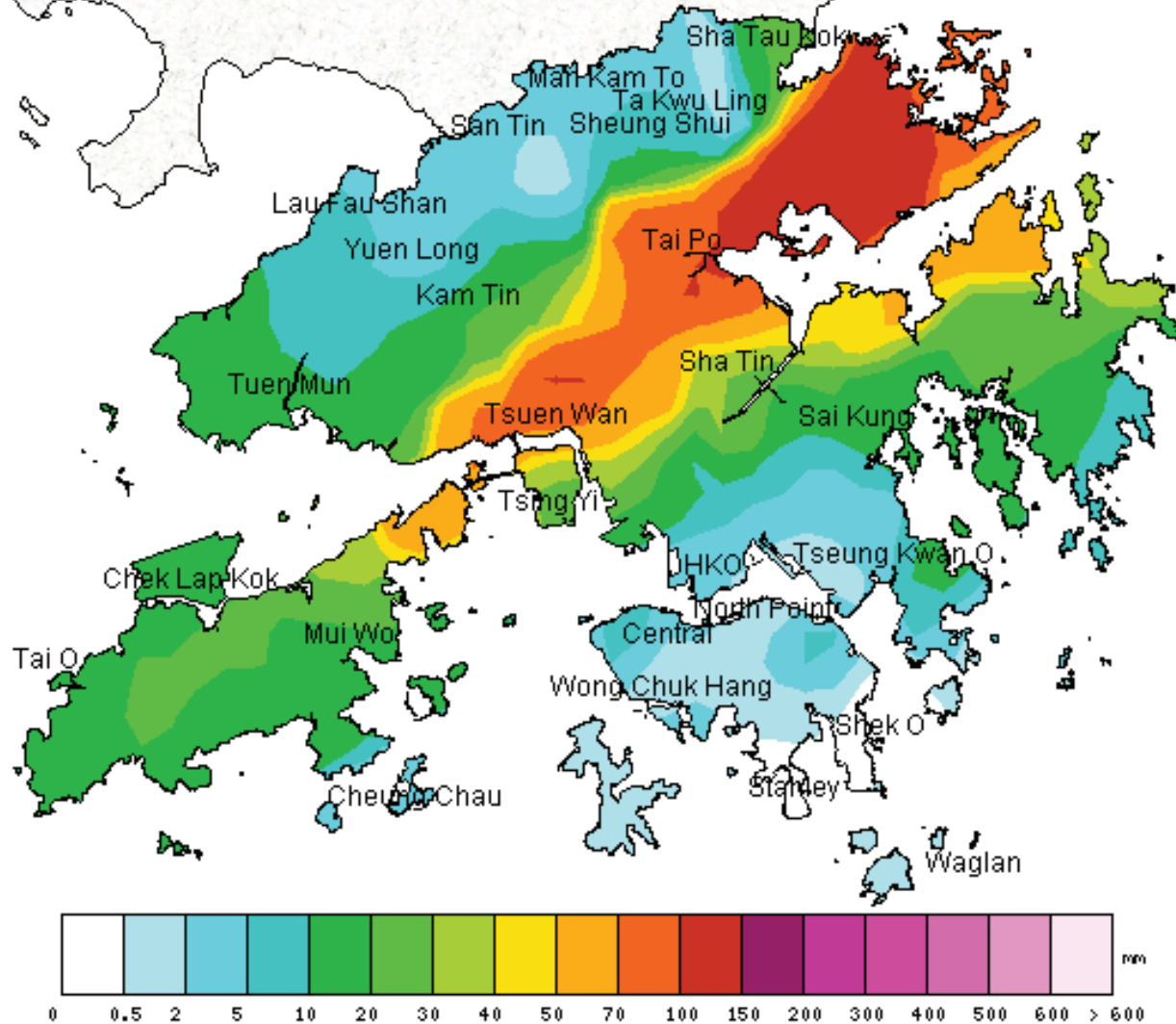


Figure 2

Rainfall distribution on 19 May 2015
(Source: Hong Kong Observatory)

Date 2/6/2015

Environmental
Resources
Management



Email
message

**Environmental
Resources
Management**

To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/07 Tuen Mun–Chek Lap
Kok Link–Southern Connection Viaduct Section

Subject Notification of Exceedance for Impact Dolphin
Monitoring

Date 19 October 2015

16/F Berkshire House,
25 Westlands Road
Quarry Bay, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com



Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0215660_Mar2015/May2015_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact
dolphin monitoring data between March and May 2015.

Regards,

A handwritten signature in black ink, appearing to read 'Jovy Tam', is positioned above the typed name.

Mr Jovy Tam
Environmental Team Leader

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ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/07
 TUEN MUN – CHEK LAP KOK LINK –
 SOUTHERN CONNECTION VIADUCT SECTION

Impact Dolphin Monitoring
 Notification of Exceedance

Log No.	0215660_Mar2014/May2015_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedance = 1]	
Date	March 2015 to May 2015 (monitored) 1 September 2015 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0.0 & ANI = 0.0
	NWL	STG = 0.47 & ANI = 2.36
	One Limit Level Exceedance is recorded in the quarterly impact dolphin monitoring at NEL and NWL between March and May 2015. The exceedance was reported in the approved <i>Nineteenth Monthly EM&A Report</i> dated 9 June 2015.	
Statistical Analyses	<p>Further to the review of the available and relevant dolphin monitoring data in the EM&A under this Contract, statistical analyses were conducted as follows:</p> <ul style="list-style-type: none"> A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present impact quarter, March to May 2015) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the averages encounter rates between the baseline and present impact monitoring quarter. By setting $\alpha = 0.05$ as the significance level in the statistical tests, significant difference in STG ($p = 0.0015$) and in ANI ($p = 0.0139$) between Period were detected. A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: baseline vs impact – cumulative quarters, December 2012 to May 2015) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the averages encounter rates between the baseline and cumulative impact monitoring quarter. By setting $\alpha = 0.01$ as the significance level in the statistical tests, significant difference in STG ($p = 0.0004$) and in ANI ($p = 0.0001$) between Cumulative Period and Location were detected. <p>* Note: The commencement date under <i>Contract No. HY/2012/07</i> is 31 October 2013.</p>	
Works Undertaken (in the monitoring quarter)	<p>In the quarter between March 2015 and May 2015, the major marine works under <i>Contract No. HY/2012/07</i> included:</p> <ul style="list-style-type: none"> Construction of Pile caps; Marine piling platform installation & uninstallation; Pier Construction; Installation of launching gantry; Installation of pier head segments; Marine Piling at Viaducts; and Additional marine ground investigation (GI) and laboratory testing. 	

Possible Reason for Action or Limit Level Exceedance(s)	<p>There is no direct evidence showing the exceedance is due to this Contract in view of the followings:</p> <ul style="list-style-type: none"> • The <i>Monitoring of Marine Mammals in Hong Kong Waters (2014 – 15)</i> ⁽¹⁾ reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to this Contract), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau. • As per the findings from the EIA report (<i>Section 8.11.9</i>), the major influences on the Chinese White Dolphin (CWD) <i>Sousa chinensis</i> under this Contract are marine traffics and bored piling works. The Contractor has implemented the marine traffic control as per the requirements in the <i>EP-354/2009/D</i> and the updated <i>EM&A Manual</i>. Likewise, the bored piling works were undertaken within a metal casing as described in the EP and the approved EIA Report. After reviewing of the bored piling records, the bored piling working rates in this quarter are within the allowable working rate described in the EP (<i>Clause 3.11</i>), in which construction works were not undertaken at more than 15 piers sites from March to May 2015. During this quarter of dolphin monitoring, no unacceptable impact on CWD due to the activities under this Contract was observed. • According to the findings in the water quality monitoring results at the impact monitoring stations between March and May 2015, there was an Action Level exceedance on depth-averaged SS on 19 May 2015, however, the recorded exceedance was considered not related to this Contract upon further investigation. Overall, the WQM results imply that no unacceptable impact on water quality was associated with the marine works under this Contract, and thus no indirect impacts on marine habitat quality due to change in water quality is observed in this Contract.
Actions Taken / To Be Taken	<p>With reference to the site inspection records in this quarter, the respective marine ecological mitigation measures (including 250 m dolphin exclusion zone, Passive Acoustic Monitoring (PAM) for night time works, acoustic decoupling plan, training to workers, marine vessels speed control and offsite travel route control) have been implemented properly by the Contractor throughout the marine works period. No immediate additional action is considered necessary. The ET will monitor for future trends in exceedance(s).</p> <p>A joint team meeting was held on 10 July 2015 for discussion on CWD trend, with attendance of ENPO, HyD, Representatives of Resident Site Staff (RSS), Environmental Team (ET) for Contract No. HY/2010/02, HY2011/03, HY/2012/07 and HY/2012/08, and Representatives of Main Contractor for Contract No. HY/2011/03 and HY/2012/08. The discussion/recommendation as recorded in the minutes of the meeting, which might be relevant to this Contract are summarized below. It was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. It was reminded that the ETs shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractor to ensure the relevant measures were fully implemented. The participants were requested by ENPO to collect and report the marine traffic statistics. It was recommended that the marine works of HZMB projects should be completed as soon as possible so as to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible.</p>
Remarks	<p>The results of impact water quality and impact dolphin monitoring, the status of implemented marine ecological mitigation measures are documented in the approved <i>Seventeenth to Nineteenth Monthly EM&A Reports</i>. Comparison on water quality between impact and baseline periods will be elaborated in the <i>6th Quarterly EM&A Report</i>.</p>

(1) Hung SKY (2015). Prepared for AFCD. Available from: http://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi_chi/con_mar_chi_chi.html