

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

***Twenty-second Quarterly Environmental
Monitoring & Audit (EM&A) Report***

30 September 2019

Environmental Resources Management
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Contract No. HY/2012/07

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

Environmental Resources Management

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Twenty-second Quarterly Environmental Monitoring & Audit (EM&A) Report

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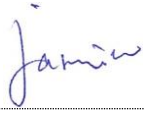


Client: Gammon		Project No: 0215660			
Summary: This document presents the Twenty-second Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.		Date: 30 September 2019			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Dr Jasmine Ng ET Leader			
	22 nd Quarterly EM&A Report	VAR	JN	CAR	30/09/19
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> <div style="text-align: right;">   </div>			

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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). Ramboll 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 southern landfall of TM-CLK Link lies alongside the Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) where a reclamation area is constructed by *Contract No. HY/2010/02* under *Environmental Permit No. EP-353/2009/K* and *EP-354/2009/D*. Upon the agreement and confirmation between the Supervising Officer Representatives and Contractors of *HY/2010/02* and *HY/2012/07* in September 2015, part of the reclamation area for southern landfall under *EP-353/2009/K* and *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07*. Another part of the southern landfall area under *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07* after completion of reclamation works by *Contract No. HY/2010/02* in June 2016.

The construction phase of the Contract commenced on 31 October 2013 and will be tentatively completed by 2019. 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 Twenty-second Quarterly EM&A Report presenting the EM&A works carried out during the period from 1 March to 31 May 2019 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 2019

Marine-based Works

- Reinstatement of Seawall at Seafront

Land-based Works

- Slope work of Viaduct A;

- Landscaping works at NLH/CTR; and
- Landscaping works at HKBCF.

April 2019

Marine-based Works

- Reinstatement of Seawall at Seafront;

Land-based Works

- Slope work of Viaduct D;
- Landscaping works at NLH/CTR; and
- Landscaping works at HKBCF.

May 2019

Marine-based Works

- Reinstatement of Seawall at Seafront

Land-based Works

- Slope work of Viaduct D; and
- Landscaping works at HKBCF.

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	38 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 construction 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

Two (2) Action Level exceedances of Suspended Solids (SS) were recorded for water quality impact monitoring in the reporting period.

Impact Dolphin Monitoring

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March to May 2019. No unacceptable impact from the construction activities of the TM-CLKL Southern Connection Viaduct Section on Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphins) was noticeable from general observations during the dolphin monitoring in this reporting quarter.

Daily marine mammal exclusion zone monitoring was undertaken during the period of marine works under this Contract. No Passive Acoustic Monitoring (PAM) was implemented as the marine piling works were not carried out outside the daylight hours in this reporting period. No sighting of the Chinese White Dolphin was recorded in the monitoring period during the exclusion zone monitoring.

Environmental Complaints, Non-compliance & Summons

There was no environmental complaint, notification of summons or successful prosecution recorded in the reporting period.

Reporting Change

There was no reporting change in this reporting period.

Upcoming Works for the Next Reporting Period

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

June 2019

Marine-based Works

- Reinstatement of Seawall at Seafront.

Land-based Works

- At-grade works at HKBCF; and
- Landscaping softwork at BCF.

July 2019

Land-based Works

- Reinstatement of seawall at seafront.

August 2019

There are no major works to be undertaken in the next monitoring period of August 2019.

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). Ramboll 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 southern landfall of TM-CLK Link lies alongside the Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) where a reclamation area is constructed by *Contract No. HY/2010/02* under *Environmental Permit No. EP-353/2009/K* and *EP-354/2009/D*. Upon the agreement and confirmation between the Supervising Officer Representatives and Contractors of *HY/2010/02* and *HY/2012/07* in September 2015, part of the reclamation area for southern landfall under *EP-353/2009/K* and *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07*. Another part of the

southern landfall area under *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07* after completion of reclamation works by *Contract No. HY/2010/02* in June 2016.

The construction phase of the Contract commenced on 31 October 2013 and will be tentatively be completed by 2019. 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*.

1.2 SCOPE OF REPORT

This is the Twenty-second 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 2019.

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
HyD (Highways Department)	Project Coordinator	Stanley Chan	2762 3406	3188 6614
	Senior Engineer	Steven Shum	2762 4133	3188 6614
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Daniel Ip	3553 3800	2492 2057
	Resident Engineer	Ivan Yim	3691 3950	3691 2899
ENPO / IEC (Ramboll Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
Contractor (Gammon Construction Limited)	Environmental Officer	Roy Leung	3520 0387	3520 0486
	24-hour Complaint Hotline		9738 4332	
ET (ERM-HK)	ET Leader	Dr. Jasmine Ng	2271 3311	2723 5660

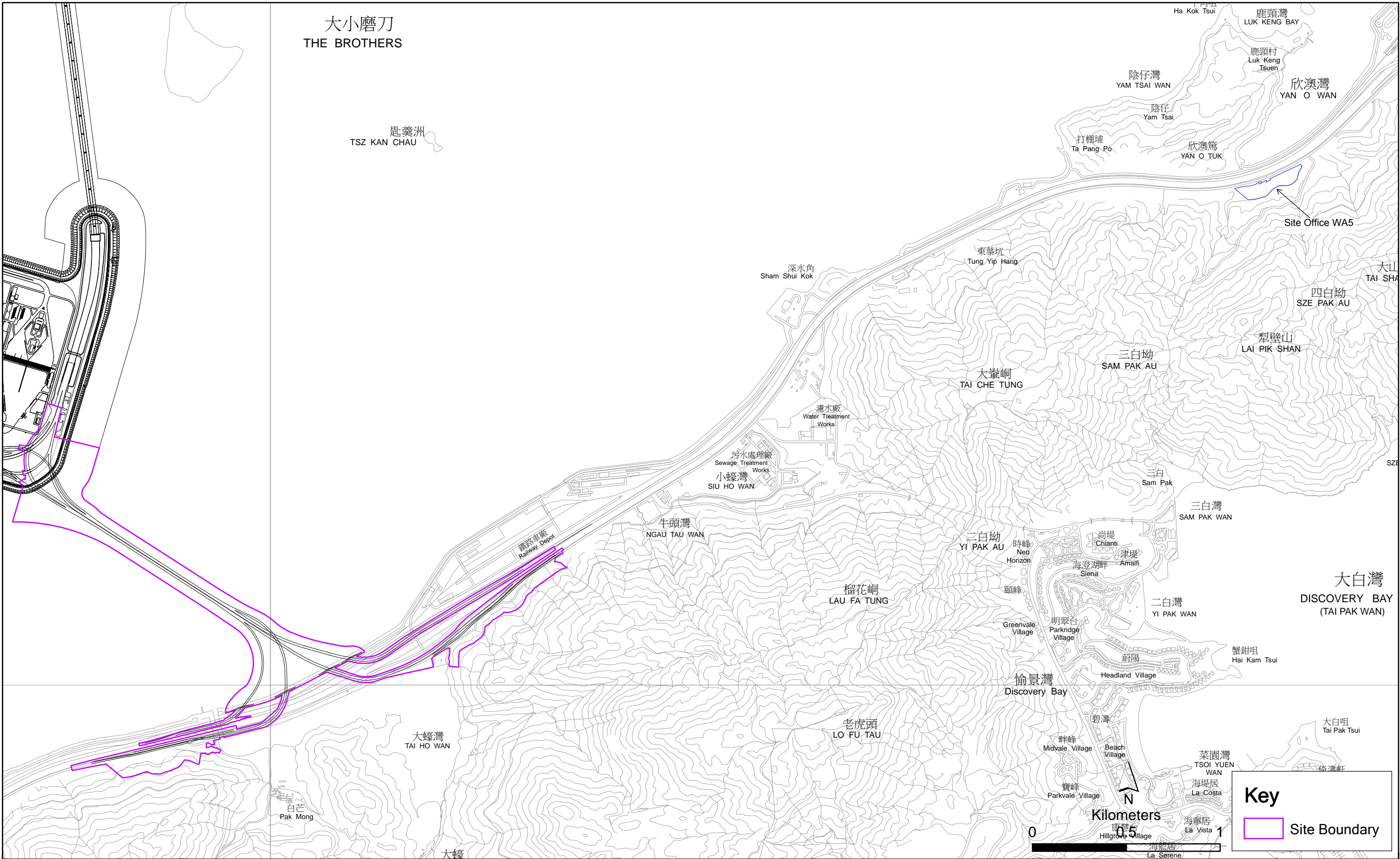
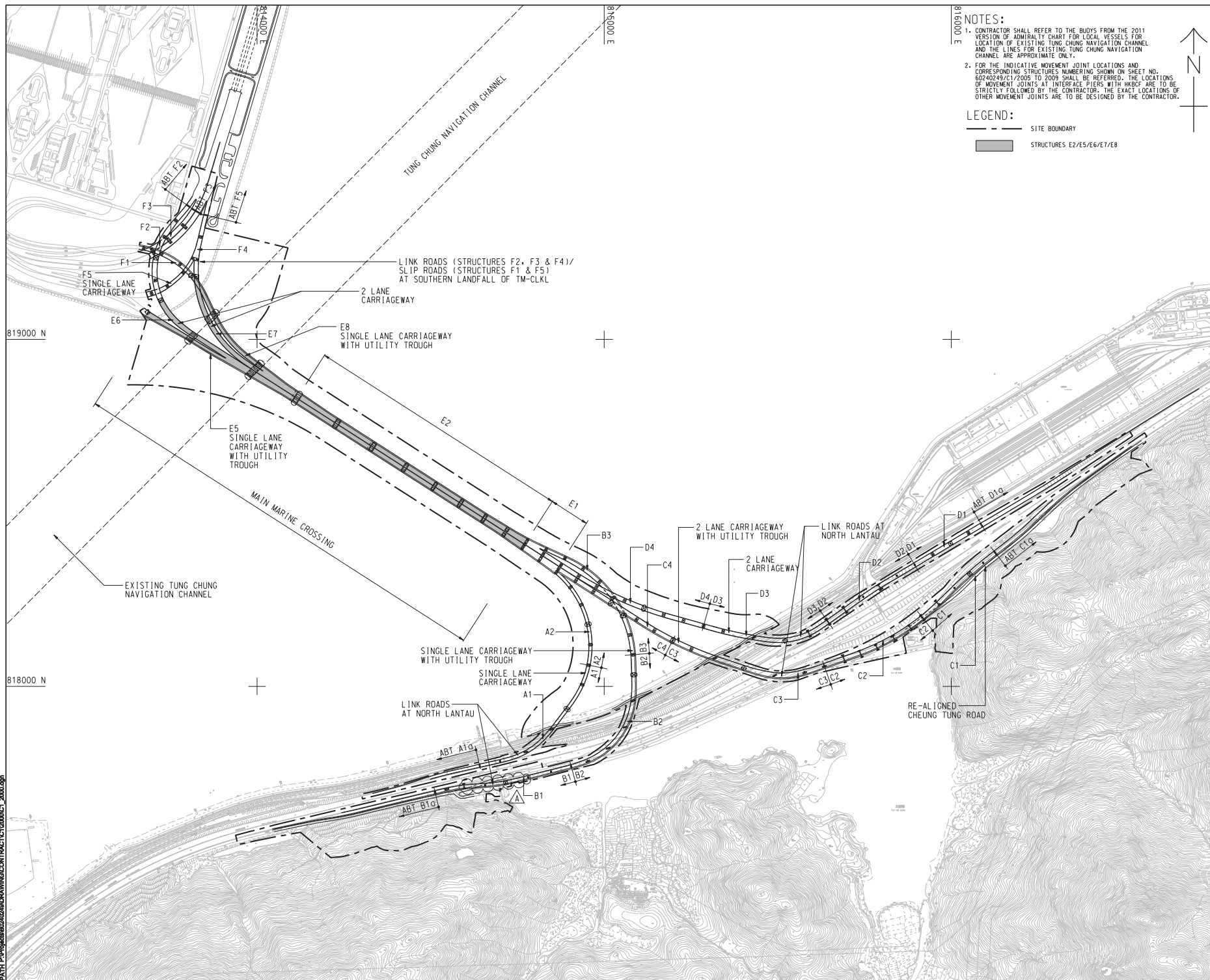


Figure 1.1

General Layout Plan of the Project



NOTES:

1. CONTRACTOR SHALL REFER TO THE BUDYS FROM THE 2011 VERSION OF ADMIRALTY CHART FOR LOCAL VESSELS FOR LINES OF EXISTING TUNG CHUNG NAVIGATION CHANNEL AND THE LINES FOR EXISTING TUNG CHUNG NAVIGATION CHANNEL ARE APPROXIMATE ONLY.
2. FOR THE INDICATIVE MOVEMENT JOINT LOCATIONS AND CORRESPONDING STRUCTURES NUMBERING SHOWN ON SHEET NO. 60240249/12/2005 TO 2009 SHALL BE REFERRED. THE LOCATIONS OF MOVEMENT JOINTS AT INTERLACE PILES WITH WIDE ARE TO BE STRICTLY FOLLOWED BY THE CONTRACTOR. THE EXACT LOCATIONS OF OTHER MOVEMENT JOINTS ARE TO BE DESIGNED BY THE CONTRACTOR.

LEGEND:

SITE LOCATION

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**
香港路政署建造工程管理處
Hong Kong - District - Islands Bridge
Hong Kong Project Management Office

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分所工程師事務所

Figure 1.2a

ISSUE/REVISION			
95			
A	NOV. 12	TENDER ADDENDUM NO. 1	CWN
-	OCT. 12	TENDER DRAWING	CWN
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SCALE 比例	DIMENSION UNIT 尺寸单位
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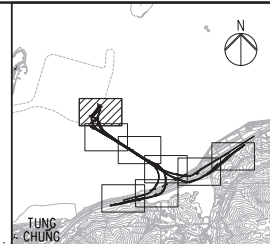
KEY PLAN

PROJECT NO. 項目編號	CONTRACT NO. 合約編號
60240249	HY/2012/07

SHEET TITLE
圖紙名稱











**SOUTHERN CONNECTION
GENERAL LAYOUT PLAN**

SHEET NUMBER
60240249/C1/2000A

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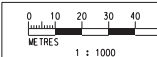
NOTES

LEGEND

- SITE BOUNDARY
GF1 FAULT
EXISTING G.1.STATIONS :
-  BOREHOLE BY GIU DATA EXCLUDING VC
 BOREHOLE BY GCL CONTRACT HY/2012/04
 BOREHOLE BY GCL CONTRACT N/LB 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.1.STATIONS :
-  PBH01 PROPOSED BOREHOLE
 TP01 PROPOSED TRIAL PIT
 CH01 PROPOSED COREHOLE
 S501 S502 PROPOSED SLOPE STRIPPING

MATCH LINE

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

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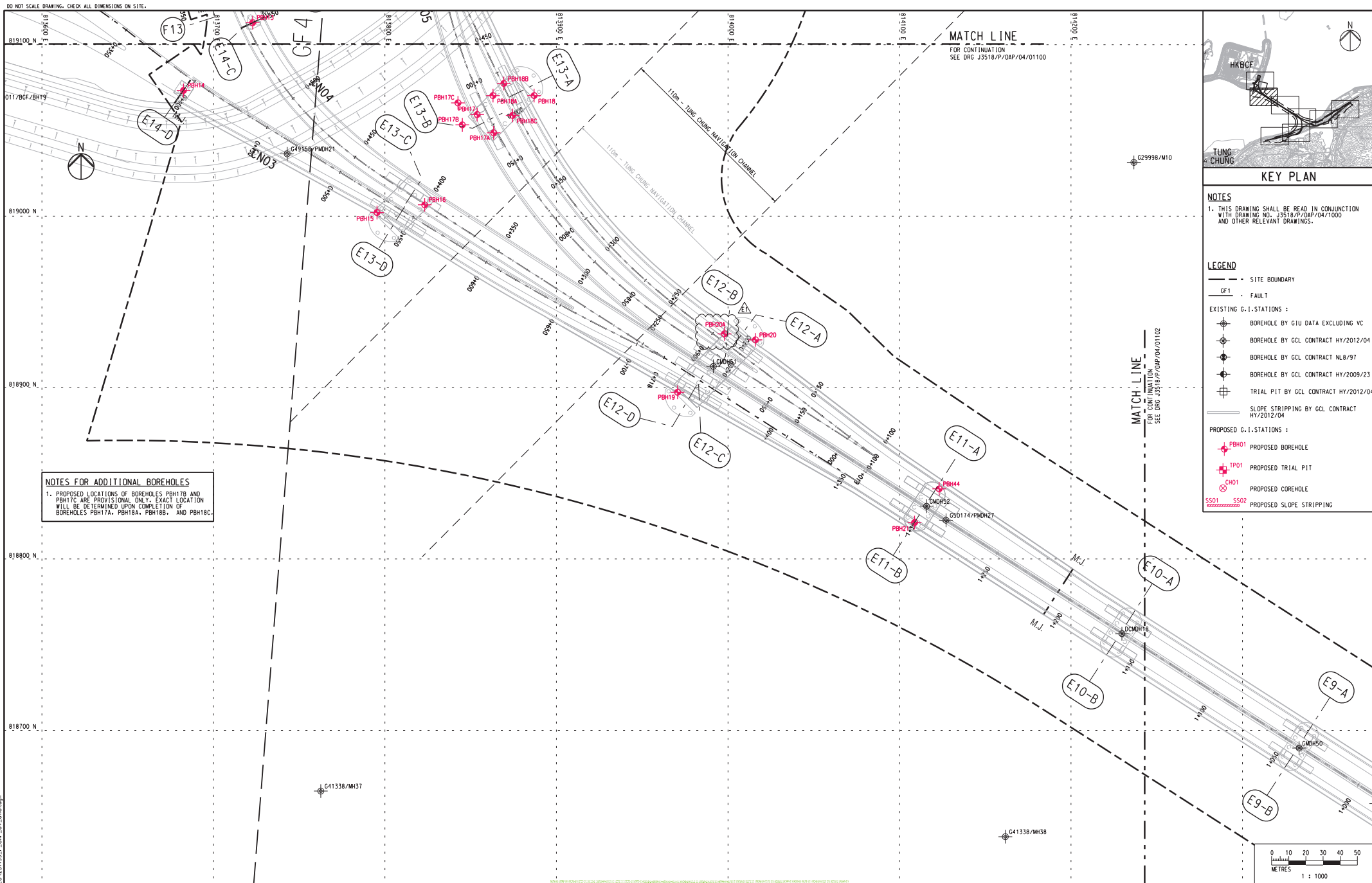
Client: **路政署**
HIGHWAYS DEPARTMENT
 香港機場快線管理處
 Hong Kong Airport Express Management Office
 Hong Kong Project Management Office

Supervising Officer: **AECOM**

Contractor: **葛士德建築有限公司**
 GOSWOLD BUILDING CO., LTD.

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

Drawing title		
Figure 1.2b		
Drawing no. J3518/P/OAP/04/01100		Rev. C



Rev	Description	By	Date	Rev	Description	By	Date	Drawn	Date	Client	Project Title	Drawing title
A	SUBMISSION	RC	07/13					RL	07/13	HIGHWAYS DEPARTMENT	Contract No. HY/2012/07	Figure 1.2c
B	SUBMISSION	RC	07/13							Hong Kong - Zhuhai - Macao Bridge	Tuen Mun - Chek Lap Kok Link	
C	SUBMISSION	RC	09/13							Hong Kong Project Management Office	Southern Connection Viaduct Section	
D	SUBMISSION	RC	10/13									
E1	FOR INTERNAL REVIEW	RC	11/13									

Checked	Approved	Supervising Officer	Contractor	Originator
DS	DOP	AECOM	Gammon	ARUP

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Drawing no.	J3518/P/OAP/04/01101	Rev.	E1
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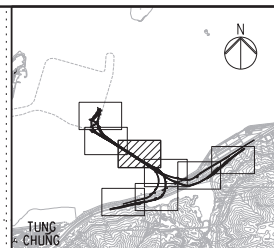
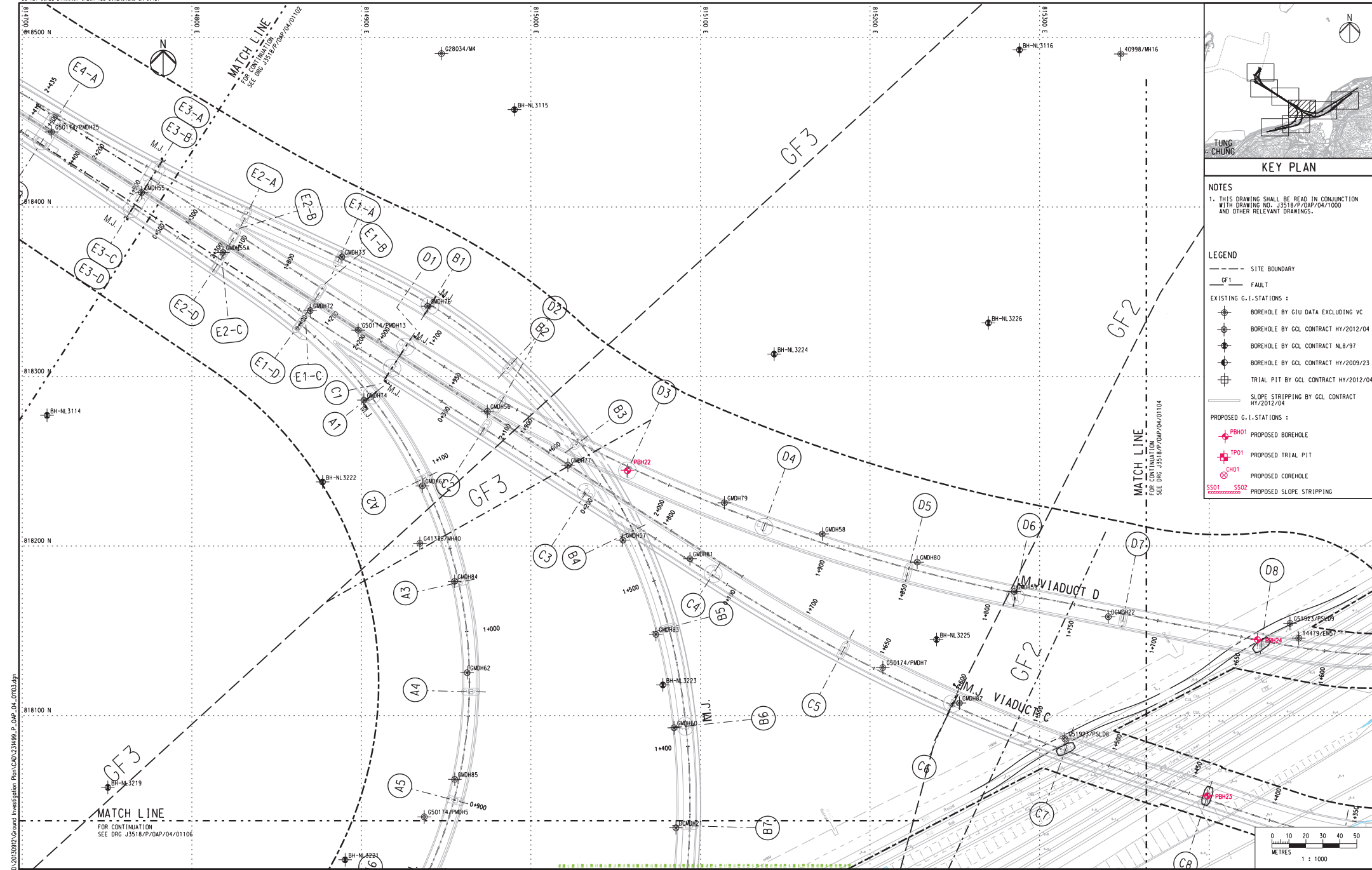


Figure 1.2d



KEY PLAN

NOTES

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

LEGEND

--- SITE BOUNDARY

GF1 FAULT

EXISTING G.I. STATIONS :

- BH-NL-3115 BOREHOLE BY GIU DATA EXCLUDING VC
- BH-NL-3116 BOREHOLE BY GCL CONTRACT HY/2012/04
- BH-NL-3224 BOREHOLE BY GCL CONTRACT NL8/97
- BH-NL-3225 BOREHOLE BY GCL CONTRACT HY/2009/23
- TP01 TRIAL PIT BY GCL CONTRACT HY/2012/04

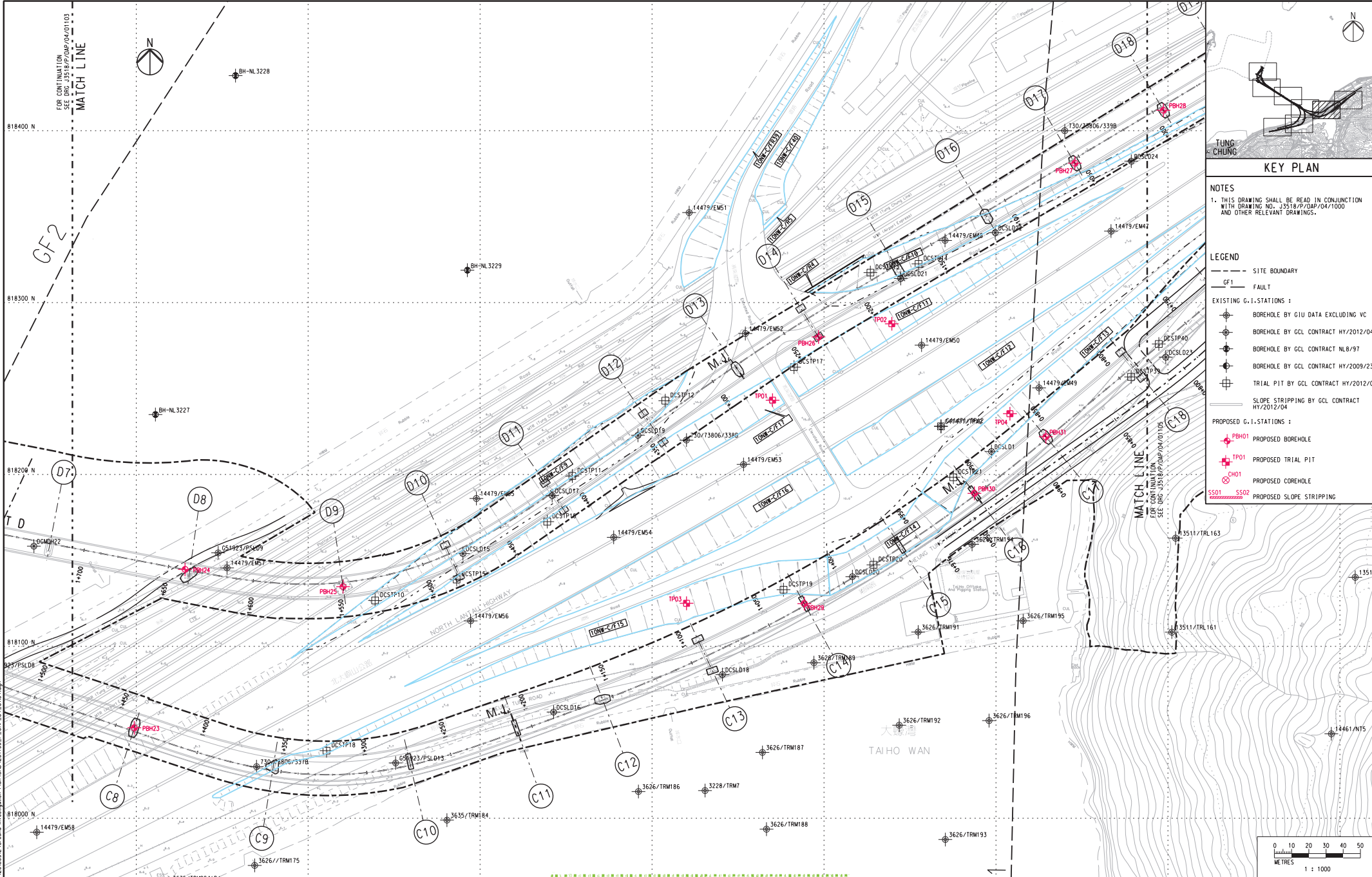
PROPOSED G.I. STATIONS :

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

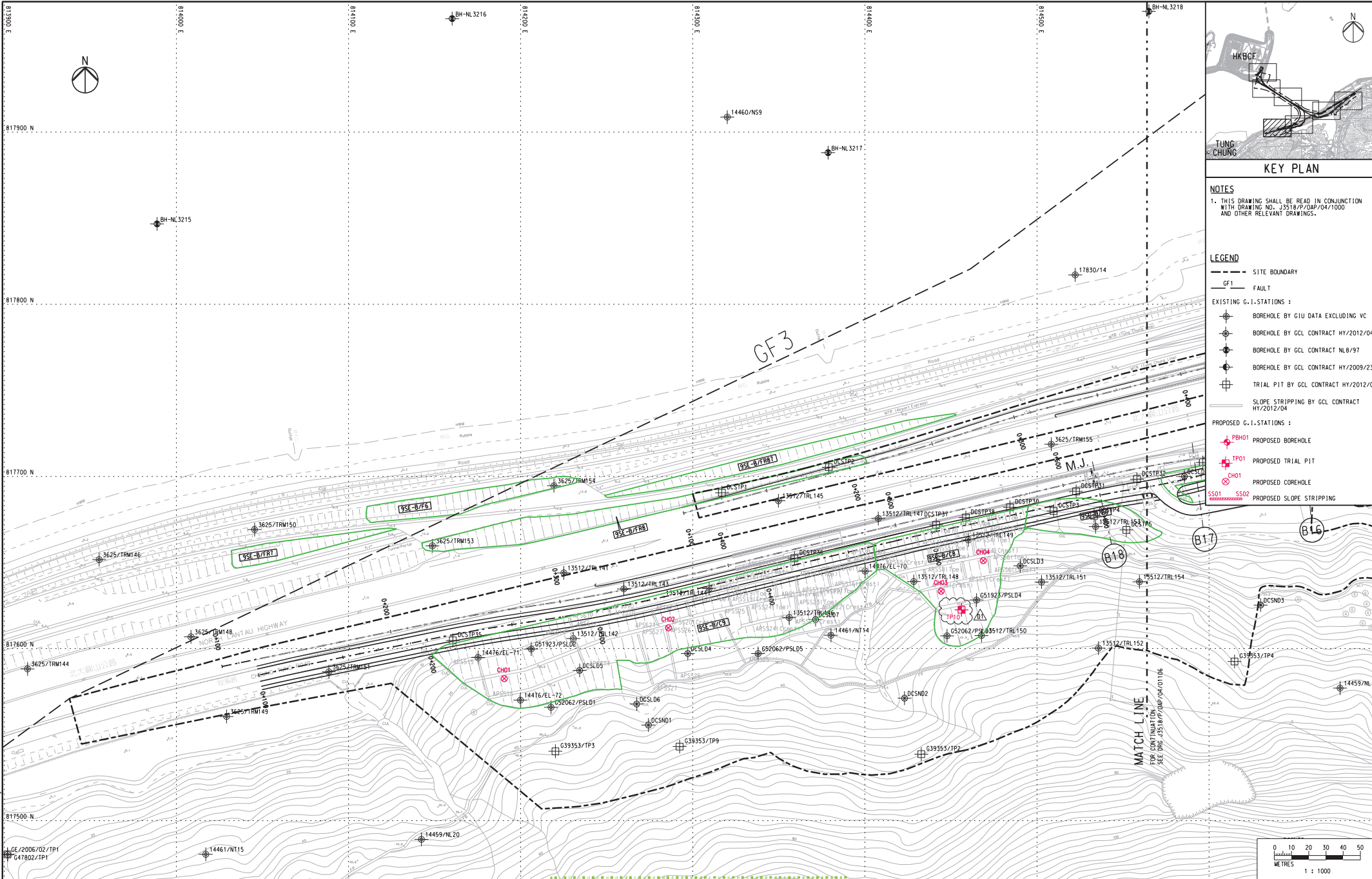
Rev	Description	By	Date	Rev	Description	By	Date	Drawn	Date	Client  路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理局 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office	Project Title Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section	Drawing title Figure 1.2e					
A	SUBMISSION	RC	07/13					RL	07/13				Supervising Officer  AECOM	Contractor  Gammon	Originator  ARUP		
B	SUBMISSION	RC	07/13					Checked	Approved							Drawing no. J3518/P/OAP/04/01103	Rev. c
C	SUBMISSION	RC	09/13					DS	DOP								
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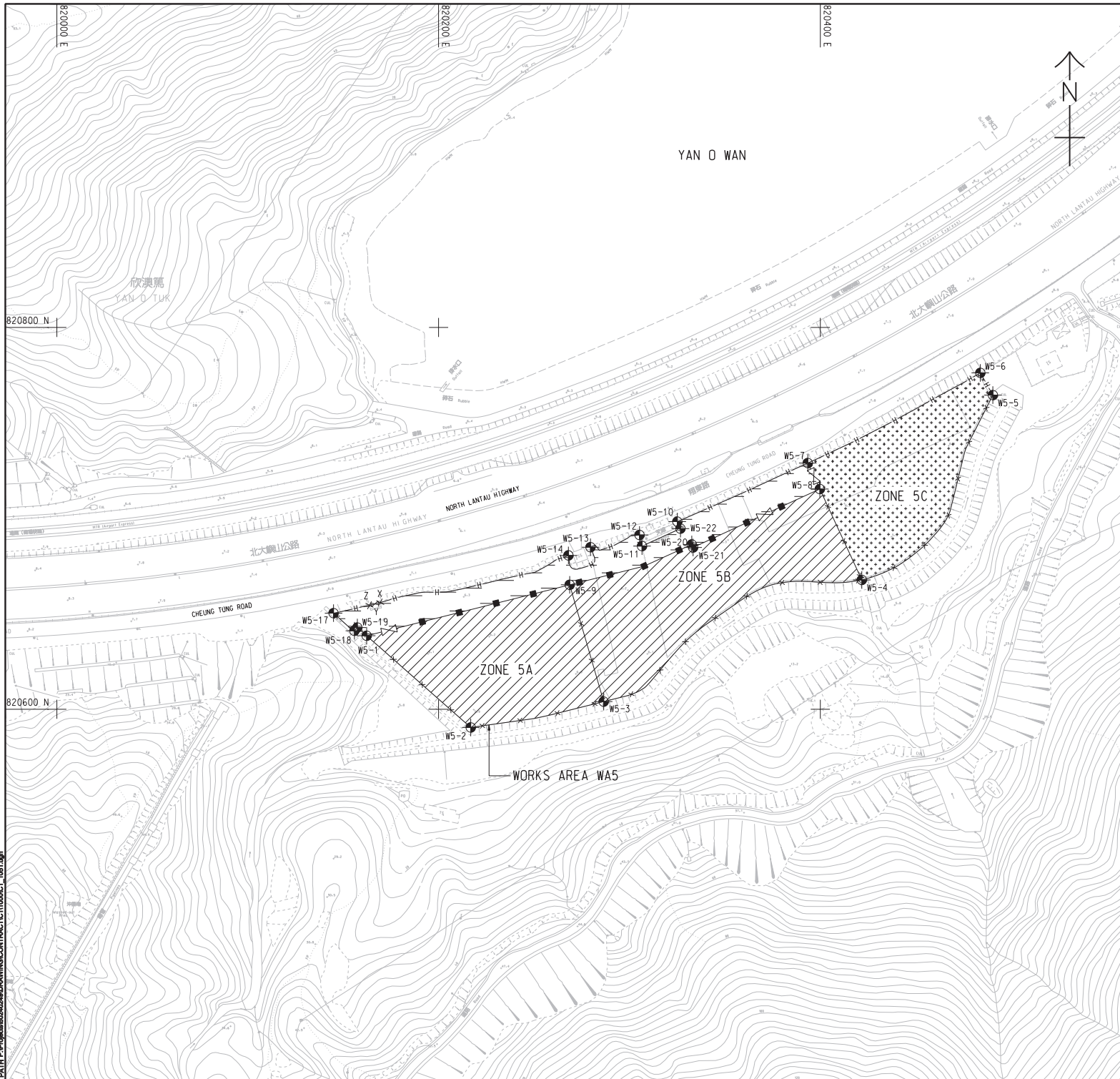


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


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A	SUBMISSION	RC	07/13					RL	07/13	 HIGHWAYS DEPARTMENT 港 港 港 港 港 港 港 港 港 港 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office	Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section	Figure 1.2g			
B	SUBMISSION	RC	07/13					Checked	Approved				Supervising Officer	Contractor	Originator
C	SUBMISSION	RC	09/13					DS	DOP						
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





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NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/CV/1000.
2. 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.
3. DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
4. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6110 AND H6111 FOR DETAILS OF HOARDING.
5. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
6. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
7. CHAIN LINK FENCE SHALL BE ERRECTED 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.
8. THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
9. NO STRUCTURES SHALL BE ERRECTED 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.
10. THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
11. THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARE-USED AMONG THE CONTRACTS OF TM-CLKL RELATED CONTRACTS. THE AREAS HATCHED WITH  ARE TENTATIVELY ALLOCATED FOR THE USE BY THIS CONTRACT.
12. 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 HANDLED OVER BY THE CONTRACTOR.
-  HOARDING AND GATE (TO BE ERRECTED AND MAINTAINED UNDER THIS CONTRACT)
-  CHAIN LINK FENCE AND GATE (TO BE ERRECTED AND MAINTAINED BY OTHERS)
-  CHAIN LINK FENCE AND GATE (TO BE ERRECTED 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
W5-22	820326.723	820694.608

AECOM

PROJECT
60240249

TUEN MUN -
CHEK LAP KOK LINK

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

CLIENT
HKS

路政署
HONG KONG
HONG KONG PROJECT MANAGEMENT OFFICE

CONSULTANT
AECOM

AECOM Asia Company Ltd.
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SUB-CONSULTANTS
AECOM

ISSUE/REVISION
001

DATE	DESCRIPTION	CHK.
OCT. 12	TENDER DRAWING	CWN
DATE	DESCRIPTION	CHK.

STATUS
001

SCALE
A1 1:1000

DIMENSION UNIT
METRES

KEY PLAN
001

Figure 1.2h

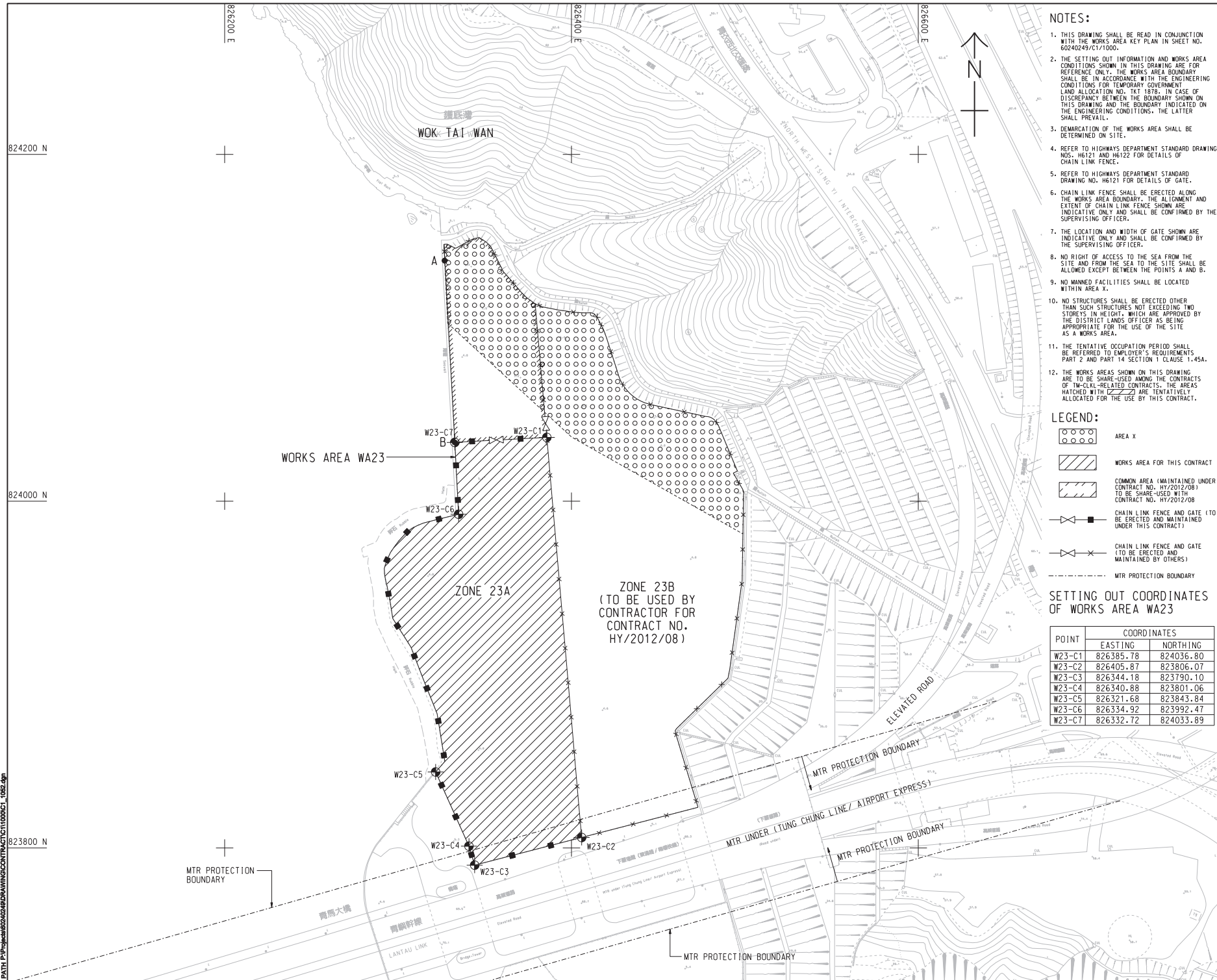
PROJECT NO.
60240249

CONTRACT NO.
HY2012/07


SHEET TITLE
WORKS AREA AND
HOARDING PLAN

SHEET NUMBER
60240249/C1/1051







SHEET 1 OF 2



NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/CT1000.
2. 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. TKT 1872. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
3. DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
4. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
5. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
6. 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.
7. THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
8. NO RIGHT OF ACCESS TO THE SEA FROM THE SITE AND FROM THE SEA TO THE SITE SHALL BE ALLOWED EXCEPT BETWEEN THE POINTS A AND B.
9. NO MANNED FACILITIES SHALL BE LOCATED WITHIN AREA X.
10. 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.
11. THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
12. THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARE-USED AMONG THE CONTRACTS OF TM-CLKL-RELATED CONTRACTS. THE AREAS HATCHED WITH  ARE TENTATIVELY ALLOCATED FOR THE USE BY THIS CONTRACT.

LEGEND:

-  AREA X
-  WORKS AREA FOR THIS CONTRACT
-  COMMON AREA (MAINTAINED UNDER CONTRACT NO. HY/2012/08) TO BE SHARE-USED WITH CONTRACT NO. HY/2012/08
-  CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)
-  CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED BY OTHERS)
-  MTR PROTECTION BOUNDARY

SETTING OUT COORDINATES OF WORKS AREA WA23

POINT	COORDINATES	
	EASTING	NORTHING
W23-C1	826385.78	824036.80
W23-C2	826405.87	823806.07
W23-C3	826344.18	823790.10
W23-C4	826340.88	823801.06
W23-C5	826321.68	823843.84
W23-C6	826334.92	823992.47
W23-C7	826332.72	824033.89

AECOM

PROJECT

**TUEN MUN - CHEK LAP KOK LINK
- SOUTHERN CONNECTION
VIADUCT SECTION**

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

CLIENT

HIGHWAYS DEPARTMENT
港務局大橋工程處
Hong Kong - Zhuhai - Hainan Bridge
Hong Kong Project Management Office

SUBSOLICITANT

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

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

STATUS

SCALE	DIMENSION UNIT
A1 1:1000	METRES

KEY PLAN

PROJECT NO.	CONTRACT NO.
60240249	HY/2012/07

Figure 1.2i

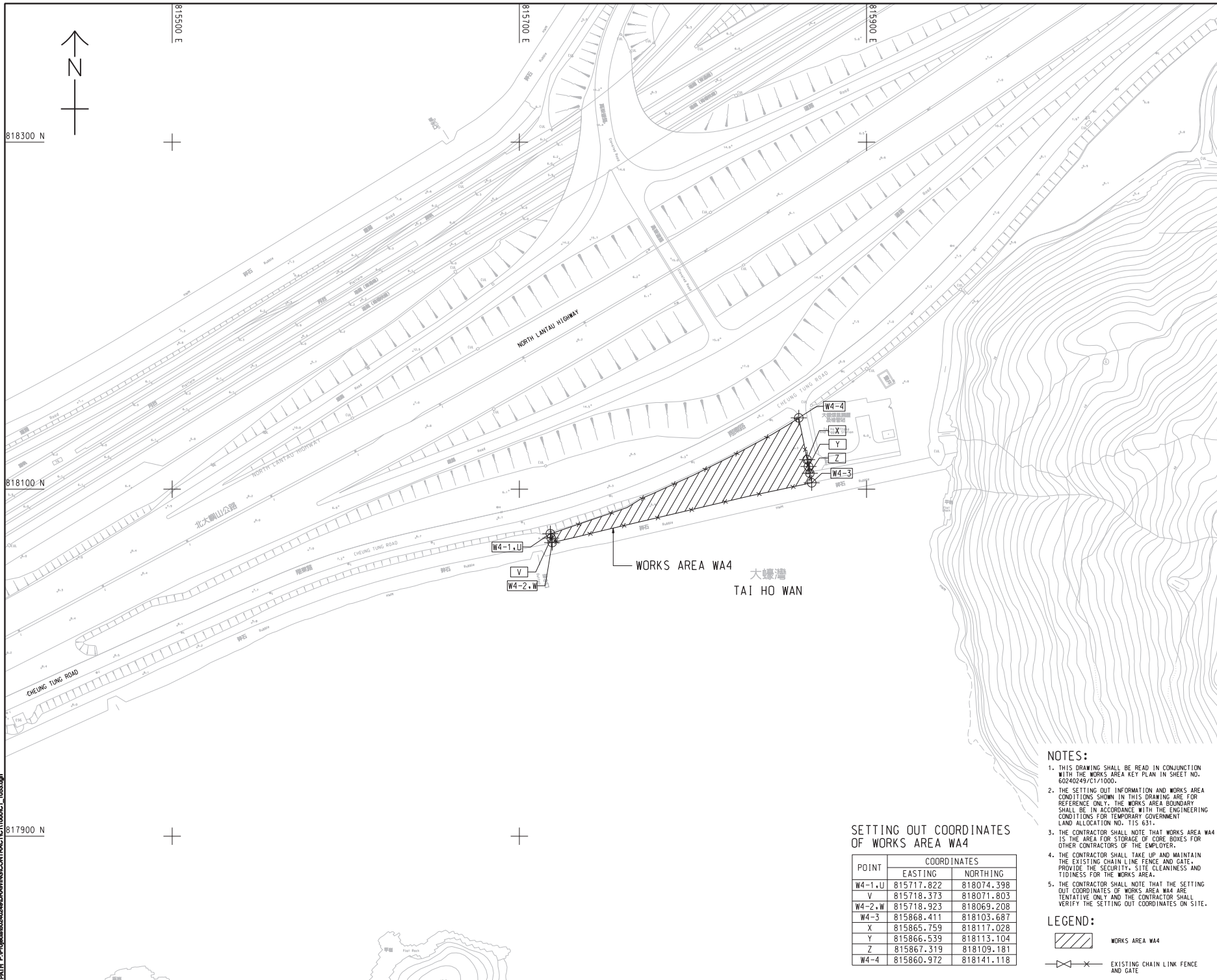
PROJECT NO.	CONTRACT NO.
60240249	HY/2012/07

SHEET TITLE
**WORKS AREA AND
HOARDING PLAN**

SHEET NUMBER

60240249/C1/1052

SHEET 2 OF 2



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
港務局
HONG KONG PROJECT MANAGEMENT OFFICE
CONSULTANT
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Figure 1.2j

ISSUE/REVISION	
NO.	DESCRIPTION
1	NOV. 12 TENDER ADDENDUM NO. 1

STATUS	
DATE	DESCRIPTION
NOV. 12	TENDER ADDENDUM NO. 1

SCALE	DIMENSION UNIT
A1 1:1000	METRES

KEY PLAN

PROJECT NO.	CONTRACT NO.
60240249	HY/2012/07

SHEET TITLE
WORKS AREA WA4

SHEET NUMBER
60240249/C/1/053

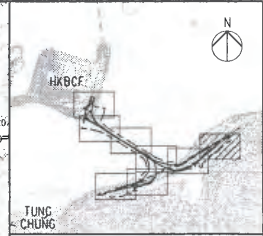
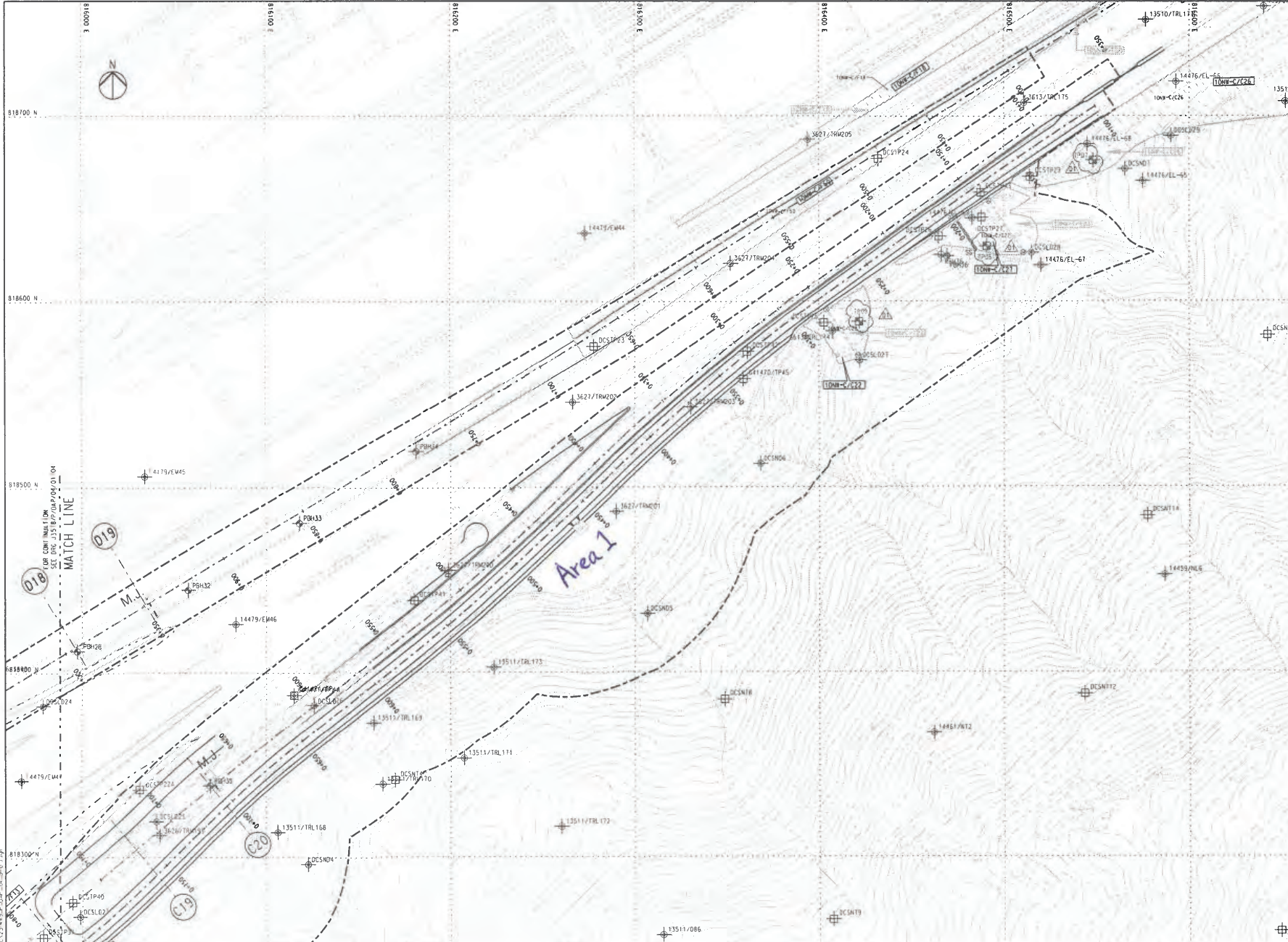
NOTES:

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C/1/000.
- 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:

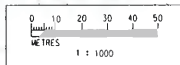
- WORKS AREA WA4
- EXISTING CHAIN LINK FENCE AND GATE




DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.



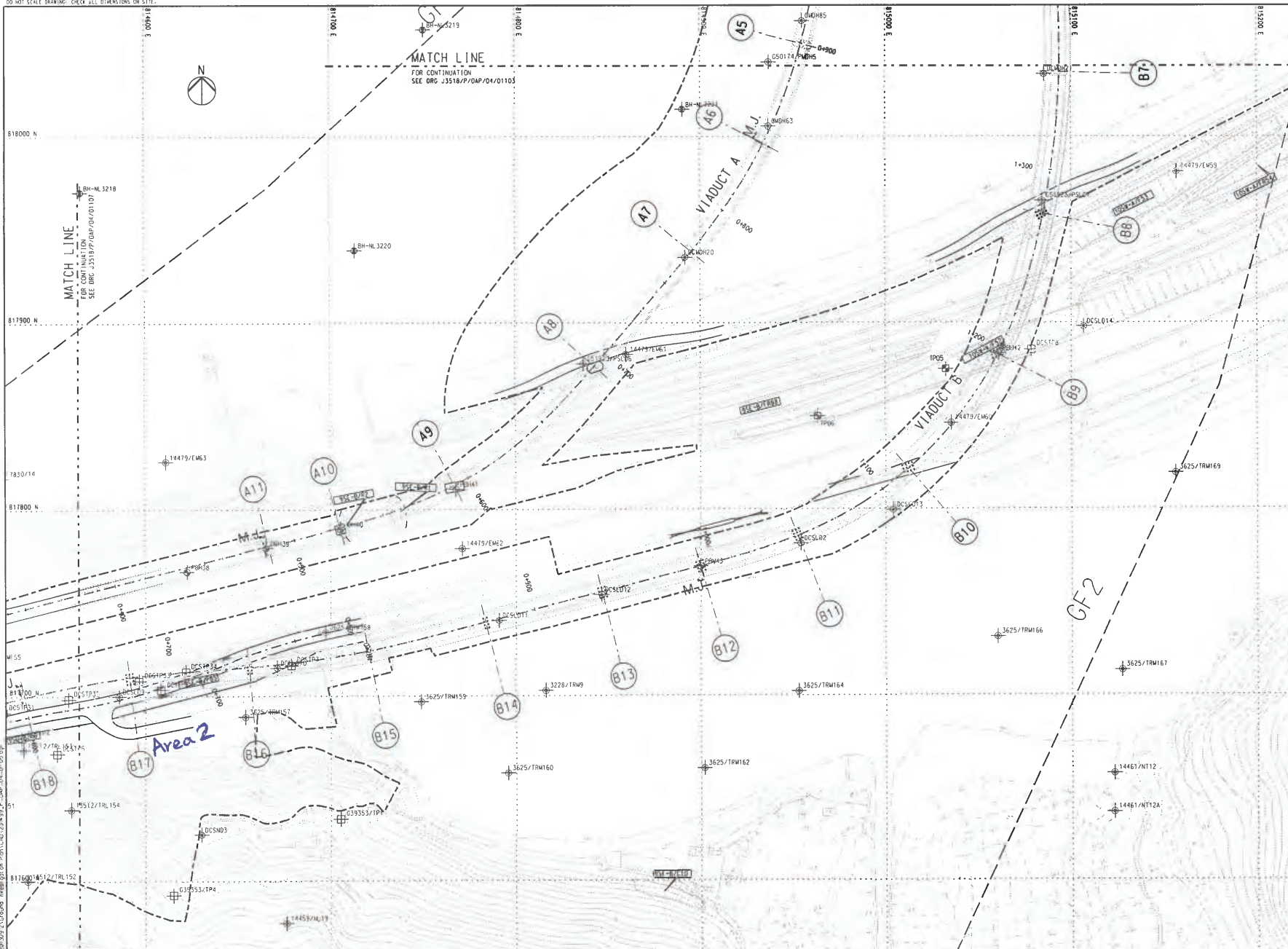
NOTES
 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- 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 NLB/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 :**
- PROPOSED BOREHOLE
 - PROPOSED TRIAL PIT
 - PROPOSED COREHOLE
 - PROPOSED SLOPE STRIPPING



Description				By	Date	Rev	Description				By	Date	Drawn	Date	Client	Project Title		Drawing title	
A	COMPLETION	RL	31/7/13									Drawn	Date	Client	Project Title		Drawing title		
B	COMPLETION	RL	27/7/13									RL	07/13	 路政署 HIGHWAYS DEPARTMENT 港珠澳大桥香港工程策理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office	Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section		Figure 1.2k		
C	COMPLETION	RL	26/7/13									Checked	Approved						
DS	FINAL INTERNAL REVIEW	RL	15/7/13									DS	DOP		Supervising Officer		Contractor	Originator	
															Scale		ARUP		
													1:1000 @ A1 / 1:2000 @ A3					Drawing no. J3518/P/OAP/04/01105 Rev. D1	

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.



TUNG CHUNG

KEY PLAN

NOTES

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

LEGEND

— SITE BOUNDARY


— GF1 FAULT

EXISTING G.I. STATIONS:

- BOREHOLE BY G.I.D DATA EXCLUDING VC
- BOREHOLE BY GCL CONTRACT HY/2012/04
- BOREHOLE BY GCL CONTRACT NLB/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:

- PROPOSED BOREHOLE
- PROPOSED TRIAL PIT
- PROPOSED COREHOLE
- PROPOSED SLOPE STRIPPING

Rev	Description	By	Date	Rev	Description	By	Date	Drawn	Date	Client	Project Title		Drawing Title	
A	COMPLETION	RL	07/13					RL	07/13	 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理局 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office	Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section		Figure 1.2I	
B	COMPLETION	RL	07/13					Checked	Approved					
C	COMPLETION	RL	09/13					DS	DOP	Supervising Officer	Contractor	Originator		
Scale: 1:1000 @ A1 / 1:2000 @ A3								ARUP		Gammon		ARUP	Drawing no. J3518/P/OAP/04/01106	Rev C

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 2019 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 2019

Marine-based Works

- Reinstatement of Seawall at Seafront

Land-based Works

- Slope work of Viaduct A;
- Landscaping works at NLH/CTR; and
- Landscaping works at HKBCF.

April 2019

Marine-based Works

- Reinstatement of Seawall at Seafront;

Land-based Works

- Slope work of Viaduct D;
- Landscaping works at NLH/CTR; and
- Landscaping works at HKBCF.

May 2019

Marine-based Works

- Reinstatement of Seawall at Seafront

Land-based Works

- Slope work of Viaduct D; and
- Landscaping works at HKBCF.

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*.

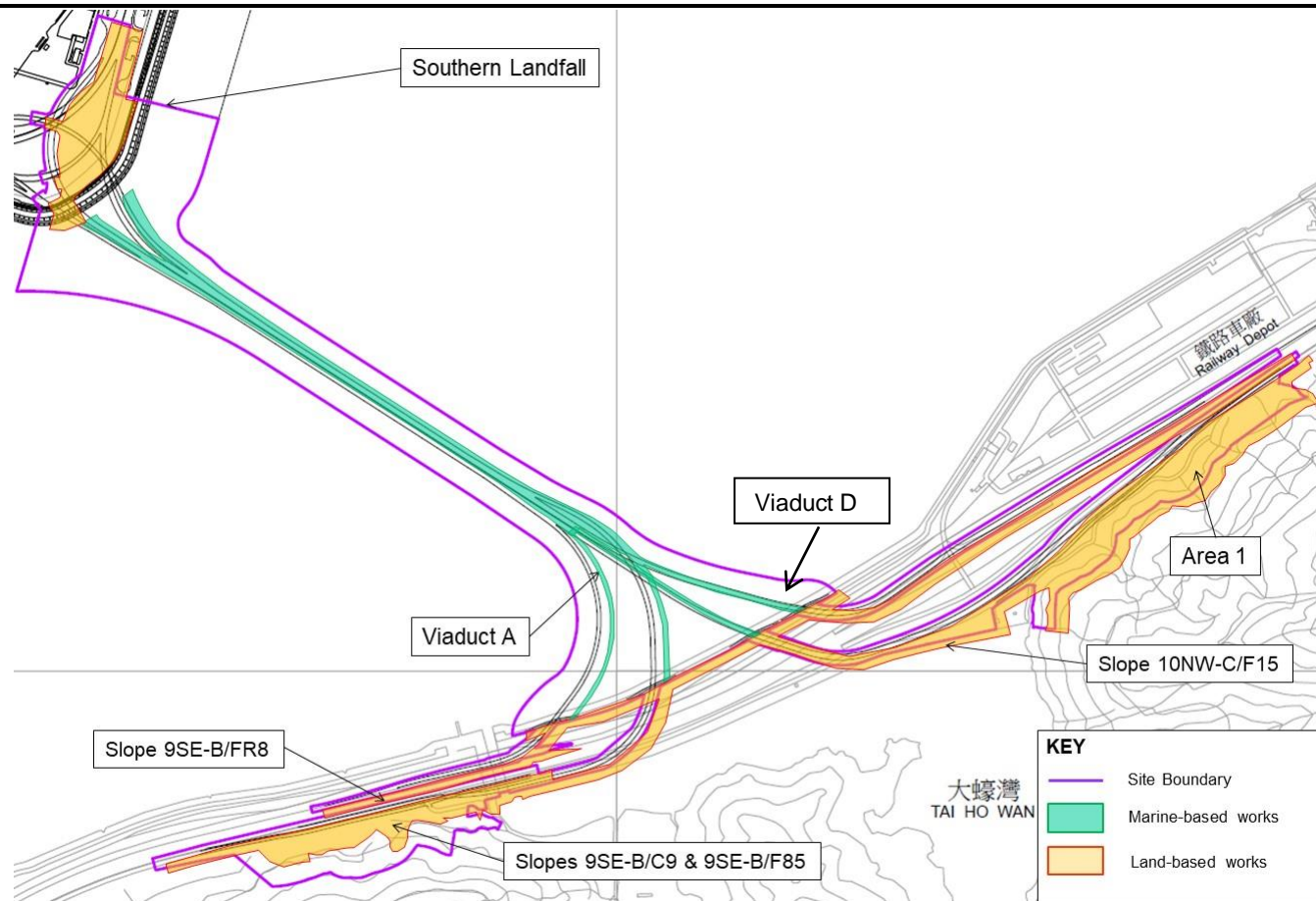
The environmental mitigation measures implementation schedule is presented in *Appendix C*.

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.

Figure 1.3 Locations of Construction Activities in the Reporting Period



Key

- Air Sensitive Receiver
- Noise Sensitive Receiver
- Water Sensitive Receiver
- ▲ Site of Special Scientific Interest (SSSI)
- Known Coral Communities
- Site Boundary

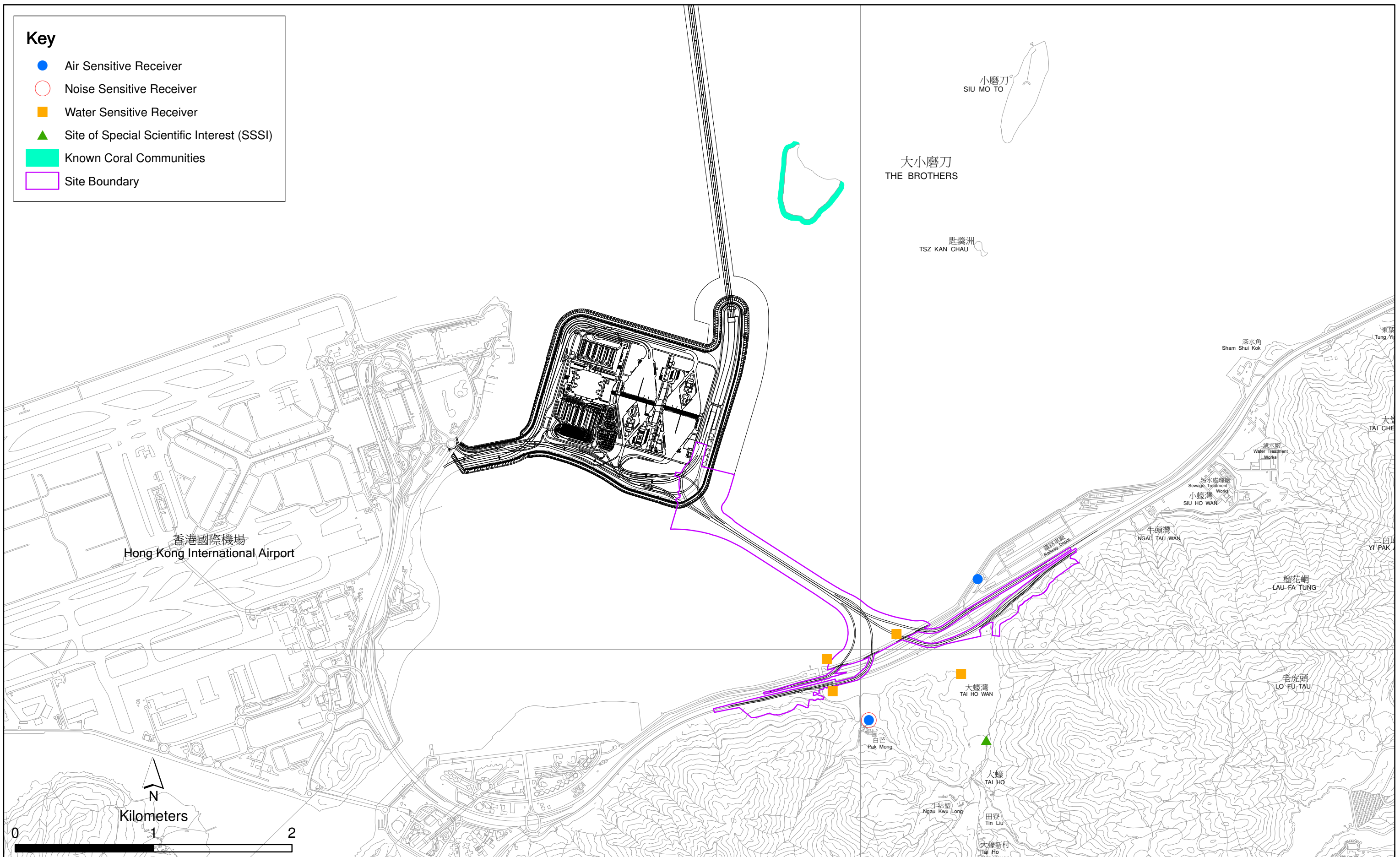


Figure 1.4

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

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Date: 18/5/2015

Environmental
Resources
Management



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 HZMB Projects during October 2011 included the two monitoring stations ASR9A and ASR9C for this Project. Thus, the baseline monitoring results and Action/Limit Level presented in HZMB 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 HVSs 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.

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	6, 12, 18, 21, 27 March 2019	Area 4	On ground at the works area, Area 4	• 1-hour Total Suspended Particulates (1-hour TSP, µg/m ³), 3 times per day every 6 days
ASR9	2, 8, 11, 17, 23 and 29 April 2019 2, 8, 14, 20, 23 and 29 May 2019	MTR Depot	On the ground nearby MTR Depot entrance	• 24-hour Total Suspended Particulates (24-hour TSP, µg/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 *Sixty-fifth* to *Sixty-seventh* *Monthly EM&A Reports*.

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 2019	ASR 8A	59	18-109	394	500
	ASR 9	65	29-139	393	500
April 2019	ASR 8A	48	27-107	394	500
	ASR 9	65	33-133	393	500
May 2019	ASR 8A	63	16-129	394	500
	ASR 9	83	42-220	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 2019	ASR 8A	41	23-55	178	260
	ASR 9	47	27-62	178	260
April 2019	ASR 8A	28	18-43	178	260
	ASR 9	58	23-107	178	260
May 2019	ASR 8A	40	16-55	178	260
	ASR 9	50	25-73	178	260

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

All 1-hour and 24-hour TSP results were below the Action and Limit Levels at all monitoring locations in this reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in *Appendix J*.

2.2 NOISE MONITORING

The baseline noise monitoring undertaken by the HZMB Projects during the period of 18 October to 1 November 2011 included the monitoring station NSR1 for this Project. Thus, the baseline monitoring results and Action/Limit Level presented in *HZMB 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.

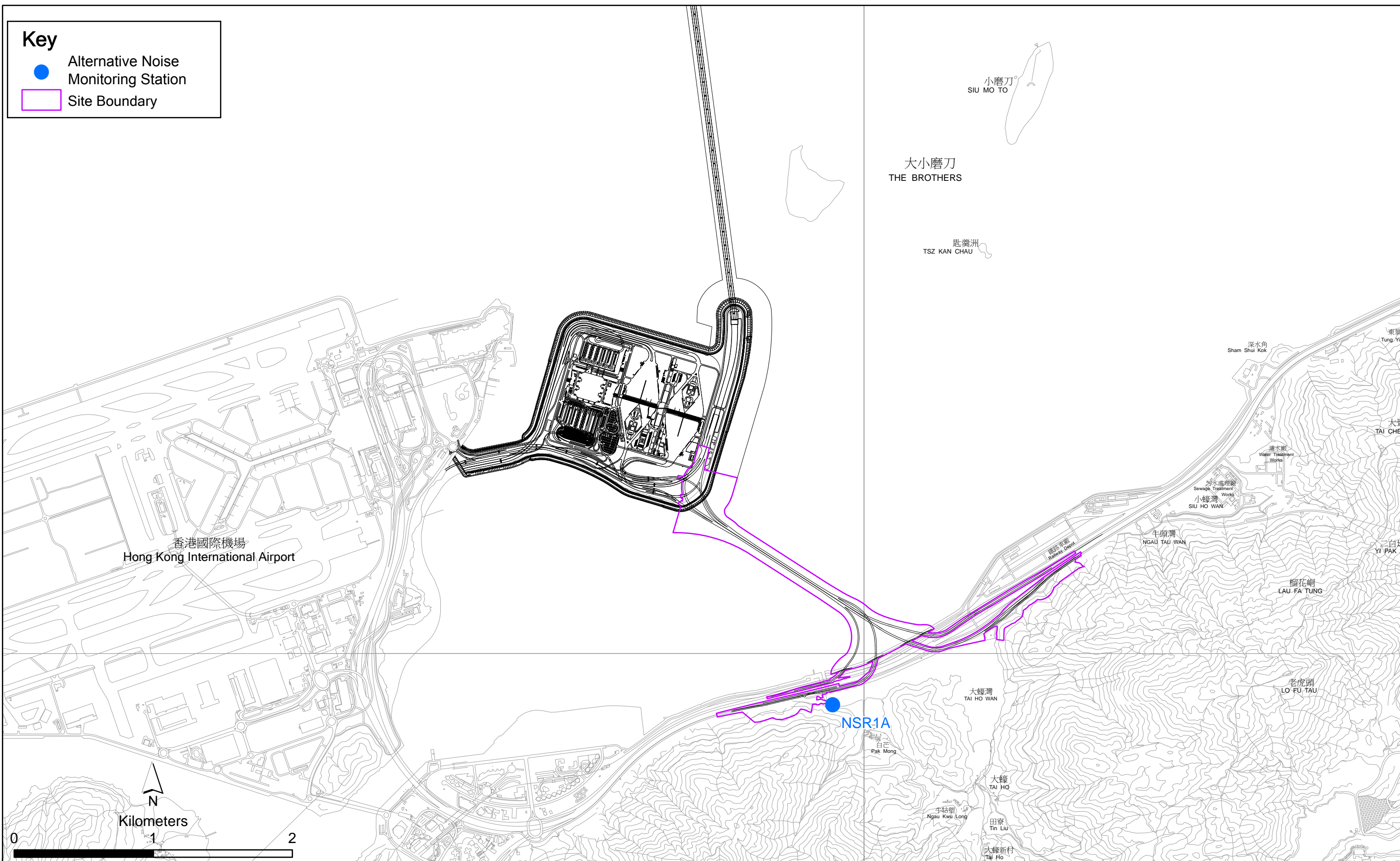


Figure 2.2

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	6, 12, 18, 21, 27 March 2019 2, 8, 11, 17, 23 and 29 April 2019 2, 8, 14, 20, 23 and 29 May 2019	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 Manual was relocated to NSR1A.			

Table 2.6 *Noise Monitoring Equipment*

Equipment	Brand and Model
Integrated Sound Level Meter	Rion NL-52
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 schedule for construction noise monitoring in the reporting period is 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 *Sixty-fifth to Sixty-seventh Monthly EM&A Reports*.

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 2019	64	63-65	75
April 2019	63	62-64	75
May 2019	64	62-66	75

A total of 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.

All noise monitoring results were below the Action and Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in *Appendix J*.

2.3 WATER QUALITY MONITORING

The baseline water quality monitoring undertaken by the HZMB Projects between 6 and 31 October 2011 included all monitoring stations except SR4a for the Project. Thus, the baseline monitoring results except for station SR4a and Action/Limit Level presented in HZMB 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.

Due to Three-Runway System (3RS) marine construction works, an alternative water quality control station CS(Mf)3(N) was proposed to replace control station CS(Mf)3. The *Proposal of Alternative Water Quality Monitoring Station* ⁽²⁾ was submitted to EPD on 31 March 2017 and granted on 6 April 2017. Water quality monitoring at CS(Mf)3(N) is undertaken since 2 May 2017. The locations of the monitoring stations under the Contract are shown in *Figure 2.3* and *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) • Dissolved Oxygen (DO) (mg/L and % of saturation) • Suspended Solid (SS) (mg/L) 	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	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			
IS8	Impact Station(Close to HKBCF construction site)	814251	818412			

⁽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.

⁽²⁾ The Proposal of Alternative Water Quality Monitoring Station with the verification letter from IEC was submitted to EPD on 31 March 2017, and subsequently replied with no objection on 6 April 2017.

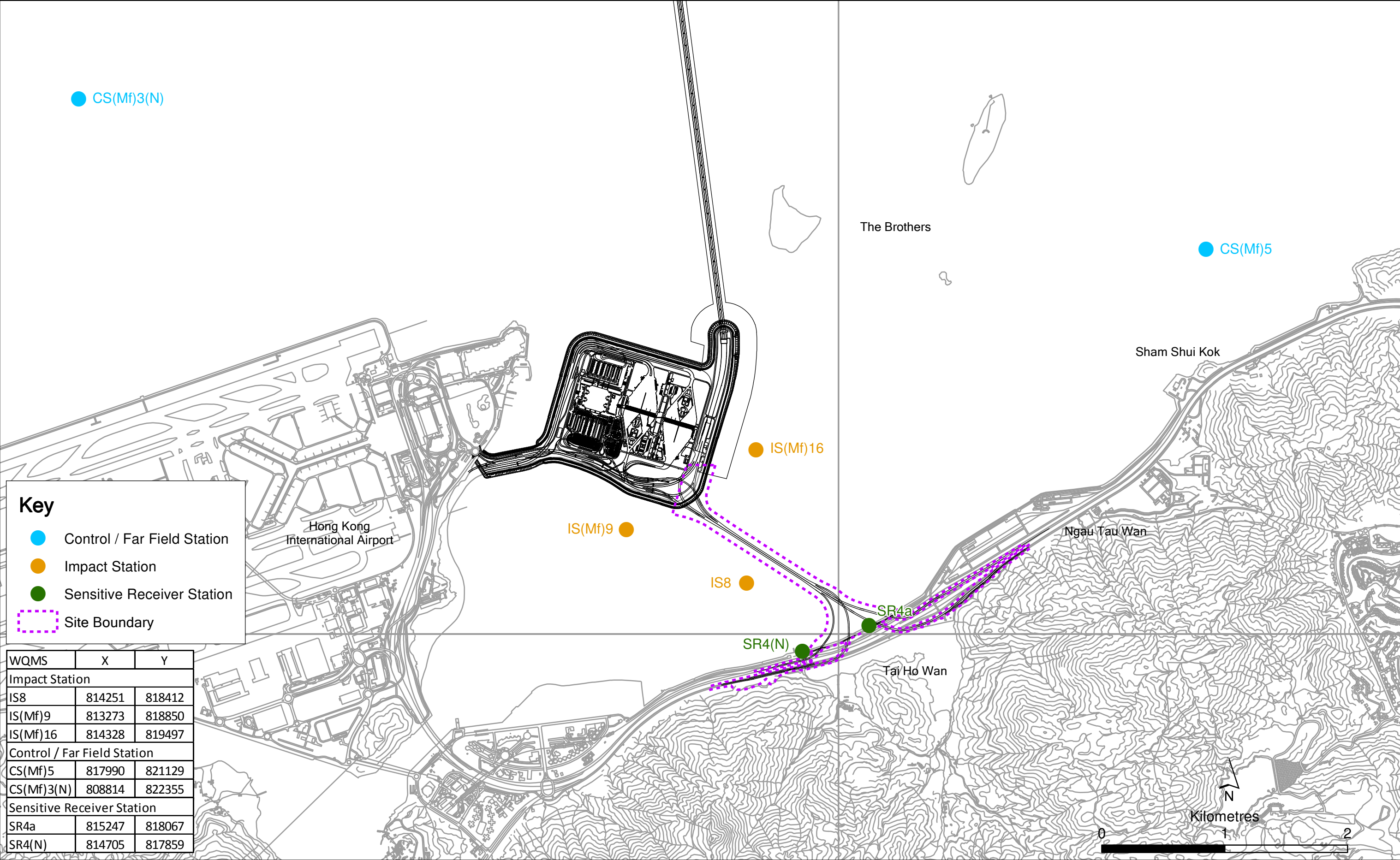


Figure 2.3
Locations of Water Quality Monitoring Stations

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
SR4(N)	Sensitive receiver (Tai Ho Inlet)	814705	817859		depth less than 6m, mid-depth may be omitted.	
SR4a	Sensitive receiver	815247	818067			
CS(Mf)3(N)	Control Station	808814	822355			
CS(Mf)5	Control Station	817990	821129			

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.

Water Quality Monitoring Station CS(Mf)3 was relocated to CS(Mf)3(N) since 2 May 2017.

Water Quality Monitoring Station SR4 was relocated to SR4(N) since 2 March 2018.

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
Multi-parameters (Dissolved Oxygen, Salinity, Turbidity, Temperature, pH)	YSI ProDSS
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4
Water Sampler	WildCo Vertical Alpha Bottles 1120-2.2L / 1120-3.2L Aquatic Research Instrument Vertical/Horizontal Point Water Sampler 2.2L / 3.0L

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*. Water quality monitoring on 5 April and 1 May 2019 was cancelled due to site closure during holiday.

2.3.4 Results and Observations

In this reporting period, a total of 38 monitoring events for impact water quality monitoring were conducted at 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 *Sixty-fifth to Sixty-seventh Monthly EM&A Reports*.

Two (2) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting month. The exceedances were considered not related to this Contract upon further investigation and the investigation report is presented in *Appendix L*. No actions was required to be undertaken in accordance with the Event Action Plan as presented in *Appendix J*.

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 Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) from the Contract. 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 2.10 summarizes the equipment used for the impact dolphin monitoring.

Table 2.10 *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 2.11* below ⁽¹⁾.

(1) Proposal on the changes of transect lines for dolphin monitoring was approved by EPD on 28 July 2017 (Reference number: (19) in EP2/G/A/129 Pt. 8).

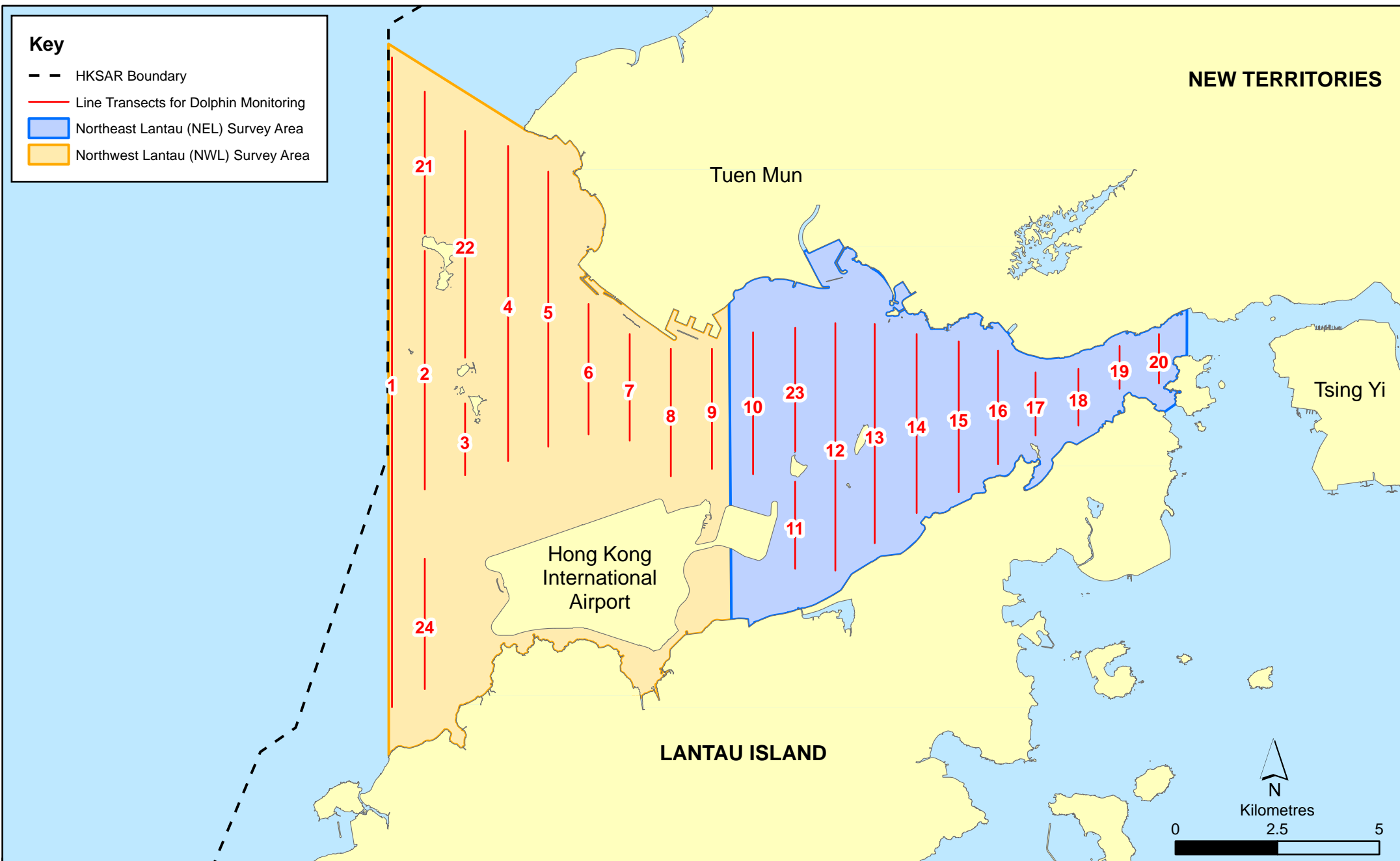


Figure 2.4

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

Table 2.11 Impact Dolphin Monitoring Line Transect Co-ordinates

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	815456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805476	820800	14	Start Point	817537	820220
2	End Point	805476	826654	14	End Point	817537	824613
3	Start Point	806464	821150	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	821500	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	821850	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	822150	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	822000*	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	821123	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	821303	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	821176	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807	24	Start Point	805476	815900
12	End Point	815542	824882	24	End Point	805476	819100

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 794.91 km of survey effort was collected, with 96.2% 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,

293.34 km and 501.57 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 572.37 km, while the effort on secondary lines was 222.54 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 2019, a total of five (5) groups of eleven (11) Chinese White Dolphins were sighted. All five (5) dolphin sightings were made during on-effort, while four (4) on-effort dolphin sightings were made on primary lines. In this quarterly period, all dolphin groups were sighted in NWL, no sighting of dolphin was sighted in NEL. Summary table of the dolphin sightings is shown in *Appendix II of 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 2.12 and 2.13*.

Table 2.12 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: 4th / 11th Mar 2019	0.0	0.0
	Set 2: 13th / 18th Mar 2019	0.0	0.0
	Set 3: 10th / 15th Apr 2019	0.0	0.0
	Set 4: 23rd / 25th Apr 2019	0.0	0.0
	Set 5: 2nd / 7th May 2019	0.0	0.0
	Set 6: 21st / 23rd May 2019	0.0	0.0
NWL	Set 1: 4th / 11th Mar 2019	0.00	0.00
	Set 2: 13th / 18th Mar 2019	3.41	6.81
	Set 3: 10th / 15th Apr 2019	0.00	0.00
	Set 4: 23rd / 25th Apr 2019	1.64	3.27
	Set 5: 2nd / 7th May 2019	1.71	5.13
	Set 6: 21st / 23rd May 2019	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 2.13 *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 2019	September - November 2011	March - May 2019	September - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	1.13 ± 1.39	9.85 ± 5.85	2.54 ± 3.00	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 two (2) to three (3) individuals per group in North Lantau region during March to May 2019. 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 2.14*.

Table 2.14 *Comparison of Quarterly Average Group Sizes*

	Average Dolphin Group Size	
	March to May 2019	September - November 2011
Overall	2.20 ± 0.45 (n = 5)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.20 ± 0.45 (n = 5)	3.92 ± 3.40 (n = 49)

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March to May 2019.

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 TM-CLKL Southern Connection Viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in both NEL and NWL, 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. No sighting of Chinese White Dolphin was recorded in the monitoring period during the exclusion zone monitoring.

Passive Acoustic Monitoring (PAM) was decommissioned in this reporting period as no marine piling works was carried out outside the daylight hours since September 2015. Daytime marine mammal exclusion zone was still in effect to cater for temporary staging installation and uninstallation works.

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 6, 13, 20 and 28 March, 3, 9, 17 and 25 April and 2, 8, 15, 22 and 30 May 2019.

Key observations during the site inspections in this reporting period are summarized in *Table 2.15*.

Table 2.15 Specific Observations Identified during the Weekly Site Inspection in this Reporting Period

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
6 March 2019	Gate 4A <ul style="list-style-type: none"> Chemical containers were observed without drip tray. General refuse were observed on the ground. Felled tree were observed on the slope. 	WA2, WA4 <ul style="list-style-type: none"> The Contractor was reminded to place chemical containers in drip tray. The Contractor was reminded to dispose general refuse in capped rubbish bin. The Contractor was reminded to remove felled trees on the slope.
13 March 2019	Seafront <ul style="list-style-type: none"> Chemicals were observed without drip tray. Accumulated general refuse were observed. 	Seafront <ul style="list-style-type: none"> The Contractor was reminded to place chemicals in drip tray. The Contractor was reminded to clear accumulated general refuse.
20 March 2019	Portion A <ul style="list-style-type: none"> Chemical containers were observed without drip tray. Stagnant water in the drip tray should be discharged. 	Portion A <ul style="list-style-type: none"> The Contractor was reminded to place chemical containers in drip tray. The Contractor was reminded to discharge stagnant water in drip tray.
28 March 2019	Portion A <ul style="list-style-type: none"> Mud was observed in the drainage. Chemical should be stored in proper containers and placed in drip tray. Accumulated waste should be cleared. 	Portion A <ul style="list-style-type: none"> The Contractor was reminded to clear the mud in the drainage. The Contractor was reminded to place chemicals in proper containers and placed the containers in drip tray. The Contractor was reminded to clear accumulated waste.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
3 April 2019	Seafront <ul style="list-style-type: none"> Accumulated general refuse was observed. Viaduct D <ul style="list-style-type: none"> Chemical containers without drip tray were observed. 	Seafront <ul style="list-style-type: none"> The Contractor was reminded to clear general refuse. Viaduct D <ul style="list-style-type: none"> The Contractor was reminded to placed chemical containers in drip tray.
9 April 2019	BCF <ul style="list-style-type: none"> Oil stain was observed from the crane lorry. 	BCF <ul style="list-style-type: none"> The Contractor was reminded to clear oil stain.
17 April 2019	BCF <ul style="list-style-type: none"> Accumulated waste should be cleared. Chemical drum should be placed in drip tray. 	BCF <ul style="list-style-type: none"> The Contractor was reminded to clear accumulated waste. The Contractor was reminded to place chemical drum in drip tray.
25 April 2019	BCF <ul style="list-style-type: none"> Chemical drum should be placed in drip tray. 	BCF <ul style="list-style-type: none"> The Contractor was reminded to place chemical drum in drip tray.
2 May 2019	Seafront <ul style="list-style-type: none"> Mud was observed in the U-channel. The road is dusty when car pass by. Viaduct D <ul style="list-style-type: none"> General refuse was observed on the ground. 	Seafront <ul style="list-style-type: none"> The Contractor was reminded to clear the mud inside the U-channel to prevent blockage. The Contractor was reminded to apply water on the road to control dust on the ground. Viaduct D <ul style="list-style-type: none"> The Contractor was reminded to clear general refuse off the ground.
8 May 2019	BCF (Portion A) <ul style="list-style-type: none"> Chemical container should be placed in drip tray. Seafront <ul style="list-style-type: none"> The silt curtain should be properly extended. 	BCF (Portion A) <ul style="list-style-type: none"> The Contractor was reminded to place chemical container in drip tray. Seafront <ul style="list-style-type: none"> The Contractor was reminded to properly extend the silt curtain.
15 May 2019	WA4 <ul style="list-style-type: none"> Mud was observed in the U-channel. General refuse was observed on the ground. 	WA4 <ul style="list-style-type: none"> The Contractor was reminded to clear the U-channel. The Contractor was reminded to clear general refuse on the ground.
22 May 2019	BCF <ul style="list-style-type: none"> Chemical container was observed without drip tray. Accumulated waste was observed. 	BCF <ul style="list-style-type: none"> The Contractor was reminded to place chemical container in drip tray. The Contractor was reminded to clear accumulated waste.
30 May 2019	Seafront <ul style="list-style-type: none"> Stagnant water was observed in drip tray. Chemical container should be placed in drip tray. 	Seafront <ul style="list-style-type: none"> The Contractor was reminded to discharge stagnant water in drip tray. The Contractor was reminded to place chemical container in drip tray.

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), recyclable materials, chemical waste and marine sediment. 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 2.16*.

Table 2.16 Quantities of Different Waste Generated in the Reporting Period

Month/ Year	Inert C&D Materials ^(a) (m ³)	Imported Fill (m ³)	Inert Constructio n Waste Re- used (m ³)	Non-inert Constructio n Waste ^(b) (kg)	Recyclable Materials ^(c) (kg)	Chemical Wastes (kg)	Marine Sediment (m ³)		
							Category L	Category M (M _p & M _f)	Category H
March 2019	4,491	0	3,627	71,750	0	0	0	0	0
April 2019	9,363	0	8,979	56,470	9,604	0	0	0	0
May 2019	5,334	0	5,258	65,810	0	0	0	0	0

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, felled trees 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 2.17* below.

Table 2.17 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-353/2009/K	11-Apr-16	N/A	HyD	Hong Kong Boundary Crossing Facilities
Environmental Permit	EP-354/2009/D	13-Mar-15	N/A	HyD	Tuen Mun- Chek Lap Kok Link
Construction Dust Notification	361571	05-Jul-13	N/A	GCL	
Construction Dust Notification	362093	17-Jul-13	N/A	GCL	For Area 23
Chemical Waste Registration	5213-951-G2380-17	12-Jun-14	N/A	GCL	Viaducts A, B, C, D & E
Chemical Waste Registration	5213-961-G2380-13	10-Oct-13	N/A	GCL	Chemical waste produced in Contract No. HY/2012/07 (Area 1 adjacent to Cheng Tung Road, Siu Ho Wan)
Chemical Waste Registration	5213-961-G2380-14	10-Oct-13	N/A	GCL	Chemical waste produced in Contract No. HY/2012/07 (Area 2 adjacent to Cheung Tung Road, Pak Mong Village)
Chemical Waste Registration	5213-974-G2588-03	04-Nov-13	N/A	GCL	Chemical waste produced in Contract No. HY/2012/07 (WA5 adjacent to Cheung Tung Road, Yam O)
Construction Waste Disposal Account	7017735	10-Jul-13	N/A	GCL	-
Construction Waste Disposal Account	7019470	03-Mar-14	N/A	GCL	Vessel CHIT Account
Waste Water Discharge License	WT00019017-2014	13-May-14	31-May-19	GCL	Discharge for marine portion
Waste Water Discharge License	WT00019018-2014	13-May-14	31-May-19	GCL	Discharge for land portion
Construction Noise Permit for night works and works in general holidays	GW-RW0012-19	23 Jan 2019	13 Jun 2019	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RS0149-19	19 February 2019	15 July 2019	GCL	Broad Permit for Whole Site Areas

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

No Action or Limit Level exceedance for 1-hour TSP and 24-hour TSP for air quality and construction noise monitoring was recorded during the reporting period.

Two (2) Action Level exceedances of Suspended Solids (SS) were record for water quality impact monitoring in the reporting period.

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 (*Table 2.18*). The monitoring results showed that the quarterly means of depth-averaged SS at all sampling stations during both mid-ebb and mid-flood tides were well below the corresponding ambient means. The depth-averaged SS results suggest that the Project did not cause unacceptable impact on water quality in the reporting period.

Table 2.18 *Comparison between Quarterly Mean and Ambient Mean Values of Depth-averaged Suspended Solids*

Station	Baseline Mean		Ambient Mean ^(a)		Quarterly Mean (March to May 2019)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS(Mf)3(N)	9.2	12.8	12.0	16.6	5.0	5.6
CS(Mf)5	9.2	11.5	11.9	14.9	4.4	4.2
SR4(N)	10.3	12.3	13.4	16.0	6.3	5.8
SR4a	9.1	9.8	11.9	12.7	5.7	4.8
IS8	11.3	13.5	14.6	17.6	7.4	5.3
IS(Mf)9	10.9	14.3	14.2	18.5	5.3	5.7
IS(Mf)16	11.4	10.3	14.8	13.4	5.9	5.3

Notes:

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

(b) Water Quality Monitoring Station CS(Mf)3 was relocated to CS(Mf)3(N) since 2 May 2017.

(c) Water Quality Monitoring Station SR4 was relocated to SR4(N) since 2 March 2018.

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, no unacceptable impact was associated with 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*.

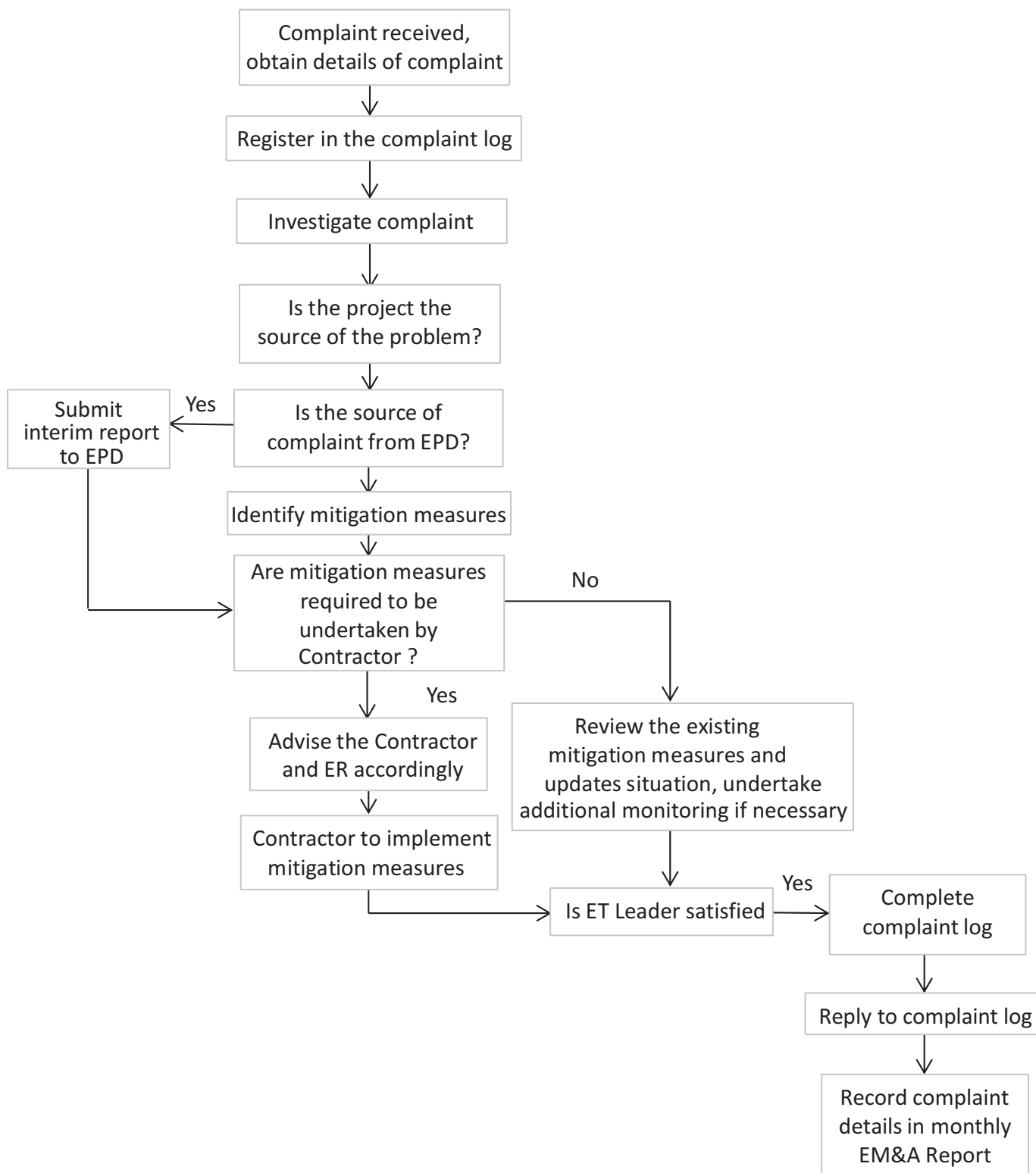


Figure 2.5

Environmental Complaint Handling Procedure

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DATE: 06/12/2013

Environmental
Resources
Management



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 2019

Marine-based Works

- Reinstatement of Seawall at Seafront.

Land-based Works

- At-grade works at HKBCF; and
- Landscaping softwork at BCF.

July 2019

Land-based Works

- Reinstatement of seawall at seafront.

August 2019

There are no major works to be undertaken in the next monitoring period of August 2019.

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

The Twenty-second Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 March to 31 May 2019, in accordance with the Updated EM&A Manual and the requirements of the *Environmental Permits (EP-354/2009/D and EP-353/2009/K)*.

Neither Action Level nor Limit Level exceedances were observed for 1-hour and 24-hour TSP level and noise impact monitoring in this reporting period.

Two (2) Action Level exceedances of Suspended Solids (SS) were record for water quality impact monitoring in the reporting period.

A total of five (5) groups of eleven (11) Chinese White Dolphins were sighted during the six sets of survey from March to May 2019. One (1) Limit Level exceedance was recorded for the quarterly dolphin monitoring data between March to May 2019, 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.

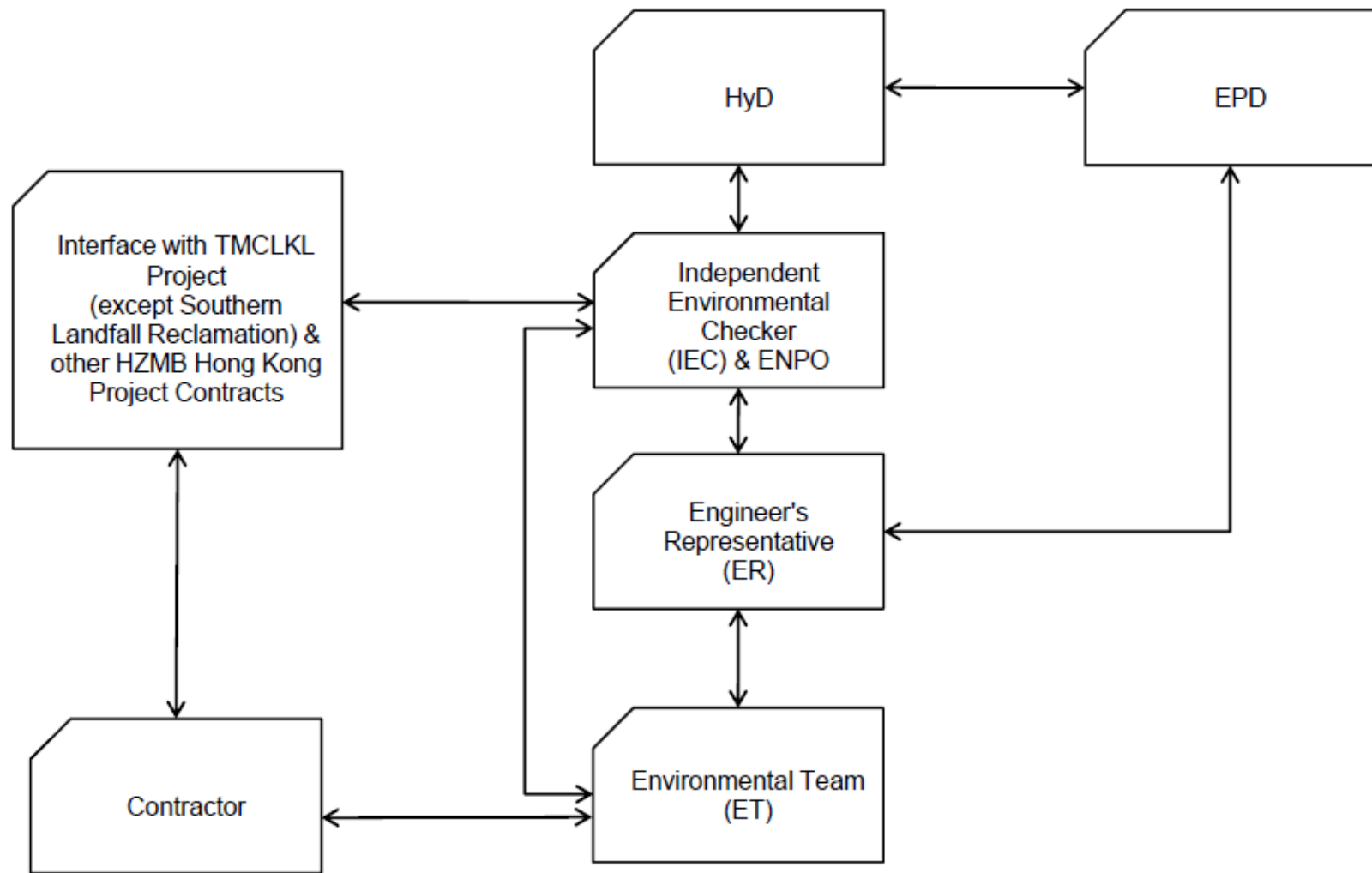
Environmental site inspection was carried out 13 times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

There was no complaint, notification of summons or successful prosecution recorded in 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

Three-Month Rolling Construction Programme

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2019																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2019																							
										May				June				July				August				mber							
										29	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12		19	26	02				
VE23-C7850	Viaduct E2 - maintenance period completion	0		0	19-Jun-19*		18-Jun-19	0	0%																								
At-Grade Works & Miscellaneous Works																																	
At-Grade Works Along North Lantau Highway																																	
Slope Works Near Viaduct A																																	
Slope 9SE-B/FR8																																	
GFXX560	9SE-B/FR8 - Slopeworks	85	11-Dec-18 A	0	26-Mar-19 A				100%																								
At-Grade Works at Southern Landfall																																	
HKBCF Area																																	
General																																	
RW30018	South Landfall - Irrigation Pipe (Portion B)	60	18-Feb-19 A	0	17-May-19 A				100%																								
RW30100	South Landfall - New proposed maintenance access	90	21-Mar-19 A	90	04-Sep-19	05-Jun-18	19-Sep-18	-283	50%																								
Landscaping Works & Establishment Works																																	
Landscape Softworks																																	
General																																	
LW00010	Landscaping Works at NLH/CTR (Slope Areas)	120	21-Dec-18 A	0	21-May-19 A				100%																								
LW00020	Irrigation System for Soft Landscape Works	100	13-Feb-19 A	0	17-May-19 A				100%																								

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-Chep 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		n/a
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		n/a

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		n/a
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		n/a
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		n/a
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		n/a
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		n/a
	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		n/a
	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		n/a
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		n/a
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		Completed in October 2014
7.13	6.5	Undertaken gabion wall works in Stream NL1 in the dry season	North Lantau slope works/ dry	Contractor	TMEIA		Y		n/a

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		✓ Tree transplanted as 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		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
10.9	7.6	Recycle/Reuse all felled trees and vegetation, e.g. mulching (CM9)	All areas/ detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		n/a No felled trees or vegetation suitable for recycle
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		✓
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	All areas/ detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		(OM4)							HyD/LCSD
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes	All areas/ detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be 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	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	
		where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	construction period						
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	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	
		materials should avoid over-ordering and wastage.							
12.6	8.1	The Contractor should recycle as many C&D 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.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
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; 	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	
		<ul style="list-style-type: none"> - Adequate ventilation; - Sufficiently covered to prevent rainfall entering (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 hard standing;	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	Site Offices/	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	
		paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	throughout construction period						
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>	<u>Surface and Middle</u>
	5.0 mg/L	4.2 mg/L
	<u>Bottom</u>	<u>Bottom</u>
	4.7 mg/L	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 10 mg/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 2019)**

Alternative Noise Monitoring at Pak Mong Village Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Mar	2-Mar
3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar
			Noise Impact Monitoring			
10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	16-Mar
		Noise Impact Monitoring				
17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar
	Noise Impact Monitoring			Noise Impact Monitoring		
24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar
			Noise Impact Monitoring			
31-Mar						

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 31 March 2019)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Mar	2-Mar
3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar
			1-hr TSP Monitoring 24-hr TSP Monitoring			
10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	16-Mar
		1-hr TSP Monitoring 24-hr TSP Monitoring				
17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar
			1-hr TSP Monitoring 24-hr TSP Monitoring			
31-Mar						

HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (March 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1/Mar	2/Mar
					ebb tide 20:44 - 0:14 flood tide 13:12 - 16:42	
3/Mar	4/Mar	5/Mar	6/Mar	7/Mar	8/Mar	9/Mar
	ebb tide 10:43 - 14:13 flood tide 5:19 - 8:49		ebb tide 11:39 - 15:09 flood tide 6:06 - 9:36		ebb tide 12:29 - 15:59 flood tide 6:42 - 10:12	
10/Mar	11/Mar	12/Mar	13/Mar	14/Mar	15/Mar	16/Mar
	ebb tide 14:03 - 17:33 flood tide 7:44 - 11:14		ebb tide 15:37 - 19:07 flood tide 8:41 - 12:11		ebb tide 18:00 - 21:30 flood tide 10:11 - 13:41	
17/Mar	18/Mar	19/Mar	20/Mar	21/Mar	22/Mar	23/Mar
	ebb tide 9:37 - 13:07 flood tide 14:48 - 18:18		ebb tide 11:02 - 14:32 flood tide 16:41 - 19:11		ebb tide 12:16 - 15:46 flood tide 7:11 - 9:52	
24/Mar	25/Mar	26/Mar	27/Mar	28/Mar	29/Mar	30/Mar
	ebb tide 14:16 - 17:46 flood tide 7:48 - 11:18		ebb tide 15:59 - 18:19 flood tide 8:51 - 12:21		ebb tide 18:34 - 22:04 flood tide 6:19 - 9:17	
31/Mar						

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 March 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Mar	2-Mar
3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar
	Impact Dolphin Monitoring					
10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	16-Mar
	Impact Dolphin Monitoring		Impact Dolphin Monitoring			
17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar
	Impact Dolphin Monitoring					
24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar
31-Mar						

HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (April 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1/Apr	2/Apr	3/Apr	4/Apr	5/Apr	6/Apr
	ebb tide 9:53 - 13:23 flood tide 4:13 - 7:43		ebb tide 10:47 - 14:17 flood tide 4:58 - 8:28		WQM was canceled due to suspension of marine works during holiday	
7/Apr	8/Apr	9/Apr	10/Apr	11/Apr	12/Apr	13/Apr
	ebb tide 13:04 - 16:34 flood tide 6:38 - 10:08		ebb tide 14:23 - 17:53 flood tide 7:32 - 11:02		ebb tide 16:15 - 19:45 flood tide 8:43 - 12:13	
14/Apr	15/Apr	16/Apr	17/Apr	18/Apr	19/Apr	20/Apr
	ebb tide 8:34 - 12:04 flood tide 13:37 - 17:07		ebb tide 10:02 - 13:32 flood tide 15:45 - 19:15		ebb tide 11:15 - 14:45 flood tide 17:33 - 21:03	
21/Apr	22/Apr	23/Apr	24/Apr	25/Apr	26/Apr	27/Apr
	ebb tide 13:11 - 16:41 flood tide 6:36 - 10:06		ebb tide 14:36 - 17:00 flood tide 7:37 - 11:07		ebb tide 16:21 - 19:51 flood tide 5:00 - 7:18	
28/Apr	29/Apr	30/Apr				
	ebb tide 8:48 - 12:18 flood tide 13:27 - 16:57					

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section Impact Noise Monitoring Schedule (1 to 30 April 2019)

Alternative Noise Monitoring at Pak Mong Village Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr
		Noise Impact Monitoring				
7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr
	Noise Impact Monitoring			Noise Impact Monitoring		
14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr
			Noise Impact Monitoring			
21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr
		Noise Impact Monitoring				
28-Apr	29-Apr	30-Apr				
	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 2019)

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr
		1-hr TSP Monitoring 24-hr TSP Monitoring				
7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr
			1-hr TSP Monitoring 24-hr TSP Monitoring			
21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr
		1-hr TSP Monitoring 24-hr TSP Monitoring				
28-Apr	29-Apr	30-Apr				
	1-hr TSP Monitoring 24-hr TSP Monitoring					

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 30 April 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr
7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr
			Impact Dolphin Monitoring			
14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr
	Impact Dolphin Monitoring					
21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr
		Impact Dolphin Monitoring		Impact Dolphin Monitoring		
28-Apr	29-Apr	30-Apr				

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section Impact Noise Monitoring Schedule (1 to 31 May 2019)

Alternative Noise Monitoring at Pak Mong Village Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-May	2-May	3-May	4-May
				Noise Impact Monitoring		
5-May	6-May	7-May	8-May	9-May	10-May	11-May
			Noise Impact Monitoring			
12-May	13-May	14-May	15-May	16-May	17-May	18-May
		Noise Impact Monitoring				
19-May	20-May	21-May	22-May	23-May	24-May	25-May
	Noise Impact Monitoring			Noise Impact Monitoring		
26-May	27-May	28-May	29-May	30-May	31-May	
			Noise Impact Monitoring			

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section Air Quality Monitoring Schedule (1 to 31 May 2019)

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Apr	2-Apr	1-May	2-May	3-May	4-May
				1-hr TSP Monitoring 24-hr TSP Monitoring		
5-May	6-May	7-May	8-May	9-May	10-May	11-May
			1-hr TSP Monitoring 24-hr TSP Monitoring			
12-May	13-May	14-May	15-May	16-May	17-May	18-May
		1-hr TSP Monitoring 24-hr TSP Monitoring				
19-May	20-May	21-May	22-May	23-May	24-May	25-May
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
26-May	27-May	28-May	29-May	30-May	31-May	
			1-hr TSP Monitoring 24-hr TSP Monitoring			

HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (May 2019)

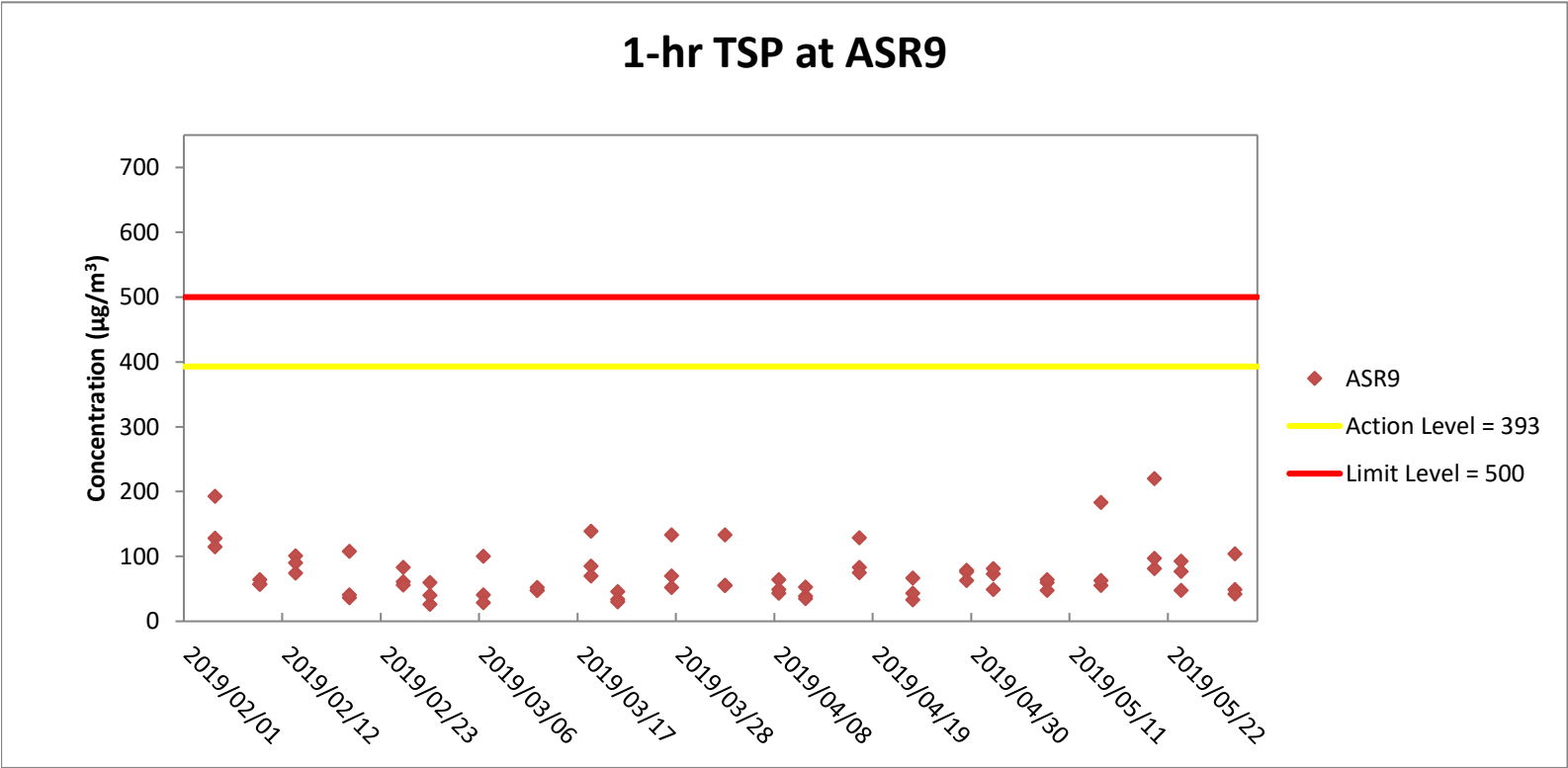
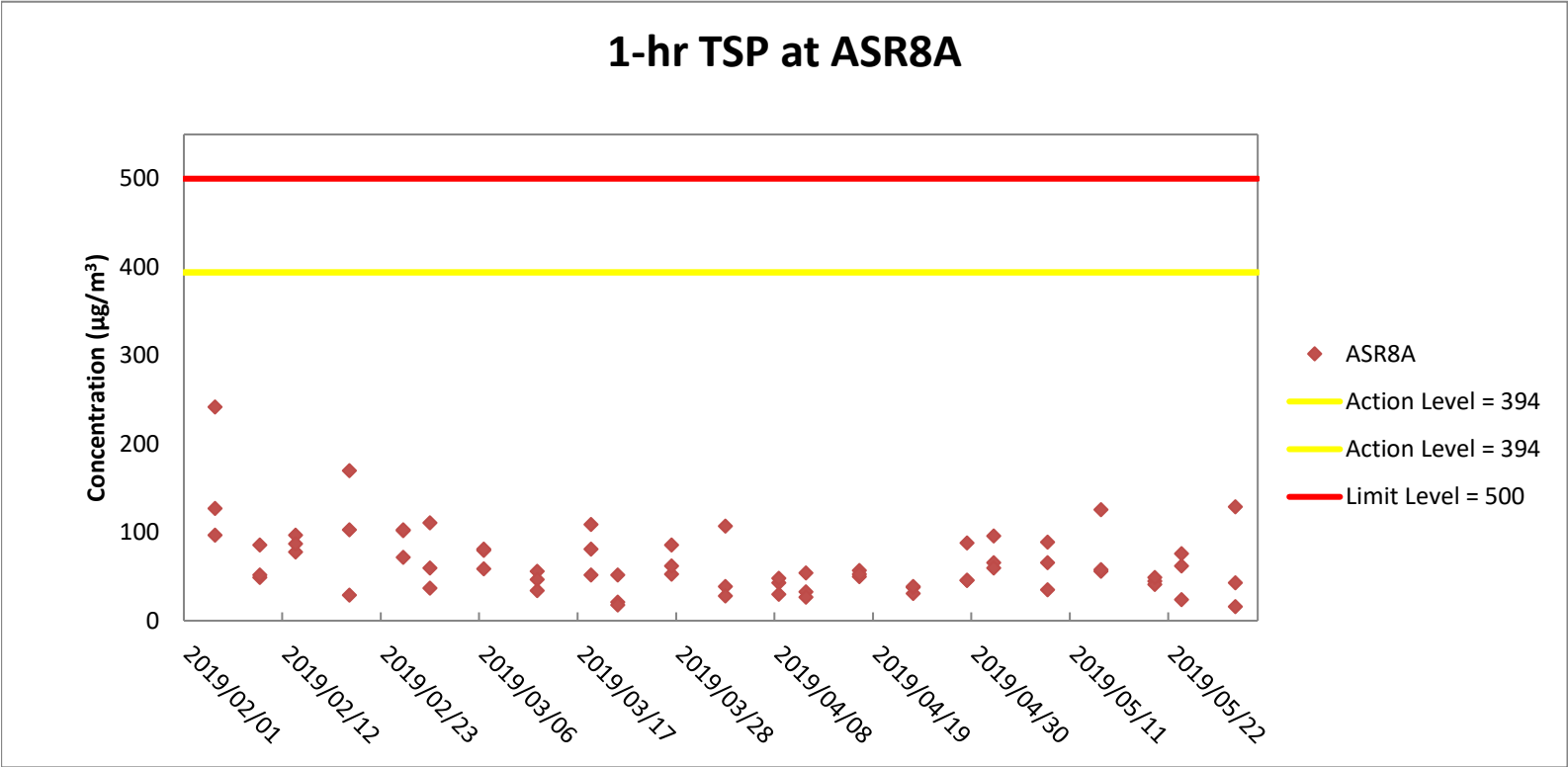
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1/May	2/May	3/May	4/May
			WQM will be canceled due to suspension of marine works during holiday		ebb tide 10:41 - 14:11 flood tide 16:45 - 20:15	
5/May	6/May	7/May	8/May	9/May	10/May	11/May
	ebb tide 12:10 - 15:40 flood tide 5:34 - 9:04		ebb tide 13:27 - 16:57 flood tide 6:34 - 10:04		ebb tide 15:04 - 18:34 flood tide 7:47 - 11:17	
12/May	13/May	14/May	15/May	16/May	17/May	18/May
	ebb tide 7:10 - 10:40 flood tide 12:05 - 15:35		ebb tide 8:58 - 12:28 flood tide 14:41 - 18:11		ebb tide 10:17 - 13:47 flood tide 16:40 - 20:10	
19/May	20/May	21/May	22/May	23/May	24/May	25/May
	ebb tide 12:13 - 15:43 flood tide 5:29 - 8:59		ebb tide 13:32 - 17:02 flood tide 6:33 - 10:03		ebb tide 14:55 - 18:25 flood tide 7:40 - 11:10	
26/May	27/May	28/May	29/May	30/May	31/May	
	ebb tide 6:54 - 10:12 flood tide 11:05 - 14:35		ebb tide 8:34 - 12:04 flood tide 13:49 - 17:19		ebb tide 9:39 - 13:09 flood tide 15:42 - 19:12	

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 May 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-May	2-May	3-May	4-May
				Impact Dolphin Monitoring		
5-May	6-May	7-May	8-May	9-May	10-May	11-May
		Impact Dolphin Monitoring				
12-May	13-May	14-May	15-May	16-May	17-May	18-May
19-May	20-May	21-May	22-May	23-May	24-May	25-May
		Impact Dolphin Monitoring		Impact Dolphin Monitoring		
26-May	27-May	28-May	29-May	30-May	31-May	

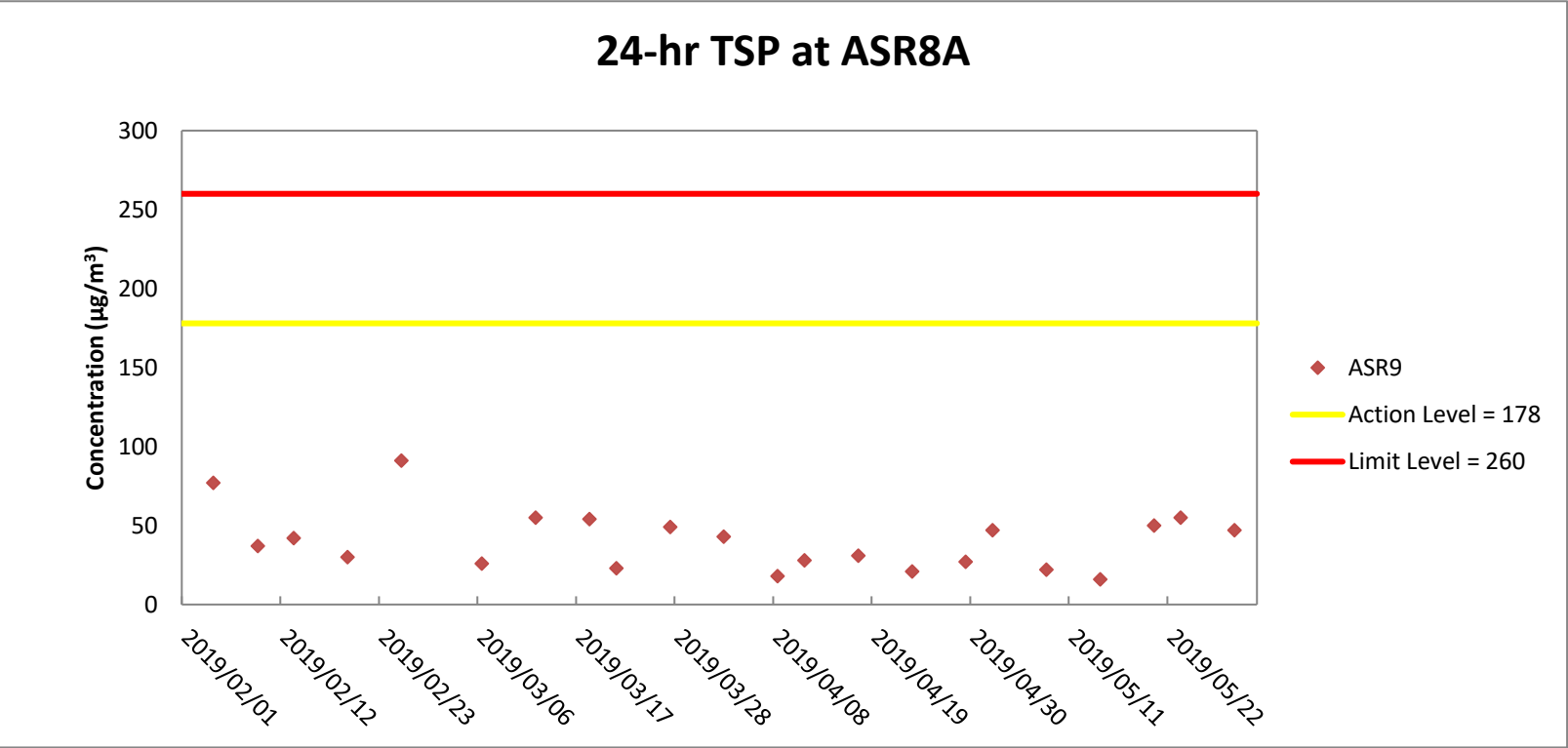
Appendix F

Impact Air Quality Monitoring Graphical Presentation

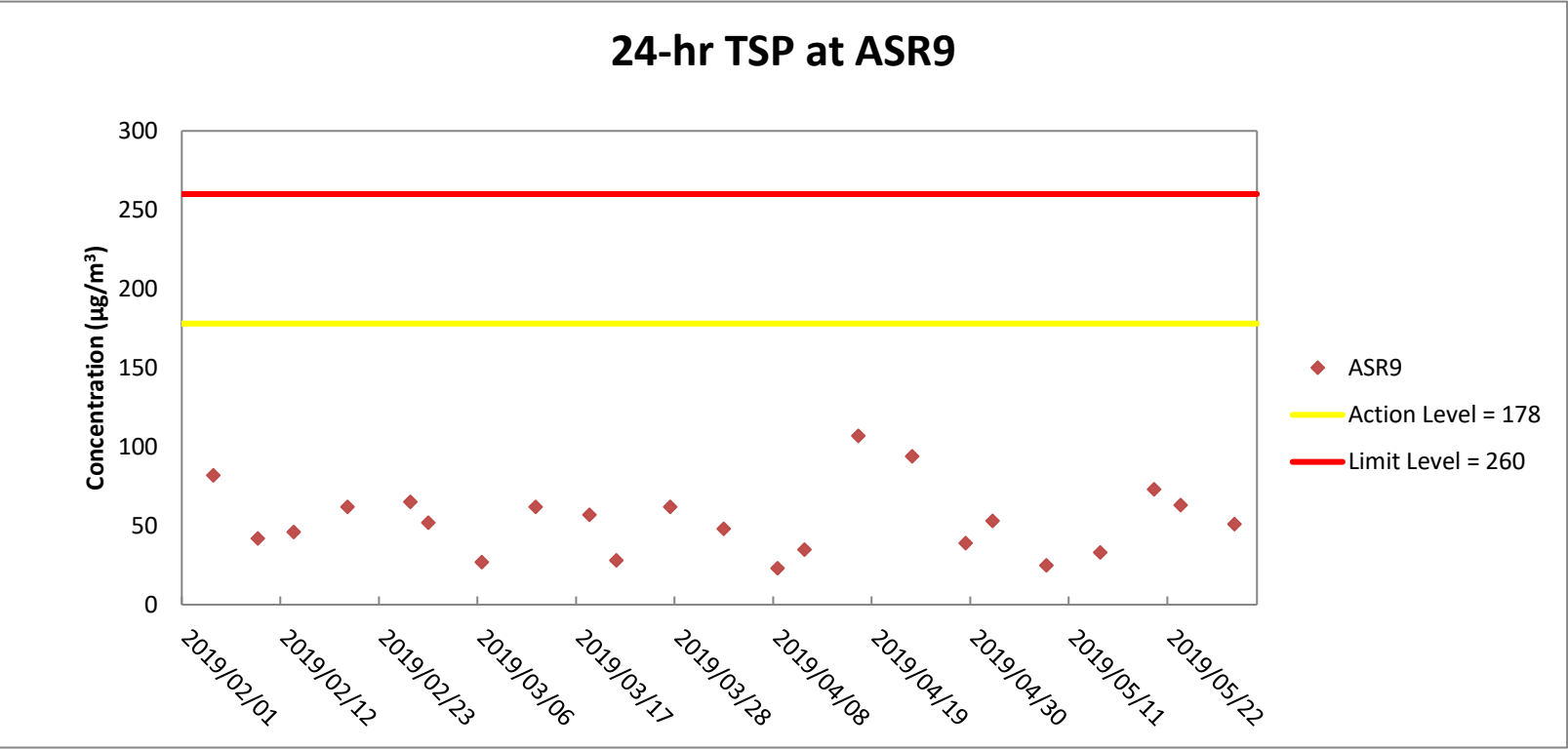


Weather condition within the reporting period varied between sunny to cloudy.
Major construction works undertaken within the reporting period include slope work at Viaduct D and landscaping works at HKBCF.
Marine works within the reporting period include reinstatement of seawall at seafront

24-hr TSP at ASR8A



24-hr TSP at ASR9

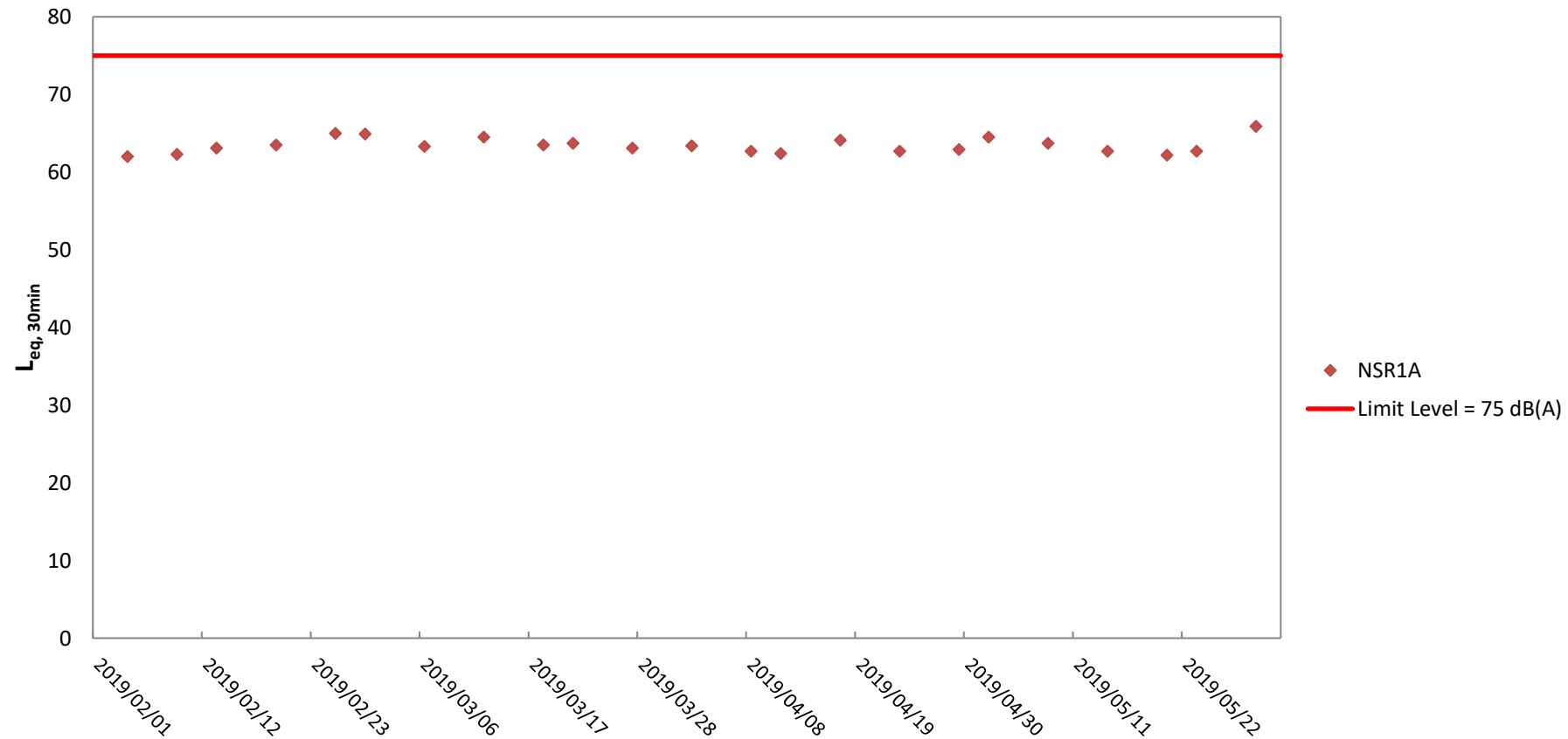


Weather condition within the reporting period varied between sunny to cloudy.
Major construction works undertaken within the reporting period include slope work at Viaduct D and landscaping works at HKBCF.
Marine works within the reporting period include reinstatement of seawall at seafront

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 cloudy.

Major construction works undertaken within the reporting period include slope work of viaduct D, landscaping works at HKBCF.

Marine works within the reporting period include reinstatement of seawall at seafront.

Appendix H

Impact Water Quality Monitoring Graphical Presentation

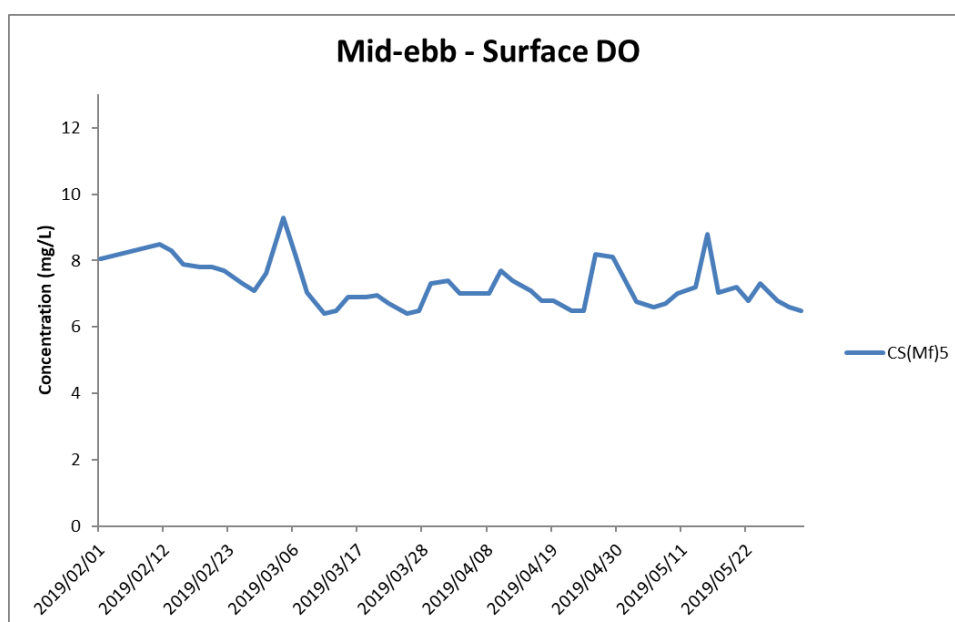
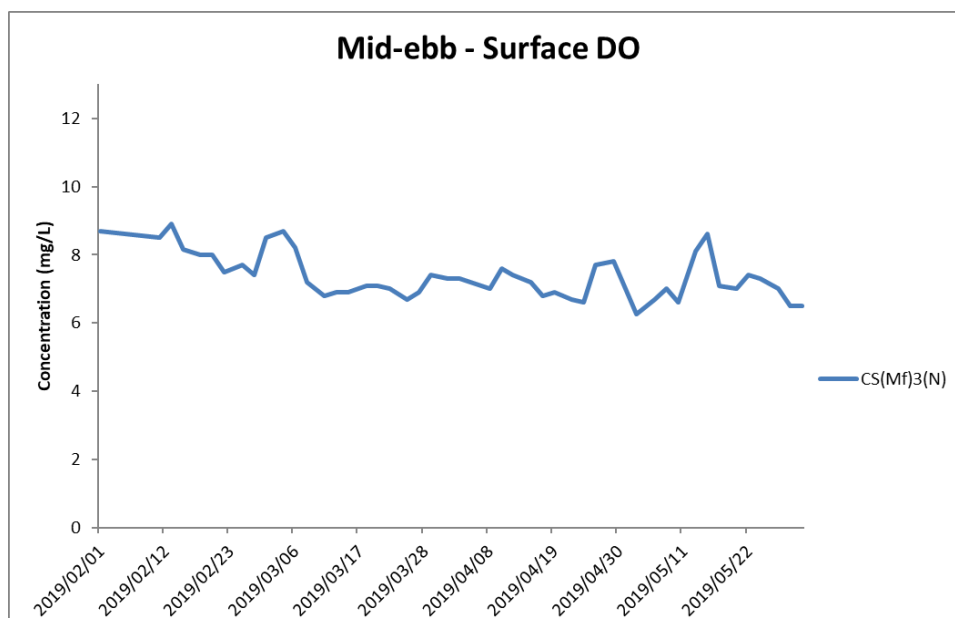


Figure H1 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 5 April and 1 May 2019 was cancelled due to site closure on holiday.

In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



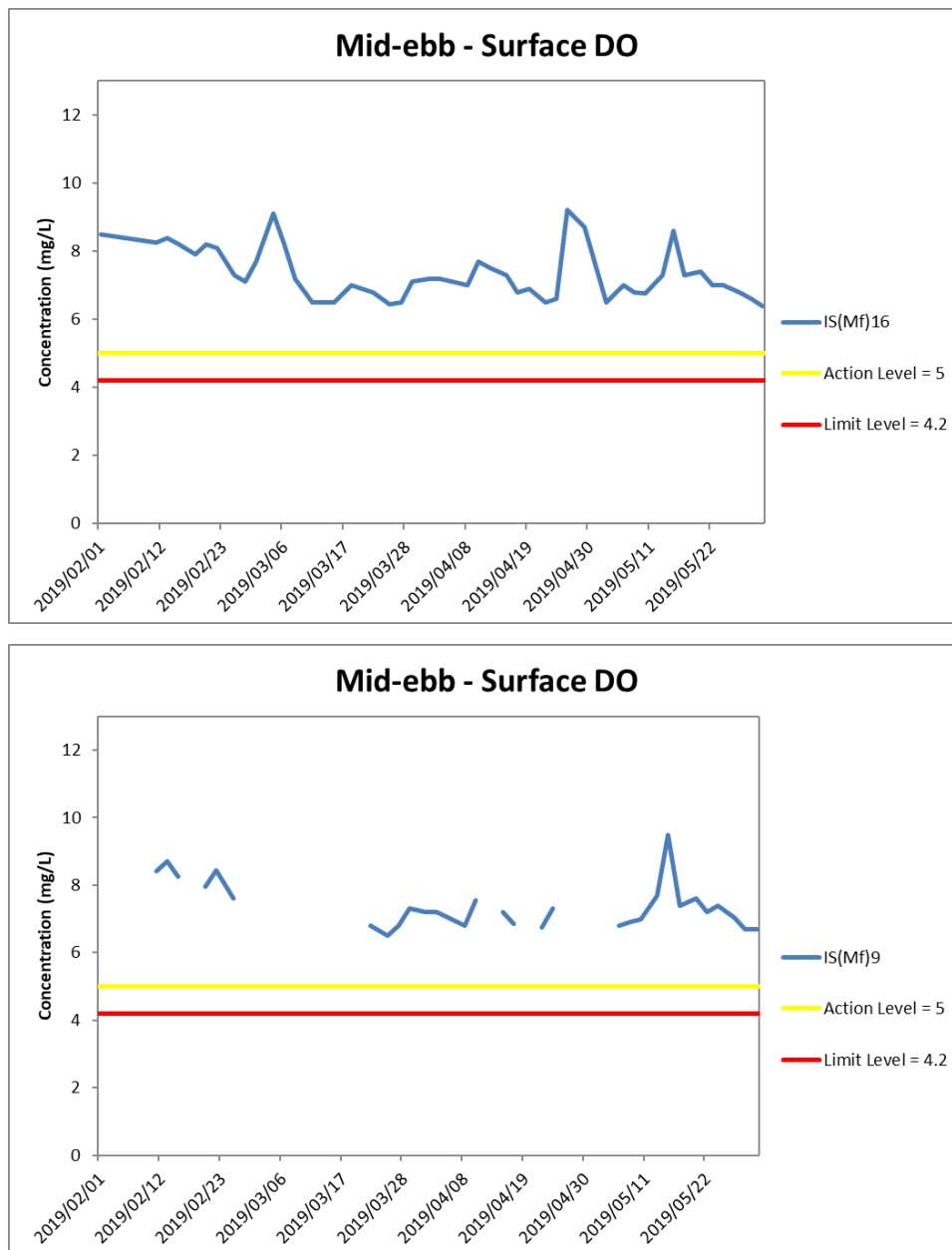


Figure H2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



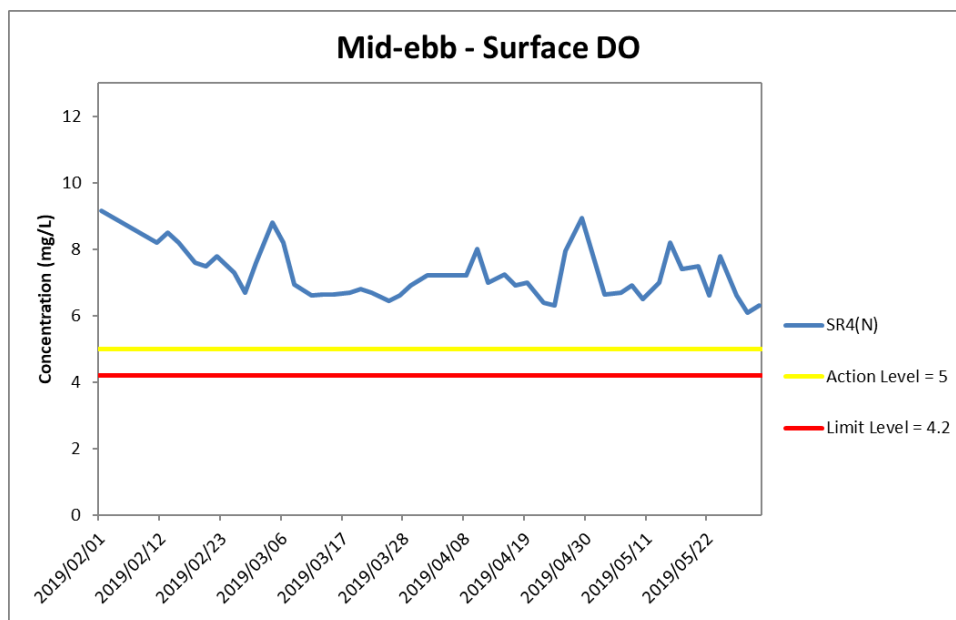
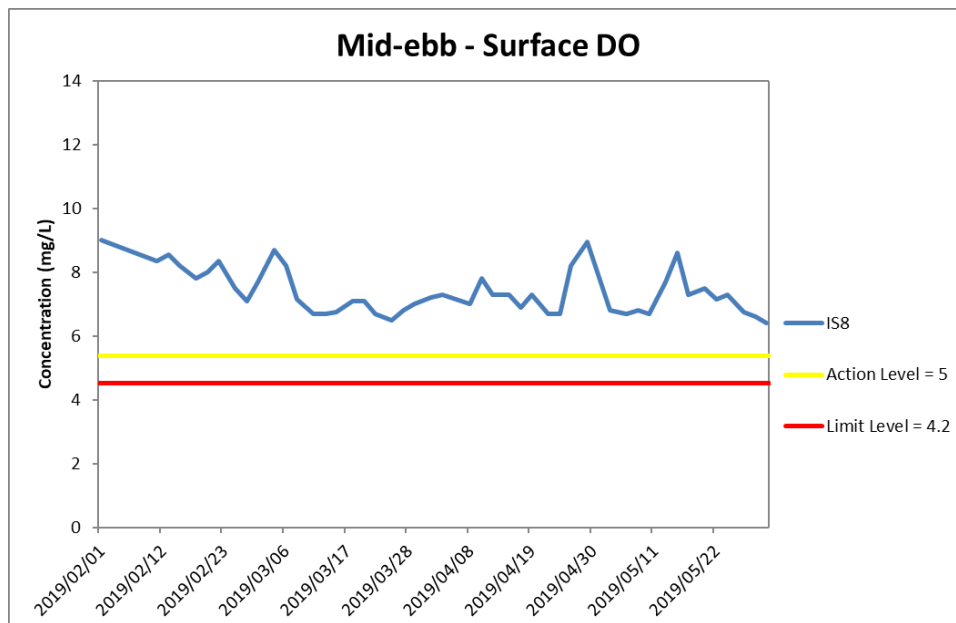


Figure H3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



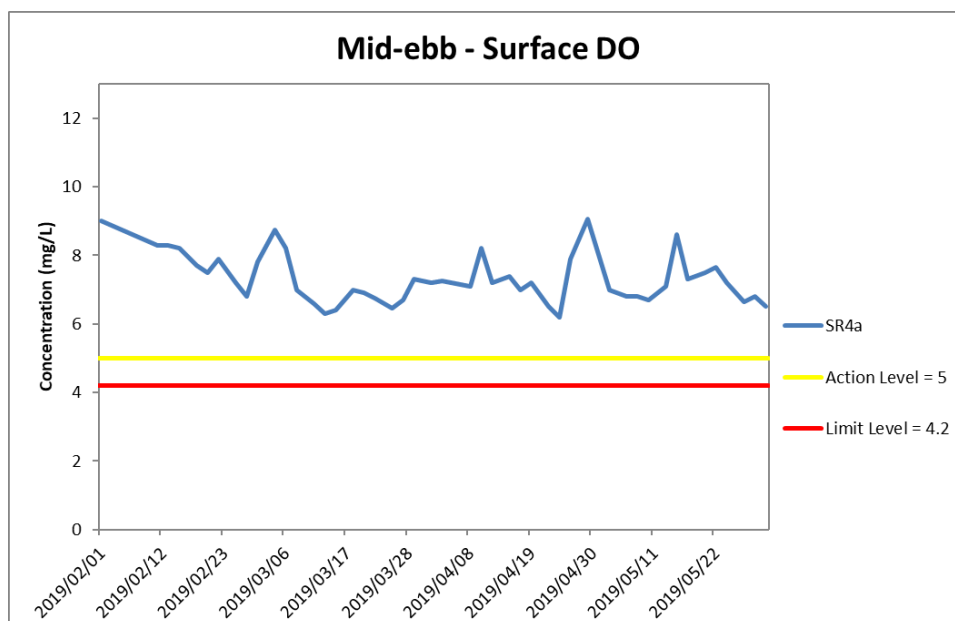


Figure H4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 February and 31 May 2019 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



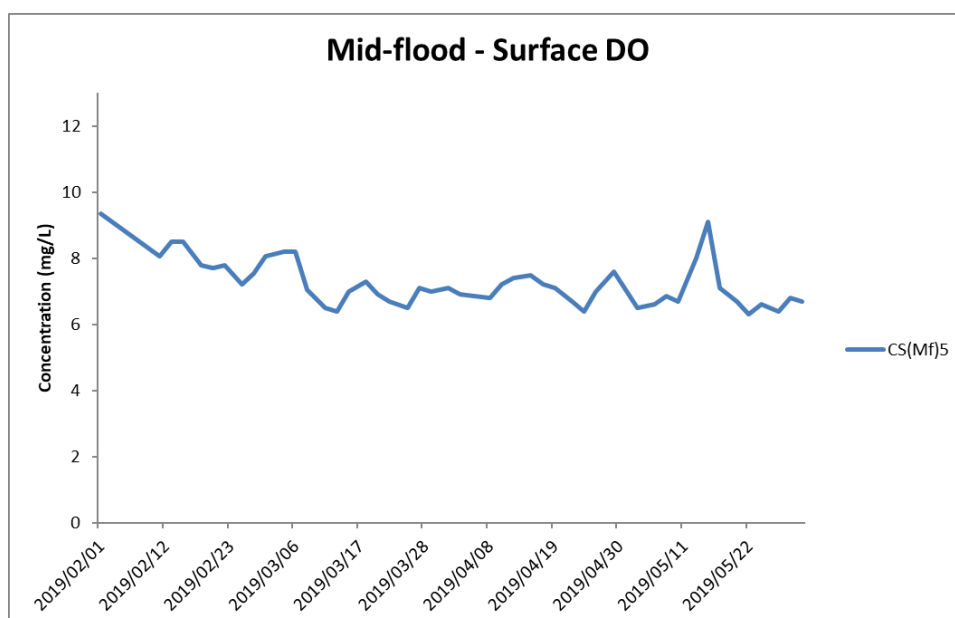
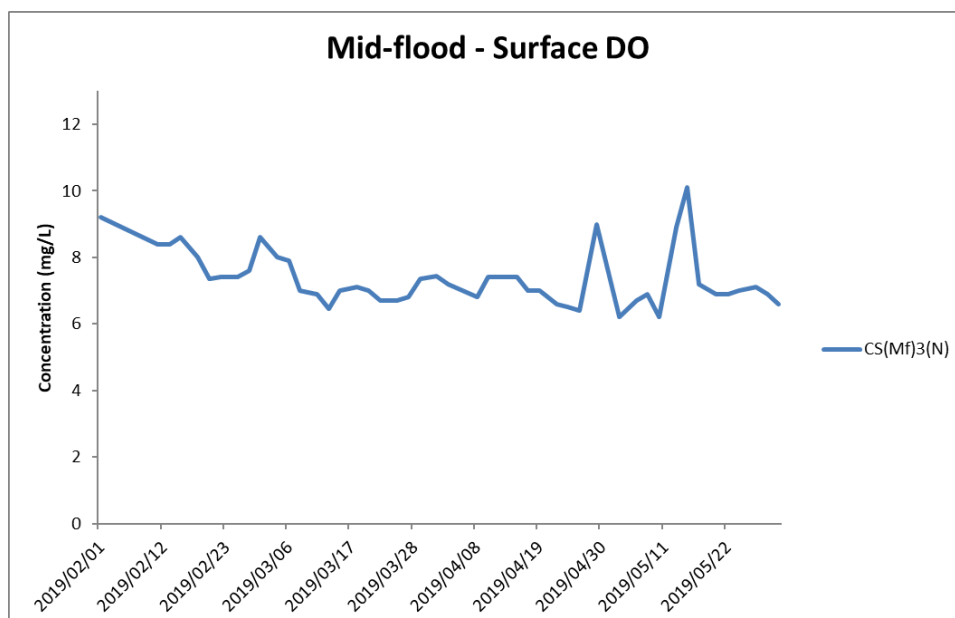


Figure H5 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



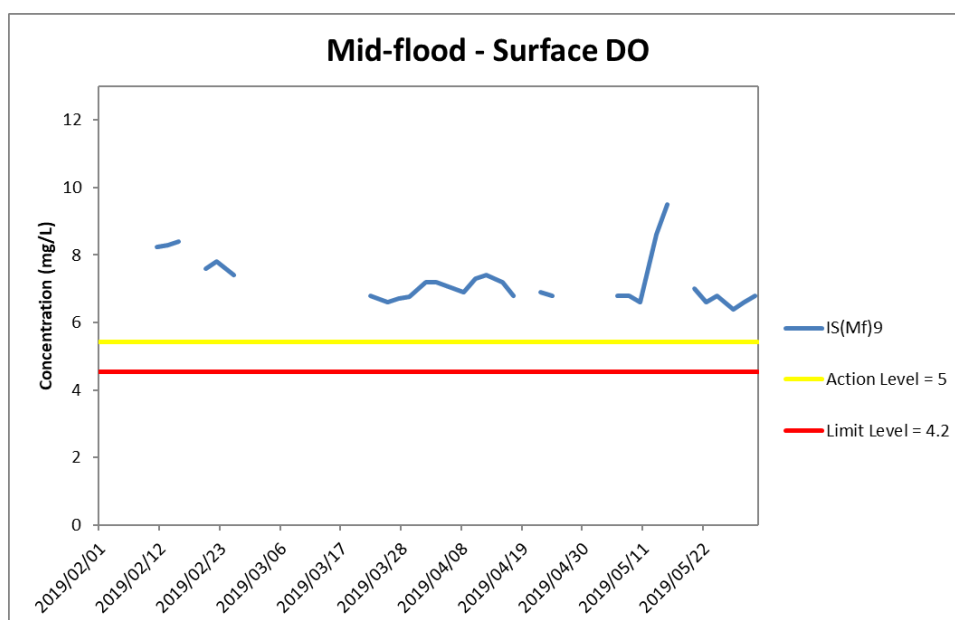
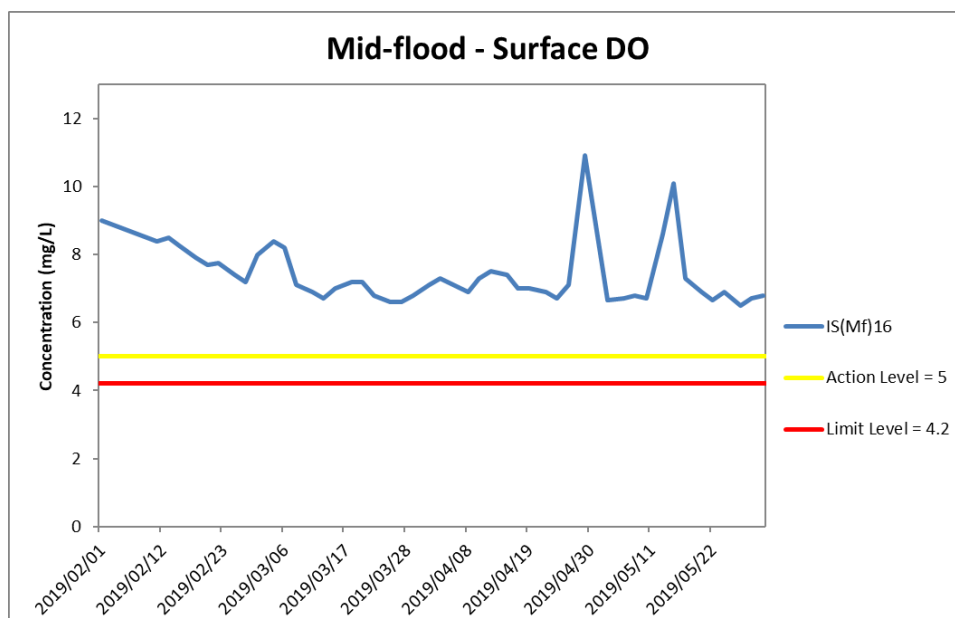


Figure H6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



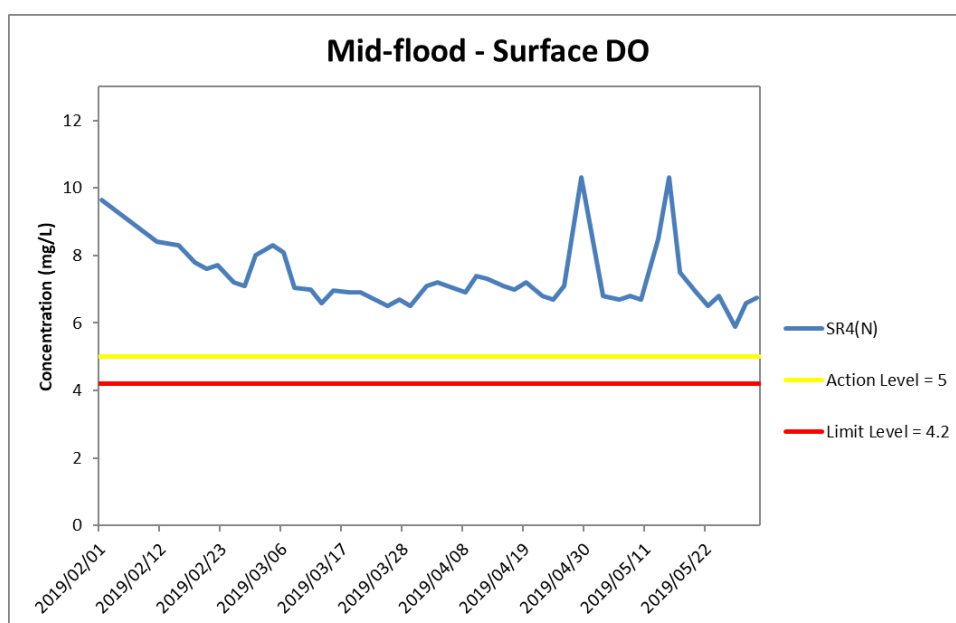
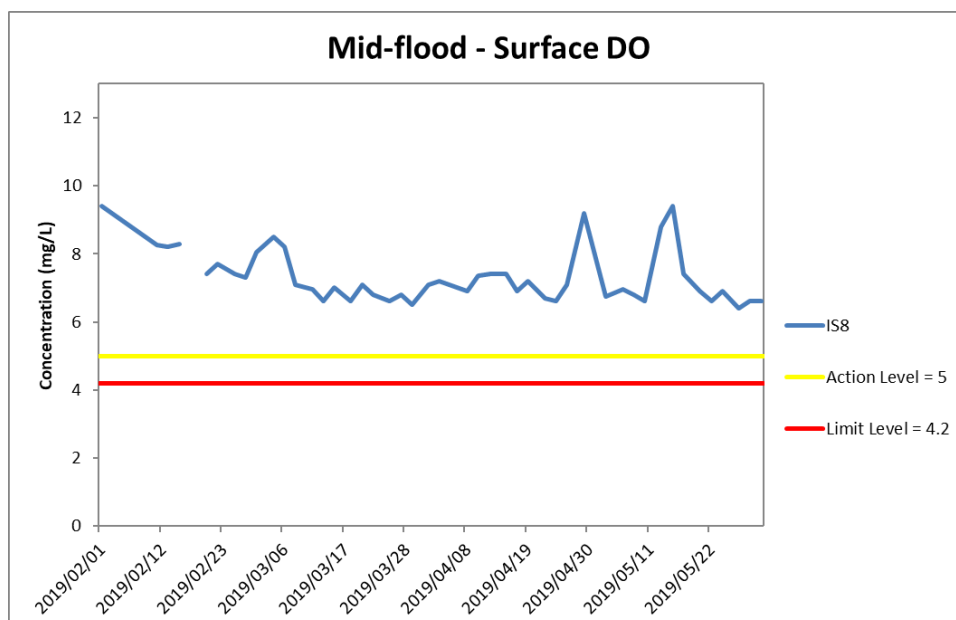


Figure H7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



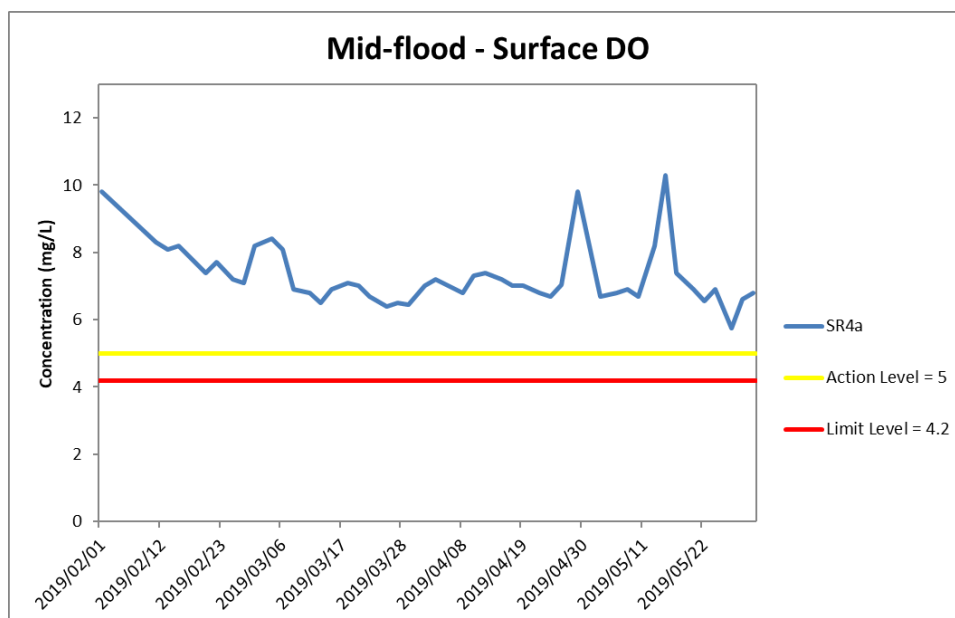


Figure H8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 February and 31 May 2019 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



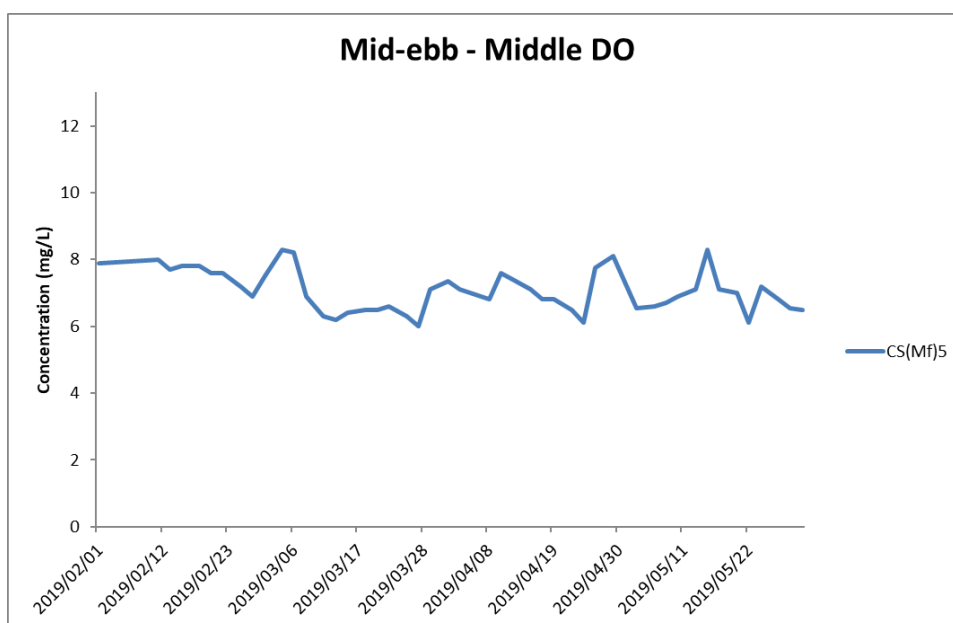
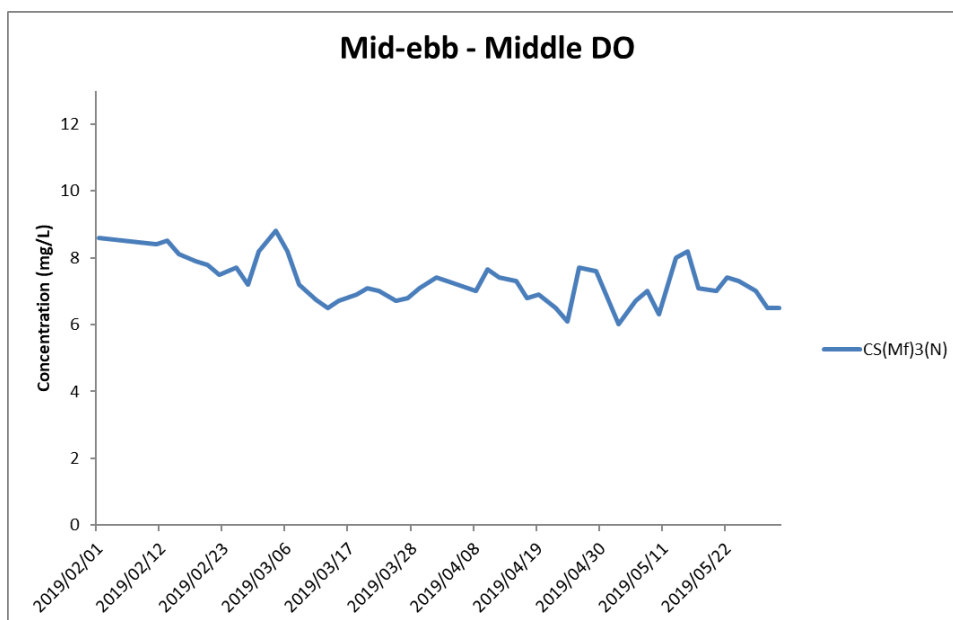


Figure H9 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



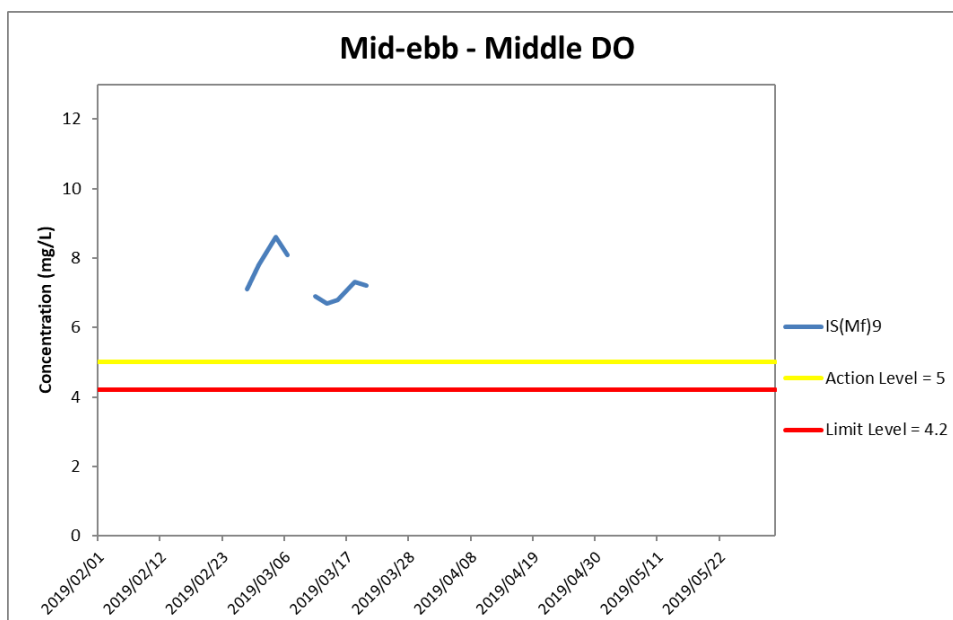


Figure H10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 February and 31 May 2019 at IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



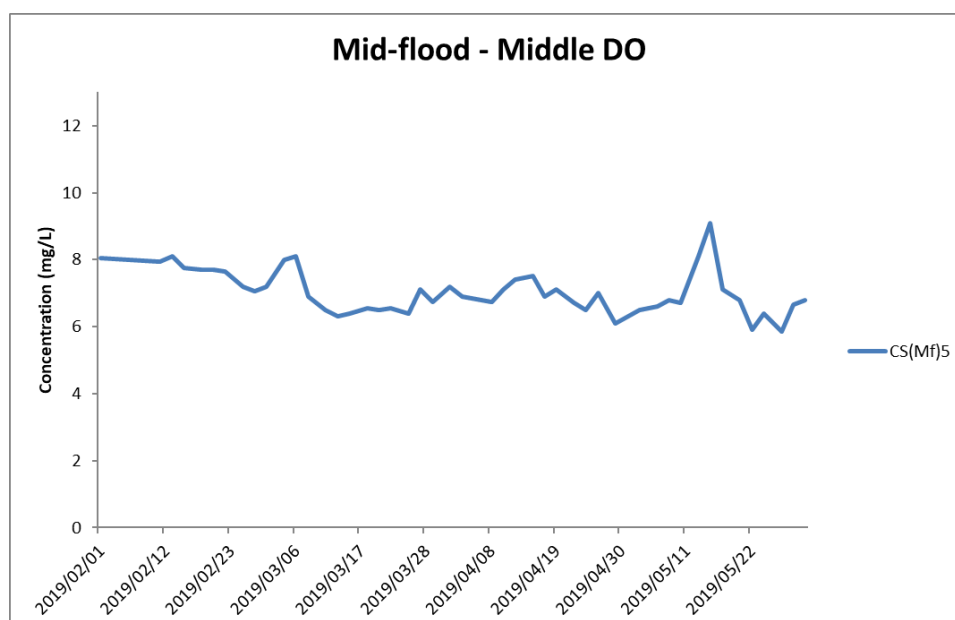
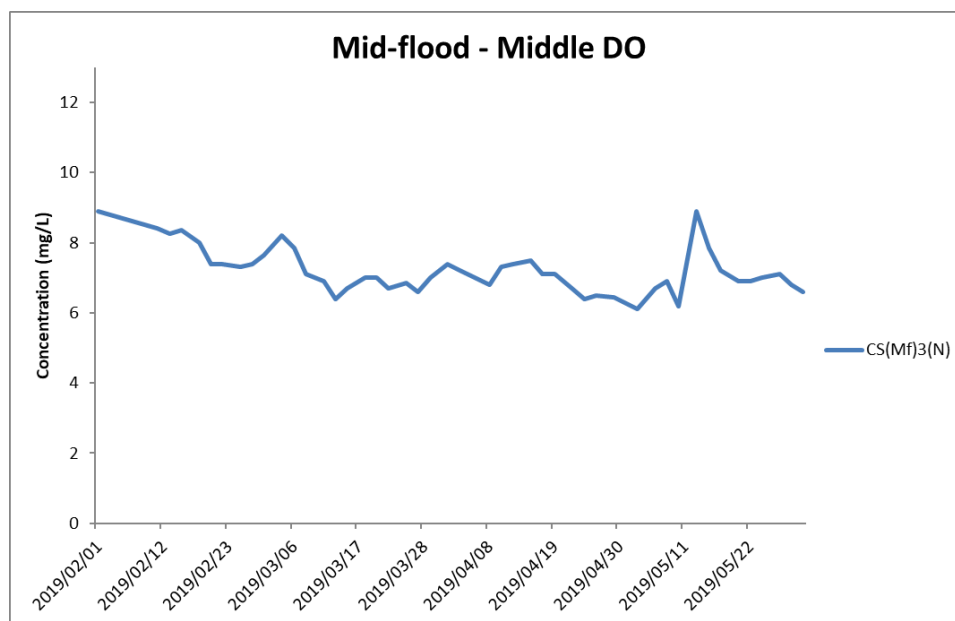


Figure H11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



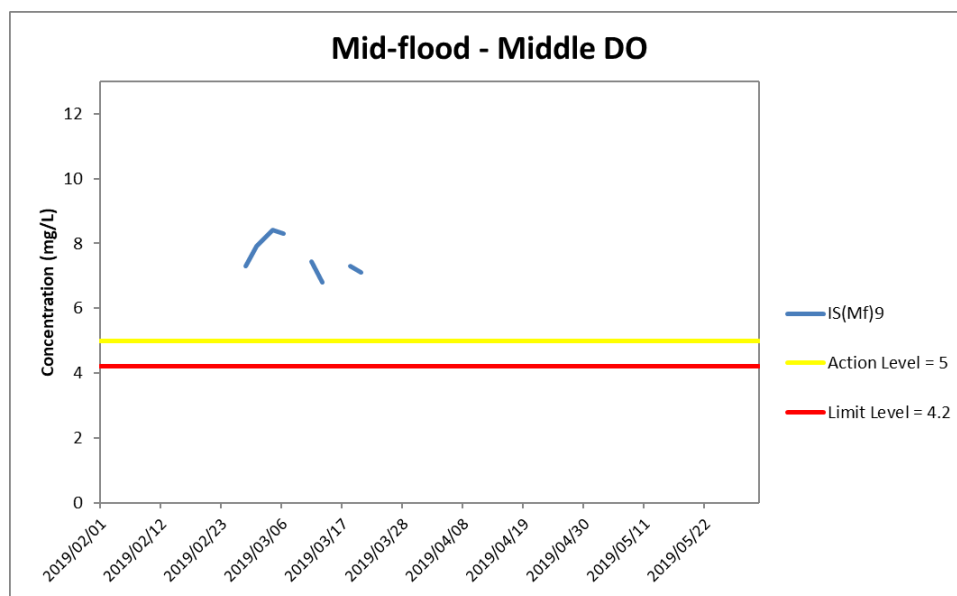


Figure H12 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 February and 31 May 2019 at IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



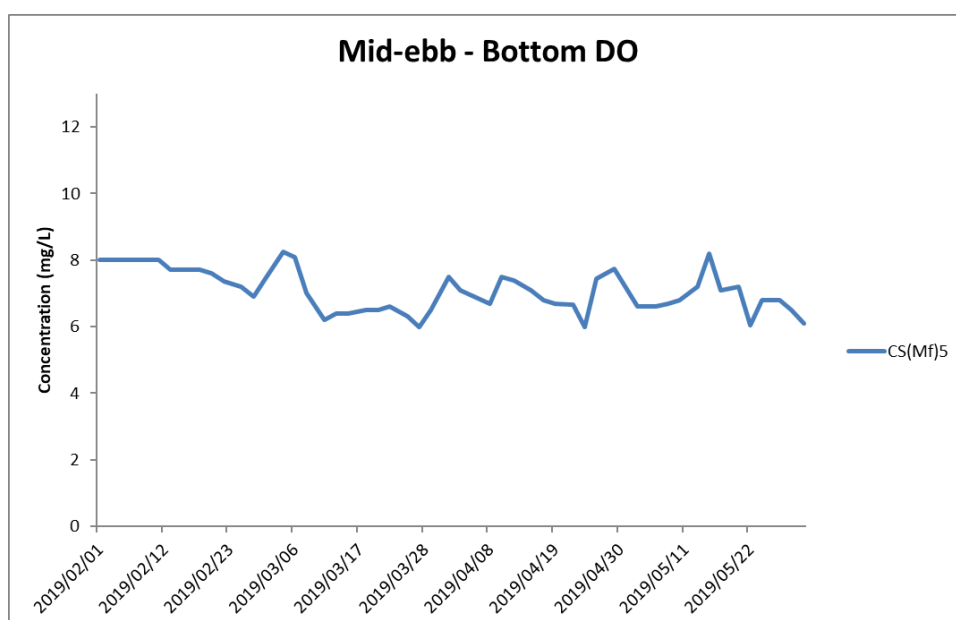
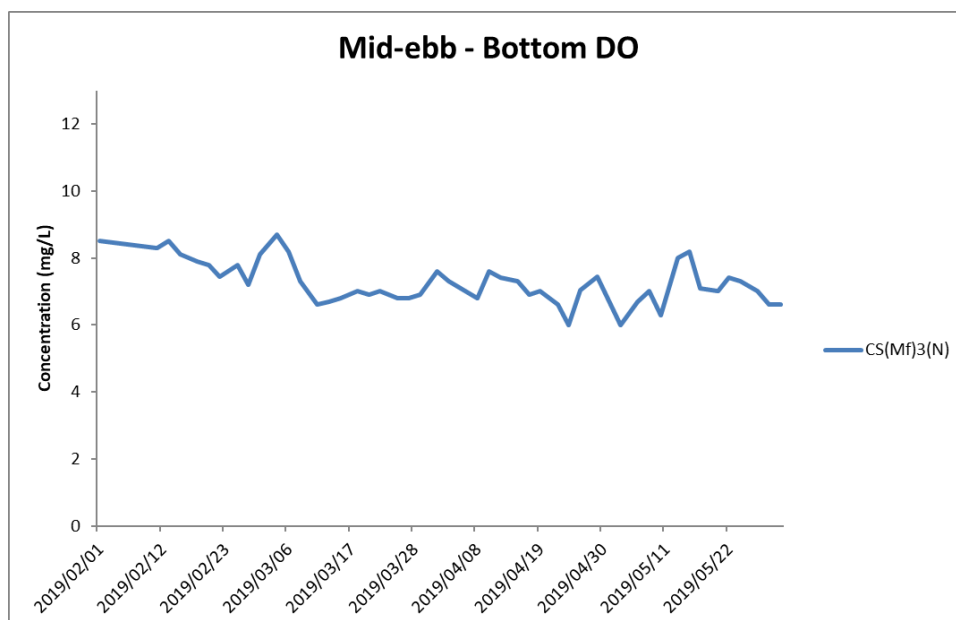


Figure H13 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



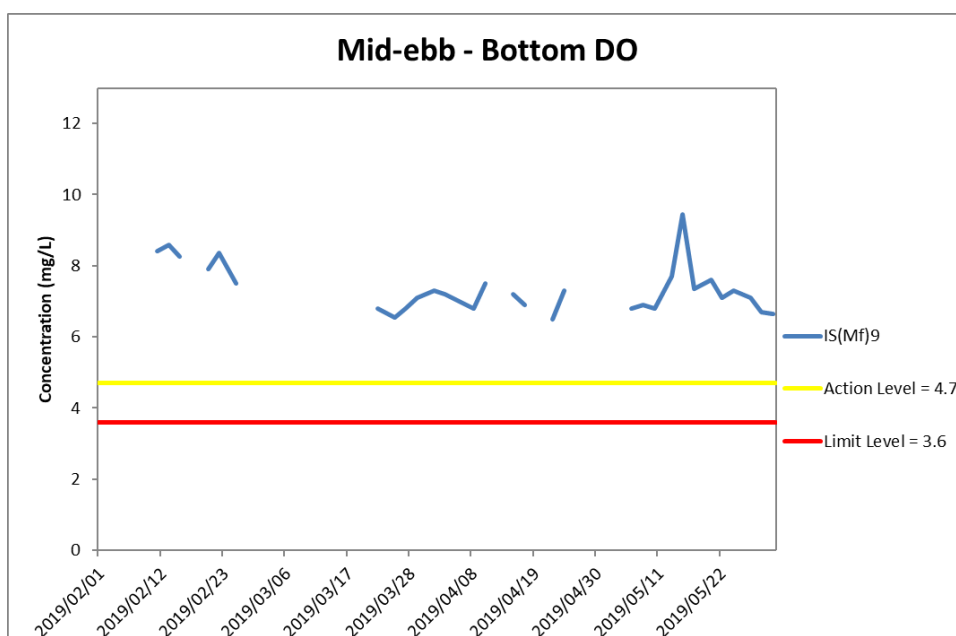
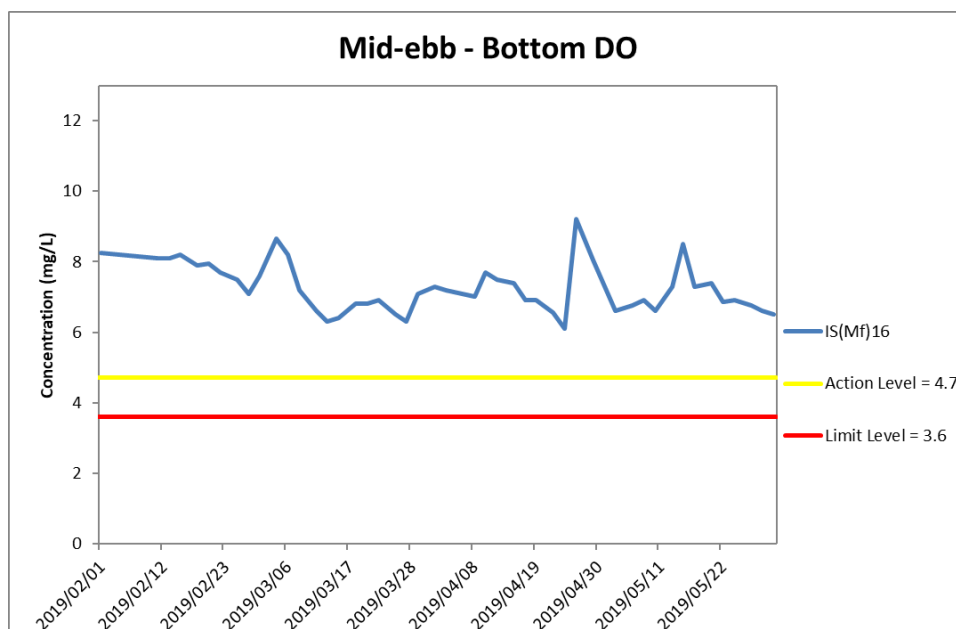


Figure H14 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



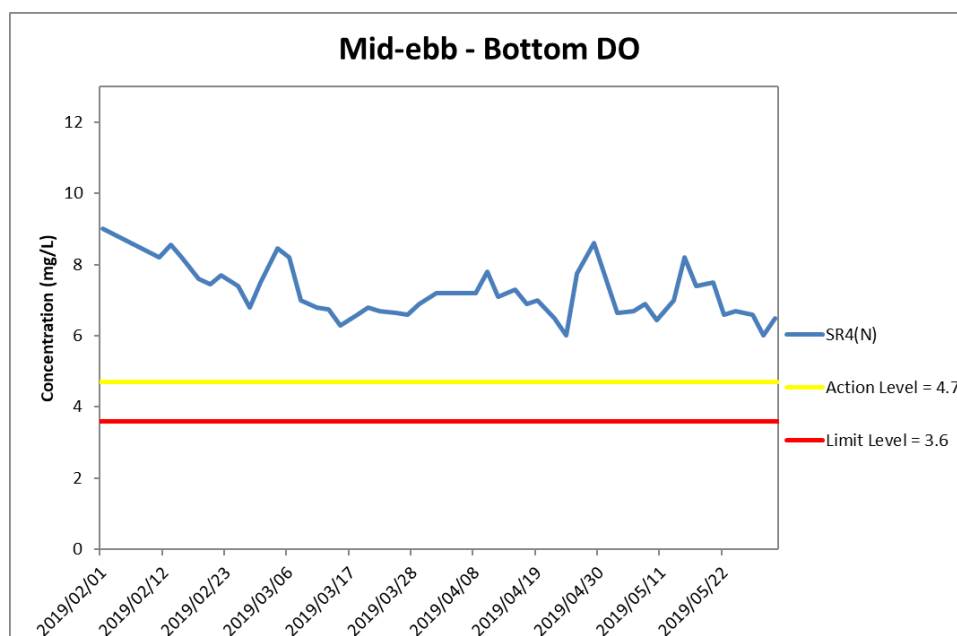
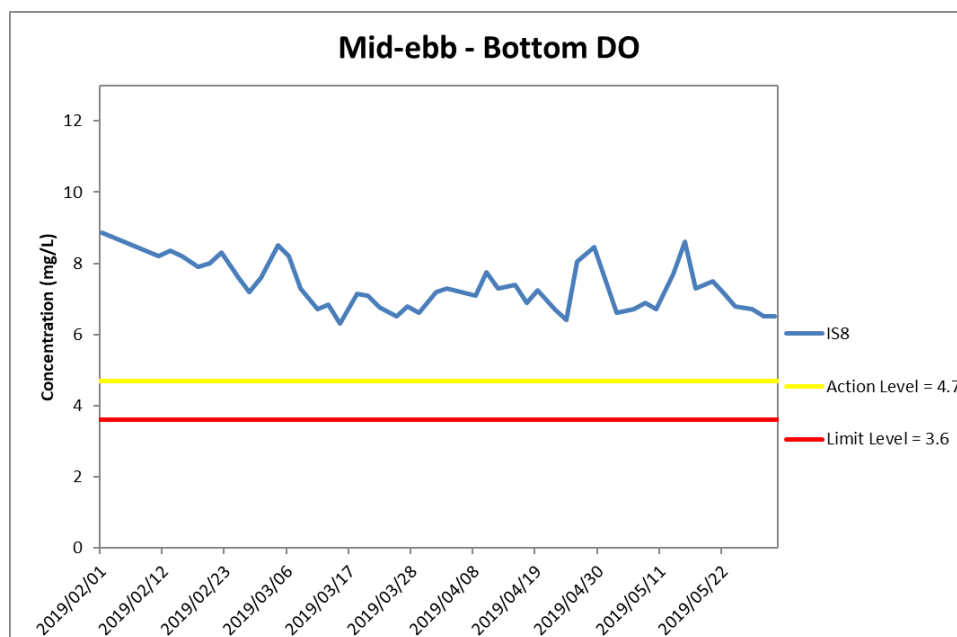


Figure H15 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
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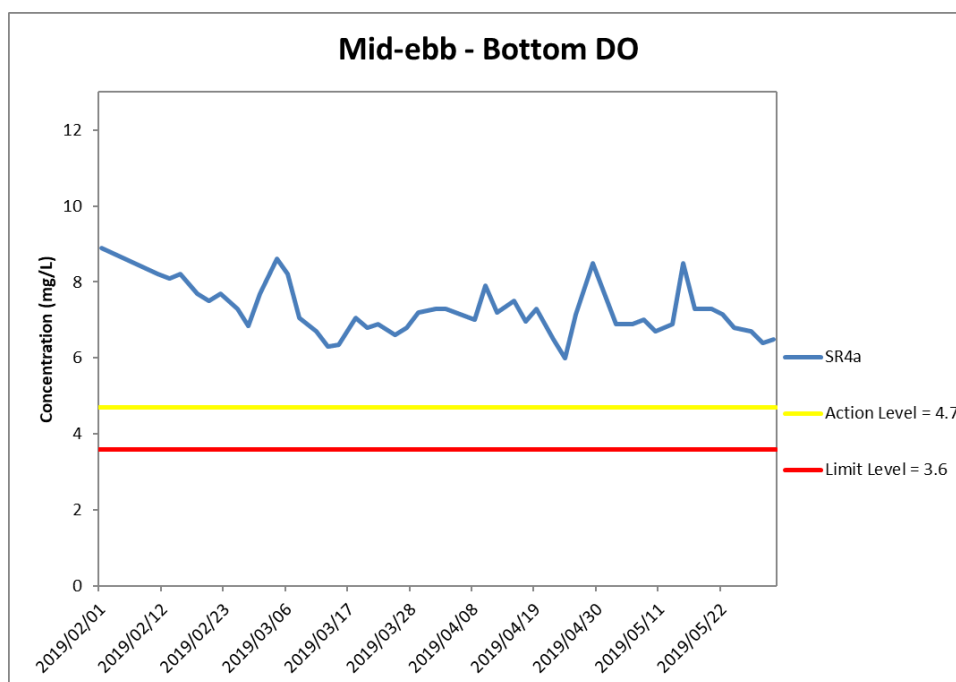


Figure H16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 February and 31 May 2019 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.*

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



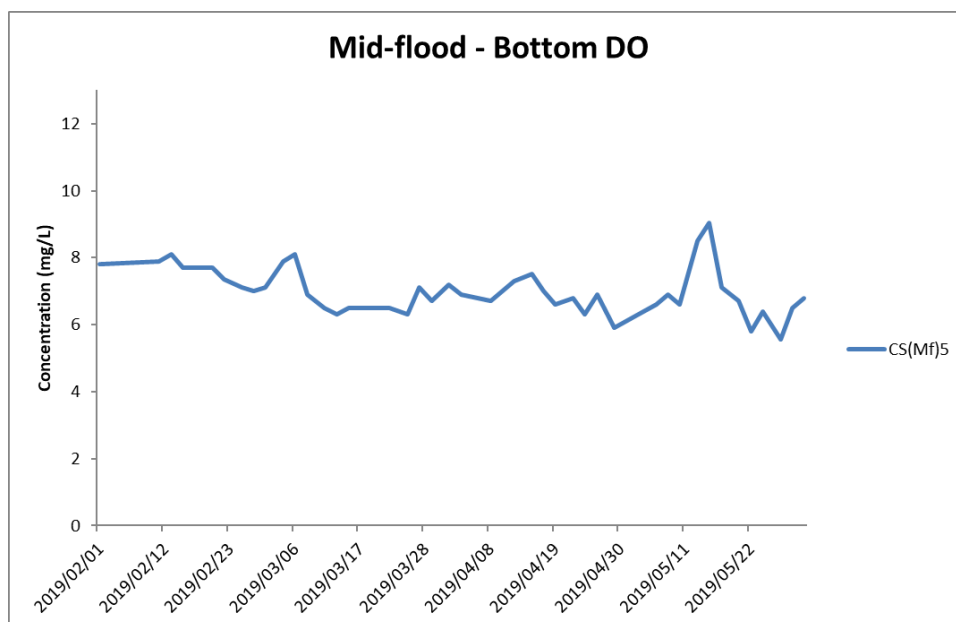
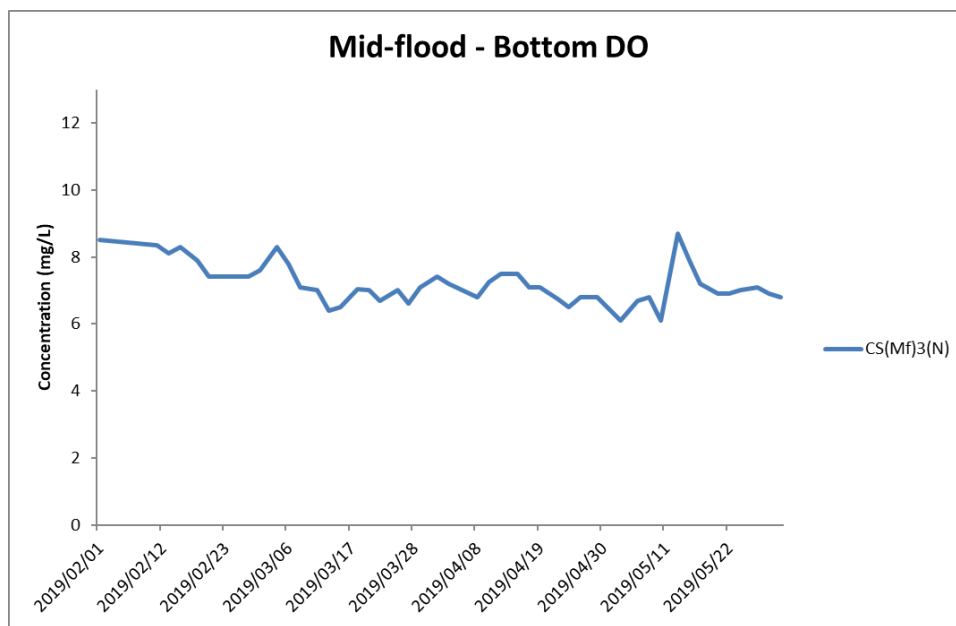


Figure H17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
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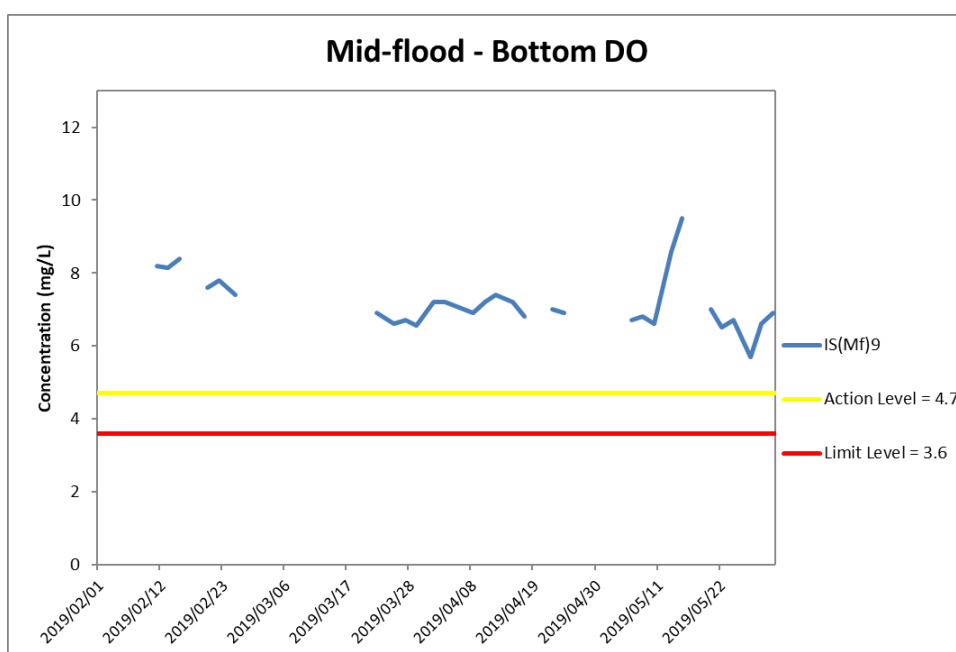
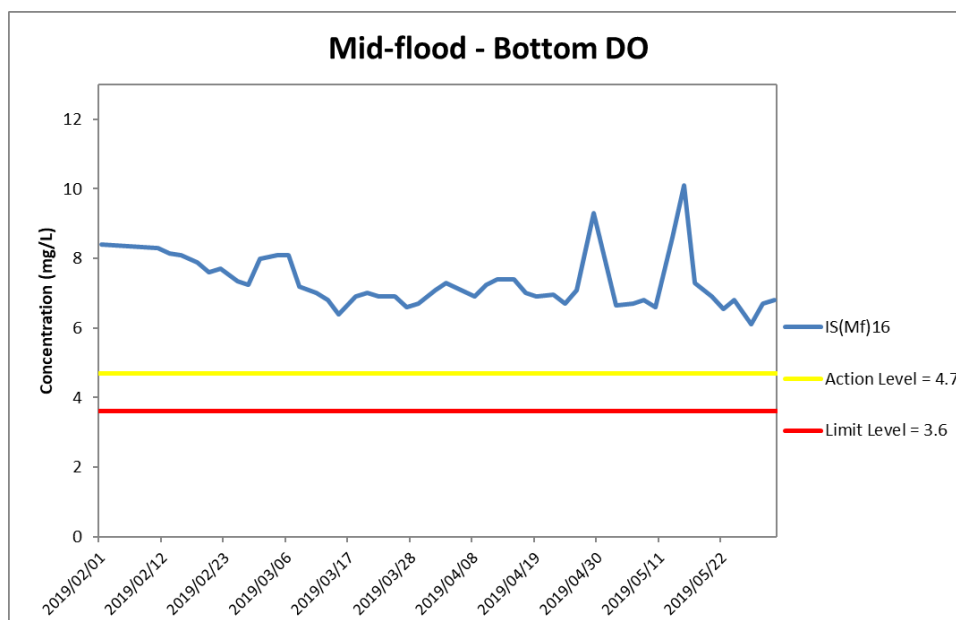


Figure H18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
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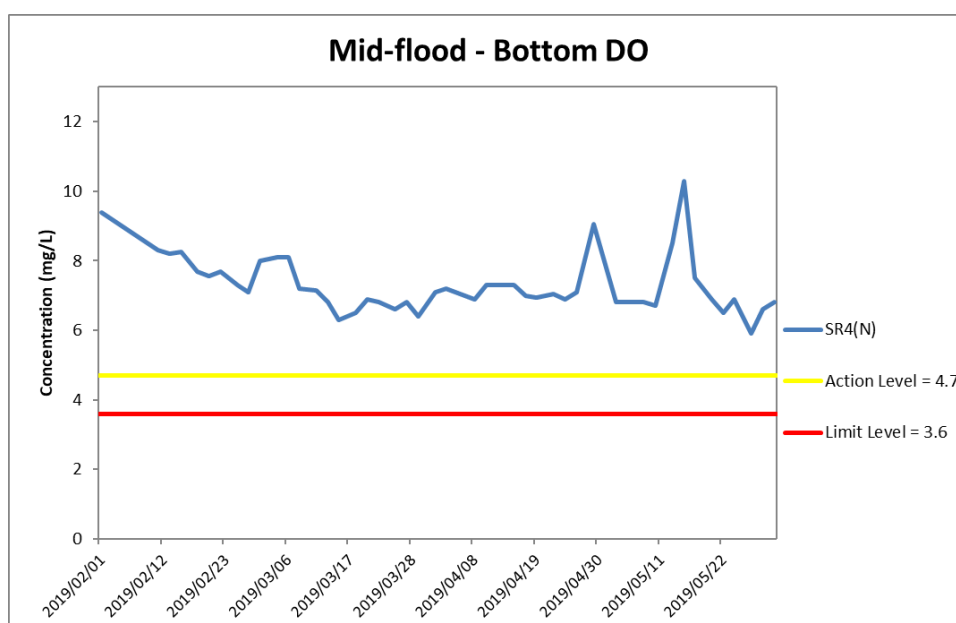
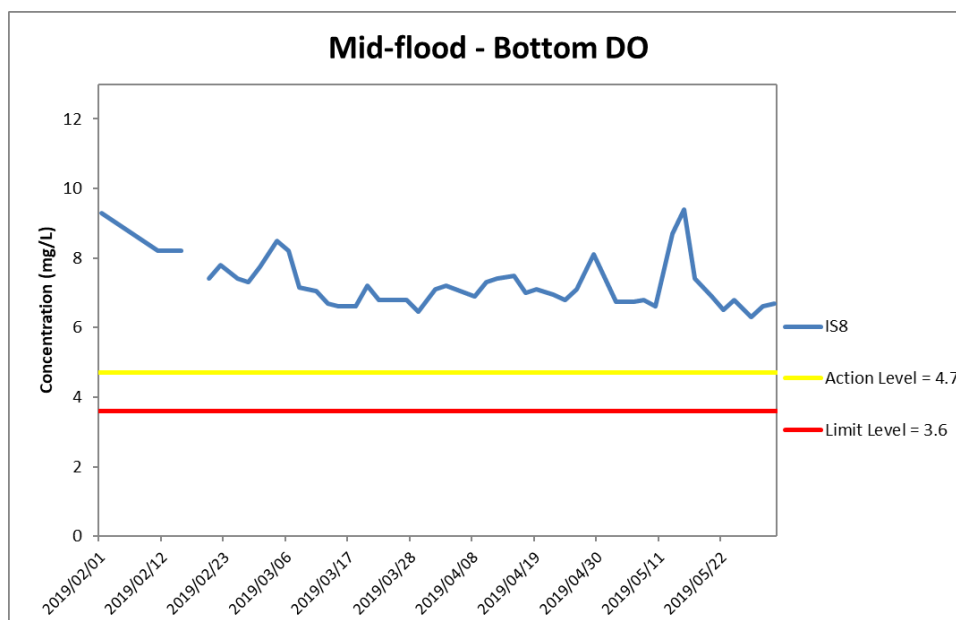


Figure H19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
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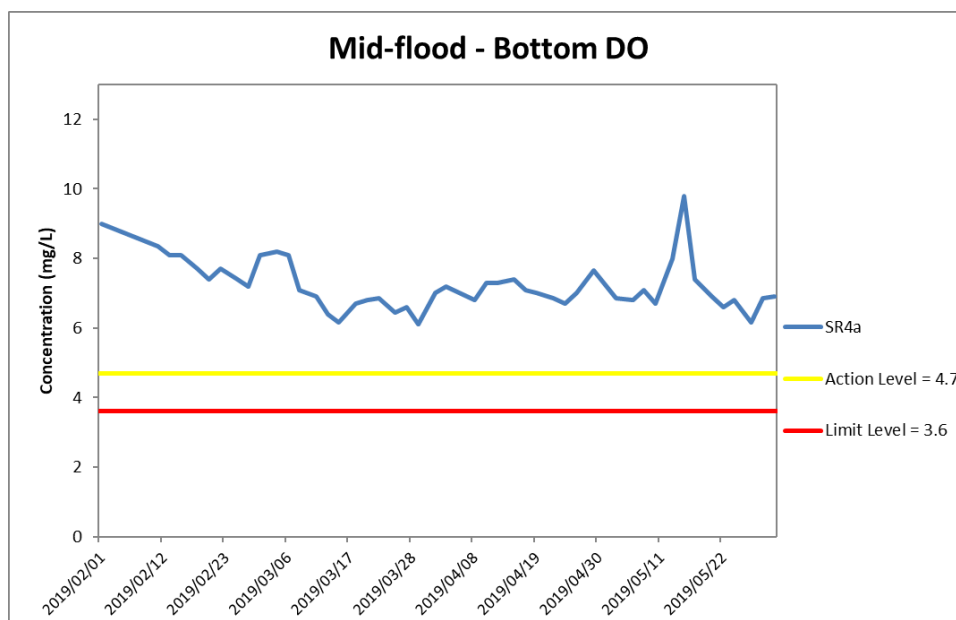


Figure H20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 February and 31 May 2019 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.*

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
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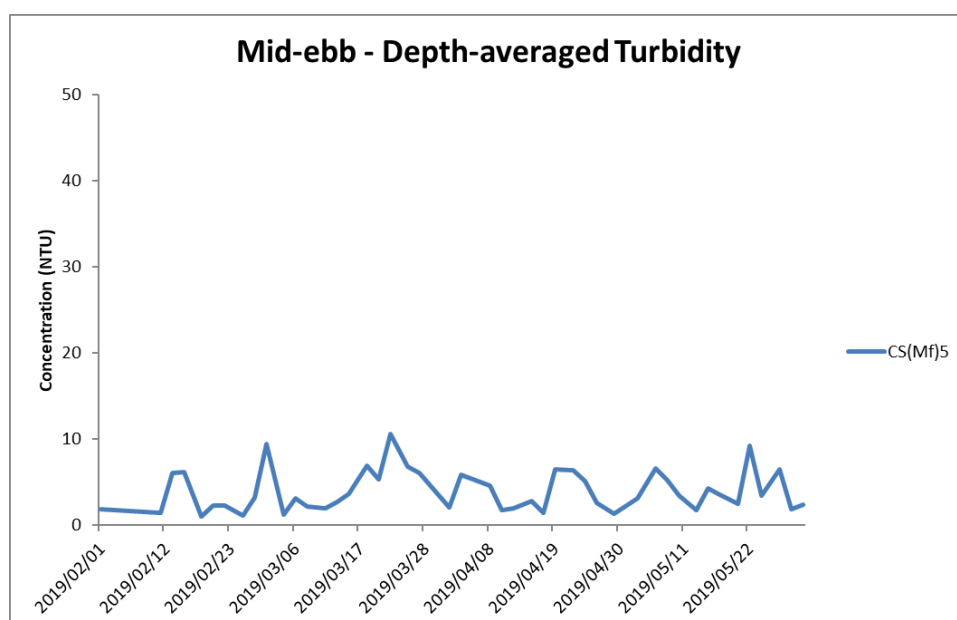
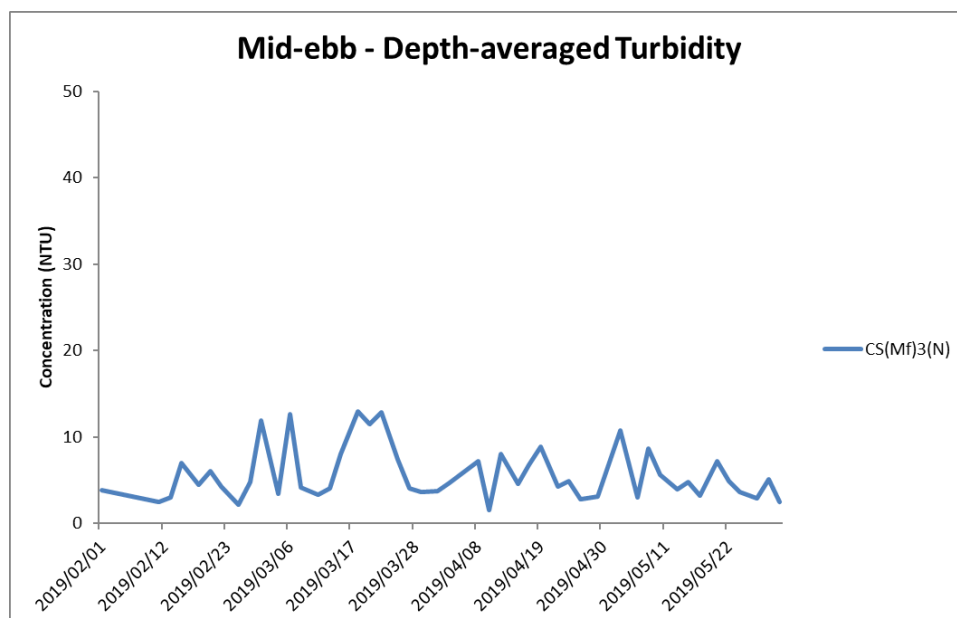


Figure H21 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
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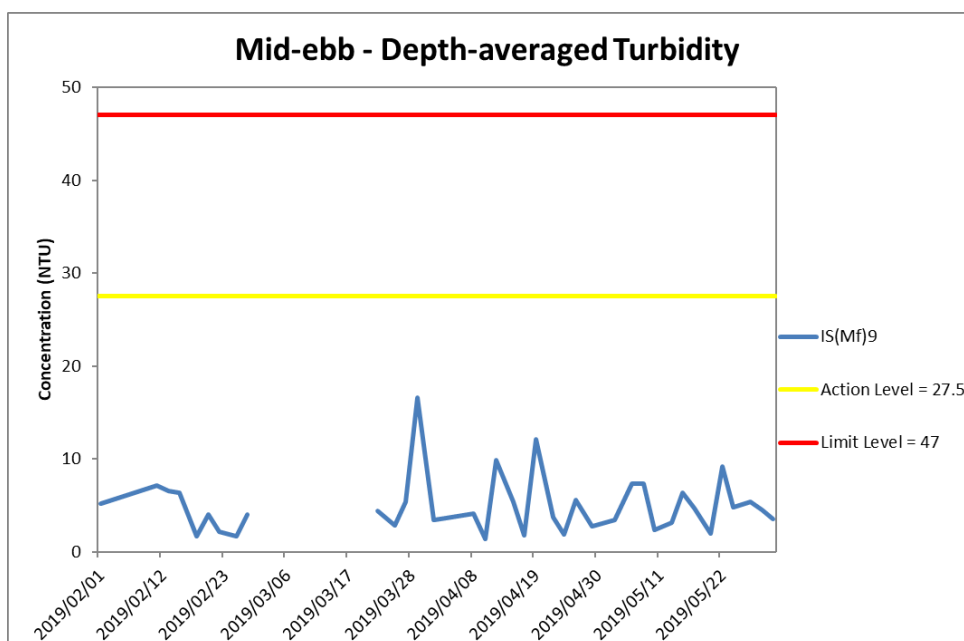
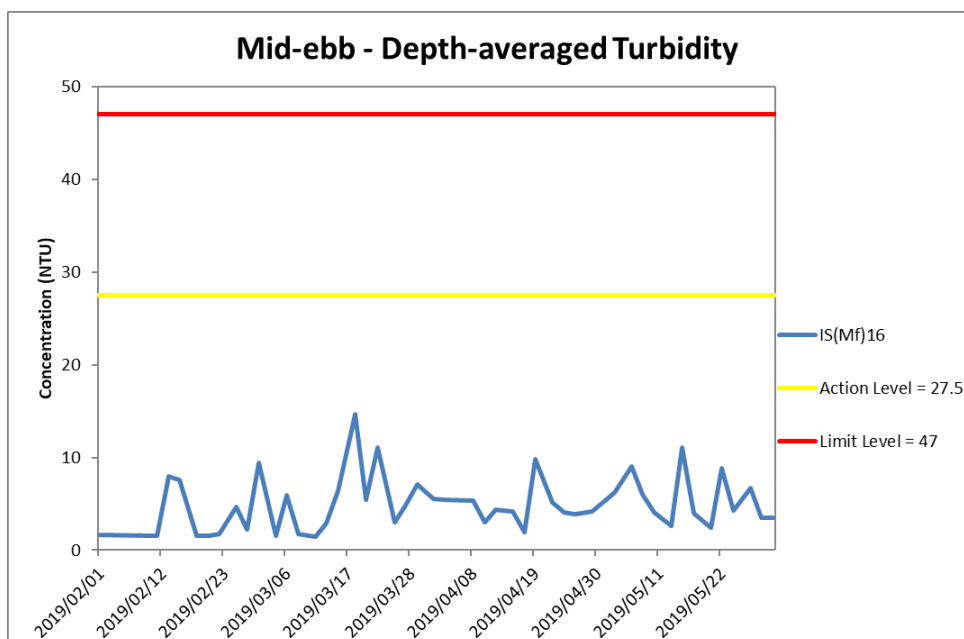


Figure H22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
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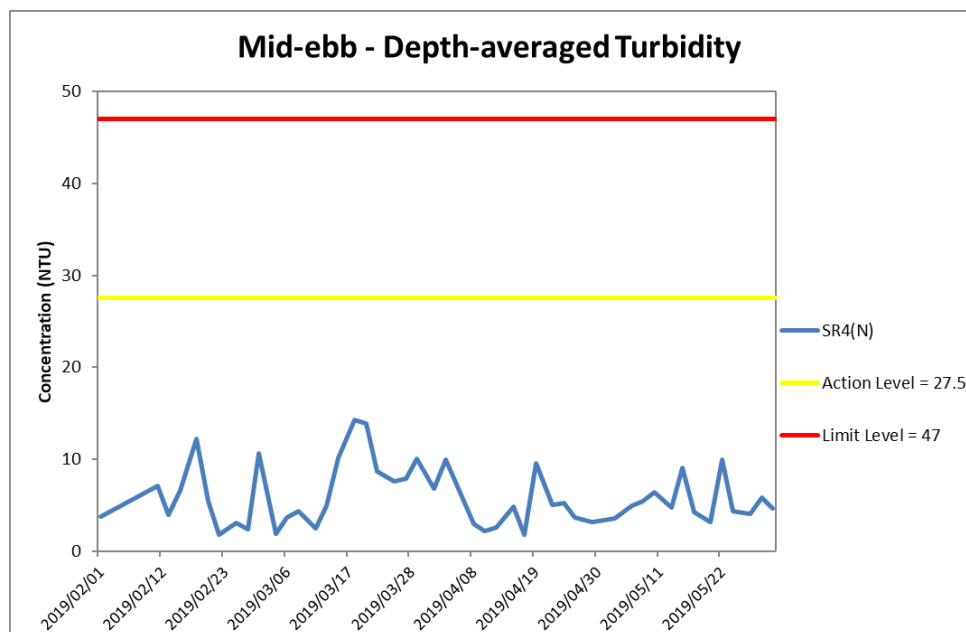
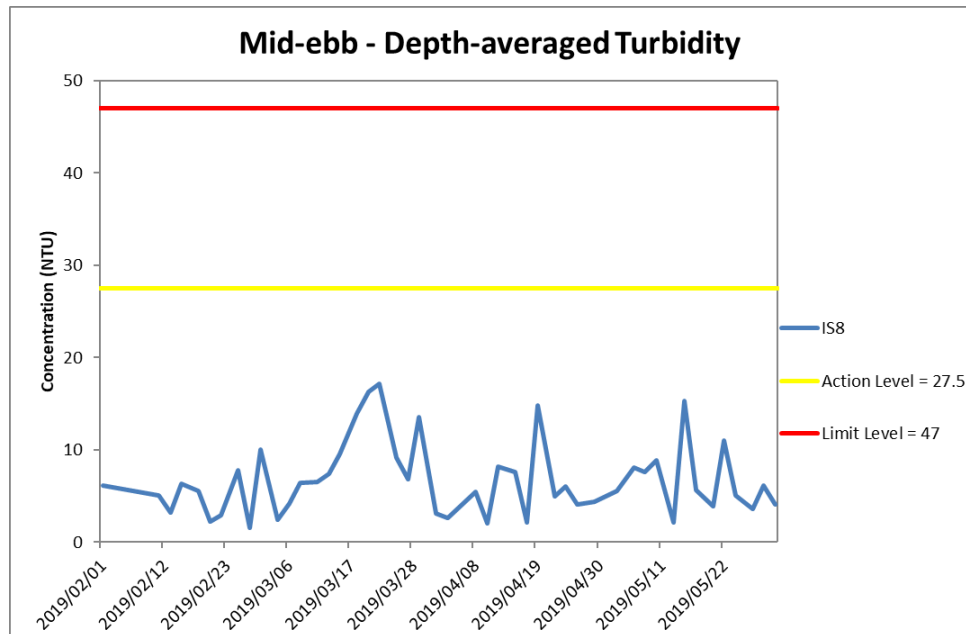


Figure H23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
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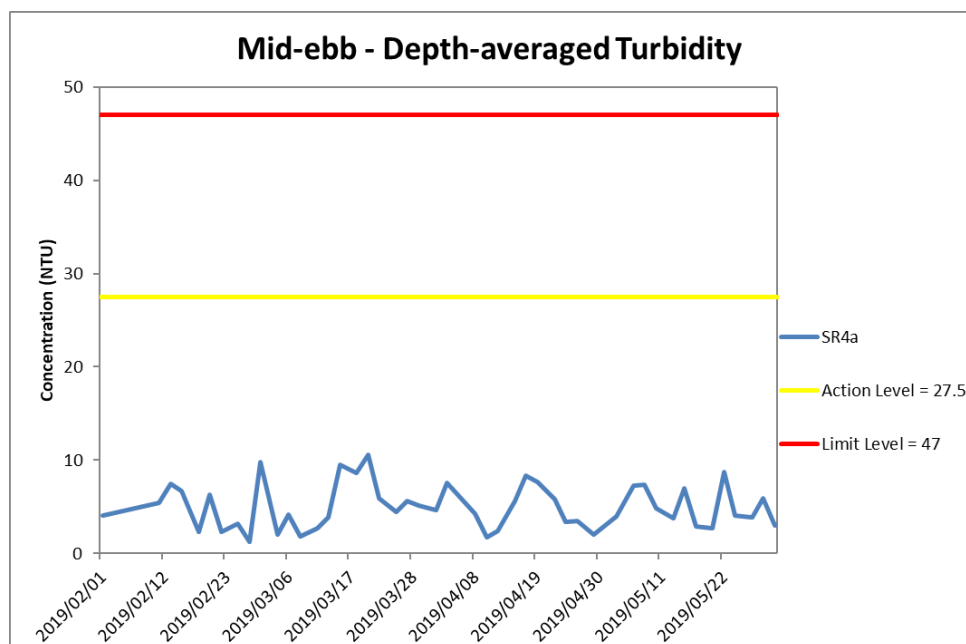


Figure H24 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 February and 31 May 2019 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



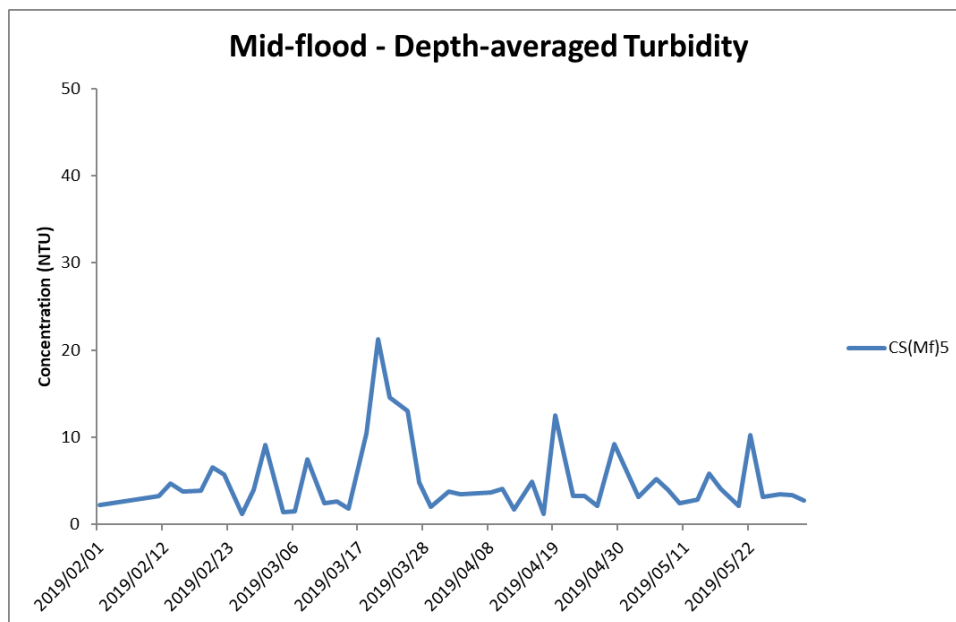
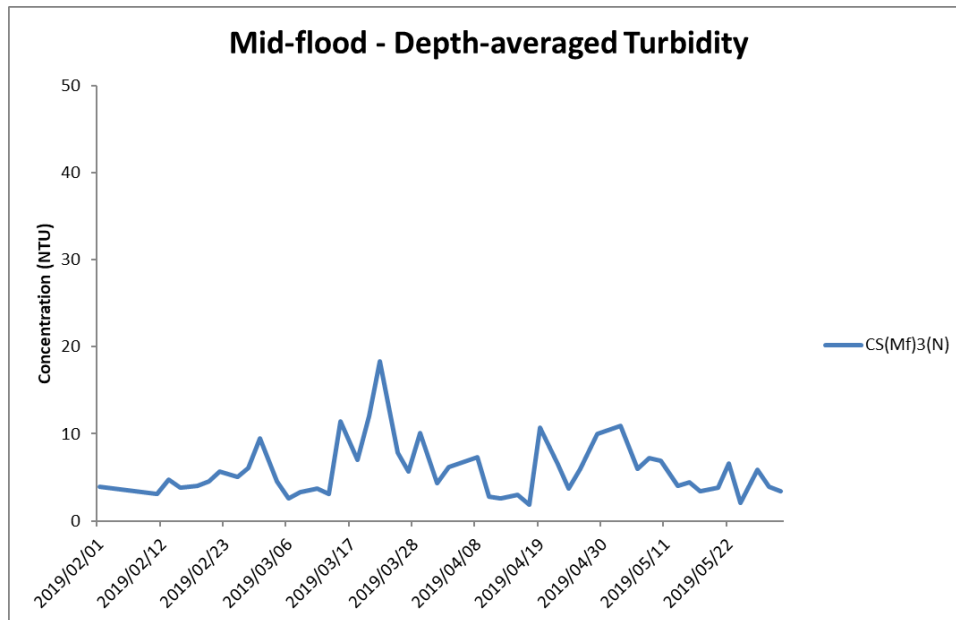


Figure H25 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(MF)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
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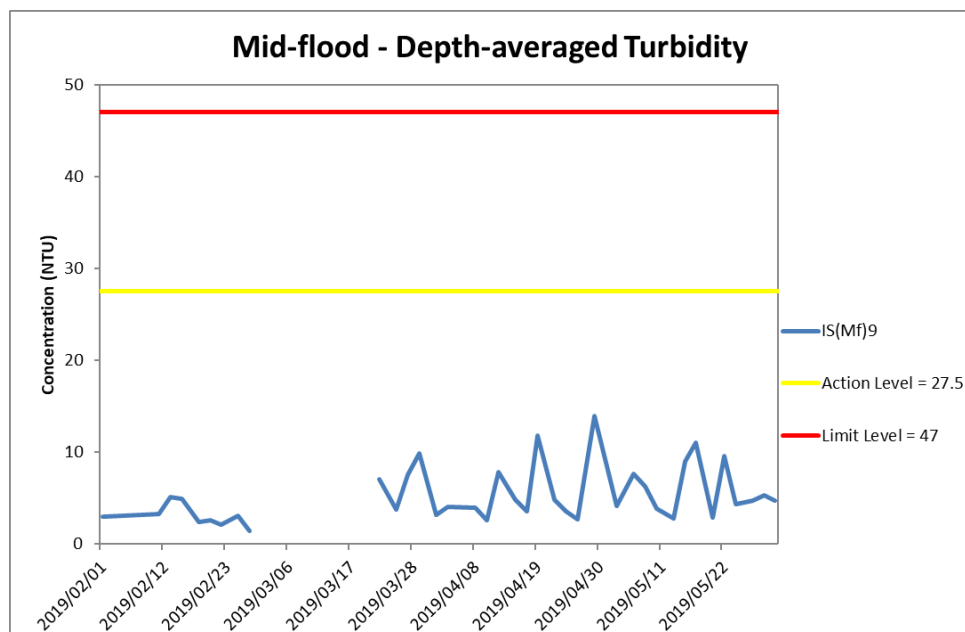
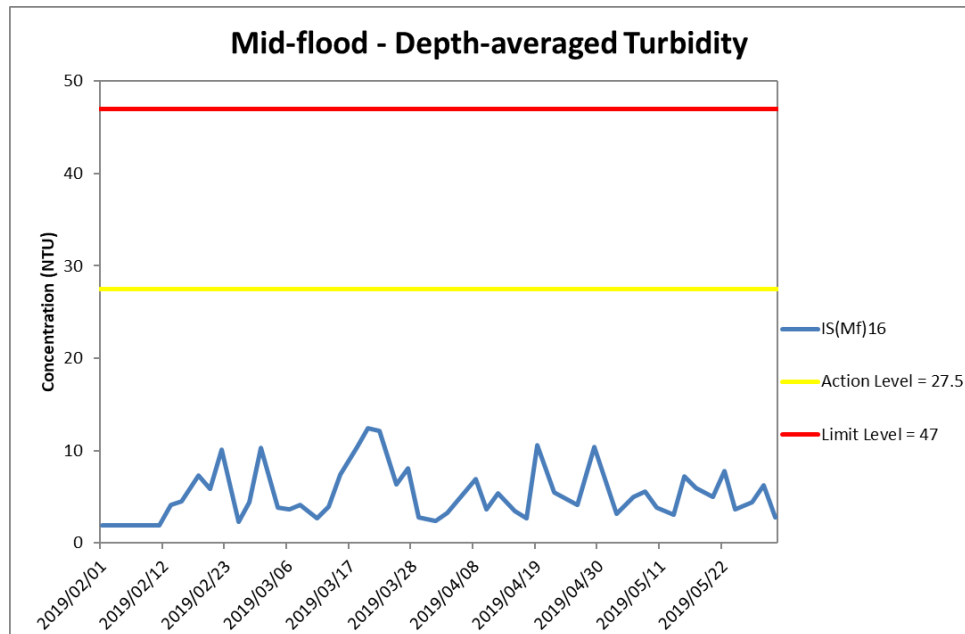


Figure H26 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
Resources
Management**



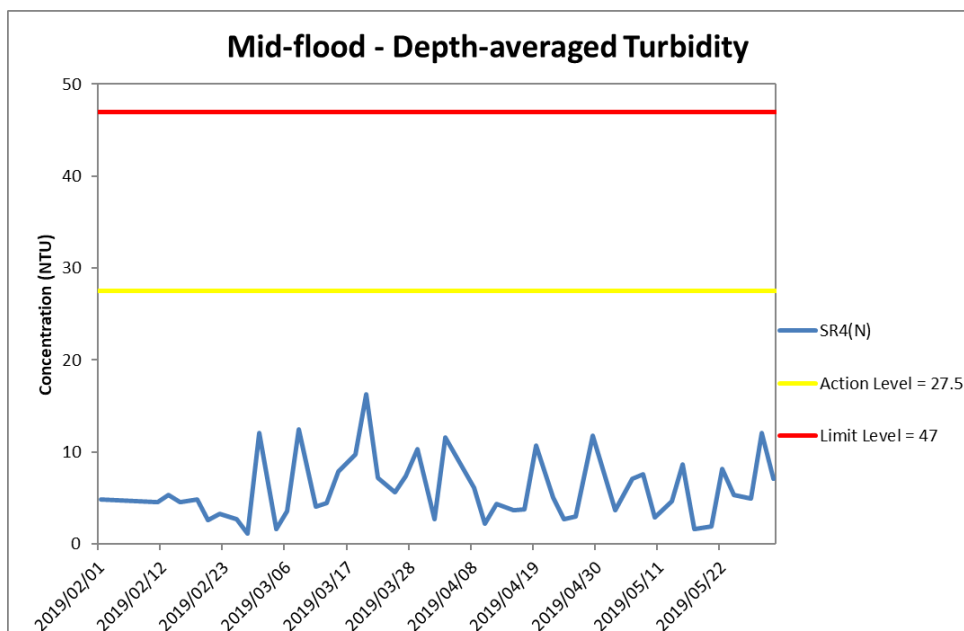
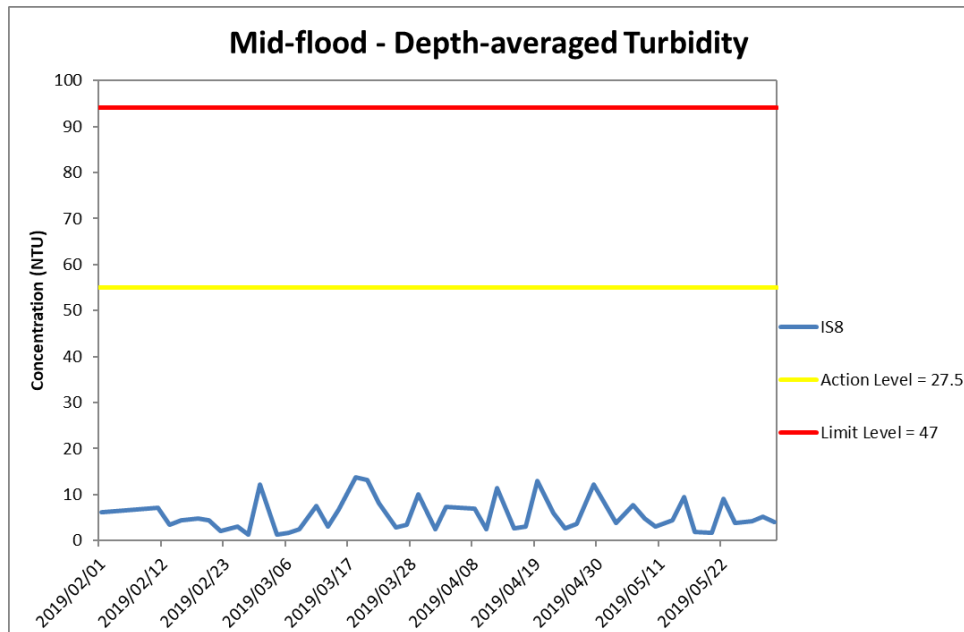


Figure H27 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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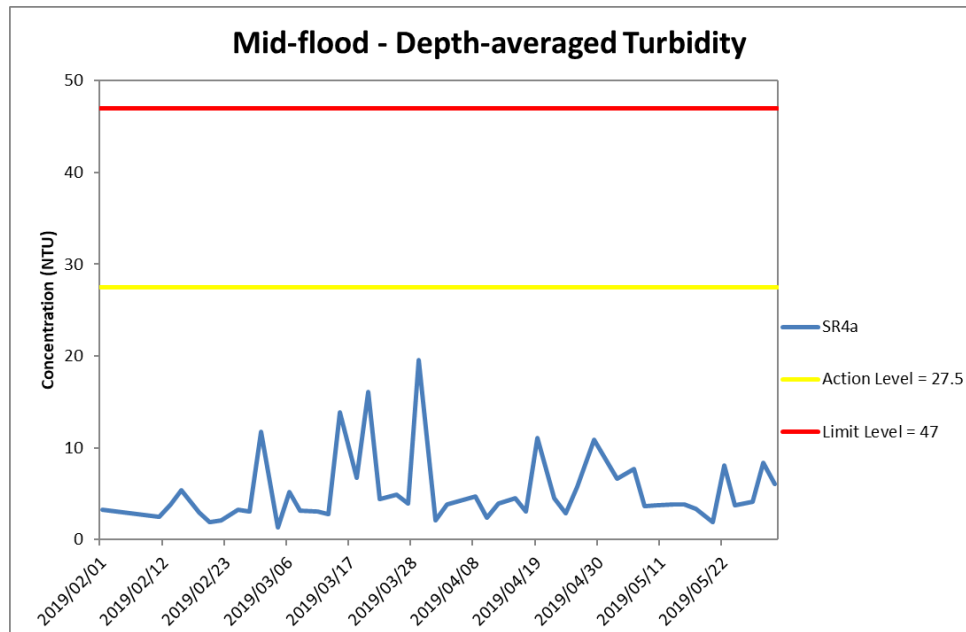


Figure H28 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 February and 31 May 2019 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

**Environmental
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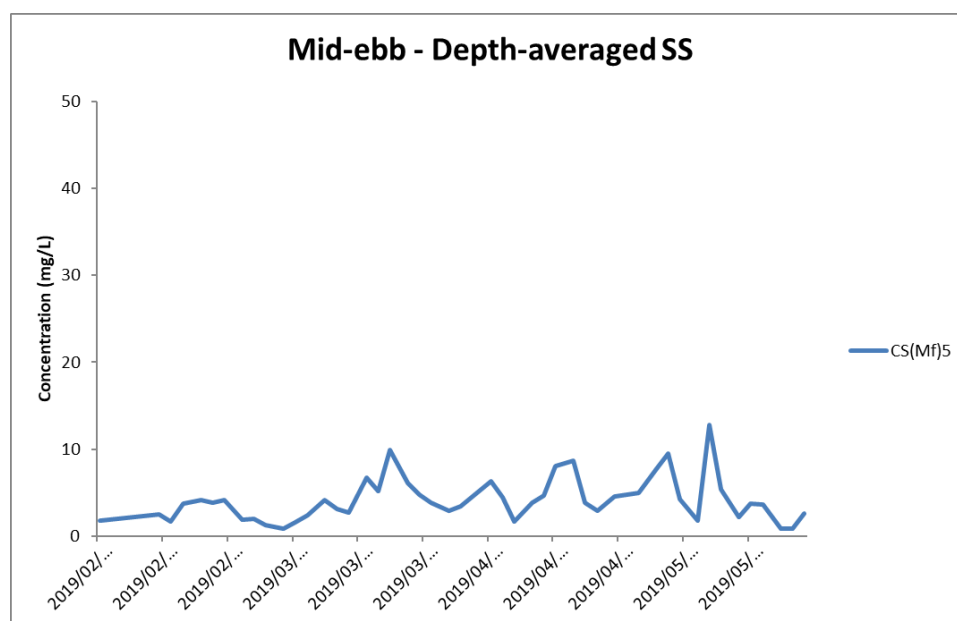
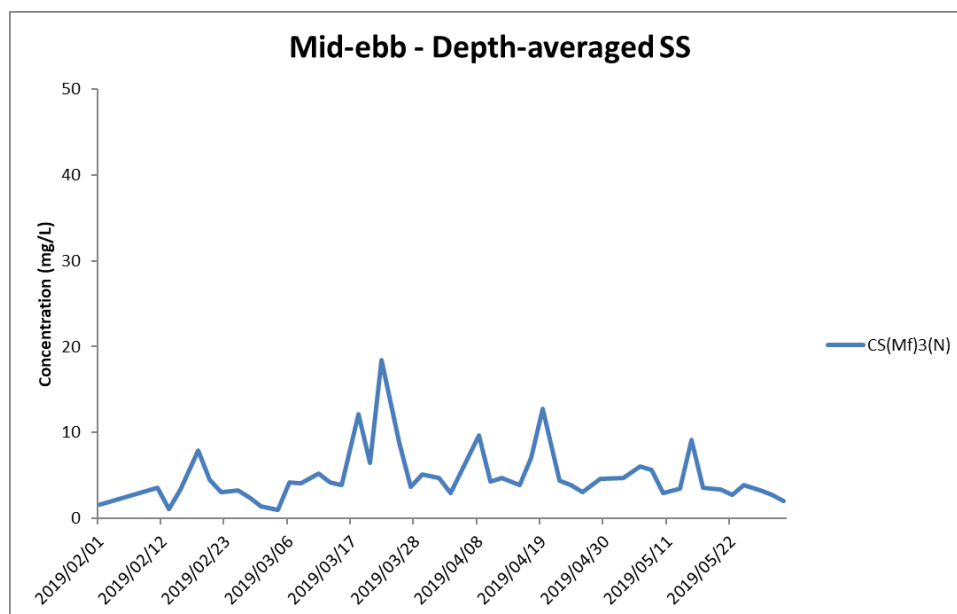


Figure H29 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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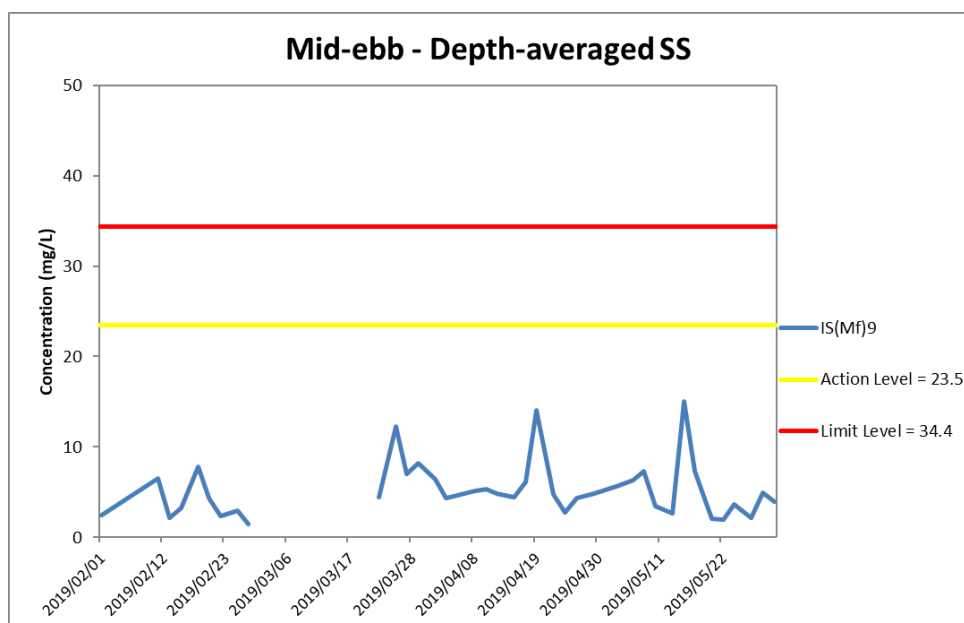
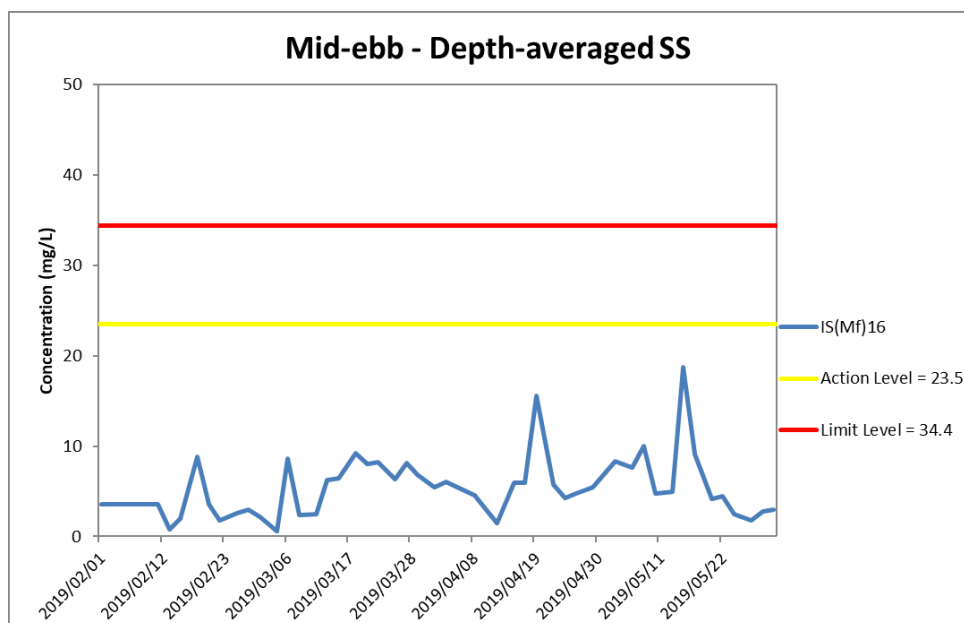


Figure H30 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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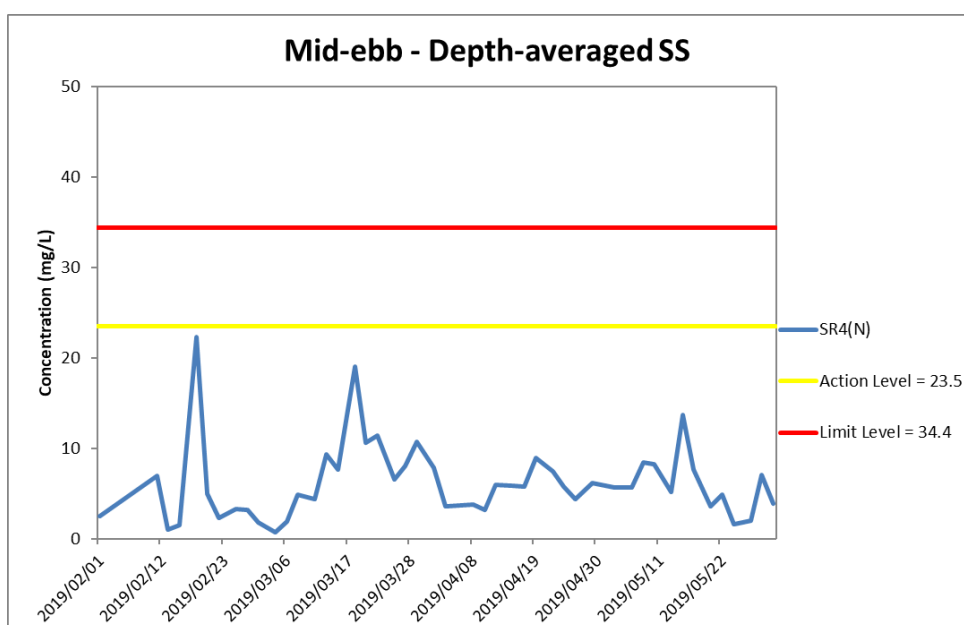
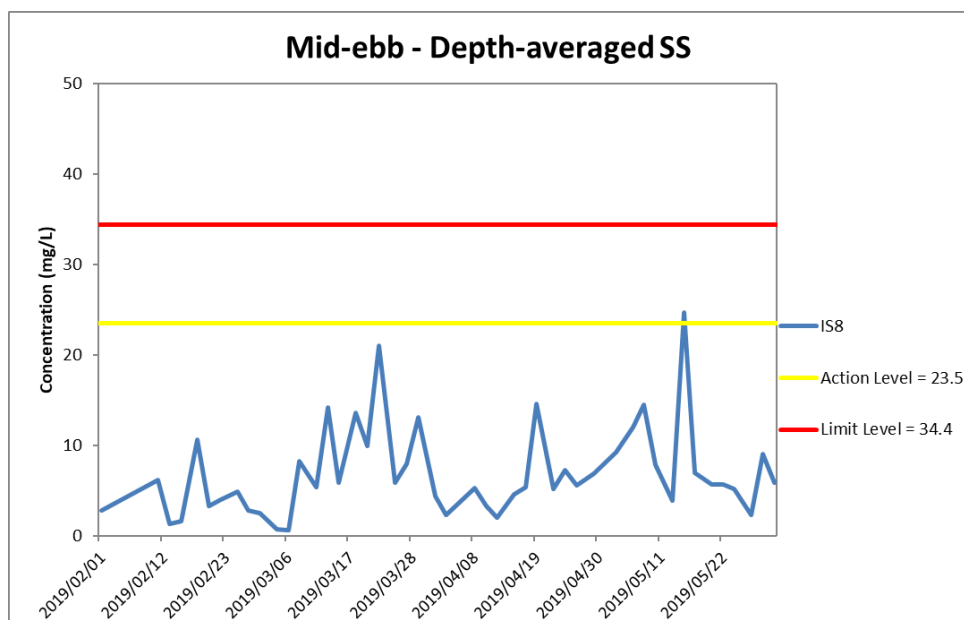


Figure H31 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2019 at IS8 and SR4(N).

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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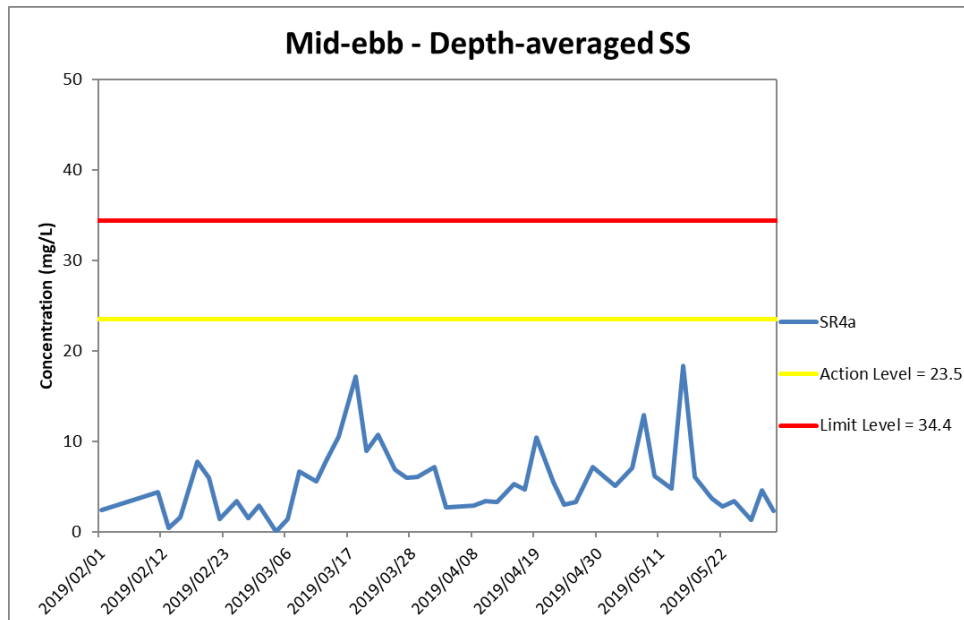


Figure H32 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 February and 31 May 2019 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.*

Marine works within the reporting period include Reinstatement of seawall at seafront.

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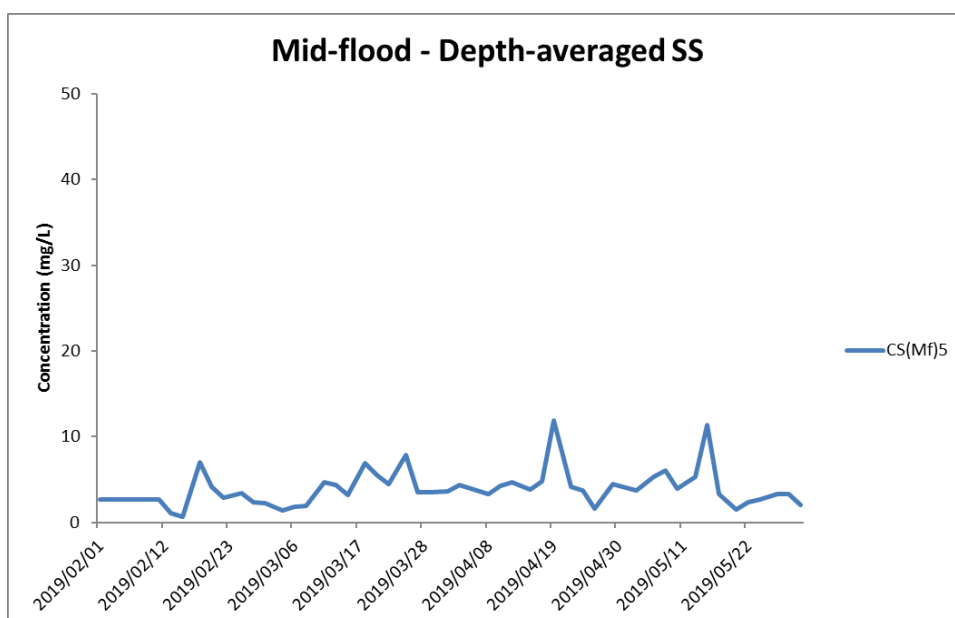
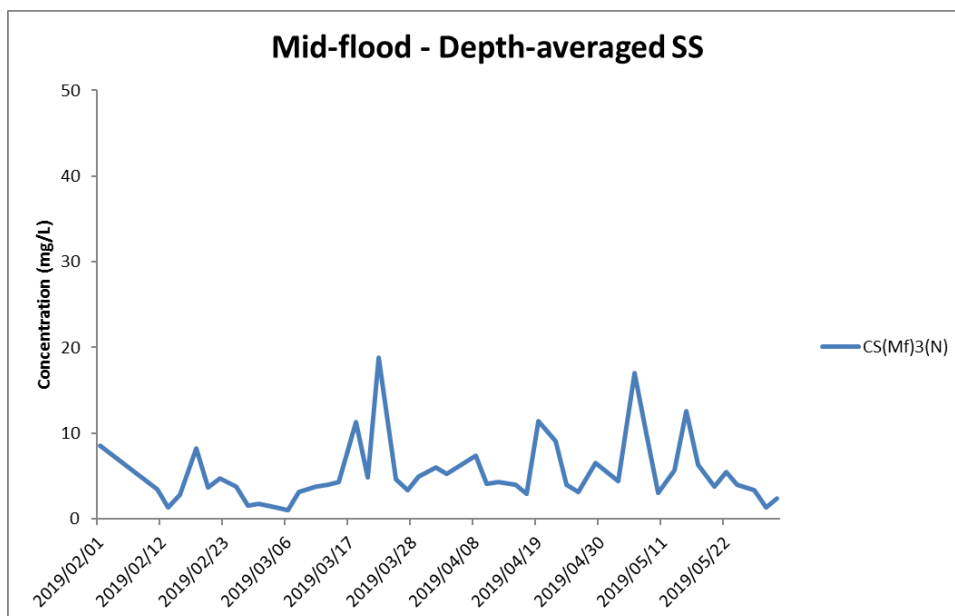


Figure H33 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2019 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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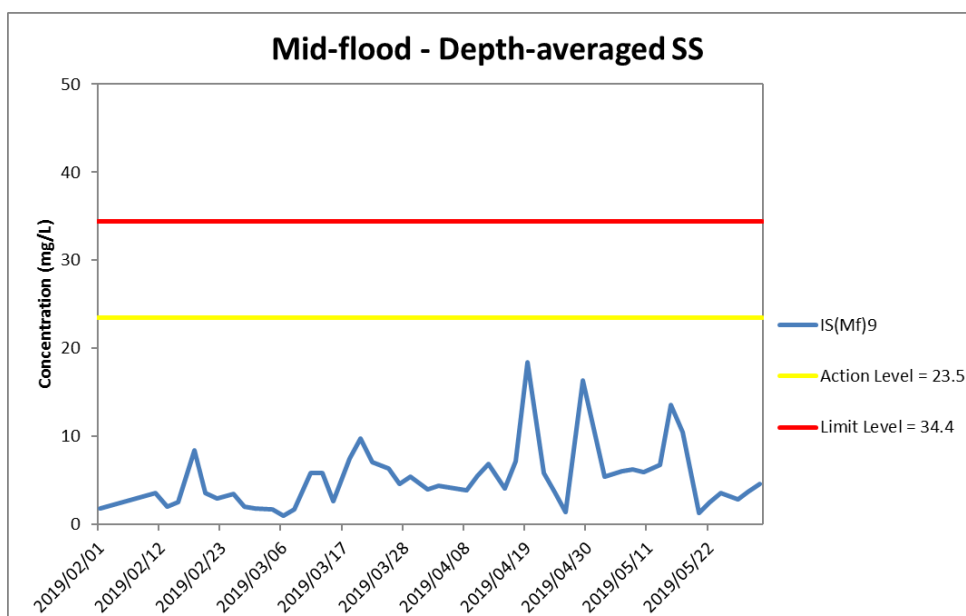
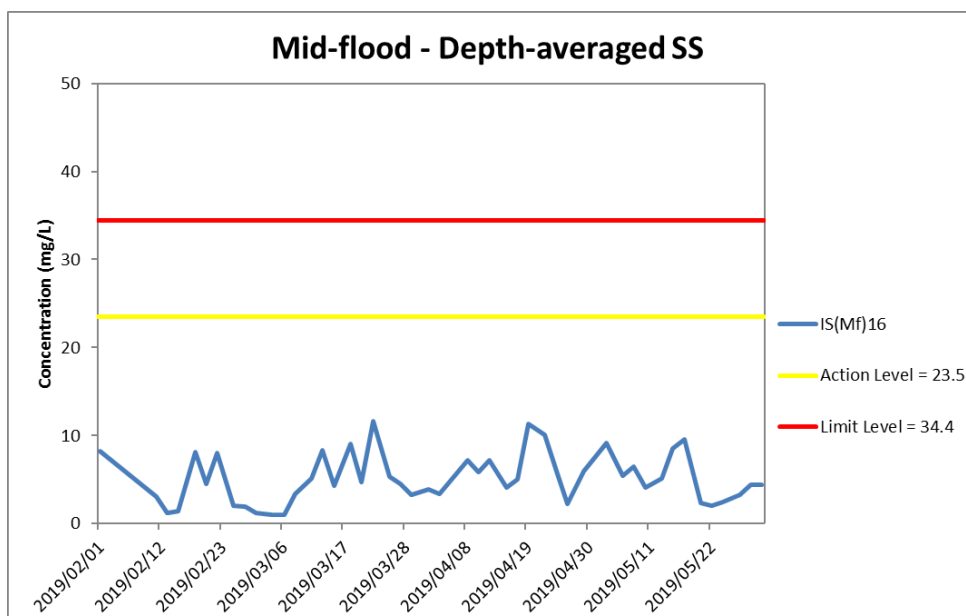


Figure H34 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2019 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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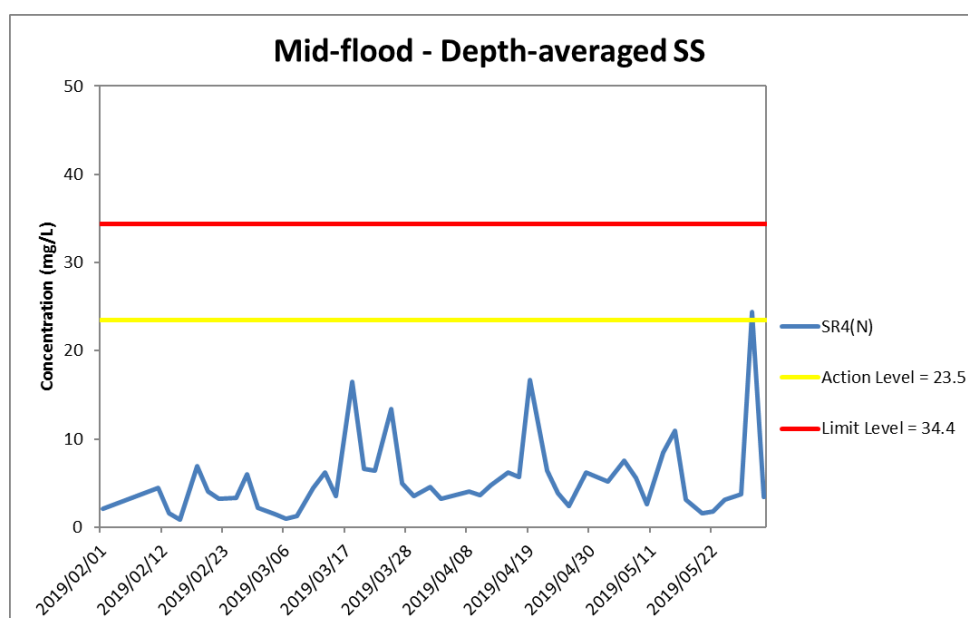
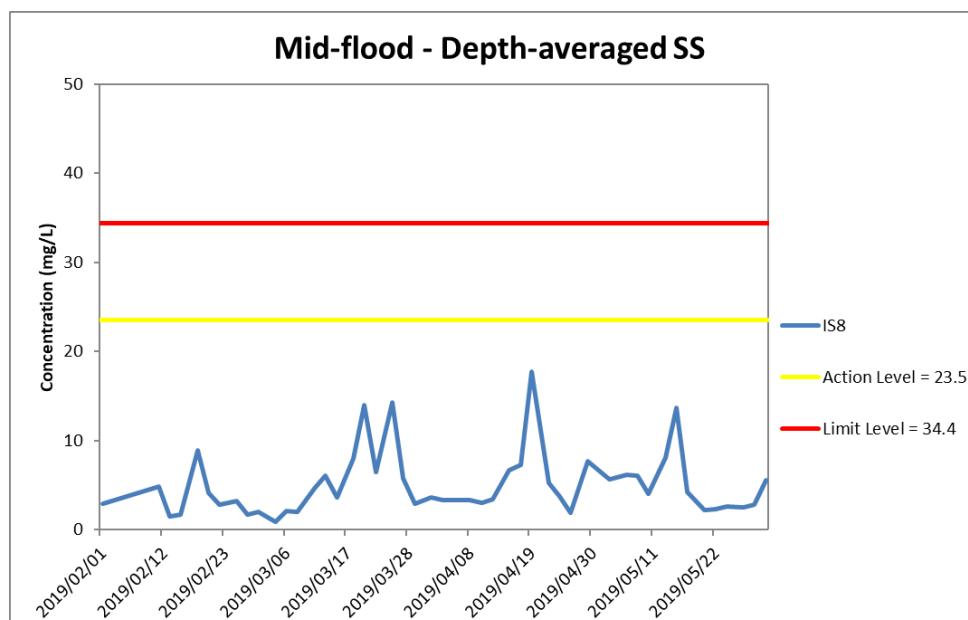


Figure H35 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2019 at IS8 and SR4(N).

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

WQM on 1 May 2019 was cancelled due to site closure on holiday.

In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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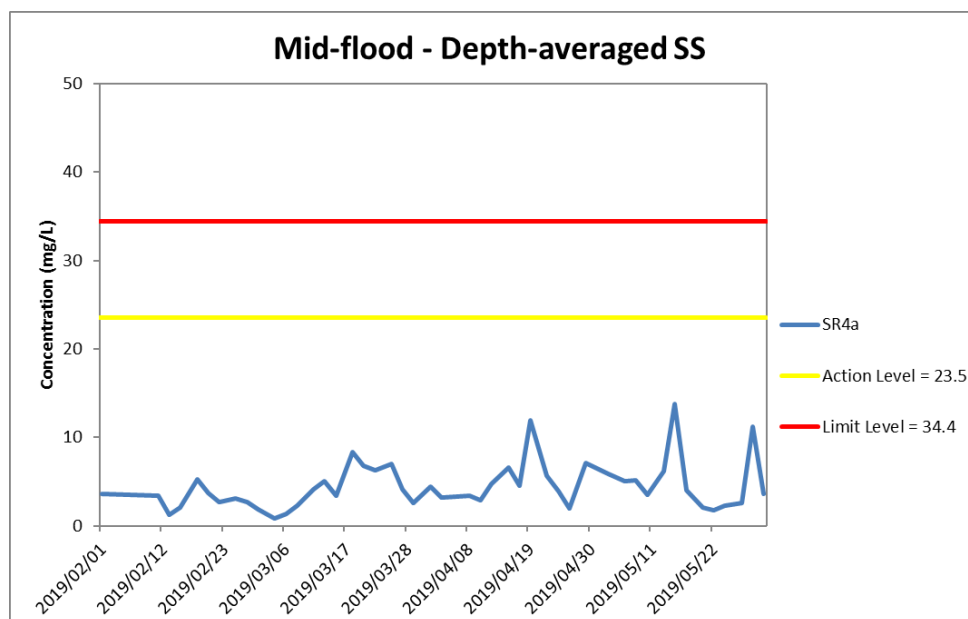


Figure H36 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 February and 31 May 2019 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 5 April and 1 May 2019 was cancelled due to site closure on holiday.
 In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

Marine works within the reporting period include Reinstatement of seawall at seafront.

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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**

*22nd Quarterly Progress Report (March-May 2019)
submitted to Gammon Construction Limited*

Submitted by
Samuel K.Y. Hung, Ph.D., Hong Kong Cetacean Research Project

19 August 2019

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 the 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 22nd 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 2019, utilizing the survey data collected by HKLR03 impact phase monitoring 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 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	815456		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805476	820800		14	Start Point	817537	820220
2	End Point	805476	826654		14	End Point	817537	824613
3	Start Point	806464	821150		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	821500		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	821850		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	822150		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	822000		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	821123		20	Start Point	823477	823402

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8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	821303		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562
10	Start Point	813525	821176		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818853		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807		24	Start Point	805476	815900
12	End Point	815542	824882		24	End Point	805476	819100

- 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 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2018). 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* 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 2019, 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 794.91 km of survey effort was collected, with 96.2% 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, 293.34 km and 501.57 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 572.37 km, while the effort on secondary lines was 222.54 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. A summary table of the survey effort is shown in Appendix I.
- 3.1.4. During the six sets of HKLR03 monitoring surveys from March to May 2019, only five groups of 11 Chinese White Dolphins were sighted. All five dolphin sightings were made during on-effort search in this quarter, with four of them being made on primary lines. A summary table of dolphin sightings is shown in Appendix II.

3.1.5. In this quarterly period, all dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during HKLR03 monitoring surveys.

3.2. *Distribution*

3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from March to May 2019 is shown in Figure 1. These sightings were all scattered at the western portion of the North Lantau region, with no particular concentration (Figure 1). And as consistently recorded in the previous monitoring quarters, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).

3.2.2. Notably, all dolphin sightings were located far away from the TM-CLKL alignment as well as the HKBCF and HKLR03 reclamation sites (Figure 1). However, one group of two dolphins was sighted near the HKLR09 alignment during the quarterly period.

3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (March-May 2019) was drastically different from the one during the baseline monitoring period (Figure 1). In the present quarter, dolphins have disappeared from 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 24 quarters of HKLR03 monitoring, which has resulted in zero to extremely low dolphin encounter rates in this area.

3.2.4. In NWL survey area, dolphin occurrence was also drastically different between the baseline and impact phase periods. During the present impact monitoring period, dolphins were sighted infrequently here, and mainly at the western portion of the North Lantau region. This was in contrary to their frequent occurrences throughout the area during the baseline period (Figure 1).

3.2.5. Another comparison in dolphin distribution was made between the six quarterly periods of spring months in 2014-19 (Figure 2). Among the six spring periods, dolphins were sighted regularly in NWL waters in 2014, but their usage was dramatically reduced to very low levels in the five subsequent spring periods, with their occurrences mostly concentrated at the western portion of North Lantau waters (Figure 2).

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).

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Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during March-May 2019

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 2019)	0.00	0.00
	Set 2 (13 & 18 Mar 2019)	0.00	0.00
	Set 3 (10 & 15 Apr 2019)	0.00	0.00
	Set 4 (23 & 25 Apr 2019)	0.00	0.00
	Set 5 (2 & 7 May 2019)	0.00	0.00
	Set 6 (21 & 23 May 2019)	0.00	0.00
Northwest Lantau	Set 1 (4 & 11 Mar 2019)	0.00	0.00
	Set 2 (13 & 18 Mar 2019)	3.41	6.81
	Set 3 (10 & 15 Apr 2019)	0.00	0.00
	Set 4 (23 & 25 Apr 2019)	1.64	3.27
	Set 5 (2 & 7 May 2019)	1.71	5.13
	Set 6 (21 & 23 May 2019)	0.00	0.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (March-May 2019) 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 2019	September – November 2011	March – May 2019	September – November 2011
Northeast Lantau	0.0	6.00 \pm 5.05	0.0	22.19 \pm 26.81
Northwest Lantau	1.13 \pm 1.39	9.85 \pm 5.85	2.54 \pm 3.00	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 1.04 sightings and 2.28 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 both zero with no on-effort sighting being made, and such extremely low occurrence of dolphins in NEL have been consistently recorded in the past 24 quarters of HKLR03 monitoring (Table 4). This is a serious

concern as the dolphin occurrence in NEL in the past five years (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) have remained exceptionally low when compared to the baseline period (Table 4). Dolphins have been virtually absent from NEL waters since August 2014, with only two lone dolphins sighted there on two separate occasions since then despite consistent and intensive survey effort being conducted in this survey area.

- 3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period (reductions of 88.5% and 94.3% respectively) were only tiny fractions of the ones recorded during the three-month baseline period, indicating a dramatic decline in dolphin usage of this survey area as well during the present impact phase period (Table 5).
- 3.3.5. When comparing among the seven spring quarters since 2013, the quarterly encounter rates in 2019 dropped to the lowest among all spring quarters during the HKLR03 construction phase (Table 5). Such dramatic drop in dolphin occurrence in NWL should raise serious concerns, and the temporal trend should be closely monitored in the upcoming monitoring quarters as the construction activities of HZMB works will soon be completed in coming months.
- 3.3.6. 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).
- 3.3.7. For the comparison between the baseline period and the present quarter (26th quarter of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0019 and 0.0113 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarters in both the average dolphin encounter rates of STG and ANI.
- 3.3.8. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. the first 26 quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were both 0.000000. Even if the alpha value is set at 0.00001, significant differences were still detected in both the average dolphin encounter rates of STG and ANI (i.e. between the two periods and the locations).

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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
June-August 2015 (Impact)	0.44 \pm 1.08	0.44 \pm 1.08
September-November 2015 (Impact)	0.00	0.00
December 2015-February 2016 (Impact)	0.00	0.00
March-May 2016 (Impact)	0.00	0.00
June-August 2016 (Impact)	0.00	0.00
September-November 2016 (Impact)	0.00	0.00
December 2016-February 2017 (Impact)	0.00	0.00
March-May 2017 (Impact)	0.00	0.00
June-August 2017 (Impact)	0.00	0.00
September-November 2017 (Impact)	0.00	0.00
December 2017-February 2018 (Impact)	0.00	0.00
March-May 2018 (Impact)	0.00	0.00
June-August 2018 (Impact)	0.00	0.00
September-November 2018 (Impact)	0.00	0.00
December 2018-February 2019 (Impact)	0.00	0.00
March-May 2019 (Impact)	0.00	0.00

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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
June-August 2015 (Impact)	2.53 \pm 3.20	9.21 \pm 11.57
September-November 2015 (Impact)	3.94 \pm 1.57	21.05 \pm 17.19
December 2015-February 2016 (Impact)	2.64 \pm 1.52	10.98 \pm 3.81
March-May 2016 (Impact)	0.98 \pm 1.10	4.78 \pm 6.85
June-August 2016 (Impact)	1.72 \pm 2.17	7.48 \pm 10.98
September-November 2016 (Impact)	2.86 \pm 1.98	10.89 \pm 10.98
December 2016-February 2017 (Impact)	3.80 \pm 3.79	14.52 \pm 17.21
March-May 2017 (Impact)	0.93 \pm 1.03	5.25 \pm 9.53
June-August 2017 (Impact)	2.20 \pm 2.88	6.58 \pm 8.12
September-November 2017 (Impact)	3.12 \pm 1.91	10.35 \pm 9.66
December 2017-February 2018 (Impact)	4.75 \pm 2.26	15.73 \pm 15.94
March-May 2018 (Impact)	2.88 \pm 4.81	11.12 \pm 22.46
June-August 2018 (Impact)	1.16 \pm 1.39	2.87 \pm 3.32
September-November 2018 (Impact)	1.51 \pm 2.25	2.70 \pm 3.78
December 2018-February 2019 (Impact)	2.40 \pm 1.88	7.95 \pm 6.60
March-May 2019 (Impact)	1.13 \pm 1.39	2.54 \pm 3.00

- 3.3.9. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented in previous quarters of the past few years.
- 3.3.10. The dramatic decline in dolphin usage of North Lantau region raises serious concern, as the timing of the decline in dolphin usage in North Lantau waters coincided well with the construction schedule of the HZMB-related projects (Hung 2018). Apparently there has been no sign of recovery of dolphin usage even though almost all marine works associated with the HZMB construction have been completed, and the Brothers Marine Park has been established as a compensation measure for the permanent habitat loss in association with the HKBCF reclamation works.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from two to three individuals per group in North Lantau region during March to May 2019. 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 2019) and baseline monitoring period (September – November 2011) (Note: \pm denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	March – May 2019	September – November 2011
Overall	2.20 \pm 0.45 (n = 5)	3.72 \pm 3.13 (n = 66)
Northeast Lantau	---	3.18 \pm 2.16 (n = 17)
Northwest Lantau	2.20 \pm 0.45 (n = 5)	3.92 \pm 3.40 (n = 49)

- 3.4.2. The average dolphin group size in NWL waters during March to May 2019 was much lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of only five dolphin groups in the present quarter was very small when compared to the 66 groups sighted during the baseline period (Table 6).
- 3.4.3. Notably, all five groups were very small with 2-3 individuals per group only (Appendix II).
- 3.5. *Habitat use*
- 3.5.1. From March to May 2019, only five grids in North Lantau waters recorded dolphin occurrence. The only grid with moderate dolphin density was located to the northeast of Lung Kwu Chau (Figures 3a and 3b). In contrast, the rest of the grids only recorded moderately low densities.
- 3.5.2. Notably, all grids near TMCLKL alignment did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 3a and 3b).

- 3.5.3. 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 should be examined when more survey effort for each grid is collected throughout the impact phase monitoring programme.
- 3.5.4. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present impact monitoring period (Figure 4). During the baseline period, many grids between Siu Mo To and Shum Shui Kok in NEL recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins there during the present impact phase period (Figure 4).
- 3.5.5. The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with high dolphin usage throughout the area, especially 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. In contrast, only one grid with moderate density was located in the western portion of North Lantau waters during the present impact phase period (Figure 4).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the present quarterly period, no young calf was sighted at all among the five groups of dolphins.
- 3.7. *Activities and associations with fishing boats*
- 3.7.1. Among the five dolphin groups, none of them was engaged in feeding, socializing, traveling or milling/resting activity during the quarterly period.
- 3.7.2. Moreover, none of the five dolphin groups was found to be associated with any operating fishing vessel during the present impact phase period.
- 3.8. *Summary of photo-identification works*
- 3.8.1. From March to May 2019, about 400 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, five individuals sighted six times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these re-sightings were made in NWL. With the exception of NL123 being re-sighted twice, the other four individuals (i.e. NL182, NL202, NL261 and WL145) were all re-sighted only once during the quarterly monitoring period (Appendix III).
- 3.8.3. Notably, none of these individuals was sighted in WL waters during the HKLR09 monitoring surveys under the same three-month period of March to May 2019.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the five 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 the present quarter were utilizing NWL waters only, but have completely avoided 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 the baseline period.
- 3.9.3. Moreover, in contrary to previous monitoring quarters, none of the five individuals have extended their range use to WL waters during the spring quarter of 2019, while one individual (WL145) that has consistently utilized WL waters in the past have extended its range use to NWL survey area during the present quarter (Appendix V).

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

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- Hung, S. K. 2018. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2017-18). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 174 pp.
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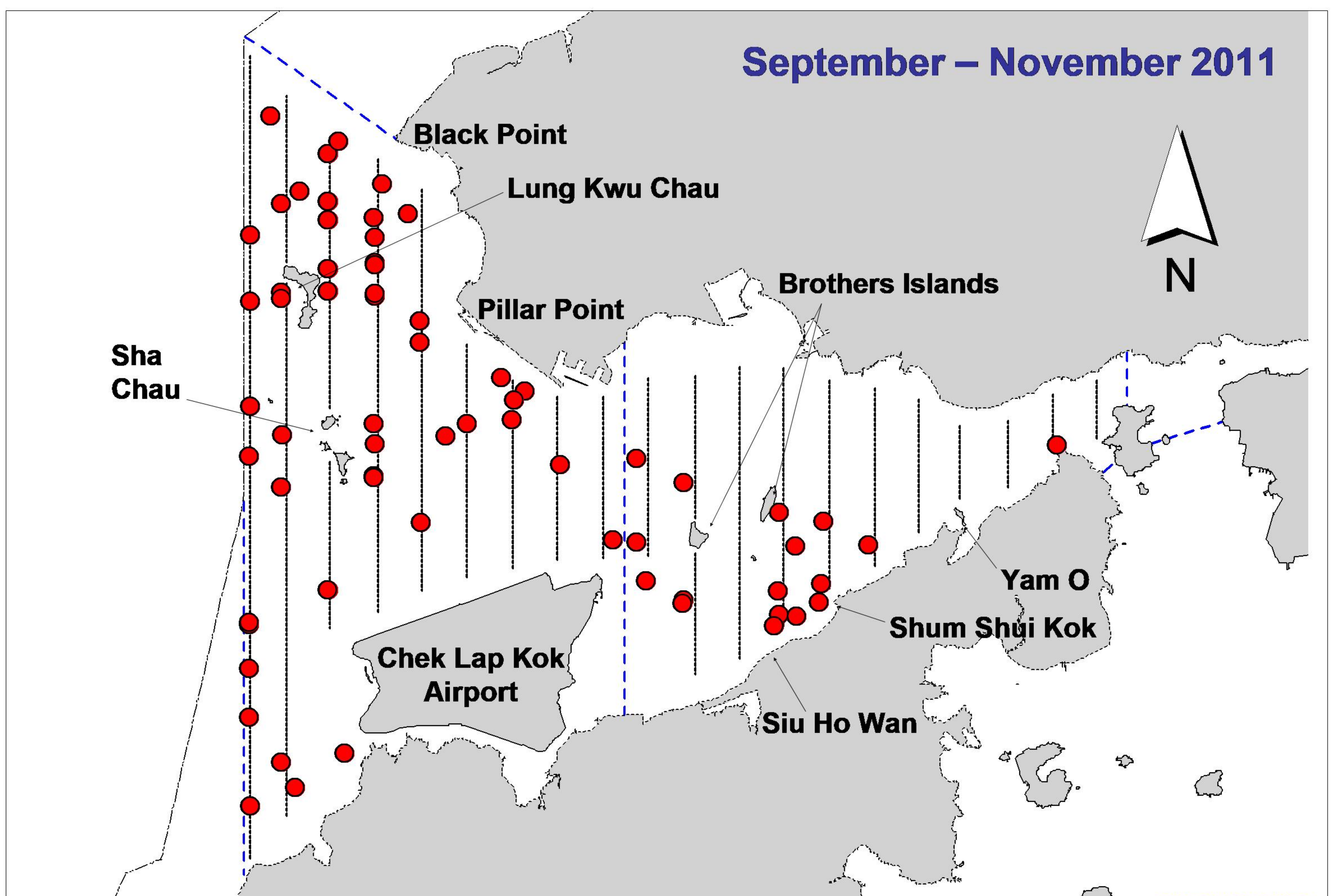
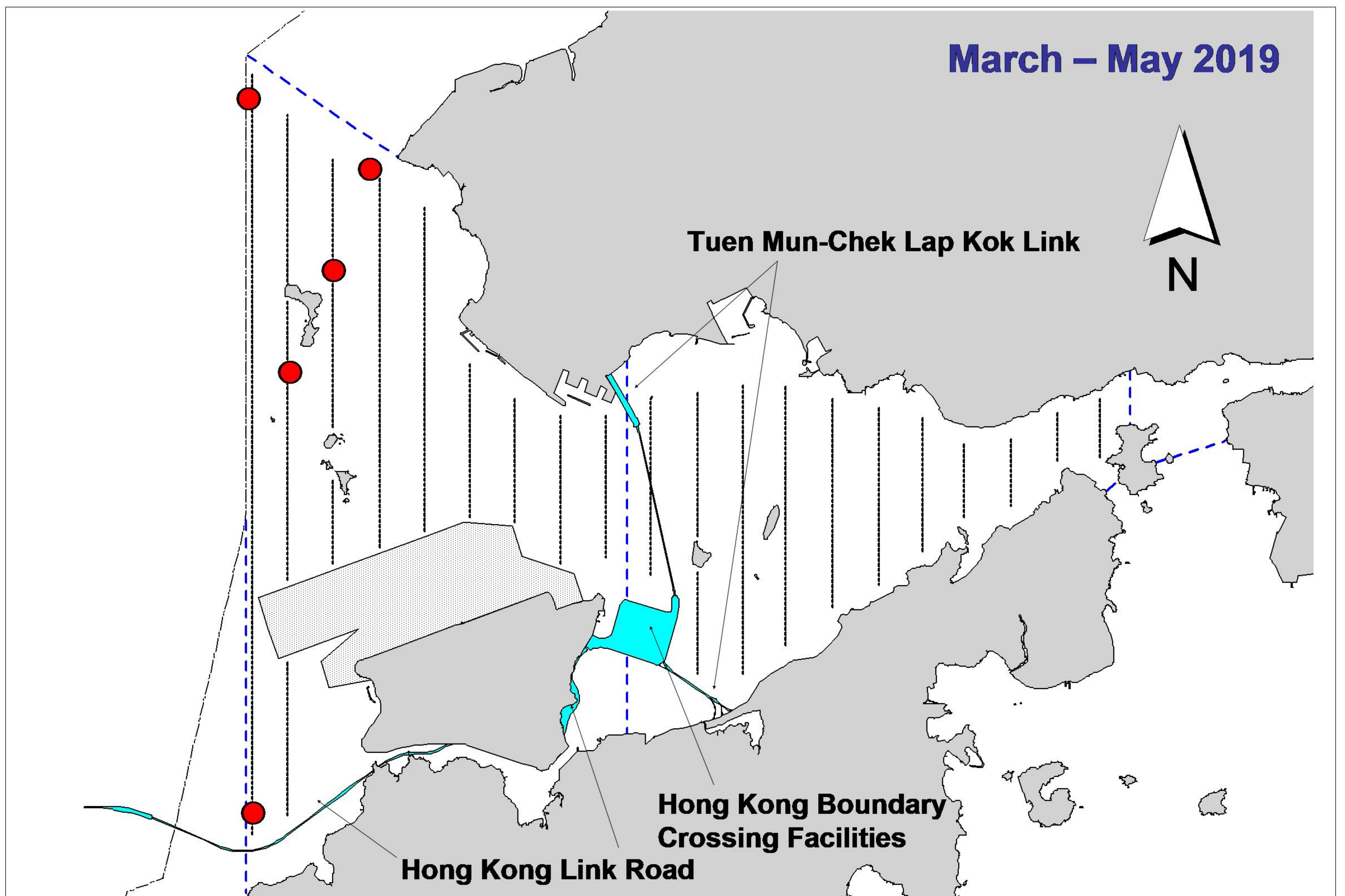


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

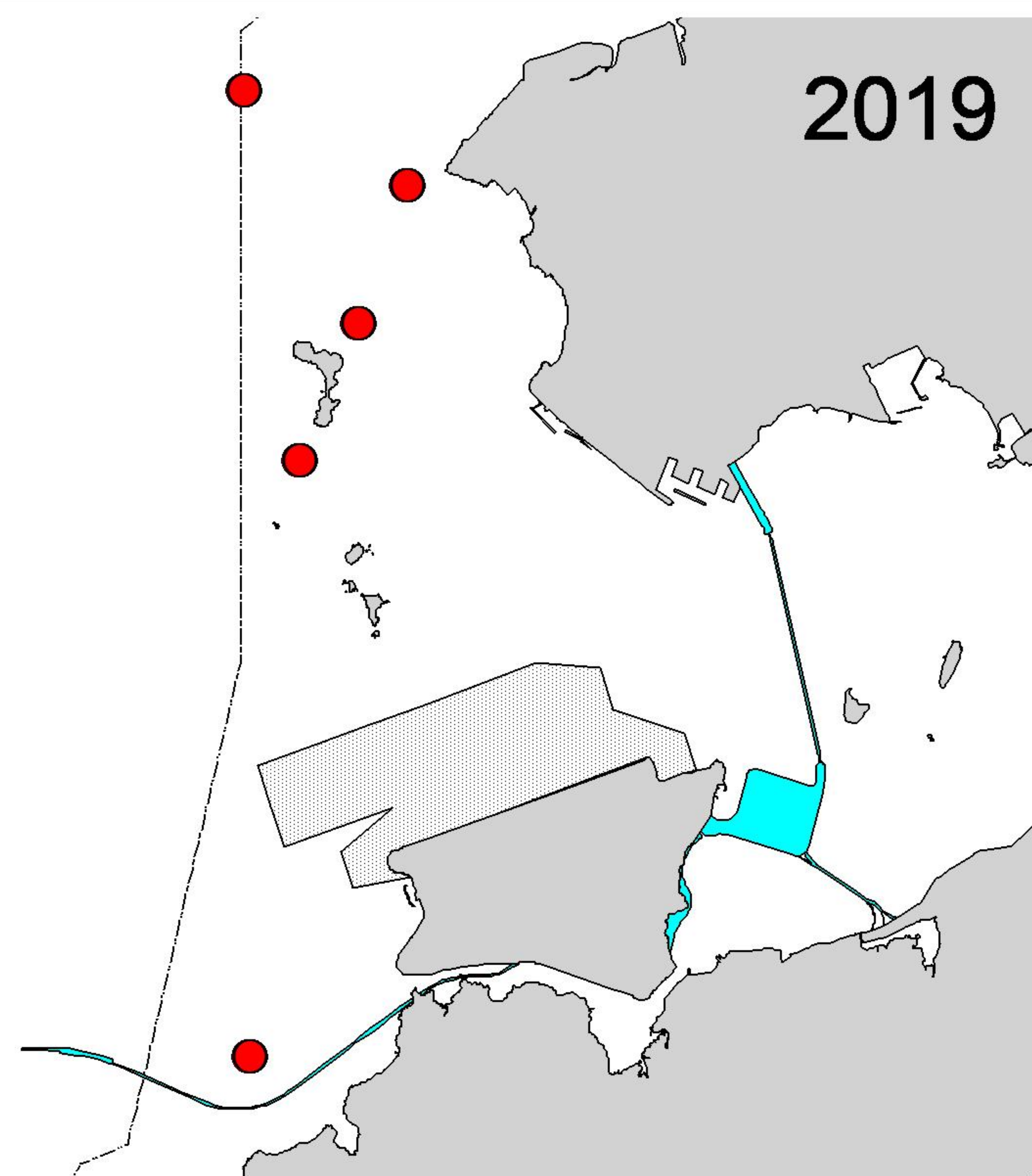
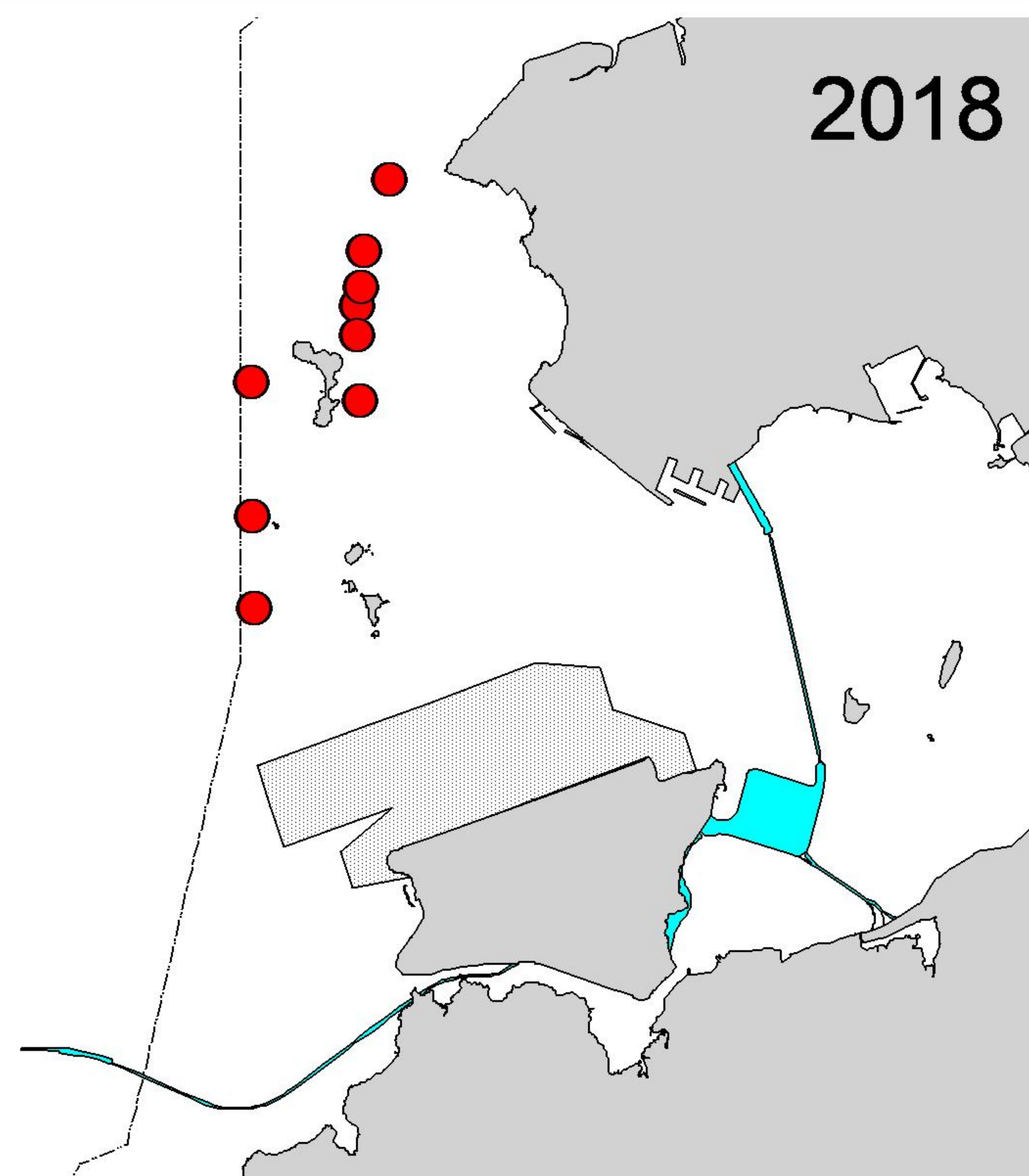
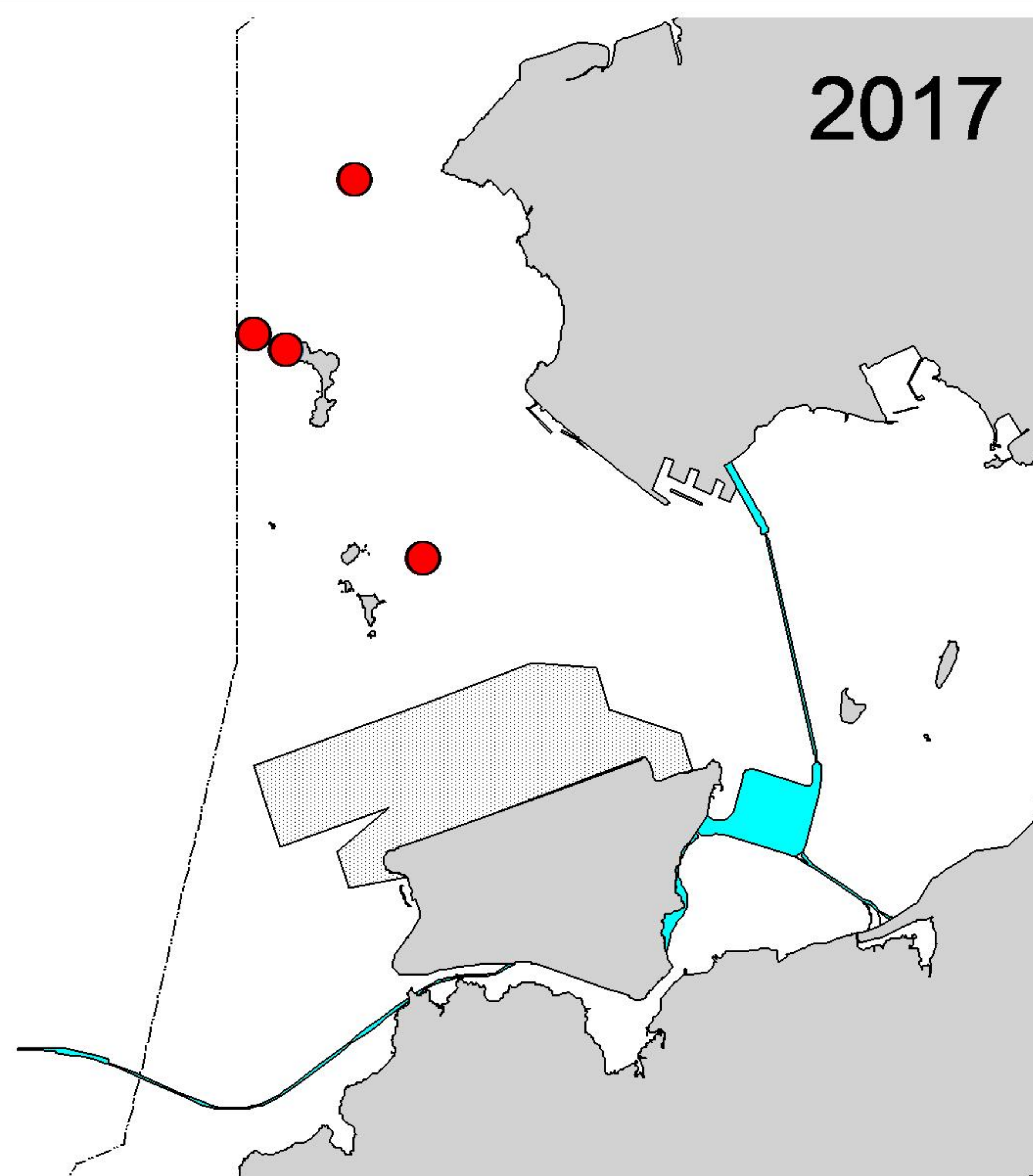
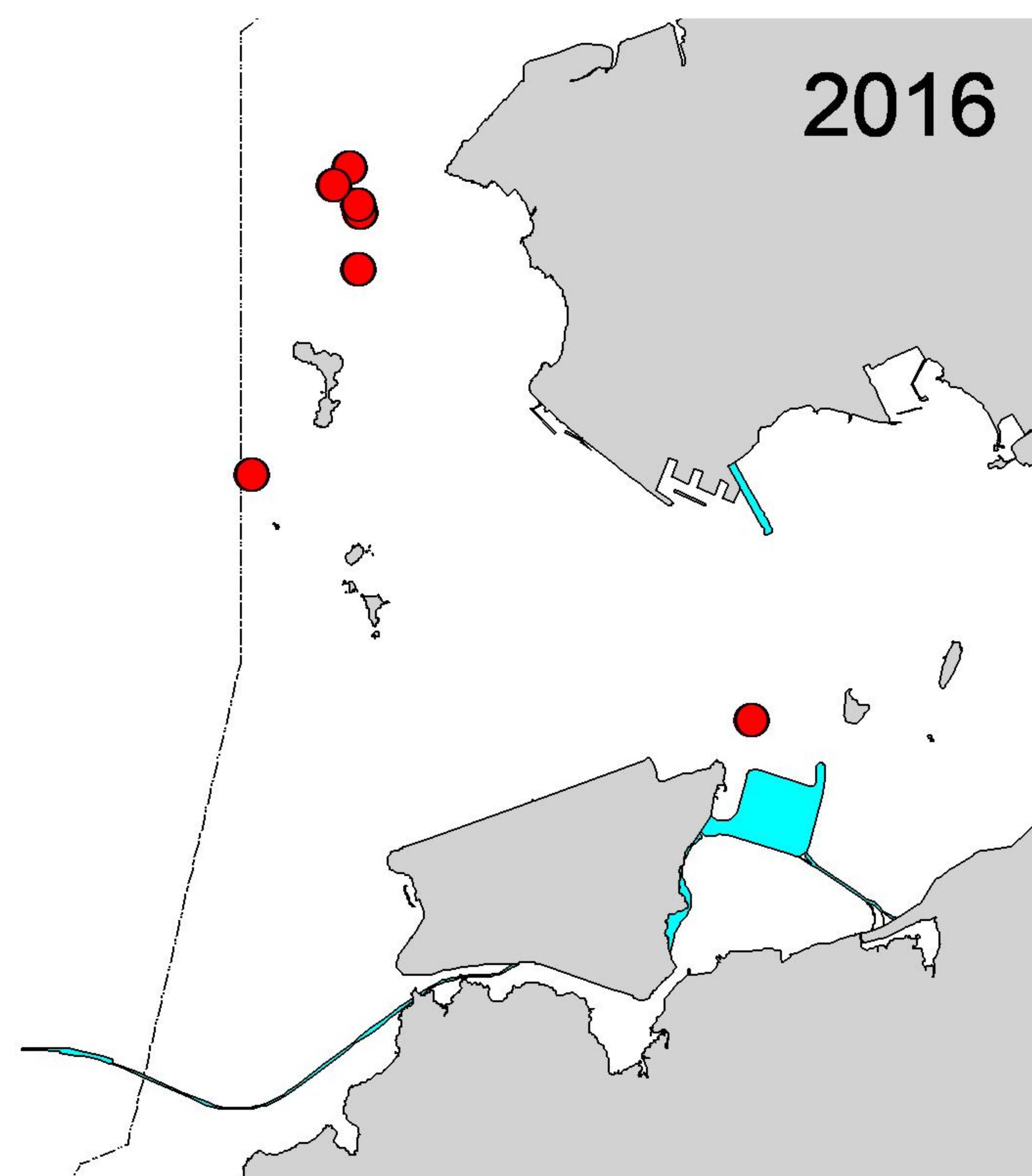
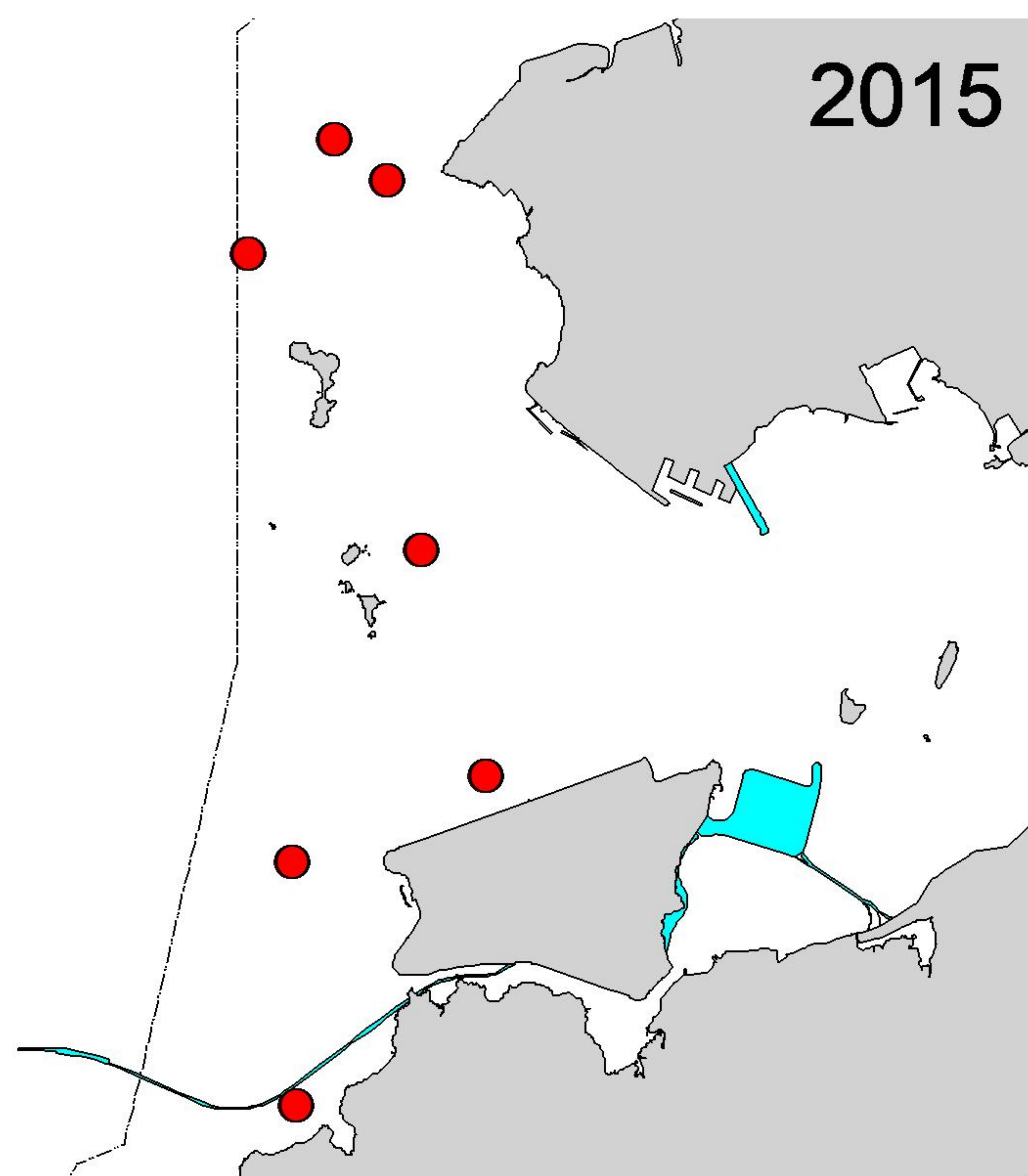
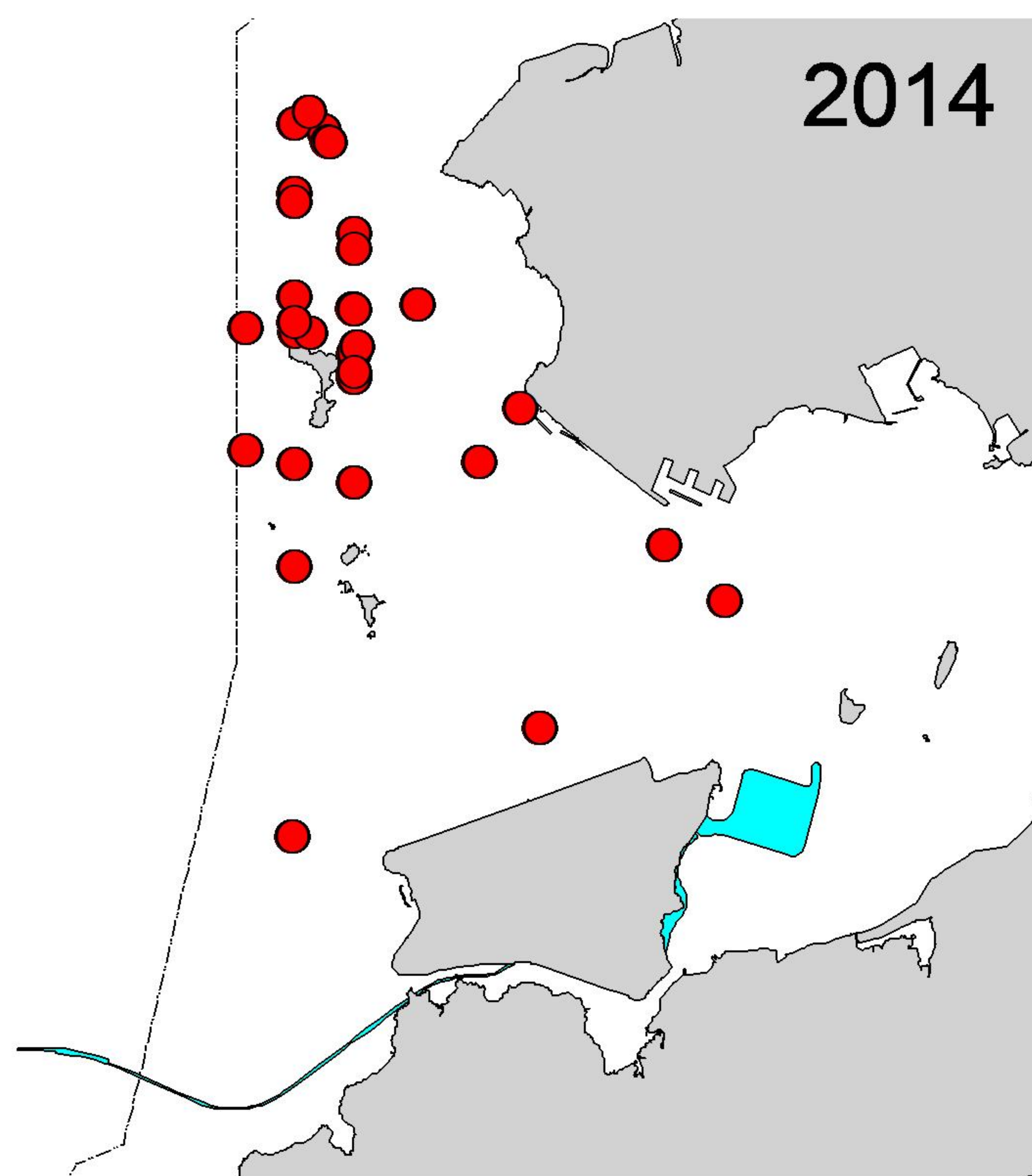


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six spring quarters (March-May) of HKLR03 impact phase in 2014-19

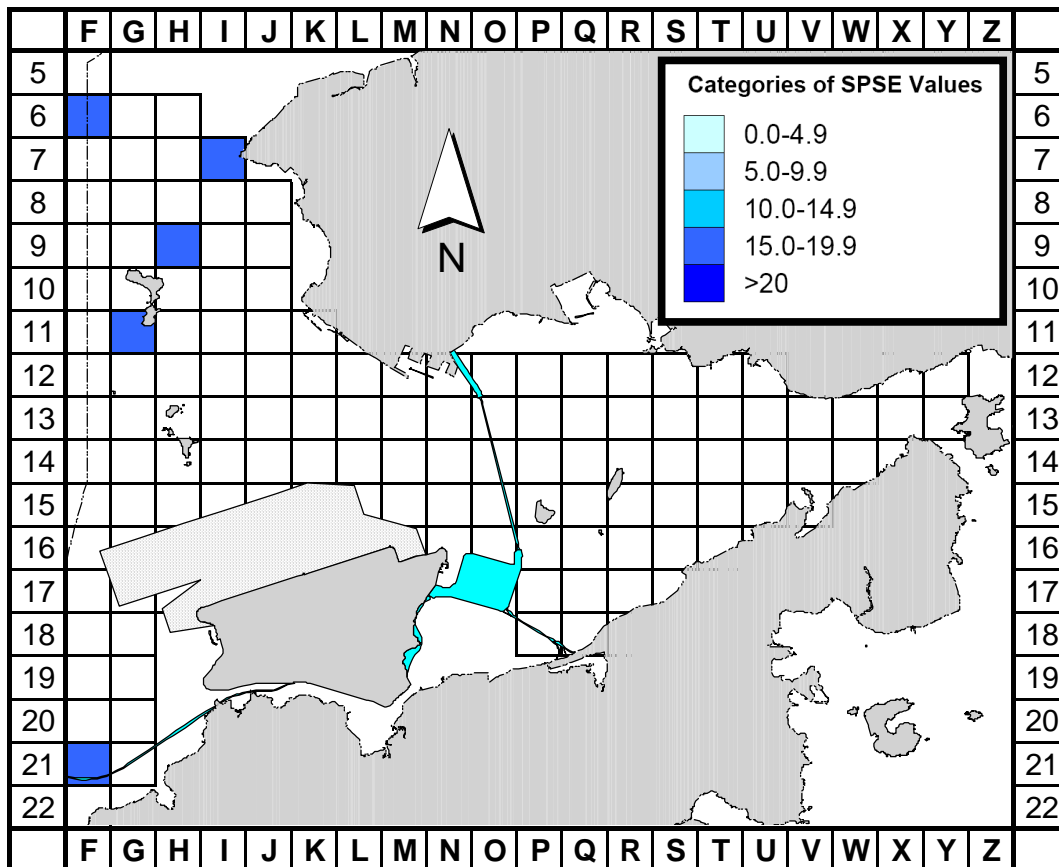


Figure 3a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (March-May 19) (SPSE = no. of on-effort sightings per 100 units of survey effort)

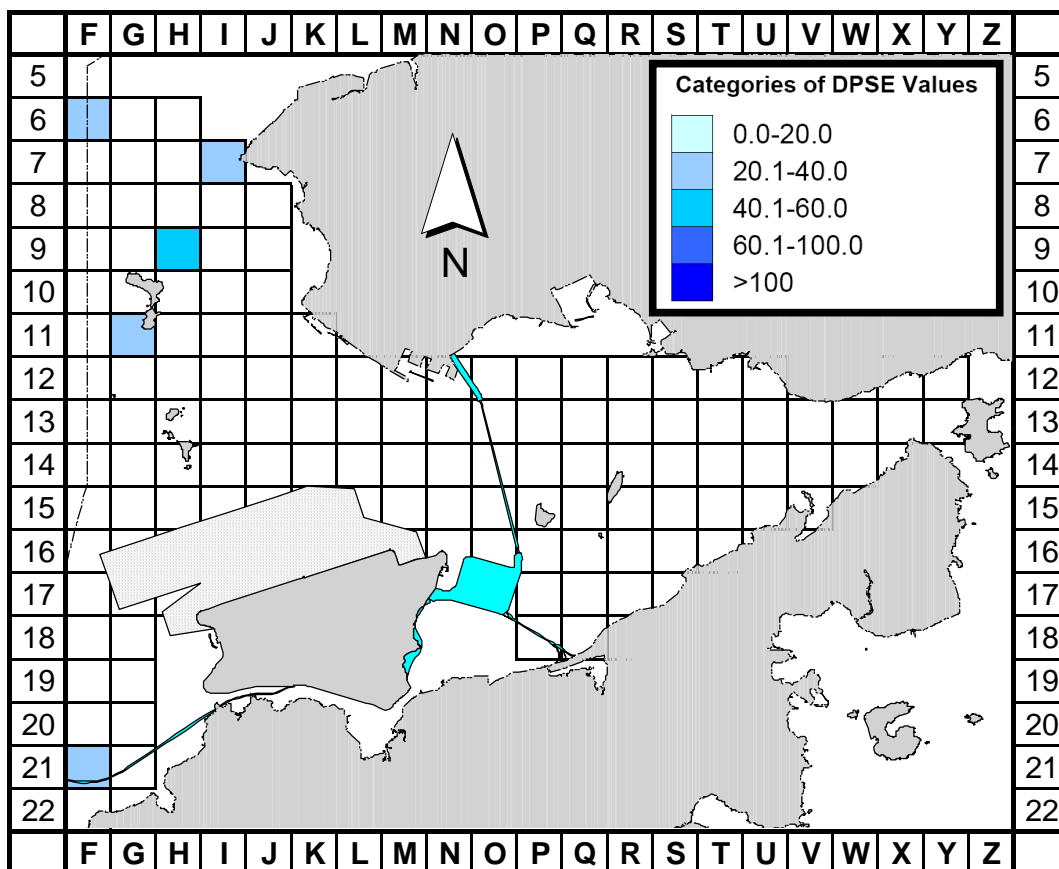


Figure 3b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (March-May 19) (DPSE = no. of dolphins per 100 units of survey effort)

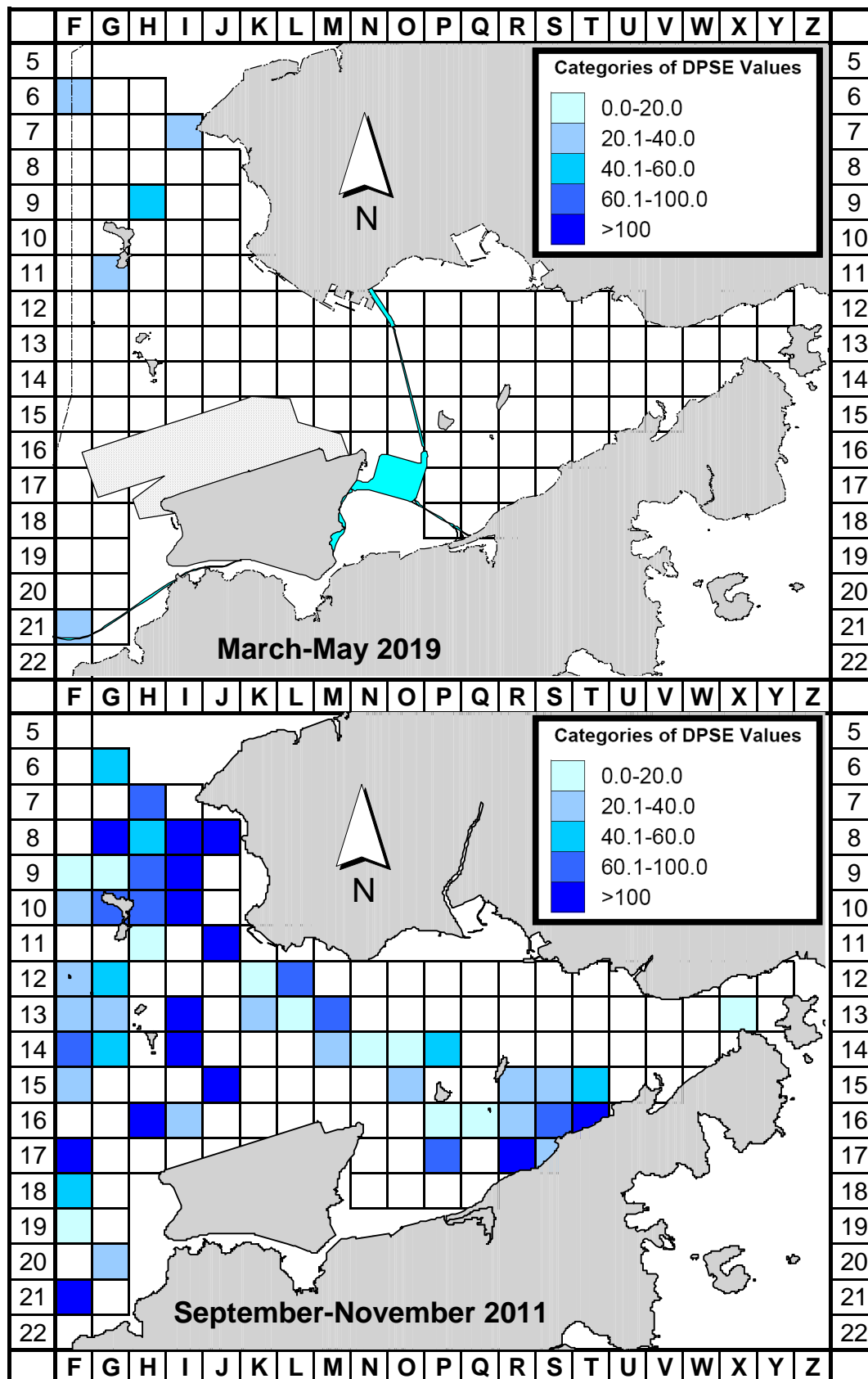


Figure 4. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (March - May 2019) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

Appendix I. HKLR03 Survey Effort Database (March-May 2019)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
4-Mar-19	NW LANTAU	2	11.18	SPRING	STANDARD36826	HKLR	P
4-Mar-19	NW LANTAU	3	20.02	SPRING	STANDARD36826	HKLR	P
4-Mar-19	NW LANTAU	2	8.70	SPRING	STANDARD36826	HKLR	S
4-Mar-19	NW LANTAU	3	2.90	SPRING	STANDARD36826	HKLR	S
4-Mar-19	NE LANTAU	2	4.90	SPRING	STANDARD36826	HKLR	P
4-Mar-19	NE LANTAU	3	19.04	SPRING	STANDARD36826	HKLR	P
4-Mar-19	NE LANTAU	4	9.20	SPRING	STANDARD36826	HKLR	P
4-Mar-19	NE LANTAU	2	2.97	SPRING	STANDARD36826	HKLR	S
4-Mar-19	NE LANTAU	3	6.69	SPRING	STANDARD36826	HKLR	S
4-Mar-19	NE LANTAU	4	2.30	SPRING	STANDARD36826	HKLR	S
11-Mar-19	NW LANTAU	2	26.50	SPRING	STANDARD36826	HKLR	P
11-Mar-19	NW LANTAU	2	14.30	SPRING	STANDARD36826	HKLR	S
13-Mar-19	NW LANTAU	1	2.59	SPRING	STANDARD36826	HKLR	P
13-Mar-19	NW LANTAU	2	21.23	SPRING	STANDARD36826	HKLR	P
13-Mar-19	NW LANTAU	3	7.50	SPRING	STANDARD36826	HKLR	P
13-Mar-19	NW LANTAU	1	3.40	SPRING	STANDARD36826	HKLR	S
13-Mar-19	NW LANTAU	2	4.45	SPRING	STANDARD36826	HKLR	S
13-Mar-19	NW LANTAU	3	4.60	SPRING	STANDARD36826	HKLR	S
13-Mar-19	NE LANTAU	2	17.90	SPRING	STANDARD36826	HKLR	P
13-Mar-19	NE LANTAU	3	18.05	SPRING	STANDARD36826	HKLR	P
13-Mar-19	NE LANTAU	2	10.55	SPRING	STANDARD36826	HKLR	S
13-Mar-19	NE LANTAU	3	1.90	SPRING	STANDARD36826	HKLR	S
18-Mar-19	NW LANTAU	2	19.21	SPRING	STANDARD36826	HKLR	P
18-Mar-19	NW LANTAU	3	8.19	SPRING	STANDARD36826	HKLR	P
18-Mar-19	NW LANTAU	2	9.25	SPRING	STANDARD36826	HKLR	S
18-Mar-19	NW LANTAU	3	1.55	SPRING	STANDARD36826	HKLR	S
10-Apr-19	NE LANTAU	1	4.30	SPRING	STANDARD36826	HKLR	P
10-Apr-19	NE LANTAU	2	32.38	SPRING	STANDARD36826	HKLR	P
10-Apr-19	NE LANTAU	2	13.15	SPRING	STANDARD36826	HKLR	S
10-Apr-19	NE LANTAU	3	0.77	SPRING	STANDARD36826	HKLR	S
10-Apr-19	NW LANTAU	2	4.14	SPRING	STANDARD36826	HKLR	P
10-Apr-19	NW LANTAU	3	21.86	SPRING	STANDARD36826	HKLR	P
10-Apr-19	NW LANTAU	4	1.50	SPRING	STANDARD36826	HKLR	P
10-Apr-19	NW LANTAU	2	3.74	SPRING	STANDARD36826	HKLR	S
10-Apr-19	NW LANTAU	3	8.86	SPRING	STANDARD36826	HKLR	S
15-Apr-19	NW LANTAU	2	2.50	SPRING	STANDARD36826	HKLR	P
15-Apr-19	NW LANTAU	3	17.18	SPRING	STANDARD36826	HKLR	P
15-Apr-19	NW LANTAU	4	13.38	SPRING	STANDARD36826	HKLR	P
15-Apr-19	NW LANTAU	2	3.37	SPRING	STANDARD36826	HKLR	S
15-Apr-19	NW LANTAU	3	5.37	SPRING	STANDARD36826	HKLR	S
15-Apr-19	NW LANTAU	4	2.10	SPRING	STANDARD36826	HKLR	S
23-Apr-19	NW LANTAU	2	20.00	SPRING	STANDARD36826	HKLR	P
23-Apr-19	NW LANTAU	3	8.13	SPRING	STANDARD36826	HKLR	P
23-Apr-19	NW LANTAU	2	8.17	SPRING	STANDARD36826	HKLR	S
23-Apr-19	NW LANTAU	3	2.90	SPRING	STANDARD36826	HKLR	S
23-Apr-19	NE LANTAU	2	34.43	SPRING	STANDARD36826	HKLR	P
23-Apr-19	NE LANTAU	3	2.70	SPRING	STANDARD36826	HKLR	P
23-Apr-19	NE LANTAU	2	13.81	SPRING	STANDARD36826	HKLR	S
25-Apr-19	NW LANTAU	2	20.27	SPRING	STANDARD36826	HKLR	P
25-Apr-19	NW LANTAU	3	12.70	SPRING	STANDARD36826	HKLR	P
25-Apr-19	NW LANTAU	2	13.23	SPRING	STANDARD36826	HKLR	S

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
2-May-19	NW LANTAU	2	22.59	SPRING	STANDARD36826	HKLR	P
2-May-19	NW LANTAU	3	4.80	SPRING	STANDARD36826	HKLR	P
2-May-19	NW LANTAU	2	9.51	SPRING	STANDARD36826	HKLR	S
2-May-19	NW LANTAU	3	2.80	SPRING	STANDARD36826	HKLR	S
2-May-19	NE LANTAU	2	22.54	SPRING	STANDARD36826	HKLR	P
2-May-19	NE LANTAU	3	13.82	SPRING	STANDARD36826	HKLR	P
2-May-19	NE LANTAU	2	12.74	SPRING	STANDARD36826	HKLR	S
7-May-19	NW LANTAU	2	14.50	SPRING	STANDARD36826	HKLR	P
7-May-19	NW LANTAU	3	16.55	SPRING	STANDARD36826	HKLR	P
7-May-19	NW LANTAU	4	0.90	SPRING	STANDARD36826	HKLR	P
7-May-19	NW LANTAU	2	8.25	SPRING	STANDARD36826	HKLR	S
7-May-19	NW LANTAU	3	2.00	SPRING	STANDARD36826	HKLR	S
21-May-19	NE LANTAU	2	27.09	SPRING	STANDARD36826	HKLR	P
21-May-19	NE LANTAU	3	9.40	SPRING	STANDARD36826	HKLR	P
21-May-19	NE LANTAU	2	11.51	SPRING	STANDARD36826	HKLR	S
21-May-19	NE LANTAU	3	1.20	SPRING	STANDARD36826	HKLR	S
21-May-19	NW LANTAU	2	9.44	SPRING	STANDARD36826	HKLR	P
21-May-19	NW LANTAU	3	19.68	SPRING	STANDARD36826	HKLR	P
21-May-19	NW LANTAU	4	1.20	SPRING	STANDARD36826	HKLR	P
21-May-19	NW LANTAU	2	8.58	SPRING	STANDARD36826	HKLR	S
21-May-19	NW LANTAU	3	4.60	SPRING	STANDARD36826	HKLR	S
23-May-19	NW LANTAU	2	18.63	SPRING	STANDARD36826	HKLR	P
23-May-19	NW LANTAU	3	10.25	SPRING	STANDARD36826	HKLR	P
23-May-19	NW LANTAU	2	11.32	SPRING	STANDARD36826	HKLR	S
23-May-19	NW LANTAU	3	1.00	SPRING	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (March-May 2019)

(Abberviations: 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 Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
13-Mar-19	1	1018	2	NW LANTAU	2	131	ON	HKLR	815946	804673	SPRING	NONE	P
13-Mar-19	2	1131	2	NW LANTAU	1	371	ON	HKLR	830873	804580	SPRING	NONE	P
18-Mar-19	1	1140	2	NW LANTAU	2	853	ON	HKLR	829406	807254	SPRING	NONE	S
23-Apr-19	1	1102	2	NW LANTAU	2	58	ON	HKLR	825168	805485	SPRING	NONE	P
7-May-19	1	1137	3	NW LANTAU	2	254	ON	HKLR	827293	806457	SPRING	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in March-May 2019

ID#	DATE	STG#	AREA
NL123	23/04/19	1	NW LANTAU
	07/05/19	1	NW LANTAU
NL182	23/04/19	1	NW LANTAU
NL202	18/03/19	1	NW LANTAU
NL261	18/03/19	1	NW LANTAU
WL145	13/03/19	1	NW LANTAU

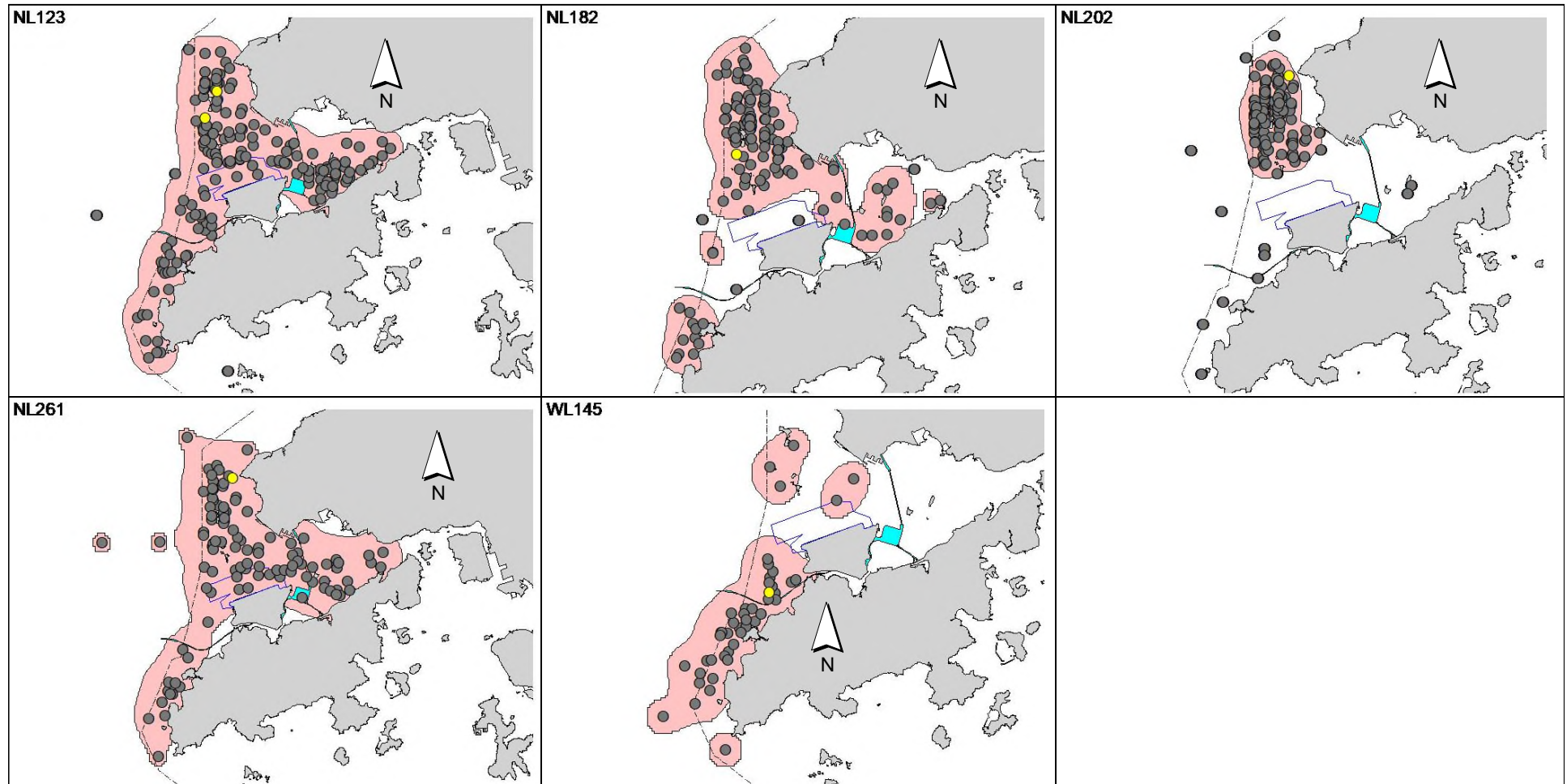
Appendix IV. Five individual dolphins that were identified during March to May 2019 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)



Appendix V. Ranging patterns (95% kernel ranges) of five individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicate sightings made in March-May 2019 during HKLR03 monitoring surveys)



Appendix J

Event Action Plan

Appendix J1 *Event/ Action Plan for Air Quality*

ACTION				
EVENT	ET ⁽¹⁾	IEC ⁽¹⁾	SOR ⁽¹⁾	Contractor
Action Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by the ET. 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	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.	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.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	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"> 1. Repeat in situ measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and SOR; 4. Check monitoring data, all plant, equipment and Contractor's working methods. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working methods. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of non-compliance in writing; 2. Notify Contractor. 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; 2. Ensure mitigation measures are properly implemented; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the Supervising Officer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of additional mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 5. Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. 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.
Limit level being exceeded by two or more consecutive sampling days	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;
	2. Identify source(s) of impact;			
	3. Inform IEC, contractor, SOR and EPD;	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;
	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;	3. Make agreement on the mitigation measures to be implemented;	3. Implement the agreed mitigation measures;
	5. Discuss mitigation measures with IEC, SOR and Contractor;		4.	
	6. Ensure mitigation measures are implemented;	4. Supervise the implementation of mitigation measures.	5. Ensure mitigation measures are properly implemented;	4. Resubmit proposals of mitigation measures if problem still not under control;
	7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days;		6. 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.	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.

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
<u>Limit 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 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	<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 2019 (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)	('000m ³)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	3.687	0.861	-	-	3.687	-	-	-	-	-	0.800	251.110	-	-	-	-
Feb	1.254	0.046	-	0.637	0.617	-	-	-	-	-	-	84.990	-	-	-	-
Mar	4.491	0.000	-	3.627	0.864	-	-	-	-	-	-	71.750	-	-	-	-
Apr	9.363	0.153	-	8.979	0.384	-	-	-	-	-	-	56.470	-	9.520	0.084	-
May	5.334	0.000	-	5.258	0.077	-	-	-	-	-	-	65.810	-	-	-	-
Jun	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUB-TOTAL	24.129	1.060	0.000	18.500	5.629	0.000	-	-	-	-	0.800	530.130	-	9.520	0.084	-
Jul	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nov	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dec	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	24.129	1.060	-	18.500	5.629	-	-	-	-	-	0.800	530.130	-	9.520	0.084	-

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 contract commencement
1-Hr TSP	Action	0	0
	Limit	0	1
24-Hr TSP	Action	0	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	2	226
	Limit	0	24
Impact Dolphin Monitoring	Action	0	11
	Limit	1	16

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 contract commencement	14	0	0

Email
message

Environmental
Resources
Management

To Ramboll 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 Marine Water
Quality Impact Monitoring

Date 30 May 2019

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jasmine.ng@erm.com



ERM

Dear Sir/ Madam,

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

Action Level Exceedance

0215660_15 May 2019_ Depth-averaged SS_E_Station IS8

A total of one exceedance was recorded on 15 May 2019.

Regards,

Dr Jasmine Ng
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.	<p align="center"><u>Action Level Exceedance</u> 0215660_15 May 2019_ Depth-averaged SS_E_Station IS8 [Total No. of Exceedance = 1]</p>	
Date	<p align="center">15 May 2019 (Measured) 16 May 2019 (<i>In situ</i> results received by ERM) 24 May 2019 (Laboratory results received by ERM)</p>	
Monitoring Station	<p align="center">CS(Mf)5, SR4a, SR4(N), IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)</p>	
Parameter(s) with Exceedance(s)	<p align="center">Depth-average SS</p>	
Action Levels for SS	Depth-averaged SS	23.5 mg/L
Limit Levels for SS	Depth-averaged SS	34.4 mg/L
Measured Levels	<p><u>Action Level Exceedance</u> 1. Mid-ebb at IS8 (Depth-averaged SS = 24.7 mg/L)</p>	
Works Undertaken (at the time of monitoring event)	<p>Reinstatement of seawall at seafront was undertaken under this Contract on 15 May 2019.</p>	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances of SS are unlikely to be due to the Contract, in view of the following</p> <ul style="list-style-type: none"> • Apart from SS exceedance at IS8 during mid-ebb tide, levels of SS at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Levels of turbidity at all monitoring stations were in compliance with the Action and Limit levels during both mid-ebb and mid-flood tides on the same day. • No effluent discharge from platforms and work areas was observed during the sampling on the same day (refer to <i>Site Photo Record</i>). 	
Actions Taken/ To Be Taken	<p>No immediate action is considered necessary. The ET will monitor for future trends in exceedances.</p>	
Remarks	<p>The monitoring results on 15 May 2019 and locations of water quality monitoring stations are attached. Site photo record on 15 May 2019 is attached.</p>	

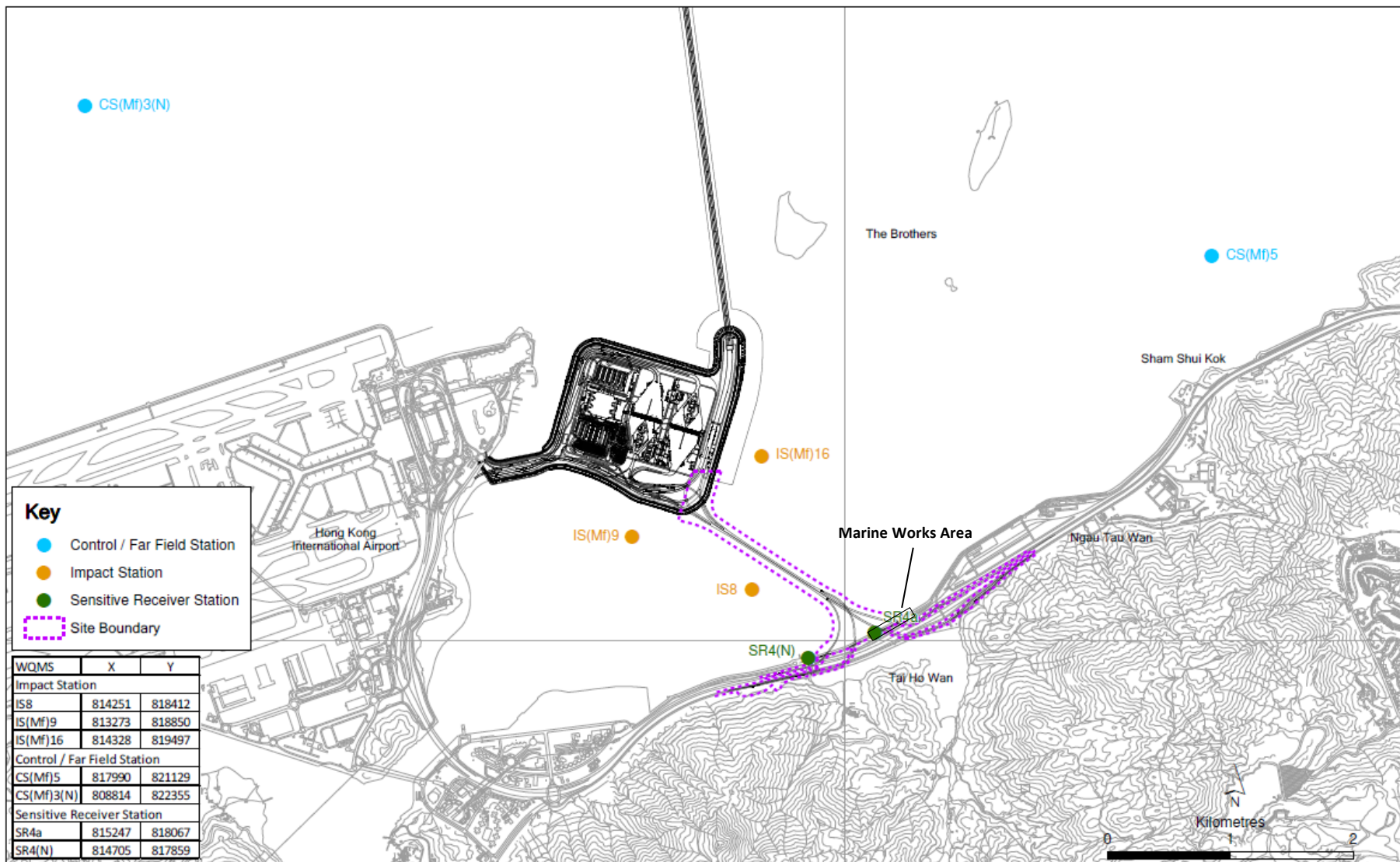
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)5	9:51	Surface	1	26.5	8.1	21.3	8.8	8.6	4.7	4.3	11.5	12.8
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)5	9:51	Surface	2	26.5	8.2	21.3	8.8		4.8		12.8	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)5	9:51	Middle	1	26.4	8.1	21.9	8.3		4.1		13.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)5	9:51	Middle	2	26.4	8.1	21.9	8.3	8.2	4.2		12.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)5	9:51	Bottom	1	26.5	8.1	23.3	8.2		4.1		13.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)5	9:51	Bottom	2	26.5	8.1	23.3	8.2		4.0		13.5	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)3(N)	11:02	Surface	1	25.3	8.1	20.6	8.6	8.4	4.1	4.7	8.0	9.2
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)3(N)	11:02	Surface	2	25.3	8.1	20.5	8.6		4.0		9.2	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)3(N)	11:02	Middle	1	25.2	8.1	20.9	8.2		5.0		9.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)3(N)	11:02	Middle	2	25.2	8.1	20.9	8.2	8.2	5.0		9.7	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)3(N)	11:02	Bottom	1	25.2	8.1	21.0	8.2		5.1		9.2	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	CS(Mf)3(N)	11:02	Bottom	2	25.2	8.1	21.0	8.2		5.1		9.2	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)16	10:25	Surface	1	26.4	8.2	21.6	8.6	8.6	10.8	11.0	18.5	18.7
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)16	10:25	Surface	2	26.5	8.2	21.6	8.6		10.3		17.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)16	10:25	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)16	10:25	Middle	2					8.5				
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)16	10:25	Bottom	1	26.3	8.2	21.8	8.5		11.5		19.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)16	10:25	Bottom	2	26.3	8.2	21.8	8.5		11.5		18.8	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4a	10:33	Surface	1	26.4	8.2	21.9	8.6	8.6	6.8	7.0	17.8	18.3
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4a	10:33	Surface	2	26.5	8.2	21.9	8.6		6.8		17.3	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4a	10:33	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4a	10:33	Middle	2					8.5				
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4a	10:33	Bottom	1	26.2	8.2	22.0	8.5		7.2		18.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4a	10:33	Bottom	2	26.2	8.2	22.0	8.5		7.1		19.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4(N)	10:38	Surface	1	26.6	8.1	21.6	8.2	8.2	10.3	9.1	13.5	13.7
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4(N)	10:38	Surface	2	26.6	8.1	21.6	8.2		10.5		14.5	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4(N)	10:38	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4(N)	10:38	Middle	2					8.2				
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4(N)	10:38	Bottom	1	26.8	8.1	21.7	8.2		7.7		13.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	SR4(N)	10:38	Bottom	2	26.8	8.1	21.7	8.2		7.8		13.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS8	10:43	Surface	1	26.4	8.2	22.1	8.6	8.6	16.1	15.3	25.1	24.7
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS8	10:43	Surface	2	26.4	8.2	22.0	8.6		16.0		25.7	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS8	10:43	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS8	10:43	Middle	2					8.6				
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS8	10:43	Bottom	1	26.3	8.2	22.1	8.6		14.6		23.4	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS8	10:43	Bottom	2	26.3	8.2	22.1	8.6		14.6		24.4	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)9	10:51	Surface	1	27.1	8.3	21.5	9.5	9.5	6.4	6.4	15.7	15.1
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)9	10:51	Surface	2	27.1	8.3	21.5	9.5		6.5		14.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)9	10:51	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)9	10:51	Middle	2					9.5				
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)9	10:51	Bottom	1	27.1	8.3	21.4	9.4		6.4		14.4	
TMCLKL	HY/2012/07	2019/05/15	Mid-Ebb	IS(Mf)9	10:51	Bottom	2	27.1	8.3	21.4	9.5		6.3		15.5	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)5	16:01	Surface	1	26.5	8.3	21.4	9.1	9.1	4.8	5.8	12.0	11.4
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)5	16:01	Surface	2	26.5	8.3	21.5	9.1		4.9		11.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)5	16:01	Middle	1	26.3	8.3	21.4	9.0		7.1		11.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)5	16:01	Middle	2	26.5	8.3	21.4	9.2		6.0		10.5	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)5	16:01	Bottom	1	26.3	8.3	21.7	9.1	9.1	6.2		11.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)5	16:01	Bottom	2	26.3	8.3	21.7	9.0		5.6		11.2	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)3(N)	14:57	Surface	1	26.5	8.3	17.4	10.1	9.0	4.5	4.5	10.9	12.5
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)3(N)	14:57	Surface	2	26.5	8.3	17.4	10.1		4.4		11.8	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)3(N)	14:57	Middle	1	25.2	8.0	18.3	7.8		4.4		12.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)3(N)	14:57	Middle	2	25.2	8.0	18.1	7.9		4.4		13.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)3(N)	14:57	Bottom	1	25.7	8.0	20.1	7.9	7.9	4.5		13.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	CS(Mf)3(N)	14:57	Bottom	2	25.5	8.0	20.2	7.9		4.5		13.8	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)16	15:34	Surface	1	26.6	8.3	21.2	10.1	10.1	9.4	7.3	7.2	8.5
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)16	15:34	Surface	2	26.6	8.3	21.2	10.1		9.2		7.7	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)16	15:34	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)16	15:34	Middle	2									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)16	15:34	Bottom	1	26.7	8.3	21.2	10.1	10.1	5.2		9.4	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)16	15:34	Bottom	2	26.7	8.3	21.2	10.1		5.2		9.7	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4a	15:25	Surface	1	26.9	8.4	21.4	10.3	10.3	3.8	3.9	13.2	13.8
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4a	15:25	Surface	2	26.9	8.4	21.4	10.3		3.9		13.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4a	15:25	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4a	15:25	Middle	2									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4a	15:25	Bottom	1	26.8	8.4	21.5	9.8	9.8	3.9		14.1	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4a	15:25	Bottom	2	26.8	8.4	21.5	9.8		3.8		14.1	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4(N)	15:22	Surface	1	26.8	8.4	21.2	10.3	10.3	11.3	8.7	9.7	10.9
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4(N)	15:22	Surface	2	26.8	8.4	21.2	10.3		12.6		8.9	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4(N)	15:22	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4(N)	15:22	Middle	2									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4(N)	15:22	Bottom	1	26.8	8.4	21.3	10.3	10.3	5.3		12.3	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	SR4(N)	15:22	Bottom	2	26.8	8.4	21.3	10.3		5.4		12.7	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS8	15:17	Surface	1	26.4	8.3	21.3	9.4	9.4	10.7	9.5	14.5	13.7
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS8	15:17	Surface	2	26.4	8.3	21.3	9.4		10.6		14.6	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS8	15:17	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS8	15:17	Middle	2									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS8	15:17	Bottom	1	26.4	8.3	21.4	9.4	9.4	8.2		12.2	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS8	15:17	Bottom	2	26.4	8.3	21.4	9.4		8.6		13.3	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)9	15:08	Surface	1	26.6	8.3	20.9	9.5	9.5	9.8	9.0	13.0	13.6
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)9	15:08	Surface	2	26.6	8.3	20.9	9.5		10.4		13.0	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)9	15:08	Middle	1									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)9	15:08	Middle	2									
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)9	15:08	Bottom	1	26.5	8.3	21.1	9.5	9.5	7.8		13.8	
TMCLKL	HY/2012/07	2019/05/15	Mid-Flood	IS(Mf)9	15:08	Bottom	2	26.5	8.3	21.1	9.5		7.8		14.4	

Note: Indicates Exceedance of Action Level
Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at IS8 on 15 May 2019





Locations of Water Quality Monitoring Stations

Email
message

Environmental
Resources
Management

To Ramboll 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 Marine Water
Quality Impact Monitoring

Date 11 June 2019

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jasmine.ng@erm.com



ERM

Dear Sir/ Madam,

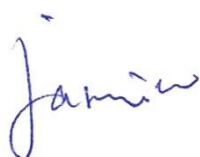
Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

Action Level Exceedance

0215660_29 May 2019_ Depth-averaged SS_F_Station SR4(N)

A total of one exceedance was recorded on 29 May 2019.

Regards,



Dr Jasmine Ng
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.	<p align="center"><u>Action Level Exceedance</u> 0215660_15 May 2019_ Depth-averaged SS_E_Station IS8 [Total No. of Exceedance = 1]</p>	
Date	<p align="center">29 May 2019 (Measured) 31 May 2019 (<i>In situ</i> results received by ERM) 10 June 2019 (Laboratory results received by ERM)</p>	
Monitoring Station	<p align="center">CS(Mf)5, SR4a, SR4(N), IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)</p>	
Parameter(s) with Exceedance(s)	<p align="center">Depth-average SS</p>	
Action Levels for SS	Depth-averaged SS	23.5 mg/L
Limit Levels for SS	Depth-averaged SS	34.4 mg/L
Measured Levels	<p><u>Action Level Exceedance</u> 1. Mid-flood at SR4(N) (Depth-averaged SS = 24.4 mg/L)</p>	
Works Undertaken (at the time of monitoring event)	<p>Reinstatement of seawall at seafront was undertaken under this Contract on 29 May 2019.</p>	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances of SS are unlikely to be due to the Contract, in view of the following</p> <ul style="list-style-type: none"> • Apart from SS exceedance at SR4(N) during mid-flood tide, levels of SS at all monitoring stations (including SR4a that closer to the marine works area) were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Levels of turbidity at all monitoring stations were in compliance with the Action and Limit levels during both mid-ebb and mid-flood tides on the same day. • No effluent discharge from platforms and work areas was observed during the sampling on the same day (refer to <i>Site Photo Record</i>). 	
Actions Taken / To Be Taken	<p>No immediate action is considered necessary. The ET will monitor for future trends in exceedances.</p>	
Remarks	<p>The monitoring results on 29 May 2019 and locations of water quality monitoring stations are attached. Site photo record on 29 May 2019 is attached.</p>	

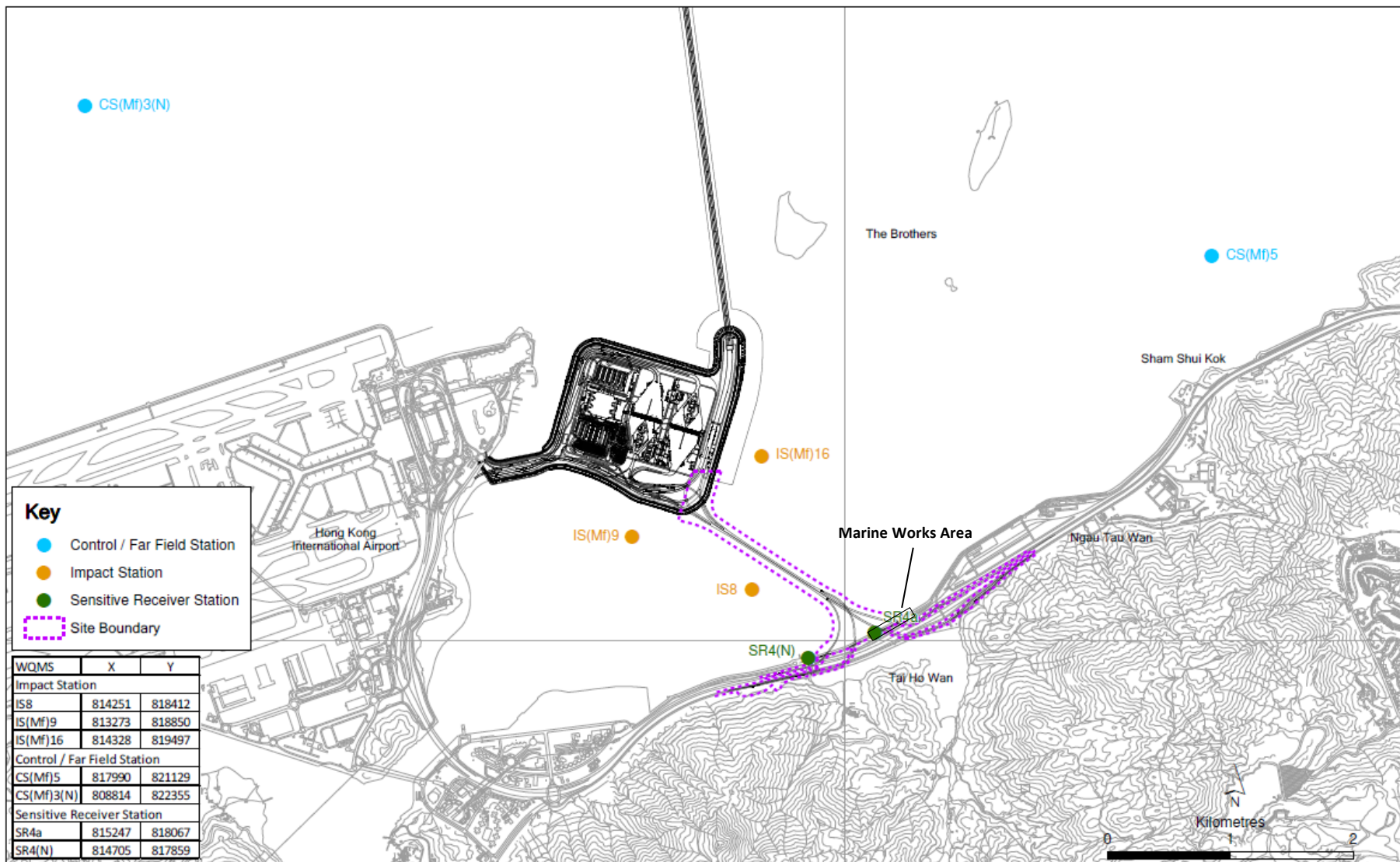
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)5	9:39	Surface	1	1	26.5	8.0	21.3	6.6	6.6	1.7	1.8	0.8	0.7
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)5	9:39	Surface	1	2	26.5	8.0	21.3	6.6		1.7		0.9	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)5	9:39	Middle	2	1	26.4	8.0	21.3	6.5		2.2		<0.5	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)5	9:39	Middle	2	2	26.4	8.0	21.3	6.6	6.5	2.2		0.6	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)5	9:39	Bottom	3	1	26.4	8.0	23.2	6.5		1.6		0.8	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)5	9:39	Bottom	3	2	26.4	8.0	23.2	6.5		1.6		1.1	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)3(N)	11:00	Surface	1	1	26.6	7.9	19.3	6.5	6.5	4.6	5.1	2.4	2.7
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)3(N)	11:00	Surface	1	2	26.6	7.9	19.3	6.5		4.6		2.3	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)3(N)	11:00	Middle	2	1	26.6	7.9	19.3	6.5		4.5		3.2	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)3(N)	11:00	Middle	2	2	26.6	7.9	19.3	6.5	6.6	4.5		2.7	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)3(N)	11:00	Bottom	3	1	26.6	7.9	19.3	6.6		6.1		3.0	
HY/2012/07	2019/05/29	Mid-Ebb	CS(Mf)3(N)	11:00	Bottom	3	2	26.6	7.9	19.3	6.6		6.1		2.7	
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)16	10:09	Surface	1	1	26.4	8.0	19.0	6.6	6.6	3.2	3.5	2.8	2.8
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)16	10:09	Surface	1	2	26.4	8.0	19.0	6.6		3.2		2.8	
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)16	10:09	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)16	10:09	Middle	2	2					6.6				
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)16	10:09	Bottom	3	1	26.4	8.0	19.1	6.6		3.7		2.7	
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)16	10:09	Bottom	3	2	26.4	8.0	19.1	6.6		3.7		2.8	
HY/2012/07	2019/05/29	Mid-Ebb	SR4a	10:17	Surface	1	1	26.6	8.0	14.7	6.8	6.8	7.6	5.9	5.1	4.3
HY/2012/07	2019/05/29	Mid-Ebb	SR4a	10:17	Surface	1	2	26.6	8.0	14.7	6.8		7.6		5.2	
HY/2012/07	2019/05/29	Mid-Ebb	SR4a	10:17	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Ebb	SR4a	10:17	Middle	2	2					6.4				
HY/2012/07	2019/05/29	Mid-Ebb	SR4a	10:17	Bottom	3	1	26.5	8.0	19.7	6.4		4.2		3.7	
HY/2012/07	2019/05/29	Mid-Ebb	SR4a	10:17	Bottom	3	2	26.5	8.0	19.7	6.4		4.2		4.1	
HY/2012/07	2019/05/29	Mid-Ebb	SR4(N)	10:21	Surface	1	1	26.4	7.9	17.4	6.1	6.1	5.4	5.8	6.2	7.1
HY/2012/07	2019/05/29	Mid-Ebb	SR4(N)	10:21	Surface	1	2	26.4	7.9	17.4	6.1		5.4		5.9	
HY/2012/07	2019/05/29	Mid-Ebb	SR4(N)	10:21	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Ebb	SR4(N)	10:21	Middle	2	2					6.0				
HY/2012/07	2019/05/29	Mid-Ebb	SR4(N)	10:21	Bottom	3	1	26.4	7.9	19.8	6.0		6.2		8.0	
HY/2012/07	2019/05/29	Mid-Ebb	SR4(N)	10:21	Bottom	3	2	26.4	7.9	19.8	6.0		6.2		8.3	
HY/2012/07	2019/05/29	Mid-Ebb	IS8	10:27	Surface	1	1	26.5	8.0	17.5	6.6	6.6	5.6	6.2	8.0	9.1
HY/2012/07	2019/05/29	Mid-Ebb	IS8	10:27	Surface	1	2	26.5	8.0	17.5	6.6		5.6		7.8	
HY/2012/07	2019/05/29	Mid-Ebb	IS8	10:27	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Ebb	IS8	10:27	Middle	2	2					6.5				
HY/2012/07	2019/05/29	Mid-Ebb	IS8	10:27	Bottom	3	1	26.4	8.0	18.9	6.5		6.7		10.3	
HY/2012/07	2019/05/29	Mid-Ebb	IS8	10:27	Bottom	3	2	26.4	8.0	18.9	6.5		6.7		10.1	
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)9	10:34	Surface	1	1	26.3	8.0	18.2	6.7	6.7	4.0	4.5	4.3	3.6
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)9	10:34	Surface	1	2	26.3	8.0	18.2	6.7		3.9		4.5	
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)9	10:34	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)9	10:34	Middle	2	2					6.7				
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)9	10:34	Bottom	3	1	26.3	8.0	17.8	6.7		5.1		5.2	
HY/2012/07	2019/05/29	Mid-Ebb	IS(Mf)9	10:34	Bottom	3	2	26.3	8.0	17.8	6.7		5.1		5.7	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)5	15:05	Surface	1	1	26.0	8.1	20.9	6.8	6.7	2.6	3.4	3.0	3.3
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)5	15:05	Surface	1	2	26.0	8.1	20.9	6.8		2.6		3.3	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)5	15:05	Middle	2	1	26.1	8.0	21.1	6.6		4.7		3.1	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)5	15:05	Middle	2	2	26.1	8.0	21.1	6.7	6.5	4.7		3.2	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)5	15:05	Bottom	3	1	25.9	8.0	22.9	6.5		2.9		3.6	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)5	15:05	Bottom	3	2	25.9	8.0	22.9	6.5		2.8		3.5	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)3(N)	14:13	Surface	1	1	26.6	7.9	18.9	6.9	6.9	3.9	3.9	1.2	1.4
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)3(N)	14:13	Surface	1	2	26.6	7.9	18.9	6.9		3.9		1.0	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)3(N)	14:13	Middle	2	1	26.6	7.9	18.9	6.8		3.9		1.3	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)3(N)	14:13	Middle	2	2	26.6	7.9	18.9	6.8	6.9	3.9		1.4	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)3(N)	14:13	Bottom	3	1	26.6	7.9	19.0	6.9		4.0		1.7	
HY/2012/07	2019/05/29	Mid-Flood	CS(Mf)3(N)	14:13	Bottom	3	2	26.6	7.9	19.0	6.9		4.0		1.6	
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)16	14:39	Surface	1	1	26.3	8.0	19.7	6.7	6.7	3.5	6.2	3.6	4.4
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)16	14:39	Surface	1	2	26.3	8.0	19.7	6.7		3.5		4.1	
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)16	14:39	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)16	14:39	Middle	2	2					6.7				
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)16	14:39	Bottom	3	1	26.4	8.0	19.8	6.7		8.9		4.7	
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)16	14:39	Bottom	3	2	26.4	8.0	19.8	6.7		9.0		5.1	
HY/2012/07	2019/05/29	Mid-Flood	SR4a	14:30	Surface	1	1	26.5	8.0	19.8	6.6	6.6	3.4	8.3	5.7	13.1
HY/2012/07	2019/05/29	Mid-Flood	SR4a	14:30	Surface	1	2	26.5	8.0	19.8	6.6		3.4		6.0	
HY/2012/07	2019/05/29	Mid-Flood	SR4a	14:30	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Flood	SR4a	14:30	Middle	2	2					6.9				
HY/2012/07	2019/05/29	Mid-Flood	SR4a	14:30	Bottom	3	1	25.9	8.0	18.8	6.9		13.3		16.5	
HY/2012/07	2019/05/29	Mid-Flood	SR4a	14:30	Bottom	3	2	25.9	8.0	18.8	6.8		13.2		16.7	
HY/2012/07	2019/05/29	Mid-Flood	SR4(N)	14:27	Surface	1	1	26.2	8.0	18.3	6.6	6.6	12.4	12.1	25.0	24.4
HY/2012/07	2019/05/29	Mid-Flood	SR4(N)	14:27	Surface	1	2	26.1	8.0	18.3	6.6		12.3		25.7	
HY/2012/07	2019/05/29	Mid-Flood	SR4(N)	14:27	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Flood	SR4(N)	14:27	Middle	2	2					6.6				
HY/2012/07	2019/05/29	Mid-Flood	SR4(N)	14:27	Bottom	3	1	26.2	8.0	18.9	6.6		11.8		23.2	
HY/2012/07	2019/05/29	Mid-Flood	SR4(N)	14:27	Bottom	3	2	26.2	8.0	18.9	6.6		11.8		23.7	
HY/2012/07	2019/05/29	Mid-Flood	IS8	14:23	Surface	1	1	26.3	8.0	20.2	6.6	6.6	3.5	5.3	2.8	2.8
HY/2012/07	2019/05/29	Mid-Flood	IS8	14:23	Surface	1	2	26.2	8.0	20.0	6.6		3.5		3.3	
HY/2012/07	2019/05/29	Mid-Flood	IS8	14:23	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Flood	IS8	14:23	Middle	2	2					6.6				
HY/2012/07	2019/05/29	Mid-Flood	IS8	14:23	Bottom	3	1	26.3	8.0	20.2	6.6		7.1		2.4	
HY/2012/07	2019/05/29	Mid-Flood	IS8	14:23	Bottom	3	2	26.3	8.0	20.2	6.6		7.0		2.6	
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)9	14:15	Surface	1	1	26.3	8.0	19.9	6.6	6.6	6.1	5.3	3.9	2.9
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)9	14:15	Surface	1	2	26.4	8.0	19.9	6.6		6.1		3.7	
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)9	14:15	Middle	2	1									
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)9	14:15	Middle	2	2					6.6				
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)9	14:15	Bottom	3	1	26.2	8.0	19.7	6.6		4.5		3.7	
HY/2012/07	2019/05/29	Mid-Flood	IS(Mf)9	14:15	Bottom	3	2	26.2	8.0	19.7	6.6		4.6		3.9	

Note: Indicates Exceedance of Action Level
Indicates Exceedance of Limit Level

Photos 1 and 2 - Mid-flood at SR4(N) on 29 May 2019





Locations of Water Quality Monitoring Stations

Email
message

Environmental
Resources
Management

To Ramboll 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 21 August 2019

2507
25/F
One Harbourfront
18 Tak Fung Street
Hung Hom
Kowloon
Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jasmine.ng@erm.com



Dear Sir or Madam,

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

0215660_March/May2019_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact
dolphin monitoring data between March to May 2019.

Regards,

A handwritten signature in blue ink that reads 'Jasmine'.

Dr Jasmine Ng
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_Mar/May2019_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedance = 1]	
Date	March - May 2019 (monitored) 19 August 2019 (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 & ANI = 0
	NWL	STG = 1.13 & ANI = 2.54
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between March to May 2019. The exceedance was reported in the approved <i>Sixty-seventh Monthly EM&A Report</i> dated 14 June 2019.	
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 2019) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and present impact monitoring quarter. By setting $\alpha = 0.05$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0019$) and ANI ($p = 0.0113$) were detected between Periods. 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 2019) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and cumulative impact monitoring quarter. By setting $\alpha = 0.00001$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000000$) and in ANI ($p = 0.000000$) between Cumulative Period (baseline and impact phases) and Location (NEL and NWL) 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)	In the quarter between March to May 2019, marine works was undertaken under <i>Contract No. HY/2012/07</i> include reinstatement of seafront.	

<p>Possible Reason for Action or Limit Level Exceedance(s)</p>	<p>The potential factors that may have contributed to the observed exceedance are reviewed below:</p> <ul style="list-style-type: none"> • Blocking of CWD travelling corridor: The <i>Monitoring of Marine Mammals in Hong Kong Waters (2018 – 19)</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 one of the factors resulting in the decrease in dolphin abundances in North Lantau. • Marine works of the Contract: 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 <i>Monitoring of Marine Mammals in Hong Kong Waters (2018-2019)</i> reported that CWD decline were likely influenced by reclamation works from construction activities. Based on these possible reasons, implementation of mitigation measures are reviewed. This Contract does not have any reclamation works, thus no habitat loss was caused by reclamation. In the reporting period, the Contractor 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>. Most of the vessels of this Contract also worked within the site boundary, in which the area is seldom used by CWD. Disturbance from vessels of this Contract is considered minor. All of the marine bored piling works of this Contract was completed in September 2015. Thus, underwater noise emission from this Contract had been substantially reduced. During dolphin monitoring in this quarter, no unacceptable impact on CWD due to the activities under this Contract was observed. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between March to May 2019, there were two (2) Action Level of Suspended Solids (SS) exceedances for water quality impact monitoring in the reporting period. The exceedances were considered not related to this Contract upon further investigation and the investigation reports are presented in <i>Appendix L of the 22nd Quarterly EM&A Report (March to May 2019)</i>. <p>In view of the above, marine ecological mitigation measures were considered properly implemented, and thus no unacceptable impact on CWD or its habitat was associated with this Contract in this quarter.</p>
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(1) Hung SKY (2019). Prepared for AFCD. Available at:
[https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi_chi/files/Final_Report_2018_19.pdf](https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2018_19.pdf)

Actions Taken/ To Be Taken	<p>With reference to the site inspection records in this quarter, the respective marine ecological mitigation measures have been implemented properly by the Contractor throughout the marine works period, including:</p> <ol style="list-style-type: none"> 1. 250m dolphin exclusion zone; 2. Acoustic decoupling plan; 3. Training to workers; 4. Offsite vessel routing control in accordance with Regular Marine Travel Routes Plan, including routing control within existing marine park boundaries; 5. Vessels speed limited at 5 knots and 10 knots within existing marine park boundaries and site boundary respectively; 6. Idling and mooring of working vessels within site boundary <p>The existing mitigation measures are recommended to be continuously implemented. Furthermore, it is also recommended to reduce the vessels for marine works as much as possible. The ET will monitor for future trends in exceedance(s).</p> <p>A joint team meeting was held on 11 March 2019 for discussion on CWD trend, with attendance of ENPO, Representatives of Resident Site Staff (RSS), Representatives of Environmental Teams (ETs) for Contract No. HY/2011/03, HY/2012/07, HY/2012/08 and HY/2013/04. The discussion/recommendation as presented in 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 or 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 contractors to ensure the relevant measures are fully implemented. It was recommended that the marine works of HZMB projects should be completed as soon as possible to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible. The participants were also reminded that the protection measures (e.g. speed limit control) for the BMP shall be implemented so as to provide a better habitat for dolphin recovery. It is noted that even though marine vessels may moor within the mooring site of BMP, commercial activities including loading / unloading / transshipment are not allowed except a permit is obtained. The HZMB works vessels were recommended to avoid the BMP. It was also recommended that the marine works footprint and vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible.</p> <p>Dolphin specialists of the Projects confirmed that the CWD sighting nearby north of Sha Chau and Lung Kwu Chau Marine Park has significantly declined. The reason for the decline was likely related to the re-routing of high-speed ferry from Skypier.</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>Sixty-fifth to Sixty-seventh Monthly EM&A Reports</i>. Comparison on water quality between impact and baseline periods is elaborated in the 22nd <i>Quarterly EM&A Report</i>.</p>