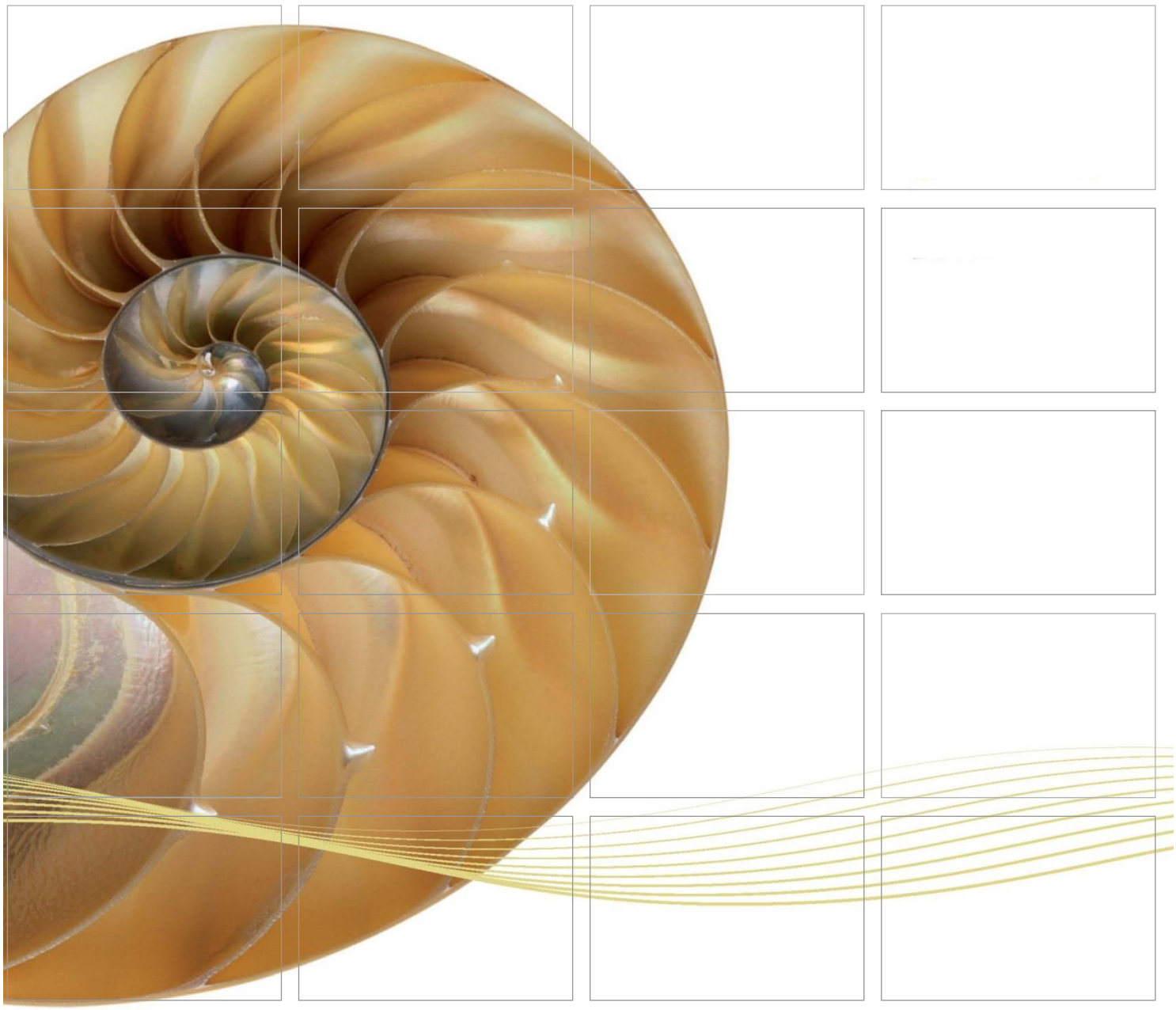
Report



Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

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

20 February 2020

Environmental Resources Management
2507, 25/F
One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
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The business of sustainability

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

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

Document Code: 0212330_24th Quarterly EM&A_20200220.doc

Environmental Resources Management

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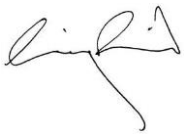
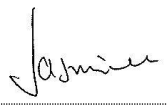
Client: DBJV	Project No: 0212330
Summary: This document presents the Twenty-fourth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.	Date: 20 February 2020 Approved by:  *Mr Craig Reid* *Partner* Certified by:  *Dr Jasmine Ng* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	24th Quarterly EM&A Report	VAR	JN	CAR	20/02/20

Distribution

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Ref.: HYDHZMBEEM00_0_7918L.20.docx

02 March 2020

By Fax (2293 6300) and By Post

AECOM
Supervising Officer Representative's Office
No.8 Mong Fat Street, Tuen Mun, N.T., Hong Kong

Attention: Mr. Roger Man

Dear Mr. Man,

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

Contract No. HY/2012/08
TM-CLKL – Northern Connection Sub-sea Tunnel Section
24th Quarterly EM&A Summary Report for September 2019 to November 2019

Reference is made to the ET's submission of 24th Quarterly EM&A Summary Report for September 2019 to November 2019 (ET's ref.: "*0212330_24th Quarterly EM&A_20200220.doc*" dated 20 February 2020) certified by the ET Leader.

Please be informed that we have no adverse comments on the captioned report.

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

Yours sincerely,

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

c.c.

HyD	Mr. Patrick Ng	(By Fax: 3188 6614)
HyD	Mr. Cheng Pan	(By Fax: 3188 6614)
AECOM	Mr. Conrad Ng	(By Fax: 3922 9797)
ERM	Dr. Jasmine Ng	(By Fax: 2723 5660)
DBJV	Mr. Bryan Lee	(By Fax: 2293 7499)

Internal: DY, YH, ENPO Site

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Ramboll Hong Kong Limited 英環香港有限公司
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Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel 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) in accordance with *Environmental Permit No. EP-354/2009/A*. Ramboll Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO). Subsequent applications for variation of environmental permits (VEP), *EP-354/2009/B*, *EP-354/2009/C and EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in early 2020. The impact monitoring of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

This is the Twenty-fourth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 September 2019 to 30 November 2019 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the "Contract") in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, the major activities in the reporting quarter included:

Land-based Works

- Construction of Thermal barrier – TBM tunnel;
- Construction of Walkway Corbel & Cover – TBM Tunnel;
- Road & Drainage works – Portion N-A and Portion S-C;
- Gantry Crane Removal – Portion N-A;
- RC structure – Portion S-A;
- E&M Platform Installation – Portion S-A;
- Backfilling – Portion S-A & S-C;
- Water Treatment Facilities Dismantling – Portion S-C; and
- Cut & Cover Tunnel RC structure – Portion S-C

Marine-based Works

- Seawall Modification Works – Portion S-B

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

24-hour TSP Monitoring	30 sessions
1-hour TSP Monitoring	30 sessions
Water Quality Monitoring	39 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	13 sessions

Implementation of Marine Mammal Exclusion Zone

Daily marine mammal exclusion zone was in effect during the period of silt curtain installation in open waters under this Contract. No sighting of the Indo-Pacific humpback dolphin (i.e. Chinese White Dolphin) was recorded in the reporting period during the exclusion zone monitoring.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

Eight (8) Action level and four (4) Limit Level exceedances of 1-hour TSP and were recorded in this reporting period. Investigation reports are provided in Appendix J.

Breaches of Action and Limit Levels for Water Quality

Thirty-five (35) Action level of Dissolved Oxygen were recorded in this reporting period. Four (4) Action Level exceedance for Depth-averaged suspended solids was recorded. Investigation reports are provided in Appendix J.

Dolphin Monitoring

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between September and November 2019, no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations during the dolphin monitoring in this reporting quarter.

Environmental Complaints, Non-compliance & Summons

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of this Contract was recorded in this reporting period.

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

Reporting Change

Water quality monitoring was carried out in the reporting period in view of the commencement of seawall modification works since 12 August 2019.

Contract No. HY/2012/08 has taken over the responsibility for implementation of dolphin monitoring from HZMB HKLR Contract No. HY/2011/03 since October 2019.

Upcoming Works for the Next Reporting Period

Works to be undertaken in the coming quarterly period include the following:
Land-based Works

- Construction of Thermal barrier – TBM tunnel;
- Construction of Walkway Corbel & Cover – TBM Tunnel;
- Road & Drainage works – Portion N-A
- Gantry Crane Removal – Portion N-B & Portion S-C;
- RC structure – Portion S-A;
- E&M Platform Installation – Portion S-A
- Backfilling – Portion S-A & S-C;
- Water Treatment Facilities Dismantling – Portion S-C;
- Cut & Cover Tunnel RC structure – Portion S-C
- Tower Crane Removal – Portion S-C

Marine-based Works

- Seawall Modification Works – Portion S-B

Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are expected to be mainly associated with dust, marine ecology, marine water quality and waste management issues.

1 INTRODUCTION

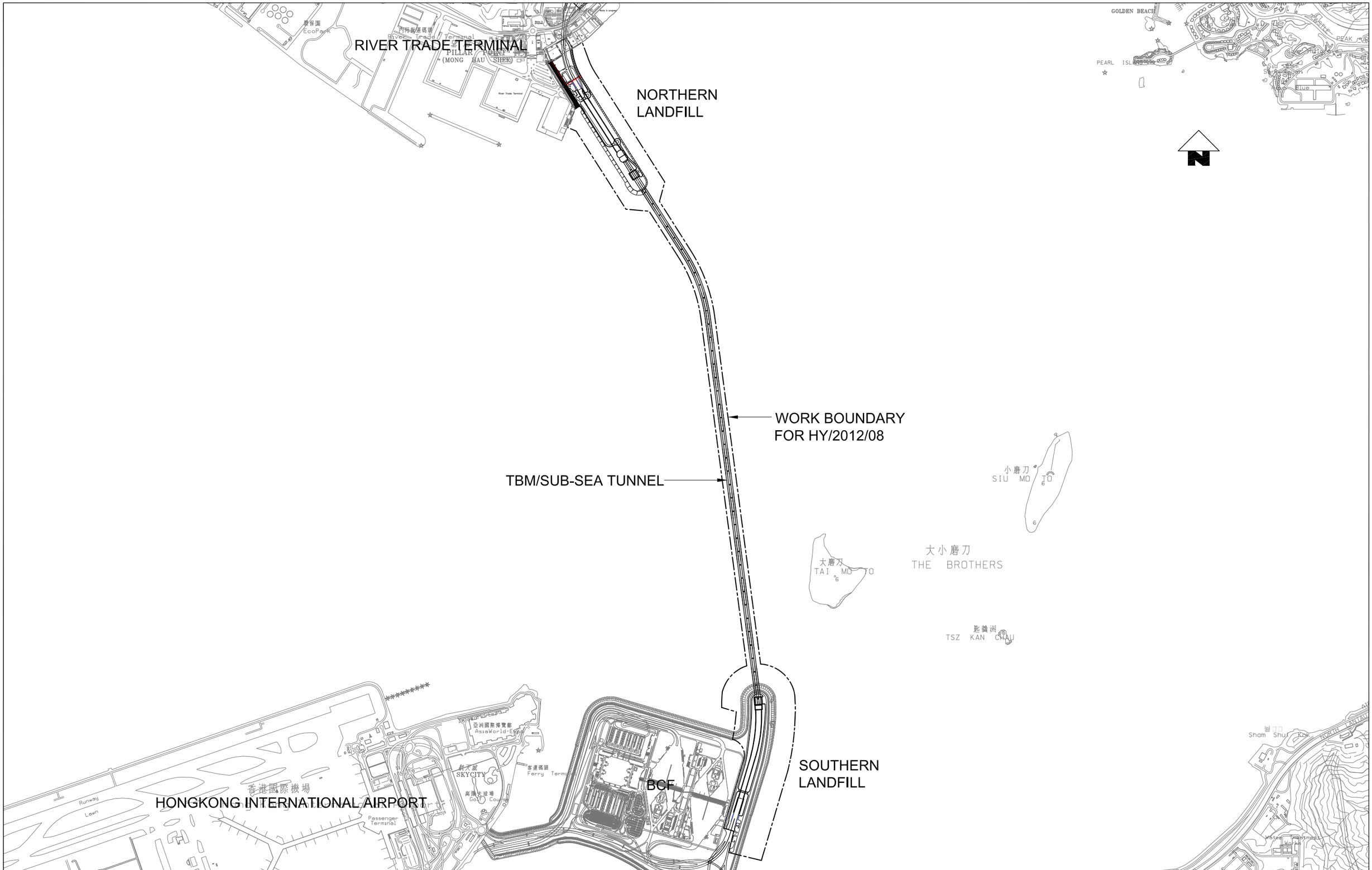
1.1 BACKGROUND

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 (VEP) (EP-354/2009/A) was issued on 8 December 2010. Subsequent applications for variation of environmental permits (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/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of TM-CLKL 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) in accordance with Environmental Permit No. EP-354/2009/A. Ramboll Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO).

Layout of the Contract components is presented in *Figure 1.1*.



Rev.	Description	Date	Checked
A	FIRST ISSUE	11SEP13	PKV

Designed By: PKV
Drawn By: DAI
Approved By: SPo PP
Date: 11SEP2013

Main Contractor: Dragages - Bouygues Joint Venture 實嘉 - 布依格聯營

Client: 路政署 HIGHWAYS DEPARTMENT

Contractor's Designer: ARUP Ove Arup & Partners Hong Kong Limited

Project: Contract No. HY/2012/08
Tuen Mun - Chek Lap Kok Link -
Northern Connection Sub-Sea Tunnel Section

Drawing Title: **Figure 1.1**

Drawing no.: TMCLKL8-DBJ-GEN-DWG-00174
Scale: 1:25000 @ A3
CADD Ref.: TMCLKL8-DBJ-GEN-DWG-00174-DFT-A
Issue Status: DFT (DRAFT)
Revision: A

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in early 2020. The impact monitoring phase of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

1.2 SCOPE OF REPORT

This is the Twenty-fourth Quarterly EM&A Report under the *Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section*. This report presents a summary of the environmental monitoring and audit works from 1 September 2019 to 30 November 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
Highways Department	Engr 24/SD	Ken T.M. Cheng	2762 4062	3188 6614
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Roger Man	2293 6388	2293 6300
		Andrew Westmoreland	2293 6360	2293 6300
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 (Dragages – Bouygues Joint Venture)	Deputy Environmental Manager	Bryan Lee	2293 7323	2293 7499
	24-hour hotline		2293 7330	
ET (ERM-HK)	ET Leader	Jasmine Ng	2271 3311	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

The construction phase of this Contract was commenced on 1 November 2013. The construction programme is shown in *Appendix B*.

As per DBJV's information, details of major construction works carried out in this reporting period are summarized in *Table 1.2*.

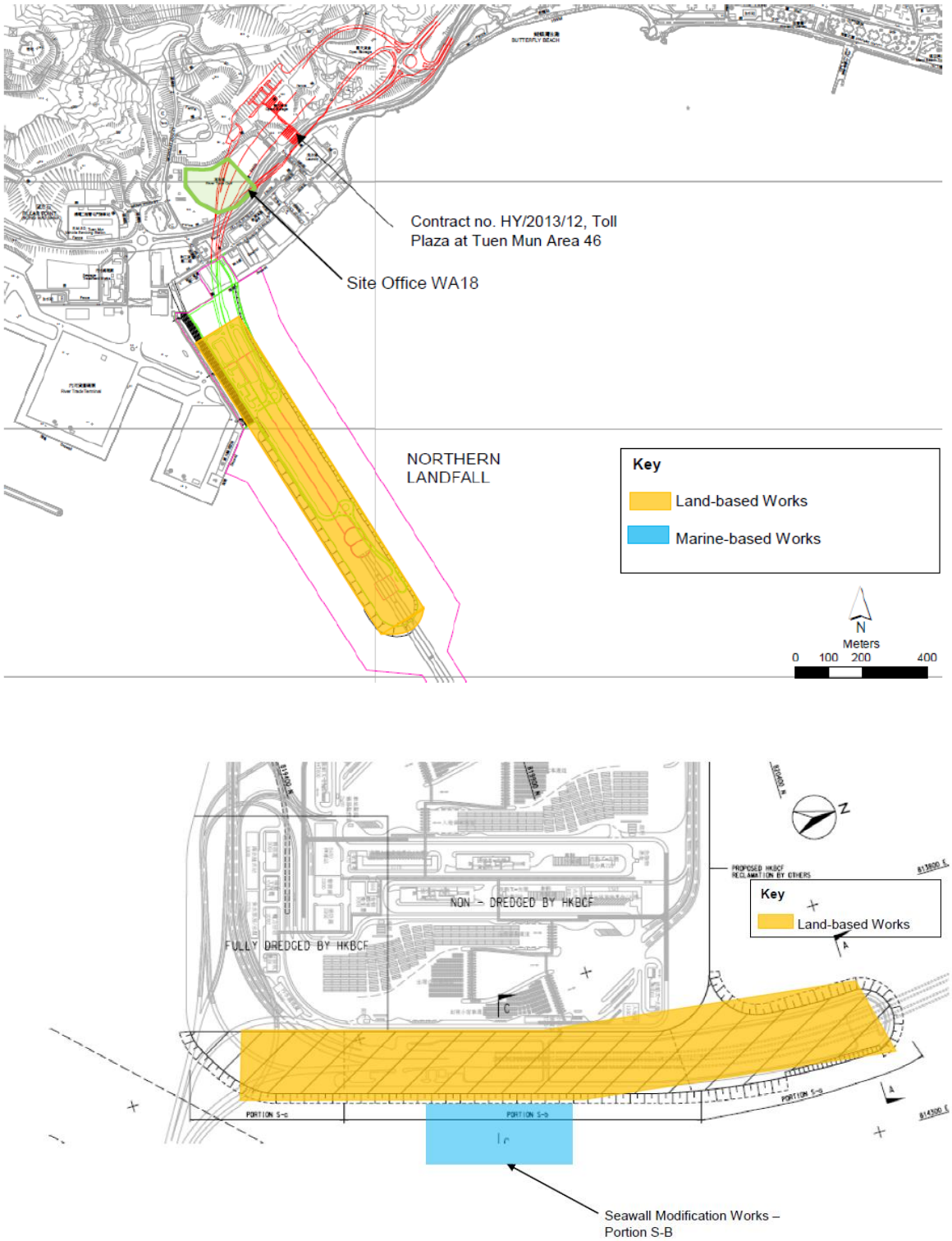
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Contract are shown in *Figure 1.3*.

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

Table 1.2 Summary of Construction Activities Undertaken during the Reporting Period

Construction Activities Undertaken
Land-based Works
• Construction of Thermal barrier – TBM tunnel; • Construction of Walkway Corbel & Cover – TBM Tunnel; • Road & Drainage works – Portion N-A; • Gantry Crane Removal – Portion N-A; • RC structure – Portion S-A; • Backfilling – Portion S-A & S-C; • Water Treatment Facilities Dismantling – Portion S-C; • Road & Drainage - Portion S-C
Marine-based Works
• Seawall Modification Works – Portion S-B

Figure 1.2 Locations of Construction Activities – September to November 2019



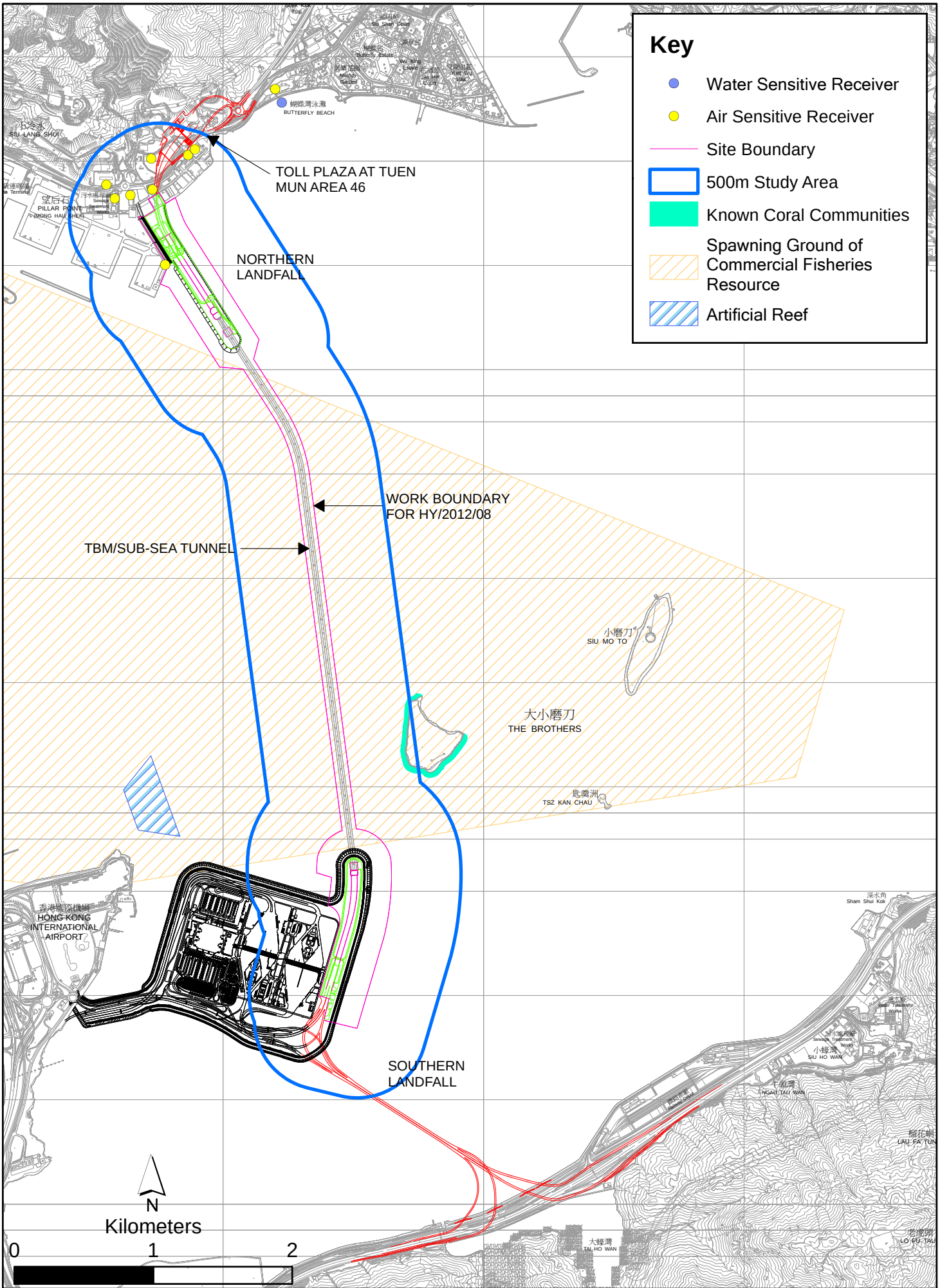


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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Date: 15/4/2014

Environmental Resources Management

The EM&A programme required environmental monitoring for air quality, 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

As per the requirements under *Condition 2.4* of *EP-354/2009/D*, the Enhanced TSP Monitoring Plan has been prepared under *Contract No. HY/2012/08*. Details of the monitoring plan are presented in the *Enhanced TSP Monitoring Plan* [1].

2.1.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual and the *Enhanced TSP Monitoring Plan*, impact 1-hour TSP monitoring was conducted three (3) times in every six (6) days and impact 24-hour TSP monitoring was carried out once in every six (6) days when the highest dust impact was expected. 1-hr and 24-hr TSP monitoring frequency was increased to three times per day every three days and daily every three days respectively as excavation works for launching shaft commenced on 24 October 2014.

High volume samplers (HVSs) were used to carry out the 1-hour and 24-hour TSP monitoring in the reporting quarter at the five (5) air quality monitoring stations in accordance with the requirements stipulated in the Updated EM&A Manual (*Figure 2.1*; *Table 2.1*). Wind anemometer was installed at the rooftop of ASR5 for logging wind speed and wind direction. Details of the equipment deployed are provided in *Table 2.2*.

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

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR1	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 September 2019	Tuen Mun Fireboat Station	Office	TSP monitoring • 1-hour Total Suspended Particulates (1-hour TSP, μg/m³), 3 times in every 6 days • 24-hour Total Suspended Particulates (24-hour TSP, μg/m³), daily for 24-hour in every 6 days Enhanced TSP monitoring (commenced on 24 October 2014) • 1-hour Total Suspended Particulates (1-hour TSP,
ASR5	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 October 2019	Pillar Point Fire Station	Office	
AQMS1	1, 4, 7, 10, 13, 16, 19, 22, 25 and 28 November 2019	Previous River Trade Golf	Bare ground	
ASR6		Butterfly Beach Laundry	Office	

[1] ERM (2013) Enhanced TSP Monitoring Plan. Submitted on 28 October 2013 and subsequently approved by EPD on 1 November 2013.

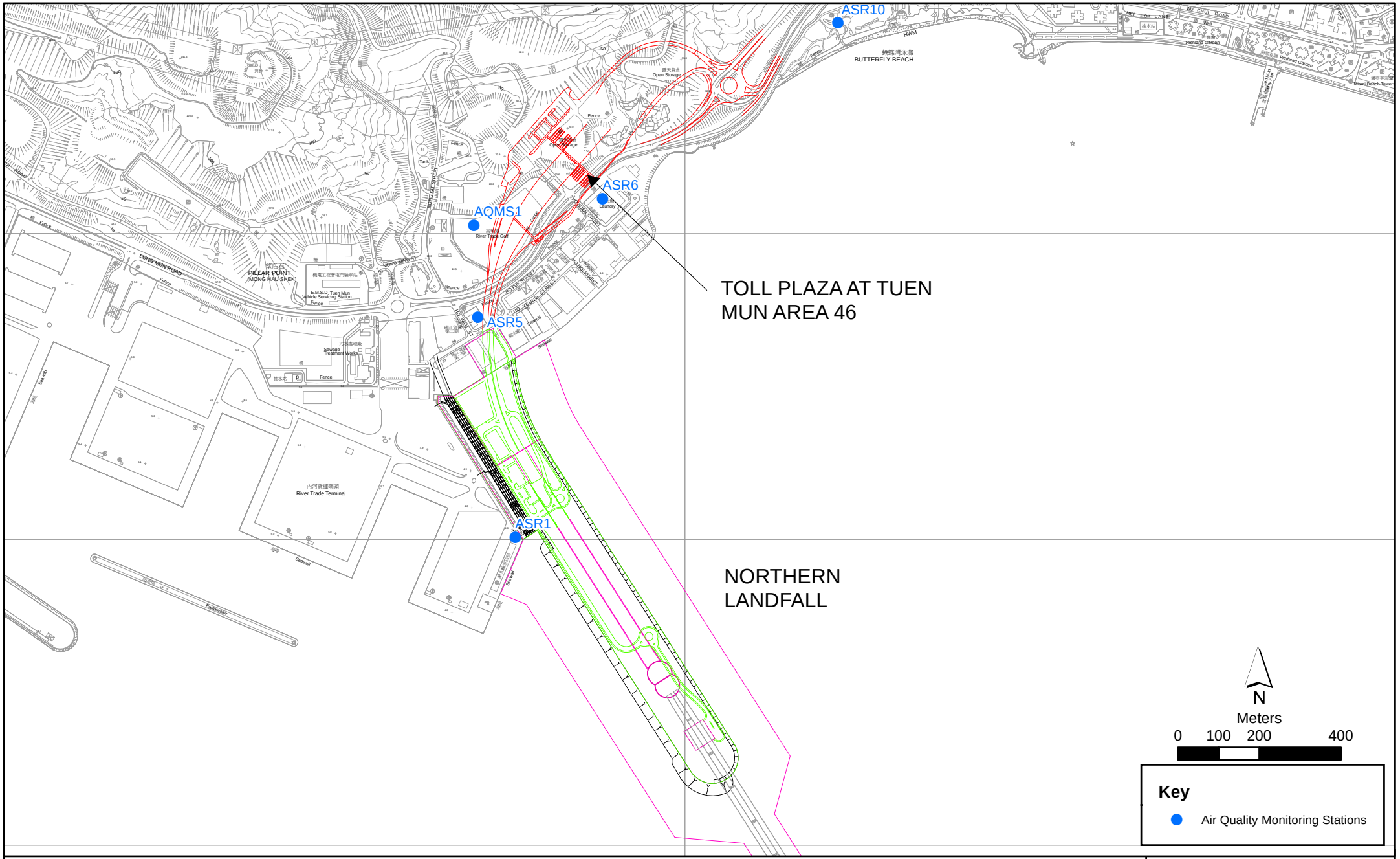

Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

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Date: 21/2/2014

Environmental Resources Management

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Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR10		Butterfly Beach Park	Recreational uses	µg/m³), 3 times in every 3 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour in every 3 days

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 Meter	Davis (Model: Vantage Pro 2 (S/N: AS160104014)
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 is provided in *Appendix D*. The Event and Action plan is presented in *Appendix H*.

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

Impact air quality monitoring was conducted at all designated monitoring stations in the reporting period under favourable weather conditions. The major dust sources in the reporting period include construction activities under the Contract as well as nearby traffic emissions.

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* and detailed impact air quality monitoring data were reported in the *Seventy-first* to *Seventy-third Monthly EM&A Report*.

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

Month/Year	Station	Average (µg/m³)	Range (µg/m³)	Action Level (µg/m³)	Limit Level (µg/m³)
September to November 2019	ASR 1	162	23 - 626	331	500
	ASR 5	183	25 - 534	340	500
	AQMS1	108	14 - 204	335	500
	ASR6	111	14 - 216	338	500
	ASR10	66	13 - 143	337	500

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

Month/Year	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
September to November 2019	ASR 1	104	28 - 207	213	260
	ASR 5	111	55 - 196	238	260
	AQMS1	71	25 - 108	213	260
	ASR6	81	32 - 145	238	260
	ASR10	54	22 - 95	214	260

Eight (8) Action level and four (4) Limit Level exceedances of 1-hour TSP and were recorded in this reporting period. Investigation reports are provided in Appendix J. Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter is detailed in *Table 2.15*.

2.2 WATER QUALITY MONITORING

Seawall Modification Works at Portion S-B was carried out in this reporting period.

2.2.1 *Monitoring Requirements & Equipment*

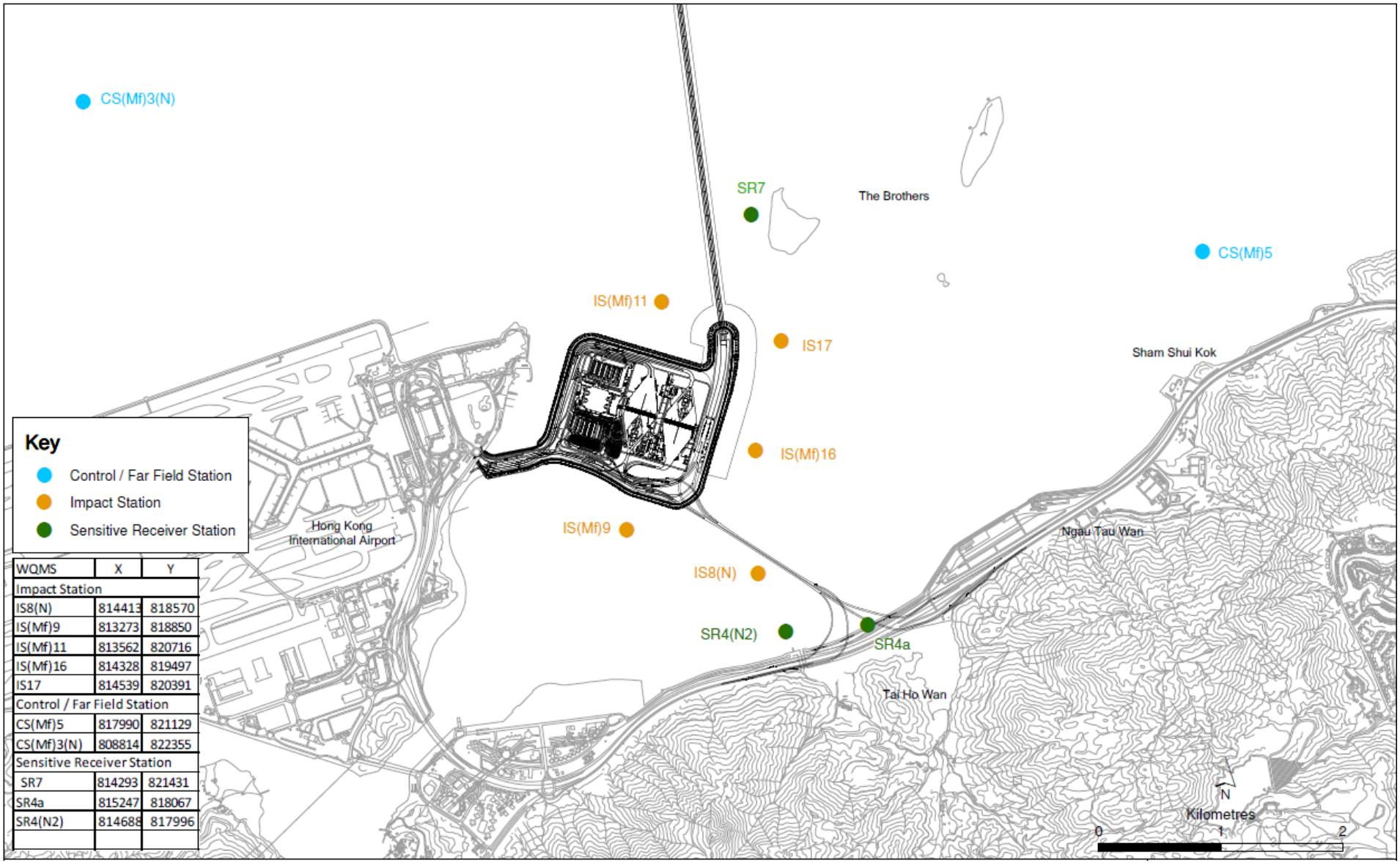
In accordance with the approved Environmental Review Report dated 21 March 2018 for the Change in Design of Vertical Seawall to Sloping Seawall on Southern Landfall, Updated Impact water quality monitoring programme and water quality monitoring stations IS17, SR7 and IS(Mf)11 specified under the EM&A Manual for HZMB HKBCF project will be adopted. (*Figure 2.2*; *Table 2.5*).

Results of water quality monitoring were adopted from the published EM&A data of Contract No. HY/2012/07 Tuen Mun-Chek Lap Kok Link – Southern Connection Viaduct Section.

The Action and Limit Levels of the water quality monitoring were adopted from the EM&A Manual for HZMB HKBCF project. The Action and Limit Levels are provided in Appendix D.

Table 2.5 ***Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements***

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716	• Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) • DO (mg/L and % of saturation)	3 water depths: 1m below sea surface, mid-depth	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 2.2

Water Quality Monitoring Stations

Environmental Resources Management

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Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
IS17	Impact Station (Close to HKBCF construction site)	814539	820391	• SS (mg/L)	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.	construction period of the Contract.
SR7	Sensitive receivers (Tai Mo Do)	814293	821431			
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850			
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497			
IS8(N)	Impact Station (Close to HKBCF construction site)	814413	818570			
SR4(N2)	Sensitive receiver (Tai Ho Inlet)	814688	817996			
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.

Water Quality Monitoring Station SR4(N) was relocated to SR4(N2) since 12 June 2019

Water Quality Monitoring Station IS8 was relocated to IS8(N) since 12 June 2019.

Table 2.6 summarizes the equipment used in the impact water quality monitoring programme.

Table 2.6 Water Quality Monitoring Equipment

Equipment	Model
Multi-Parameters	YSI ProDss 18A104824
Multi-Parameters	YSI ProDss 15M100005
Multi-Parameters	YSI ProDss 0001C6A7
Multi-Parameters	YSI ProDss 17H105557
Multi-Parameters	YSI ProDss 00019CB2
Multi-Parameters	YSI ProDss 17E100747
Multi-Parameters	YSI ProDss 16H104233
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4

2.2.2 Action & Limit Levels

The Action and Limit levels of water quality impact monitoring are shown in *Appendix D*. The Event and Action plan is presented in *Appendix I*.

2.2.3 Monitoring Schedule for the Reporting Period

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

2.2.4 Results and Observations

Impact water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. Results and graphical presentations of impact water quality monitoring are presented in *Appendix G*. Detailed water quality monitoring data were reported in the *Seventy-first and Seventy-third Monthly EM&A Report*.

2.3 DOLPHIN MONITORING

2.3.1 Monitoring Requirements

Impact dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins. In order to fulfil the EM&A requirements and make good use of available resources, Contract No. HY/2012/08 has taken over the responsibility for implementation of dolphin monitoring from HZMB HKLR Contract No. HY/2011/03 since October 2019.

2.3.2 Monitoring Equipment

Table 2.7 summarizes the equipment used for the impact dolphin monitoring.

Table 2.7 Dolphin Monitoring Equipment

Equipment	Model
Global Positioning System (GPS)	Garmin 18X-PC Geo One Phottix
Camera	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

2.3.3 *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.

2.3.4 *Monitoring Location*

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.3*. The co-ordinates of all transect lines are shown in *Table 2.8* below.

Table 2.8 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

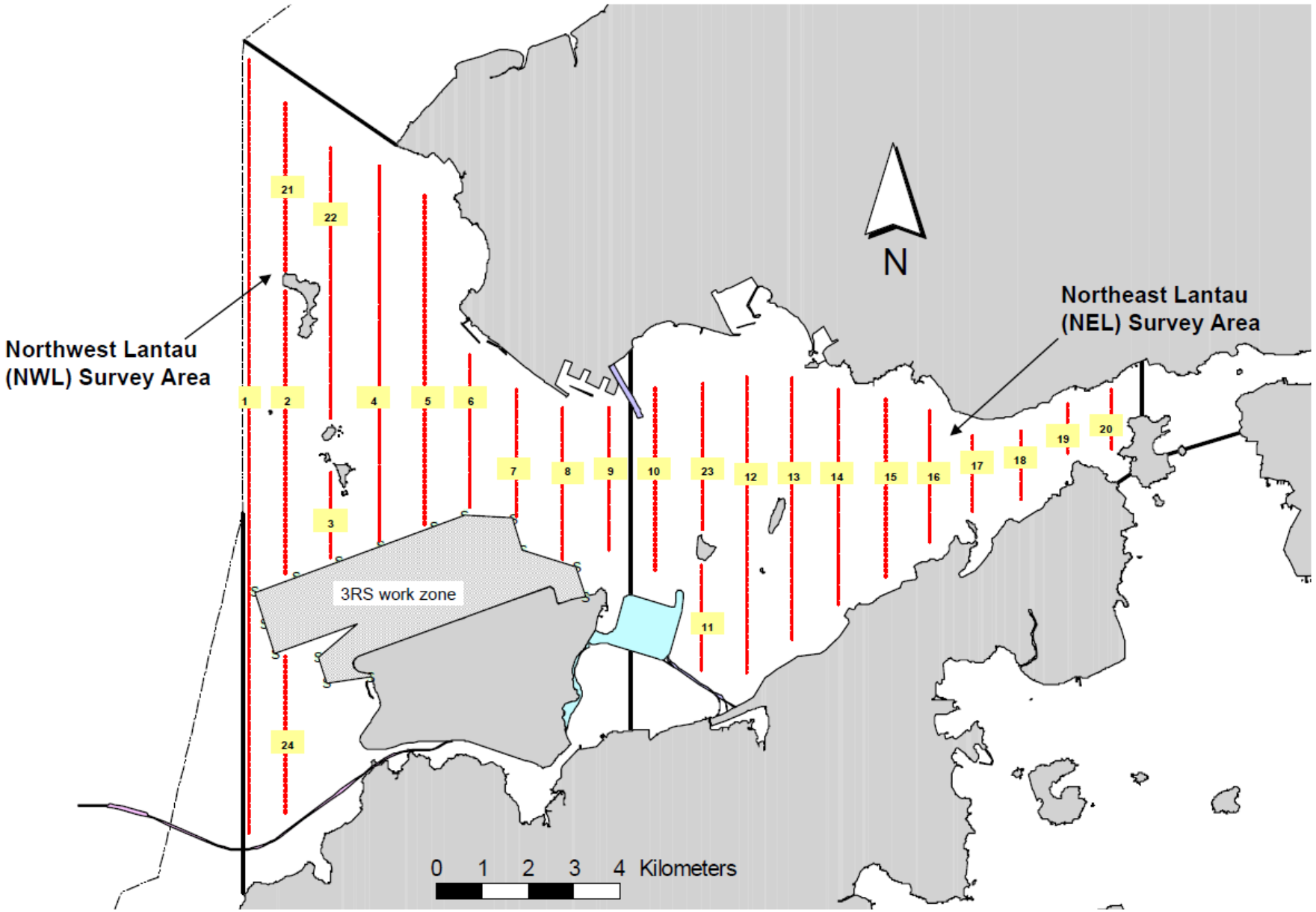

Figure 2.3

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

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Line No.		Easting	Northing	Line No.		Easting	Northing
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*

Remarks: The coordinates of several starting and ending points have been revised since August 2017 due to the presence of a work zone to the north of the airport platform with intense construction activities in association with the construction of the third runway expansion for the Hong Kong International Airport. Co-ordinates in red and marked with asterisk are revised co-ordinates of transect line.

2.3.5 *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 I*.

2.3.6 *Monitoring Schedule for the Reporting Period*

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

2.3.7 *Results & Observations*

A total of 796.79 km of survey effort was conducted, with 97.9% of the total survey effort being conducted under favourable weather conditions (ie Beaufort Sea State 3 or below with good visibility) in this reporting quarter. Amongst the two areas, 293.68 km and 503.11 km of survey effort were conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 572.39 km and 224.40 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 4 groups of 7 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All four dolphin sightings were made during on-effort search, and three of the four on-effort dolphin sightings were made on primary lines. During this reporting quarter, all dolphin groups were sighted in NWL, while no dolphin was sighted in NEL.

Encounter rates of Chinese White Dolphins are deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort

3 or below with good visibility) in the reporting quarter with the results and comparison with baseline results present in *Tables 2.9* and *2.10*.

Table 2.9 Individual Survey Event 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)
		Primary Lines Only	**Primary Lines Only**
NEL	Set 1 (4 & 11 Sep 2019)	0.00	0.00
	Set 2 (17 & 23 Sep 2019)	0.00	0.00
	Set 3 (8 & 9 Oct 2019)	0.00	0.00
	Set 4 (14 & 29 Oct 2019)	0.00	0.00
	Set 5 (5 & 19 Nov 2019)	0.00	0.00
	Set 6 (27 & 28 Nov 2019)	0.00	0.00
NWL	Set 1 (4 & 11 Sep 2019)	1.64	3.28
	Set 2 (17 & 23 Sep 2019)	0.00	0.00
	Set 3 (8 & 9 Oct 2019)	1.68	1.68
	Set 4 (14 & 29 Oct 2019)	0.00	0.00
	Set 5 (5 & 19 Nov 2019)	1.67	1.67
	Set 6 (27 & 28 Nov 2019)	0.00	0.00

Note: Dolphin Encounter Rates are deduced from the Two Sets of Surveys (Two Surveys in Each Set) in the reporting quarter in Northeast (NEL) and Northwest Lantau (NWL)

Table 2.10 Quarterly 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 2019	**September – November 2011**	**September – November 2019**	**September – November 2011**
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	0.83 ± 0.91	9.85 ± 5.85	1.10 ± 1.34	44.66 ± 29.85

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.

Group size of Chinese White Dolphins ranged from 1 – 3 individuals per group in North Lantau region during September to November 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 2.11*.

Table 2.11 Average Dolphin Group Size

	Average Dolphin Group Size	
	September – November 2019	**September – November 2011**
Overall	1.75 ± 0.96 (n = 4)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	1.75 ± 0.96 (n = 4)	3.92 ± 3.40 (n = 49)

Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between September and November 2019, no unacceptable impact from the construction activities of this Contract was recorded from the general observations.

Although the dolphins infrequently occurred along the alignment of TM-CLKL Northern Connection Sub-Sea Tunnel Section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL.

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.

2.3.8 Implementation of Marine Mammal Exclusion Zone

Daily marine mammal exclusion zone was in effect during the period of silt curtain installation in open waters under this Contract. No sighting of the Indo-Pacific humpback dolphin (i.e. Chinese White Dolphin) was recorded in the reporting period during the exclusion zone monitoring.

2.4 EM&A SITE INSPECTION

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Thirteen (13) site inspections were carried out in the reporting quarter on 4, 11, 18 and 25 September 2019; 2, 9, 16, 23 and 30 October 2019; 7, 14, 21 and 28 November 2019.

Key observations during the site inspections in this reporting period are summarized in *Table 2.12*.

Table 2.12 Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Period

Inspection Date	Environmental Observations	Recommendations/ Remarks
4 September 2019	Works Area – Portion N-A • Food waste in the skip should be removed. • Drip tray should be provided for the chemical containers. • The faded NRMM label should be replaced. • The broken water barrier should be removed. Works Area - Portion S-A • Food waste should be removed.	Works Area – Portion N-A • The Contractor was reminded to Remove the food waste in the skip. • The Contractor was reminded to provide drip tray for the chemical containers. • The Contractor was reminded to replace the NRMM label. • The Contractor was reminded to remove the broken water barrier. Works Area - Portion S-A • The Contractor was reminded to remove the food waste.
11 September 2019	Works Area – TBM tunnel • Better housekeeping should be maintained. • The broken water barrier should be removed. • Water spraying should be applied for dust control. Works Area - Portion S-A • Food waste should be removed. Works Area – Portion S-B • Oil spillage on the floor should be cleaned up.	Works Area – TBM tunnel • The Contractor was reminded to maintain better housekeeping. • The Contractor was reminded to remove the broken water barrier. • The Contractor was reminded to apply water spraying for dust control. Works Area - Portion S-A • The Contractor was reminded to remove the food waste. Works Area – Portion S-B • The Contractor was reminded to clean up the oil spillage on the floor.
18 September 2019	Works Area – Portion N-B • Waste should be removed and better housekeeping should be maintained. • Drip tray should be provided for the chemical containers. **Reminder from the SOR** Works Area – Portion S-B • Stagnant water and rubbish should be cleared. • Stagnant water should be cleared.	Works Area – Portion N-B • The Contractor was reminded to remove the waste and maintain better housekeeping. • The Contractor was reminded to provide drip tray for the chemical containers. **Reminder from the SOR** Works Area – Portion S-B • The Contractor was reminded to clear the stagnant water and rubbish. • The Contractor was reminded to clear the stagnant water.
25 September 2019	Works Area – Portion S-B • Waste and stagnant water should be cleared. Works Area - Portion N-B • Waste should be cleared and better housekeeping should be maintained. • Drip tray should be provided for the chemical containers. **Reminder from the SOR** Works Area – Portion S-B • Stagnant water should be cleared.	Works Area – Portion S-B • The Contractor was reminded to clear the waste and stagnant water. Works Area - Portion N-B • The Contractor was reminded to clear the waste and maintain better housekeeping. • The Contractor was reminded to provide drip tray for the chemical containers. **Reminder from the SOR** Works Area – Portion S-B • The Contractor was reminded to clear the stagnant water.

Inspection Date	Environmental Observations	Recommendations/ Remarks
2 October 2019	Works Area – Portion N-A • Water spraying should be applied on main haul road. • NRMM label on machine should be fixed. Works Area – Portion S-B • Water spraying should be applied on main haul road. • Food waste in the waste skip should be cleared. **Reminder from the SOR** Works Area - Portion S-B Cover of the water barrier should be provided.	Works Area – Portion N-A • The Contractor was reminded to apply water spraying on the main haul road. • The Contractor was reminded to fix the NRMM label on machine. Works Area – Portion S-B • The Contractor was reminded to apply water sraying on the main haul road. • The Contractor was reminded to clear the food waste in the waste skip. **Reminder from the SOR** Works Area - Portion S-B The Contractor was reminded to provide the cover of the water barrier.
9 October 2019	Works Area – TBM tunnel • Food waste should be removed and better housekeeping should be maintained. Works Area – Portion S-A • Cement bages should be covered with tarpaulin sheets. **Reminder from the SOR** Works Area – TBM tunnel • Stagnant water should be cleared. Works Area - Portion S-A • Stagnant water should be cleared.	Works Area – TBM tunnel • The Contractor was reminded to remove the food waste and maintain better housekeeping. Works Area – Portion S-A • The Contractor was reminded to cover the cement bags with tarpaulin sheets. **Reminder from the SOR** Works Area – TBM tunnel • The Contractor was reminded to clear the stagnant water. Works Area - Portion S-A • The Contractor was reminded to clear the stagnant water.
16 October 2019	Works Area – Portion S-A • Faded NRMM label should be replaced. Works Area – Portion S-B • Food waste in the skip should be cleared. Works Area – Portion N-A • Drip tray should be provided for the chemical containers. **Reminder from the SOR** Works Area – Portion S-A • Stagnant water should be cleared. Works Area – Portion N-A • Lifting eyes should be filled with sand.	Works Area – Portion S-A • The Contractor was reminded to replace the faded NRMM label. Works Area – Portion S-B • The Contractor was reminded to clear the food waste in the skip. Works Area – Portion N-A • The Contractor was reminded to provide drip tray for the chemical containers. **Reminder from the SOR** Works Area – Portion S-A • The Contractor was reminded to clear the stagnant water. Works Area – Portion N-A • The Contractor was reminded to fill the lifting eyes with sand.
23 October 2019	Works Area – Portion S-A • Cement batching station should be sheltered on top and 3 sides. • Cement bags should be covered with tarpaulin sheets. Works Area – TBM tunnel • Cement bages should be covered with tarpaulin sheets. **Reminder from the SOR** Works Area – TBM tunnel Covers of the water barrier should be provided.	Works Area – Portion S-A • The Contractor was reminded to shelter the cement batching station on top and 3 sides. • The Contractor was reminded to cover the cement bags with tarpaulin sheets. Works Area – TBM tunnel • The Contractor was reminded to cover the cement bags with tarpaulin sheets. **Reminder from the SOR** Works Area – TBM tunnel The Contractor was reminded to provide covers for the water barrier.

Inspection Date	Environmental Observations	Recommendations/ Remarks
30 October 2019	Works Area – Portion S-A • The faded NRMM label on the air compressor should be replaced. Works Area – Portion S-B • Food waste should be removed. Works Area – Poriton N-A • Food waste from the skip should be removed. • The damaged NRMM label should be replaced. **Reminder from the SOR** Works Area – Portion N-A • The oil leakage should be fixed. •	Works Area – Portion S-A • The Contractor was reminded to replace the faded NRMM label on the air compressor. Works Area – Portion S-B • The Contractor was reminded to remove the food waste. Works Area – Poriton N-A • The Contractor was reminded to remove the food waste from the skip. • The Contractor was reminded to replace the damaged NRMM label. **Reminder from the SOR** Works Area – Portion N-A • The Contractor was reminded to fix the oil leakage. •
7 November 2019	Works Area – TBM tunnel • The cement batching station should be sheltered on top and 3 sides. Works Area – Portion S-A • Drip tray should be provided for the chemical containers. • Broken water barrier should be removed. **Reminder from the SOR** Works Area - Portion S-A • The lifting eyes should be filled with sand.	Works Area – TBM tunnel • The Contractor was reminded to shelter the cement batching station on top and 3 sides. Works Area – Portion S-A • The Contractor was reminded to provide drip tray for the chemical containers. • The Contractor was reminded to remove the broken barrier. **Reminder from the SOR** Works Area - Portion S-A • The Contractor was reminded to fill the lifting eyes with sand.
14 November 2019	Works Area – Portion S-B • The damaged NRMM label for the excavator should be replaced. Works Area – Portion N-A • Water spraying should be applied on main haul raod. • Drip tray should be provided for the chemical containers. **Reminder from the SOR** Works Area – Portion S-B • Stagnant water should be cleared.	Works Area – Portion S-B • The Contractor was reminded to replace the damaged NRMM label for the excavator. Works Area – Portion N-A • The Contractor was reminded to apply water spraying on main haul road. • The Contractor was reminded to provide drip tray for the chemical containers. **Reminder from the SOR** Works Area – Portion S-B • The Contractor was reminded to clear the stagnant water.
21 November 2019	Works Area – TBM tunnel • The NRMM label should be replaced. • Food waste from the skip should be removed and better housekeeping should be maintained. Works Area – Portion S-B • Drip tray should be provided for the chemical containers. **Reminder from the SOR** Works Area – Portion S-A • Broken water barrier should be replaced.	Works Area – TBM tunnel • The Contractor was reminded to replace the NRMM label. • The Contractor was reminded to remove the food waste from the skip and maintain better housekeeping. Works Area – Portion S-B • The Contractor was reminded to provide drip tray for the chemical containers. **Reminder from the SOR** Works Area – Portion S-A • The Contractor was reminded to replace the broken water barrier.

Inspection Date	Environmental Observations	Recommendations/ Remarks
28 November 2019	Works Area – Portion S-A • Food waste should be removed. Works Area – TBM tunnel • The faded NRMM label should be replaced.	Works Area – Portion S-A • The Contractor was reminded to remove the food waste. Works Area – TBM tunnel • The Contractor was reminded to replace the NRMM label.

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

2.5 *WASTE MANAGEMENT STATUS*

The Contractor had 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). 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 2.13*.

Table 2.13 Quantities of Different Waste Generated in the Reporting Period

Month/Year	Inert Construction Waste [(a)] (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste [(b)] (tonnes)	Recyclable Materials [(c)] (kg)	Chemical Wastes (kg)	Marine Sediment (m^3)		
						Category L	Category M (M_p & M_f)	Mixed (L+M)
September 2019	4,191[(d)]	0	737[(d)]	399,320	8,000	0	0	0
October 2019	8,366	0	754	524,090	5,800	0	0	0
November 2019	6,215	0	525	273,630	1,000	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 and others.
(d) Updated figure and waste flow table is presented in this quarterly report.

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.

2.6 *ENVIRONMENTAL LICENSES AND PERMITS*

The status of environmental licensing and permit is summarized in *Table 2.14* below.

Table 2.14 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	13 March 2015	Throughout the Contract	HyD	Application for VEP on 3 March 2015 to supersede EP-354/2009/C
Construction Dust Notification	363510	19 August 2013	Throughout the Contract	DBJV	Northern Landfall
Construction Dust Notification	403620	10 June 2016	Throughout the Contract	DBJV	Southern Landfall
Chemical Waste Registration	5213-422-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Construction Waste Disposal Account	7021715	4 July 2019	14 October 2019	DBJV	Vessel Disposal
Construction Waste Disposal Account	7021715	4 October 2019	14 January 2020	DBJV	Vessel Disposal
Waste Water Discharge License	WT00031435-2018	2 August 2018	31 August 2023	DBJV	Southern Landfall
Waste Water Discharge License	WT00034060-2019	25 July 2019	30 June 2024	DBJV	Northern Landfall (4 Discharge Point)
Marine Dumping Permit	EP/MD/20-013	19 May 2019	18 November 2019	DBJV	Type 1 (Open Sea Disposal)
Construction Noise Permit	GW-RW0406-18	27 April 2019	15 October 2019	DBJV	Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0406-18	17 October 2019	15 April 2020	DBJV	Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0374-19	20 August 2019	19 February 2020	DBJV	WA23 @ Tsing Yi
Construction Noise Permit	GW-RS0766-19	2 September 2019	25 February 2020	DBJV	Southern Landfall
Construction Noise Permit	GW-RS0224-19	25 March 2019	24 September 2019	DBJV	Southern Landfall
Construction Noise Permit	GW-RW0179-19	27 April 2019	15 October 2019	DBJV	Urmston Road in front of Pillar Point

Notes:
HyD = Highways Department
DBJV = Dragages – Bouygues Joint Venture
VEP = Variation of Environmental Permit

2.7 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

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

A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in *Appendix C*. The necessary mitigation measures relevant to this Contract were implemented properly.

2.8 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

For air quality impact monitoring, a total of thirty monitoring events for both 1-hour TSP and 24-hour TSP were undertaken in which Eight (8) Action level and four (4) Limit Level exceedances of 1-hour TSP and were recorded (*Table 2.15*).

Table 2.15 Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter

Station	Exceedance Level	Date of Exceedances		Number of Exceedances	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
AQMS1	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR1	Action Level	2019-10-14 2019-10-17 2019-10-17 2019-11-28 2019-11-28	-	-	-
	Limit Level	2019-09-20 2019-11-04 2019-11-28	-	-	-
ASR5	Action Level	2019-11-04 2019-11-07 2019-11-28	-	-	-
	Limit Level	2019-11-28	-	-	-
ASR6	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR10	Action Level	-	-	-	-
	Limit Level	-	-	-	-
	Total number of Action level Exceedances:			**8**	**0**
	Total number of Limit level Exceedances:			**4**	**0**

For marine water quality impact monitoring, a total of thirty-nine monitoring events were undertaken in which Thirty-five (35) Action level of Dissolved Oxygen were recorded in this reporting period. Four (4) Action Level exceedance for Depth-averaged suspended solids was recorded. (*Table 2.16*).

Table 2.16 Summary of Exceedances for Marine Water Quality Impact Monitoring in this Reporting Quarter

Station	Exceedance Level [a]	DO (Surface and Middle)		DO (Bottom)		Turbidity (depth-averaged)		SS (depth-averaged)	
		Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
IS17	**AL**	2019-09-18 2019-09-20	2019-09-16 2019-09-18 2019-09-20	2019-09-16 2019-09-18 2019-09-20	2019-09-16 2019-09-18 2019-09-20	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS(Mf)11	**AL**	2019-09-18	2019-09-16 2019-09-18 2019-09-20	2019-09-18	2019-09-18 2019-09-20	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR7	**AL**	-	2019-09-16 2019-09-18 2019-09-20	-	2019-09-18	-	-	-	2019-10-02 2019-10-28
	LL	-	-	-	-	-	-	-	-
CS(Mf)5	**AL**	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
CS(Mf)3(N)	**AL**	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS(Mf)16	**AL**	-	2019-09-18	-	-	-	-	2019-11-01	-
	LL	-	-	-	-	-	-	-	-
SR4a	**AL**	-	2019-09-18	2019-09-16	2019-09-06	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR4(N2)	**AL**	2019-09-23	2019-09-18	2019-09-23	2019-09-18 2019-09-20	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS8(N)	**AL**	2019-09-16 2019-09-18	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS(Mf)9	**AL**	2019-09-18	2019-09-18	-	-	-	-	2019-09-09	-
	LL	-	-	-	-	-	-	-	-

Station	Exceedance Level [(a)]	DO (Surface and Middle)		DO (Bottom)		Turbidity (depth-averaged)		SS (depth-averaged)	
		Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
	Total AL Exceedances:	**7**	**13**	**6**	**9**	**0**	**0**	**2**	**2**
	Total LL Exceedances:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Notes:
(a) AL = Action Level; LL = Limit Level

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between September and November 2019, whilst no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations.

Cumulative statistics are provided in *Appendix J*.

2.9 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.4*.

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

Statistics on complaints, notifications of summons and successful prosecutions are summarized in *Appendix J*.

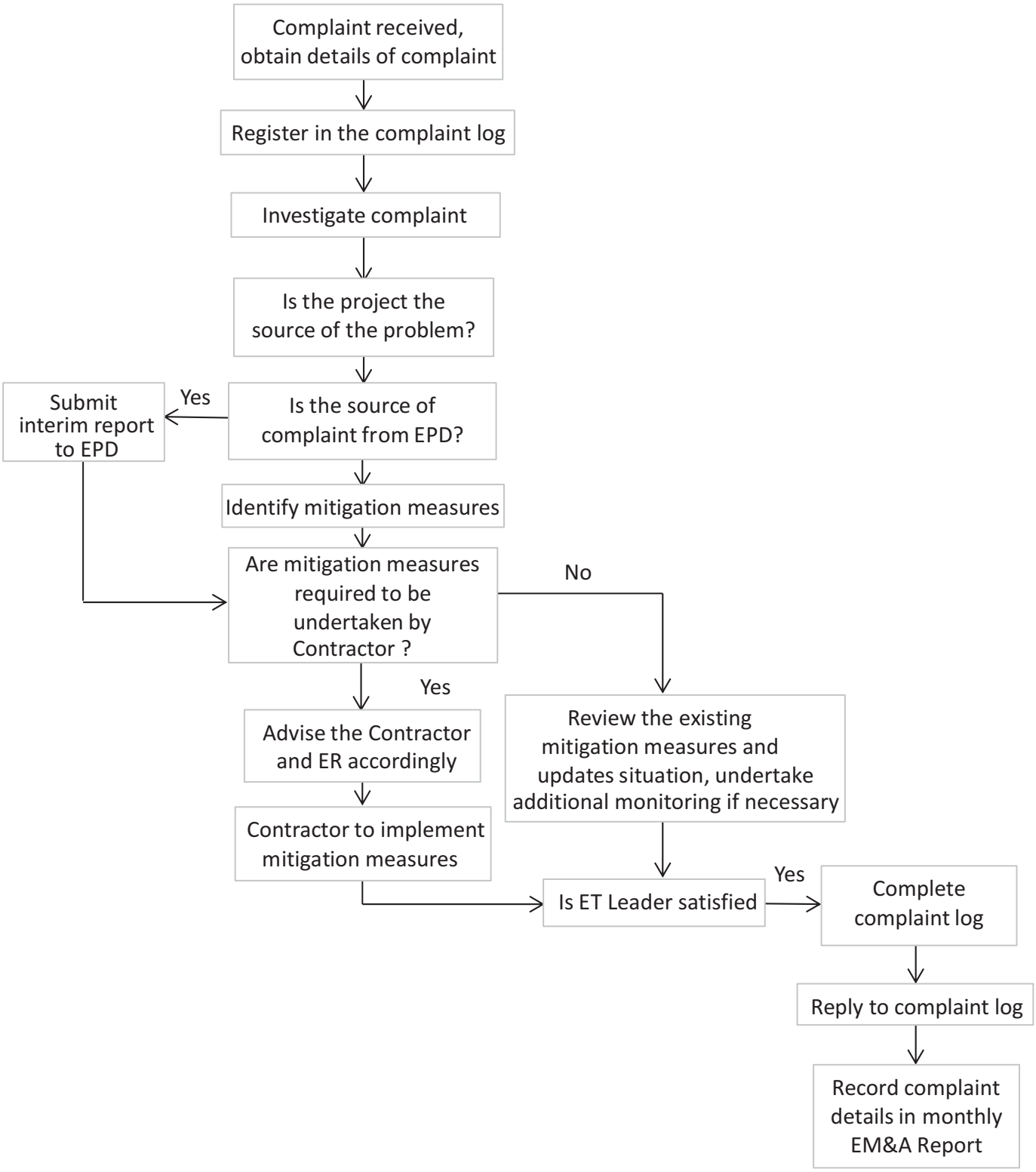

Figure 2.4 Environmental Complaint Handling Procedure

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3 FUTURE KEY ISSUES

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 in *Table 3.1*.

Table 3.1 Construction Works to Be Undertaken in the Coming Quarter

Works to be undertaken
Land-based Works • Construction of Thermal barrier – TBM tunnel; • Construction of Walkway Corbel & Cover – TBM Tunnel; • Road & Drainage works – Portion N-A • Gantry Crane Removal – Portion N-B & Portion S-C; • RC structure – Portion S-A; • E&M Platform Installation – Portion S-A • Backfilling – Portion S-A & S-C; • Water Treatment Facilities Dismantling – Portion S-C; • Cut & Cover Tunnel RC structure – Portion S-C • Tower Crane Removal – Portion S-C *Marine-based Works* • Seawall Modification Works – Portion S-B

3.2 KEY ISSUES FOR THE COMING QUARTER

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are expected to be mainly associated with dust, marine ecology, marine water quality and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality and marine ecology (include 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. Change to the monitoring programme was thus not considered to be necessary at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period.

4 CONCLUSIONS

This Twenty-fourth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 September 2019 to 30 November 2019, in accordance with the Updated EM&A Manual and the requirements of *EP-354/2009/D*.

Air quality (including 1-hour TSP and 24-hour TSP), water quality and dolphin monitoring were carried out in the reporting period. Eight (8) Action level and four (4) Limit Level exceedances of 1-hour TSP and were recorded in this reporting period.

Thirty-five (35) Action level of Dissolved Oxygen were recorded in this reporting period. Four (4) Action Level exceedance for Depth-averaged suspended solids was recorded.

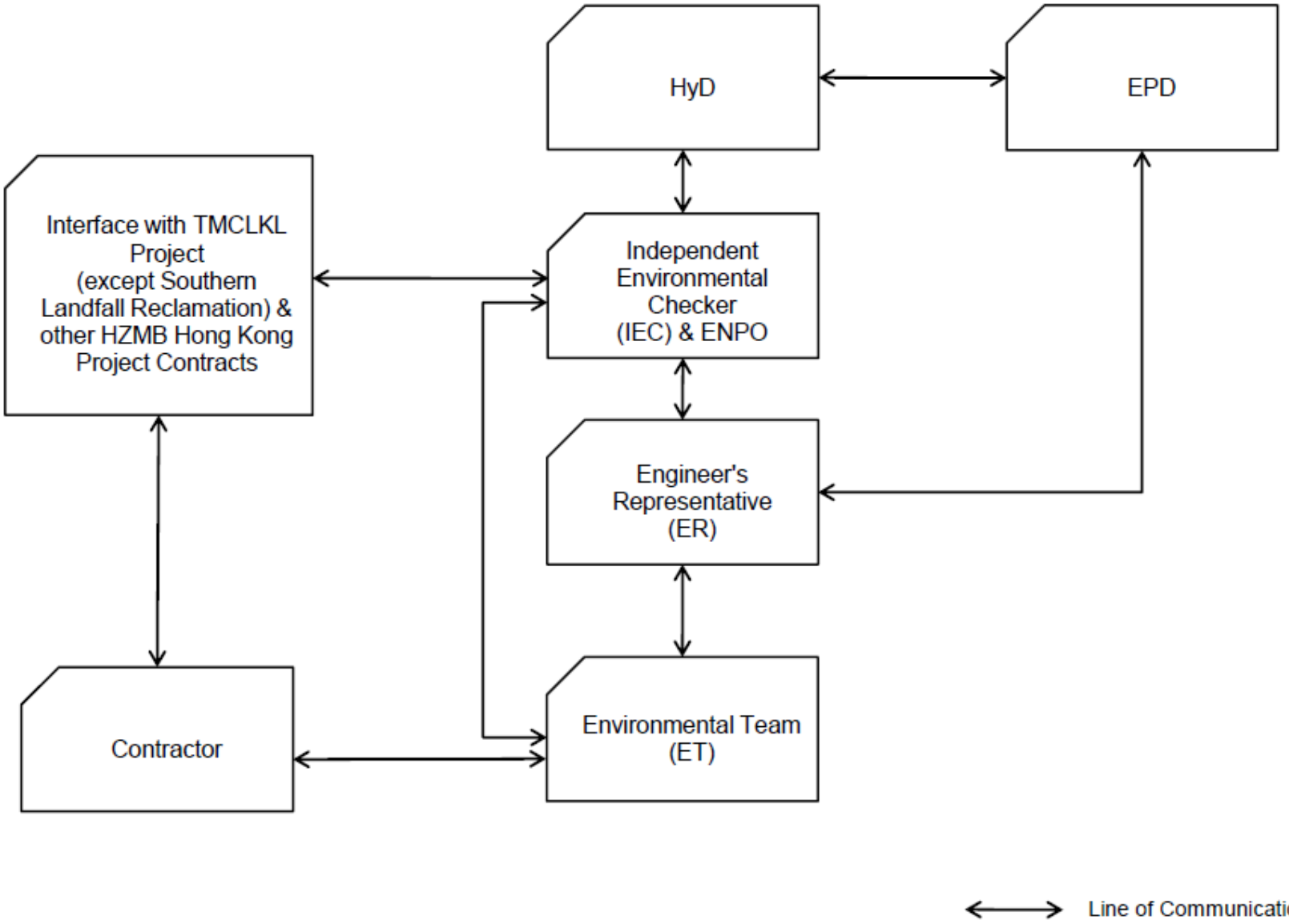
A total of 4 groups of 7 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All four dolphin sightings were made during on-effort search, and three of the four on-effort dolphin sightings were made on primary lines. Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between September to November 2019, no unacceptable impact from the construction activities of this Contract was recorded from the general observations. Although the dolphins infrequently occurred along the alignment of TM-CLKL Northern Connection Sub-Sea Tunnel Section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL. 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 construction works of the Contract, and whether suitable mitigation measure can be applied to improve the situation.

Thirteen weekly environmental site inspections were carried out in the reporting period. Recommendations on remedial actions provided for the deficiencies identified during the site audits were properly implemented by the Contractor. No non-compliance event was recorded during the reporting period.

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

Appendix A

Project Organization for Environmental Works



Appendix A1

Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section
Project Organization

DATE: 06/03/2013

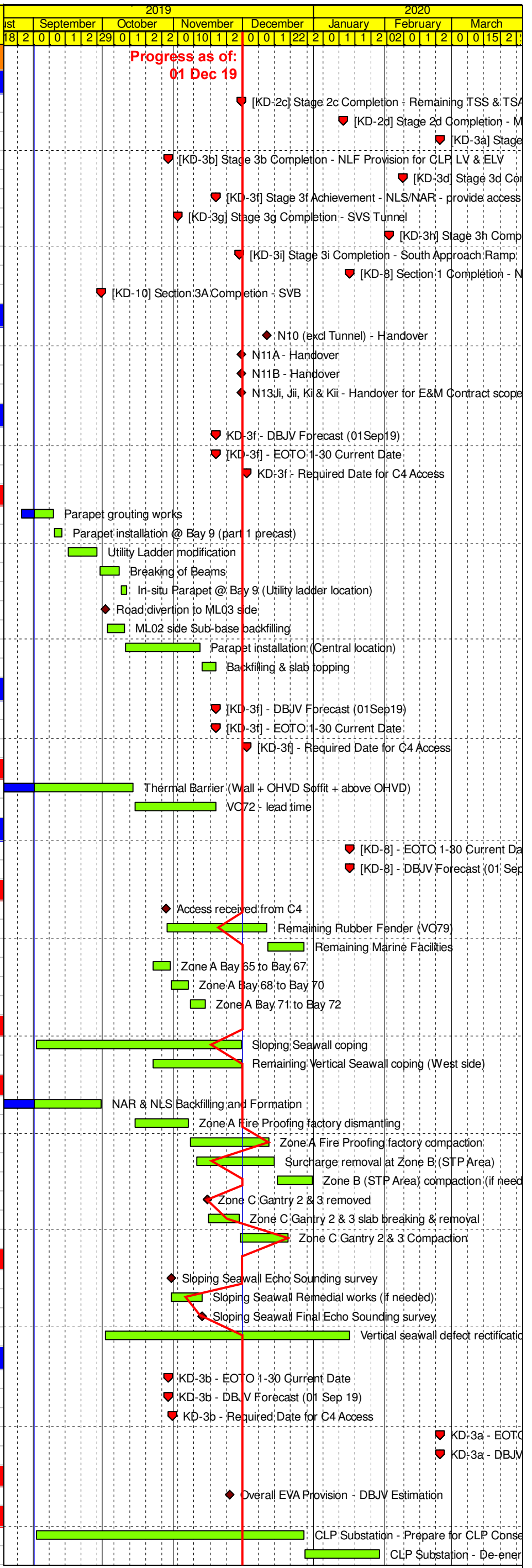
Environmental Resources Management

ERM

Appendix B

Construction Programme

#	Activity Name	Orig Dur	Start	Finish
1	**TMCLKL Northern Connection Sub-sea Tunnel Section**			
2	**Contract Key Dates**			
3	[KD-2c] Stage 2c Completion - Remaining TSS & TSA	0		30-Nov-19*
4	[KD-2d] Stage 2d Completion - MHS C&C Tunnel	0		13-Jan-20*
5	[KD-3a] Stage 3a Completion - NLF UU/At-grade Provision	0		24-Feb-20*
6	[KD-3b] Stage 3b Completion - NLF Provision for CLP, LV & ELV	0		29-Oct-19*
7	[KD-3d] Stage 3d Completion - SLF Provision for CLP, LV & ELV	0		08-Feb-20*
8	[KD-3f] Stage 3f Achievement - NLS/NAR - provide access	0		19-Nov-19*
9	[KD-3g] Stage 3g Completion - SVS Tunnel	0		02-Nov-19*
10	[KD-3h] Stage 3h Completion - SVS Ventilation Duct	0		02-Feb-20*
11	[KD-3i] Stage 3i Completion - South Approach Ramp	0		29-Nov-19*
12	[KD-8] Section 1 Completion - NLF Reclamation & Seawall	0		16-Jan-20*
13	[KD-10] Section 3A Completion - SVB	0		30-Sep-19*
14	**Portion Handover Dates**			
15	N10 (excl Tunnel) - Handover	0		11-Dec-19*
16	N11A - Handover	0		30-Nov-19*
17	N11B - Handover	0		30-Nov-19*
18	N13Ji, Jii, Ki & Kii - Handover for E&M Contract scope	0		30-Nov-19*
19	**North Approach Ramp KD-3f**			
20	KD-3f - DBJV Forecast (01Sep19)	0		19-Nov-19
21	[KD-3f] - EOTO 1-30 Current Date	0		19-Nov-19*
22	KD-3f - Required Date for C4 Access	0		02-Dec-19*
23	**North Approach Ramp**			
24	Parapet grouting works	12	27-Aug-19 A	09-Sep-19
25	Parapet installation @ Bay 9 (part 1 precast)	4	10-Sep-19	13-Sep-19
26	Utility Ladder modification	12	16-Sep-19	28-Sep-19
27	Breaking of Beams	6	30-Sep-19	08-Oct-19
28	In-situ Parapet @ Bay 9 (Utility ladder location)	3	09-Oct-19	11-Oct-19
29	Road divertion to ML03 side	0		02-Oct-19*
30	ML02 side Sub-base backfilling	6	03-Oct-19	10-Oct-19
31	Parapet installation (Central location)	28	11-Oct-19	12-Nov-19
32	Backfilling & slab topping	6	13-Nov-19	19-Nov-19
33	**North Launching Shaft KD-3f**			
34	[KD-3f] - DBJV Forecast (01Sep19)	0		19-Nov-19
35	[KD-3f] - EOTO 1-30 Current Date	0		19-Nov-19*
36	[KD-3f] - Required Date for C4 Access	0		02-Dec-19*
37	**North Launching Shaft**			
38	Thermal Barrier (Wall + OHVD Soffit + above OHVD)	70	22-Jul-19 A	14-Oct-19
39	VO72 - lead time	31	15-Oct-19	19-Nov-19
40	**Remaining North Reclamation KD-8**			
41	[KD-8] - EOTO 1-30 Current Date	0		16-Jan-20*
42	[KD-8] - DBJV Forecast (01 Sep 19)	0		16-Jan-20
43	**Vertical Seawall**			
44	Access received from C4	0		28-Oct-19*
45	Remaining Rubber Fender (VO79)	38	29-Oct-19	11-Dec-19
46	Remaining Marine Facilities	12	12-Dec-19	27-Dec-19
47	Zone A Bay 65 to Bay 67	7	23-Oct-19	30-Oct-19
48	Zone A Bay 68 to Bay 70	7	31-Oct-19	07-Nov-19
49	Zone A Bay 71 to Bay 72	6	08-Nov-19	14-Nov-19
50	**Sloping Seawall**			
51	Sloping Seawall coping	75	02-Sep-19	30-Nov-19
52	Remaining Vertical Seawall coping (West side)	34	23-Oct-19	30-Nov-19
53	**Removal, Backfilling & Compaction**			
54	NAR & NLS Backfilling and Formation	51	01-Aug-19 A	30-Sep-19
55	Zone A Fire Proofing factory dismantling	21	15-Oct-19*	07-Nov-19
56	Zone A Fire Proofing factory compaction	30	08-Nov-19	12-Dec-19
57	Surcharge removal at Zone B (STP Area)	30	11-Nov-19*	14-Dec-19
58	Zone B (STP Area) compaction (if needed)	12	16-Dec-19	31-Dec-19
59	Zone C Gantry 2 & 3 removed	0		15-Nov-19*
60	Zone C Gantry 2 & 3 slab breaking & removal	12	16-Nov-19	29-Nov-19
61	Zone C Gantry 2 & 3 Compaction	18	30-Nov-19	20-Dec-19
62	**Overall**			
63	Sloping Seawall Echo Sounding survey	0		31-Oct-19*
64	Sloping Seawall Remedial works (if needed)	12	31-Oct-19	13-Nov-19
65	Sloping Seawall Final Echo Sounding survey	0		13-Nov-19
66	Vertical seawall defect rectification	88	02-Oct-19	16-Jan-20
67	**NLF Demobilization & At-grade works**			
68	KD-3b - EOTO 1-30 Current Date	0		29-Oct-19*
69	KD-3b - DBJV Forecast (01 Sep 19)	0		29-Oct-19*
70	KD-3b - Required Date for C4 Access	0		31-Oct-19*
71	KD-3a - EOTO 1-30 Current Date	0		24-Feb-20*
72	KD-3a - DBJV Forecast (01 Sep 19)	0		24-Feb-20
73	**Requirement**			
74	Overall EVA Provision - DBJV Estimation	0		25-Nov-19*
75	**Portion N12 & Portion N6B**			
76	CLP Substation - Prepare for CLP Consent for de-energization	96	02-Sep-19	27-Dec-19
77	CLP Substation - De-energization	24	28-Dec-19	29-Jan-20



Planned Bar
Planned Milestone
Key Date
Progress Milestone
Progress Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

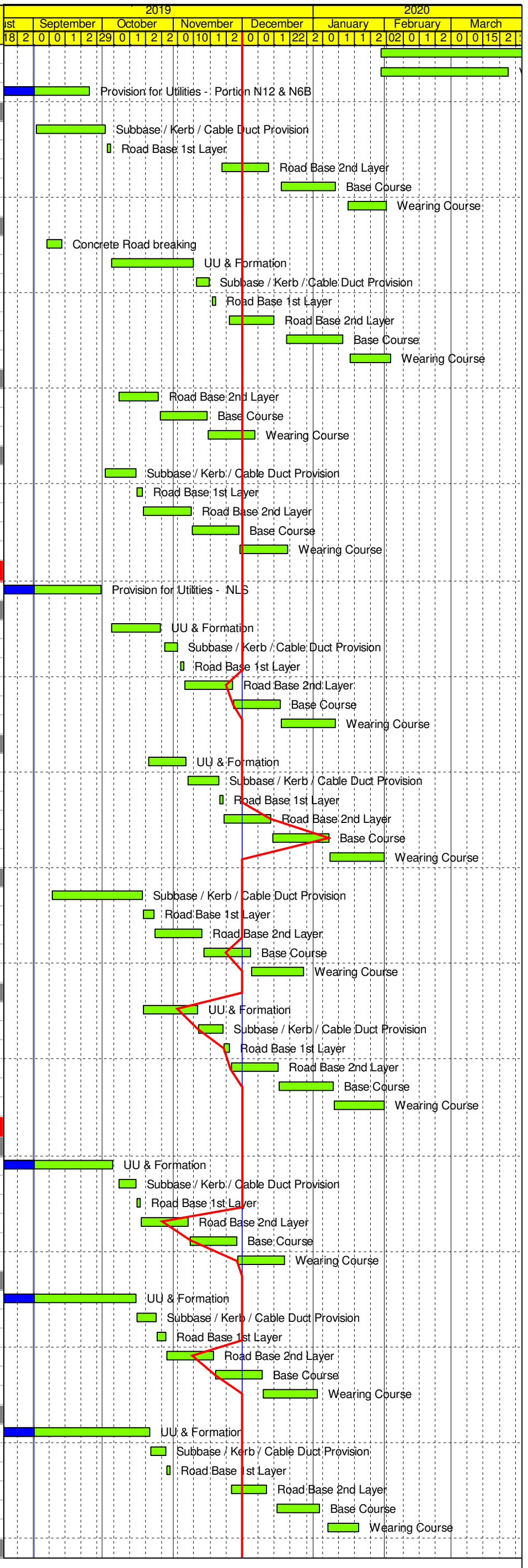
Detailed Works Programme Rev. K

Forecast as of 01 September 2019

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev. H	WYu	
05-Feb-18	Rev. I AC	WYu	
07-Mar-18	Rev. I	WYu	
04-Jun-18	Rev. J	WYu	
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
78	CLP Substation - Dismantling & Removal	102	30-Jan-20	02-Jun-20
79	VO-009 Temporary Protection Barrier - Dismantling & Removal	48	30-Jan-20	25-Mar-20
80	Provision for Utilities - Portion N12 & N6B	133	15-Apr-19 A	25-Sep-19
81	**NPO5 (ML03)**			
82	Subbase / Kerb / Cable Duct Provision	25	02-Sep-19	02-Oct-19
83	Road Base 1st Layer	2	03-Oct-19	04-Oct-19
84	Road Base 2nd Layer	18	22-Nov-19	12-Dec-19
85	Base Course	18	18-Dec-19	10-Jan-20
86	Wearing Course	12	16-Jan-20	01-Feb-20
87	**NPO5 (ML02) + NP05 (MD)**			
88	Concrete Road breaking	6	07-Sep-19	13-Sep-19
89	UU & Formation	30	05-Oct-19	09-Nov-19
90	Subbase / Kerb / Cable Duct Provision	6	11-Nov-19	16-Nov-19
91	Road Base 1st Layer	2	18-Nov-19	19-Nov-19
92	Road Base 2nd Layer	18	25-Nov-19	14-Dec-19
93	Base Course	18	20-Dec-19	13-Jan-20
94	Wearing Course	12	17-Jan-20	03-Feb-20
95	**Portion N6**			
96	Road Base 2nd Layer	16	08-Oct-19*	25-Oct-19
97	Base Course	18	26-Oct-19	15-Nov-19
98	Wearing Course	18	16-Nov-19	06-Dec-19
99	**Retaining Wall A**			
100	Subbase / Kerb / Cable Duct Provision	11	02-Oct-19*	15-Oct-19
101	Road Base 1st Layer	3	16-Oct-19	18-Oct-19
102	Road Base 2nd Layer	18	19-Oct-19	08-Nov-19
103	Base Course	18	09-Nov-19	29-Nov-19
104	Wearing Course	18	30-Nov-19	20-Dec-19
105	**North Launching Shaft**			
106	Provision for Utilities - NLS	48	05-Aug-19 A	30-Sep-19
107	**Roundabout at NLS**			
108	UU & Formation	18	05-Oct-19	26-Oct-19
109	Subbase / Kerb / Cable Duct Provision	6	28-Oct-19	02-Nov-19
110	Road Base 1st Layer	2	04-Nov-19	05-Nov-19
111	Road Base 2nd Layer	18	06-Nov-19	26-Nov-19
112	Base Course	18	27-Nov-19	17-Dec-19
113	Wearing Course	18	18-Dec-19	10-Jan-20
114	**Carpark**			
115	UU & Formation	15	21-Oct-19	06-Nov-19
116	Subbase / Kerb / Cable Duct Provision	12	07-Nov-19	20-Nov-19
117	Road Base 1st Layer	2	21-Nov-19	22-Nov-19
118	Road Base 2nd Layer	18	23-Nov-19	13-Dec-19
119	Base Course	18	14-Dec-19	07-Jan-20
120	Wearing Course	18	08-Jan-20	31-Jan-20
121	**Retaining Wall A to B**			
122	Subbase / Kerb / Cable Duct Provision	32	09-Sep-19	18-Oct-19
123	Road Base 1st Layer	4	19-Oct-19	23-Oct-19
124	Road Base 2nd Layer	18	24-Oct-19	13-Nov-19
125	Base Course	18	14-Nov-19	04-Dec-19
126	Wearing Course	18	05-Dec-19	27-Dec-19
127	**NPO3**			
128	UU & Formation	20	19-Oct-19	11-Nov-19
129	Subbase / Kerb / Cable Duct Provision	10	12-Nov-19	22-Nov-19
130	Road Base 1st Layer	2	23-Nov-19	25-Nov-19
131	Road Base 2nd Layer	18	26-Nov-19	16-Dec-19
132	Base Course	18	17-Dec-19	09-Jan-20
133	Wearing Course	16	10-Jan-20	31-Jan-20
134	**Sloping Seawall**			
135	**Workshop 14-9**			
136	UU & Formation	127	06-May-19 A	05-Oct-19
137	Subbase / Kerb / Cable Duct Provision	7	08-Oct-19	15-Oct-19
138	Road Base 1st Layer	2	16-Oct-19	17-Oct-19
139	Road Base 2nd Layer	18	18-Oct-19	07-Nov-19
140	Base Course	18	08-Nov-19	28-Nov-19
141	Wearing Course	18	29-Nov-19	19-Dec-19
142	**Workshop 9-1**			
143	UU & Formation	107	07-Jun-19 A	15-Oct-19
144	Subbase / Kerb / Cable Duct Provision	8	16-Oct-19	24-Oct-19
145	Road Base 1st Layer	3	25-Oct-19	28-Oct-19
146	Road Base 2nd Layer	18	29-Oct-19	18-Nov-19
147	Base Course	18	19-Nov-19	09-Dec-19
148	Wearing Course	18	10-Dec-19	02-Jan-20
149	**Outfall C 1/2**			
150	UU & Formation	86	10-Jul-19 A	21-Oct-19
151	Subbase / Kerb / Cable Duct Provision	6	22-Oct-19	28-Oct-19
152	Road Base 1st Layer	2	29-Oct-19	30-Oct-19
153	Road Base 2nd Layer	14	26-Nov-19	11-Dec-19
154	Base Course	14	16-Dec-19	03-Jan-20
155	Wearing Course	12	07-Jan-20	20-Jan-20
156	**Outfall C 2/2**			



Planned Bar
Planned Milestone
Key Date
Progress Milestone
Progress Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. K

Forecast as of 01 September 2019

Dragages HongKong
A member of the Bouygues Construction group
Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

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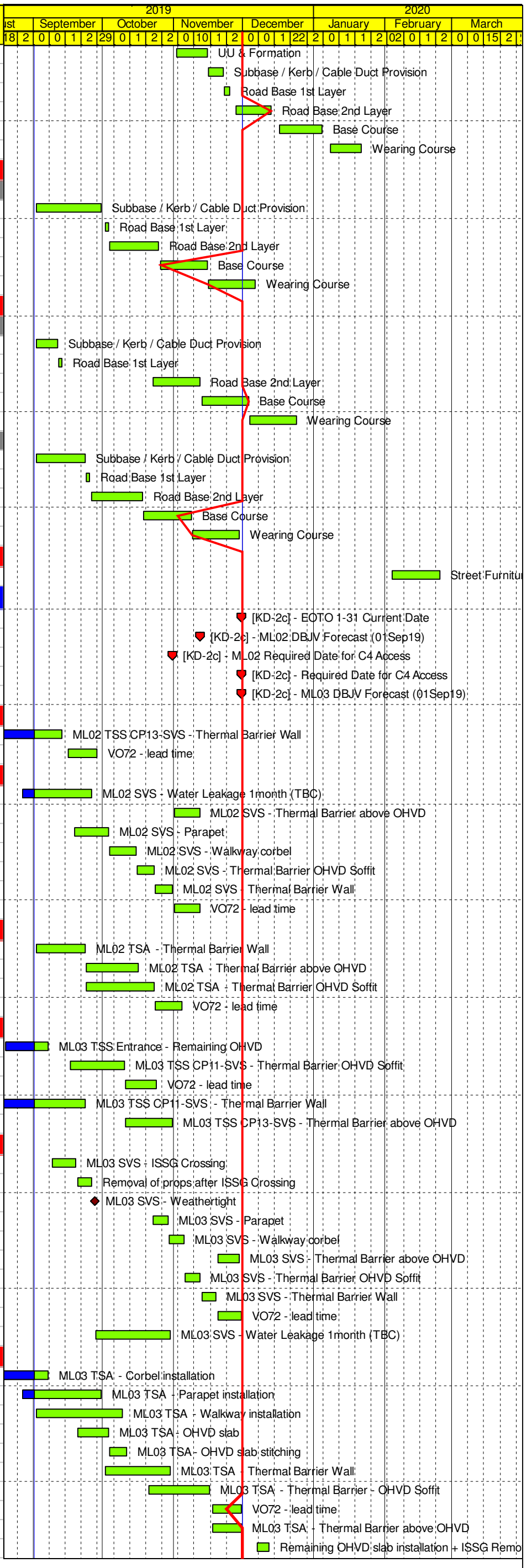
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
157	UU & Formation	12	02-Nov-19	15-Nov-19
158	Subbase / Kerb / Cable Duct Provision	6	16-Nov-19	22-Nov-19
159	Road Base 1st Layer	2	23-Nov-19	25-Nov-19
160	Road Base 2nd Layer	14	28-Nov-19	13-Dec-19
161	Base Course	14	17-Dec-19	04-Jan-20
162	Wearing Course	12	08-Jan-20	21-Jan-20
163	**Precast Segment Yard**			
164	**Roundabout/G4**			
165	Subbase / Kerb / Cable Duct Provision	24	02-Sep-19	30-Sep-19
166	Road Base 1st Layer	2	02-Oct-19	03-Oct-19
167	Road Base 2nd Layer	18	04-Oct-19	25-Oct-19
168	Base Course	18	26-Oct-19	15-Nov-19
169	Wearing Course	18	16-Nov-19	06-Dec-19
170	**NVS & STP (Portion N7 Interface)**			
171	**North Ventilation Building**			
172	Subbase / Kerb / Cable Duct Provision	9	02-Sep-19	11-Sep-19
173	Road Base 1st Layer	2	12-Sep-19	13-Sep-19
174	Road Base 2nd Layer	18	23-Oct-19	12-Nov-19
175	Base Course	18	13-Nov-19	03-Dec-19
176	Wearing Course	18	04-Dec-19	24-Dec-19
177	**FSD/CEDD**			
178	Subbase / Kerb / Cable Duct Provision	18	02-Sep-19	23-Sep-19
179	Road Base 1st Layer	2	24-Sep-19	25-Sep-19
180	Road Base 2nd Layer	18	26-Sep-19	18-Oct-19
181	Base Course	18	19-Oct-19	08-Nov-19
182	Wearing Course	18	09-Nov-19	29-Nov-19
183	**Northern Landfall - Overall**			
184	Street Furniture & Road Marking	18	04-Feb-20	24-Feb-20
185	**Remaining Internal Structure KD-2c**			
186	[KD-2c] - EOTO 1-31 Current Date	0		30-Nov-19*
187	[KD-2c] - ML02 DBJV Forecast (01Sep19)	0		12-Nov-19
188	[KD-2c] - ML02 Required Date for C4 Access	0		31-Oct-19*
189	[KD-2c] - Required Date for C4 Access	0		30-Nov-19*
190	[KD-2c] - ML03 DBJV Forecast (01Sep19)	0		30-Nov-19
191	**ML02 TSS**			
192	ML02 TSS CP13-SVS - Thermal Barrier Wall	47	22-Jul-19 A	13-Sep-19
193	VO72 - lead time	12	16-Sep-19	28-Sep-19
194	**ML02 SVS**			
195	ML02 SVS - Water Leakage 1month (TBC)	26	27-Aug-19 A	26-Sep-19
196	ML02 SVS - Thermal Barrier above OHVD	10	01-Nov-19	12-Nov-19
197	ML02 SVS - Parapet	12	19-Sep-19*	03-Oct-19
198	ML02 SVS - Walkway corbel	9	04-Oct-19	15-Oct-19
199	ML02 SVS - Thermal Barrier OHVD Soffit	7	16-Oct-19	23-Oct-19
200	ML02 SVS - Thermal Barrier Wall	7	24-Oct-19	31-Oct-19
201	VO72 - lead time	10	01-Nov-19	12-Nov-19
202	**ML02 TSA**			
203	ML02 TSA - Thermal Barrier Wall	18	02-Sep-19	23-Sep-19
204	ML02 TSA - Thermal Barrier above OHVD	18	24-Sep-19	16-Oct-19
205	ML02 TSA - Thermal Barrier OHVD Soffit	24	24-Sep-19	23-Oct-19
206	VO72 - lead time	10	24-Oct-19	04-Nov-19
207	**ML03 TSS**			
208	ML03 TSS Entrance - Remaining OHVD	17	20-Aug-19 A	07-Sep-19
209	ML03 TSS CP11-SVS - Thermal Barrier OHVD Soffit	19	17-Sep-19	10-Oct-19
210	VO72 - lead time	12	11-Oct-19	24-Oct-19
211	ML03 TSS CP11-SVS - Thermal Barrier Wall	30	19-Aug-19 A	23-Sep-19
212	ML03 TSS CP13-SVS - Thermal Barrier above OHVD	18	11-Oct-19	31-Oct-19
213	**ML03 SVS**			
214	ML03 SVS - ISSG Crossing	9	09-Sep-19	19-Sep-19
215	Removal of props after ISSG Crossing	6	20-Sep-19	26-Sep-19
216	ML03 SVS - Weathertight	0		27-Sep-19*
217	ML03 SVS - Parapet	6	23-Oct-19	29-Oct-19
218	ML03 SVS - Walkway corbel	6	30-Oct-19	05-Nov-19
219	ML03 SVS - Thermal Barrier above OHVD	9	20-Nov-19	29-Nov-19
220	ML03 SVS - Thermal Barrier OHVD Soffit	6	06-Nov-19	12-Nov-19
221	ML03 SVS - Thermal Barrier Wall	6	13-Nov-19	19-Nov-19
222	VO72 - lead time	10	20-Nov-19	30-Nov-19
223	ML03 SVS - Water Leakage 1month (TBC)	26	28-Sep-19	30-Oct-19
224	**ML03 TSA**			
225	ML03 TSA - Corbel installation	93	21-May-19 A	07-Sep-19
226	ML03 TSA - Parapet installation	29	27-Aug-19 A	30-Sep-19
227	ML03 TSA - Walkway installation	30	02-Sep-19	09-Oct-19
228	ML03 TSA - OHVD slab	11	20-Sep-19	03-Oct-19
229	ML03 TSA - OHVD slab stitching	6	04-Oct-19	11-Oct-19
230	ML03 TSA - Thermal Barrier Wall	24	02-Oct-19	30-Oct-19
231	ML03 TSA - Thermal Barrier - OHVD Soffit	24	21-Oct-19	16-Nov-19
232	VO72 - lead time	12	18-Nov-19	30-Nov-19
233	ML03 TSA - Thermal Barrier above OHVD	12	18-Nov-19	30-Nov-19
234	Remaining OHVD slab installation + ISSG Removal	6	07-Dec-19	12-Dec-19



Data Date: 01-Sep-19

Project ID: DWP Rev. K

Planned Bar
Planned Milestone
Key Date
Progress Milestone
Progress Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. K

Forecast as of 01 September 2019

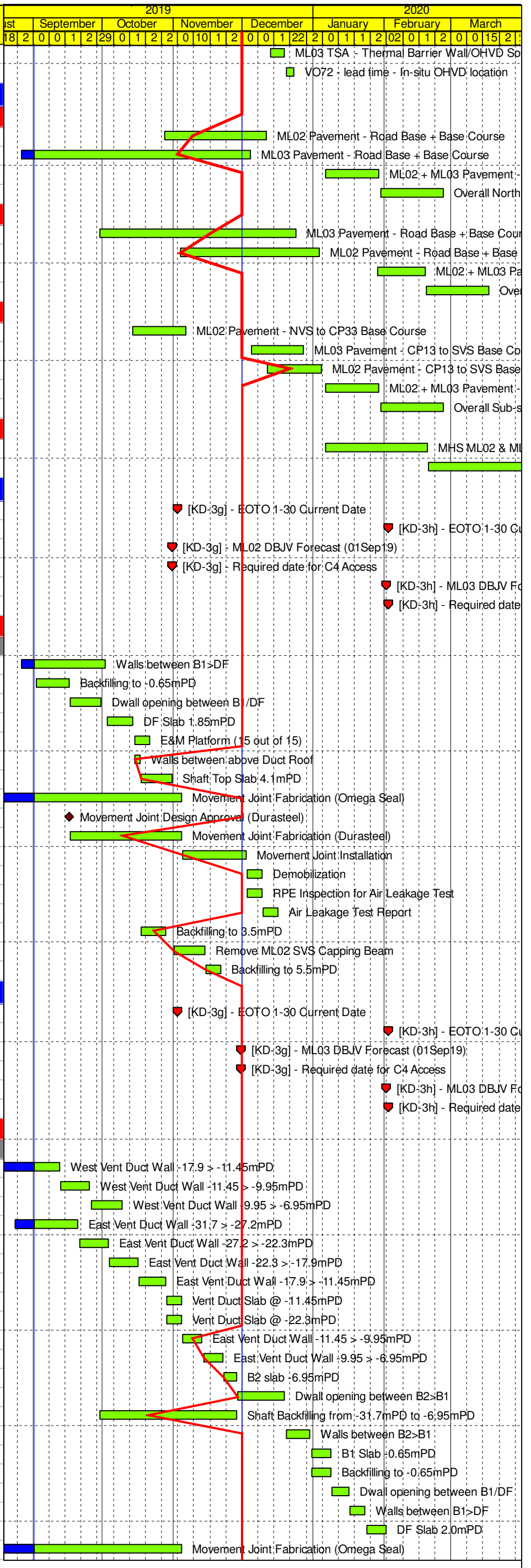
Dragages HongKong 香港寶嘉

A member of the Bouygues Construction group

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev. H	WYu	
05-Feb-18	Rev. I AC	WYu	
07-Mar-18	Rev. I	WYu	
04-Jun-18	Rev. J	WYu	
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
235	ML03 TSA - Thermal Barrier Wall/OHVD Soffit - In-situ OHVD locatior	6	13-Dec-19	19-Dec-19
236	VO72 - lead time - In-situ OHVD location	3	20-Dec-19	23-Dec-19
237	**Tunnel Roadworks**			
238	**North Approach Ramp & North Launching Shaft**			
239	ML02 Pavement - Road Base + Base Course	39	28-Oct-19*	11-Dec-19
240	ML03 Pavement - Road Base + Base Course	83	27-Aug-19 A	04-Dec-19
241	ML02 + ML03 Pavement - Final Layer	18	06-Jan-20	29-Jan-20
242	Overall North Approach Ramp Road Marking	24	30-Jan-20	26-Feb-20
243	**North Approach Tunnel to North Ventilation Shaft**			
244	ML03 Pavement - Road Base + Base Course	72	30-Sep-19*	24-Dec-19
245	ML02 Pavement - Road Base + Base Course	50	04-Nov-19*	03-Jan-20
246	ML02 + ML03 Pavement - Final Layer	18	29-Jan-20	18-Feb-20
247	Overall North Approach Tunnel Road Marking	24	19-Feb-20	17-Mar-20
248	**Sub-sea Tunnel**			
249	ML02 Pavement - NVS to CP33 Base Course	21	14-Oct-19*	06-Nov-19
250	ML03 Pavement - CP13 to SVS Base Course	18	05-Dec-19	27-Dec-19
251	ML02 Pavement - CP13 to SVS Base Course	18	12-Dec-19	04-Jan-20
252	ML02 + ML03 Pavement - Final Layer	18	06-Jan-20	29-Jan-20
253	Overall Sub-sea Tunnel Road Marking	24	30-Jan-20	26-Feb-20
254	**MHS TBM Tunnel, Cut & Cover & South Approach Ramp**			
255	MHS ML02 & ML03 TBM Tunnel	36	06-Jan-20	19-Feb-20
256	MHS C&C Tunnel and Approach Ramp	36	20-Feb-20	01-Apr-20
257	**ML02 South Ventilation Shaft**			
258	[KD-3g] - EOTO 1-30 Current Date	0		02-Nov-19*
259	[KD-3h] - EOTO 1-30 Current Date	0		02-Feb-20*
260	[KD-3g] - ML02 DBJV Forecast (01Sep19)	0		31-Oct-19
261	[KD-3g] - Required date for C4 Access	0		31-Oct-19*
262	[KD-3h] - ML03 DBJV Forecast (01Sep19)	0		01-Feb-20
263	[KD-3h] - Required date for C4 Access	0		02-Feb-20*
264	**ML02 SVS Structure**			
265	**Above Tunnel Vent Duct**			
266	Walls between B1>DF	30	27-Aug-19 A	02-Oct-19
267	Backfilling to -0.65mPD	12	02-Sep-19	16-Sep-19
268	Dwall opening between B1/DF	12	17-Sep-19	30-Sep-19
269	DF Slab 1.85mPD	9	03-Oct-19	14-Oct-19
270	E&M Platform (15 out of 15)	6	15-Oct-19	21-Oct-19
271	Walls between above Duct Roof	3	15-Oct-19	17-Oct-19
272	Shaft Top Slab 4.1mPD	12	18-Oct-19	31-Oct-19
273	Movement Joint Fabrication (Omega Seal)	113	21-Jun-19 A	04-Nov-19
274	Movement Joint Design Approval (Durasteel)	0		16-Sep-19*
275	Movement Joint Fabrication (Durasteel)	40	17-Sep-19	04-Nov-19
276	Movement Joint Installation	24	05-Nov-19	02-Dec-19
277	Demobilization	6	03-Dec-19	09-Dec-19
278	RPE Inspection for Air Leakage Test	6	03-Dec-19	09-Dec-19
279	Air Leakage Test Report	6	10-Dec-19	16-Dec-19
280	Backfilling to 3.5mPD	9	18-Oct-19	28-Oct-19
281	Remove ML02 SVS Capping Beam	12	01-Nov-19	14-Nov-19
282	Backfilling to 5.5mPD	6	15-Nov-19	21-Nov-19
283	**ML03 South Ventilation Shaft**			
284	[KD-3g] - EOTO 1-30 Current Date	0		02-Nov-19*
285	[KD-3h] - EOTO 1-30 Current Date	0		02-Feb-20*
286	[KD-3g] - ML03 DBJV Forecast (01Sep19)	0		30-Nov-19*
287	[KD-3g] - Required date for C4 Access	0		30-Nov-19*
288	[KD-3h] - ML03 DBJV Forecast (01Sep19)	0		01-Feb-20
289	[KD-3h] - Required date for C4 Access	0		02-Feb-20*
290	**ML03 SVS Structure**			
291	**Above Tunnel Vent Duct**			
292	West Vent Duct Wall -17.9 > -11.45mPD	51	16-Jul-19 A	12-Sep-19
293	West Vent Duct Wall -11.45 > -9.95mPD	10	13-Sep-19	25-Sep-19
294	West Vent Duct Wall -9.95 > -6.95mPD	10	26-Sep-19	09-Oct-19
295	East Vent Duct Wall -31.7 > -27.2mPD	23	24-Aug-19 A	20-Sep-19
296	East Vent Duct Wall -27.2 > -22.3mPD	10	21-Sep-19	03-Oct-19
297	East Vent Duct Wall -22.3 > -17.9mPD	10	04-Oct-19	16-Oct-19
298	East Vent Duct Wall -17.9 > -11.45mPD	10	17-Oct-19	28-Oct-19
299	Vent Duct Slab @ -11.45mPD	6	29-Oct-19	04-Nov-19
300	Vent Duct Slab @ -22.3mPD	6	29-Oct-19	04-Nov-19
301	East Vent Duct Wall -11.45 > -9.95mPD	8	05-Nov-19	13-Nov-19
302	East Vent Duct Wall -9.95 > -6.95mPD	8	14-Nov-19	22-Nov-19
303	B2 slab -6.95mPD	5	23-Nov-19	28-Nov-19
304	Dwall opening between B2>B1	18	29-Nov-19	19-Dec-19
305	Shaft Backfilling from -31.7mPD to -6.95mPD	50	30-Sep-19	28-Nov-19
306	Walls between B2>B1	7	20-Dec-19	30-Dec-19
307	B1 Slab -0.65mPD	7	31-Dec-19	08-Jan-20
308	Backfilling to -0.65mPD	7	31-Dec-19	08-Jan-20
309	Dwall opening between B1/DF	7	09-Jan-20	16-Jan-20
310	Walls between B1>DF	6	17-Jan-20	23-Jan-20
311	DF Slab 2.0mPD	5	24-Jan-20	01-Feb-20
312	Movement Joint Fabrication (Omega Seal)	113	21-Jun-19 A	04-Nov-19



Planned Bar
Planned Milestone
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Progress Milestone
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TMCLKL Northern Connection Sub-sea Tunnel Section

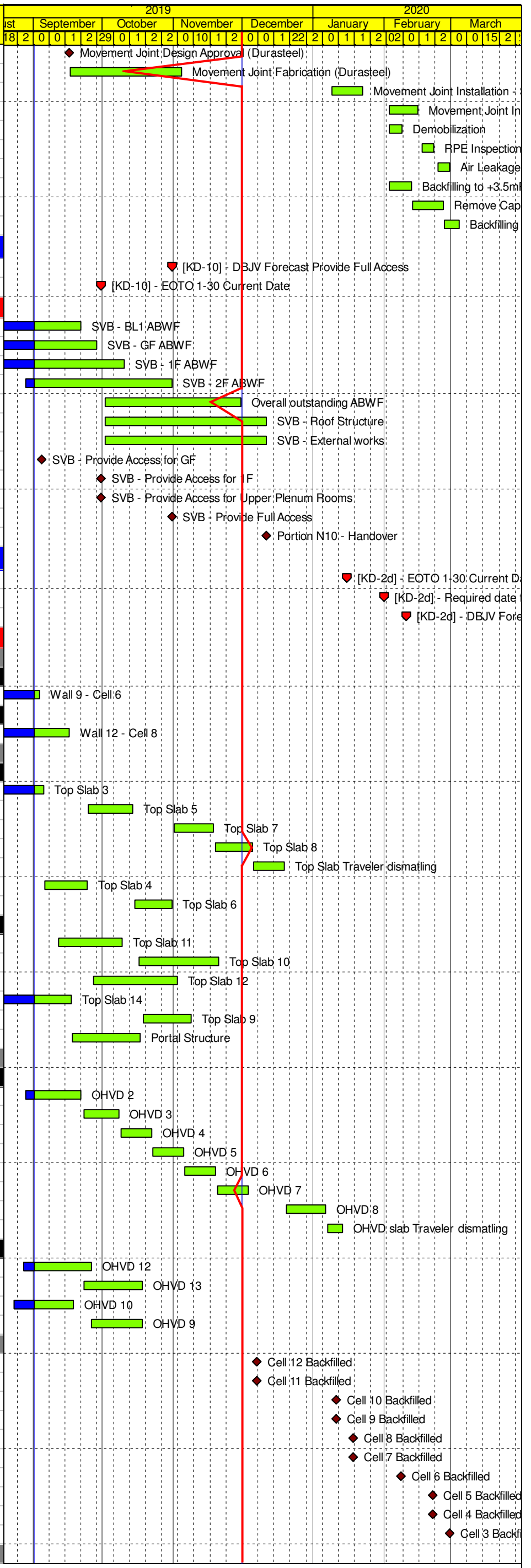
Detailed Works Programme Rev. K

Forecast as of 01 September 2019

Dragages HongKong 香港寶嘉
A member of the Bouygues Construction group
Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev. H	WYu	
05-Feb-18	Rev. I AC	WYu	
07-Mar-18	Rev. I	WYu	
04-Jun-18	Rev. J	WYu	
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
313	Movement Joint Design Approval (Durasteel)	0		16-Sep-19*
314	Movement Joint Fabrication (Durasteel)	40	17-Sep-19	04-Nov-19
315	Movement Joint Installation - Stage 1	12	09-Jan-20	22-Jan-20
316	Movement Joint Installation - Stage 2	12	03-Feb-20	15-Feb-20
317	Demobilization	6	03-Feb-20	08-Feb-20
318	RPE Inspection for Air Leakage Test	6	17-Feb-20	22-Feb-20
319	Air Leakage Test Report	6	24-Feb-20	29-Feb-20
320	Backfilling to +3.5mPD	9	03-Feb-20	12-Feb-20
321	Remove Capping Beam	12	13-Feb-20	26-Feb-20
322	Backfilling to +5.5mPD	6	27-Feb-20	04-Mar-20
323	**South Ventilation Building KD-10**			
324	[KD-10] - DBJV Forecast Provide Full Access	0		31-Oct-19
325	[KD-10] - EOTO 1-30 Current Date	0		30-Sep-19*
326	**ABWF**			
327	SVB - BL1 ABWF	79	20-Jun-19 A	21-Sep-19
328	SVB - GF ABWF	85	20-Jun-19 A	28-Sep-19
329	SVB - 1F ABWF	49	12-Aug-19 A	10-Oct-19
330	SVB - 2F ABWF	52	29-Aug-19 A	31-Oct-19
331	Overall outstanding ABWF	51	02-Oct-19	30-Nov-19
332	SVB - Roof Structure	60	02-Oct-19	11-Dec-19
333	SVB - External works	60	02-Oct-19	11-Dec-19
334	SVB - Provide Access for GF	0		04-Sep-19*
335	SVB - Provide Access for 1F	0		30-Sep-19*
336	SVB - Provide Access for Upper Plenum Rooms	0		30-Sep-19*
337	SVB - Provide Full Access	0		31-Oct-19
338	Portion N10 - Handover	0		11-Dec-19*
339	**MHS Cut-and-cover Tunnel KD-2d**			
340	[KD-2d] - EOTO 1-30 Current Date	0		15-Jan-20*
341	[KD-2d] - Required date for C4 Access	0		31-Jan-20*
342	[KD-2d] - DBJV Forecast (01Sep19)	0		10-Feb-20
343	**South MHS Cut-and-cover KD-2d**			
344	**Wall**			
345	**Traveller Formworks**			
346	Wall 9 - Cell 6	22	09-Aug-19 A	03-Sep-19
347	**Traditional Formworks**			
348	Wall 12 - Cell 8	40	31-Jul-19 A	16-Sep-19
349	**Top Slab**			
350	**Traveller Formworks**			
351	Top Slab 3	22	12-Aug-19 A	05-Sep-19
352	Top Slab 5	15	25-Sep-19	14-Oct-19
353	Top Slab 7	15	01-Nov-19	18-Nov-19
354	Top Slab 8	15	19-Nov-19	05-Dec-19
355	Top Slab Traveler dismatling	12	06-Dec-19	19-Dec-19
356	Top Slab 4	15	06-Sep-19	24-Sep-19
357	Top Slab 6	15	15-Oct-19	31-Oct-19
358	**Traditional Formworks**			
359	Top Slab 11	21	12-Sep-19	09-Oct-19
360	Top Slab 10	30	17-Oct-19	20-Nov-19
361	Top Slab 12	30	27-Sep-19	02-Nov-19
362	Top Slab 14	31	12-Aug-19 A	17-Sep-19
363	Top Slab 9	18	19-Oct-19	08-Nov-19
364	Portal Structure	24	18-Sep-19	17-Oct-19
365	**OHVD**			
366	**Traveller Formworks**			
367	OHVD 2	20	29-Aug-19 A	21-Sep-19
368	OHVD 3	12	23-Sep-19	08-Oct-19
369	OHVD 4	12	09-Oct-19	22-Oct-19
370	OHVD 5	12	23-Oct-19	05-Nov-19
371	OHVD 6	12	06-Nov-19	19-Nov-19
372	OHVD 7	12	20-Nov-19	03-Dec-19
373	OHVD 8	12	20-Dec-19	06-Jan-20
374	OHVD slab Traveler dismatling	6	07-Jan-20	13-Jan-20
375	**Traditional Formworks**			
376	OHVD 12	25	28-Aug-19 A	26-Sep-19
377	OHVD 13	21	23-Sep-19	18-Oct-19
378	OHVD 10	21	24-Aug-19 A	18-Sep-19
379	OHVD 9	18	26-Sep-19	18-Oct-19
380	**Backfilling**			
381	Cell 12 Backfilled	0		07-Dec-19*
382	Cell 11 Backfilled	0		07-Dec-19*
383	Cell 10 Backfilled	0		11-Jan-20*
384	Cell 9 Backfilled	0		11-Jan-20*
385	Cell 8 Backfilled	0		18-Jan-20*
386	Cell 7 Backfilled	0		18-Jan-20*
387	Cell 6 Backfilled	0		08-Feb-20*
388	Cell 5 Backfilled	0		22-Feb-20*
389	Cell 4 Backfilled	0		22-Feb-20*
390	Cell 3 Backfilled	0		29-Feb-20*
391	**Internal Structure**			



Data Date: 01-Sep-19

Project ID: DWP Rev. K

Planned Bar
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TMCLKL Northern Connection Sub-sea Tunnel Section

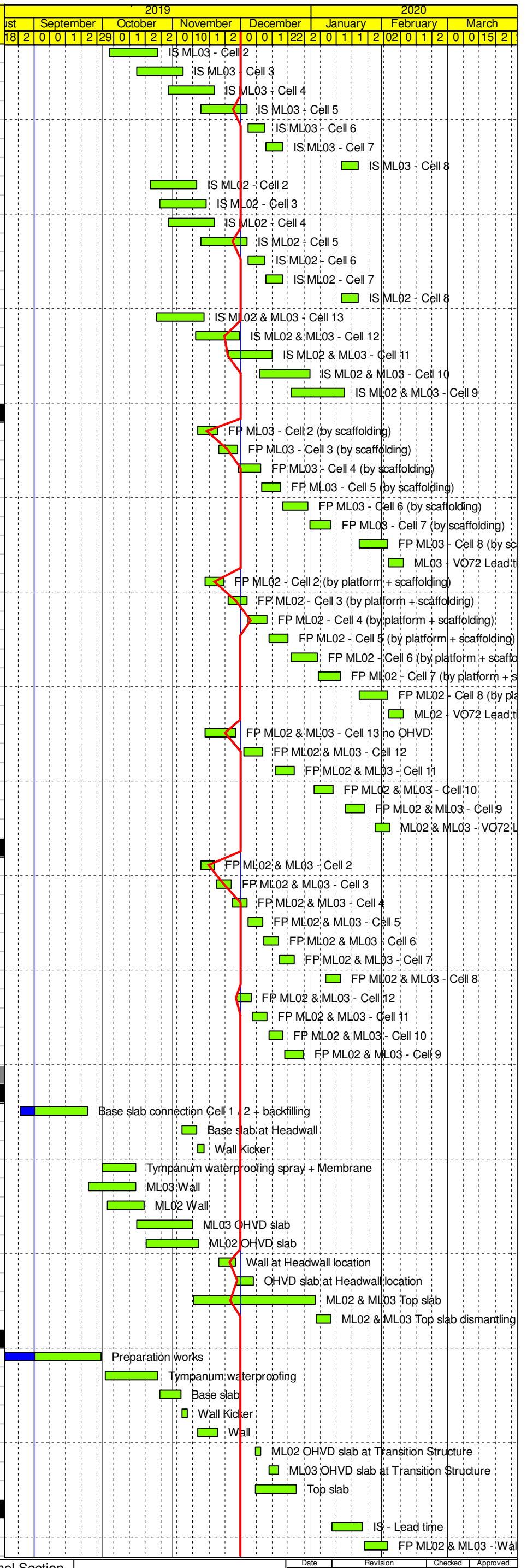
Detailed Works Programme Rev. K

Forecast as of 01 September 2019

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev. H	WYu	
05-Feb-18	Rev. I AC	WYu	
07-Mar-18	Rev. I	WYu	
04-Jun-18	Rev. J	WYu	
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
392	IS ML03 - Cell 2	18	04-Oct-19	25-Oct-19
393	IS ML03 - Cell 3	18	16-Oct-19	05-Nov-19
394	IS ML03 - Cell 4	18	30-Oct-19	19-Nov-19
395	IS ML03 - Cell 5	18	13-Nov-19	03-Dec-19
396	IS ML03 - Cell 6	7	04-Dec-19	11-Dec-19
397	IS ML03 - Cell 7	7	12-Dec-19	19-Dec-19
398	IS ML03 - Cell 8	7	14-Jan-20	21-Jan-20
399	IS ML02 - Cell 2	18	22-Oct-19	11-Nov-19
400	IS ML02 - Cell 3	18	26-Oct-19	15-Nov-19
401	IS ML02 - Cell 4	18	30-Oct-19	19-Nov-19
402	IS ML02 - Cell 5	18	13-Nov-19	03-Dec-19
403	IS ML02 - Cell 6	7	04-Dec-19	11-Dec-19
404	IS ML02 - Cell 7	7	12-Dec-19	19-Dec-19
405	IS ML02 - Cell 8	7	14-Jan-20	21-Jan-20
406	IS ML02 & ML03 - Cell 13	18	25-Oct-19	14-Nov-19
407	IS ML02 & ML03 - Cell 12	18	11-Nov-19	30-Nov-19
408	IS ML02 & ML03 - Cell 11	18	25-Nov-19	14-Dec-19
409	IS ML02 & ML03 - Cell 10	18	09-Dec-19	31-Dec-19
410	IS ML02 & ML03 - Cell 9	18	23-Dec-19	15-Jan-20
411	**Thermal Barrier (Wall + OHVD Soffit)**			
412	FP ML03 - Cell 2 (by scaffolding)	8	12-Nov-19	20-Nov-19
413	FP ML03 - Cell 3 (by scaffolding)	8	21-Nov-19	29-Nov-19
414	FP ML03 - Cell 4 (by scaffolding)	8	30-Nov-19	09-Dec-19
415	FP ML03 - Cell 5 (by scaffolding)	8	10-Dec-19	18-Dec-19
416	FP ML03 - Cell 6 (by scaffolding)	8	19-Dec-19	30-Dec-19
417	FP ML03 - Cell 7 (by scaffolding)	8	31-Dec-19	09-Jan-20
418	FP ML03 - Cell 8 (by scaffolding)	8	22-Jan-20	03-Feb-20
419	ML03 - VO72 Lead time	6	04-Feb-20	10-Feb-20
420	FP ML02 - Cell 2 (by platform + scaffolding)	8	15-Nov-19	23-Nov-19
421	FP ML02 - Cell 3 (by platform + scaffolding)	8	25-Nov-19	03-Dec-19
422	FP ML02 - Cell 4 (by platform + scaffolding)	8	04-Dec-19	12-Dec-19
423	FP ML02 - Cell 5 (by platform + scaffolding)	8	13-Dec-19	21-Dec-19
424	FP ML02 - Cell 6 (by platform + scaffolding)	8	23-Dec-19	03-Jan-20
425	FP ML02 - Cell 7 (by platform + scaffolding)	8	04-Jan-20	13-Jan-20
426	FP ML02 - Cell 8 (by platform + scaffolding)	8	22-Jan-20	03-Feb-20
427	ML02 - VO72 Lead time	6	04-Feb-20	10-Feb-20
428	FP ML02 & ML03 - Cell 13 no OHVD	12	15-Nov-19	28-Nov-19
429	FP ML02 & ML03 - Cell 12	8	02-Dec-19	10-Dec-19
430	FP ML02 & ML03 - Cell 11	8	16-Dec-19	24-Dec-19
431	FP ML02 & ML03 - Cell 10	8	02-Jan-20	10-Jan-20
432	FP ML02 & ML03 - Cell 9	8	16-Jan-20	24-Jan-20
433	ML02 & ML03 - VO72 Lead time	6	29-Jan-20	04-Feb-20
434	**Thermal Barrier (above OHVD)**			
435	FP ML02 & ML03 - Cell 2	6	13-Nov-19	19-Nov-19
436	FP ML02 & ML03 - Cell 3	6	20-Nov-19	26-Nov-19
437	FP ML02 & ML03 - Cell 4	6	27-Nov-19	03-Dec-19
438	FP ML02 & ML03 - Cell 5	6	04-Dec-19	10-Dec-19
439	FP ML02 & ML03 - Cell 6	6	11-Dec-19	17-Dec-19
440	FP ML02 & ML03 - Cell 7	6	18-Dec-19	24-Dec-19
441	FP ML02 & ML03 - Cell 8	6	07-Jan-20	13-Jan-20
442	FP ML02 & ML03 - Cell 12	6	29-Nov-19	05-Dec-19
443	FP ML02 & ML03 - Cell 11	6	06-Dec-19	12-Dec-19
444	FP ML02 & ML03 - Cell 10	6	13-Dec-19	19-Dec-19
445	FP ML02 & ML03 - Cell 9	6	20-Dec-19	28-Dec-19
446	**Cell 1 Interface**			
447	**SCC Section + Headwall**			
448	Base slab connection Cell 1 / 2 + backfilling	25	26-Aug-19 A	24-Sep-19
449	Base slab at Headwall	7	05-Nov-19	11-Nov-19
450	Wall Kicker	3	12-Nov-19	14-Nov-19
451	Tympanum waterproofing spray + Membrane	15	01-Oct-19	15-Oct-19
452	ML03 Wall	21	25-Sep-19	15-Oct-19
453	ML02 Wall	17	03-Oct-19	19-Oct-19
454	ML03 OHVD slab	25	16-Oct-19	09-Nov-19
455	ML02 OHVD slab	24	20-Oct-19	12-Nov-19
456	Wall at Headwall location	8	21-Nov-19	28-Nov-19
457	OHVD slab at Headwall location	8	29-Nov-19	06-Dec-19
458	ML02 & ML03 Top slab	54	10-Nov-19	02-Jan-20
459	ML02 & ML03 Top slab dismantling	7	03-Jan-20	09-Jan-20
460	**Transition Structure**			
461	Preparation works	36	19-Aug-19 A	30-Sep-19
462	Tympanum waterproofing	20	02-Oct-19	25-Oct-19
463	Base slab	10	26-Oct-19	04-Nov-19
464	Wall Kicker	3	05-Nov-19	07-Nov-19
465	Wall	9	12-Nov-19	20-Nov-19
466	ML02 OHVD slab at Transition Structure	3	07-Dec-19	09-Dec-19
467	ML03 OHVD slab at Transition Structure	5	13-Dec-19	17-Dec-19
468	Top slab	19	07-Dec-19	25-Dec-19
469	**Internal Structure**			
470	IS - Lead time	12	10-Jan-20	23-Jan-20
471	FP ML02 & ML03 - Wall + OHVD Soffit + Above OHVD	6	24-Jan-20	03-Feb-20



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BOUYGUES TRAVAUX PUBLICS

Date	Revision	Checked	Approved
22-Dec-17	Rev. H	WYu	
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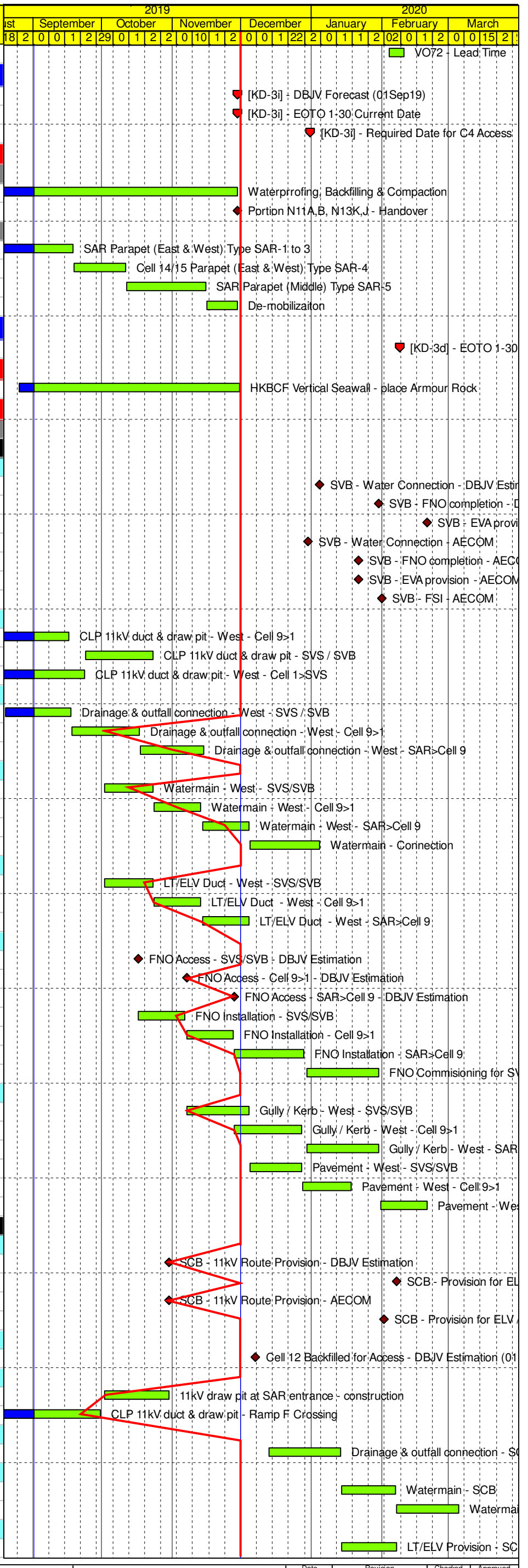
07-Mar-18	Rev. I	WYu	
04-Jun-18	Rev. J	WYu	
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
472	VO72 - Lead Time	6	04-Feb-20	10-Feb-20
473	**MHS Approach Ramp KD-3i**			
474	[KD-3i] - DBJV Forecast (01Sep19)	0		29-Nov-19
475	[KD-3i] - EOTO 1-30 Current Date	0		29-Nov-19*
476	[KD-3i] - Required Date for C4 Access	0		31-Dec-19*
477	**South Approach Ramp**			
478	**RC Structure**			
479	Waterprrofing, Backfilling & Compaction	216	11-Mar-19 A	29-Nov-19
480	Portion N11A,B, N13K,J - Handover	0		29-Nov-19
481	**Internal Structure**			
482	SAR Parapet (East & West) Type SAR-1 to 3	40	02-Aug-19 A	18-Sep-19
483	Cell 14/15 Parapet (East & West) Type SAR-4	18	19-Sep-19	11-Oct-19
484	SAR Parapet (Middle) Type SAR-5	30	12-Oct-19	15-Nov-19
485	De-mobilizaiton	12	16-Nov-19	29-Nov-19
486	**Southern Landfall - Surface**			
487	[KD-3d] - EOTO 1-30 Current Date	0		08-Feb-20*
488	**HKBCF Seawall Modification (schedule TBC)**			
489	HKBCF Vertical Seawall - place Armour Rock	81	26-Aug-19 A	30-Nov-19
490	**UU / At-grade works**			
491	**South Road & Drain KD-3c**			
492	**South Ventilation Building - Provision for FSI**			
493	**Requirement**			
494	SVB - Water Connection - DBJV Estimation	0		04-Jan-20
495	SVB - FNO completion - DBJV Estimation	0		30-Jan-20
496	SVB - EVA provision - DBJV Estimation	0		20-Feb-20
497	SVB - Water Connection - AECOM	0		30-Dec-19*
498	SVB - FNO completion - AECOM	0		21-Jan-20*
499	SVB - EVA provision - AECOM	0		21-Jan-20*
500	SVB - FSI - AECOM	0		31-Jan-20*
501	**CLP 11kV**			
502	CLP 11kV duct & draw pit - West - Cell 9>1	51	18-Jul-19 A	16-Sep-19
503	CLP 11kV duct & draw pit - SVS / SVB	24	24-Sep-19	23-Oct-19
504	CLP 11kV duct & draw pit - West - Cell 1>SVS	36	12-Aug-19 A	23-Sep-19
505	**Drainage**			
506	Drainage & outfall connection - West - SVS / SVB	24	20-Aug-19 A	17-Sep-19
507	Drainage & outfall connection - West - Cell 9>1	24	18-Sep-19	17-Oct-19
508	Drainage & outfall connection - West - SAR>Cell 9	24	18-Oct-19	14-Nov-19
509	**Watermain**			
510	Watermain - West - SVS/SVB	18	02-Oct-19*	23-Oct-19
511	Watermain - West - Cell 9>1	18	24-Oct-19	13-Nov-19
512	Watermain - West - SAR>Cell 9	18	14-Nov-19	04-Dec-19
513	Watermain - Connection	24	05-Dec-19	04-Jan-20
514	**LT/ELV**			
515	LT/ELV Duct - West - SVS/SVB	18	02-Oct-19*	23-Oct-19
516	LT/ELV Duct - West - Cell 9>1	18	24-Oct-19	13-Nov-19
517	LT/ELV Duct - West - SAR>Cell 9	18	14-Nov-19	04-Dec-19
518	**Provision for FNO**			
519	FNO Access - SVS/SVB - DBJV Estimation	0	17-Oct-19	
520	FNO Access - Cell 9>1 - DBJV Estimation	0	07-Nov-19	
521	FNO Access - SAR>Cell 9 - DBJV Estimation	0	28-Nov-19	
522	FNO Installation - SVS/SVB	18	17-Oct-19	06-Nov-19
523	FNO Installation - Cell 9>1	18	07-Nov-19	27-Nov-19
524	FNO Installation - SAR>Cell 9	25	28-Nov-19	28-Dec-19
525	FNO Commisioning for SVB	24	30-Dec-19	30-Jan-20
526	**Gully / Kerb / Pavement**			
527	Gully / Kerb - West - SVS/SVB	24	07-Nov-19*	04-Dec-19
528	Gully / Kerb - West - Cell 9>1	24	28-Nov-19	27-Dec-19
529	Gully / Kerb - West - SAR>Cell 9	24	30-Dec-19	30-Jan-20
530	Pavement - West - SVS/SVB	18	05-Dec-19	27-Dec-19
531	Pavement - West - Cell 9>1	18	28-Dec-19	18-Jan-20
532	Pavement - West - SAR>Cell 9	18	31-Jan-20	20-Feb-20
533	**Satellite Control Building - Provision for FSI**			
534	**Requirement**			
535	SCB - 11kV Route Provision - DBJV Estimation	0		30-Oct-19
536	SCB - Provision for ELV / Power Cable - DBJV Estimation	0		07-Feb-20
537	SCB - 11kV Route Provision - AECOM	0		30-Oct-19*
538	SCB - Provision for ELV / Power Cable - AECOM	0		01-Feb-20*
539	**Interface Activities**			
540	Cell 12 Backfilled for Access - DBJV Estimation (01-Sep-19)	0		07-Dec-19*
541	**CLP 11kV**			
542	11kV draw pit at SAR entrance - construction	24	02-Oct-19	30-Oct-19
543	CLP 11kV duct & draw pit - Ramp F Crossing	63	18-Jul-19 A	30-Sep-19
544	**Drainage**			
545	Drainage & outfall connection - SCB	24	13-Dec-19	13-Jan-20
546	**Watermain**			
547	Watermain - SCB	18	14-Jan-20	06-Feb-20
548	Watermain connection - SCB	24	07-Feb-20	05-Mar-20
549	**LT/ELV**			
550	LT/ELV Provision - SCB	18	14-Jan-20	07-Feb-20



Data Date: 01-Sep-19

Project ID: DWP Rev. K

Planned Bar
Planned Milestone
Key Date
Progress Milestone
Progress Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. K

Forecast as of 01 September 2019

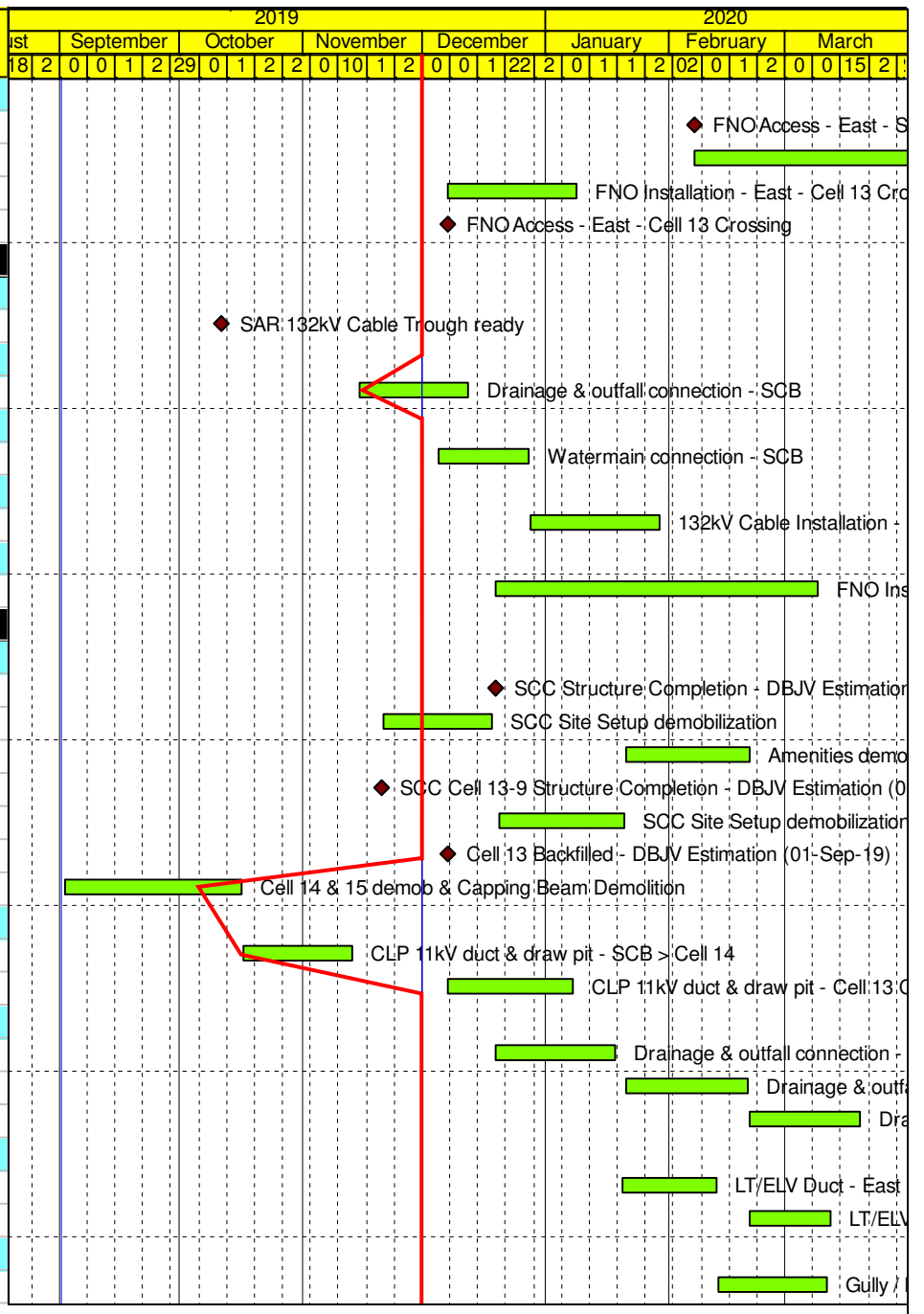
Dragages HongKong 香港寶嘉

A member of the Bouygues Construction group

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev. H	WYu	
05-Feb-18	Rev. I AC	WYu	
07-Mar-18	Rev. I	WYu	
04-Jun-18	Rev. J	WYu	
11-Nov-19	Rev. K	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
551	**Provision for FNO**			
552	FNO Access - East - SCB>Cell 13	0	07-Feb-20	
553	FNO Installation - East - SCB>Cell 13	50	07-Feb-20	06-Apr-20
554	FNO Installation - East - Cell 13 Crossing	25	07-Dec-19	08-Jan-20
555	FNO Access - East - Cell 13 Crossing	0	07-Dec-19	
556	**Remaining - East - SCB to C1**			
557	**Interface Activities**			
558	SAR 132kV Cable Trough ready	0		11-Oct-19
559	**Drainage**			
560	Drainage & outfall connection - SCB	24	15-Nov-19	12-Dec-19
561	**Watermain**			
562	Watermain connection - SCB	18	05-Dec-19	27-Dec-19
563	**CLP 132kV**			
564	132kV Cable Installation - East - C1>SAR	24	28-Dec-19	29-Jan-20
565	**Provision for FNO**			
566	FNO Installation - East - C1>SCB	63	19-Dec-19	09-Mar-20
567	**Remaining - East - Cell 13 to SVB**			
568	**Interface Activities**			
569	SCC Structure Completion - DBJV Estimation (01-Sep-19)	0		19-Dec-19
570	SCC Site Setup demobilization	24	21-Nov-19	18-Dec-19
571	Amenities demobilization - DBJV Estimation	24	21-Jan-20	21-Feb-20
572	SCC Cell 13-9 Structure Completion - DBJV Estimation (01-Sep-19	0		20-Nov-19
573	SCC Site Setup demobilization	24	20-Dec-19	20-Jan-20
574	Cell 13 Backfilled - DBJV Estimation (01-Sep-19)	0		07-Dec-19*
575	Cell 14 & 15 demob & Capping Beam Demolition	36	02-Sep-19 A	16-Oct-19
576	**CLP 11kV**			
577	CLP 11kV duct & draw pit - SCB > Cell 14	24	17-Oct-19	13-Nov-19
578	CLP 11kV duct & draw pit - Cell 13 Crossing	24	07-Dec-19	07-Jan-20
579	**Drainage**			
580	Drainage & outfall connection - East - SAR>Cell 9	24	19-Dec-19	18-Jan-20
581	Drainage & outfall connection - East - Cell 9>1	24	21-Jan-20	20-Feb-20
582	Drainage & outfall connection - East - Amenities	24	21-Feb-20	19-Mar-20
583	**LT/ELV**			
584	LT/ELV Duct - East - SAR>Cell 9	18	20-Jan-20	12-Feb-20
585	LT/ELV Duct - East - Cell 9>1	18	21-Feb-20	12-Mar-20
586	**Gully / Kerb / Pavement**			
587	Gully / Kerb - East - SAR>Cell 9	24	13-Feb-20	11-Mar-20



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BOUYGUES TRAVAUX PUBLICS
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Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

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 twice 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	Watering of the construction sites in Lantau for 8 times/day and in Tuen Mun for 12 times/day to reduce dust emissions by 87.5% and 91.7% respectively and shall be undertaken.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		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		✓

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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		✓
WATER QUALITY									
Marine Works (Sequence A)									
6.1 Figure 6.2a Appendix D6a	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 30% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL southern landfall	TM-CLKL southern landfall reclamation filling	Contractor	TM-EIAO		Y		N/A
6.1	-	a maximum of 100% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL northern landfall	TM-CLKL northern landfall reclamation filling	Contractor	TM-EIAO		Y		✓
6.1	-	Use of cage type silt curtains round allgrab dredgers during the HKBCF, HKLR and TM-CLKL southern reclamation works.	All areas dredging works	Contractor	TM-EIAO		Y		✓
	Figure 1.1 of Annex C	A layer of floating type silt curtain will be applied when dredging and reclamation works are being undertaken at Portion N-a as shown in Figure 1.1 of Annex C of the EM&A Manual.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	Trailer suction hopper dredgers shall not allow mud to overflow.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	The use of Lean Material Overboard (LMOB) systems shall be prohibited.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1 Figure 6.2b Appendix D6b	Annex A	For other parts of the reclamation works construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. It should be noted that the protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2b and detailed in Appendices D6b. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation; - Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and - Reclamation dredging and filling for Portion 1 of HKLR;	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓
6.1	-	The filling material for the other parts of the works are the same as Sequence A;	All other areas/backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	5.7	Cage type silt curtain (with steel enclosure) shall be used for grab dredgers working in the site of HKBCF and TM- CLKL southern reclamation. Cage type silt curtains will be applied round all grab dredgers at other works area.	HKBCF, HKLR and TM-CLKL grab dredging	Contractor	TM-EIAO		Y		✓
6.1	Annex A	A layer of floating type silt curtain will be applied around all works as defined in Appendix D6b.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	TM-CLKL northern landfall: - Reclamation filling shall not proceed until at least 200m section of leading seawall at both the east and west sides of the reclamation are formed above +2.5 mPD, except for 100m gaps for marine access;	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
General Marine Works									

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	Use of TMB for the construction of the submarine tunnel.	Tunnel works / Construction phase	Contractor	TM-EIAO		Y		N/A
6.1	-	Export dredged spoils from NWWCZ.	All areas as much as possible / dredging activities	Contractor	DASO Permit conditions		Y		✓
6.1	-	Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25%	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Where sand fill is proposed for filling below +2.5mPD, the fine content in the sand fill will be controlled to 5%.	All areas/ backfilling works	Contractor	TM-EIAO		Y		N.A
6.1	-	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	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		✓
6.1	-	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		✓
6.1	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	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		Y		✓

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					Guidelines. DASO permit conditions.				
6.1	-	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
6.1	-	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
6.1	-	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		✓
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
Land Works									
6.1	-	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		✓

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						D	C	O	
6.1	-	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		✓
6.1	-	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		<>
6.1	-	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		✓
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	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		✓
6.1	-	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		✓
6.1	-	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		✓

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	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		✓
6.1	-	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		✓
6.1	-	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		✓
6.1	-	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		✓
6.1	-	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		✓
6.1	-	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		✓
6.1	-	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 off site disposal.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		N/A
6.1	-	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		<>
6.1	-	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		Y		✓

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						D	C	O	
					Ordinance				
6.1	-	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		✓
6.1	-	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		✓
6.1	-	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	✓
6.1	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		✓
Water Quality Monitoring									
6.1	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	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓

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						D	C	O	
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m2 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 implemented 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 dredging and reclamation works	All areas/ Detailed Design/during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.5	Audit coral translocation success	Post translocation	Contractor	TMEIA		Y		✓
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.
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									

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						D	C	O	
10.9	7.6	The colour and shape of the toll control buildings, ventilation building and administration building shall adopt a design which could blend it into the vicinity elements, and the details will be developed in detailed design stage (DM2)	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	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		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (OM6)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓

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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	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			✓
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	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.	Reclamation areas / throughout dredging works	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	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: *f* suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; *f* Having a capacity of <450L unless the specifications have been approved by the EPD; and *f* Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. *f* Clearly labelled and used solely for the storage of chemical wastes; *f* Enclosed with at least 3 sides; *f* 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		<>

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		ƒ Adequate ventilation; ƒ Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and ƒ 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		N/A
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	Office wastes can be reduced by recycling of 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.	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓
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

*** Remarks:**

✓	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

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

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 µg/m³	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214	260
1 Hour TSP Level in µg /m³	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337	500

Table D2 Action and Limit Levels for Water Quality

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

Notes:

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

(a) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

(b) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths

(c) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

(d) All figures given in the table are used for reference only, and EPD may amend the figures whenever it is considered as necessary

(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.

(f) The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Table D3 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 D4 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	NEL = [STG < 2.4 & ANI <8.9] and NWL = [STG < 3.9 & ANI <17.9]	

Appendix E

EM&A Monitoring Schedules

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - September 2019

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Sep	2-Sep	3-Sep	4-Sep	5-Sep	6-Sep	7-Sep
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
8-Sep	9-Sep	10-Sep	11-Sep	12-Sep	13-Sep	Public Holiday 14-Sep
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
15-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep	21-Sep
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
22-Sep	23-Sep	24-Sep	25-Sep	26-Sep	27-Sep	28-Sep
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
29-Sep	30-Sep					
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM						

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - October 2019

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Public Holiday 1-Oct	2-Oct	3-Oct	4-Oct	5-Oct
			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
6-Oct	Public Holiday 7-Oct	8-Oct	9-Oct	10-Oct	11-Oct	12-Oct
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
20-Oct	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct	26-Oct
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
27-Oct	28-Oct	29-Oct	30-Oct	31-Oct		
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM				

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - November 2019

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01-Nov	02-Nov
					1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		

HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall
Impact Marine Water Quality Monitoring (WQM) Schedule (September 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1/Sep	2/Sep	3/Sep	4/Sep	5/Sep	6/Sep	7/Sep
	ebb tide 13:25 - 16:55 flood tide Cancelled due to adverse weather		ebb tide 14:57 - 18:27 flood tide 8:52 - 12:22		ebb tide 16:57 - 20:27 flood tide 11:32 - 15:02	
8/Sep	9/Sep	10/Sep	11/Sep	12/Sep	13/Sep	Public Holiday 14/Sep
	ebb tide 8:14 - 11:44 flood tide 16:00 - 19:30		ebb tide 9:47 - 13:17 flood tide 16:59 - 20:29		ebb tide 11:00 - 14:30 flood tide 17:48 - 21:18	
15/Sep	16/Sep	17/Sep	18/Sep	19/Sep	20/Sep	21/Sep
	ebb tide 12:28 - 15:58 flood tide 6:12 - 9:42		ebb tide 13:28 - 16:58 flood tide 7:30 - 11:00		ebb tide 14:44 - 18:14 flood tide 9:11 - 12:41	
22/Sep	23/Sep	24/Sep	25/Sep	26/Sep	27/Sep	28/Sep
	ebb tide 5:25 - 8:55 flood tide 18:18 - 21:00		ebb tide 8:11 - 11:41 flood tide 15:40 - 19:10		ebb tide 10:02 - 13:32 flood tide 16:51 - 20:21	
29/Sep	30/Sep					
	ebb tide 12:19 - 15:49 flood tide 6:01 - 9:31					

Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section
Impact Marine Water Quality Monitoring (WQM) Schedule (October 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Public Holiday 1-Oct	2-Oct	3-Oct	4-Oct	5-Oct
			ebb tide 13:48 - 17:18 flood tide 7:52 - 11:22		ebb tide 15:24 - 18:54 flood tide 10:00 - 13:30	
6-Oct	Public Holiday 7-Oct	8-Oct	9-Oct	10-Oct	11-Oct	12-Oct
	ebb tide 6:08 - 9:38 flood tide 14:47 - 18:17		ebb tide 8:31 - 12:01 flood tide 15:55 - 19:25		ebb tide 9:55 - 13:25 flood tide 16:40 - 20:10	
13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct
	ebb tide 11:29 - 14:59 flood tide 5:27 - 8:57		ebb tide 12:31 - 16:01 flood tide 6:43 - 10:13		ebb tide 13:45 - 17:15 flood tide 8:14 - 11:44	
20-Oct	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct	26-Oct
	ebb tide 3:41 - 7:11 flood tide 16:12 - 19:00		ebb tide 7:00 - 9:49 flood tide 14:24 - 17:54		ebb tide 8:48 - 12:18 flood tide 15:38 - 19:08	
27-Oct	28-Oct	29-Oct	30-Oct	31-Oct		
	ebb tide 11:15 - 14:45 flood tide 5:10 - 8:40		ebb tide 12:47 - 16:17 flood tide 7:01 - 10:31			

Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section
Impact Marine Water Quality Monitoring (WQM) Schedule (November 2019)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Nov	2-Nov
					ebb tide 14:13 - 17:43 flood tide 8:50 - 12:20	
3-Nov	4-Nov	5-Nov	6-Nov	7-Nov	8-Nov	9-Nov
	ebb tide 3:58 - 7:28 flood tide 16:28 - 19:13		ebb tide 7:13 - 9:53 flood tide 14:37 - 18:07		ebb tide 8:32 - 12:02 flood tide 15:26 - 18:56	
10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov
	ebb tide 10:24 - 13:54 flood tide 16:23 - 19:53		ebb tide 11:34 - 15:04 flood tide 17:08 - 19:58		ebb tide 12:52 - 16:22 flood tide 7:58 - 10:57	
17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov
	ebb tide 2:29 - 5:59 flood tide 10:22 - 13:52		ebb tide 4:26 - 7:56 flood tide 12:58 - 16:28		ebb tide 7:19 - 10:49 flood tide 14:21 - 17:51	
24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov
	ebb tide 10:12 - 13:42 flood tide 15:58 - 18:55		ebb tide 11:48 - 15:18 flood tide 6:55 - 9:43		ebb tide 13:10 - 16:40 flood tide 7:52 - 11:22	

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - September 2019

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - October 2019

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - November 2019

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

Appendix F

Impact Air Quality Monitoring Results

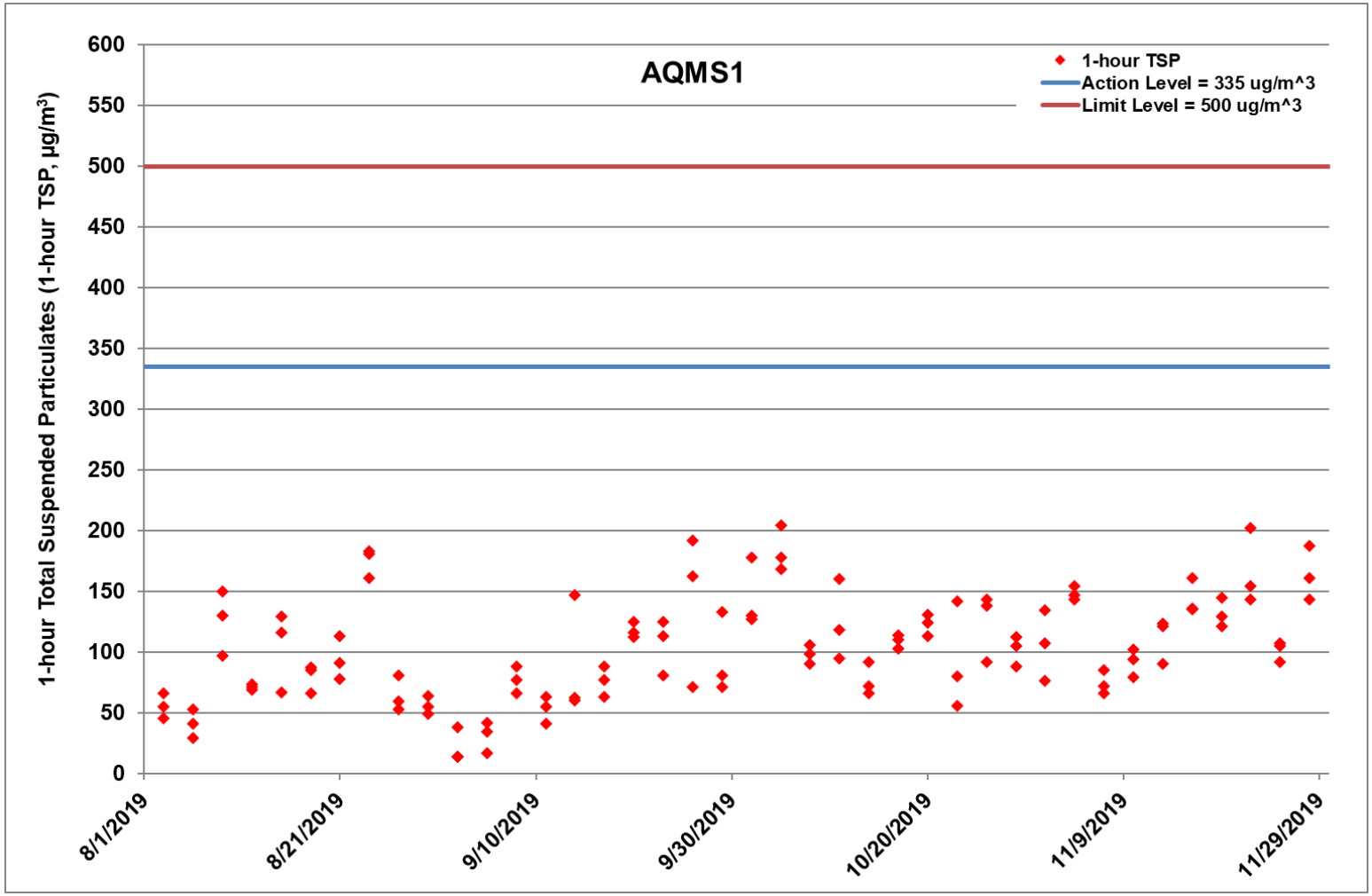

Figure F.1 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

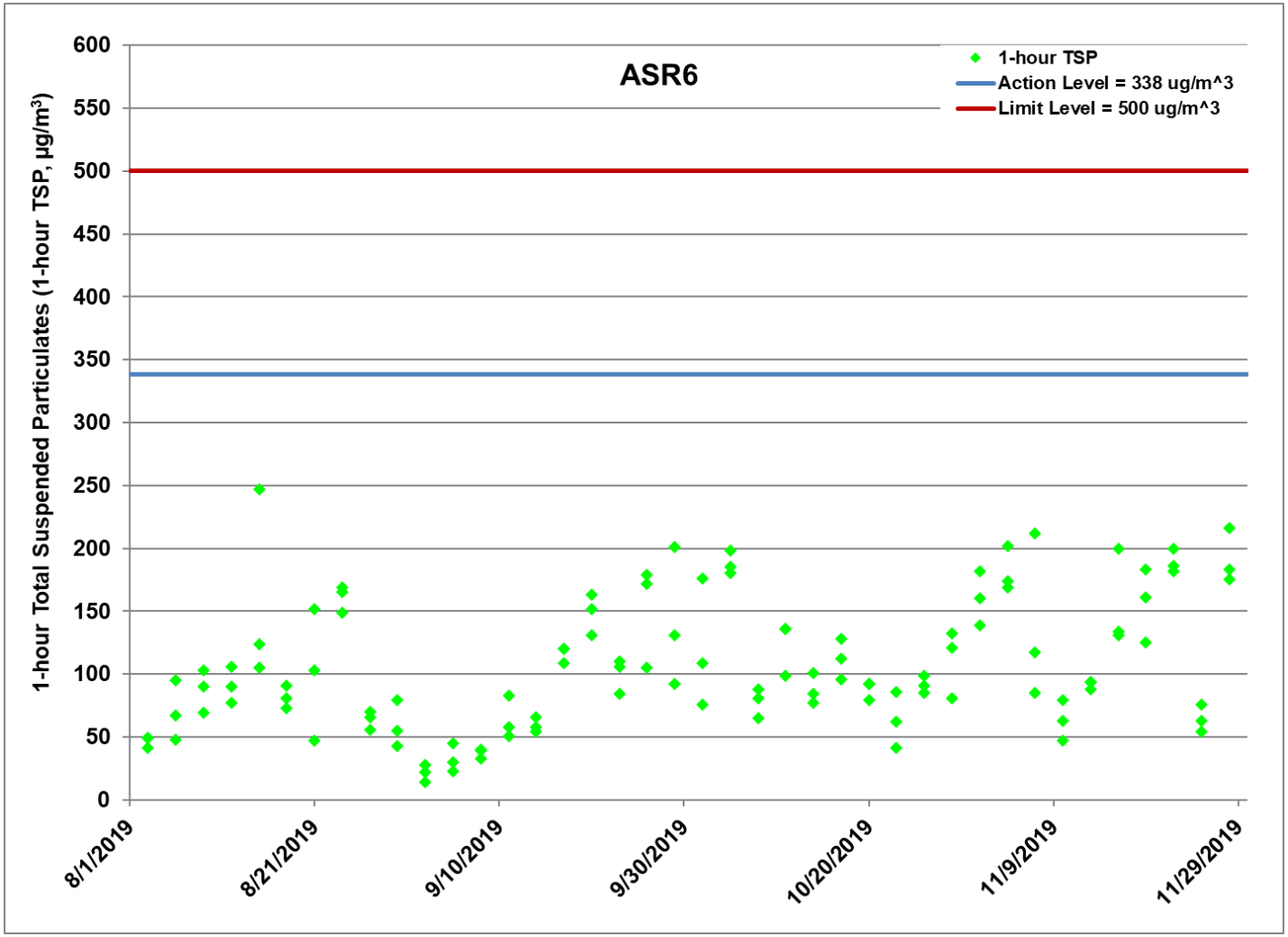

Figure F.2 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

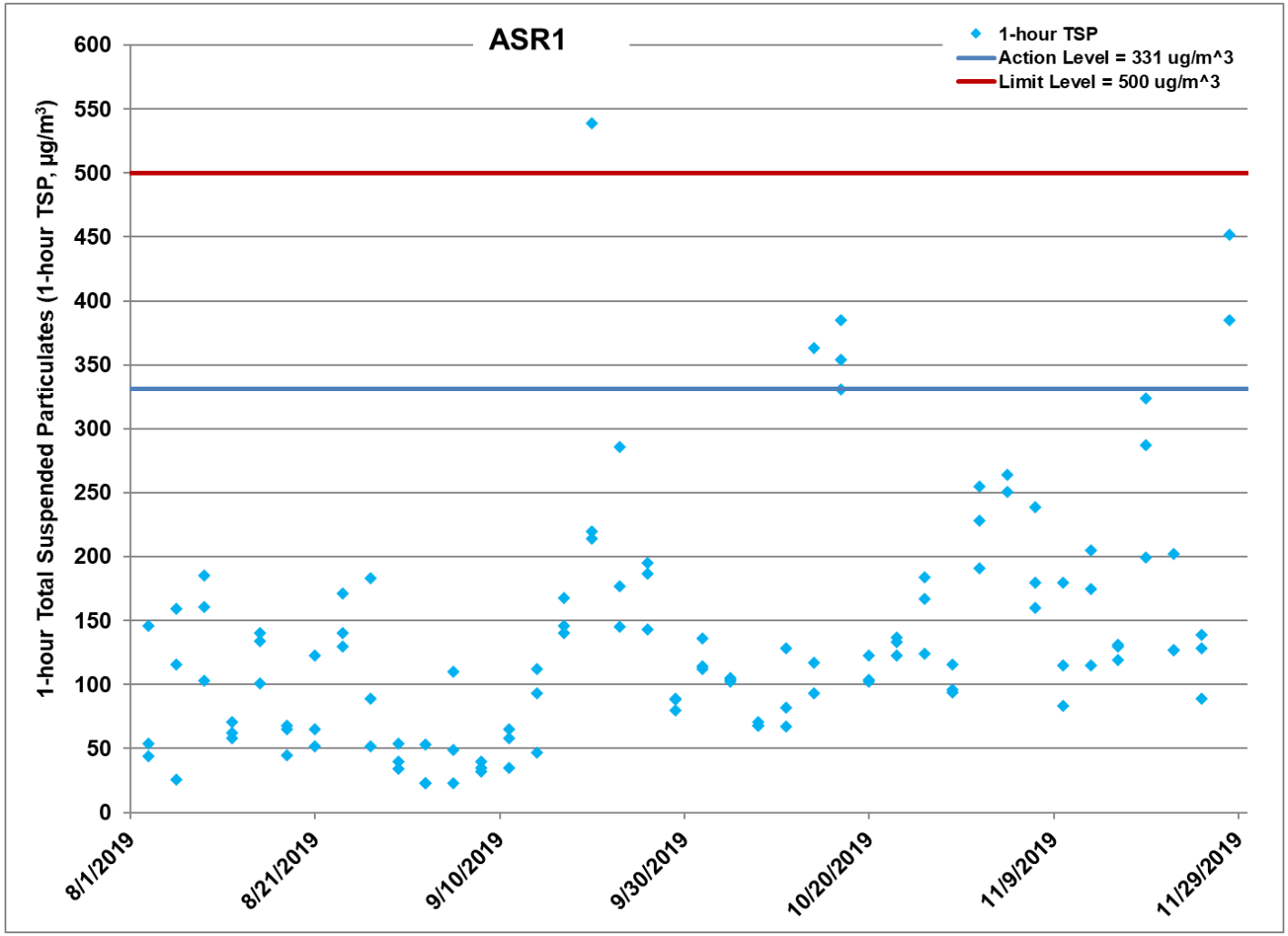

Figure F.3 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

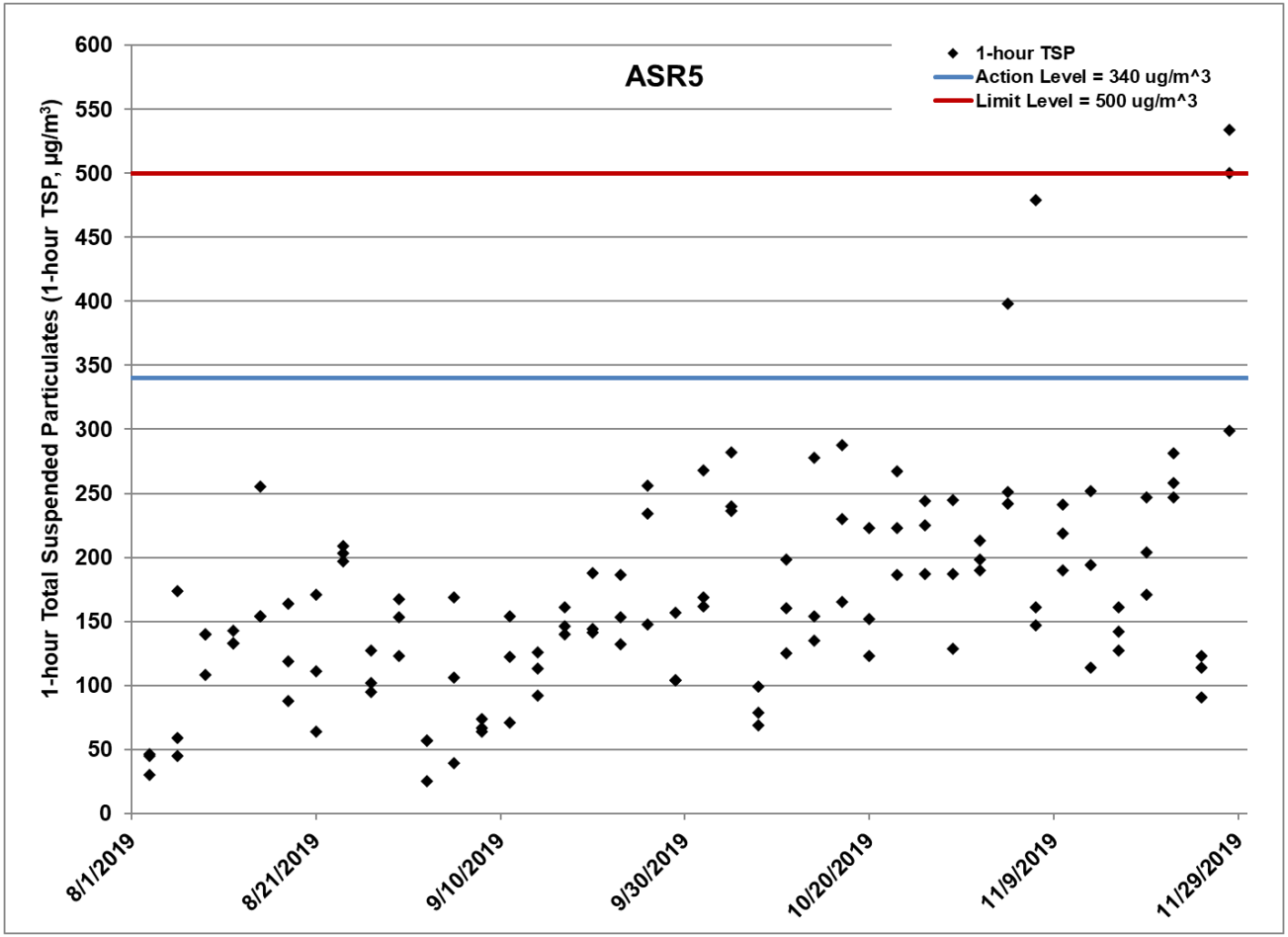

Figure F.4 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

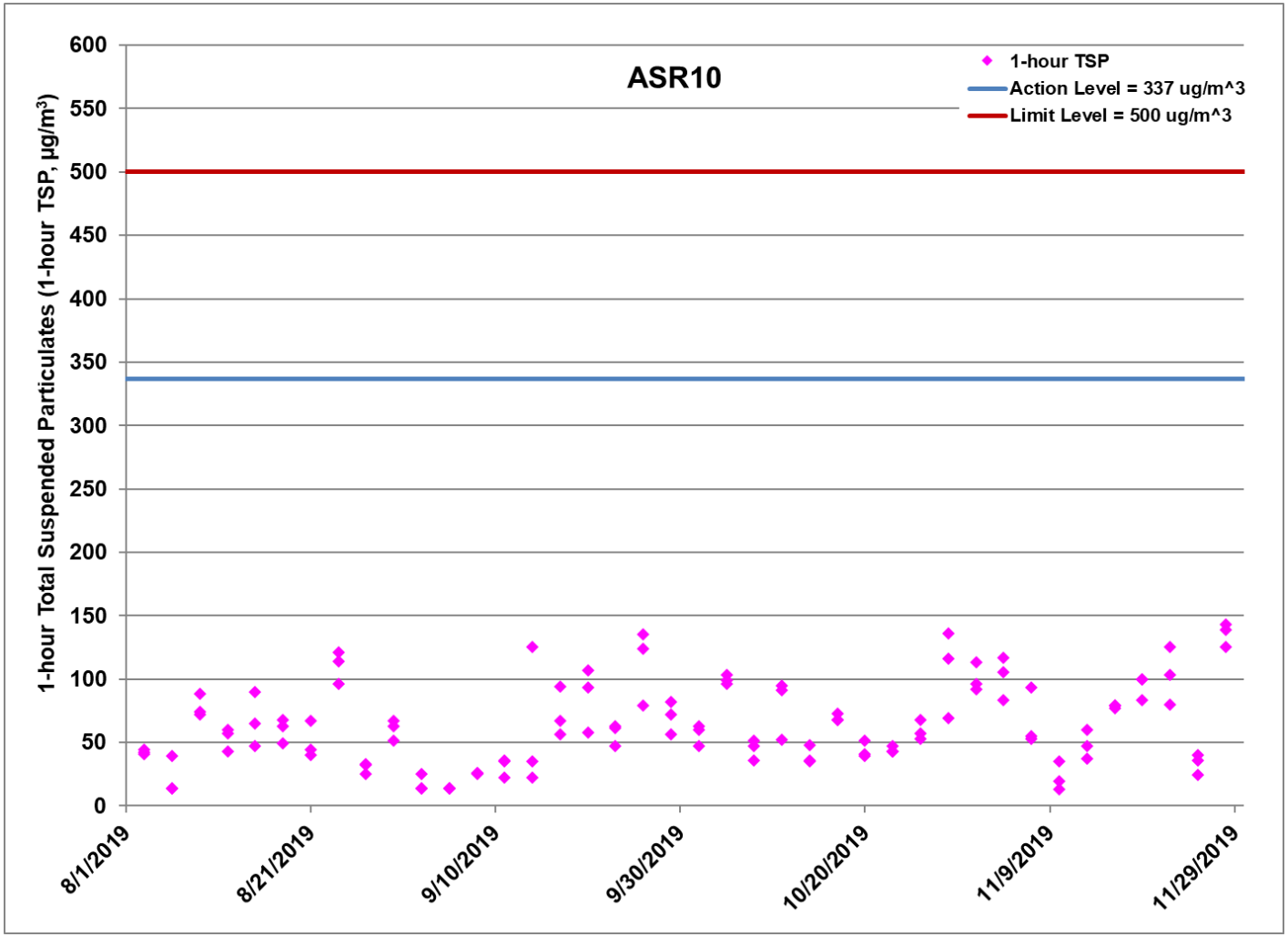

Figure F.5 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

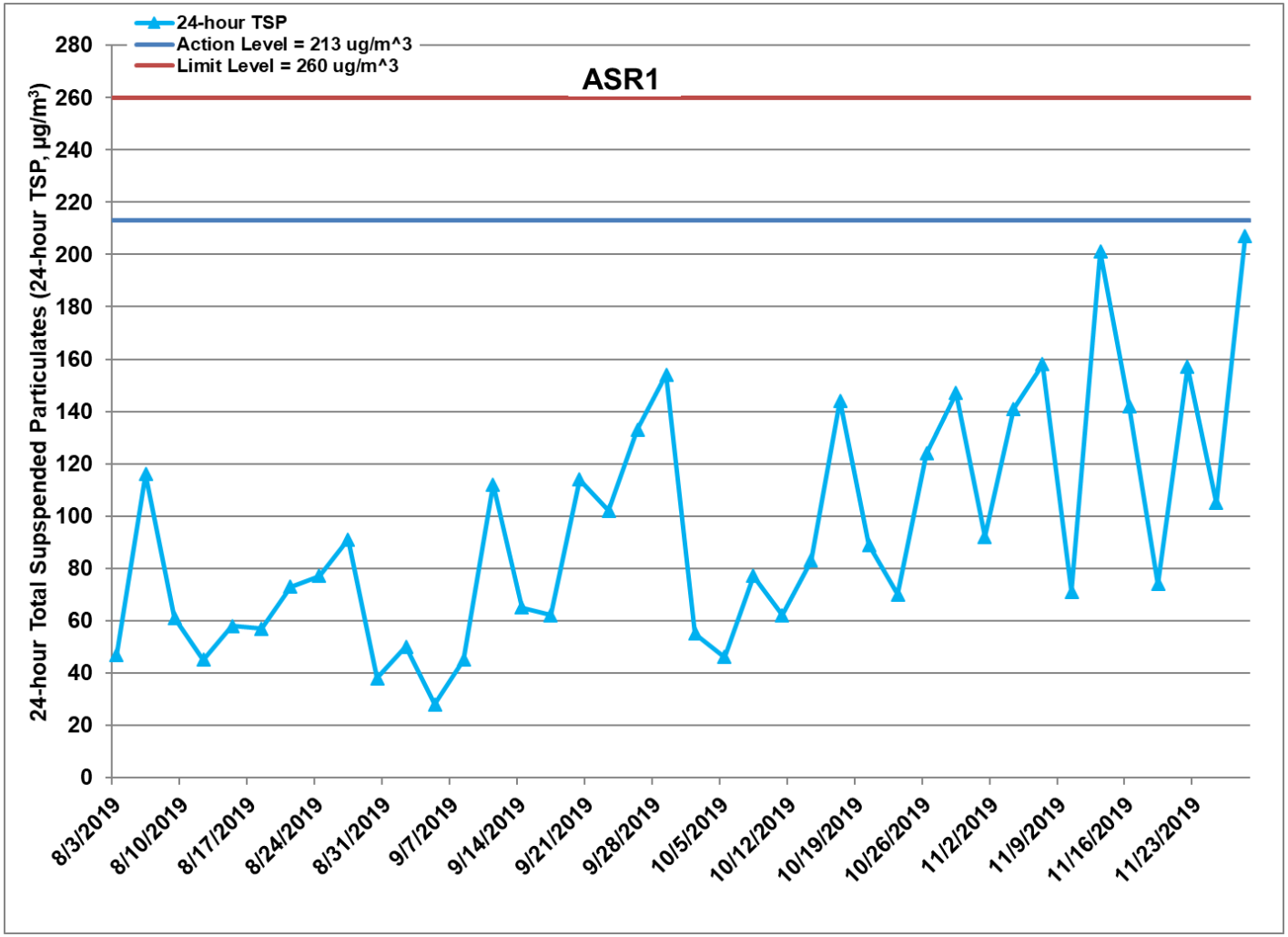

Figure F.6 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

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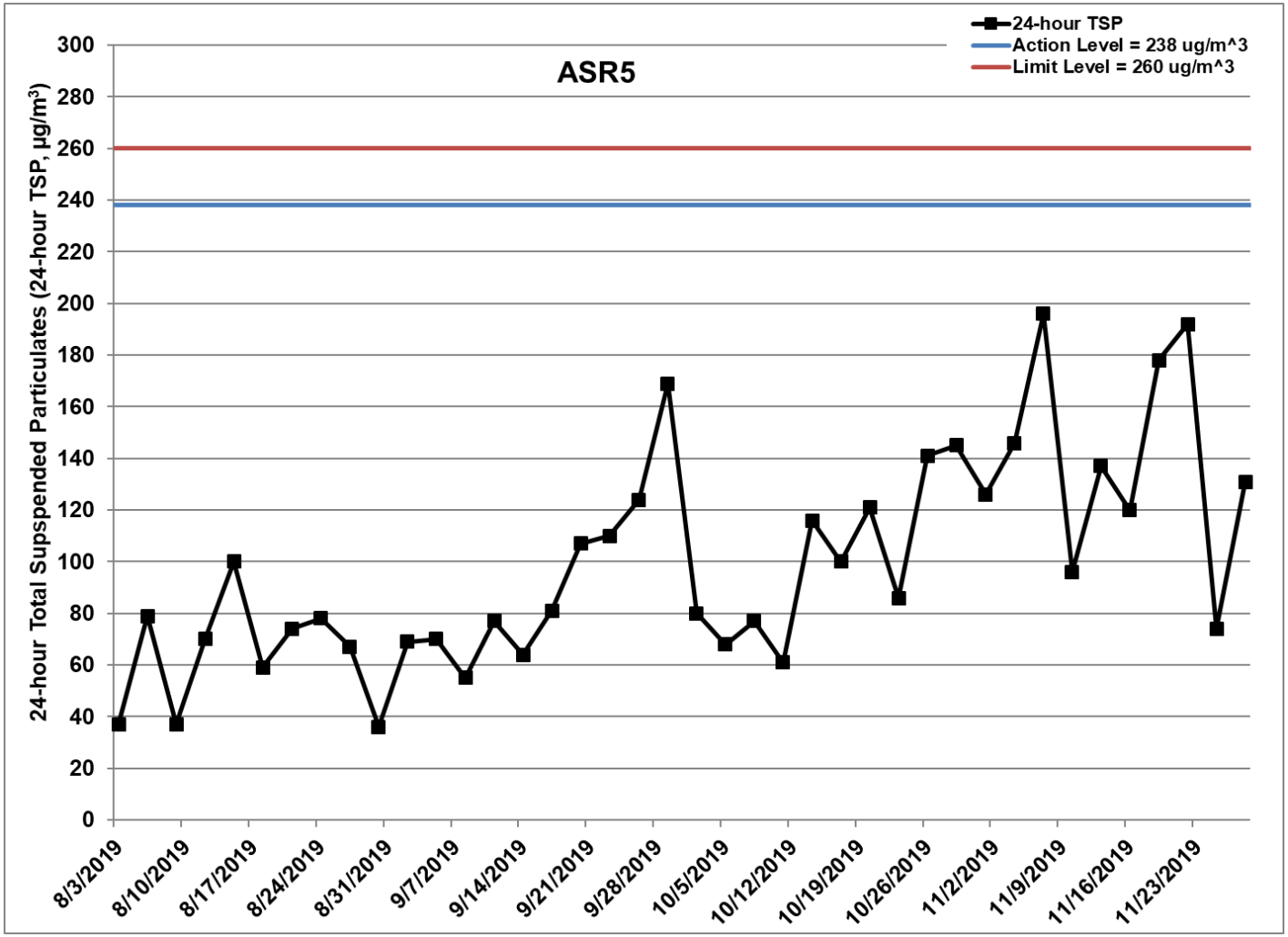


Figure F.7 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

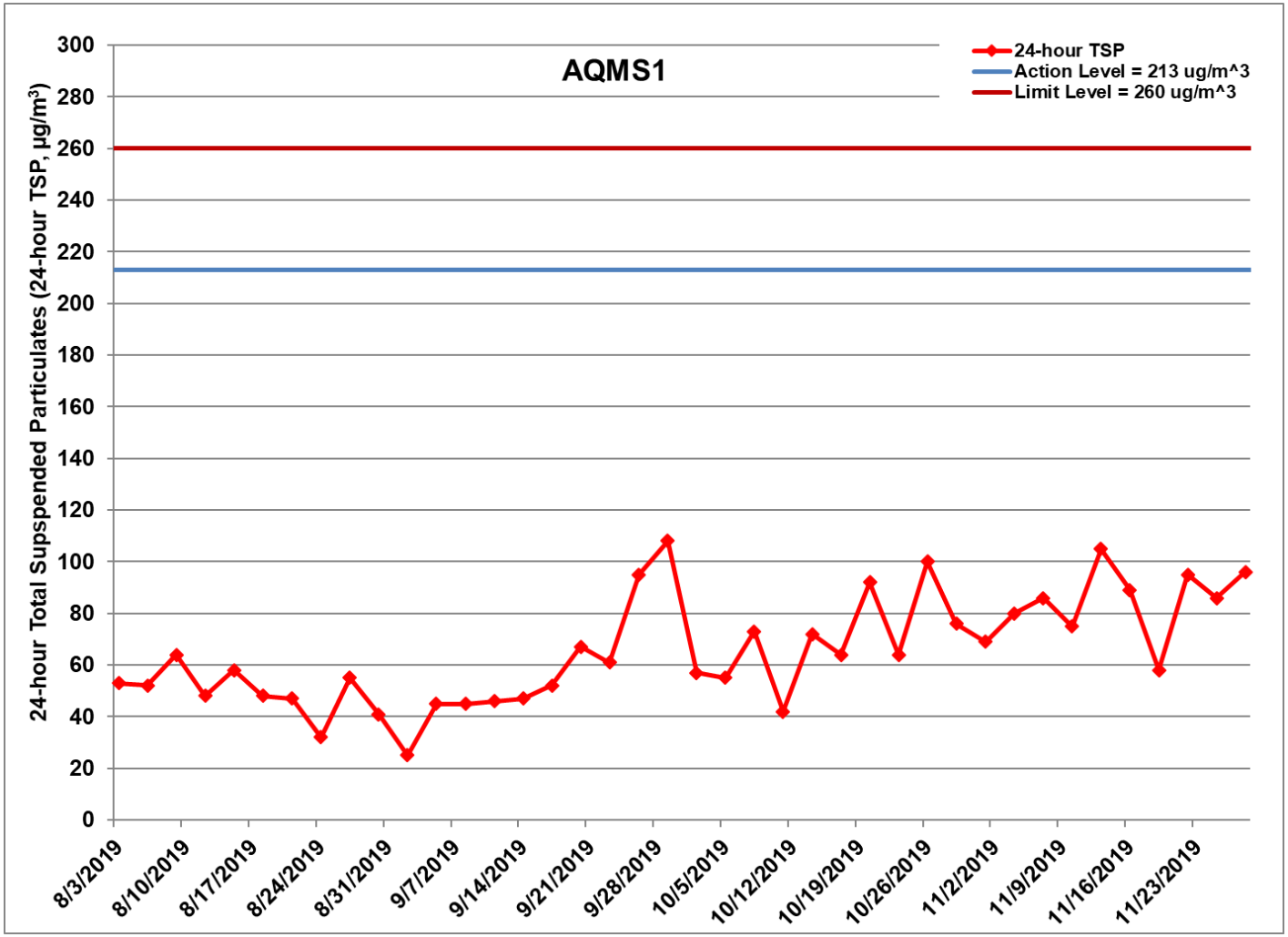


Figure F.8 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

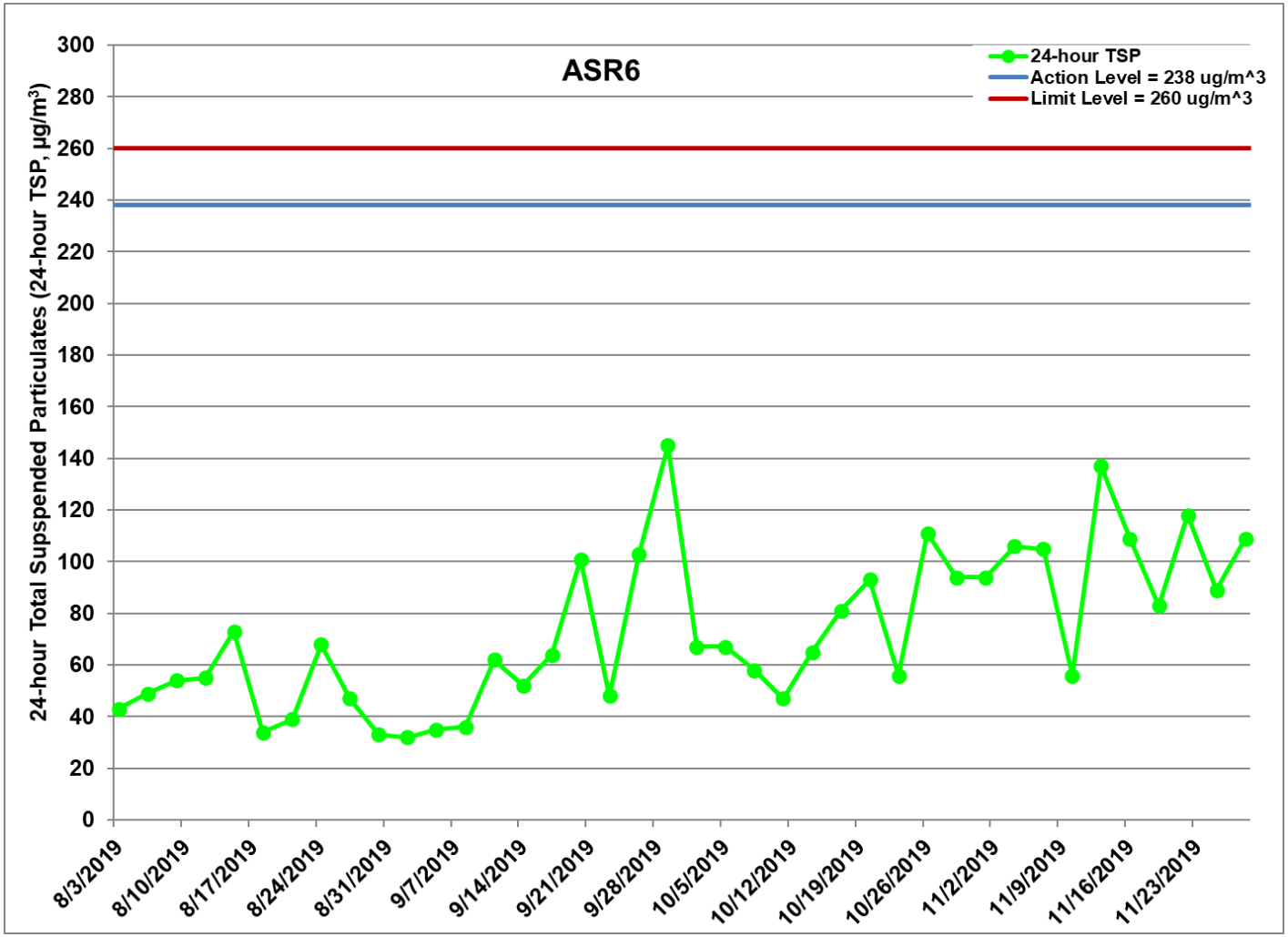


Figure F.9 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

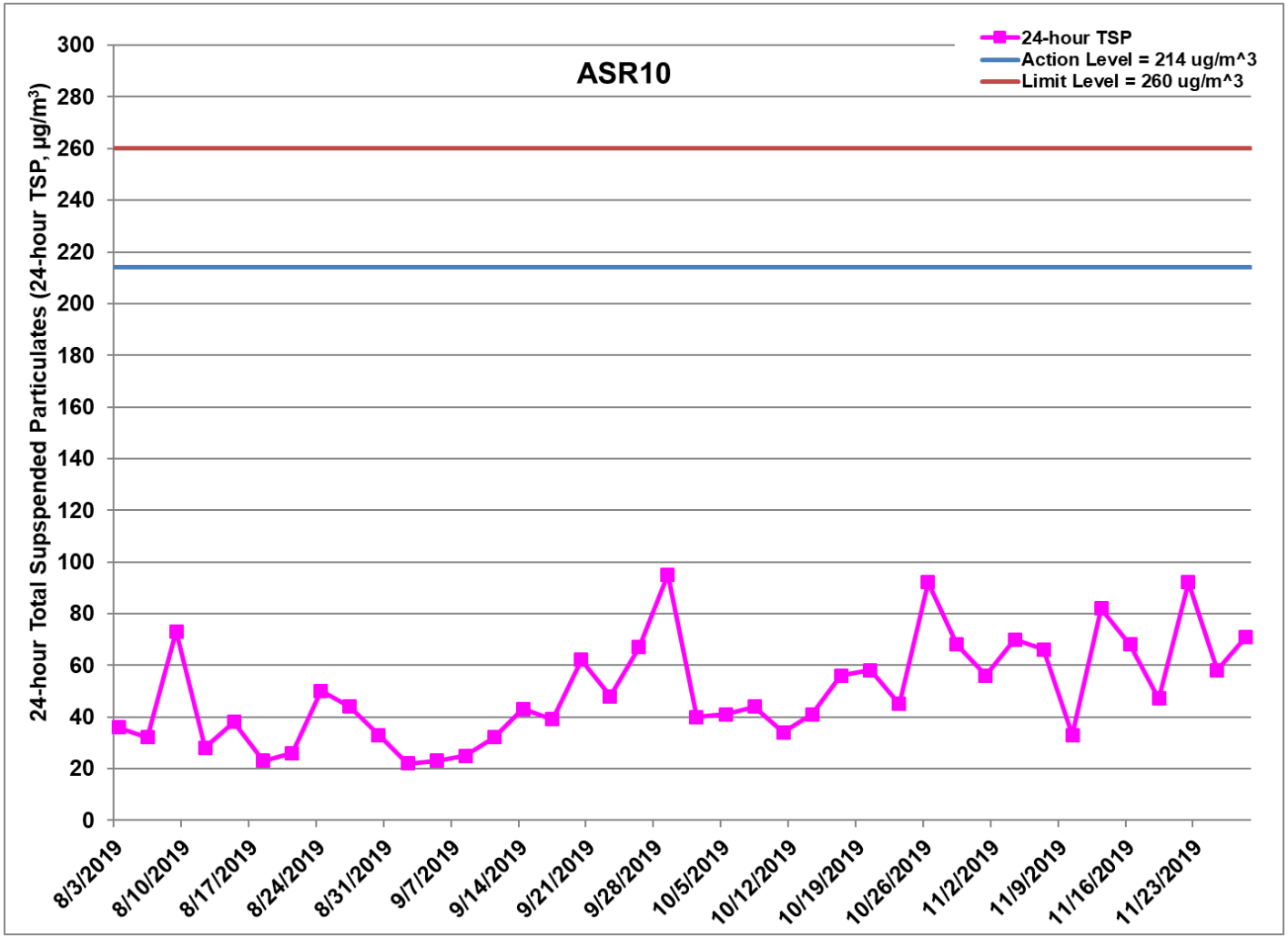


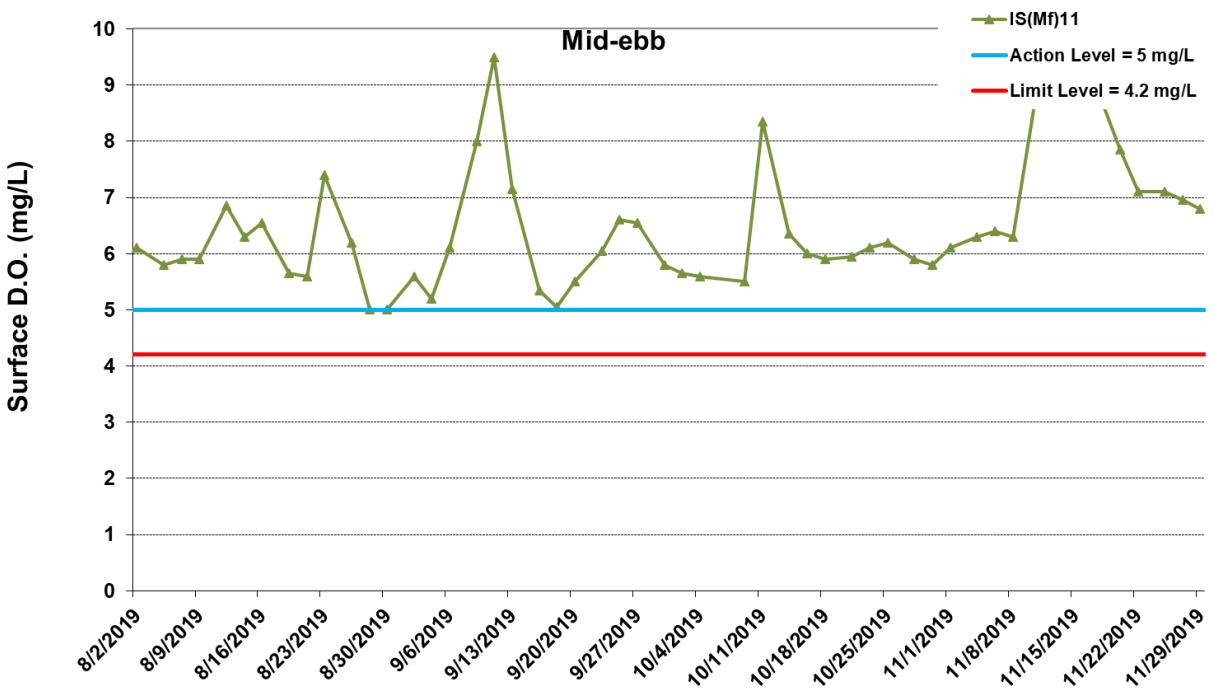
Figure F.10 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 August 2019 and 30 November 2019 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road & Drainage Works (1/8/2019 – 30/11/2019)

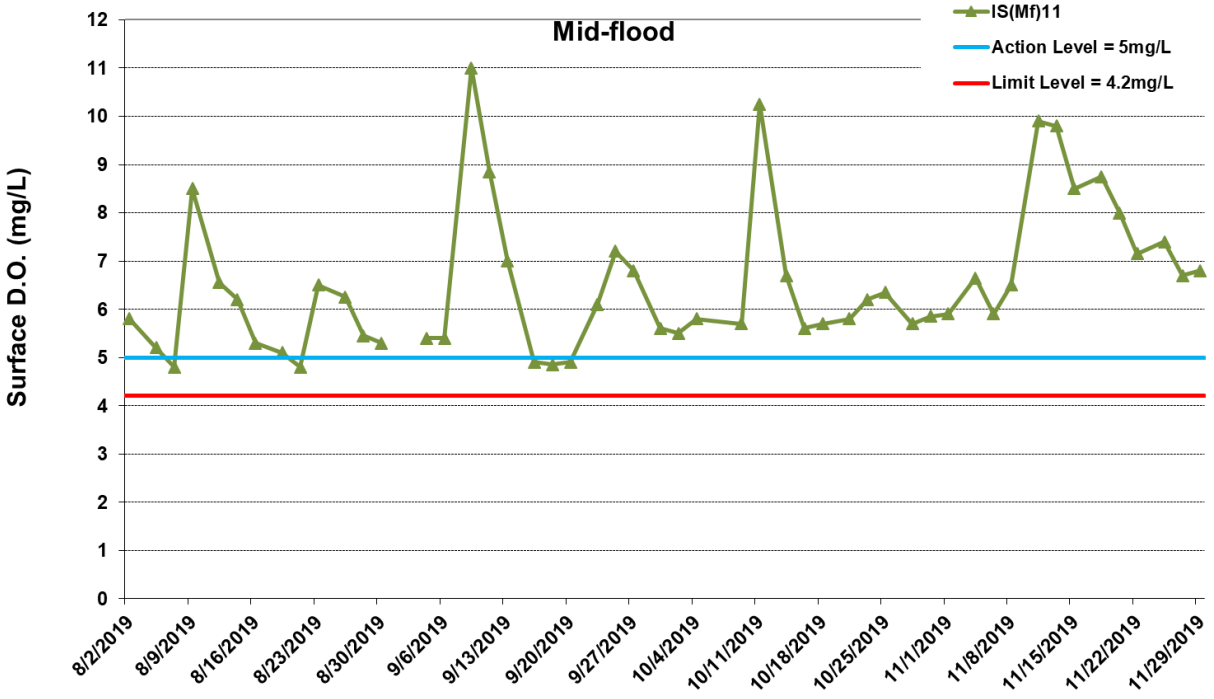
Ref: 0212330_Impact AQM graphs_November 2019_REV a.xlsx

ERM

Appendix G

Impact Water Quality Monitoring Results



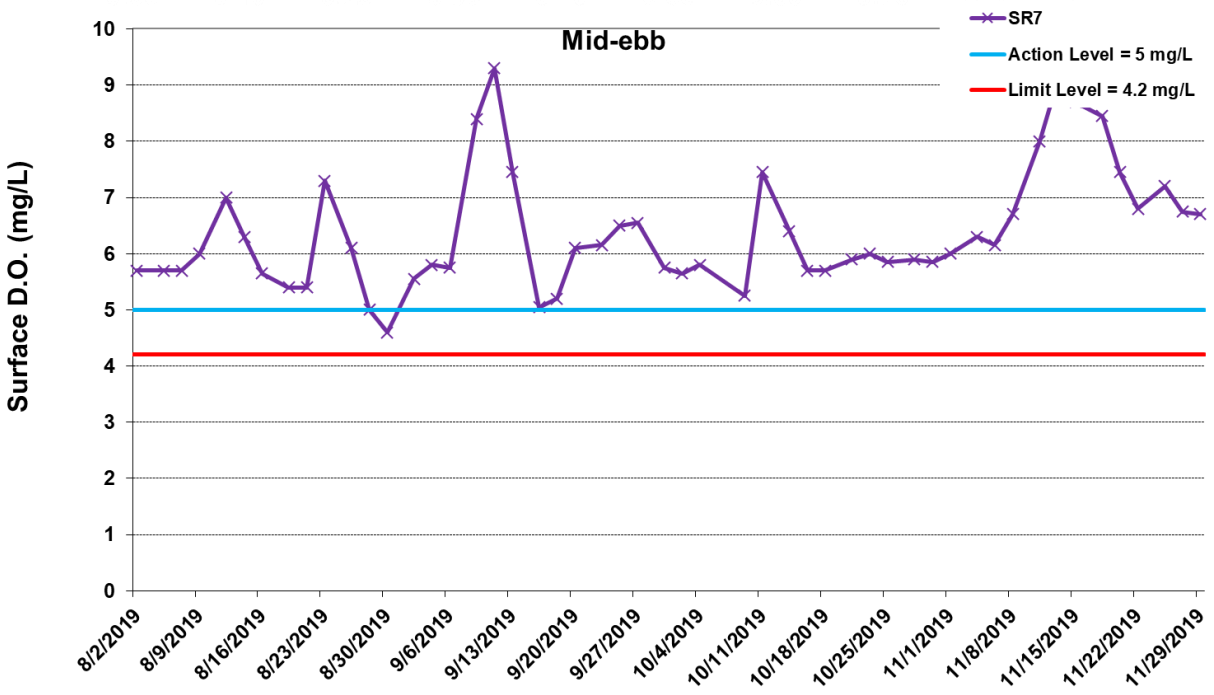


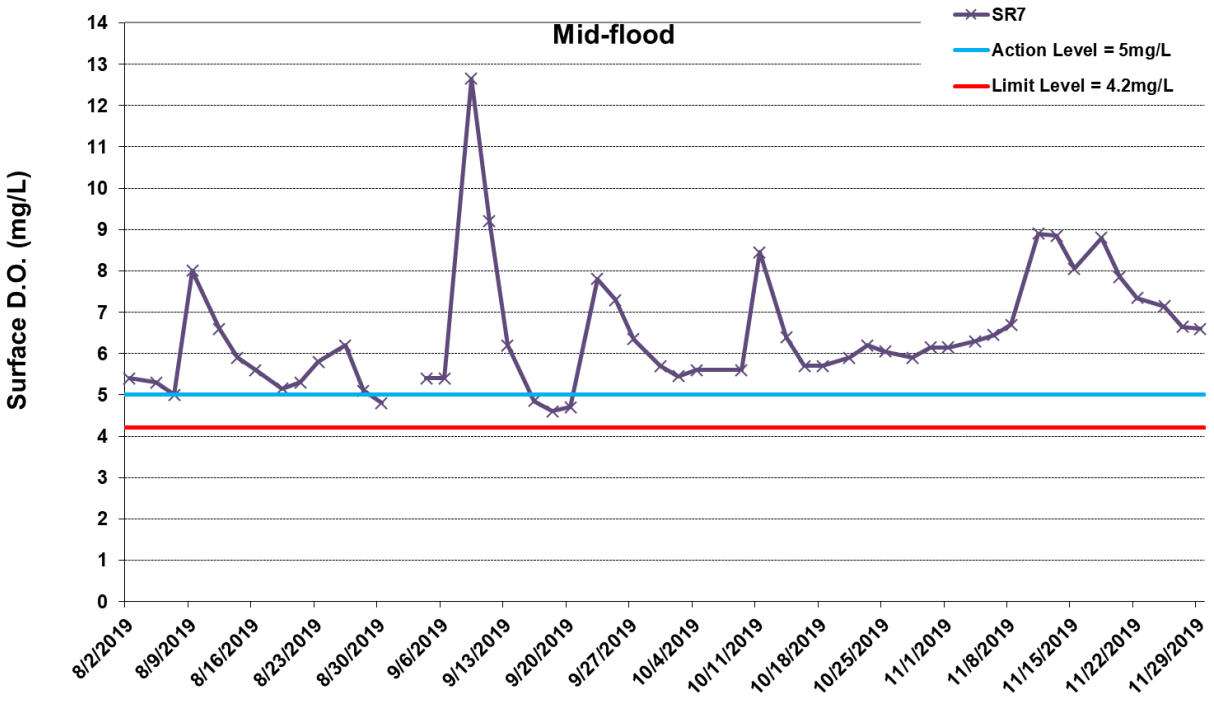
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G1 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



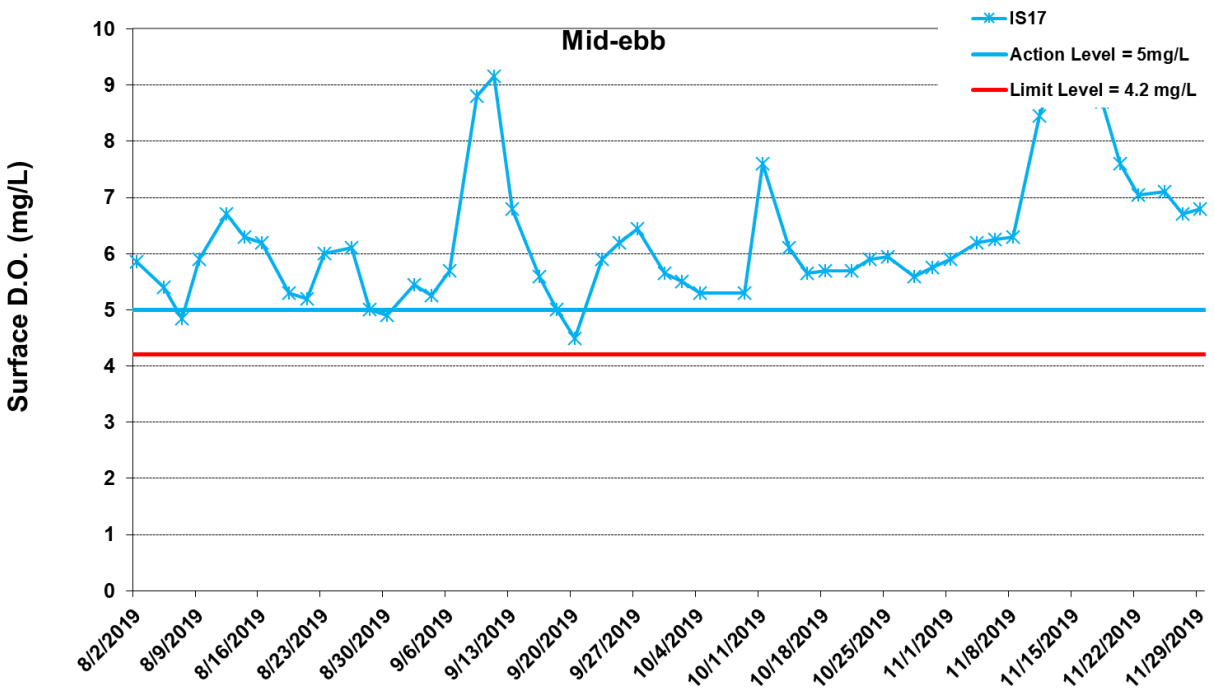


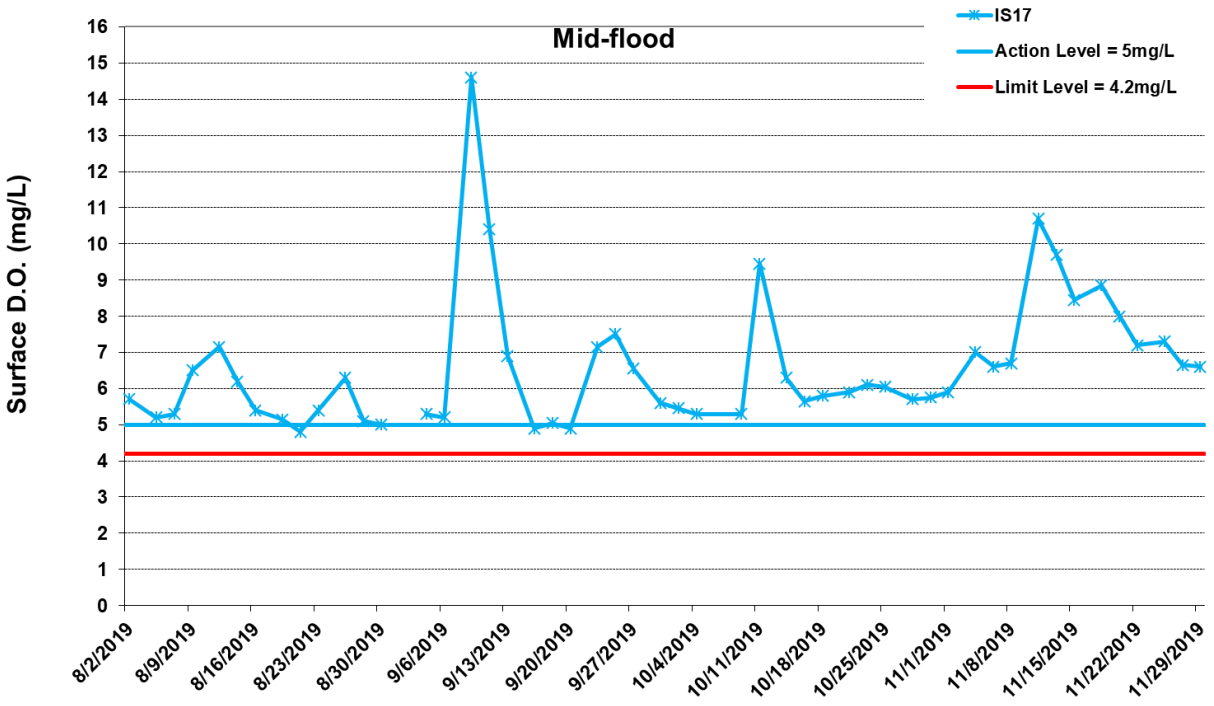
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



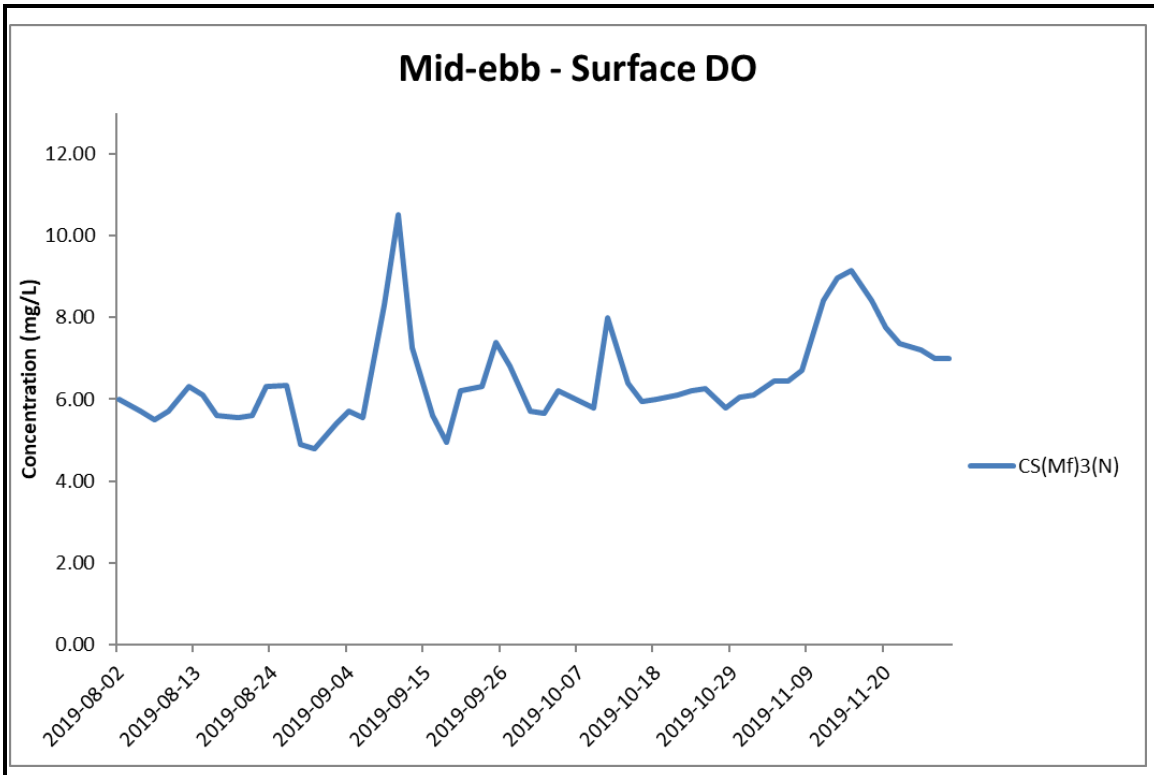


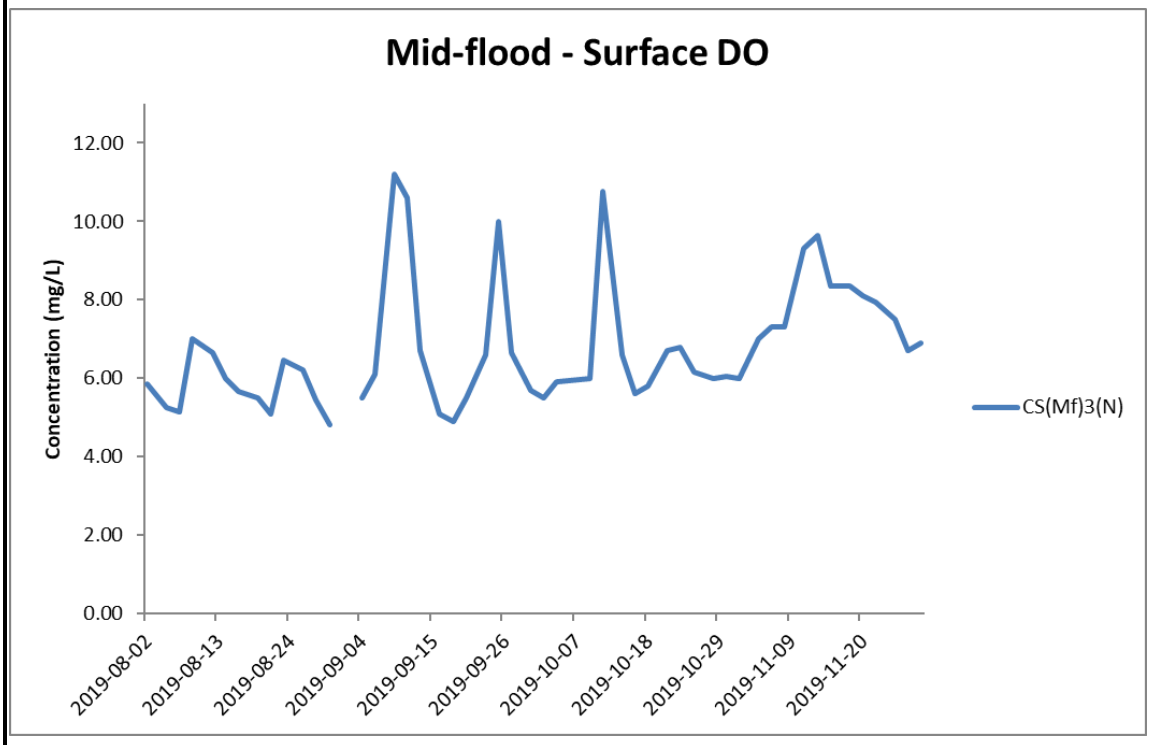
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

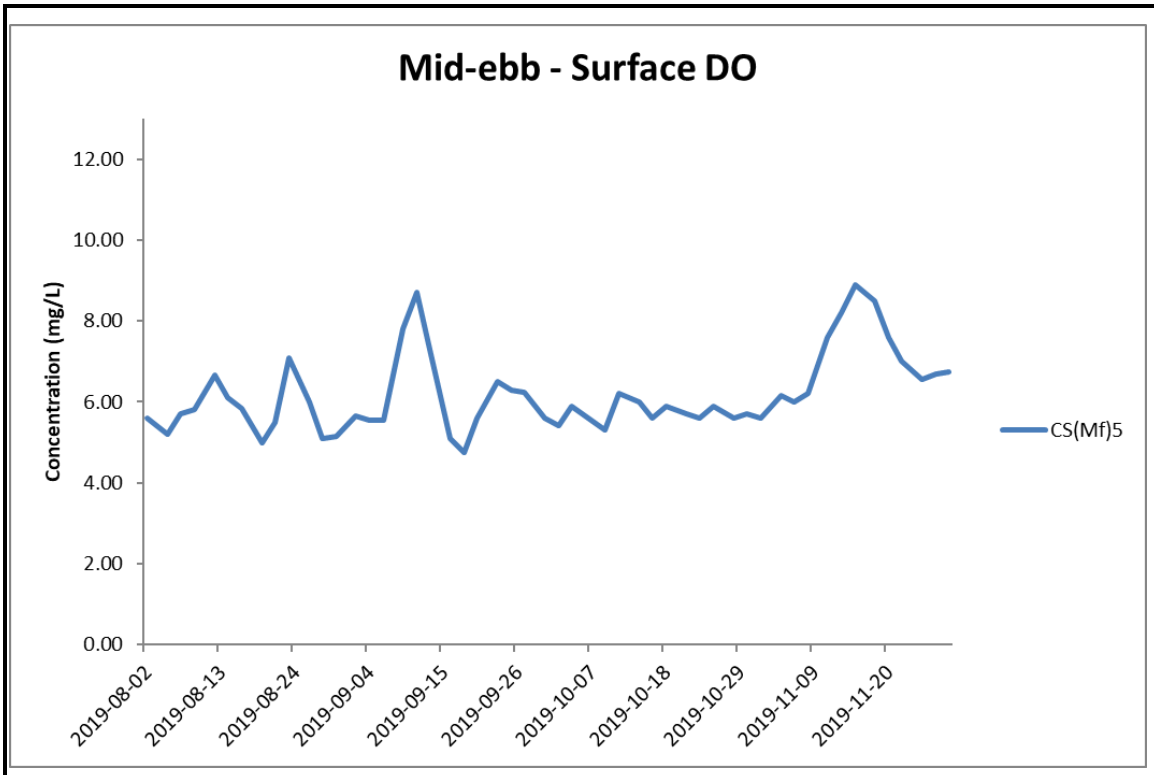


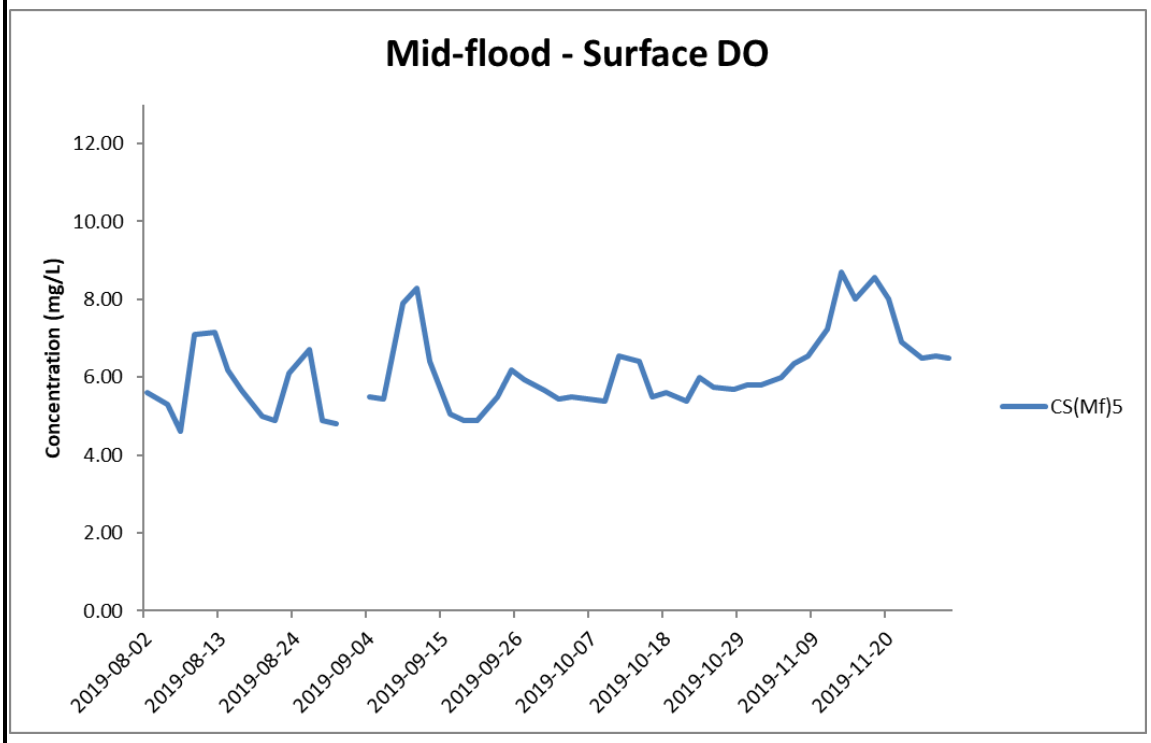


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

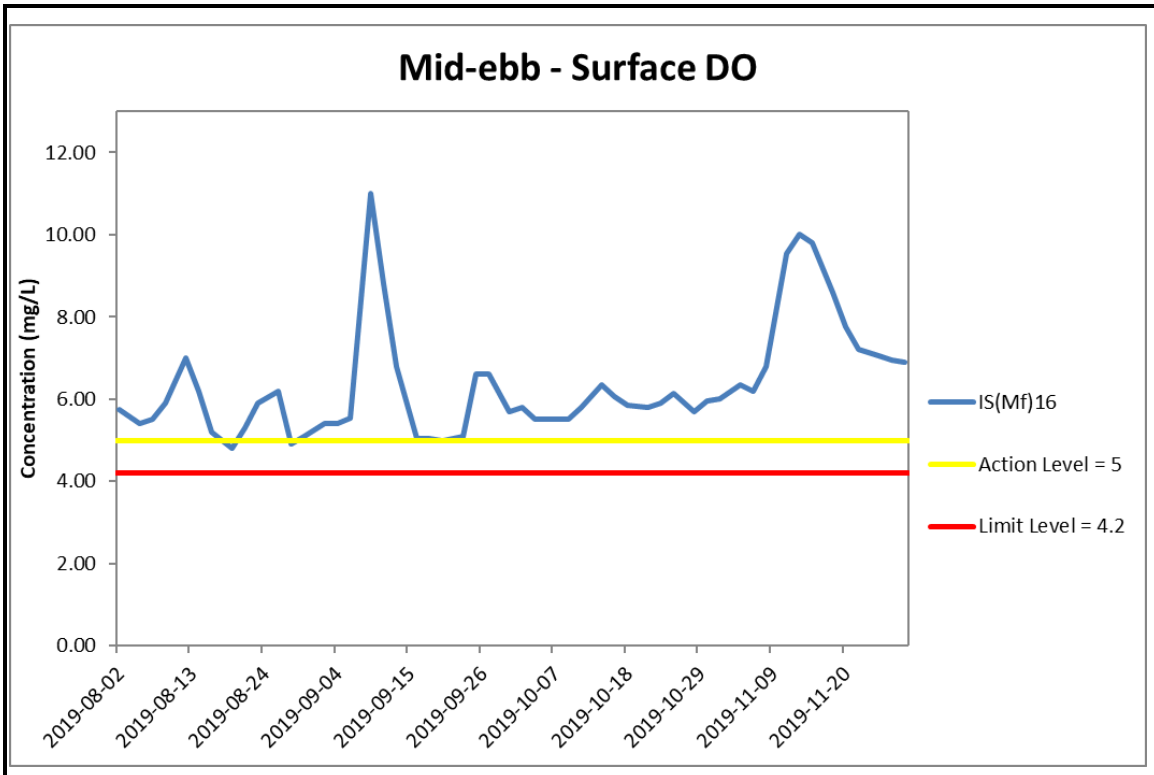


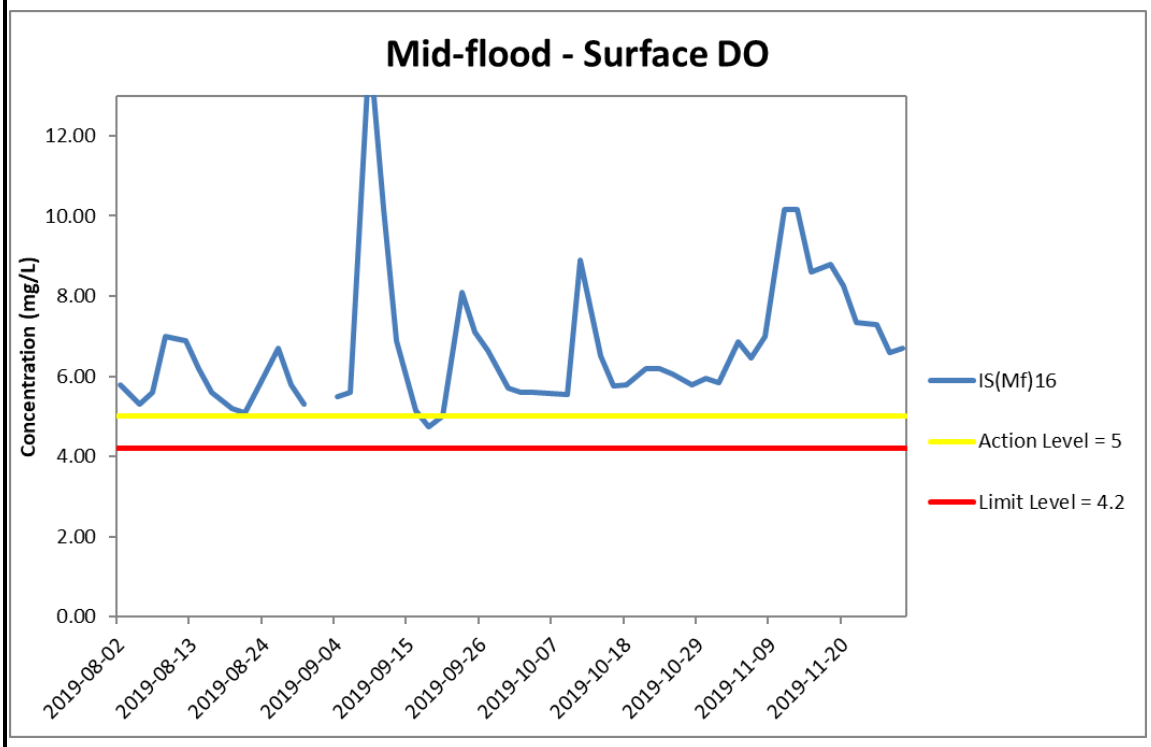


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G5 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

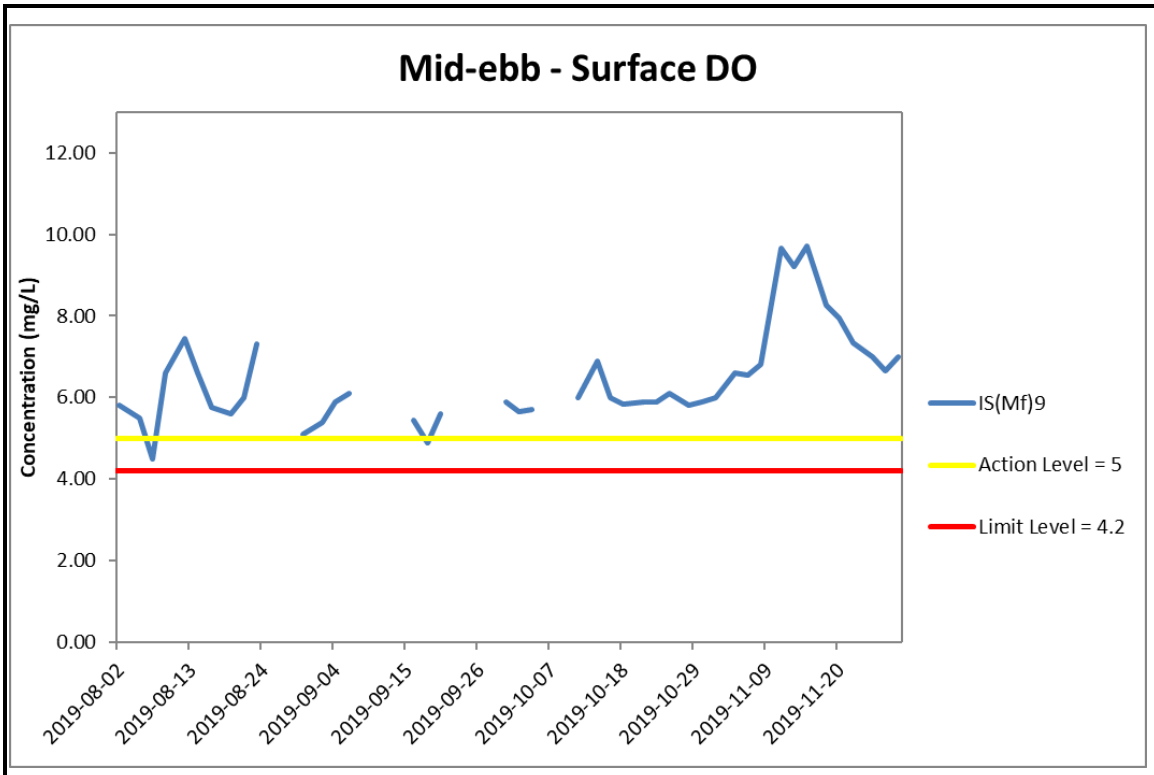


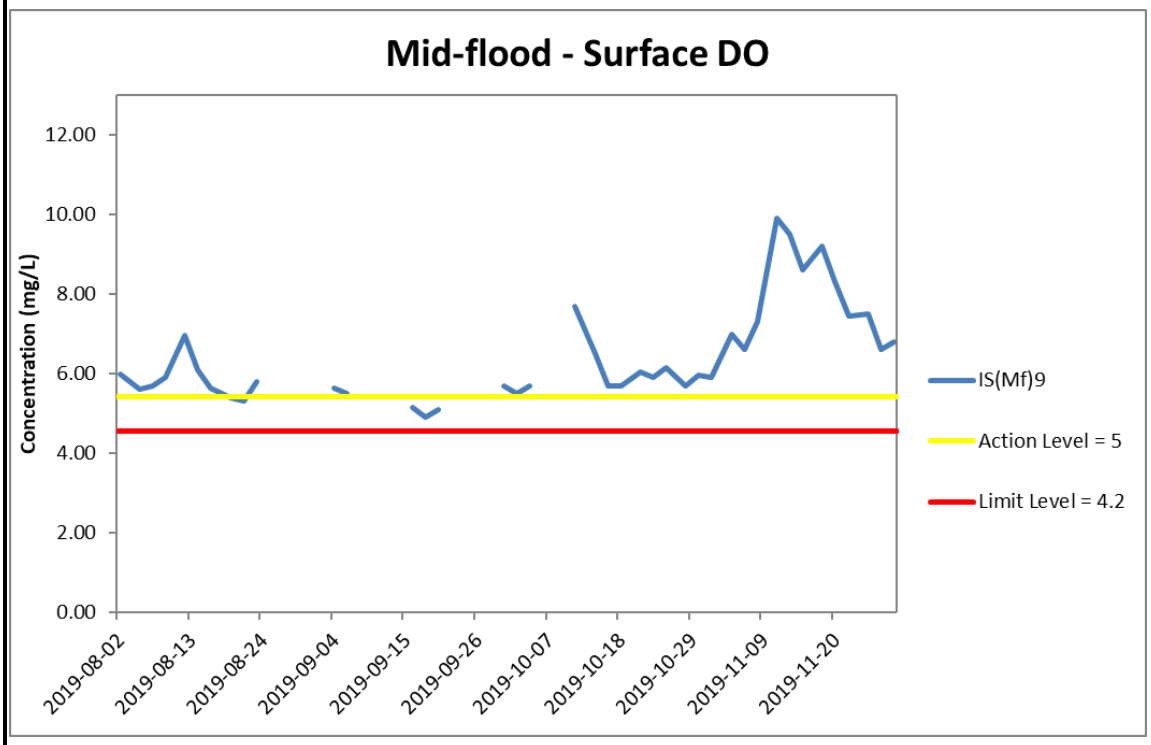


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

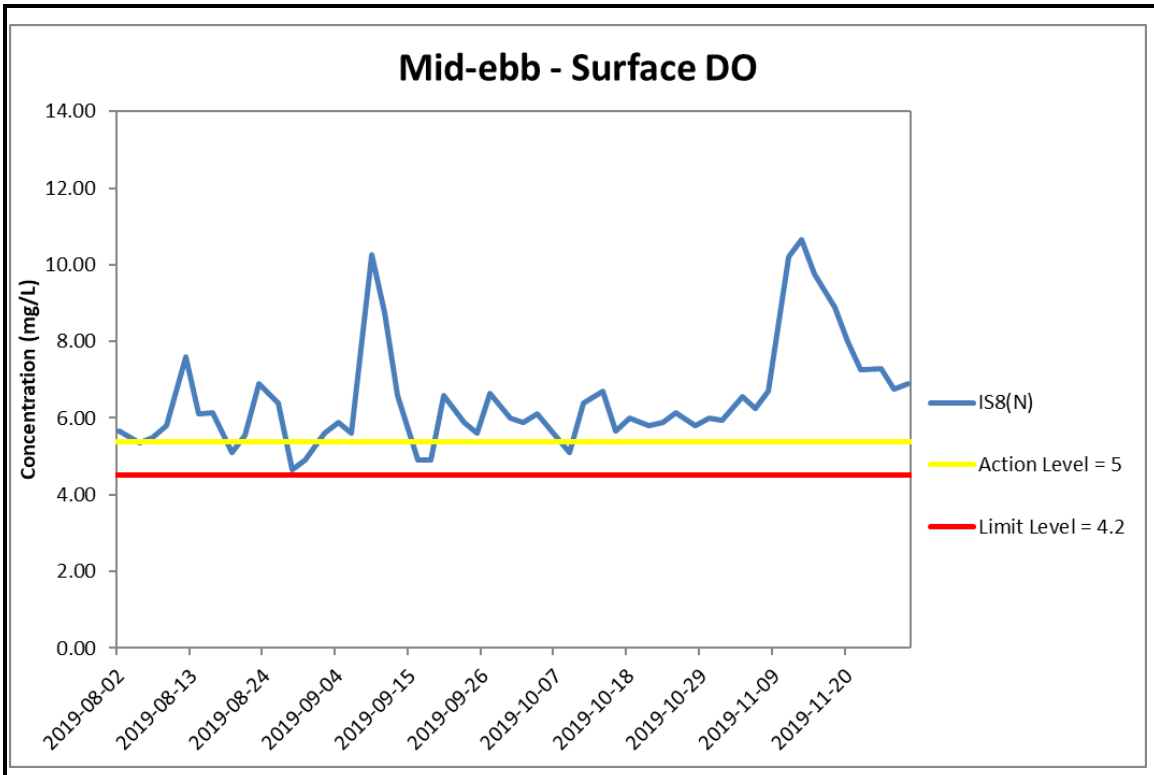


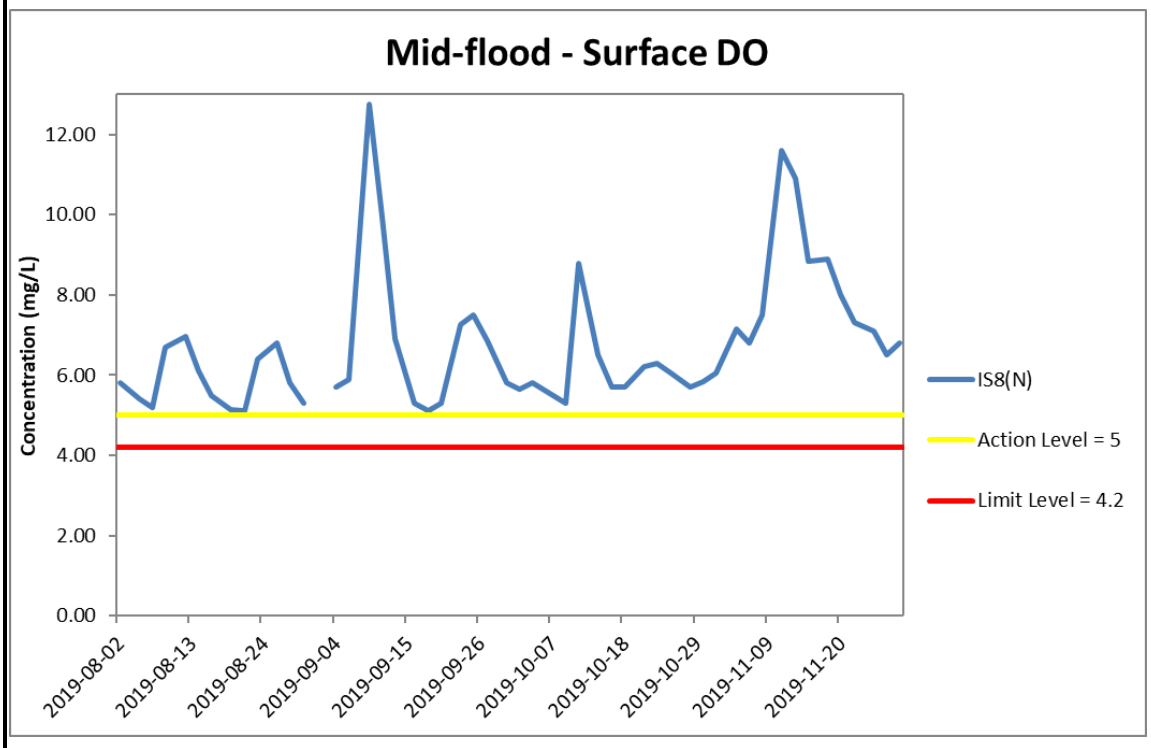


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

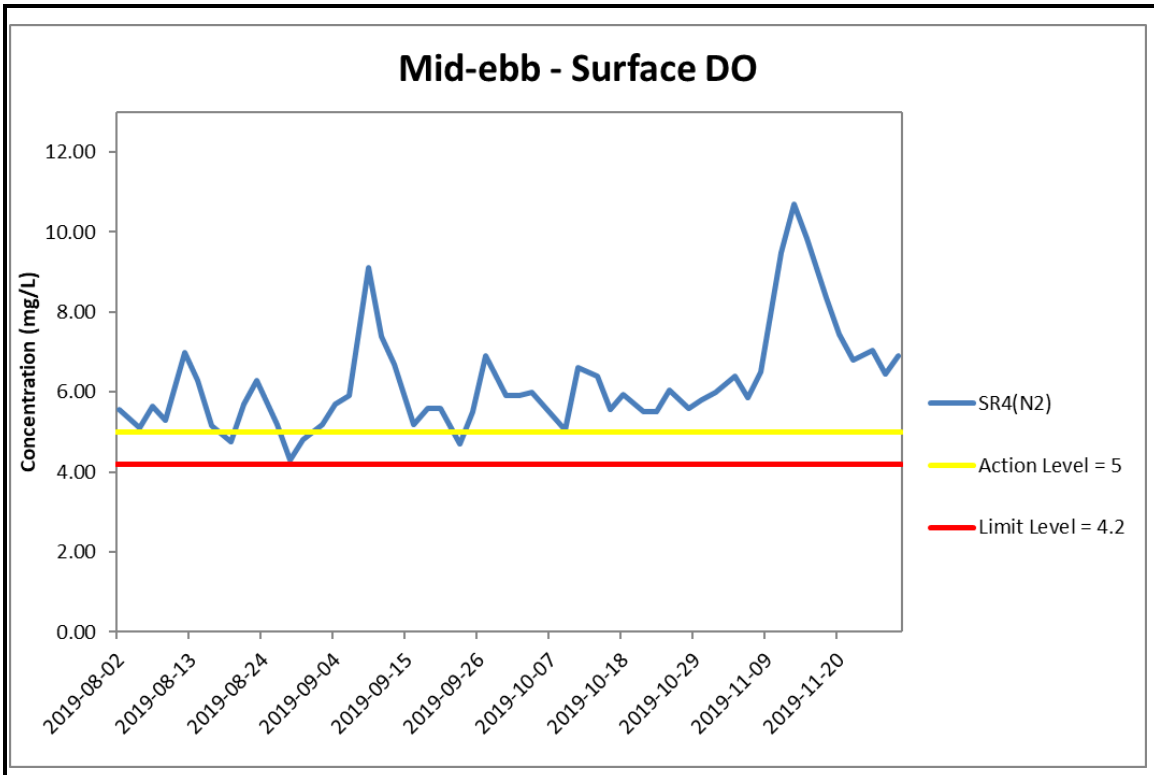


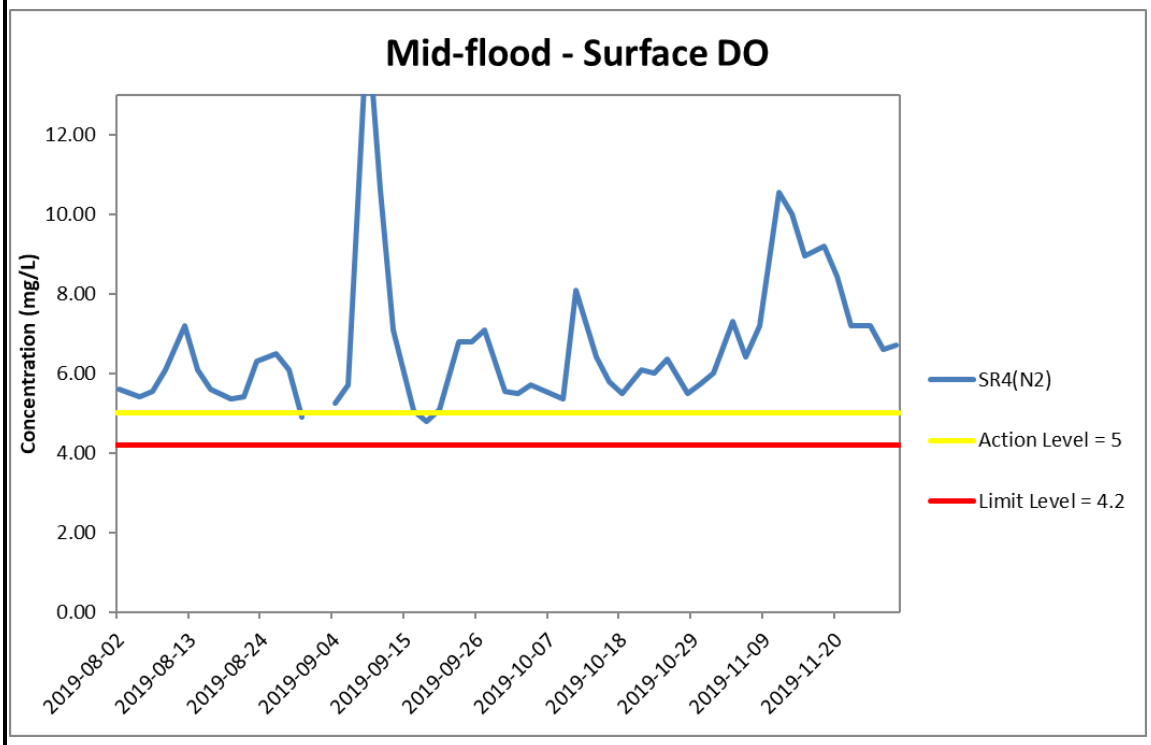


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

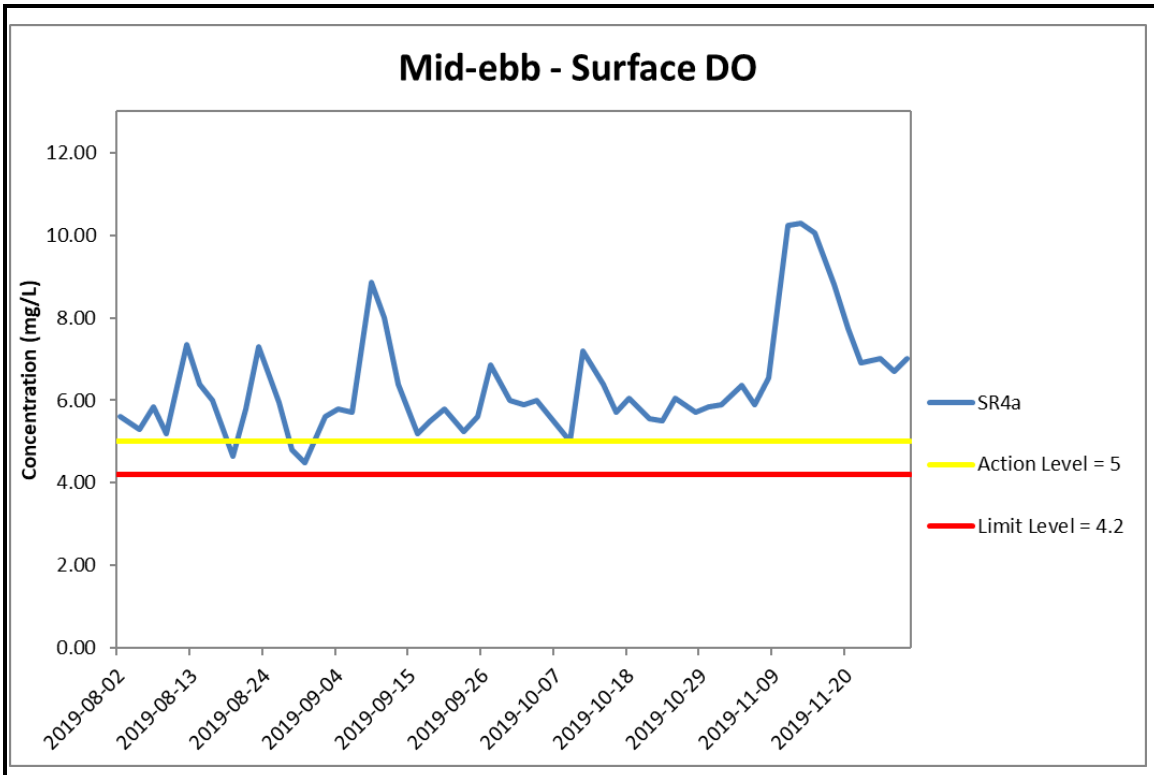


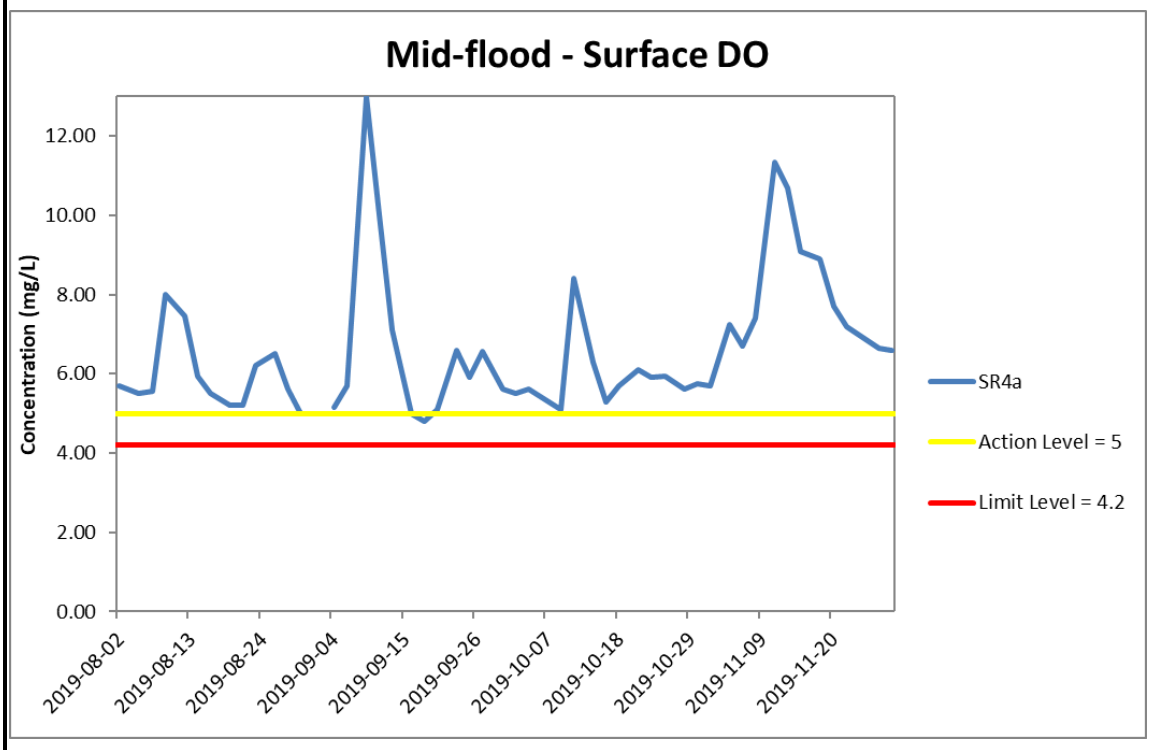


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G9 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

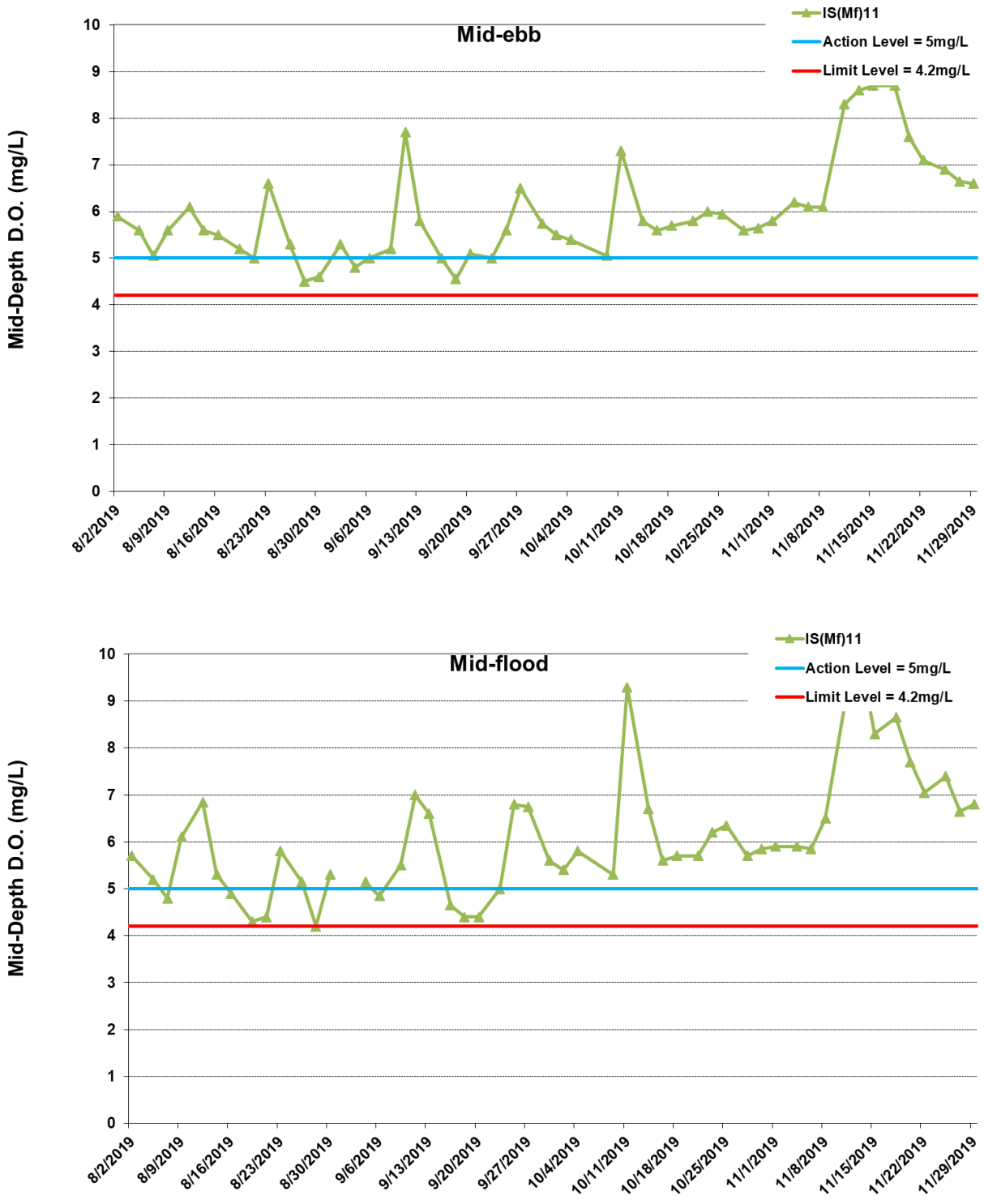




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2019 and 30 November 2019 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



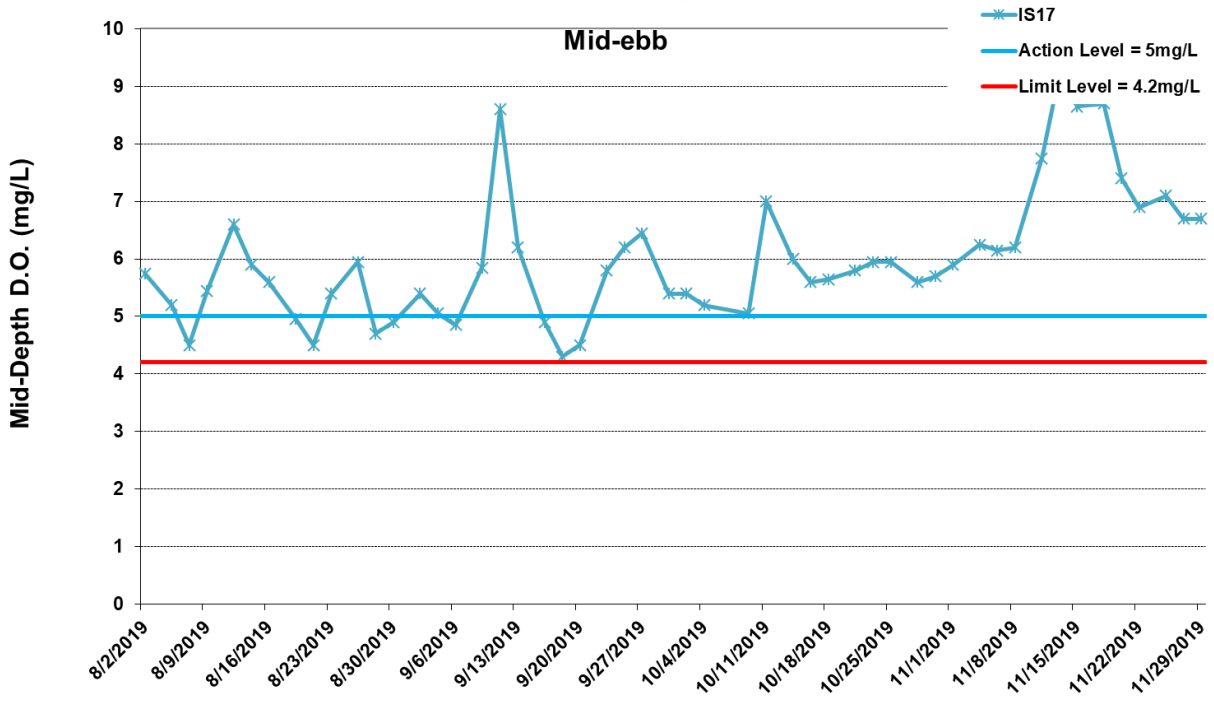
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

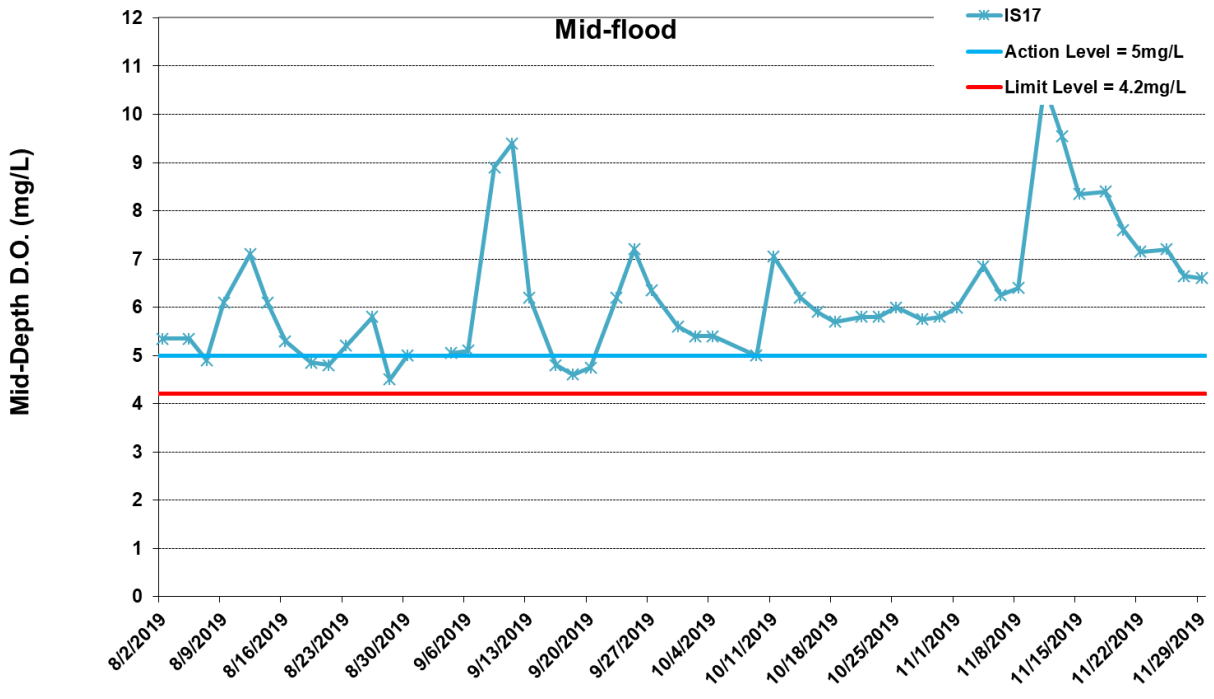
*No data for Stations SR7 due to shallow water depth (< 6m).

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2019 and 30 November 2019 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls





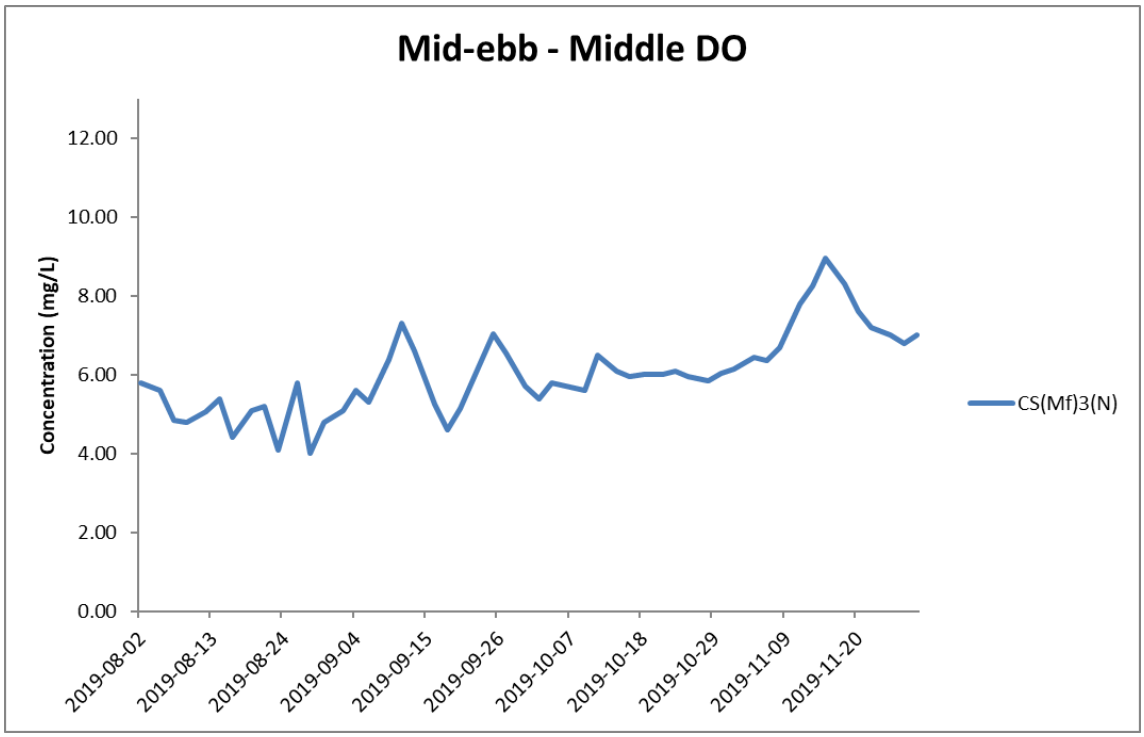
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

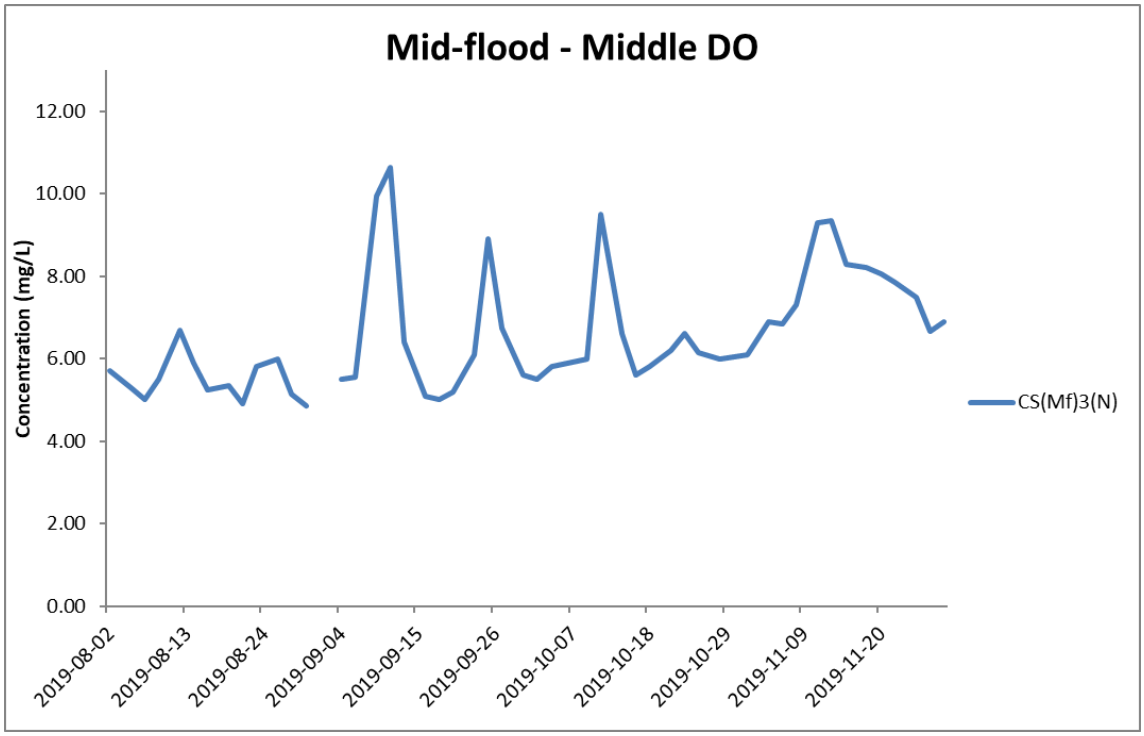
*No data for Stations SR7 due to shallow water depth (< 6m).

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G12 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2019 and 30 November 2019 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

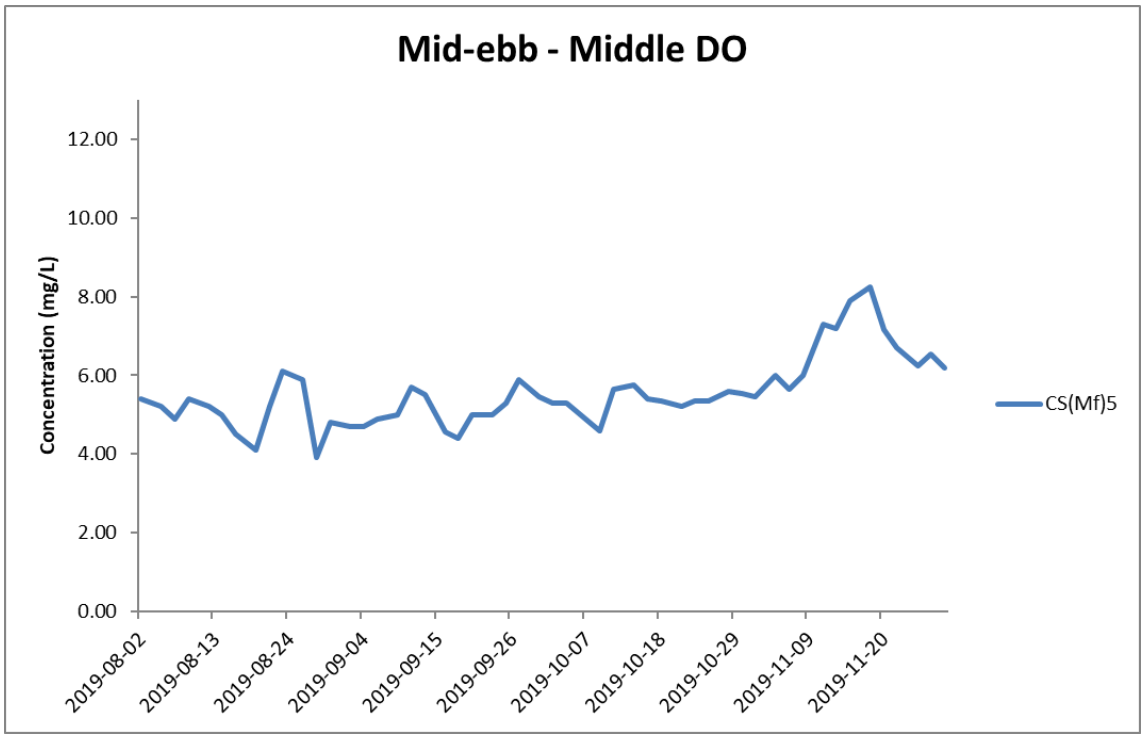


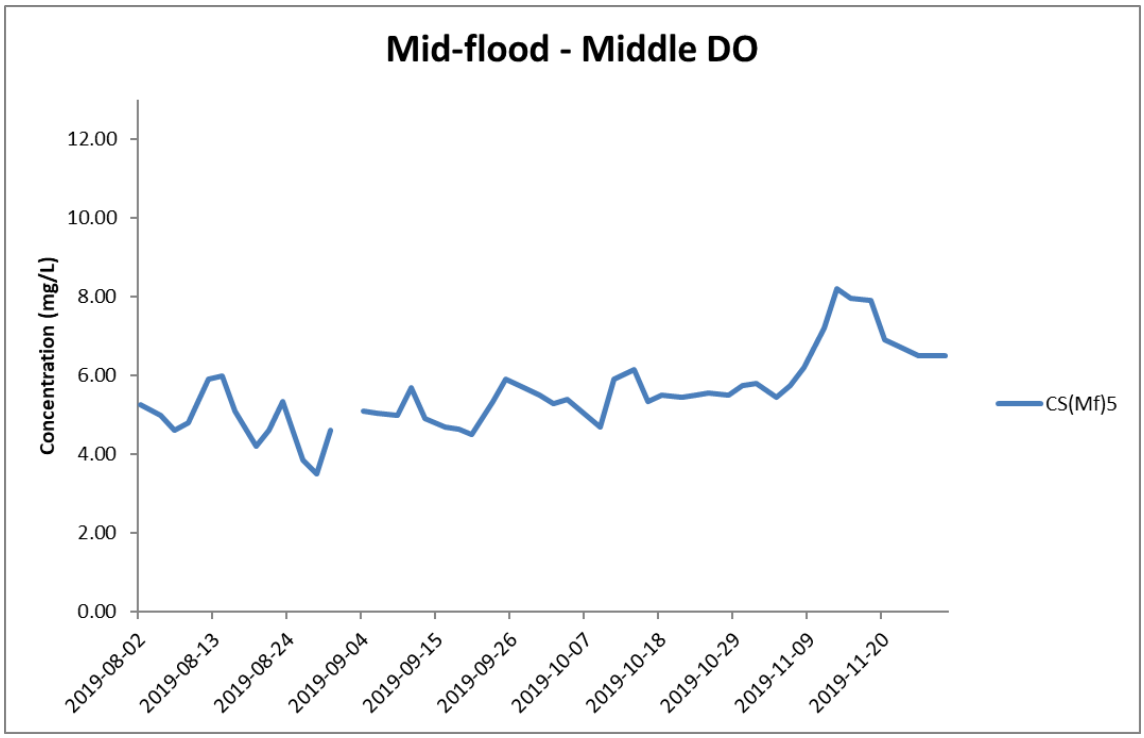


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G13 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2019 and 30 November 2019 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

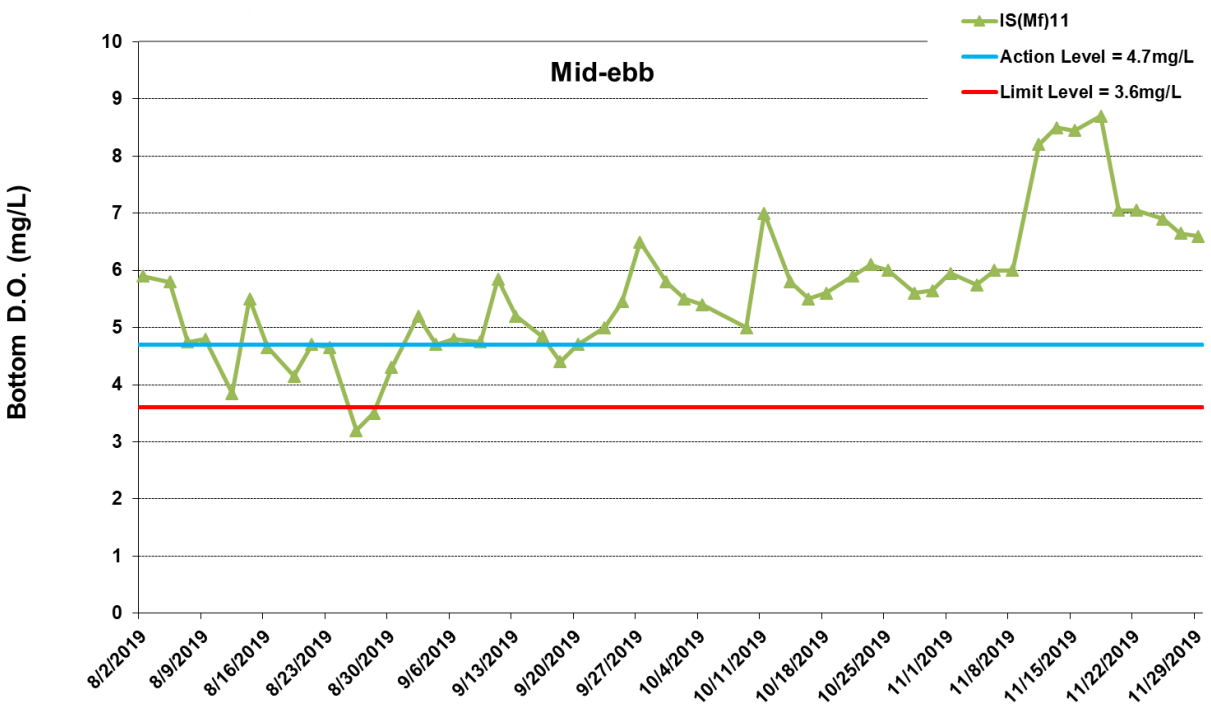


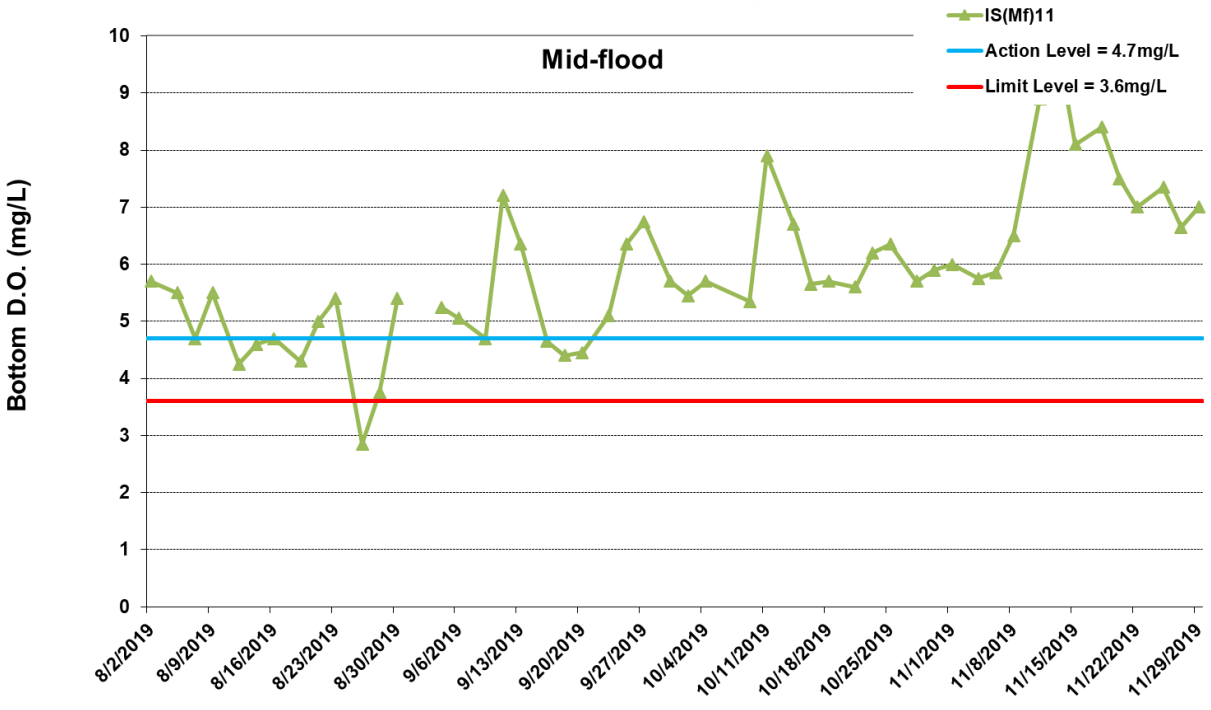


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G14 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2019 and 30 November 2019 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



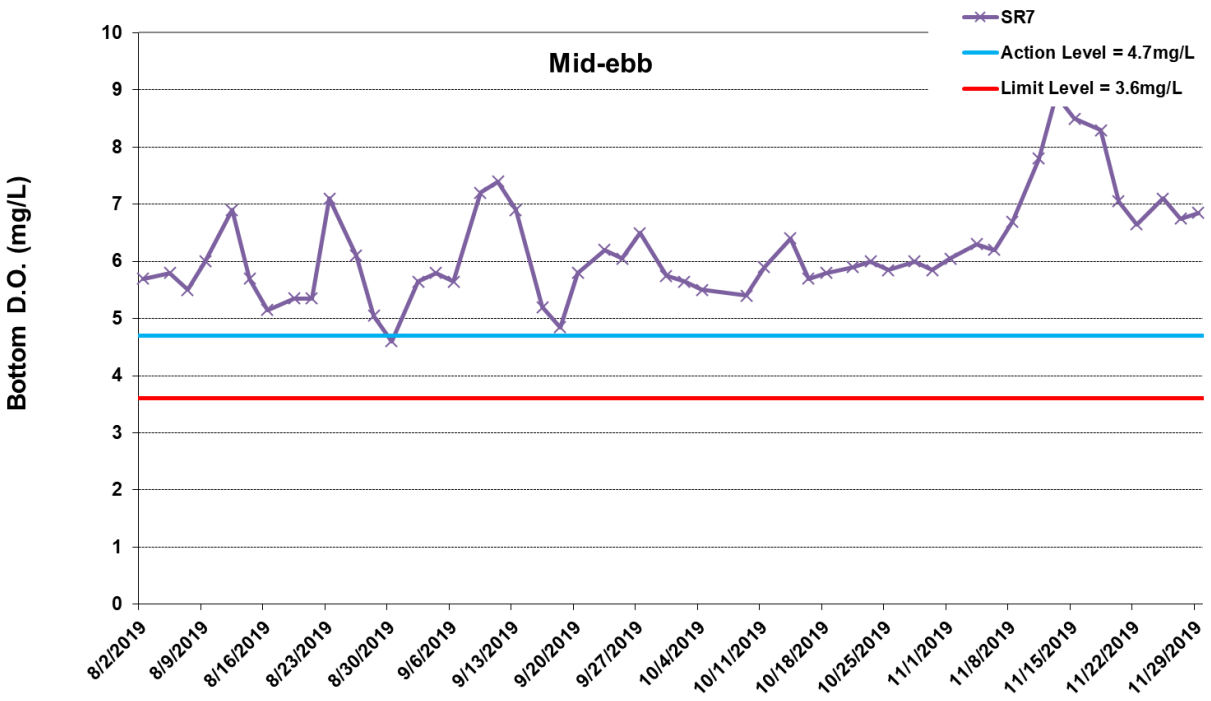


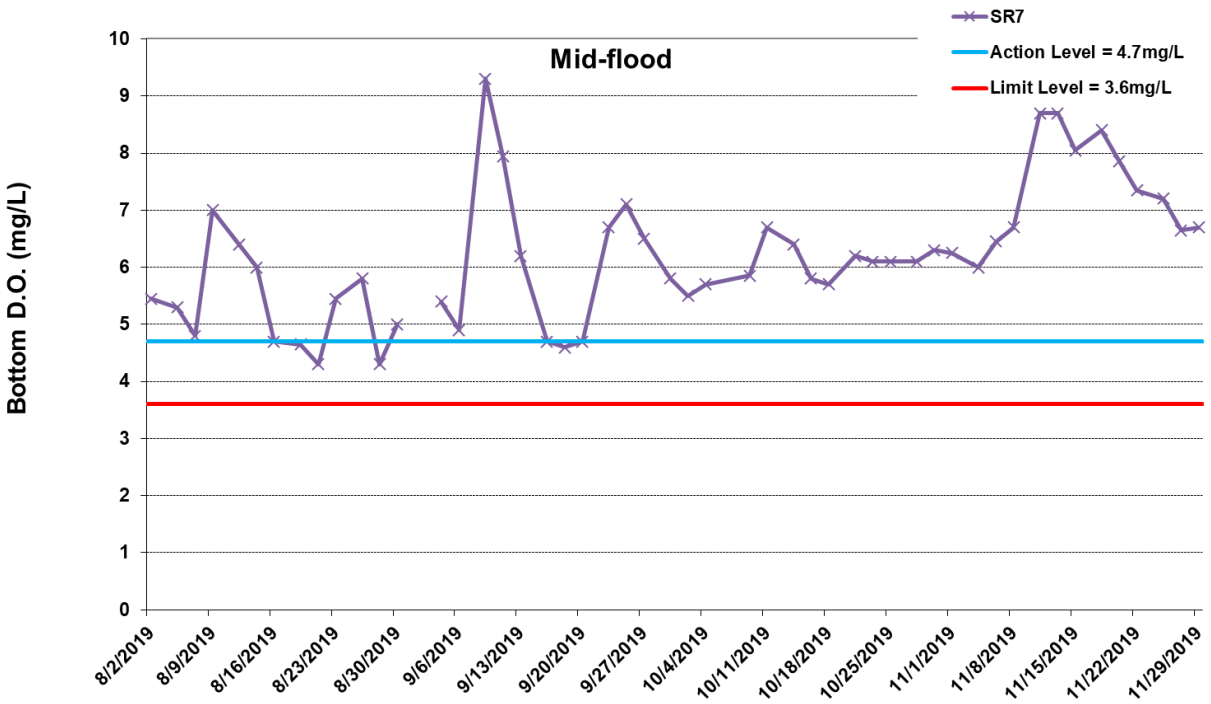
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G15 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



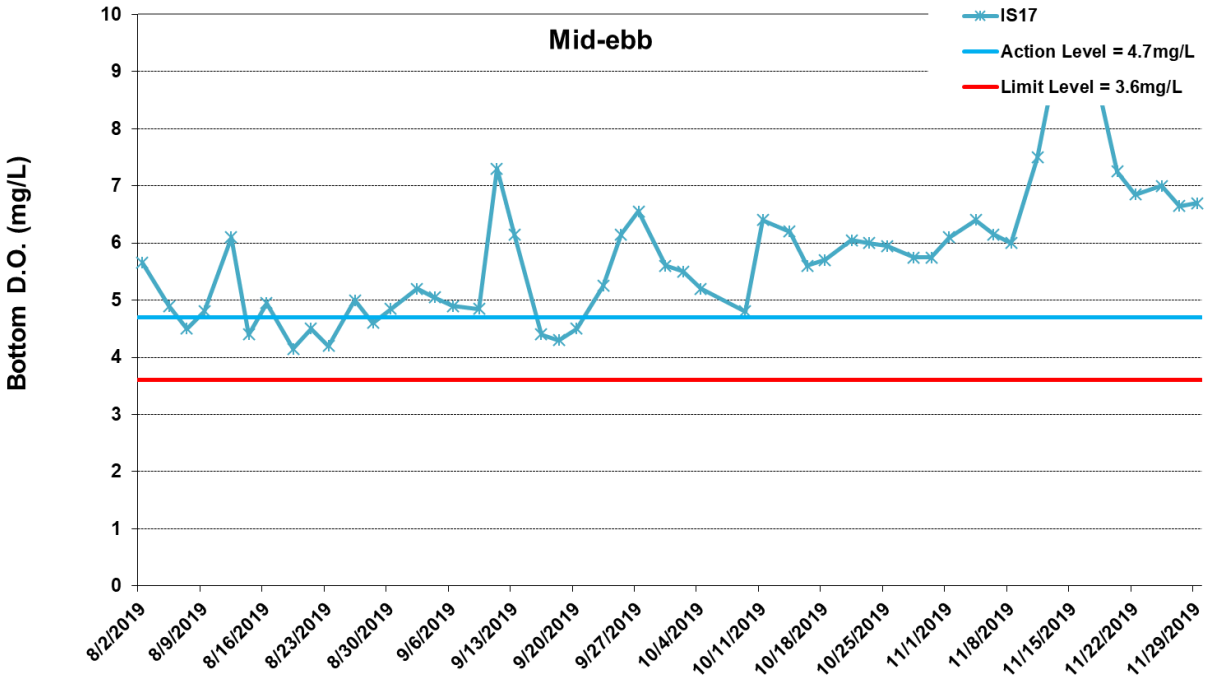


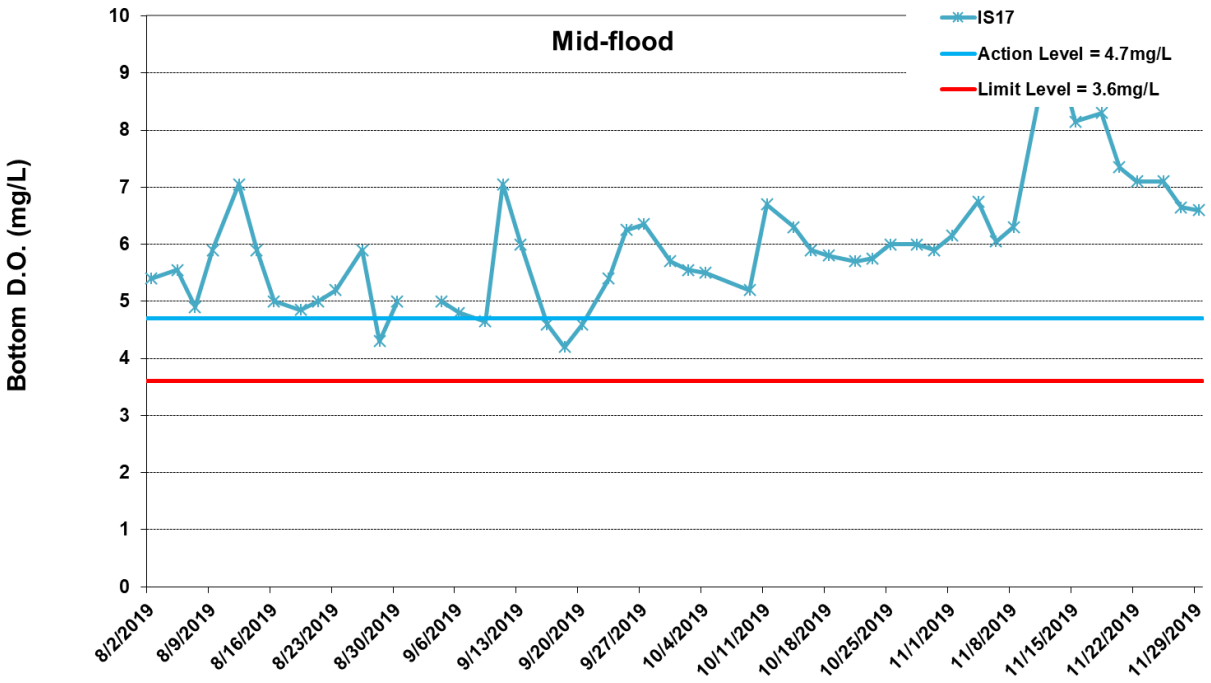
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



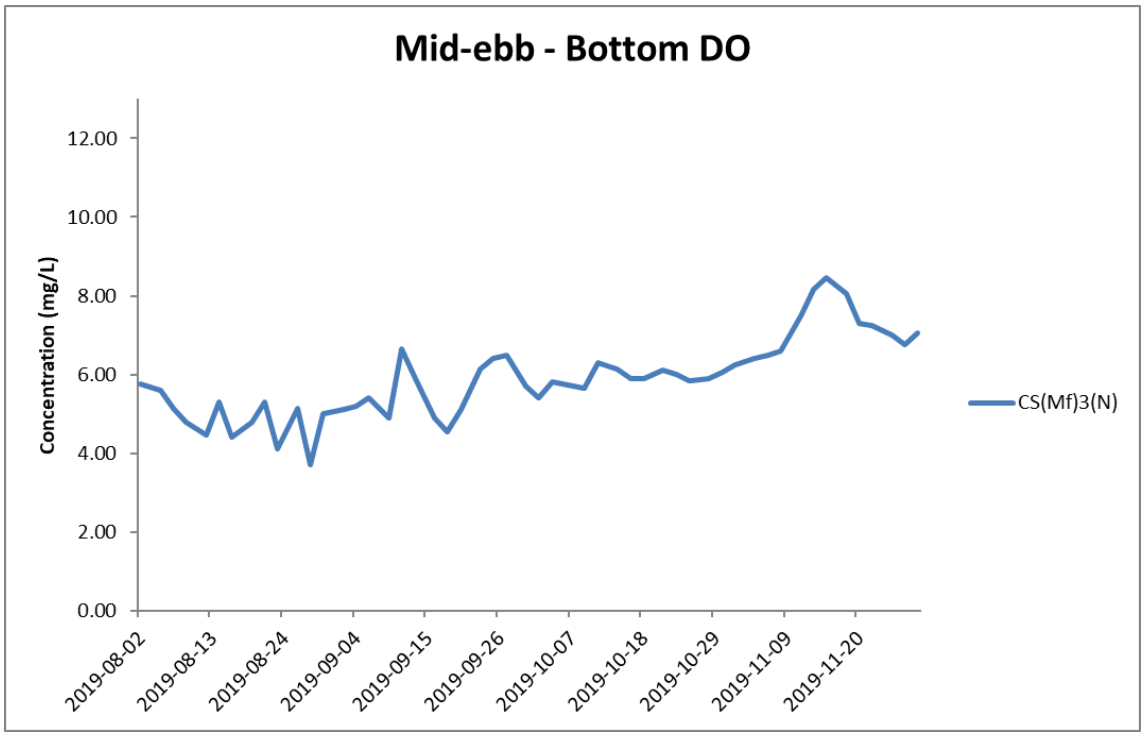


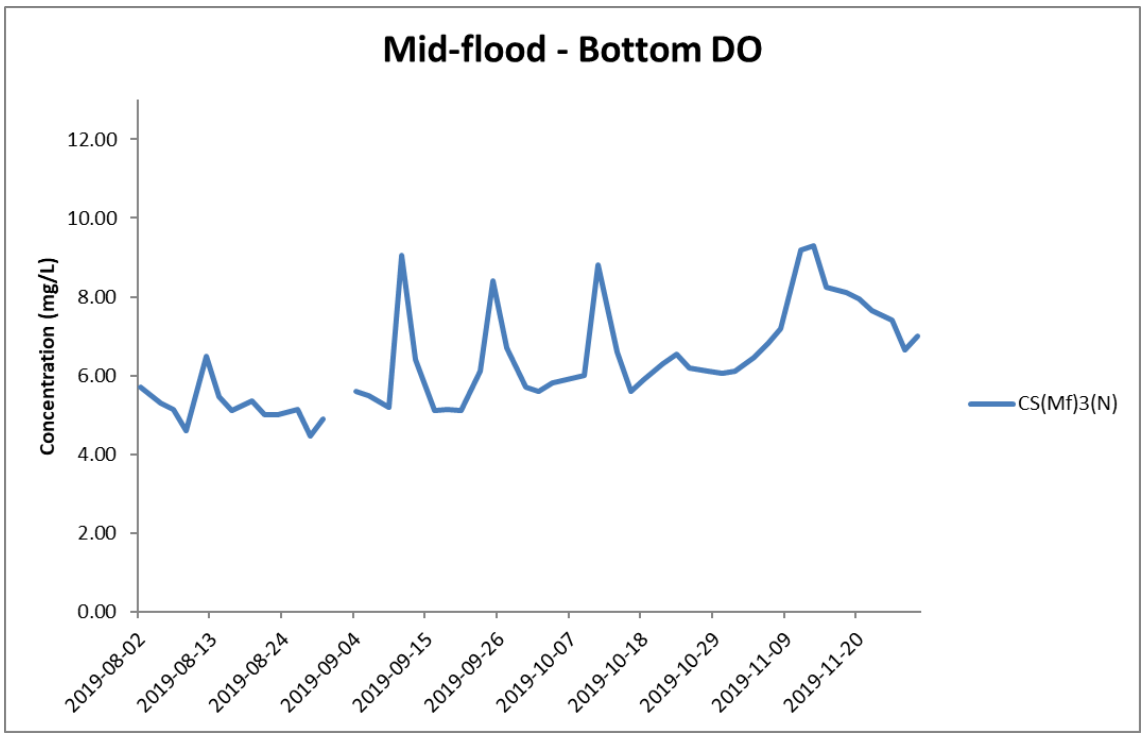
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

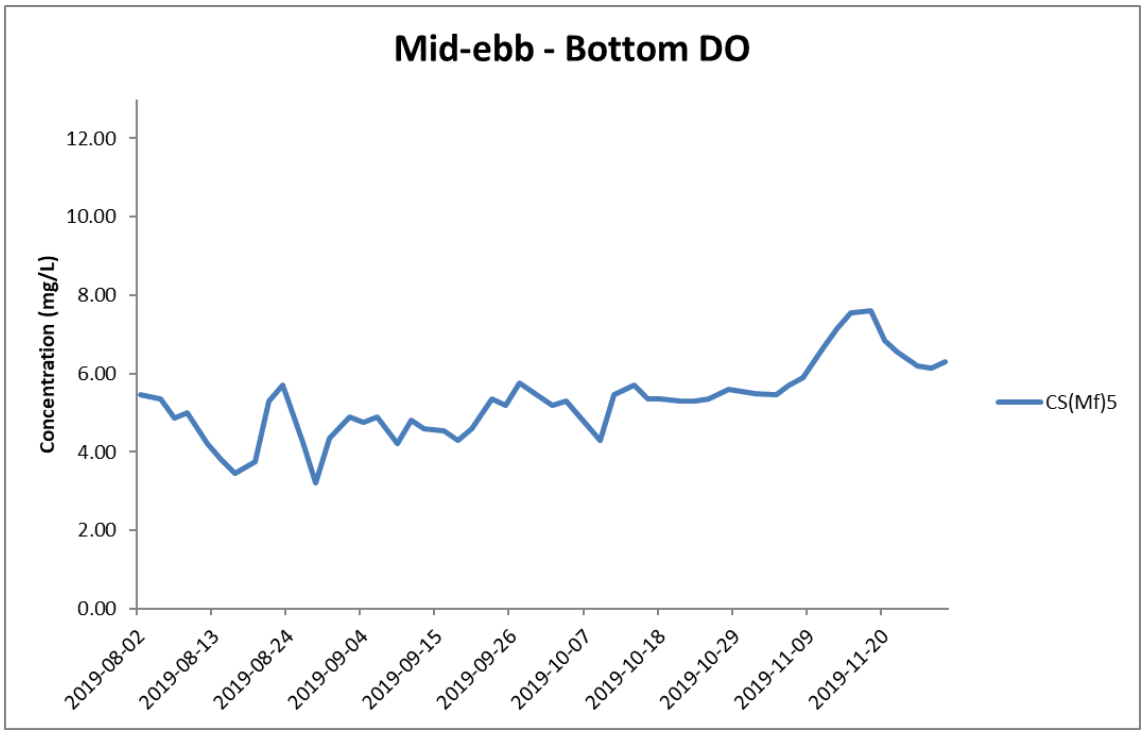


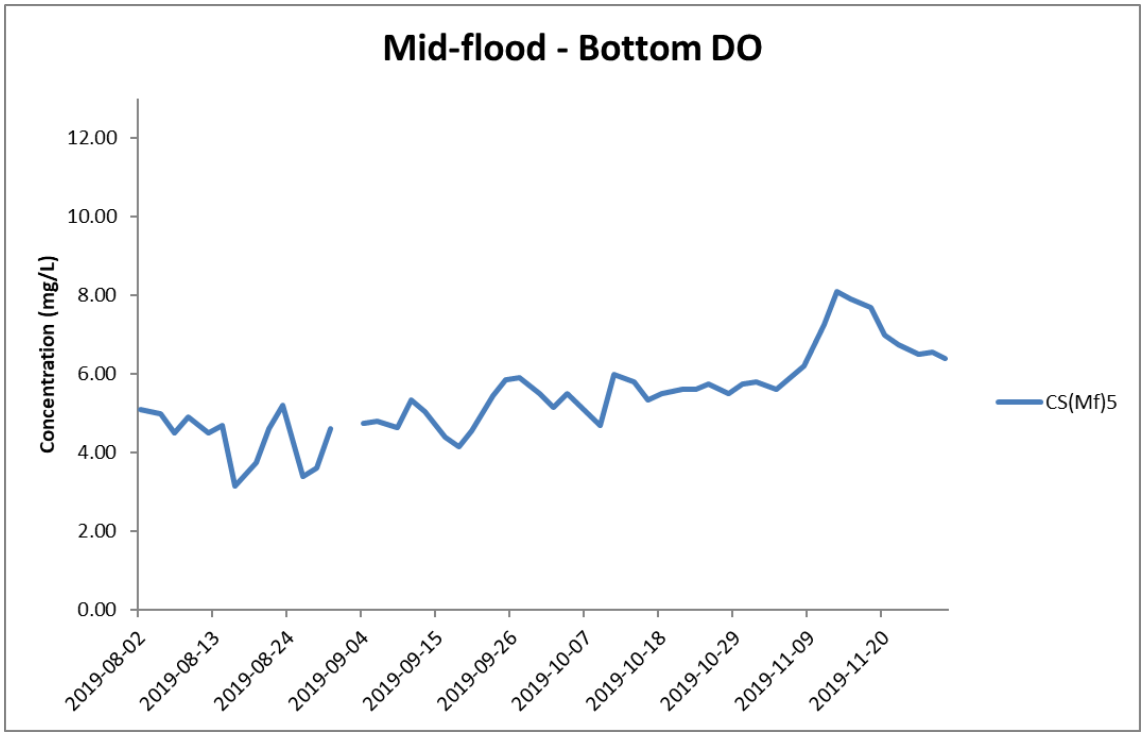


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

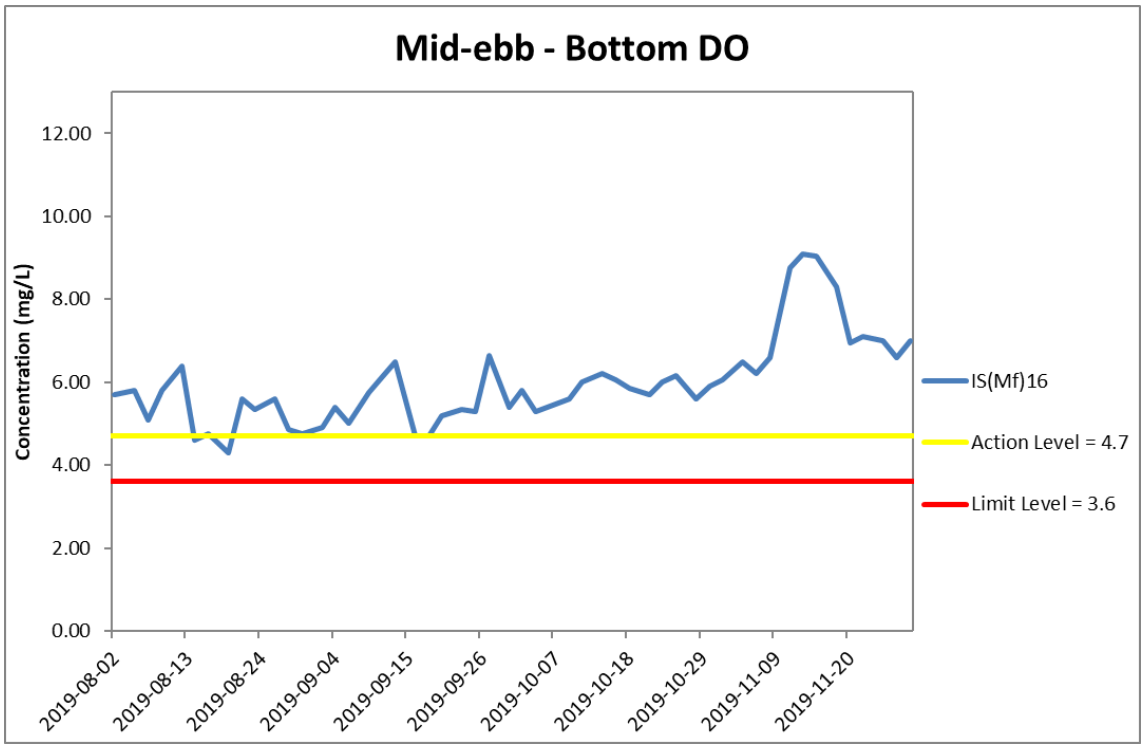


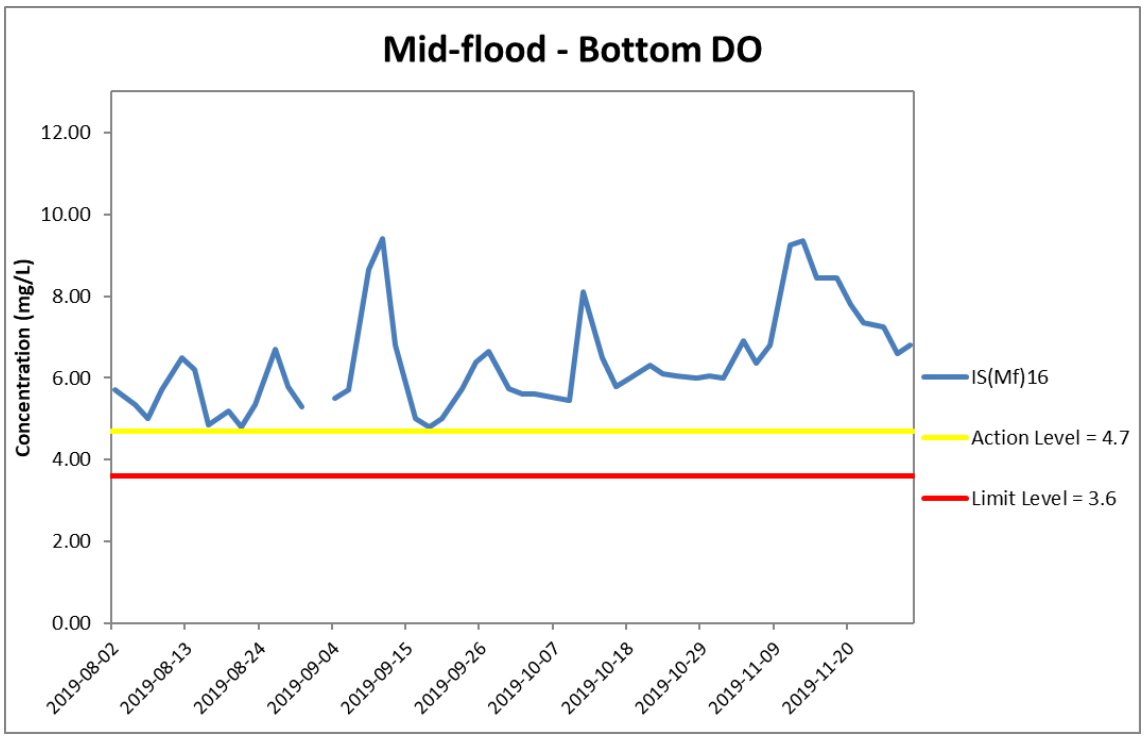


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

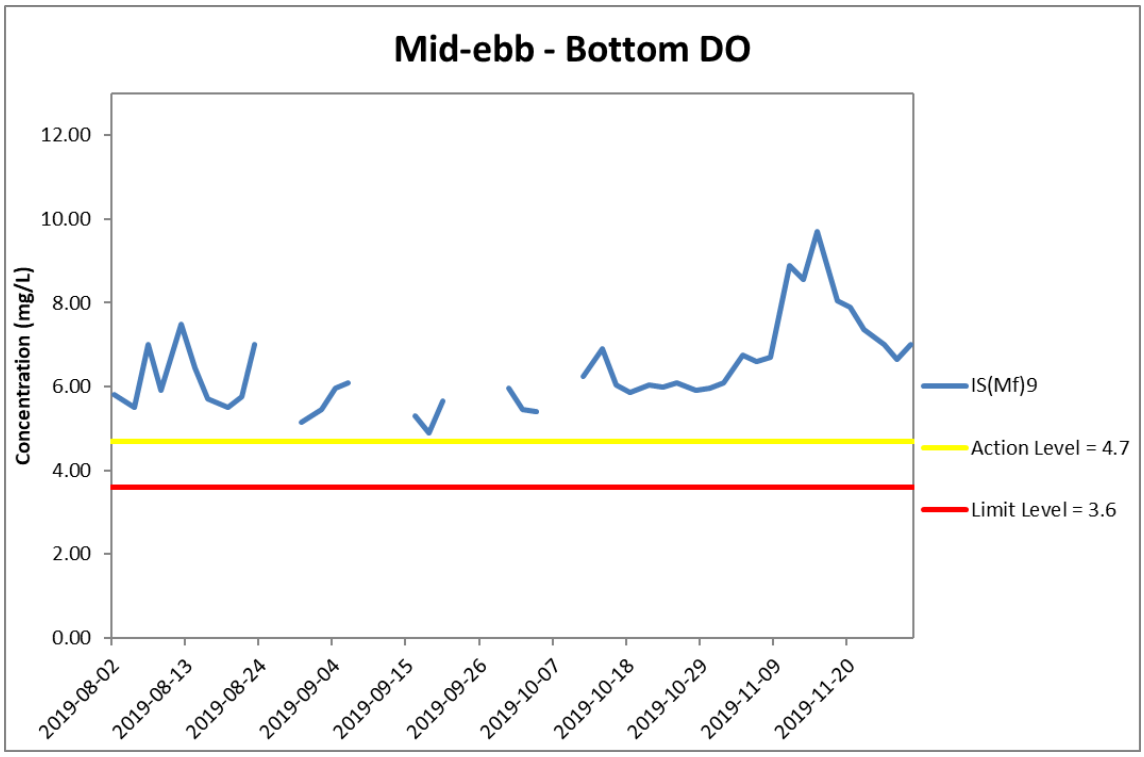


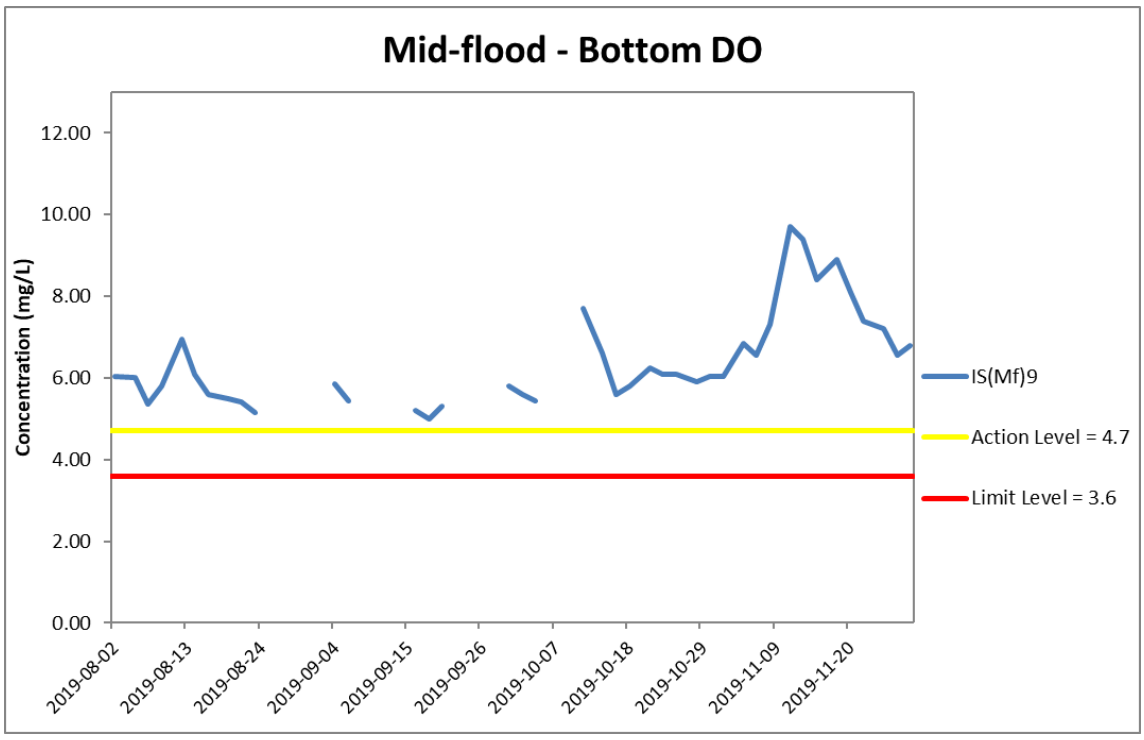


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

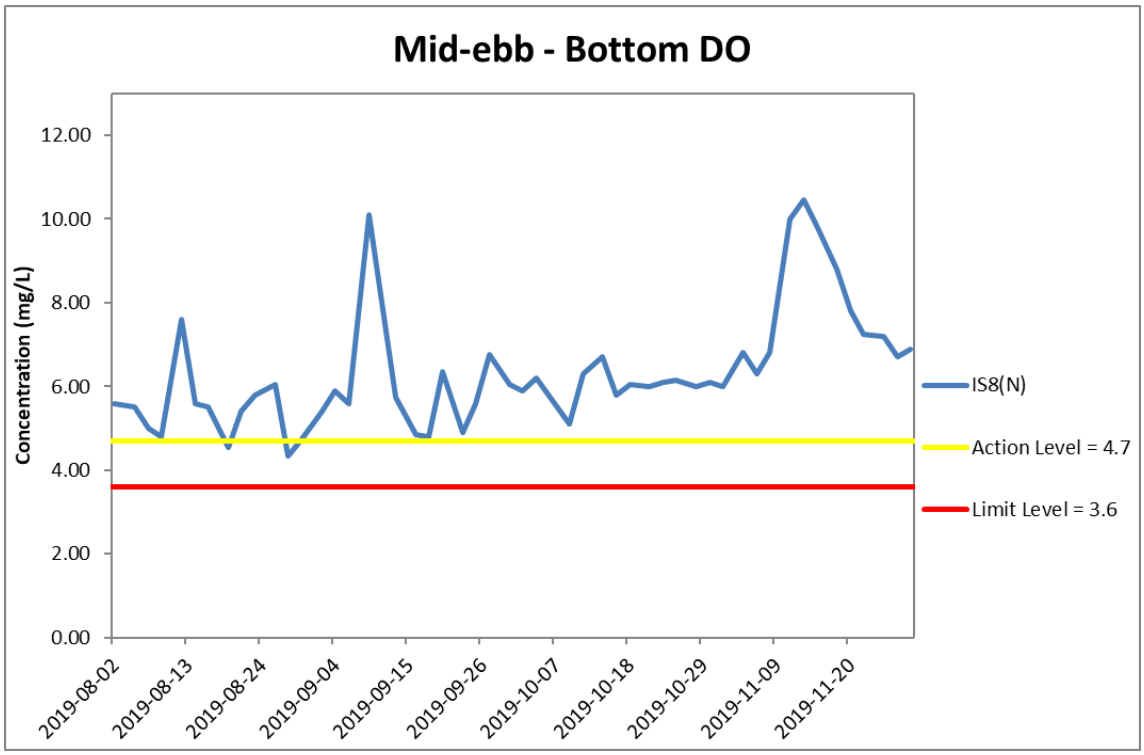


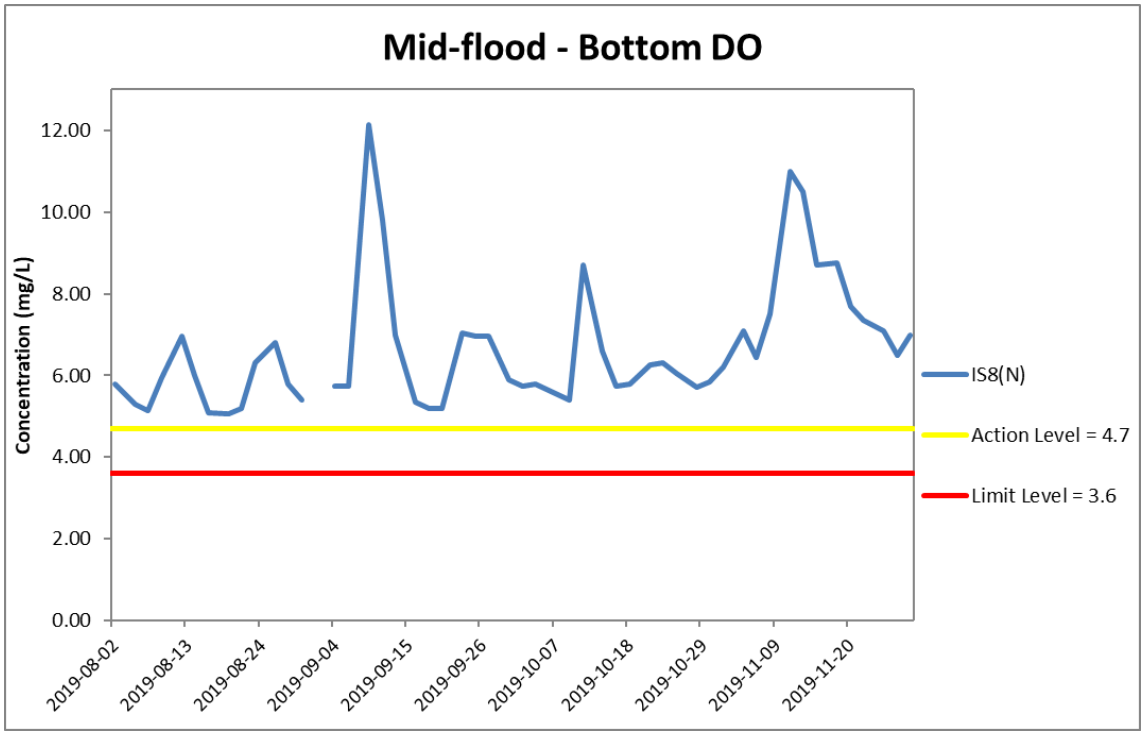


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G21 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

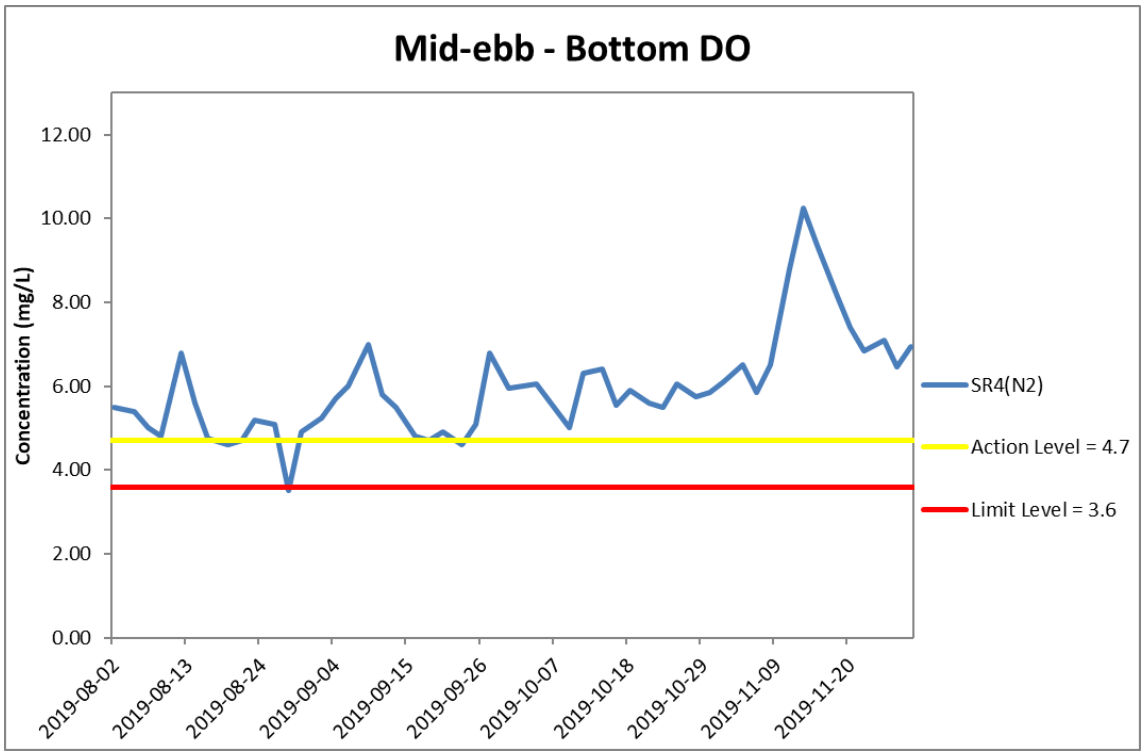


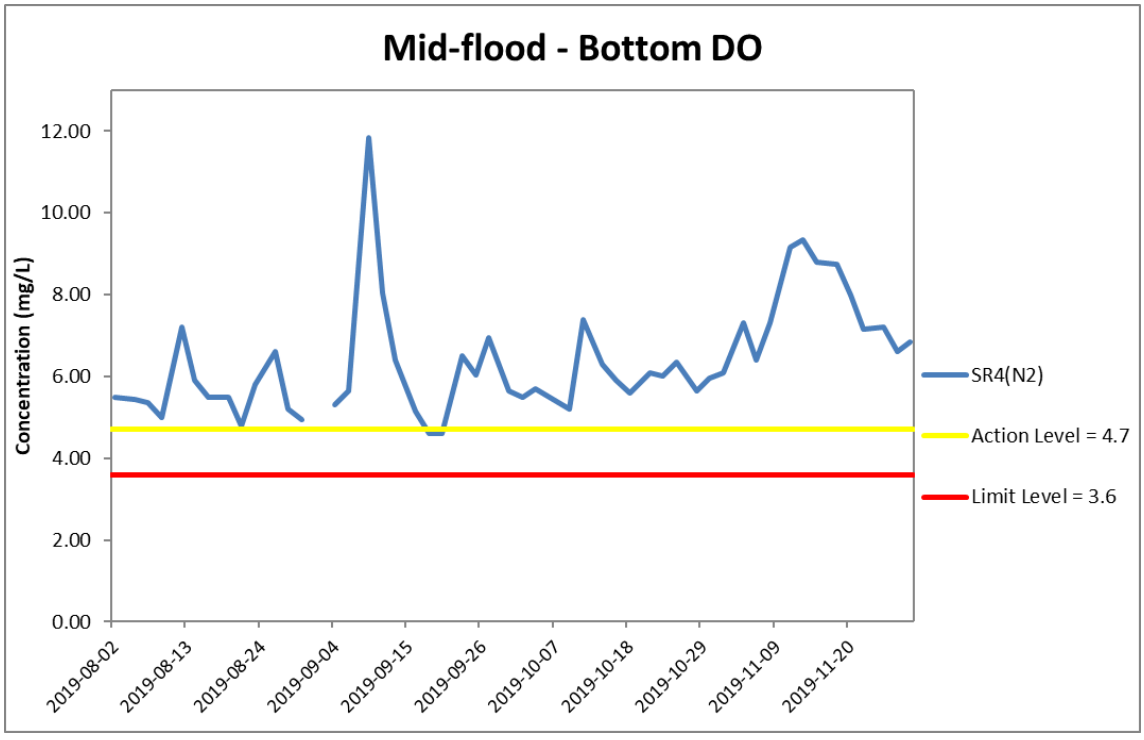


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G22 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

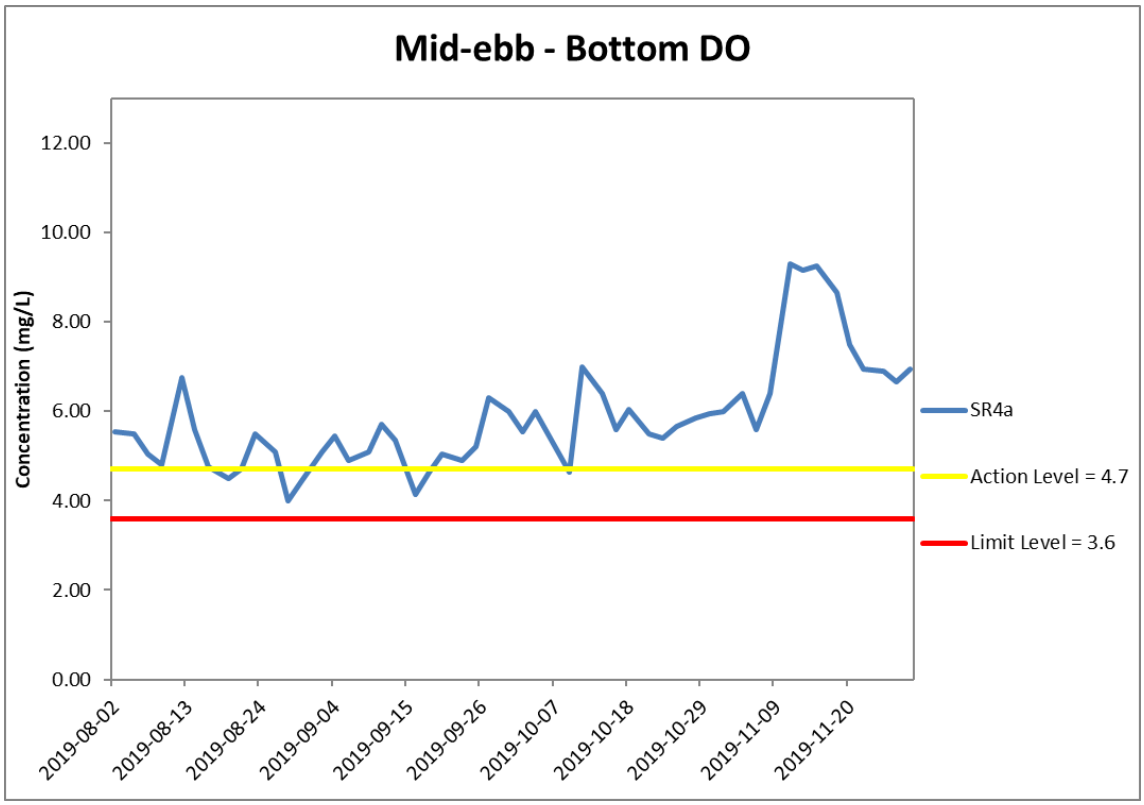


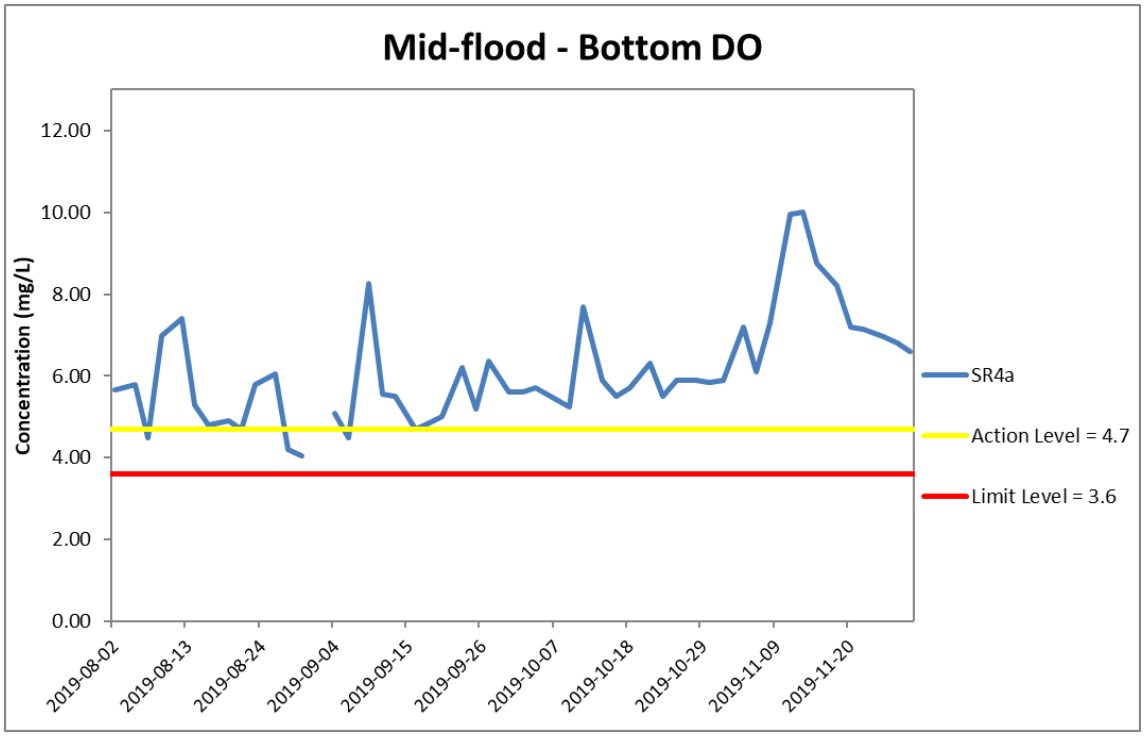


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G23 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

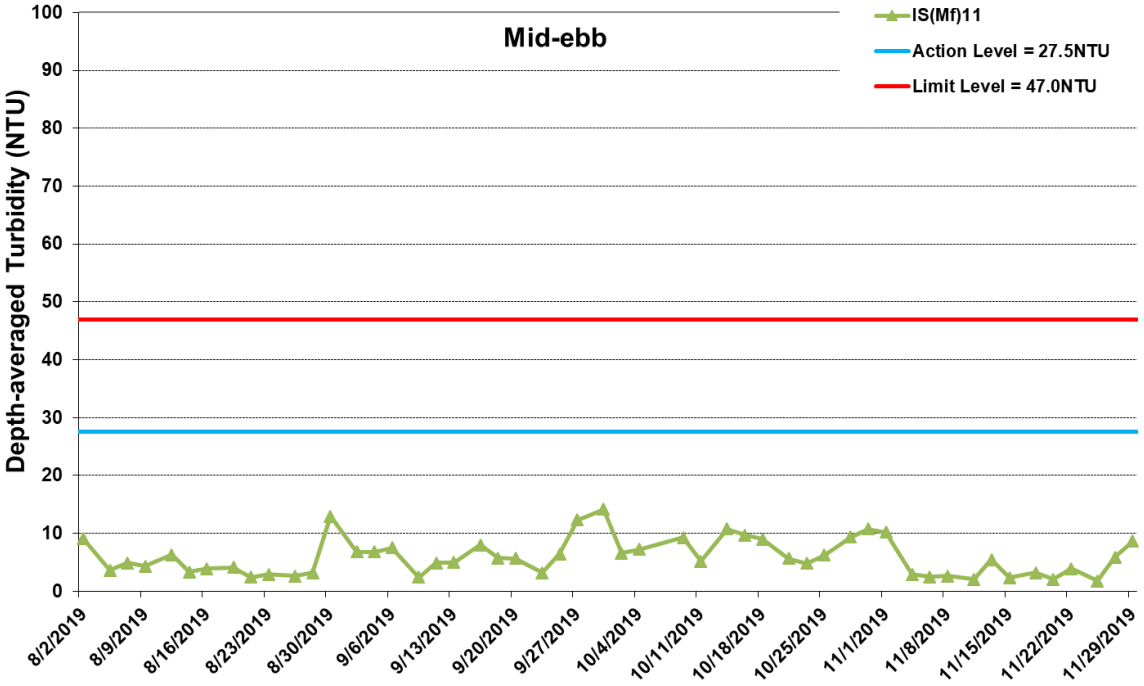


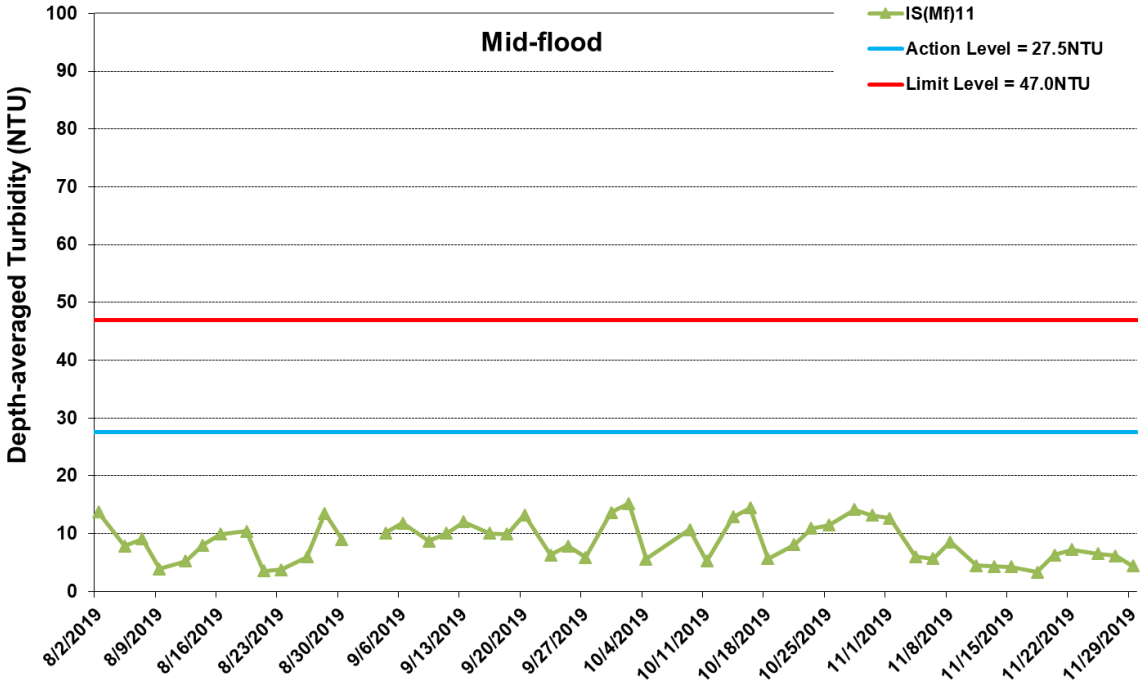


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G24 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2019 and 30 November 2019 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

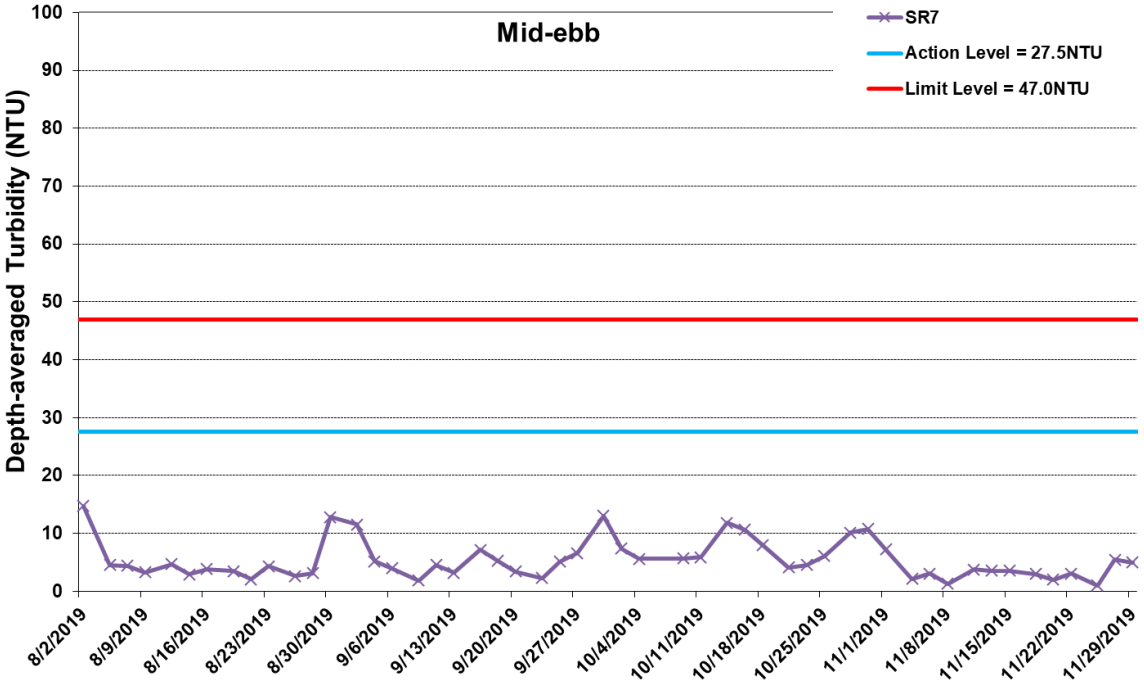


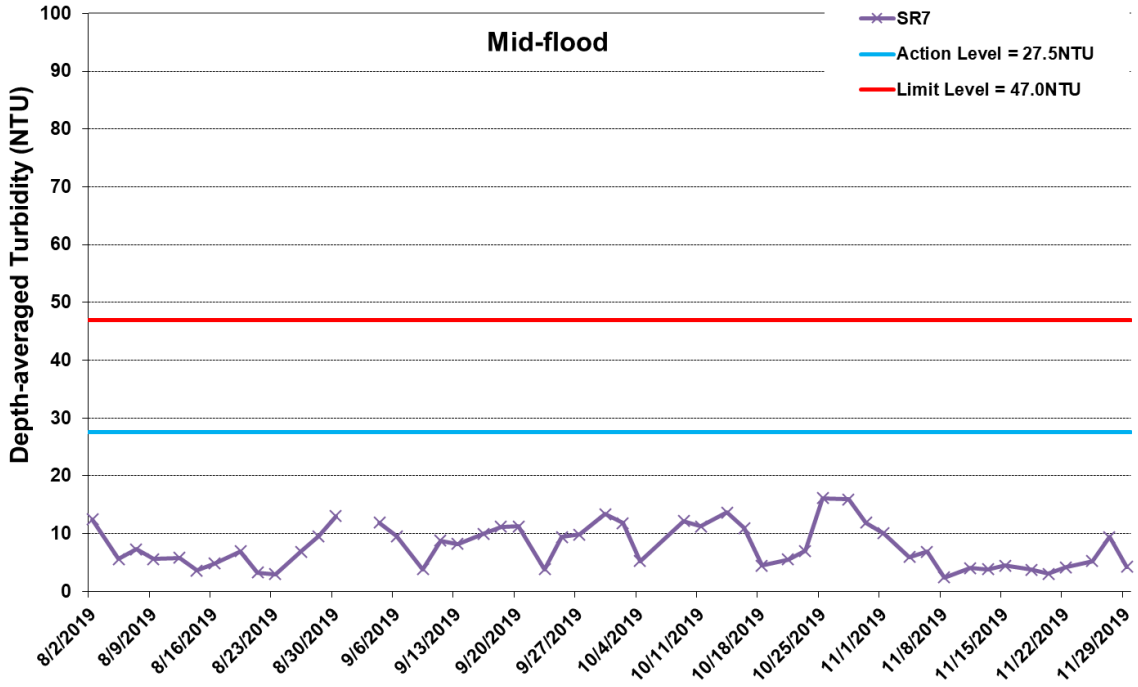


* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Figure G25 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

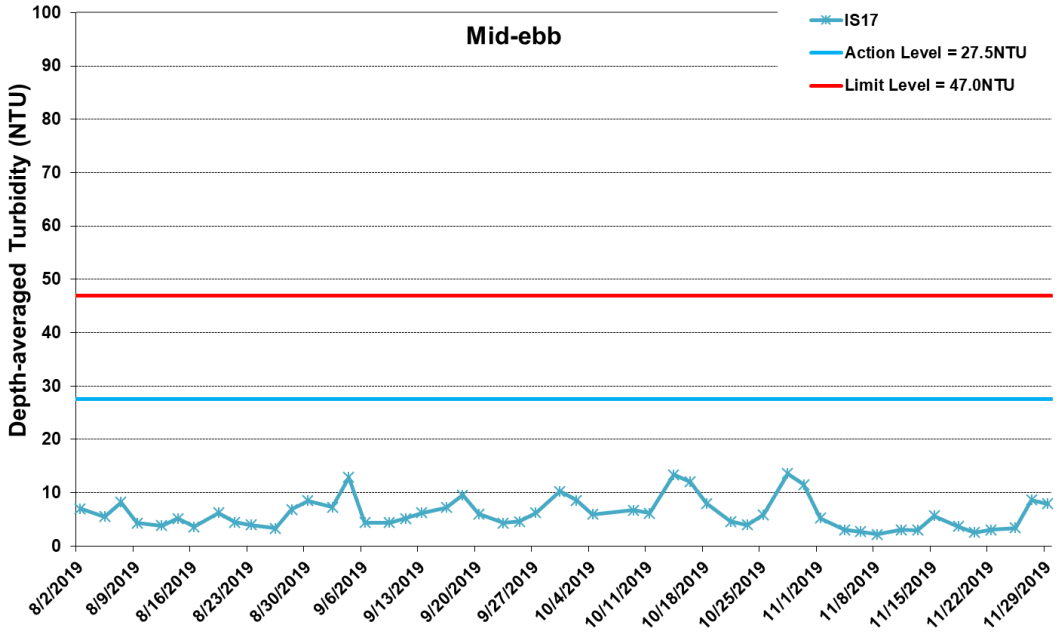


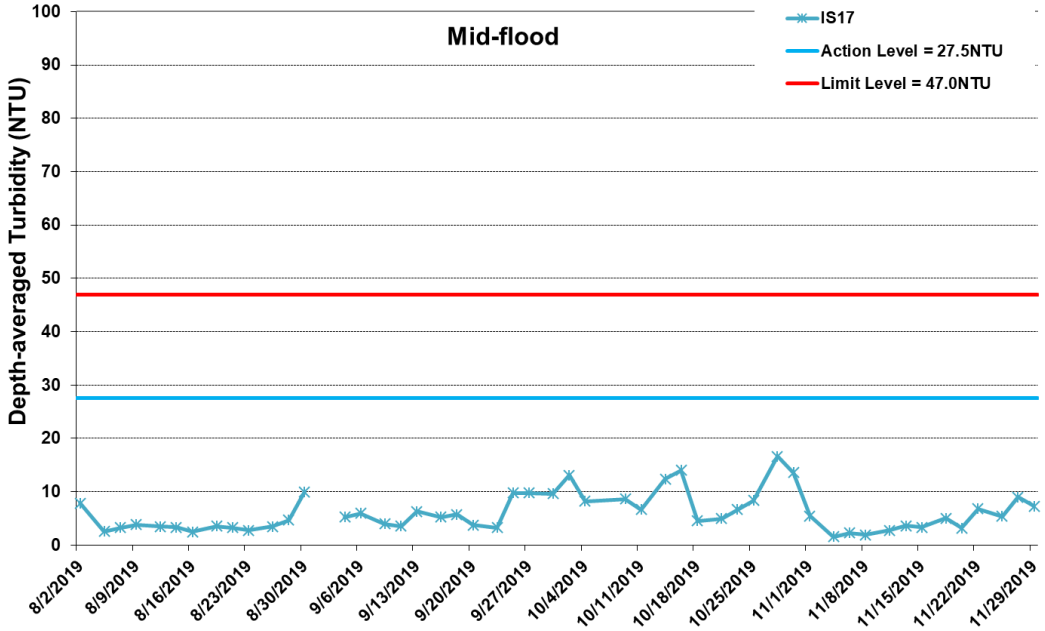


* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Figure G26 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

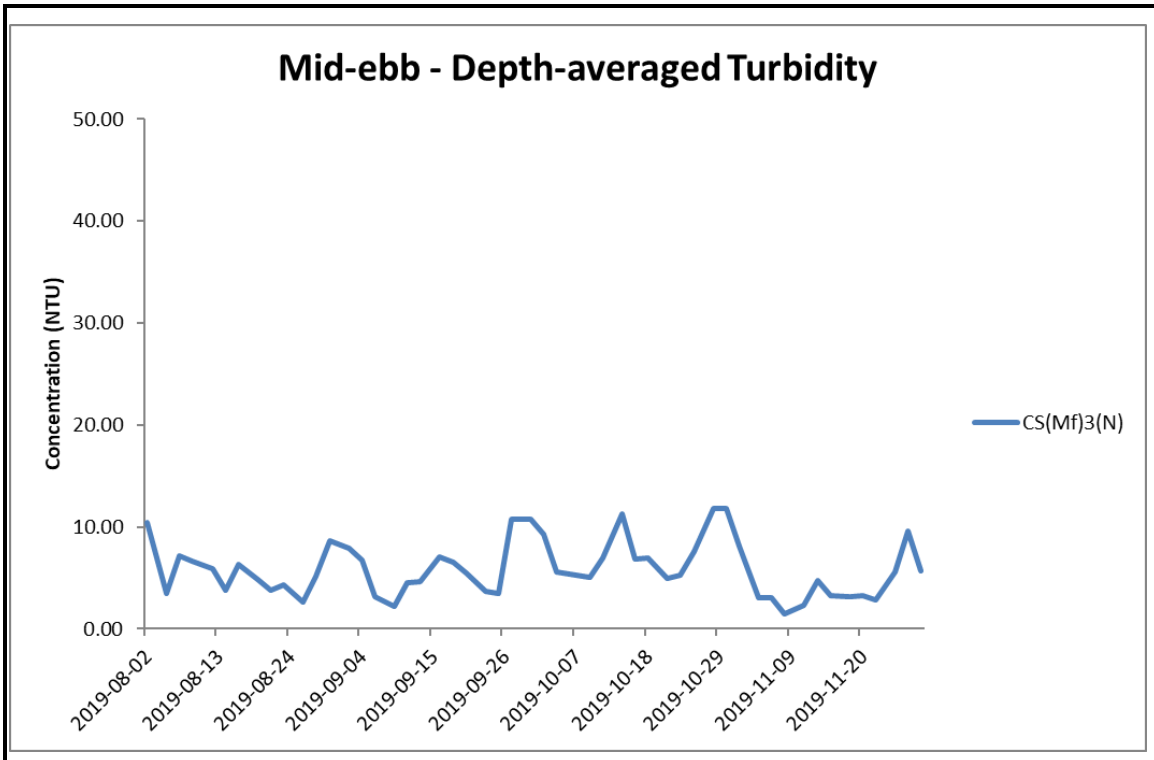




* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Figure G27 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



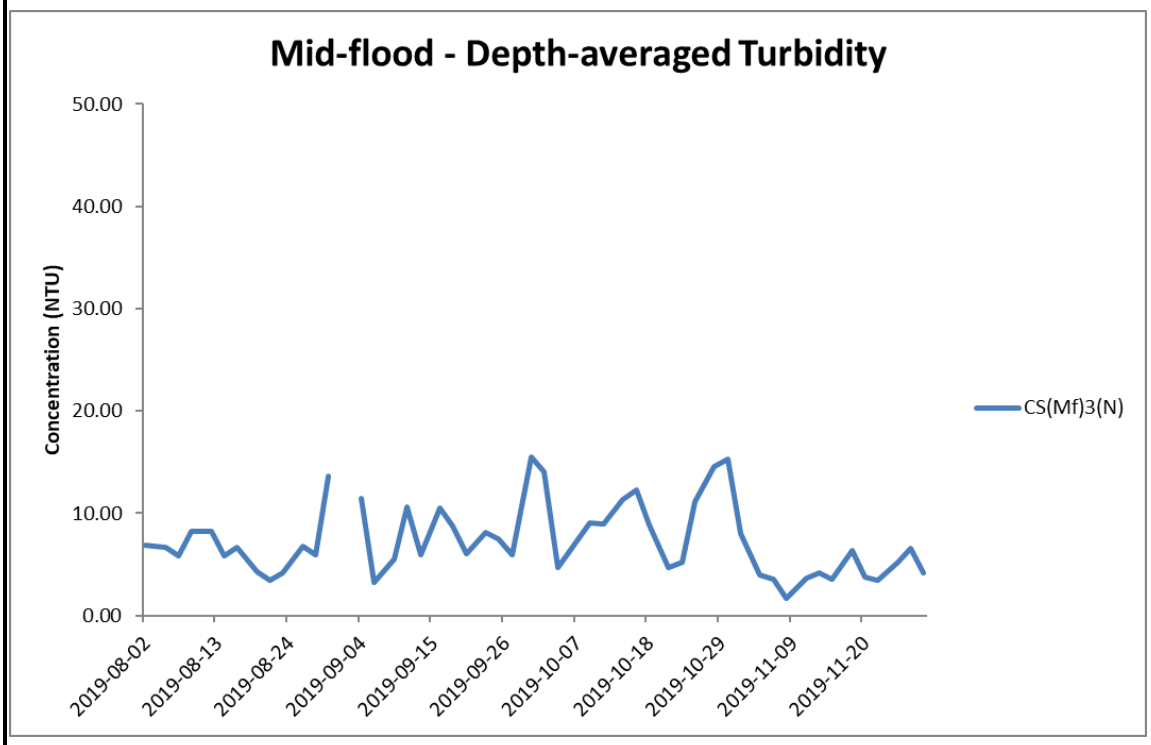
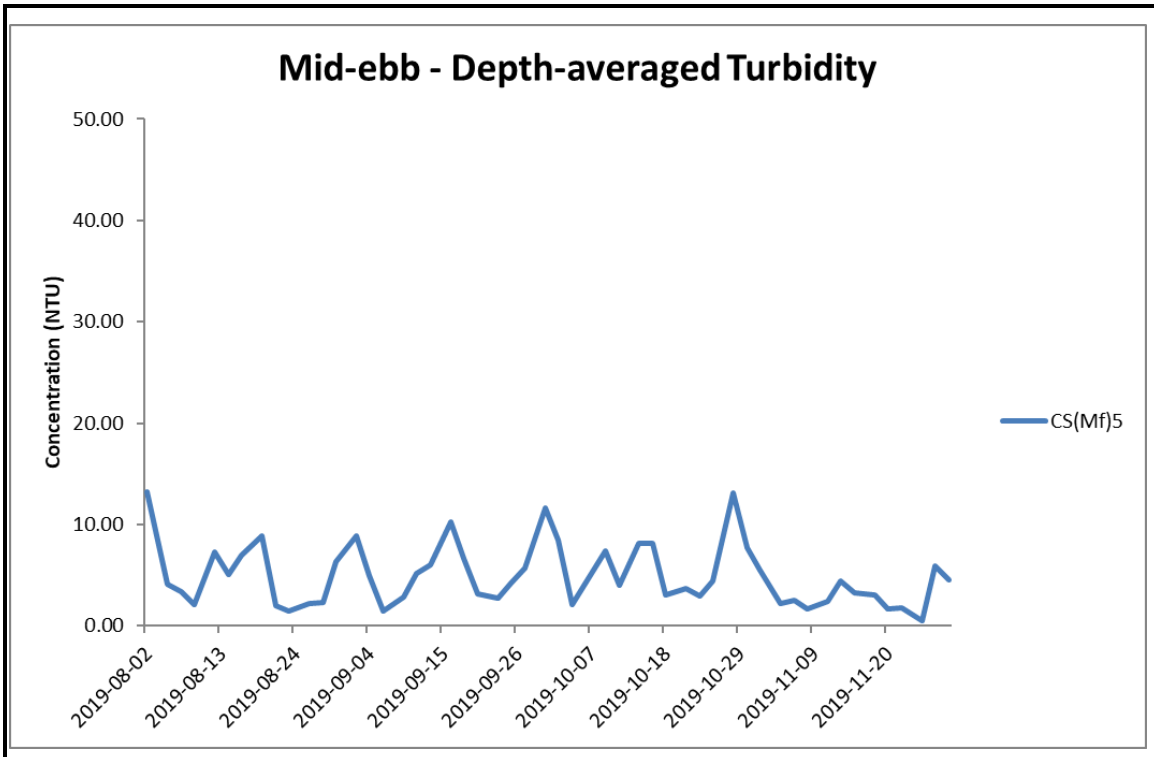


Figure G28 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



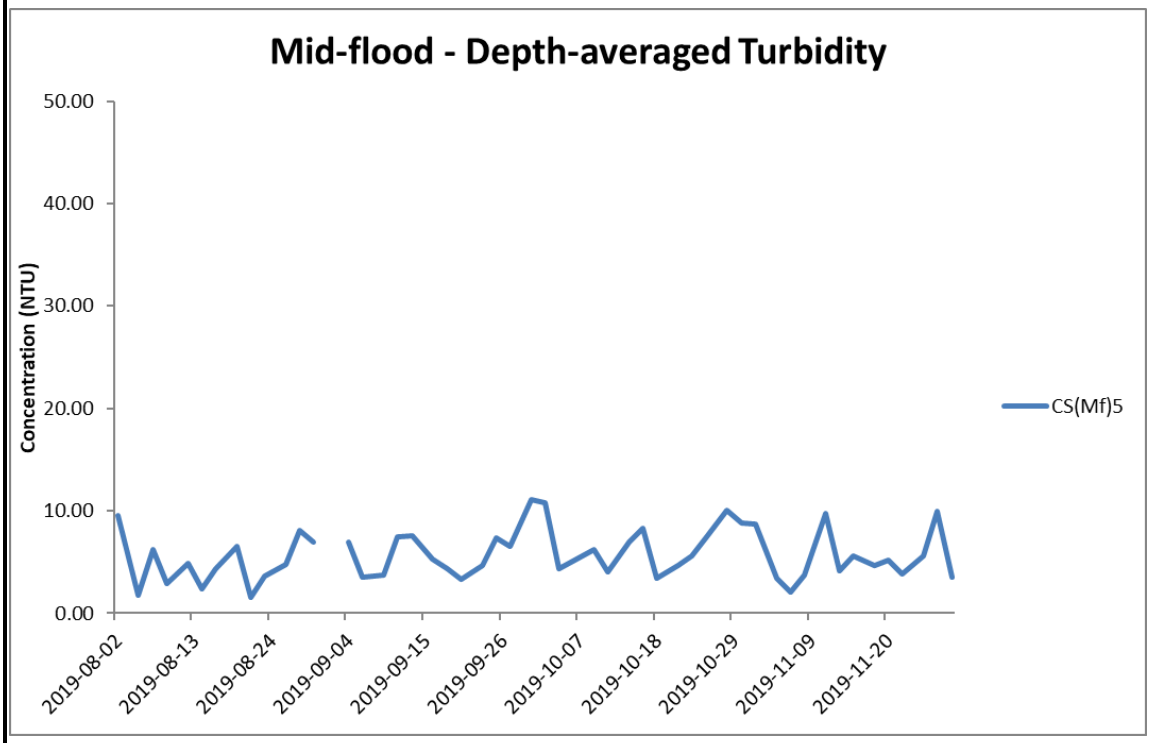
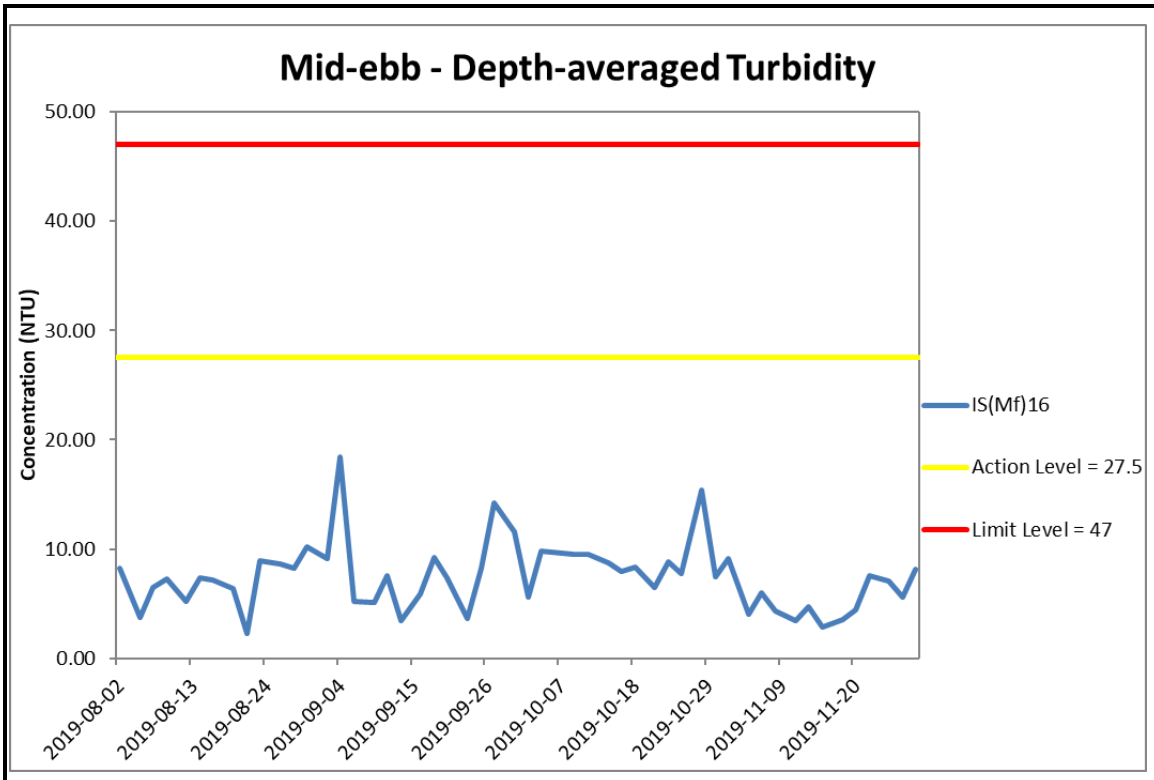


Figure G29 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



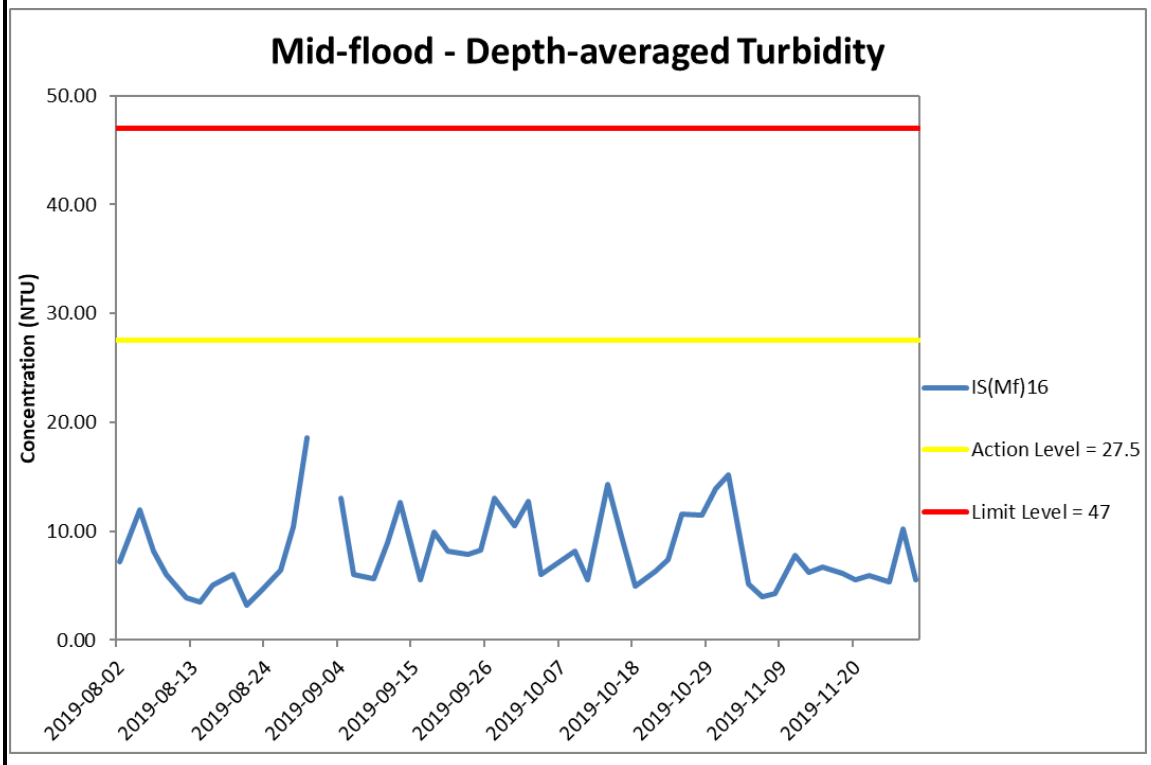
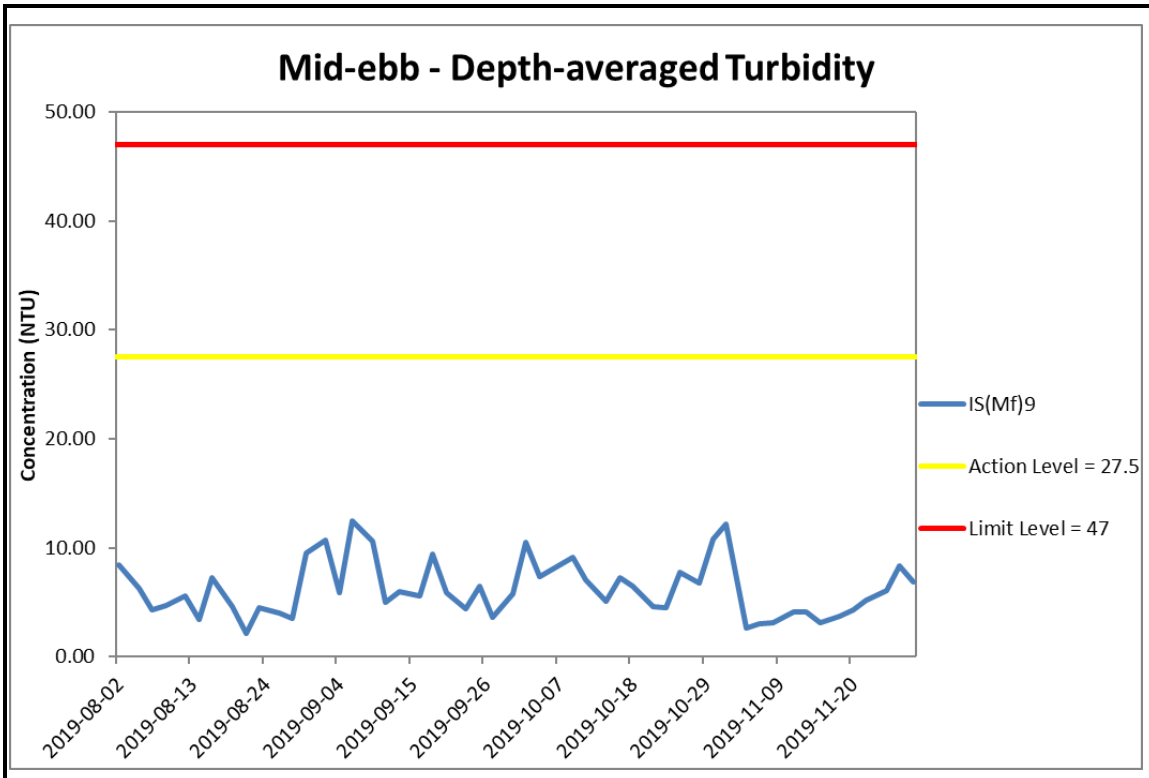


Figure G30 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



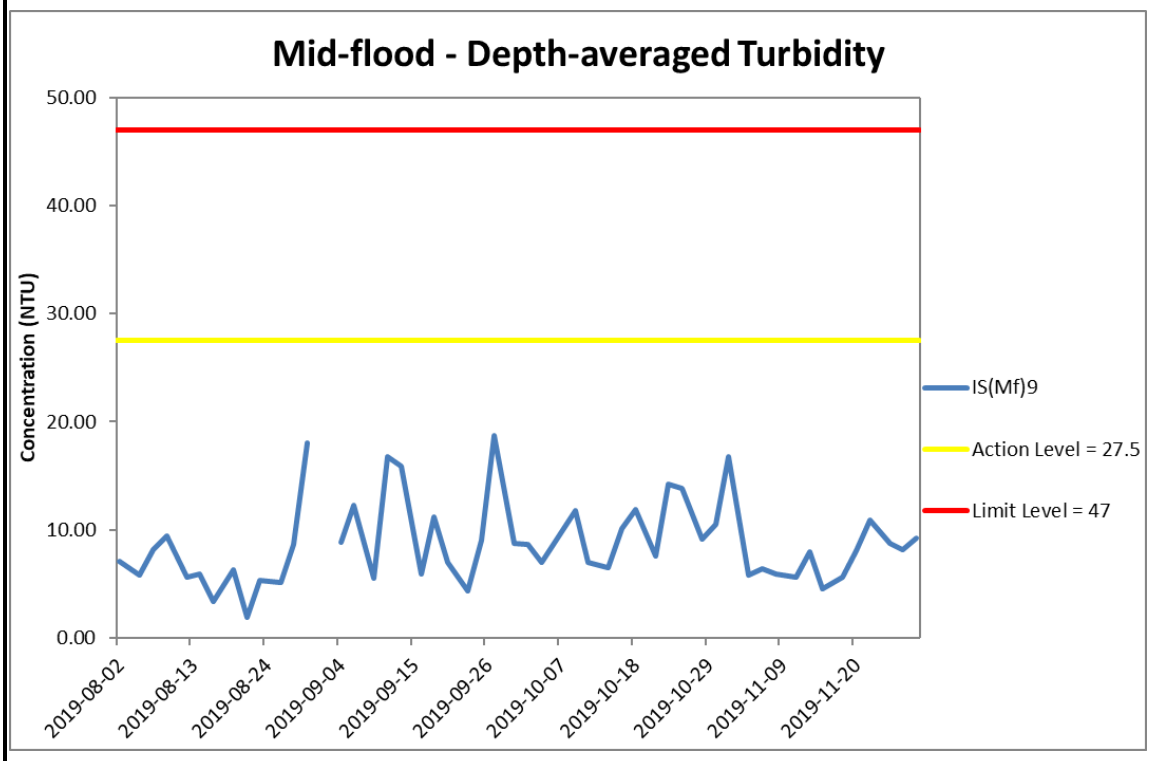


Figure G31 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

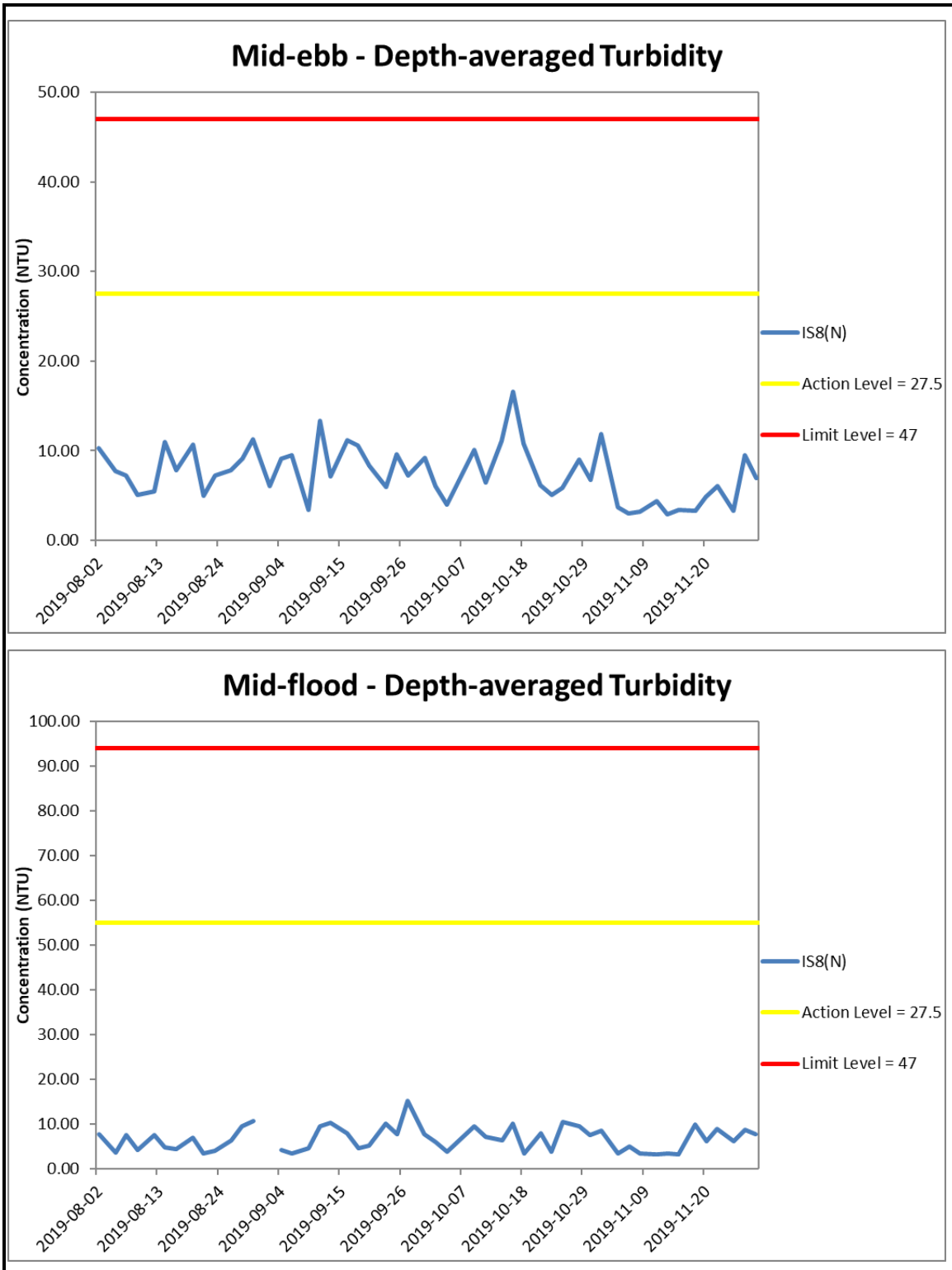
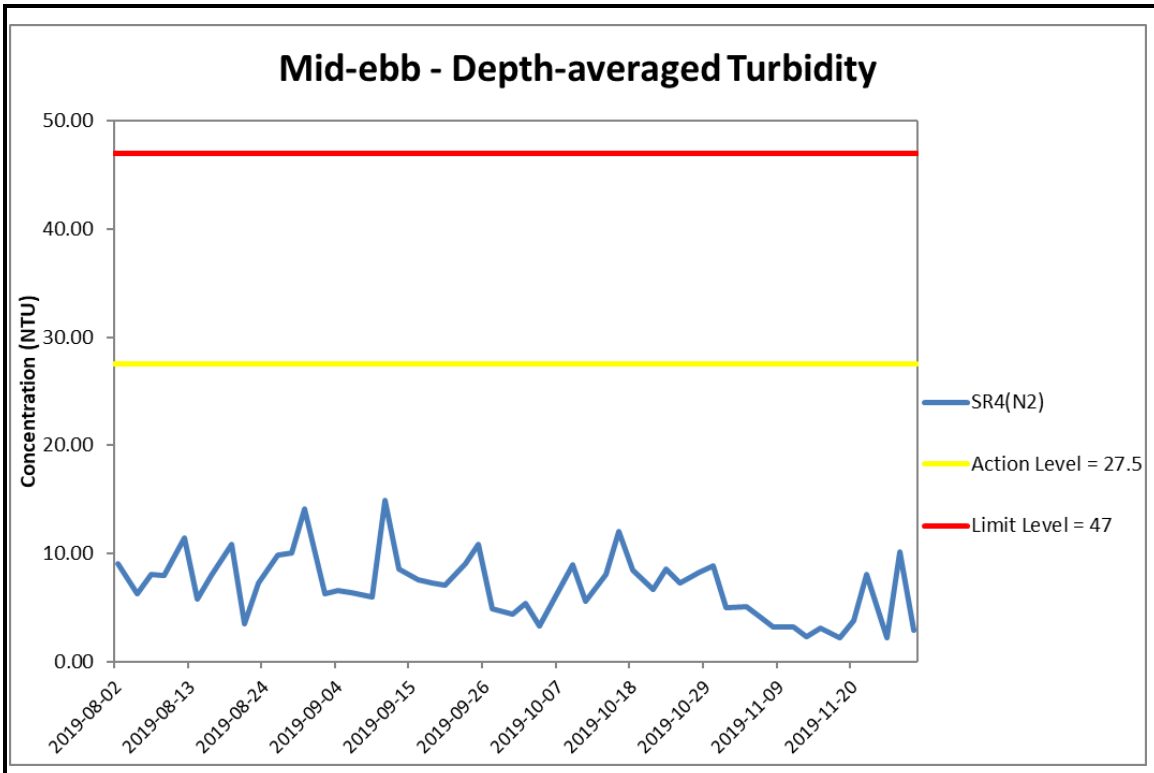


Figure G32 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



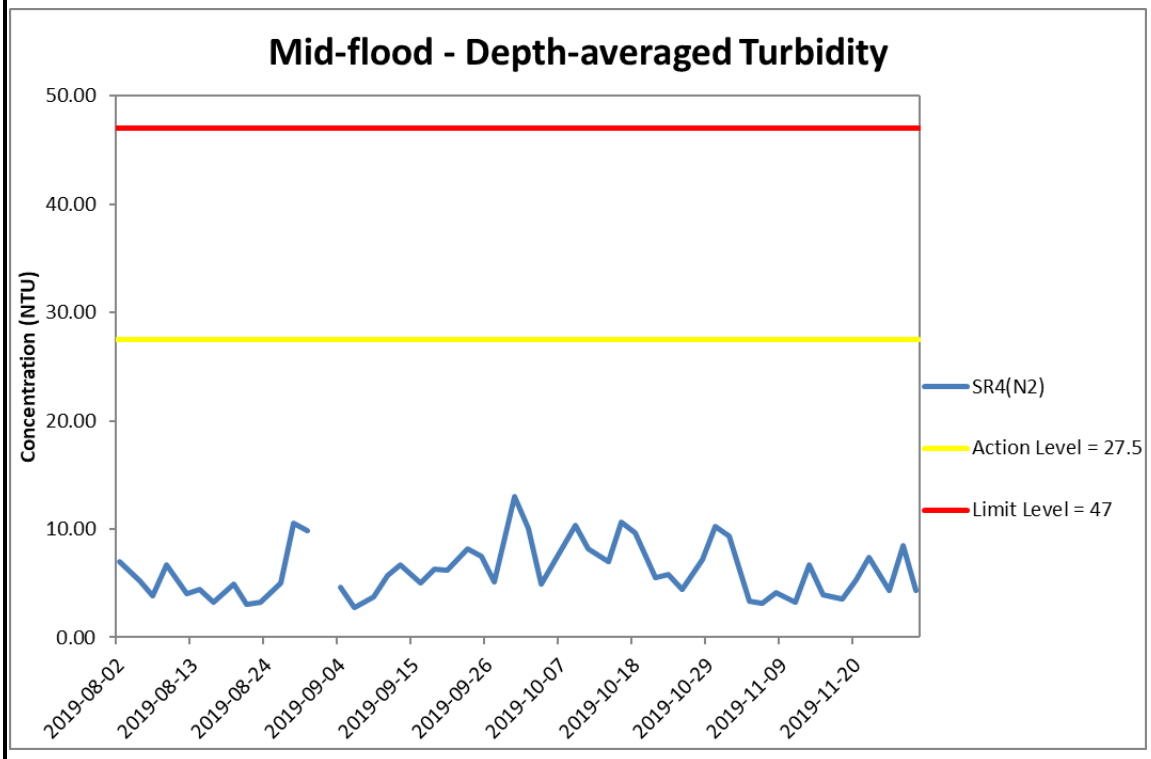
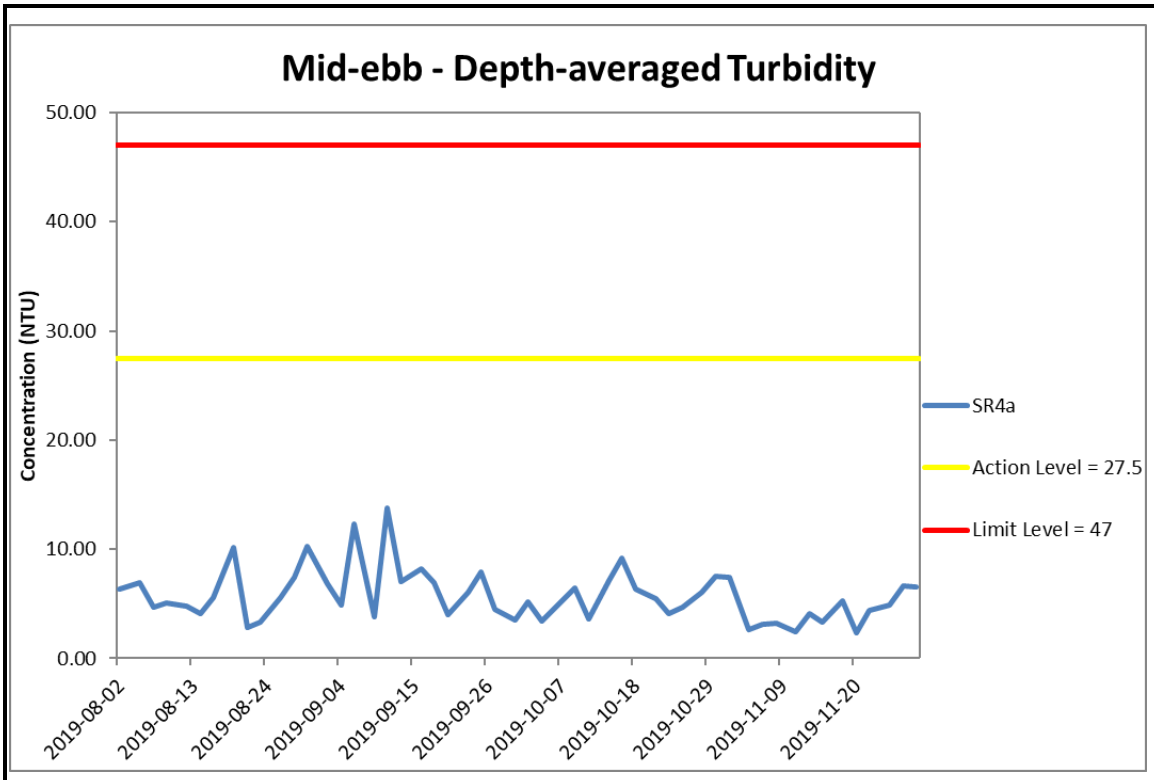


Figure G33 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



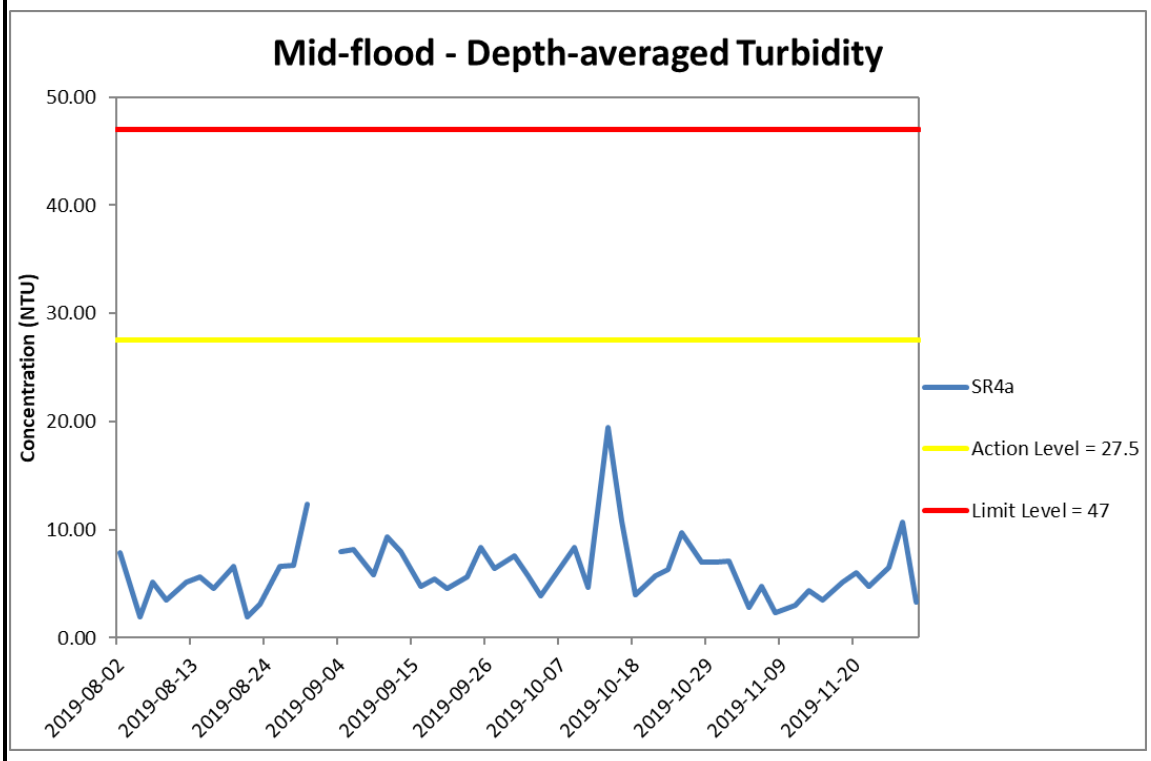
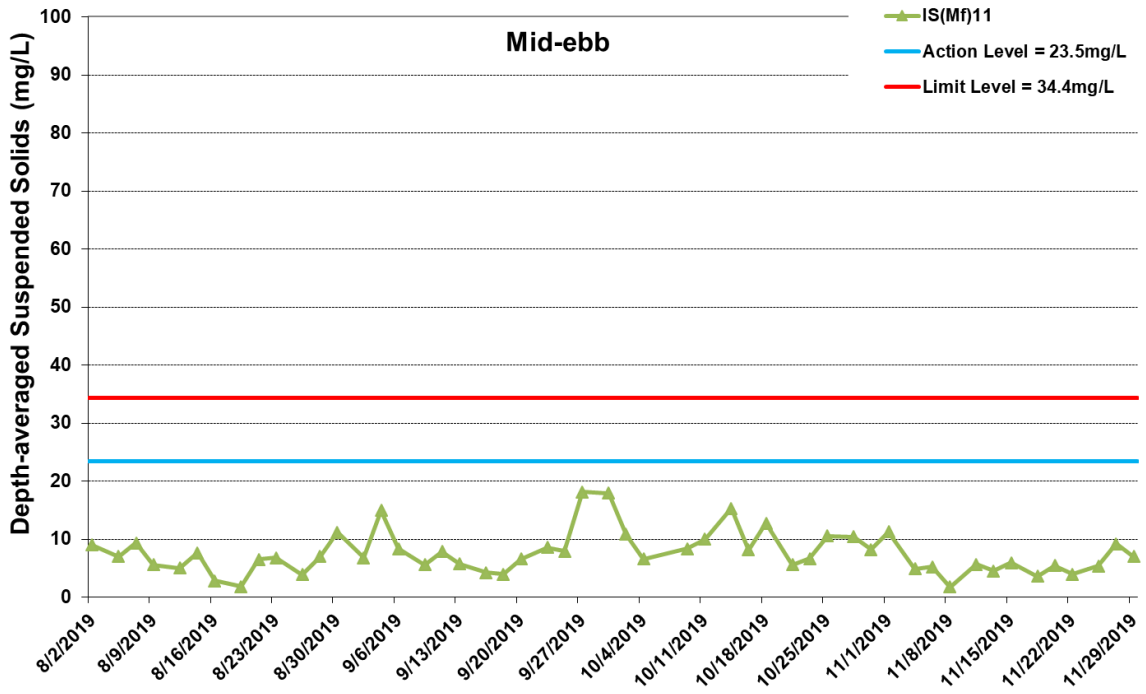
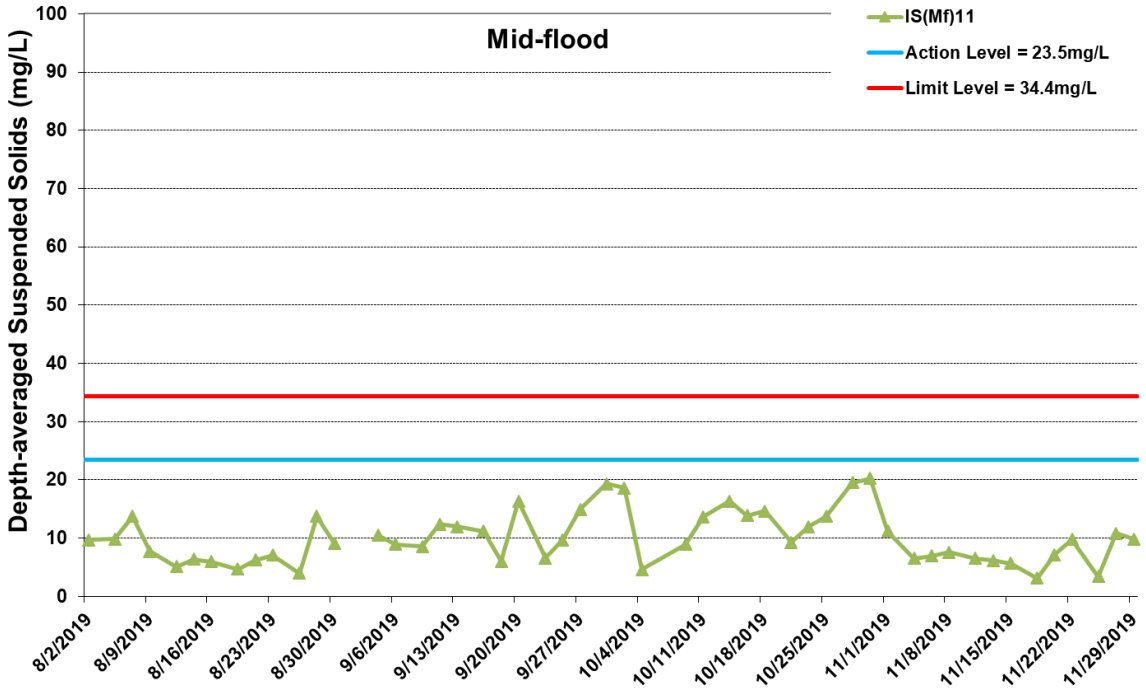


Figure G34 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2019 and 30 November 2019 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

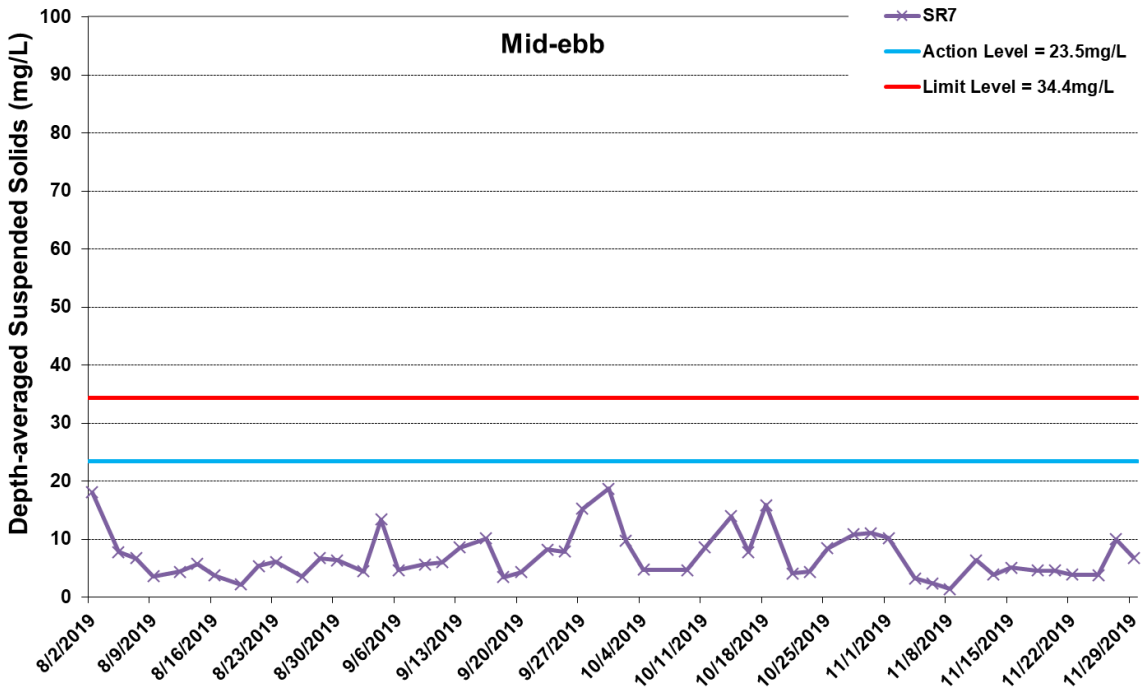


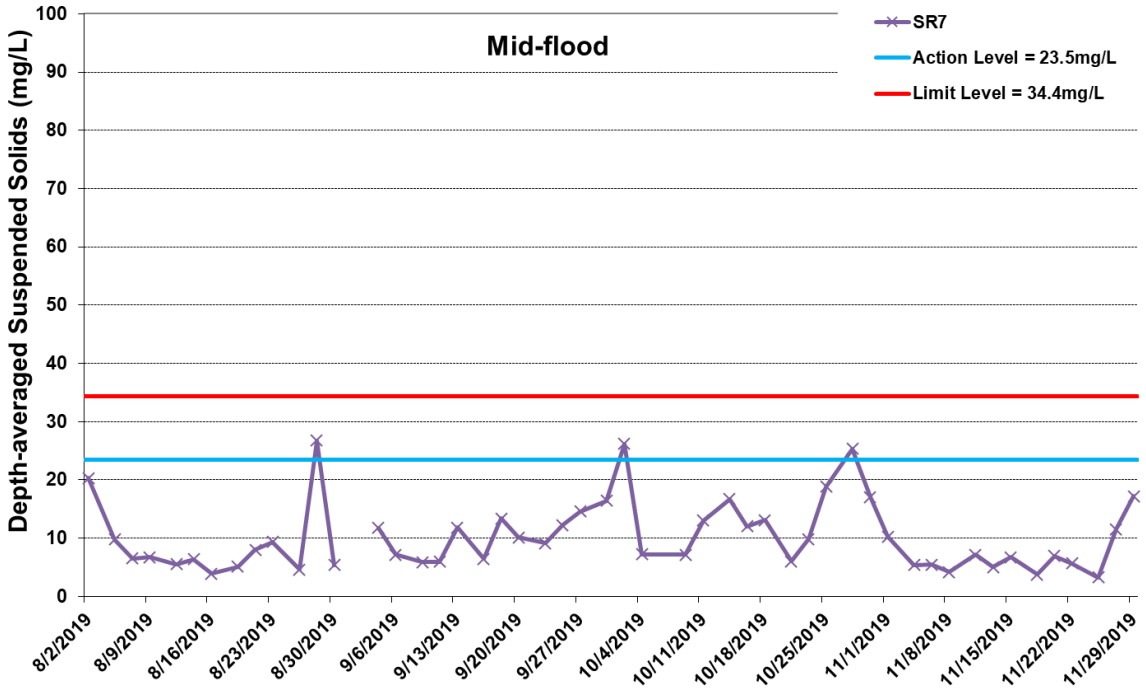


* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Figure G35 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

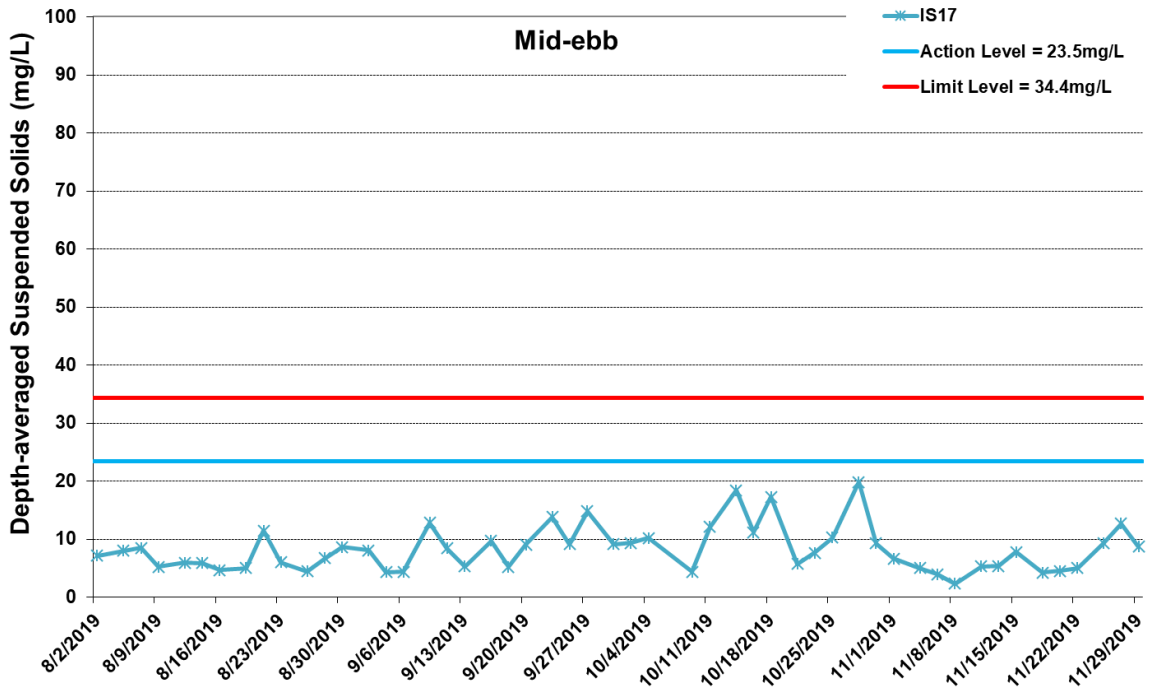


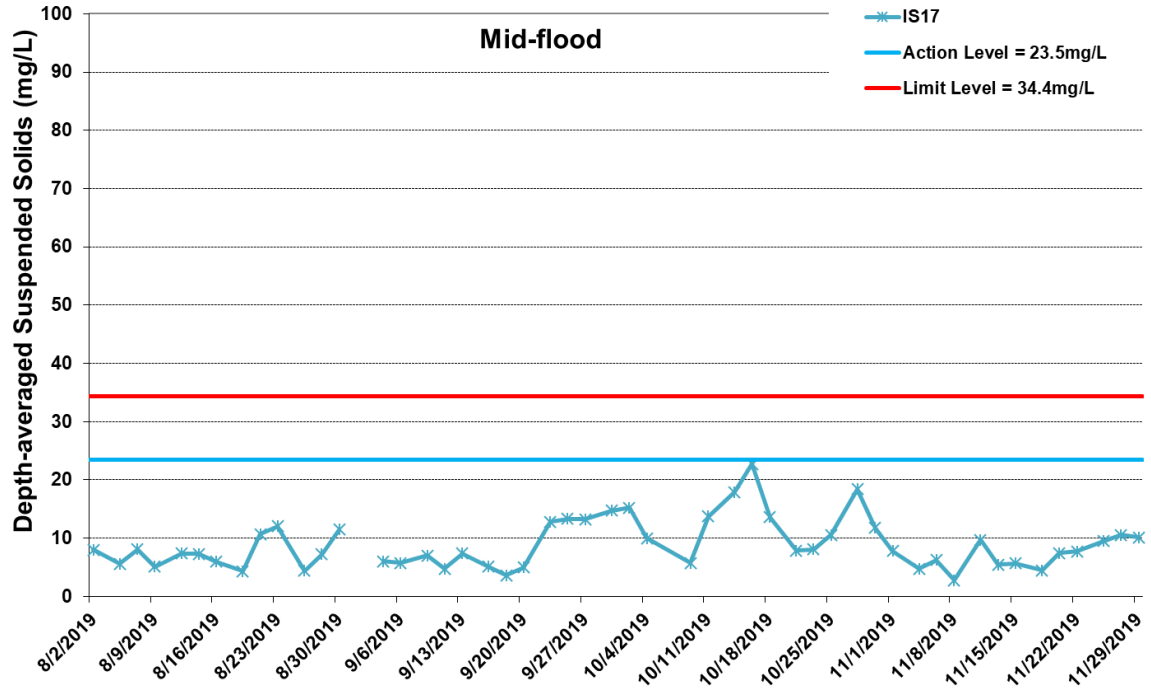


* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Figure G36 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls





* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Figure G37 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

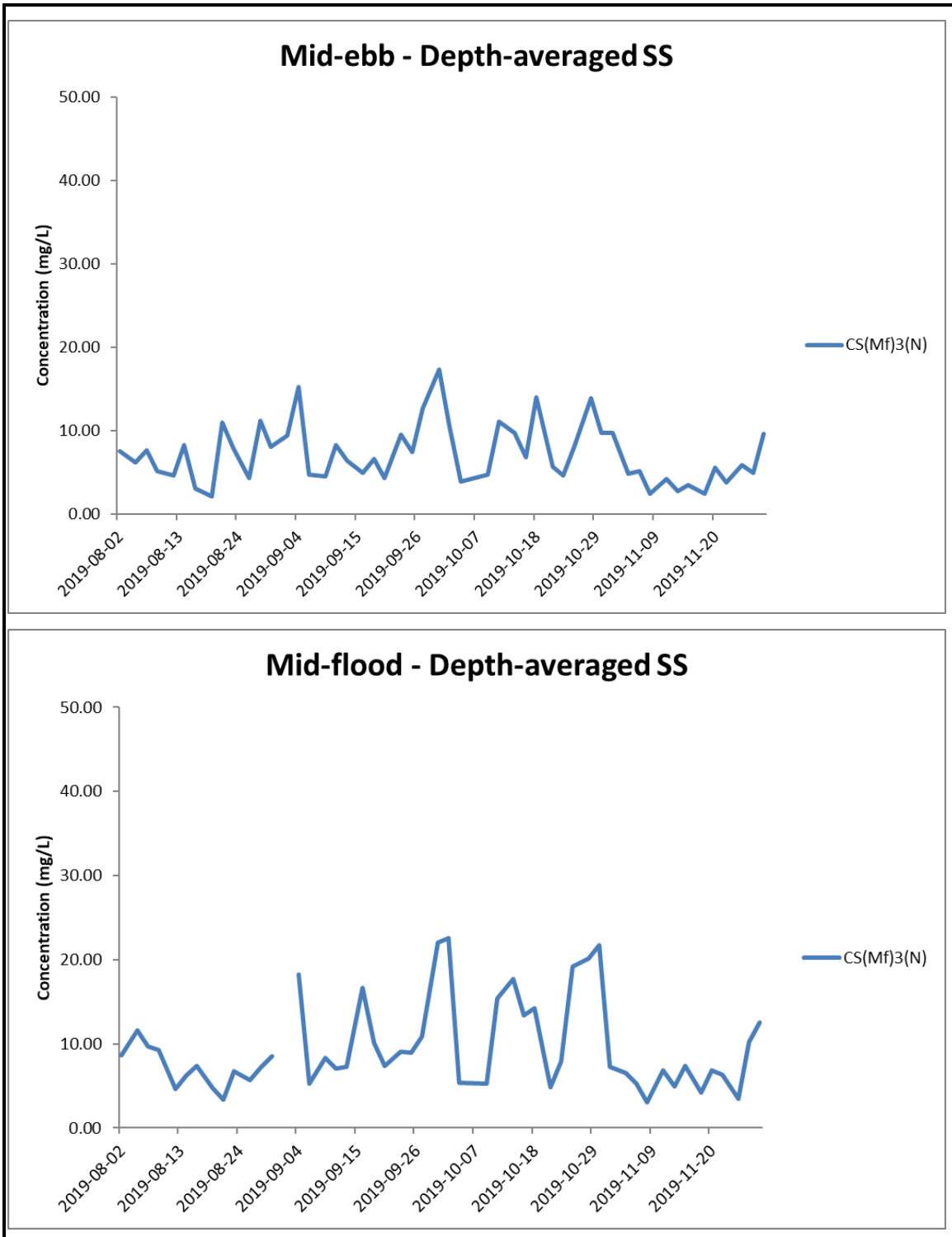
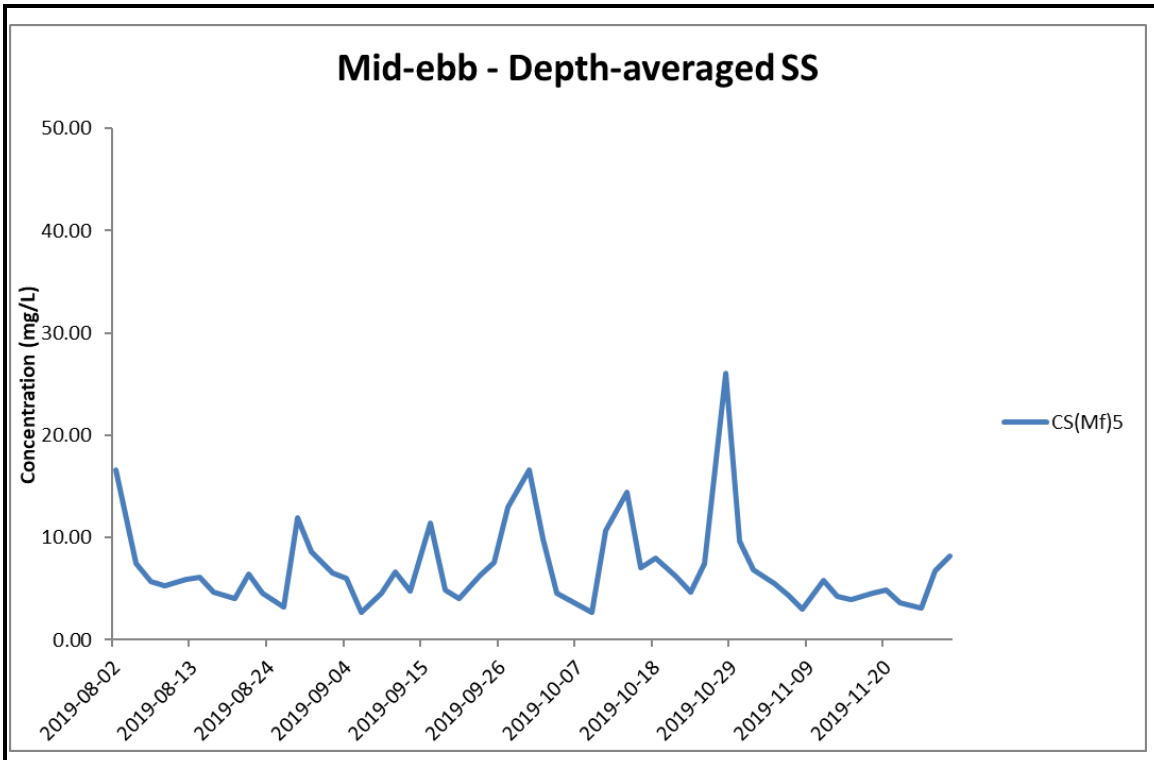


Figure G38 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



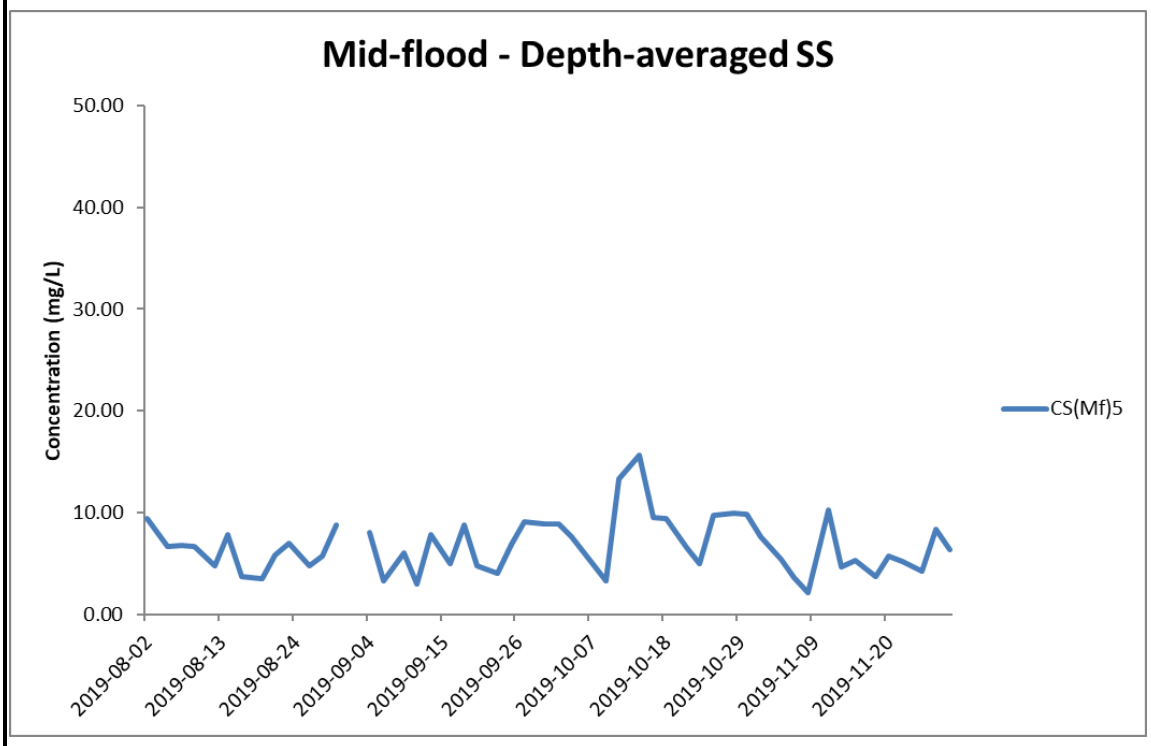
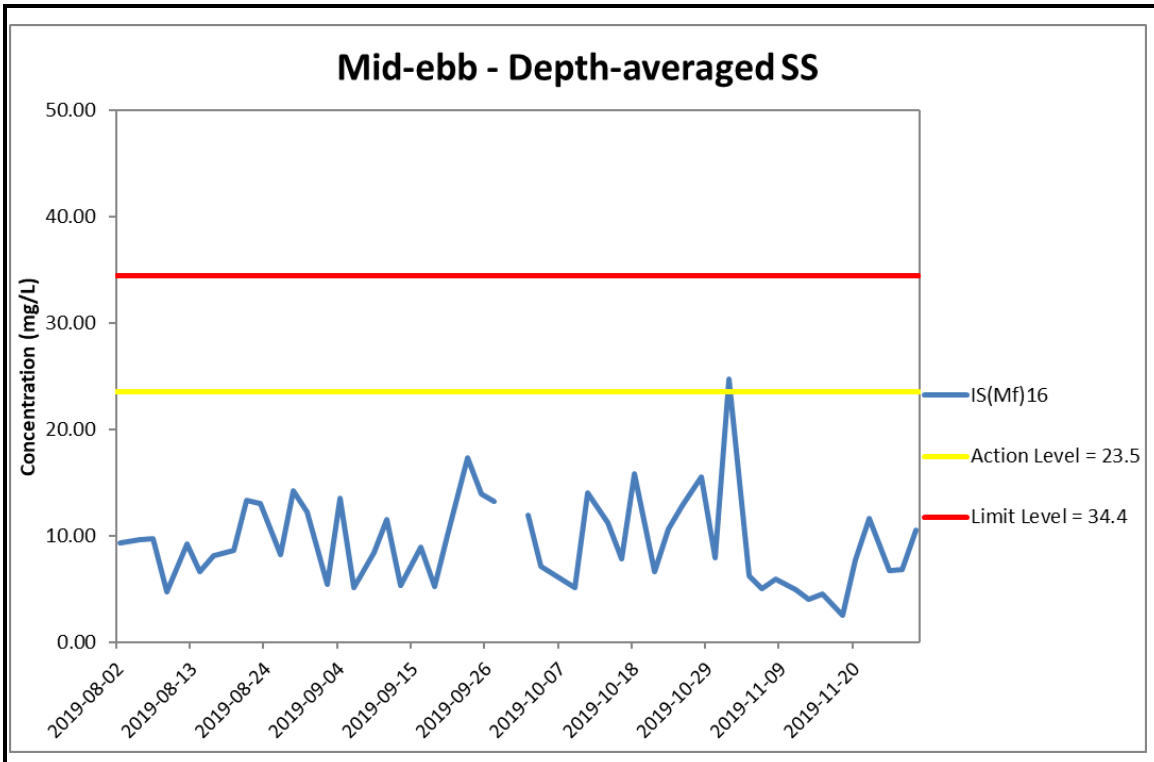


Figure G39 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



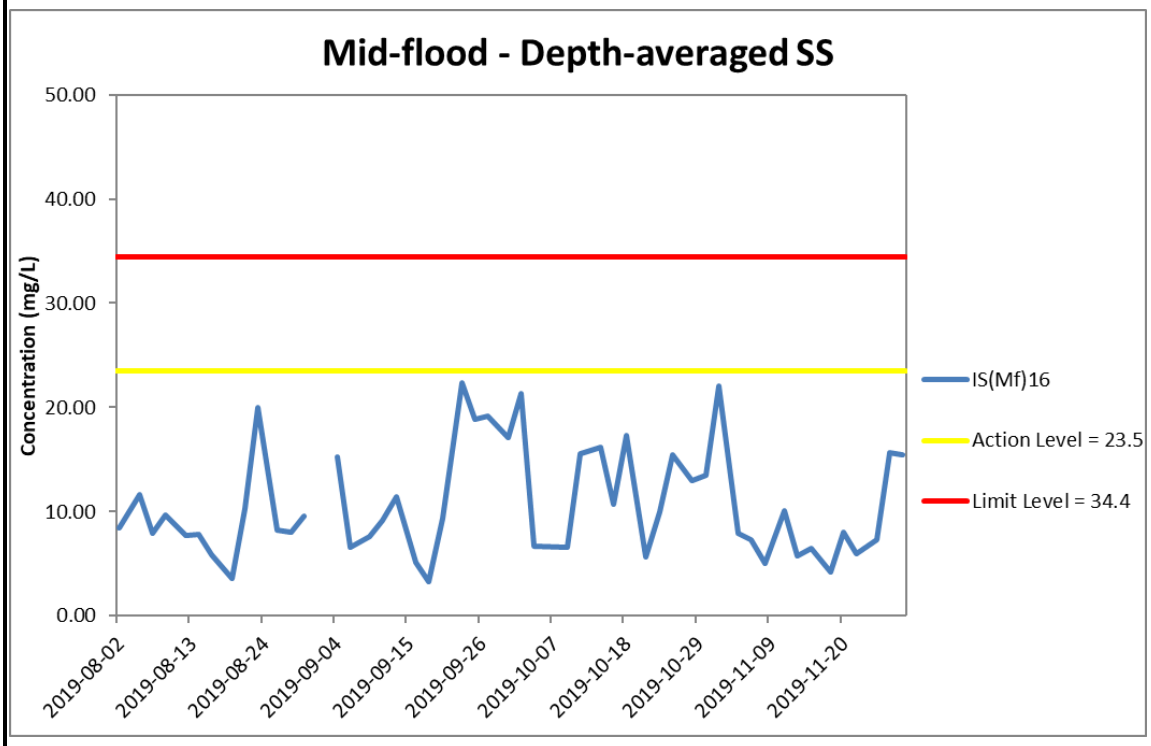
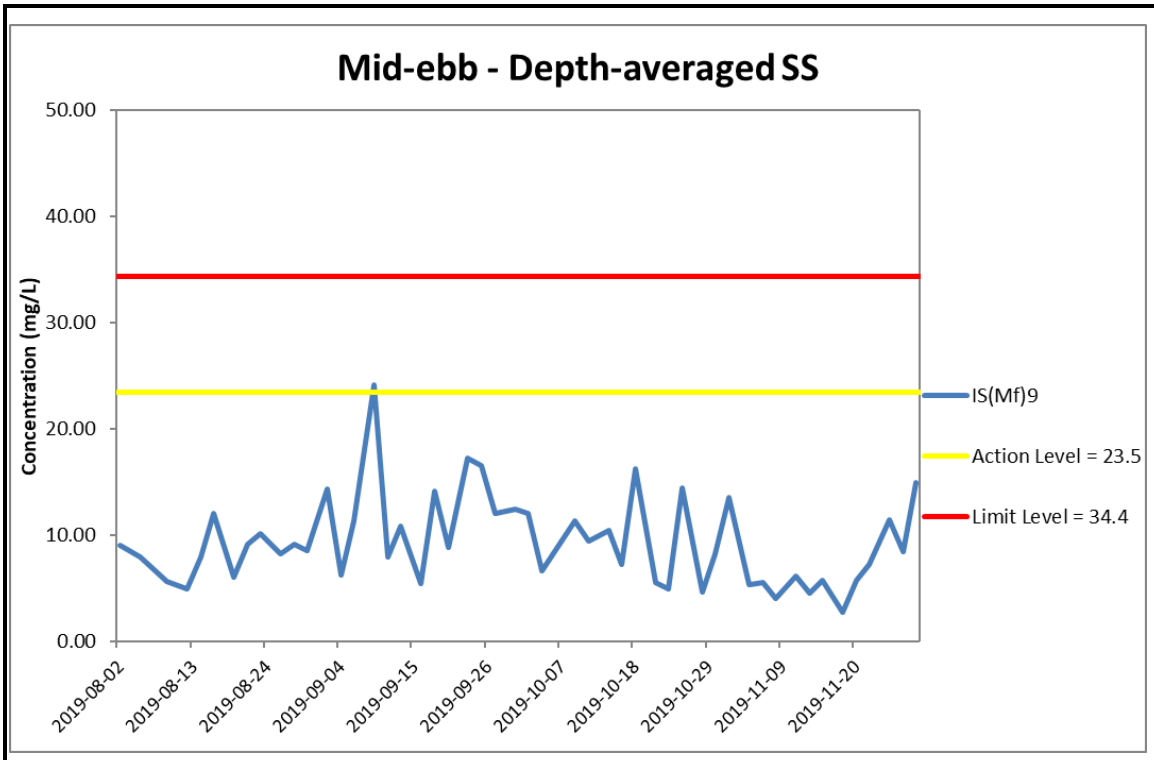


Figure G40 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



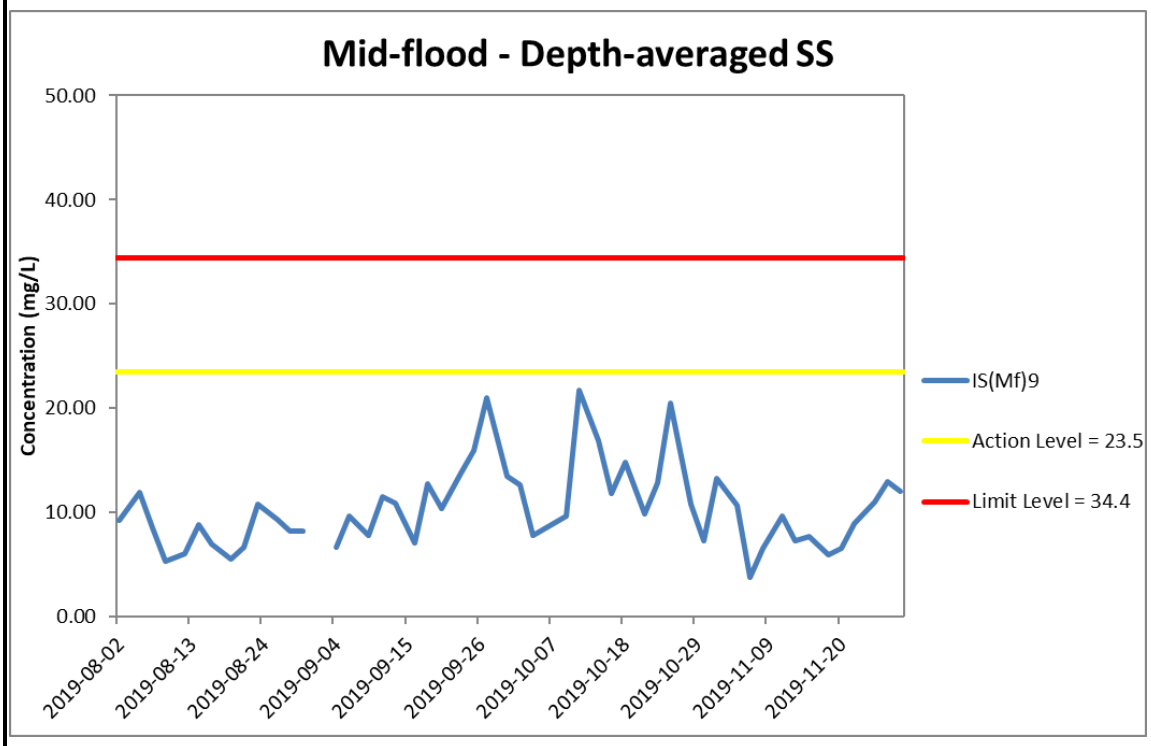
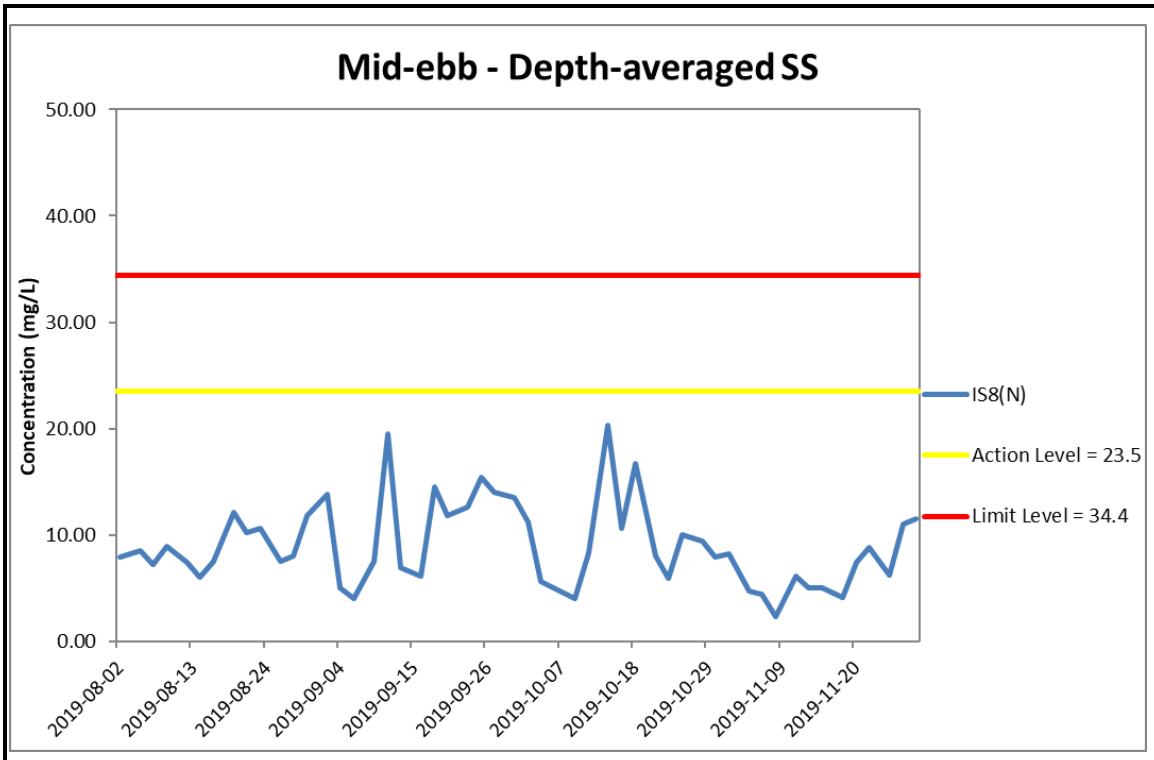


Figure G41 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



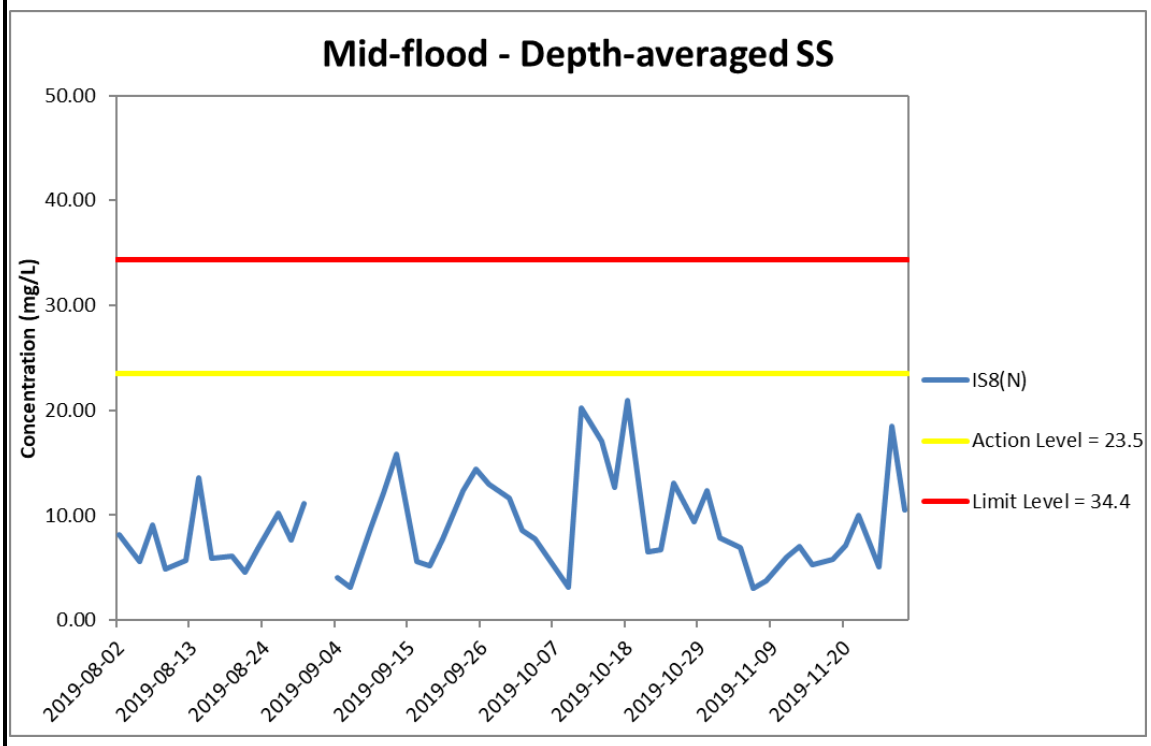
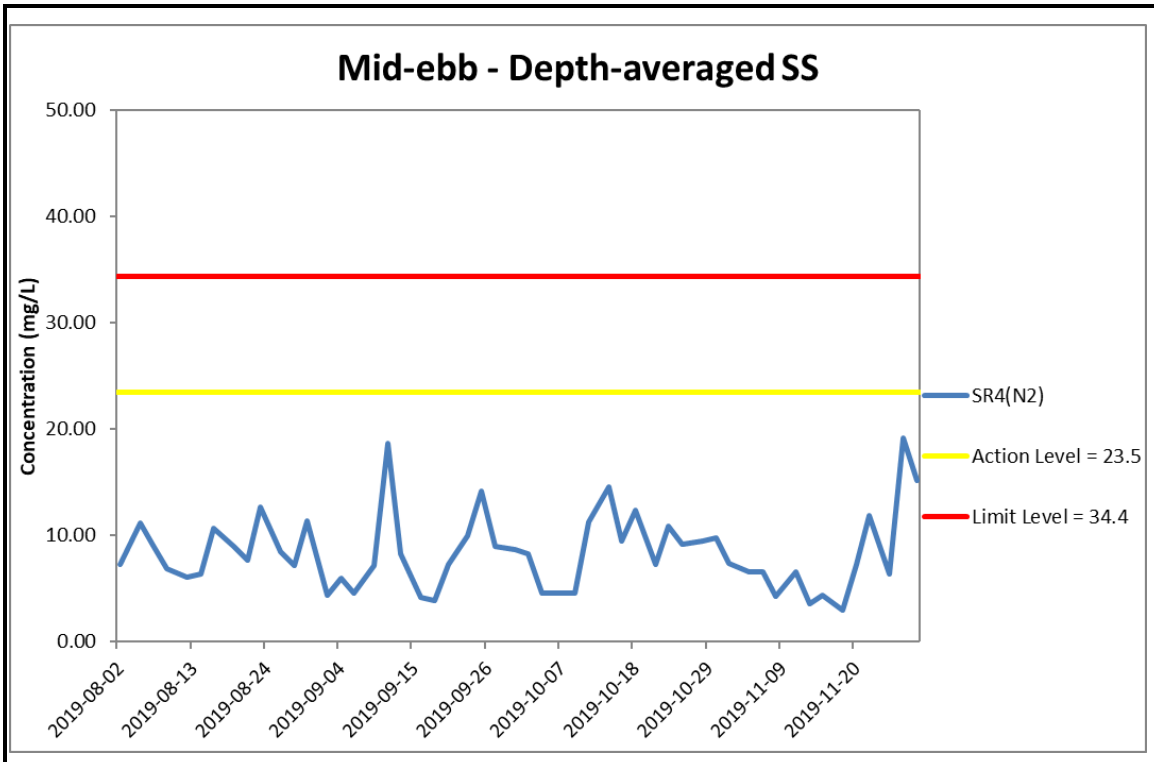


Figure G42 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



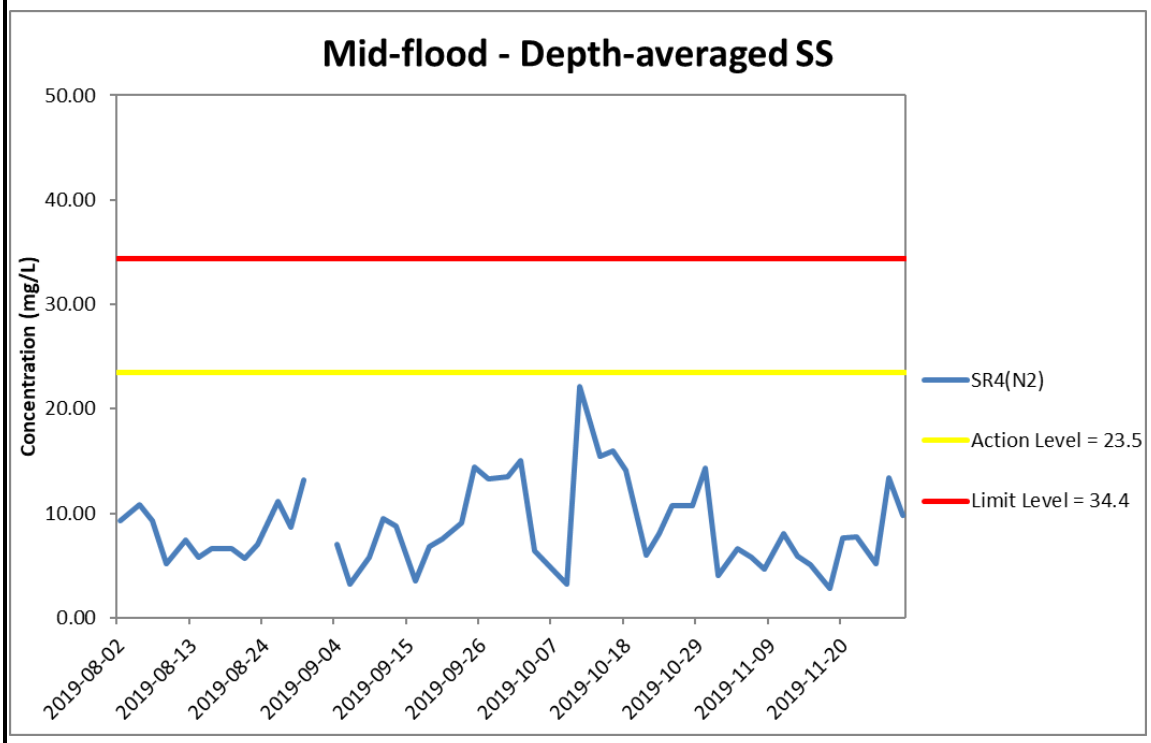
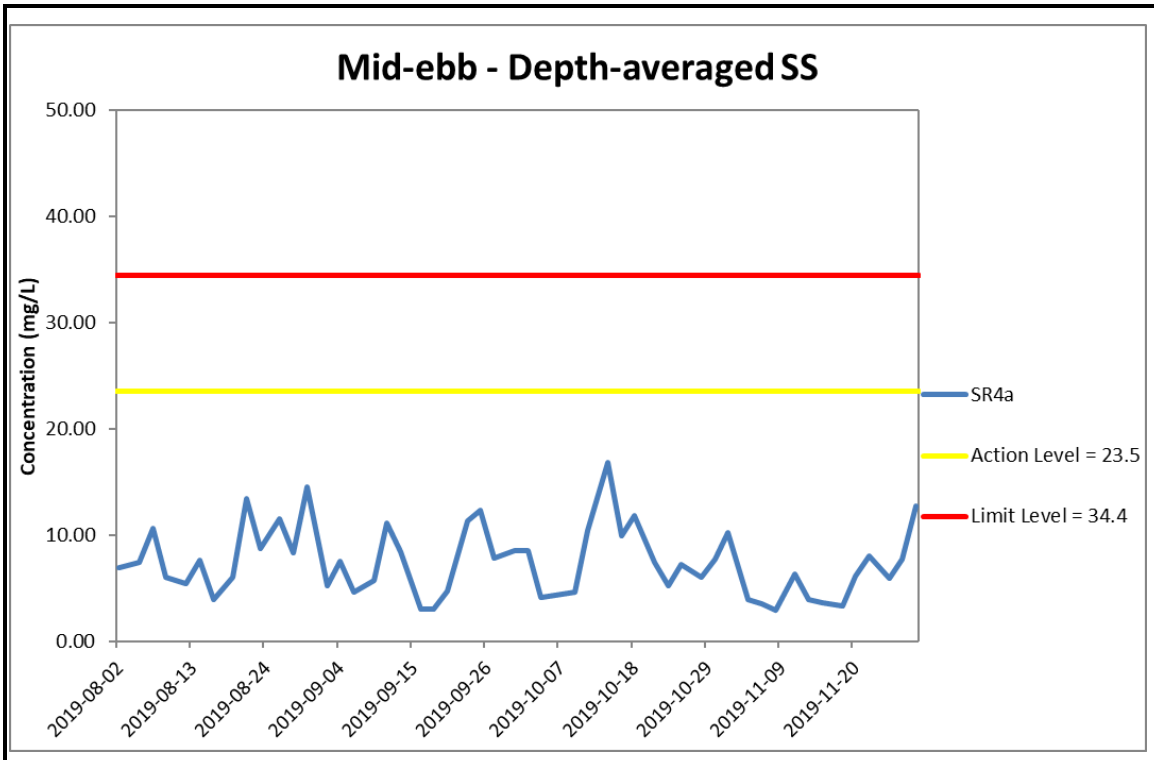


Figure G43 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls



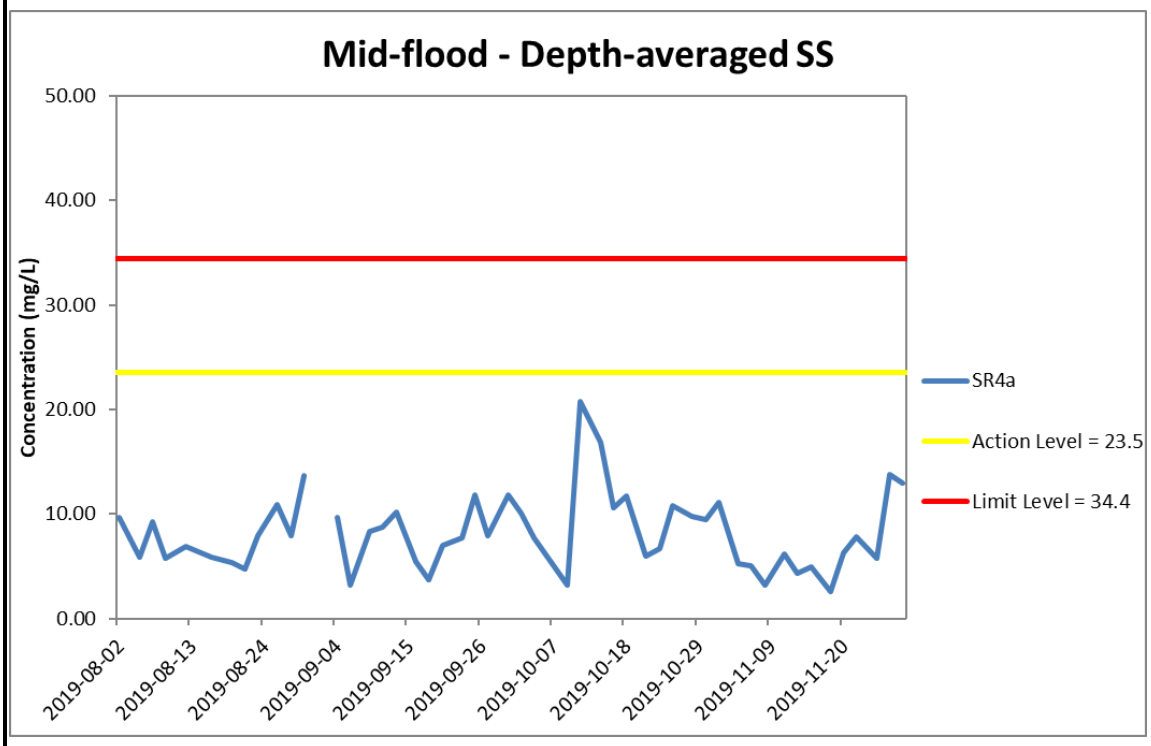


Figure G44 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2019 and 30 November 2019 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/8/2019 – 30/11/2019).

Ref: 0212330_Impact-WQM_November2019_graphs_Rev a.xls

Appendix H

Impact Dolphin Monitoring Survey

CONTRACT NO. HY/2012/08
Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link (Northern Connection Sub-sea Tunnel Section)
Dolphin Quarterly Monitoring

24th Quarterly Progress Report (September-November 2019)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.

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

6 February 2020

1. Introduction

1.1. As part of the Hong Kong-Zhuhai-Macao Bridge, the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Northern Connection Sub-sea Tunnel Section (Contract no. HY/2012/08) comprises the sub-sea TBM tunnels (two tubes with cross passages) across the Urmston Road to connect Tuen Area 40 and Hong Kong Boundary Crossing Facilities (HKBCF) of approximately 4 km in length with dual 2-lane carriageway, the tunnels at both the southern landfall and the northern landfall for construction of approach roads to the sub-sea TBM tunnels of approximately 1.5 km in length, as well as the northern landfall reclamation of approximately 16.5 hectares and about 20.km long seawalls. Dragages – Bouygues Joint Venture (hereinafter called the "Contractor") was awarded as the main contractor for the Northern Connection Sub-sea Tunnel Section, and ERM Hong Kong Limited would serve as the Environmental Team to implement the Environmental Monitoring and Audit (EM&A) programme.

1.2. According to the updated 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 has ended in September 2019, upon the completion of the dolphin monitoring carried out by HKLR03 contract. Starting in October 2019, the TMCLKL08 contract (i.e. the TM-CLKL Northern Connection Sub-sea Tunnel Section contract) takes over the dolphin monitoring works by conducting the regular vessel-based line-transect surveys.

1.3. In November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by ERM Hong Kong Limited as the dolphin specialist for the TMCLKL08 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 TMCLKL08 project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas.

1.4. During the construction period of HKLR, the dolphin specialist would be in charge of reviewing and collating information collected by HKLR03 dolphin monitoring programme to examine any potential impacts of TMCLKL08 construction works on the dolphins up until September 2019. Thereafter, the dolphin specialist would utilize the monitoring data collected by TMCLKL08 dolphin monitoring programme to produce regular progress reports. 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.

1.5. This report is the 24th quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, which summarizes the results of the surveys findings during the period of September to November 2019 by utilizing the survey data collected by both HKLR03 and TMCLKL08 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/TMCLKL08 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
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/TMCLKL08 survey teams 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^{o} and 90^{o} (in relation to the bow, which is defined as 0^{o}). 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/TMCLKL08 survey teams 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-km^2 grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km^2) and dolphin densities (total number of dolphins from on-effort sightings per km^2) 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 **s**ightings **p**er 100 units of **s**urvey **e**ffort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of **d**olphins **p**er 100 units of **s**urvey **e**ffort. Among the 1-km^2 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-km^2 grid within the study area:

SPSE = ((S / E) x 100) / SA%
DPSE = ((D / E) x 100) / 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 September to November 2019, six sets of systematic line-transect vessel surveys were conducted under the HKLR03/TMCLKL08 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.

3.1.2. From these HKLR03/TMCLKL08 surveys, a total of 796.79 km of survey effort was collected, with 97.9% 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, 293.68 km and 503.11 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 572.39 km, while the effort on secondary lines was 224.40 km. Survey effort conducted on both primary and secondary lines were considered to be 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/TMCLKL08 monitoring surveys from September to November 2019, only four groups of seven Chinese White Dolphins were sighted. All four dolphin sightings were made during on-effort search in this quarter, with three 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/TMCLKL08 monitoring surveys.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during the HKLR03/TMCLKL08 monitoring surveys from September to November 2019 is shown in Figure 1. Two of the four dolphin groups were sighted just to the north of Lung Kwu Chau, and the other two were sighted near Black Point and to the west of Sha Chau respectively (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, during the quarterly period, all dolphin sightings were located far away from the TMCLKL alignment, HKLR09 alignment as well as the HKBCF and HKLR03 reclamation sites (Figure 1).

3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (September-November 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 six years 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 only at the western end 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 autumn months in 2014-19 (Figure 2). Among the six quarterly periods, dolphins were sighted regularly in NWL waters in 2014 and 2015, but their usage was progressively reduced to very low levels in the subsequent autumn periods, with their occurrences mostly restricted to the western portion of North Lantau waters (Figure 2). On the other hand, dolphins were consistently absent from the NEL survey area throughout the six quarterly periods.

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/ TMCLKL08 surveys in NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of surveys were also compared with the ones deduced from the baseline monitoring period (September-November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during September-November 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 Sep 2019)	0.00	0.00
	Set 2 (17 & 23 Sep 2019)	0.00	0.00
	Set 3 (8 & 9 Oct 2019)	0.00	0.00
	Set 4 (14 & 29 Oct 2019)	0.00	0.00
	Set 5 (5 & 19 Nov 2019)	0.00	0.00
	Set 6 (27 & 28 Nov 2019)	0.00	0.00
Northwest Lantau	Set 1 (4 & 11 Sep 2019)	1.64	3.28
	Set 2 (17 & 23 Sep 2019)	0.00	0.00
	Set 3 (8 & 9 Oct 2019)	1.68	1.68
	Set 4 (14 & 29 Oct 2019)	0.00	0.00
	Set 5 (5 & 19 Nov 2019)	1.67	1.67
	Set 6 (27 & 28 Nov 2019)	0.00	0.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (September-November 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; ± 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 2019	September – November 2011	September – November 2019	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	0.83 ± 0.91	9.85 ± 5.85	1.10 ± 1.34	44.66 ± 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter

rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 0.82 sightings and 1.44 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 during the same autumn quarters throughout the HKLR03/TMCLKL08 monitoring (Table 4).

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from the same autumn quarters of HKLR03/TMCLKL08 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; ± 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 ± 5.05	22.19 ± 26.81
September-November 2013 (Impact)	1.01 ± 1.59	3.77 ± 6.49
September-November 2014 (Impact)	0.00	0.00
September-November 2015 (Impact)	0.00	0.00
September-November 2016 (Impact)	0.00	0.00
September-November 2017 (Impact)	0.00	0.00
September-November 2018 (Impact)	0.00	0.00
September-November 2019 (Impact)	0.00	0.00

3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present quarterly period were only tiny fractions of the ones recorded during the three-month baseline period (with reductions of 91.6% and 97.5% respectively), indicating a dramatic decline in dolphin usage of this survey area during the present quarterly period as compared to the baseline period (Table 5).

3.3.5. When comparing among the seven autumn quarters since 2013, the quarterly encounter rates in 2019 continued to plummet to the lowest level among all autumn quarters during the HKLR03/TMCLKL08 impact monitoring period (Table 5). Such dramatic drop in dolphin occurrence in NWL raises 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.

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from the same autumn quarters of HKLR03/TMCLKL08 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; ± 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 ± 5.85	44.66 ± 29.85
September-November 2013 (Impact)	8.04 ± 1.10	32.48 ± 26.51
September-November 2014 (Impact)	5.10 ± 4.40	20.52 ± 15.10
September-November 2015 (Impact)	3.94 ± 1.57	21.05 ± 17.19
September-November 2016 (Impact)	2.86 ± 1.98	10.89 ± 10.98
September-November 2017 (Impact)	3.12 ± 1.91	10.35 ± 9.66
September-November 2018 (Impact)	1.51 ± 2.25	2.70 ± 3.78
September-November 2019 (Impact)	0.83 ± 0.91	1.10 ± 1.34

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 (28th quarter of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0018 and 0.0124 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 28 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).

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. 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 HZMB reclamation works.

3.4. Group size

3.4.1. Group size of Chinese White Dolphins ranged from one to three individuals per group in North Lantau region during September to November 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 (September – November 2019) and baseline monitoring period (September – November 2011) (Note: ± denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	September – November 2019	**September – November 2011**
Overall	1.75 ± 0.96 (n = 4)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	1.75 ± 0.96 (n = 4)	3.92 ± 3.40 (n = 49)

3.4.2. The average dolphin group size in NWL waters during September to November 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 four 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 four dolphin groups were small with 1-3 individuals per group only (Appendix II). This is in stark contrast to the baseline period when the larger groups were frequently sighted and evenly distributed in NWL, with a few also sighted in NEL waters.

3.5. Habitat use

3.5.1. From September to November 2019, only three grids in North Lantau waters recorded dolphin occurrences, and all three grids recorded moderately low to moderate dolphin densities (Figures 3a and 3b). 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).

3.5.2. However, 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.

3.5.3. 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).

3.5.4. The density patterns were also very different in NWL between the baseline and present 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, all three grids with dolphin densities were only moderately low to moderate 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 four groups of dolphins.

3.7. Activities and associations with fishing boats

3.7.1. Among the four dolphin groups, only one of them was engaged in feeding activity, while none of them was engaged in socializing, traveling or milling/resting activity during the quarterly period. The lone dolphin group engaged in feeding activity was located near Black Point (Figure 5). This is in stark contrast with the regularly occurrence and even distribution of dolphin groups engaged in different activities during the baseline period.

3.7.2. None of the four 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 September to November 2019, about 250 digital photographs of Chinese White Dolphins were taken during the HKLR03/TMCLKL08 impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, four individuals sighted four 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, and all identified individuals were re-sighted only once during the quarterly monitoring period (Appendix III).

3.8.3. Notably, none of the four identified individuals was sighted in WL waters during the HKLR09 monitoring surveys under the same three-month period.

3.9. Individual range use

3.9.1. Ranging patterns of the four 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, none of the identified individuals has extended the range use to WL waters during the quarterly period (Appendix V), even though such individual movements between North and West Lantau have been quite frequent in the past several years of HKLR03/TMCLKL08 dolphin monitoring.

4. Conclusion

4.1. During this quarter of dolphin monitoring, no adverse impact from the activities of the TMCLKL construction project on Chinese White Dolphins was noticeable from general observations.

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

4.3. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

5. References

- Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.

- Hung, S. K. 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.

- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

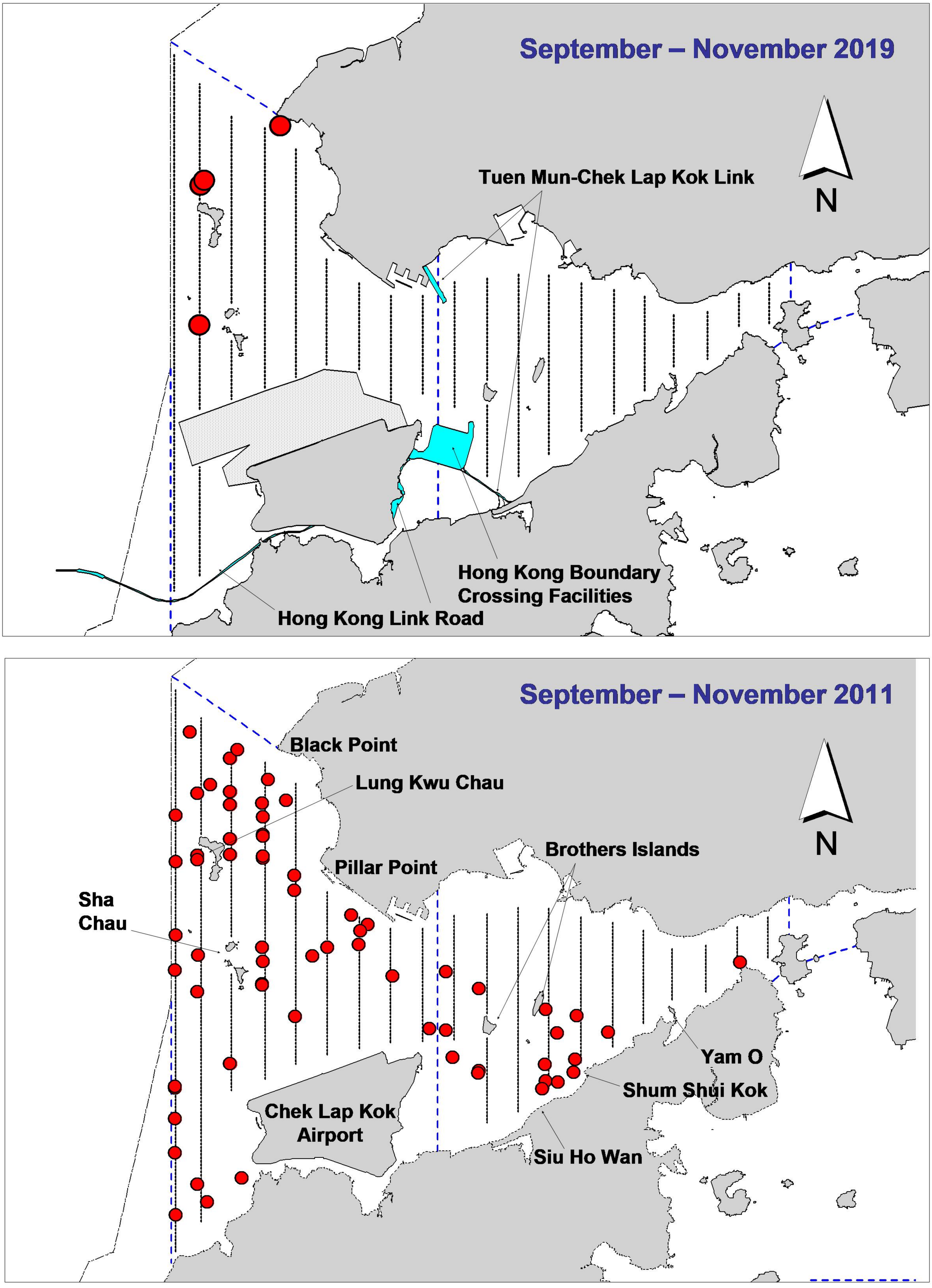


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during TMCLKL impact phase (top) and baseline monitoring surveys (bottom)

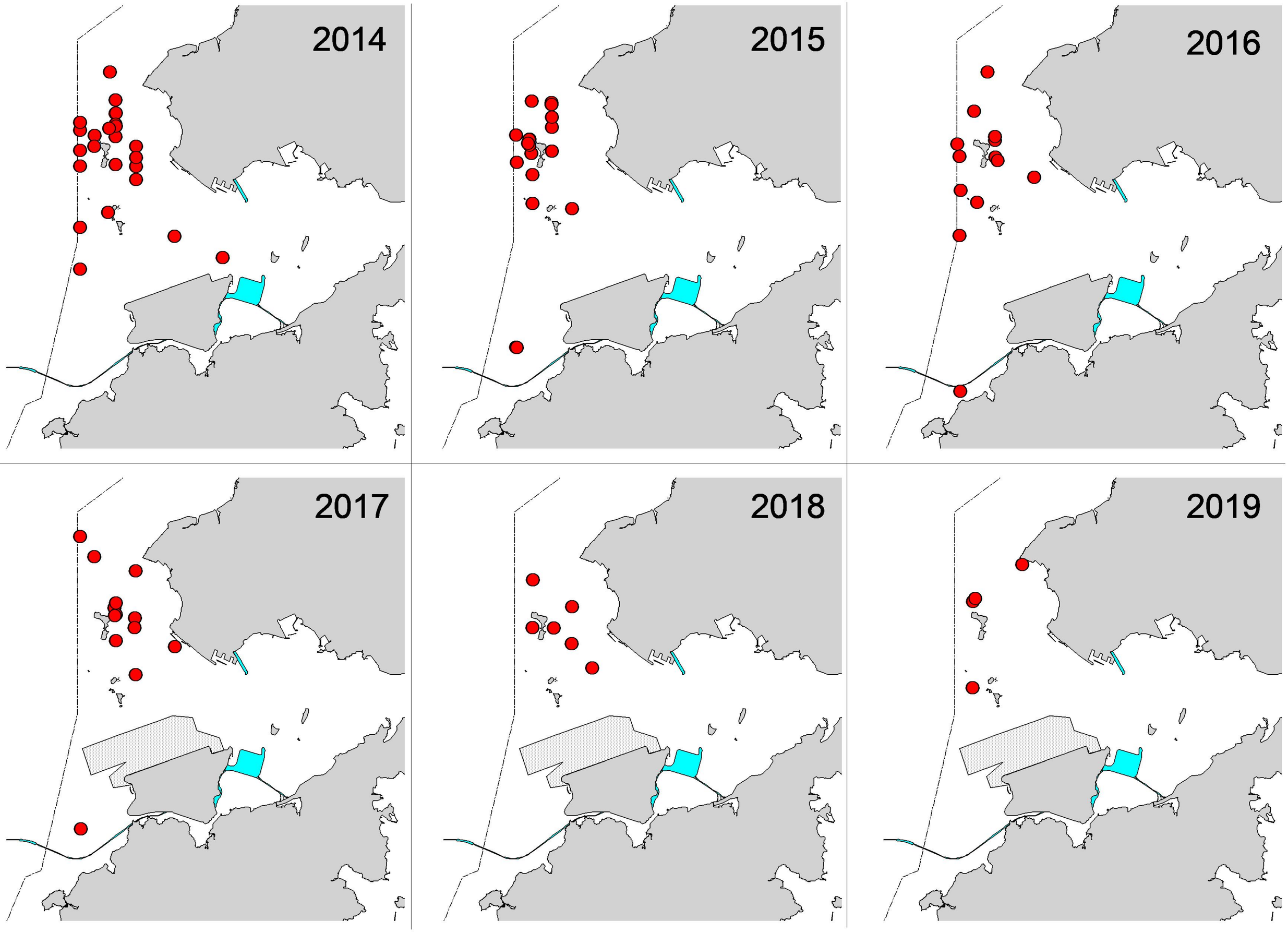


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six autumn quarters (September-November) of TMCLKL impact phase in 2014-19

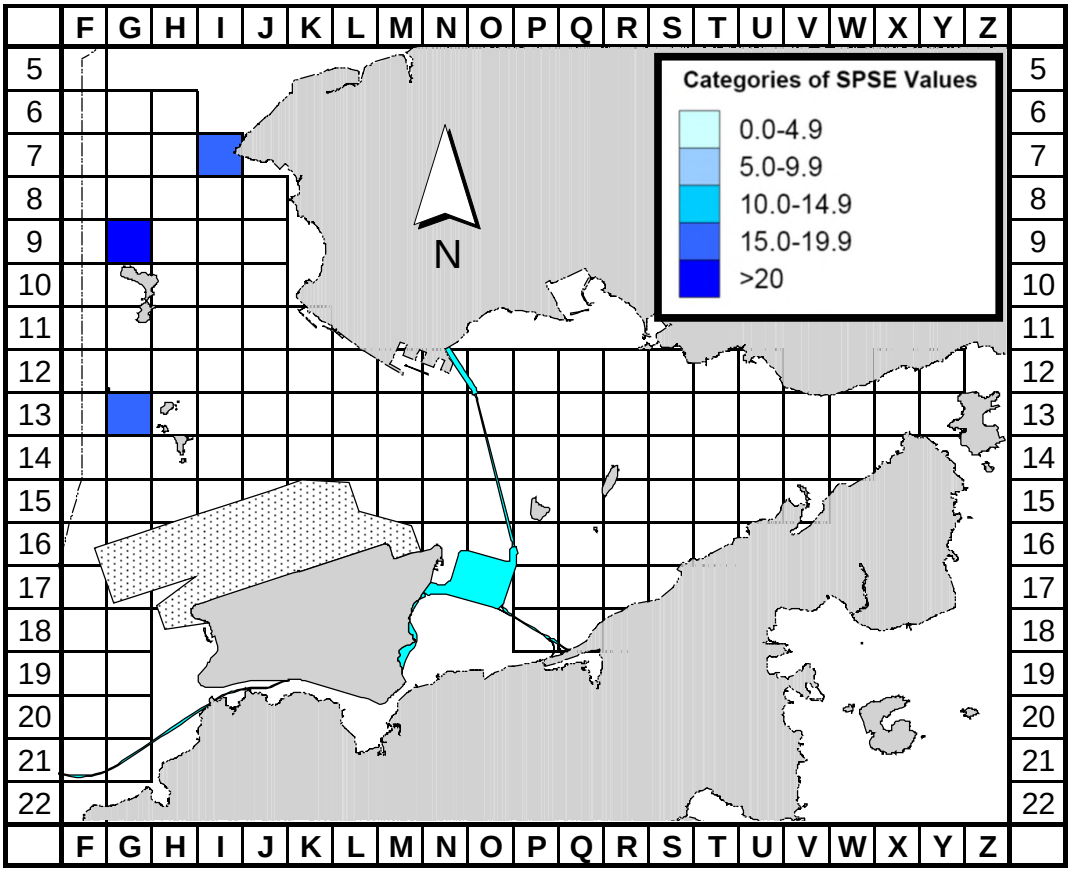


Figure 3a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL impact monitoring period (September-November 2019) (SPSE = no. of on-effort sightings per 100 units of survey effort)

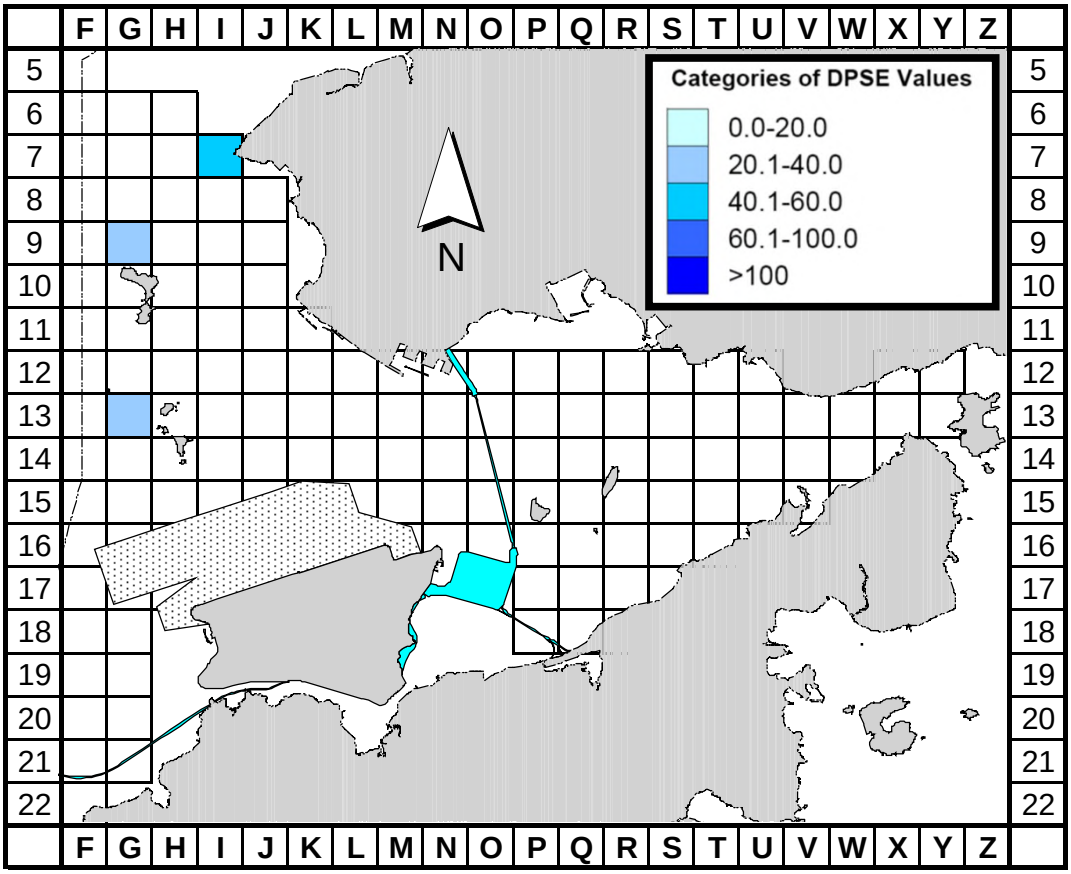


Figure 3b. Density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL impact monitoring period (September-November 2019) (DPSE = no. of dolphins per 100 units of survey effort)

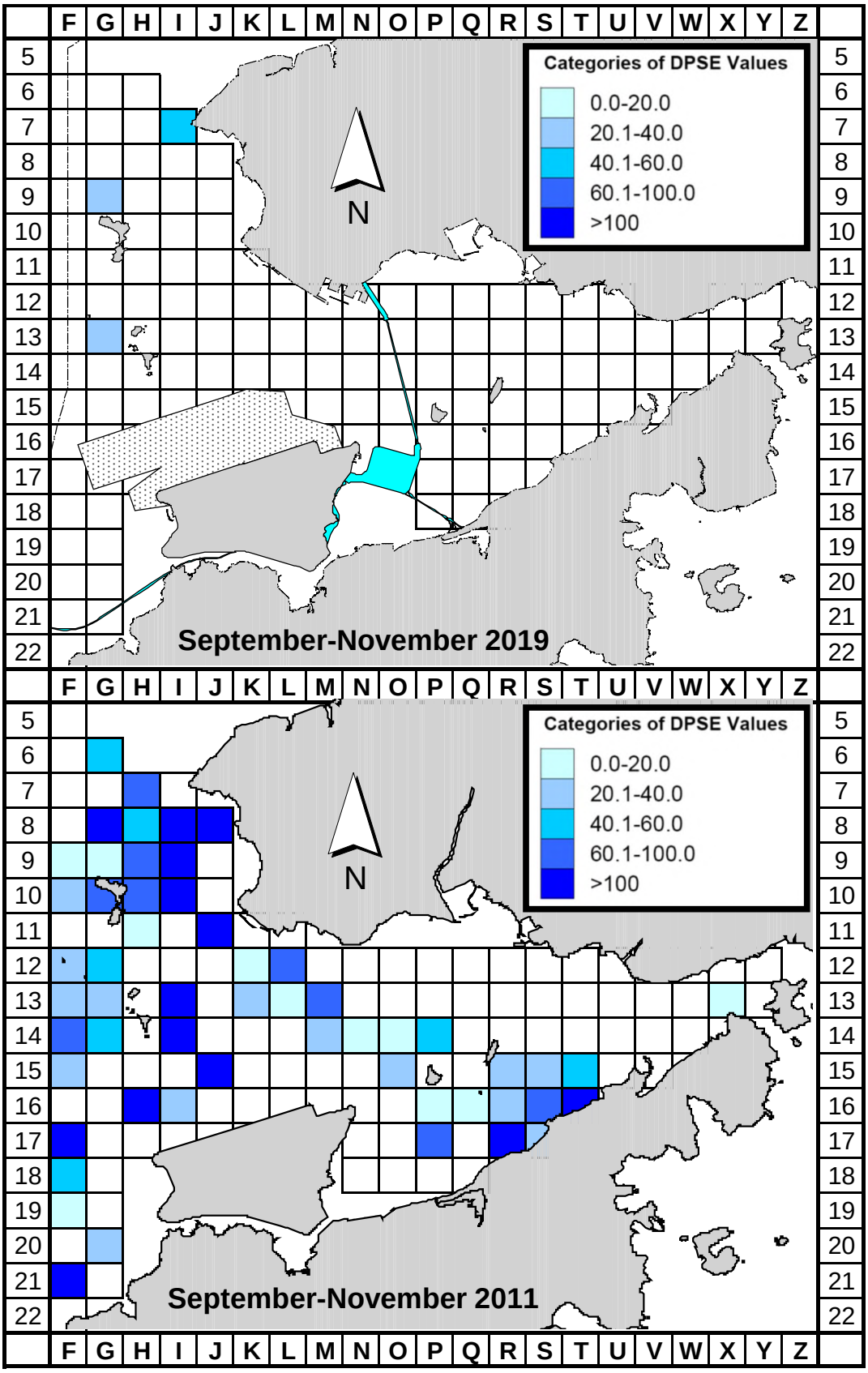


Figure 4. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in Northwest and Northeast Lantau survey area between the impact monitoring period (September - November 2019) and baseline monitoring period (September-November 2011)
(DPSE = no. of dolphins per 100 units of survey effort)

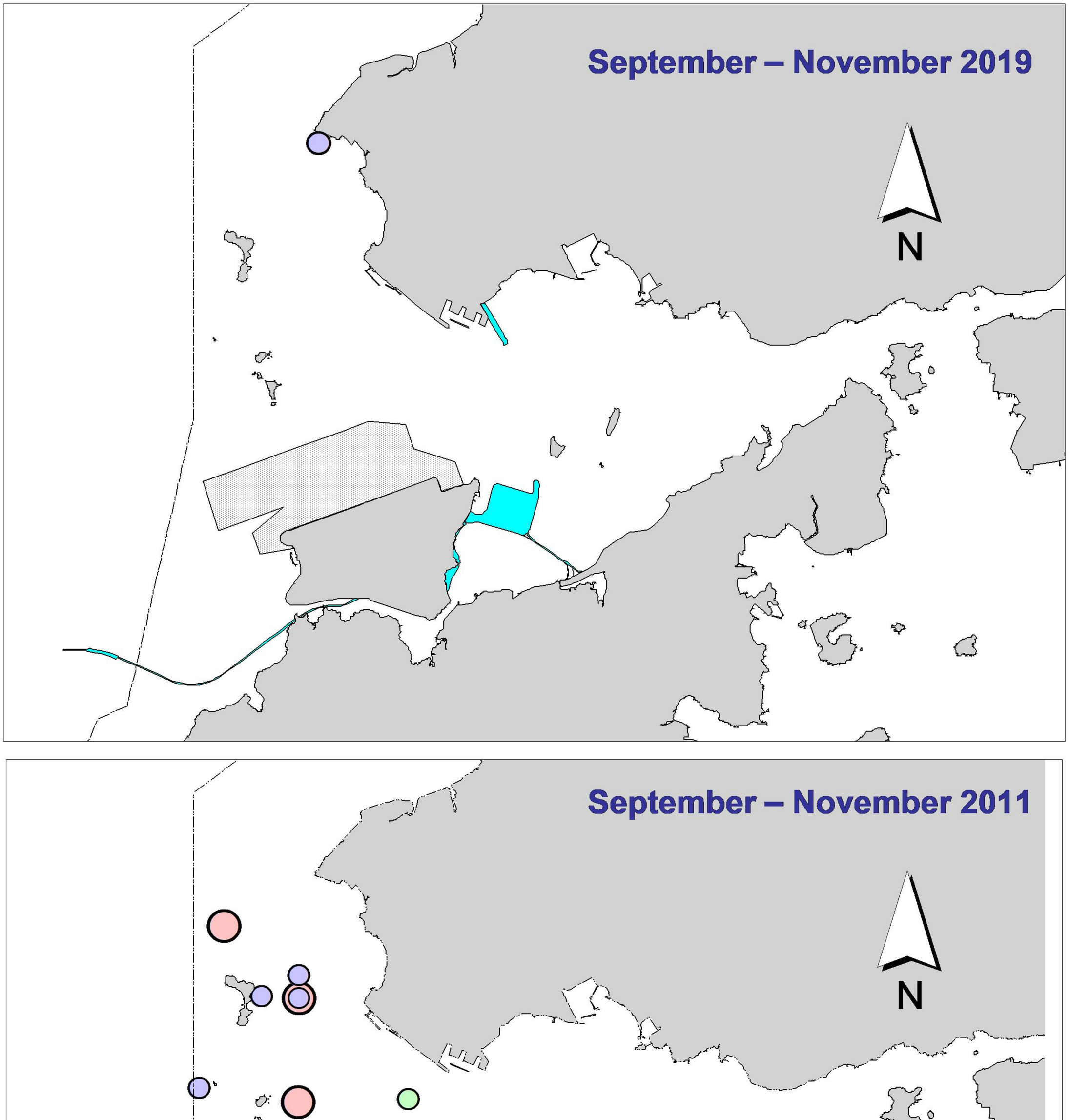


Figure 5. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during TMCLKL impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. TMCLKL/HKLR03 Survey Effort Database (Sep-Nov 2019)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
4-Sep-19	NW LANTAU	2	21.38	AUTUMN	STANDARD36826	HKLR	P
4-Sep-19	NW LANTAU	3	6.40	AUTUMN	STANDARD36826	HKLR	P
4-Sep-19	NW LANTAU	2	9.12	AUTUMN	STANDARD36826	HKLR	S
4-Sep-19	NW LANTAU	3	2.52	AUTUMN	STANDARD36826	HKLR	S
4-Sep-19	NE LANTAU	2	16.70	AUTUMN	STANDARD36826	HKLR	P
4-Sep-19	NE LANTAU	3	18.83	AUTUMN	STANDARD36826	HKLR	P
4-Sep-19	NE LANTAU	2	7.75	AUTUMN	STANDARD36826	HKLR	S
4-Sep-19	NE LANTAU	3	5.12	AUTUMN	STANDARD36826	HKLR	S
11-Sep-19	NW LANTAU	1	1.60	AUTUMN	STANDARD36826	HKLR	P
11-Sep-19	NW LANTAU	2	29.50	AUTUMN	STANDARD36826	HKLR	P
11-Sep-19	NW LANTAU	3	2.10	AUTUMN	STANDARD36826	HKLR	P
11-Sep-19	NW LANTAU	1	1.40	AUTUMN	STANDARD36826	HKLR	S
11-Sep-19	NW LANTAU	2	8.99	AUTUMN	STANDARD36826	HKLR	S
17-Sep-19	NW LANTAU	2	8.96	AUTUMN	STANDARD36826	HKLR	P
17-Sep-19	NW LANTAU	3	22.90	AUTUMN	STANDARD36826	HKLR	P
17-Sep-19	NW LANTAU	4	1.90	AUTUMN	STANDARD36826	HKLR	P
17-Sep-19	NW LANTAU	2	4.54	AUTUMN	STANDARD36826	HKLR	S
17-Sep-19	NW LANTAU	3	4.90	AUTUMN	STANDARD36826	HKLR	S
17-Sep-19	NW LANTAU	4	1.20	AUTUMN	STANDARD36826	HKLR	S
23-Sep-19	NW LANTAU	2	19.22	AUTUMN	STANDARD36826	HKLR	P
23-Sep-19	NW LANTAU	3	7.79	AUTUMN	STANDARD36826	HKLR	P
23-Sep-19	NW LANTAU	2	9.84	AUTUMN	STANDARD36826	HKLR	S
23-Sep-19	NW LANTAU	3	4.25	AUTUMN	STANDARD36826	HKLR	S
23-Sep-19	NE LANTAU	1	11.30	AUTUMN	STANDARD36826	HKLR	P
23-Sep-19	NE LANTAU	2	25.35	AUTUMN	STANDARD36826	HKLR	P
23-Sep-19	NE LANTAU	1	3.61	AUTUMN	STANDARD36826	HKLR	S
23-Sep-19	NE LANTAU	2	10.74	AUTUMN	STANDARD36826	HKLR	S
8-Oct-19	NW LANTAU	1	3.70	AUTUMN	STANDARD36826	TMCLKL	P
8-Oct-19	NW LANTAU	2	23.60	AUTUMN	STANDARD36826	TMCLKL	P
8-Oct-19	NW LANTAU	3	5.20	AUTUMN	STANDARD36826	TMCLKL	P
8-Oct-19	NW LANTAU	2	8.30	AUTUMN	STANDARD36826	TMCLKL	S
8-Oct-19	NW LANTAU	3	2.80	AUTUMN	STANDARD36826	TMCLKL	S
8-Oct-19	NE LANTAU	2	11.50	AUTUMN	STANDARD36826	TMCLKL	P
8-Oct-19	NE LANTAU	3	21.93	AUTUMN	STANDARD36826	TMCLKL	P
8-Oct-19	NE LANTAU	2	5.40	AUTUMN	STANDARD36826	TMCLKL	S
8-Oct-19	NE LANTAU	3	8.87	AUTUMN	STANDARD36826	TMCLKL	S
9-Oct-19	NW LANTAU	2	7.77	AUTUMN	STANDARD36826	TMCLKL	P
9-Oct-19	NW LANTAU	3	19.26	AUTUMN	STANDARD36826	TMCLKL	P
9-Oct-19	NW LANTAU	2	4.33	AUTUMN	STANDARD36826	TMCLKL	S
9-Oct-19	NW LANTAU	3	8.44	AUTUMN	STANDARD36826	TMCLKL	S
14-Oct-19	NW LANTAU	1	3.10	AUTUMN	STANDARD36826	TMCLKL	P
14-Oct-19	NW LANTAU	2	24.38	AUTUMN	STANDARD36826	TMCLKL	P
14-Oct-19	NW LANTAU	1	1.60	AUTUMN	STANDARD36826	TMCLKL	S
14-Oct-19	NW LANTAU	2	11.62	AUTUMN	STANDARD36826	TMCLKL	S
29-Oct-19	NW LANTAU	2	7.60	AUTUMN	STANDARD36826	TMCLKL	P
29-Oct-19	NW LANTAU	3	14.90	AUTUMN	STANDARD36826	TMCLKL	P
29-Oct-19	NW LANTAU	4	10.10	AUTUMN	STANDARD36826	TMCLKL	P
29-Oct-19	NW LANTAU	2	5.10	AUTUMN	STANDARD36826	TMCLKL	S
29-Oct-19	NW LANTAU	3	6.10	AUTUMN	STANDARD36826	TMCLKL	S
29-Oct-19	NE LANTAU	2	31.08	AUTUMN	STANDARD36826	TMCLKL	P
29-Oct-19	NE LANTAU	3	4.40	AUTUMN	STANDARD36826	TMCLKL	P

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
29-Oct-19	NE LANTAU	2	12.30	AUTUMN	STANDARD36826	TMCLKL	S
5-Nov-19	NW LANTAU	2	13.97	AUTUMN	STANDARD36826	TMCLKL	P
5-Nov-19	NW LANTAU	3	13.02	AUTUMN	STANDARD36826	TMCLKL	P
5-Nov-19	NW LANTAU	2	4.90	AUTUMN	STANDARD36826	TMCLKL	S
5-Nov-19	NW LANTAU	3	8.21	AUTUMN	STANDARD36826	TMCLKL	S
5-Nov-19	NE LANTAU	1	4.62	AUTUMN	STANDARD36826	TMCLKL	P
5-Nov-19	NE LANTAU	2	32.15	AUTUMN	STANDARD36826	TMCLKL	P
5-Nov-19	NE LANTAU	1	3.48	AUTUMN	STANDARD36826	TMCLKL	S
5-Nov-19	NE LANTAU	2	10.95	AUTUMN	STANDARD36826	TMCLKL	S
19-Nov-19	NW LANTAU	2	12.62	AUTUMN	STANDARD36826	TMCLKL	P
19-Nov-19	NW LANTAU	3	20.43	AUTUMN	STANDARD36826	TMCLKL	P
19-Nov-19	NW LANTAU	2	5.63	AUTUMN	STANDARD36826	TMCLKL	S
19-Nov-19	NW LANTAU	3	5.22	AUTUMN	STANDARD36826	TMCLKL	S
27-Nov-19	NW LANTAU	2	30.30	AUTUMN	STANDARD36826	TMCLKL	P
27-Nov-19	NW LANTAU	3	1.10	AUTUMN	STANDARD36826	TMCLKL	P
27-Nov-19	NW LANTAU	2	9.30	AUTUMN	STANDARD36826	TMCLKL	S
27-Nov-19	NW LANTAU	3	2.60	AUTUMN	STANDARD36826	TMCLKL	S
28-Nov-19	NW LANTAU	2	10.90	AUTUMN	STANDARD36826	TMCLKL	P
28-Nov-19	NW LANTAU	3	13.76	AUTUMN	STANDARD36826	TMCLKL	P
28-Nov-19	NW LANTAU	4	1.96	AUTUMN	STANDARD36826	TMCLKL	P
28-Nov-19	NW LANTAU	2	2.80	AUTUMN	STANDARD36826	TMCLKL	S
28-Nov-19	NW LANTAU	3	8.74	AUTUMN	STANDARD36826	TMCLKL	S
28-Nov-19	NW LANTAU	4	1.24	AUTUMN	STANDARD36826	TMCLKL	S
28-Nov-19	NE LANTAU	2	26.61	AUTUMN	STANDARD36826	TMCLKL	P
28-Nov-19	NE LANTAU	3	8.50	AUTUMN	STANDARD36826	TMCLKL	P
28-Nov-19	NE LANTAU	2	11.39	AUTUMN	STANDARD36826	TMCLKL	S
28-Nov-19	NE LANTAU	3	1.10	AUTUMN	STANDARD36826	TMCLKL	S

Appendix II. TMCLKL/HKLR03 Chinese White Dolphin Sighting Database (September-November 2019)

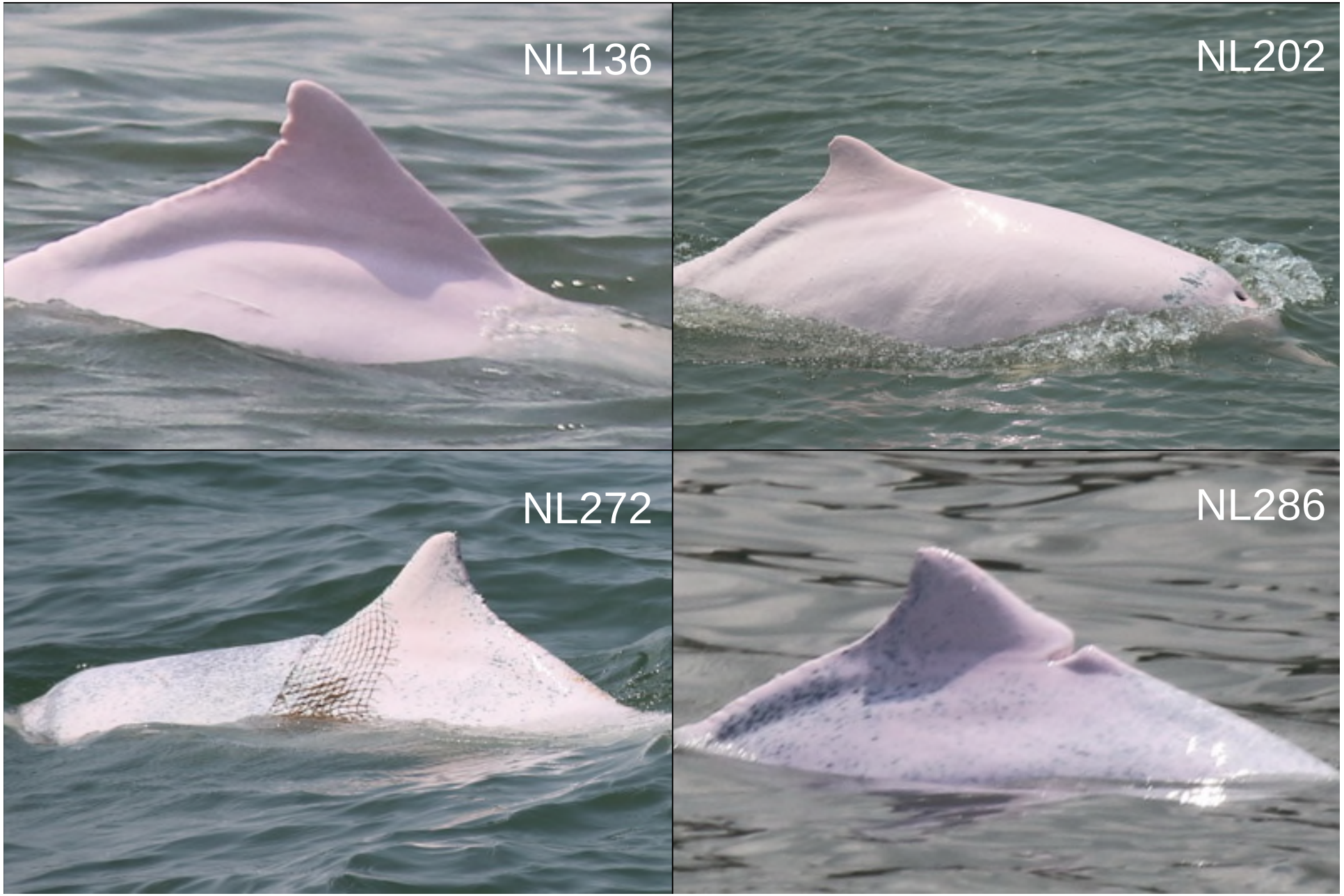
(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
4-Sep-19	1	1046	2	NW LANTAU	2	311	ON	HKLR	823375	805440	AUTUMN	NONE	P
11-Sep-19	1	1058	3	NW LANTAU	2	430	ON	HKLR	829316	807975	AUTUMN	NONE	S
9-Oct-19	1	1221	1	NW LANTAU	3	57	ON	TMCLKL	827538	805469	AUTUMN	NONE	P
19-Nov-19	1	1144	1	NW LANTAU	3	386	ON	TMCLKL	827671	805583	AUTUMN	NONE	P

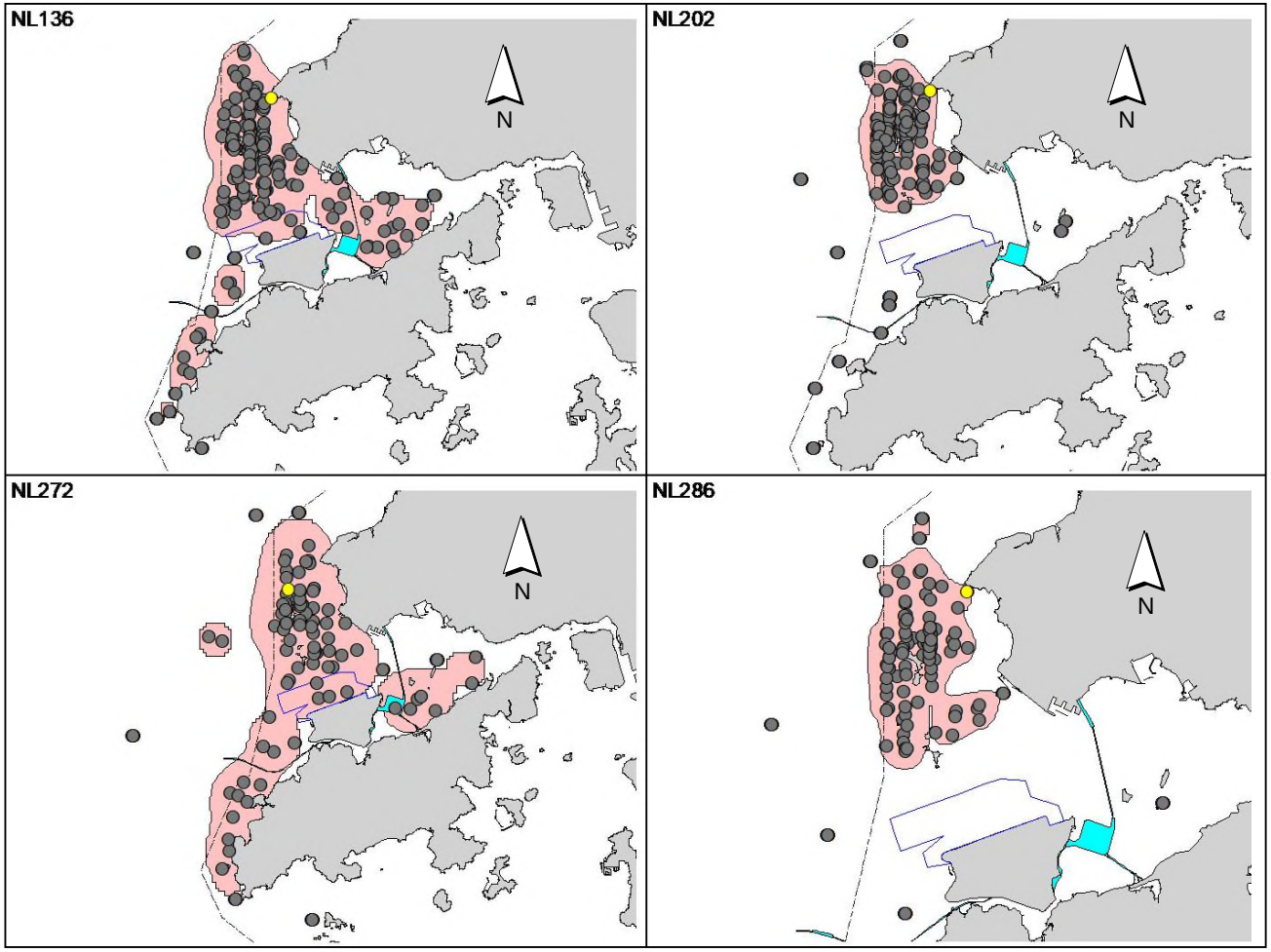
Appendix III. Individual dolphins identified during TMCLKL/HKLR03 monitoring surveys in September-November 2019

ID#	DATE	STG#	AREA
NL136	11/09/19	1	NW LANTAU
NL202	11/09/19	1	NW LANTAU
NL272	19/11/19	1	NW LANTAU
NL286	11/09/19	1	NW LANTAU

Appendix IV. Four individual dolphins that were identified between September and November 2019 under TMCLKL/HKLR03 monitoring surveys



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



Appendix I

Event and Action Plan

Event and Action Plan for Impact Air Monitoring

	Action			
	ET [(a)]	**IEC [(a)]**	**SOR [(a)]**	**Contractor(s)**
Action Level Exceedance				
	1. Identify the source. 2. Repeat measurement to confirm finding. If two consecutive measurements exceed Action Level, the exceedance is then confirmed. 3. Inform the IEC and the SOR. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. 6. Discuss with the IEC and the Contractor on remedial actions required. 7. If exceedance continues, arrange meeting with the IEC and the SOR. 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working method. 3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	1. Rectify any unacceptable practice 2. Amend working methods if appropriate 3. If the exceedance is confirmed to be Project related, submit proposals for remedial actions to IEC within 3 working days of notification 4. Implement the agreed proposals 5. Amend proposal if appropriate

	Action			
	ET [(a)]	**IEC [(a)]**	**SOR [(a)]**	**Contractor(s)**
Limit Level Exceedance				
	1. Identify the source. 2. Repeat measurement to confirm finding. If two consecutive measurements exceed Limit Level, the exceedance is then confirmed. 3. Inform the IEC, the SOR, the DEP and the Contractor. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. 6. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 7. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 8. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 9. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. If the exceedance is confirmed to be Project related after investigation, 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. If the exceedance is confirmed to be Project related after investigation, submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

Note: (a) ET – Environmental Team; IEC – Independent Environmental Checker; SOR – Supervising Officer's Representative

Event & Action Plan for Impact Water Quality Monitoring

Event	ET Leader	IEC	SOR	Contractor
Action level being exceeded by one sampling day	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.	1. Check monitoring data submitted by ET and Contractor's working methods.	1. Confirm receipt of notification of non-compliance in writing; 2. Notify Contractor.	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	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;	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.	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.	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	1. Repeat measurement on next day of exceedance to confirm findings;	1. Check monitoring data submitted by ET and	1. Confirm receipt of notification of failure in	1. Inform the SOR and confirm notification of the

Event	ET Leader	IEC	SOR	Contractor
	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;	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.	writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to review the working methods.	non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 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; 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 Limit level for two consecutive days;	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 Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. 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.	1. Take immediate action to avoid further exceedance; 2. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 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.

Note: ET – Environmental Team, IEC – Independent Environmental Checker, SOR – Supervising Officer's Representative

Event / Action Plan for Impact Dolphin Monitoring

EVENT	ACTION			
	ET	**IEC**	**SOR**	**Contractor**
Action Level	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.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor.	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.	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.
Limit Level	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;	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, SOR and	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 SOR is satisfied with the	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and SOR the necessity of additional dolphin monitoring and any other

EVENT	ACTION			
	ET	**IEC**	**SOR**	**Contractor**
	3. Identify source(s) of impact; 4. Inform the IEC, 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, 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.	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 SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly.	proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, 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.	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.

Note: ET – Environmental Team, IEC – Independent Environmental Checker, SOR – Supervising Officer's Representative

Appendix J

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

Table J1 *Cumulative Statistics on Exceedances*

Monitoring Parameters	Action/Limit Level	Total No. recorded in this reporting quarter	Total No. recorded since Contract commencement
1-Hr TSP	Action	8	101
	Limit	4	11
24-Hr TSP	Action	0	10
	Limit	0	4
Water Quality	Action	39	167
	Limit	0	19
Impact Dolphin Monitoring	Action	0	11
	Limit	1	17

Table J2 *Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions*

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Period (September to November 2019)	0	0	0
Total No. received since Contract commencement	17	1	0

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	27 September 2019

Dear Sir or Madam,

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

0212330_20September2019_1hrTSP_Station ASR1

One Limit Level Exceedance was recorded on 20 September 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**Limit Level Exceedance** **0212330_20September2019_1hrTSP_Station ASR1** **[Total No. of Exceedances = 1]**	
Date	20 September 2019 (Measured) 26 September 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m^3)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m^3)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m^3)	500
	24-hr TSP (µg/m^3)	260
Measured Levels	Limit Level Exceedance for 1-hr TSP is observed at ASR1 (539 µg/m3) during 1049 – 1149 hrs.	
Works Undertaken (at the time of monitoring event)	On 20 September 2019, Road and Drainage Works were carried out on site.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 20 September 2019 • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Project site and associated works areas. • With reference to the recorded wind direction (ranged between 2^o and 5^o, blowing from a northerly direction) and wind speed (ranged between 0.5 and 0.7 m/s) during the works period, Stations ASR1 are located downstream to the construction works at Portion N-A. However, the exceedance was only recorded in the third hour of 1-hour TSP monitoring with the same construction works and dust mitigation measures being carried out. Road & Drainage Works carried out at Portion N-A are unlikely to cause significant dust impact. Based on the above, the exceedance is unlikely to be due to this Contract.	

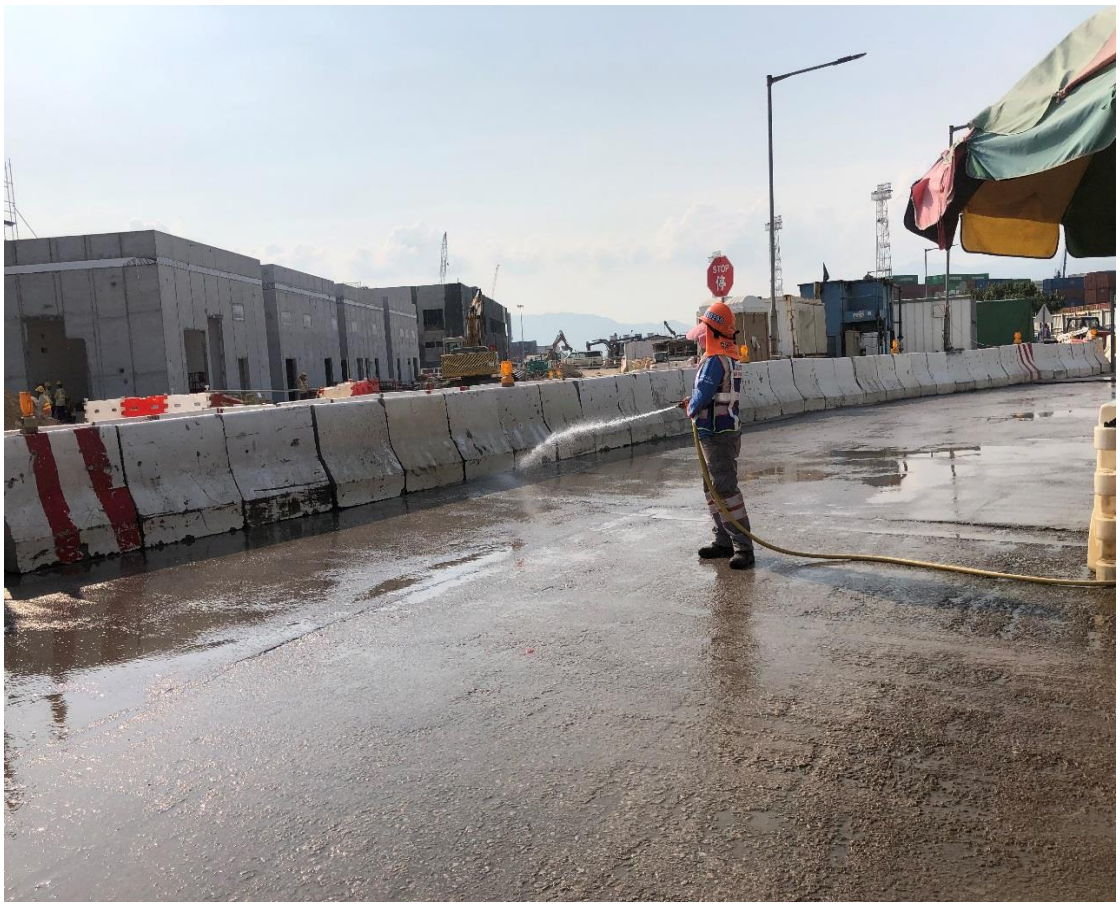
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site throughout the construction period.
Remarks	The monitoring results and the locations of air quality monitoring stations are attached.

ERM

Annex A Photos provided by the Contractor

*Note: Photos taken on 20/9/2019

Water truck was used for water spraying to prevent dust. (Works Area Portion N-C)



Water spraying was applied on main haul road to prevent dust. (Works Area Portion N-A)

Air quality monitoring results on 20/9/2019								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	20/9/2019	AQMS1	Sunny	8:56	1-hour TSP	125	ug/m3
TMCLKL	HY/2012/08	20/9/2019	AQMS1	Sunny	9:58	1-hour TSP	116	ug/m3
TMCLKL	HY/2012/08	20/9/2019	AQMS1	Sunny	11:00	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR1	Sunny	8:45	1-hour TSP	220	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR1	Sunny	9:47	1-hour TSP	214	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR1	Sunny	10:49	1-hour TSP	539	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR10	Sunny	8:11	1-hour TSP	107	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR10	Sunny	9:13	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR10	Sunny	10:15	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR5	Sunny	8:33	1-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR5	Sunny	9:35	1-hour TSP	188	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR5	Sunny	10:37	1-hour TSP	144	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR6	Sunny	8:23	1-hour TSP	152	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR6	Sunny	9:25	1-hour TSP	163	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR6	Sunny	10:27	1-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	20/9/2019	AQMS1	Sunny	12:02	24-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR1	Sunny	11:51	24-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR10	Sunny	11:17	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR5	Sunny	11:39	24-hour TSP	107	ug/m3
TMCLKL	HY/2012/08	20/9/2019	ASR6	Sunny	11:29	24-hour TSP	101	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
19/09/20	0:00	0.5	274
19/09/20	1:00	0.6	285
19/09/20	2:00	1.2	291
19/09/20	3:00	1	288
19/09/20	4:00	1.1	251
19/09/20	5:00	0.5	322
19/09/20	6:00	0.4	288
19/09/20	7:00	0.3	351
19/09/20	8:00	0.5	350
19/09/20	9:00	0.6	347
19/09/20	10:00	0.7	5
19/09/20	11:00	0.5	2
19/09/20	12:00	0.5	347
19/09/20	13:00	0.3	322
19/09/20	14:00	0.8	21
19/09/20	15:00	0.2	24
19/09/20	16:00	0.1	3
19/09/20	17:00	0.1	357
19/09/20	18:00	0.2	344
19/09/20	19:00	0.3	351
19/09/20	20:00	0.5	352
19/09/20	21:00	0.6	287
19/09/20	22:00	1.1	295
19/09/20	23:00	0.4	354
19/09/20	0:00	0.3	305

Figure 1

Indicative Construction Works Area on 20 September 2019

DATE: 06/03/2013

Environmental Resources Management

ERM

Dragages - Bouygues Joint Venture 實嘉 · 布依格聯營	Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section	**Weekly Water Spraying Record** **每週灑水檢查記錄**

Site Location 地盤位置: Northern Landfall

Date 日期: 16 Sep 2019 to 至 22 Sep 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	✓	✓	✓	✓	✓	✓	✓
2	8:45 – 9:30	✓	✓	✓	✓	✓	✓	✓
3	9:30 – 10:15	✓	✓	✓	✓	✓	✓	✓
4	10:15 – 11:00	✓	✓	✓	✓	✓	✓	✓
5	11:00 – 11:45	✓	✓	✓	✓	✓	✓	✓
6	11:45 – 12:30	✓	✓	✓	✓	✓	✓	✓
7	12:30 – 13:15	✓	✓	✓	✓	✓	✓	✓
8	13:15 – 14:00	✓	✓	✓	✓	✓	✓	✓
9	14:00 – 14:45	✓	✓	✓	✓	✓	✓	✓
10	14:45 – 15:30	✓	✓	✓	✓	✓	✓	✓
11	15:30 – 16:45	✓	✓	✓	✓	✓	✓	✓
12	16:45 – 17:30	✓	✓	✓	✓	✓	✓	✓
	Verified by Site Foreman 地盤科文簽署確認	✓	✓	✓	✓	✓	✓	✓

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (√) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(√)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

(1) Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
(2) Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
(3) If it is raining, no water spraying is needed.
(4) The no of spraying will be increased due to site condition.

備註:

(1) 根據環境許可證 3.15 條例，在整個施工階段內，許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
(2) 灑水位置包括主要運輸道路，空曠地帶，斜坡，存料堆，以及任何其他產生塵埃物料。
(3) 當下雨時，地盤將不需要灑水。
(4) 如果地盤情況更改或有需要時，灑水次數會相應增加。

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	24 October 2019

Dear Sir or Madam,

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

0212330_14October2019_1hrTSP_Station ASR1

One Action Level Exceedance was recorded on 14 October 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_14October2019_1hrTSP_Station ASR1 [Total No. of Exceedances = 1]**	
Date	14 October 2019 (Measured) 24 October 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m^3)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m^3)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m^3)	500
	24-hr TSP (µg/m^3)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR1 (363 µg/m3) during 0950 – 1050 hrs.	
Works Undertaken (at the time of monitoring event)	On 14 October 2019, Road and Drainage Works were carried out on site.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 14 October 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Project site and associated works areas. • With reference to the recorded wind direction (ranged between 65^o and 335^o, blowing from a North-easterly and North-westerly direction) and wind speed (0.4 m/s) during the works period, Stations ASR1 are located downstream to the construction works at Portion N-A. However, the exceedance was only recorded in the second hour of 1-hour TSP monitoring with the same construction works and dust mitigation measures being carried out. Road & Drainage Works carried out at Portion N-A are unlikely to cause significant dust impact. Based on the above, the exceedance is unlikely to be due to this Contract.	

Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site throughout the construction period.
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached.

Air quality monitoring results on 14/10/2019								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	14/10/2019	AQMS1	Sunny	9:00	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	14/10/2019	AQMS1	Sunny	10:02	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	14/10/2019	AQMS1	Sunny	11:04	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR1	Sunny	8:48	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR1	Sunny	9:50	1-hour TSP	363	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR1	Sunny	10:52	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR10	Sunny	8:15	1-hour TSP	36	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR10	Sunny	9:17	1-hour TSP	35	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR10	Sunny	10:19	1-hour TSP	48	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR5	Sunny	8:37	1-hour TSP	278	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR5	Sunny	9:39	1-hour TSP	135	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR5	Sunny	10:41	1-hour TSP	154	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR6	Sunny	8:25	1-hour TSP	101	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR6	Sunny	9:27	1-hour TSP	77	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR6	Sunny	10:29	1-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	14/10/2019	AQMS1	Sunny	12:06	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR1	Sunny	11:54	24-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR10	Sunny	11:21	24-hour TSP	41	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR5	Sunny	11:43	24-hour TSP	116	ug/m3
TMCLKL	HY/2012/08	14/10/2019	ASR6	Sunny	11:31	24-hour TSP	65	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
19/10/14	0:00	0.4	165
19/10/14	1:00	0.4	336
19/10/14	2:00	0.9	77
19/10/14	3:00	0.9	66
19/10/14	4:00	1.3	65
19/10/14	5:00	0.9	80
19/10/14	6:00	0.4	178
19/10/14	7:00	0.4	187
19/10/14	8:00	0	-
19/10/14	9:00	0.4	65
19/10/14	10:00	0.4	335
19/10/14	11:00	0.9	60
19/10/14	12:00	1.3	64
19/10/14	13:00	0.9	83
19/10/14	14:00	0.9	3
19/10/14	15:00	1.3	30
19/10/14	16:00	1.3	344
19/10/14	17:00	1.3	114
19/10/14	18:00	0.4	123
19/10/14	19:00	0.4	81
19/10/14	20:00	0.9	65
19/10/14	21:00	0.9	86
19/10/14	22:00	1.3	83
19/10/14	23:00	2.7	62

Figure 1

Indicative Construction Works Area on 14 October 2019

DATE: 06/03/2013

Environmental Resources Management

ERM

Dragages Hong Kong	Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section	**Weekly Water Spraying Record** **每週灑水檢查記錄**

Site Location 地盤位置: Northern Landfall

Date 日期: 14 Oct 2019 to 至 20 Oct 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	√	√	—	—	√	—	—
2	8:45 – 9:30	—	—	—	—	—	—	—
3	9:30 – 10:15	—	—	—	—	—	—	—
4	10:15 – 11:00	—	—	—	—	—	—	—
5	11:00 – 11:45	—	—	—	—	—	—	—
6	11:45 – 12:30	—	—	—	—	—	—	—
7	12:30 – 13:15	—	—	—	—	—	—	—
8	13:15 – 14:00	—	—	—	—	—	—	—
9	14:00 – 14:45	—	—	—	—	—	—	—
10	14:45 – 15:30	—	—	—	—	—	—	—
11	15:30 – 16:45	—	—	—	—	—	—	—
12	16:45 – 17:30	—	—	—	—	—	—	—
	Verified by Site Foreman 地盤科文簽署確認	7	7	7	7	7	7	7

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (√) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(√)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

(1) Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
(2) Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
(3) If it is raining, no water spraying is needed.
(4) The no of spraying will be increased due to site condition.

備註:

(1) 根據環境許可證 3. 15 條例，在整個施工階段內，許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
(2) 灑水位置包括主要運輸道路，空曠地帶，斜坡，存料堆，以及任何其他產生塵埃物料。
(3) 當下雨時，地盤將不需要灑水。
(4) 如果地盤情況更改或有需要時，灑水次數會相應增加。

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	24 October 2019

ERM

Dear Sir or Madam,

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

0212330_17October2019_1hrTSP_Station ASR1
0212330_17October2019_1hrTSP_Station ASR1

Two Action Level Exceedances were recorded on 17 October 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_17October2019_1hrTSP_Station ASR1 0212330_17October2019_1hrTSP_Station ASR1 [Total No. of Exceedances = 2]**	
Date	17 October 2019 (Measured) 24 October 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m^3)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m^3)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m^3)	500
	24-hr TSP (µg/m^3)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR1 (354 µg/m3) during 0941 – 1041 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR1 (385 µg/m3) during 1043 – 1143 hrs.	
Works Undertaken (at the time of monitoring event)	On 17 October 2019, Road and Drainage Works were carried out on site.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 17 October 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Project site and associated works areas. • With reference to the recorded wind direction (ranged between 67^o and 98^o, blowing from a north-easterly direction) and wind speed (ranged between 1.3 and 1.8 m/s) during the works period, Stations ASR1 are located downstream to the construction works at Portion N-A. However, only Road & Drainage Works was carried out at Portion N-A on 17 October 2019, which are unlikely to cause significant dust impact. Based on the above, the exceedance is unlikely to be due to this Contract.	

Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site throughout the construction period.
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached.

Air quality monitoring results on 17/10/2019								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	17/10/2019	AQMS1	Sunny	8:50	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	17/10/2019	AQMS1	Sunny	9:52	1-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	17/10/2019	AQMS1	Sunny	10:54	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR1	Sunny	8:39	1-hour TSP	331	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR1	Sunny	9:41	1-hour TSP	354	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR1	Sunny	10:43	1-hour TSP	385	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR10	Sunny	8:04	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR10	Sunny	9:06	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR10	Sunny	10:08	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR5	Sunny	8:27	1-hour TSP	288	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR5	Sunny	9:29	1-hour TSP	230	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR5	Sunny	10:31	1-hour TSP	165	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR6	Sunny	8:15	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR6	Sunny	9:17	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR6	Sunny	10:19	1-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	17/10/2019	AQMS1	Sunny	11:56	24-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR1	Sunny	11:45	24-hour TSP	144	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR10	Sunny	11:10	24-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR5	Sunny	11:33	24-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	17/10/2019	ASR6	Sunny	11:21	24-hour TSP	81	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
19/10/17	0:00	0.4	153
19/10/17	1:00	0.4	108
19/10/17	2:00	0.4	7
19/10/17	3:00	0.4	69
19/10/17	4:00	0.4	183
19/10/17	5:00	0	-
19/10/17	6:00	0.4	111
19/10/17	7:00	1.3	101
19/10/17	8:00	2.2	67
19/10/17	9:00	1.8	84
19/10/17	10:00	1.3	98
19/10/17	11:00	1.8	67
19/10/17	12:00	1.3	98
19/10/17	13:00	1.8	44
19/10/17	14:00	1.3	56
19/10/17	15:00	0.9	74
19/10/17	16:00	0.9	27
19/10/17	17:00	0.9	329
19/10/17	18:00	0.9	345
19/10/17	19:00	0.9	356
19/10/17	20:00	0.9	337
19/10/17	21:00	0.9	351
19/10/17	22:00	1.3	335
19/10/17	23:00	1.3	339

Figure 1

Indicative Construction Works Area on 17 October 2019

DATE: 06/03/2013

Environmental Resources Management

ERM

Dragages Hong Kong	Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section	**Weekly Water Spraying Record** **每週灑水檢查記錄**

Site Location 地盤位置: Northern Landfall

Date 日期: 14 Oct 2019 to 至 20 Oct 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	√	√	—	—	√	—	—
2	8:45 – 9:30	—	—	—	—	—	—	—
3	9:30 – 10:15	—	—	—	—	—	—	—
4	10:15 – 11:00	—	—	—	—	—	—	—
5	11:00 – 11:45	—	—	—	—	—	—	—
6	11:45 – 12:30	—	—	—	—	—	—	—
7	12:30 – 13:15	—	—	—	—	—	—	—
8	13:15 – 14:00	—	—	—	—	—	—	—
9	14:00 – 14:45	—	—	—	—	—	—	—
10	14:45 – 15:30	—	—	—	—	—	—	—
11	15:30 – 16:45	—	—	—	—	—	—	—
12	16:45 – 17:30	—	—	—	—	—	—	—
	Verified by Site Foreman 地盤科文簽署確認	7	7	7	7	7	7	7

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (√) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(√)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

(1) Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
(2) Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
(3) If it is raining, no water spraying is needed.
(4) The no of spraying will be increased due to site condition.

備註:

(1) 根據環境許可證 3. 15 條例，在整個施工階段內，許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
(2) 灑水位置包括主要運輸道路，空曠地帶，斜坡，存料堆，以及任何其他產生塵埃物料。
(3) 當下雨時，地盤將不需要灑水。
(4) 如果地盤情況更改或有需要時，灑水次數會相應增加。

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Contract number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	18 November 2019

ERM

Dear Sir or Madam,

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

0212330_4November2019_1hrTSP_Station ASR1
0212330_4November2019_1hrTSP_Station ASR5

One Action Level and One Limit Level Exceedances were recorded on 4 November 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK –
NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_4November2019_1hrTSP_Station ASR5 <u>Limit Level Exceedance</u> 0212330_4November2019_1hrTSP_Station ASR1 [Total No. of Exceedances = 2]**	
Date	4 November 2019 (Measured) 14 November 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m³)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m³)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m³)	500
	24-hr TSP (µg/m³)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (398 µg/m3) during 0826 - 0926 hrs. Limit Level Exceedance for 1-hr TSP is observed at ASR1 (626 µg/m3) during 0839 - 0939 hrs.	
Works Undertaken (at the time of monitoring event)	On 4 November 2019, Road and Drainage Works were carried out on site.	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 4 November 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Contract site and associated works areas. • With reference to the recorded wind direction (ranged between 14^{o} and 16^{o}, blowing from a north-easterly direction) and wind speed (2.2 m/s) during the works period, Stations ASR1 are located downstream to the construction works at Portion N-A. However, only Road & Drainage Works was carried out at Portion N-A on 4 November 2019, • Stations ASR1 are located downstream to the construction works at Portion N-A during the 1-hour TSP monitoring. However, with similar wind speed and wind direction in the 2nd and 3rd hour, the exceedance was only recorded in the 1st hour of 1-hour TSP monitoring with the same construction works and dust mitigation measures being carried out. Road & Drainage Works carried out at Portion N-A are unlikely to cause significant dust impact. • Stations ASR5 are located upstream to the construction works at Portion N-A during the recorded exceedance. Therefore, the exceedance is unlikely to be related to this Contract. Based on the above, the exceedance is unlikely to be due to this Contract.
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached.

Air quality monitoring results on 4/11/2019								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2019-11-04	AQMS1	Sunny	8:50	1-hour TSP	154	ug/m3
TMCLKL	HY/2012/08	2019-11-04	AQMS1	Sunny	9:52	1-hour TSP	147	ug/m3
TMCLKL	HY/2012/08	2019-11-04	AQMS1	Sunny	10:54	1-hour TSP	143	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR1	Sunny	8:39	1-hour TSP	626	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR1	Sunny	9:41	1-hour TSP	264	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR1	Sunny	10:43	1-hour TSP	251	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR10	Sunny	8:02	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR10	Sunny	9:04	1-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR10	Sunny	10:06	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR5	Sunny	8:26	1-hour TSP	398	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR5	Sunny	9:28	1-hour TSP	251	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR5	Sunny	10:30	1-hour TSP	242	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR6	Sunny	8:14	1-hour TSP	202	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR6	Sunny	9:16	1-hour TSP	174	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR6	Sunny	10:18	1-hour TSP	169	ug/m3
TMCLKL	HY/2012/08	2019-11-04	AQMS1	Sunny	11:56	24-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR1	Sunny	11:45	24-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR10	Sunny	11:08	24-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR5	Sunny	11:32	24-hour TSP	146	ug/m3
TMCLKL	HY/2012/08	2019-11-04	ASR6	Sunny	11:20	24-hour TSP	106	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
19/11/04	0:00	1.3	342
19/11/04	1:00	1.8	17
19/11/04	2:00	2.7	341
19/11/04	3:00	3.1	359
19/11/04	4:00	3.6	3
19/11/04	5:00	3.6	4
19/11/04	6:00	1.8	14
19/11/04	7:00	1.3	342
19/11/04	8:00	2.2	16
19/11/04	9:00	2.2	14
19/11/04	10:00	1.8	12
19/11/04	11:00	2.2	30
19/11/04	12:00	1.8	23
19/11/04	13:00	1.8	16
19/11/04	14:00	1.3	18
19/11/04	15:00	1.3	25
19/11/04	16:00	1.8	347
19/11/04	17:00	1.8	332
19/11/04	18:00	1.8	313
19/11/04	19:00	0.9	326
19/11/04	20:00	0.4	324
19/11/04	21:00	0.4	320
19/11/04	22:00	0.9	328
19/11/04	23:00	1.8	343

Figure 1

Indicative Construction Works Area on 4 November 2019

DATE: 06/03/2013

Environmental Resources Management

ERM

Dragages Hong Kong	Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section	**Weekly Water Spraying Record** **每週灑水檢查記錄**

Site Location 地盤位置: Northern Landfall

Date 日期: 04 Nov 2019 to 至 10 Nov 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	√	√	√	√	√	√	√
2	8:45 – 9:30	√	√	√	√	√	√	√
3	9:30 – 10:15	√	√	√	√	√	√	√
4	10:15 – 11:00	√	√	√	√	√	√	√
5	11:00 – 11:45	√	√	√	√	√	√	√
6	11:45 – 12:30	√	√	√	√	√	√	√
7	12:30 – 13:15	√	√	√	√	√	√	√
8	13:15 – 14:00	√	√	√	√	√	√	√
9	14:00 – 14:45	√	√	√	√	√	√	√
10	14:45 – 15:30	√	√	√	√	√	√	√
11	15:30 – 16:45	√	√	√	√	√	√	√
12	16:45 – 17:30	√	√	√	√	√	√	√
	Verified by Site Foreman 地盤科文簽署確認							

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (√) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(√)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

(1) Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
(2) Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
(3) If it is raining, no water spraying is needed.
(4) The no of spraying will be increased due to site condition.

備註:

(1) 根據環境許可證 3. 15 條例，在整個施工階段內，許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
(2) 灑水位置包括主要運輸道路，空曠地帶，斜坡，存料堆，以及任何其他產生塵埃物料。
(3) 當下雨時，地盤將不需要灑水。
(4) 如果地盤情況更改或有需要時，灑水次數會相應增加。

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	19 November 2019

ERM

Dear Sir or Madam,

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

0212330_7November2019_1hrTSP_Station ASR5

One Action Level Exceedance was recorded on 7 November 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_7November2019_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]**	
Date	7 November 2019 (Measured) 19 November 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m^3)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m^3)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m^3)	500
	24-hr TSP (µg/m^3)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (479 µg/m3) during 1324- 1424hrs.	
Works Undertaken (at the time of monitoring event)	On 7 November 2019, Road and Drainage Works were carried out on site.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 7 November 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Project site and associated works areas. • With reference to the recorded wind direction (ranged between 16^o and 304^o, blowing from a north-easterly or north-westerly direction) and wind speed (1.8 – 2.2 m/s) during the works period, Stations ASR5 are located upstream to the construction works at Portion N-A. Therefore, the exceedance is unlikely to be related to this Contract. Based on the above, the exceedance is unlikely to be due to this Contract.	
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site throughout the construction period.	

Remarks	The monitoring results, wind data, water spraying record and the locations of air quality monitoring stations are attached.

Air quality monitoring results on 7/11/2019								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2019-11-07	AQMS1	Sunny	13:46	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2019-11-07	AQMS1	Sunny	14:48	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2019-11-07	AQMS1	Sunny	15:50	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR1	Sunny	13:35	1-hour TSP	239	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR1	Sunny	14:37	1-hour TSP	180	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR1	Sunny	15:39	1-hour TSP	160	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR10	Sunny	13:01	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR10	Sunny	14:03	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR10	Sunny	15:05	1-hour TSP	53	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR5	Sunny	13:24	1-hour TSP	479	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR5	Sunny	14:26	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR5	Sunny	15:28	1-hour TSP	147	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR6	Sunny	13:13	1-hour TSP	212	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR6	Sunny	14:15	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR6	Sunny	15:17	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2019-11-07	AQMS1	Sunny	16:52	24-hour TSP	86	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR1	Sunny	16:41	24-hour TSP	158	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR10	Sunny	16:07	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR5	Sunny	16:30	24-hour TSP	196	ug/m3
TMCLKL	HY/2012/08	2019-11-07	ASR6	Sunny	16:19	24-hour TSP	105	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
19/11/07	0:00	0	-
19/11/07	1:00	0	-
19/11/07	2:00	0.4	22
19/11/07	3:00	0.9	25
19/11/07	4:00	1.8	32
19/11/07	5:00	1.8	21
19/11/07	6:00	1.3	22
19/11/07	7:00	1.8	31
19/11/07	8:00	1.8	15
19/11/07	9:00	1.8	4
19/11/07	10:00	2.2	33
19/11/07	11:00	2.2	33
19/11/07	12:00	2.2	16
19/11/07	13:00	1.8	16
19/11/07	14:00	2.2	304
19/11/07	15:00	2.7	316
19/11/07	16:00	1.3	341
19/11/07	17:00	1.8	316
19/11/07	18:00	1.8	327
19/11/07	19:00	0.4	318
19/11/07	20:00	0	-
19/11/07	21:00	0.4	336
19/11/07	22:00	1.3	313
19/11/07	23:00	1.8	357

Figure 1

Indicative Construction Works Area on 7 November 2019

DATE: 06/03/2013

Environmental Resources Management

ERM

Dragages Hong Kong	Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section	**Weekly Water Spraying Record** **每週灑水檢查記錄**

Site Location 地盤位置: Northern Landfall

Date 日期: 04 Nov 2019 to 至 10 Nov 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	√	√	√	√	√	√	√
2	8:45 – 9:30	√	√	√	√	√	√	√
3	9:30 – 10:15	√	√	√	√	√	√	√
4	10:15 – 11:00	√	√	√	√	√	√	√
5	11:00 – 11:45	√	√	√	√	√	√	√
6	11:45 – 12:30	√	√	√	√	√	√	√
7	12:30 – 13:15	√	√	√	√	√	√	√
8	13:15 – 14:00	√	√	√	√	√	√	√
9	14:00 – 14:45	√	√	√	√	√	√	√
10	14:45 – 15:30	√	√	√	√	√	√	√
11	15:30 – 16:45	√	√	√	√	√	√	√
12	16:45 – 17:30	√	√	√	√	√	√	√
	Verified by Site Foreman 地盤科文簽署確認							

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (√) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(√)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

(1) Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
(2) Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
(3) If it is raining, no water spraying is needed.
(4) The no of spraying will be increased due to site condition.

備註:

(1) 根據環境許可證 3. 15 條例，在整個施工階段內，許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
(2) 灑水位置包括主要運輸道路，空曠地帶，斜坡，存料堆，以及任何其他產生塵埃物料。
(3) 當下雨時，地盤將不需要灑水。
(4) 如果地盤情況更改或有需要時，灑水次數會相應增加。

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Contract number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	4 December 2019

ERM

Dear Sir or Madam,

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

0212330_28November2019_1hrTSP_Station ASR1
0212330_28November2019_1hrTSP_Station ASR1
0212330_28November2019_1hrTSP_Station ASR1
0212330_28November2019_1hrTSP_Station ASR5
0212330_28November2019_1hrTSP_Station ASR5

Two Limit Level and Three Action Level Exceedances were recorded on 28 November 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u>** **0212330_28November2019_1hrTSP_Station ASR1** **0212330_28November2019_1hrTSP_Station ASR1** **0212330_28November2019_1hrTSP_Station ASR5** **<u>Limit Level Exceedance</u>** **0212330_28November2019_1hrTSP_Station ASR1** **0212330_28November2019_1hrTSP_Station ASR5** **[Total No. of Exceedances = 5]**	
Date	28 November 2019 (Measured) 4 December 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m³)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m³)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m³)	500
	24-hr TSP (µg/m³)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR1 (452 µg/m³) during 0940- 1040hrs. Action Level Exceedance for 1-hr TSP is observed at ASR1 (385 µg/m³) during 1042- 1142hrs. Action Level Exceedance for 1-hr TSP is observed at ASR5 (500 µg/m³) during 0927- 1027hrs. Limit Level Exceedance for 1-hr TSP is observed at ASR1 (577 µg/m³) during 0838- 0938hrs. Limit Level Exceedance for 1-hr TSP is observed at ASR5 (534 µg/m³) during 0802- 0902hrs.	
Works Undertaken (at the time of monitoring event)	On 28 November 2019, Road and Drainage Works were carried out on site.	

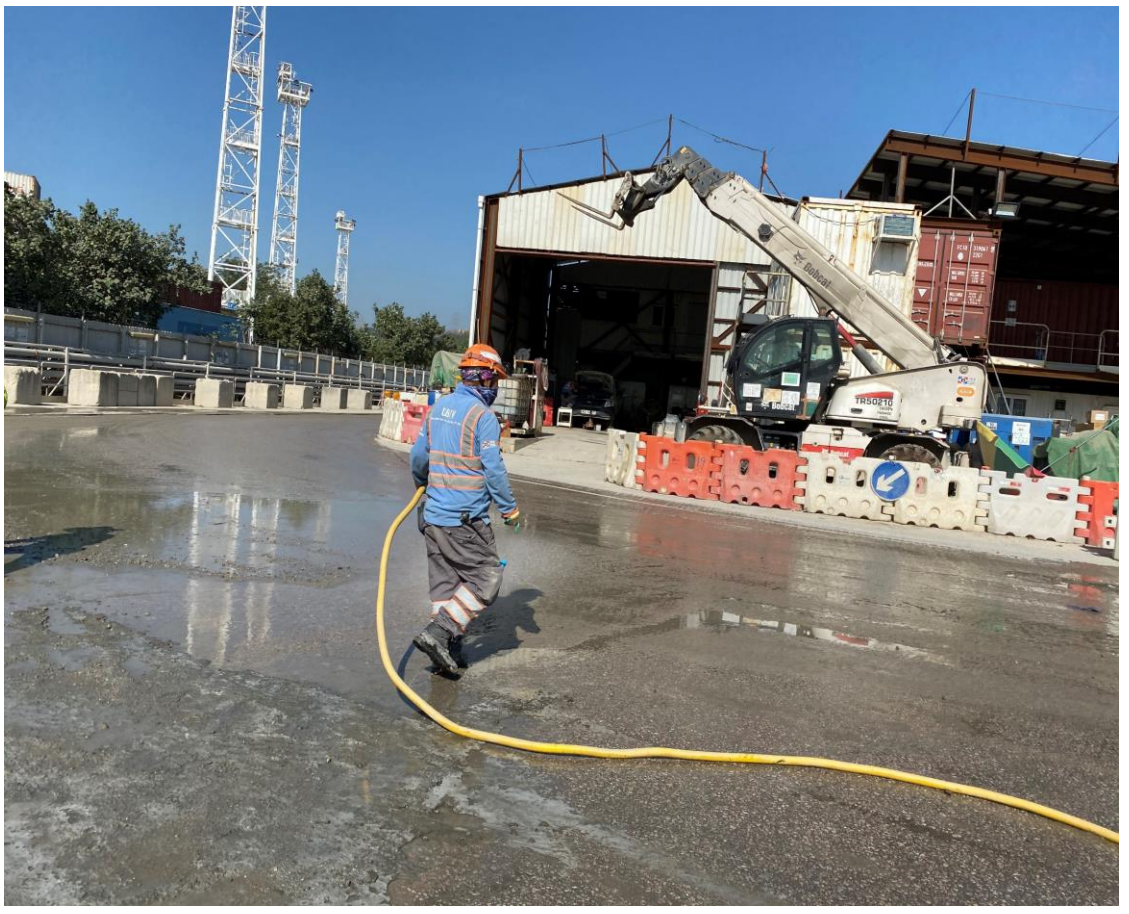
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 28 November 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Contract site and associated works areas. Photo record is provided. • With reference to the recorded wind direction (ranged between 14^{o} and 34^{o}, blowing from a north-easterly direction) and wind speed (2.2 – 2.7 m/s) during the works period, Stations ASR5 are located upstream to the construction works at Portion N-A. Stations ASR1 are located downstream to the construction works at Portion N-A. However, Road & Drainage Works carried out at Portion N-A with implementation of dust mitigation measures are unlikely to cause significant dust impact. Based on the above, the exceedance is unlikely to be due to this Contract.
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached.

ERM

Annex A Photos provided by the Contractor

*Note: Photos taken on 28/11/2019

Water truck was used for water spraying to prevent dust. (Works Area Portion N-A)



Water spraying was applied on main haul road to prevent dust. (Works Area Portion N-A)

ERM

Annex A Photos provided by the Contractor

*Note: Photos taken on 28/11/2019

Exposed soi is covered by tarpaulin sheet to prevent dust. (Works Area Portion N-C)

Water spraying was applied on main haul road to prevent dust. (Works Area Portion N-C)

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
19/11/28	0:00	0	-
19/11/28	1:00	0.4	346
19/11/28	2:00	1.8	2
19/11/28	3:00	2.2	331
19/11/28	4:00	0.9	20
19/11/28	5:00	1.3	341
19/11/28	6:00	1.3	339
19/11/28	7:00	1.3	357
19/11/28	8:00	2.2	24
19/11/28	9:00	2.7	14
19/11/28	10:00	2.2	34
19/11/28	11:00	1.8	344
19/11/28	12:00	1.8	311
19/11/28	13:00	1.8	310
19/11/28	14:00	1.8	336
19/11/28	15:00	1.3	341
19/11/28	16:00	1.8	337
19/11/28	17:00	1.3	340
19/11/28	18:00	1.8	338
19/11/28	19:00	1.8	335
19/11/28	20:00	2.2	3
19/11/28	21:00	2.2	20
19/11/28	22:00	2.7	24
19/11/28	23:00	2.2	30

Air quality monitoring results on 28/11/2019								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2019-11-28	AQMS1	Sunny	8:49	1-hour TSP	187	ug/m3
TMCLKL	HY/2012/08	2019-11-28	AQMS1	Sunny	9:51	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2019-11-28	AQMS1	Sunny	10:53	1-hour TSP	143	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR1	Sunny	8:38	1-hour TSP	577	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR1	Sunny	9:40	1-hour TSP	452	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR1	Sunny	10:42	1-hour TSP	385	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR10	Sunny	8:00	1-hour TSP	125	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR10	Sunny	9:02	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR10	Sunny	10:04	1-hour TSP	143	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR5	Sunny	8:02	1-hour TSP	534	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR5	Sunny	9:27	1-hour TSP	500	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR5	Sunny	10:29	1-hour TSP	299	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR6	Sunny	8:13	1-hour TSP	216	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR6	Sunny	9:15	1-hour TSP	183	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR6	Sunny	10:17	1-hour TSP	175	ug/m3
TMCLKL	HY/2012/08	2019-11-28	AQMS1	Sunny	11:55	24-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR1	Sunny	11:44	24-hour TSP	207	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR10	Sunny	11:06	24-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR5	Sunny	11:31	24-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	2019-11-28	ASR6	Sunny	11:19	24-hour TSP	109	ug/m3

Figure 1

Indicative Construction Works Area on 28 November 2019

DATE: 06/03/2013

Environmental Resources Management

ERM

Dragages Hong Kong	Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section	**Weekly Water Spraying Record** **每週灑水檢查記錄**

Site Location 地盤位置: Northern Landfall

Date 日期: 25 Nov 2019 to 至 01 Dec 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	√	√	√	√	√	√	√
2	8:45 – 9:30	√	√	√	√	√	√	√
3	9:30 – 10:15	√	√	√	√	√	√	√
4	10:15 – 11:00	√	√	√	√	√	√	√
5	11:00 – 11:45	√	√	√	√	√	√	√
6	11:45 – 12:30	√	√	√	√	√	√	√
7	12:30 – 13:15	√	√	√	√	√	√	√
8	13:15 – 14:00	√	√	√	√	√	√	√
9	14:00 – 14:45	√	√	√	√	√	√	√
10	14:45 – 15:30	√	√	√	√	√	√	√
11	15:30 – 16:45	√	√	√	√	√	√	√
12	16:45 – 17:30	√	√	√	√	√	√	√
	Verified by Site Foreman 地盤科文簽署確認	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (√) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(√)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

(1) Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
(2) Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
(3) If it is raining, no water spraying is needed.
(4) The no of spraying will be increased due to site condition.

備註:

(1) 根據環境許可證 3. 15 條例, 在整個施工階段內, 許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
(2) 灑水位置包括主要運輸道路, 空曠地帶, 斜坡, 存料堆, 以及任何其他產生塵埃物料。
(3) 當下雨時, 地盤將不需要灑水。
(4) 如果地盤情況更改或有需要時, 灑水次數會相應增加。

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	16 September 2019

ERM

Dear Sir or Madam,

Please find the Notification of Exceedance (NOE) of the following Log no.:
Action Level Exceedance
0212330_6 September 2019_ Bottom DO_F_Station SR4a

A total of one Action Level exceedance was recorded on 6 September 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_6 September 2019_ Bottom DO_F_Station SR4a [Total No. of Exceedances = 1]**		
Date	6 September 2019 (Measured) 9 September 2019 (*In situ* results received by ERM) 17 September 2019 (Laboratory results received by ERM)		
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11		
Parameter(s) with Exceedance(s)	Dissolved Oxygen (mg/L)		
Action Levels	DO	Surface and Middle 5.0 mg/L	Bottom 4.7 mg/L
Limit Levels	DO	Surface and Middle 4.2 mg/L	Bottom 3.6 mg/L
Measured Levels	<u>Action Level Exceedance</u> 1. Mid-flood at SR4a (Bottom-depth DO = 4.5 mg/L)		
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 6 September 2019.		
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except DO, 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. • SR4a is far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • The DO pattern at SR4a during mid-flood tide was similar to their corresponding control station where the bottom-depth DO levels were generally lower. Lower bottom-depth DO levels may be possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level. • As reported by the marine mammal observer, no discharge of organic matters into waters from landside works area was recorded. Moreover, no exceedance was recorded at IS(Mf)16 which is the closest station to the Seawall Modification Works Area during both mid-ebb and mid-flood tide. Therefore, exceedances recorded at SR4a during mid-flood tide are unlikely to be caused by the marine works of this Contract.		
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.		
Remarks	The monitoring results on 6 September 2019 and locations of water quality monitoring stations are attached.		

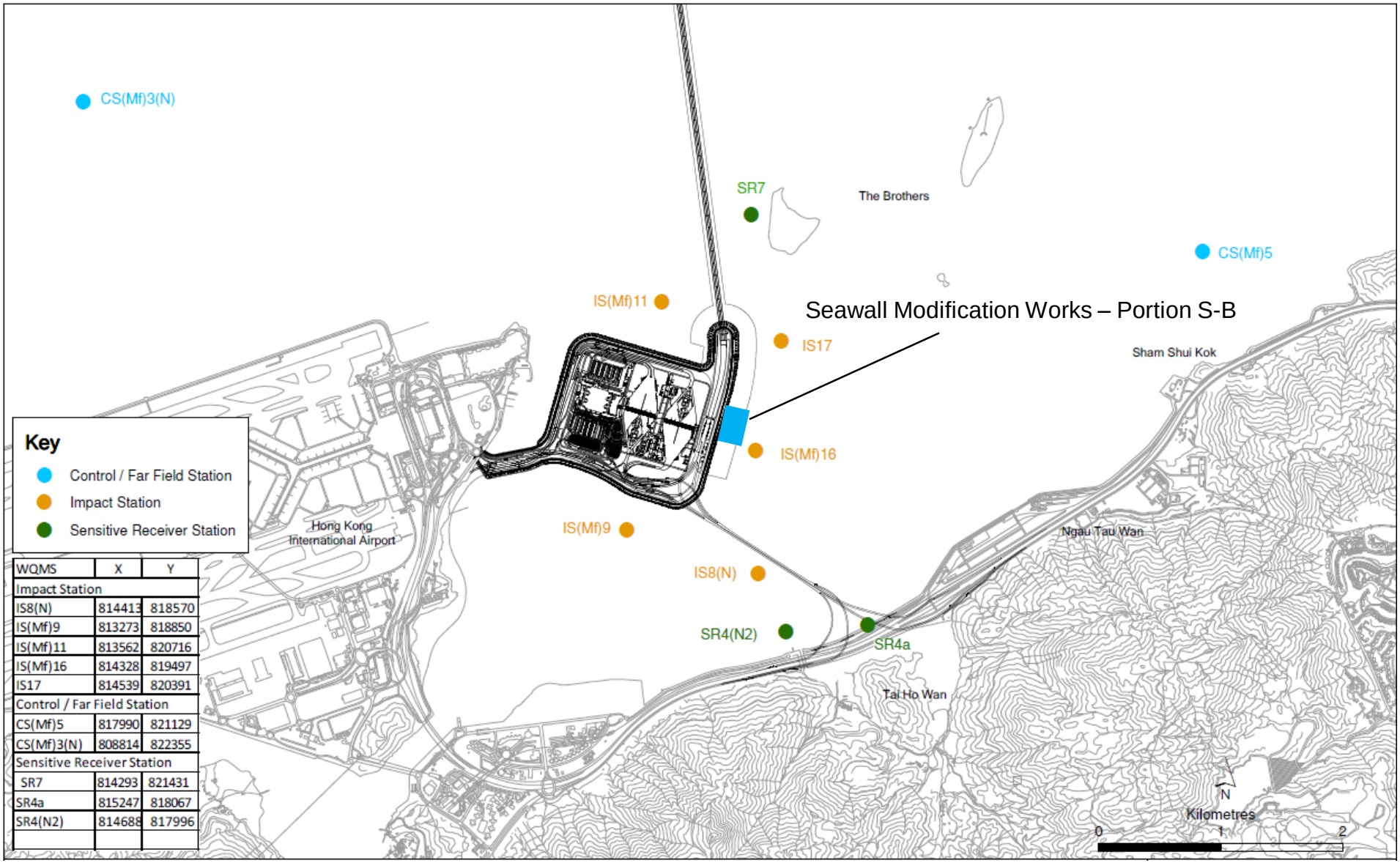
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)5	18:40	Surface	1	1	28.0	7.9	25.8	5.5	5.2	1.0	1.4	3.2	2.7
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)5	18:40	Surface	1	2	28.1	7.9	25.6	5.6		1.0		3.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)5	18:40	Middle	2	1	27.5	7.9	27.8	4.9		1.6		3.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)5	18:40	Middle	2	2	27.5	7.9	27.7	4.9		1.5		3.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)5	18:40	Bottom	3	1	27.5	7.9	27.7	4.9	4.9	1.7		1.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)5	18:40	Bottom	3	2	27.5	7.9	27.8	4.9		1.7		1.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)3(N)	17:53	Surface	1	1	28.4	7.9	19.7	5.6	5.4	2.5	3.2	3.5	4.8
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)3(N)	17:53	Surface	1	2	28.5	7.9	19.8	5.5		2.7		3.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)3(N)	17:53	Middle	2	1	28.0	7.9	22.9	5.3		2.7		4.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)3(N)	17:53	Middle	2	2	28.0	7.9	22.9	5.3		2.5		3.8	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)3(N)	17:53	Bottom	3	1	28.0	7.9	25.2	5.4	5.4	4.4		6.4	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	CS(Mf)3(N)	17:53	Bottom	3	2	28.0	7.9	25.1	5.4		4.2		7.0	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)16	17:18	Surface	1	1	28.0	7.9	24.9	5.5	5.6	5.2	5.2	7.1	5.1
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)16	17:18	Surface	1	2	28.1	7.9	24.7	5.6		5.3		6.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)16	17:18	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)16	17:18	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)16	17:18	Bottom	3	1	27.6	7.8	25.8	5.0	5.0	5.2		3.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)16	17:18	Bottom	3	2	27.6	7.8	25.8	5.0		5.2		3.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4a	17:09	Surface	1	1	28.1	7.8	24.6	5.7	5.7	9.4	12.3	4.0	4.7
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4a	17:09	Surface	1	2	28.2	7.8	24.4	5.7		9.2		3.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4a	17:09	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4a	17:09	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4a	17:09	Bottom	3	1	27.9	7.8	24.9	4.9	4.9	15.2		5.4	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4a	17:09	Bottom	3	2	27.9	7.8	24.9	4.9		15.4		5.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4(N2)	17:04	Surface	1	1	28.4	7.9	24.1	5.9	5.9	4.1	6.4	5.6	4.6
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4(N2)	17:04	Surface	1	2	28.4	7.9	24.1	5.9		4.2		5.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4(N2)	17:04	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4(N2)	17:04	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4(N2)	17:04	Bottom	3	1	28.4	7.8	24.2	6.0	6.0	8.5		3.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR4(N2)	17:04	Bottom	3	2	28.3	7.8	24.2	6.0		8.8		3.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS8(N)	17:01	Surface	1	1	28.3	7.9	24.4	5.6	5.6	9.1	9.6	4.5	4.0
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS8(N)	17:01	Surface	1	2	28.3	7.9	24.4	5.6		8.8		4.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS8(N)	17:01	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS8(N)	17:01	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS8(N)	17:01	Bottom	3	1	28.3	7.8	24.4	5.6	5.6	10.1		3.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS8(N)	17:01	Bottom	3	2	28.3	7.8	24.4	5.6		10.2		3.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)9	16:58	Surface	1	1	28.8	7.9	24.6	6.1	6.1	11.8	12.5	7.2	11.4
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)9	16:58	Surface	1	2	28.8	7.9	24.6	6.1		11.7		7.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)9	16:58	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)9	16:58	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)9	16:58	Bottom	3	1	28.6	7.8	24.6	6.1	6.1	13.4		16.1	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)9	16:58	Bottom	3	2	28.6	7.8	24.6	6.1		13.0		14.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)11	18:15	Surface	1	1	28.5	7.9	23.1	6.1	5.6	5.2	7.5	5.2	8.4
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)11	18:15	Surface	1	2	28.7	7.9	22.9	6.1		5.5		4.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)11	18:15	Middle	2	1	27.6	7.9	26.0	5.0		8.9		6.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)11	18:15	Middle	2	2	27.6	7.9	25.9	5.0		8.9		7.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)11	18:15	Bottom	3	1	27.5	7.9	26.2	4.8	4.8	8.3		12.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS(Mf)11	18:15	Bottom	3	2	27.5	7.9	26.3	4.8		8.2		13.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR7	18:22	Surface	1	1	28.3	7.9	24.7	5.7	5.8	2.7	4.0	5.5	4.7
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR7	18:22	Surface	1	2	28.4	7.9	24.6	5.8		2.3		5.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR7	18:22	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR7	18:22	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR7	18:22	Bottom	3	1	28.2	7.9	24.9	5.6	5.7	5.5		4.0	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	SR7	18:22	Bottom	3	2	28.2	7.9	24.9	5.7		5.3		3.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS17	17:24	Surface	1	1	28.1	7.9	25.1	5.7	5.3	1.7	4.4	6.6	4.4
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS17	17:24	Surface	1	2	28.2	7.9	24.9	5.7		1.5		6.1	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS17	17:24	Middle	2	1	27.5	7.9	26.4	4.8		5.6		3.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS17	17:24	Middle	2	2	27.5	7.9	26.3	4.9		5.0		3.4	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/09/06	Mid-Ebb	IS17	17:24	Bottom	3	1	27.5	7.9	26.6	4.9	4.9	6.1		3.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-Ebb	IS17	17:24	Bottom	3	2	27.4	7.9	26.7	4.9		6.5		3.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)5	11:50	Surface	1	1	27.8	7.8	24.7	5.4	5.3	1.8	3.5	2.0	3.3
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)5	11:50	Surface	1	2	27.9	7.9	24.3	5.5		1.6		2.1	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)5	11:50	Middle	2	1	27.5	7.8	25.8	5.0		2.1		3.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)5	11:50	Middle	2	2	27.6	7.8	25.5	5.1		2.3		3.1	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)5	11:50	Bottom	3	1	27.3	7.8	27.1	4.8	4.8	6.6		4.8	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)5	11:50	Bottom	3	2	27.3	7.8	27.2	4.8		6.5		4.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)3(N)	12:47	Surface	1	1	28.9	7.8	18.0	6.1	5.8	2.2	3.2	9.9	5.3
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)3(N)	12:47	Surface	1	2	29.0	7.8	18.0	6.1		2.3		10.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)3(N)	12:47	Middle	2	1	28.3	7.8	19.8	5.6		3.7		3.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)3(N)	12:47	Middle	2	2	28.3	7.8	20.0	5.5		3.4		3.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)3(N)	12:47	Bottom	3	1	28.4	7.8	22.3	5.5	5.5	3.8		1.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	CS(Mf)3(N)	12:47	Bottom	3	2	28.3	7.8	22.4	5.5		3.9		1.8	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)16	13:27	Surface	1	1	28.1	7.8	24.4	5.6	5.6	5.5	6.1	7.5	6.6
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)16	13:27	Surface	1	2	28.1	7.8	24.3	5.6		5.7		7.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)16	13:27	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)16	13:27	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)16	13:27	Bottom	3	1	28.0	7.8	24.4	5.7	5.7	6.4		5.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)16	13:27	Bottom	3	2	28.0	7.8	24.4	5.7		6.6		5.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4a	13:36	Surface	1	1	28.4	7.8	24.1	5.7	5.7	8.4	8.2	2.9	3.2
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4a	13:36	Surface	1	2	28.5	7.8	23.9	5.7		8.2		2.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4a	13:36	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4a	13:36	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4a	13:36	Bottom	3	1	27.8	7.8	25.0	4.5	4.5	8.1		3.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4a	13:36	Bottom	3	2	27.7	7.8	25.0	4.5		8.1		3.8	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4(N2)	13:41	Surface	1	1	28.3	7.9	24.0	5.7	5.7	2.9	2.7	4.8	3.3
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4(N2)	13:41	Surface	1	2	28.4	7.9	23.9	5.7		2.7		4.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4(N2)	13:41	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4(N2)	13:41	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4(N2)	13:41	Bottom	3	1	28.5	7.9	23.7	5.7	5.7	2.5		1.8	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR4(N2)	13:41	Bottom	3	2	28.4	7.9	23.9	5.6		2.8		1.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS8(N)	13:48	Surface	1	1	28.6	7.9	24.0	5.9	5.9	2.7	3.4	3.5	3.1
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS8(N)	13:48	Surface	1	2	28.6	7.9	23.9	5.9		2.2		3.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS8(N)	13:48	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS8(N)	13:48	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS8(N)	13:48	Bottom	3	1	28.4	7.8	24.2	5.8	5.8	4.4		2.8	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS8(N)	13:48	Bottom	3	2	28.4	7.8	24.2	5.7		4.3		2.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)9	13:54	Surface	1	1	28.1	7.9	24.9	5.5	5.5	10.3	12.3	6.0	9.7
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)9	13:54	Surface	1	2	28.1	7.9	24.9	5.5		10.7		5.3	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)9	13:54	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)9	13:54	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)9	13:54	Bottom	3	1	28.2	7.9	24.9	5.5	5.5	14.2		13.0	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)9	13:54	Bottom	3	2	28.2	7.9	25.0	5.4		13.8		14.4	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)11	12:23	Surface	1	1	28.0	7.9	24.5	5.4	5.1	6.2	11.8	3.7	8.9
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)11	12:23	Surface	1	2	28.2	7.9	24.3	5.4		6.0		3.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)11	12:23	Middle	2	1	27.5	7.8	26.1	4.9		13.9		6.9	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)11	12:23	Middle	2	2	27.5	7.8	26.1	4.8		13.3		7.0	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)11	12:23	Bottom	3	1	27.6	7.8	26.1	5.1	5.1	15.9		15.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS(Mf)11	12:23	Bottom	3	2	27.6	7.8	26.1	5.0		15.7		16.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR7	12:15	Surface	1	1	28.1	7.8	24.6	5.4	5.4	7.5	9.6	6.7	7.1
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR7	12:15	Surface	1	2	28.2	7.8	24.3	5.4		7.9		6.5	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR7	12:15	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR7	12:15	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR7	12:15	Bottom	3	1	27.7	7.8	25.6	4.9	4.9	11.3		7.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	SR7	12:15	Bottom	3	2	27.7	7.8	25.7	4.9		11.6		7.7	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS17	13:19	Surface	1	1	27.8	7.9	24.8	5.2	5.2	3.3	5.9	7.0	5.7
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS17	13:19	Surface	1	2	27.8	7.9	24.8	5.2		3.7		6.6	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS17	13:19	Middle	2	1	27.6	7.8	25.6	5.1		4.4		5.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS17	13:19	Middle	2	2	27.6	7.8	25.4	5.1		4.4		5.4	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS17	13:19	Bottom	3	1	27.5	7.8	26.1	4.8	4.8	9.9		5.2	
TMCLKL	HY/2012/08	2019/09/06	Mid-flood	IS17	13:19	Bottom	3	2	27.5	7.8	26.3	4.8		9.9		4.9	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	23 September 2019

ERM

Dear Sir or Madam,

Please find the Notification of Exceedance (NOE) of the following Log no.:
Action Level Exceedance
0212330_9 September 2019_ Depth-averaged SS_E_Station IS(Mf)9

A total of one Action Level exceedance was recorded on 9 September 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**Action Level Exceedance** **0212330_9 September 2019_ Depth-averaged SS_E_Station IS(Mf)9** **[Total No. of Exceedances = 1]**	
Date	9 September 2019 (Measured) 12 September 2019 (*In situ* results received by ERM) 19 September 2019 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11	
Parameter(s) with Exceedance(s)	Suspended Solids (mg/L)	
Action Levels	SS	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
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS(Mf)9 (Depth-averaged SS = 24.2 mg/L)	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 9 September 2019.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except 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. • For the exceedance of SS level at IS(Mf)9 during mid-ebb tide, IS(Mf)9 is far away (>1.5km) from the Seawall Modification Works Area (Figure 1), thus the observed exceedance should not be affected by the marine works under this Contract. Moreover, no exceedance of SS was recoded at IS(Mf)16 during mid-ebb tide, which are closer to the Seawall Modification Works Area than IS(Mf)9. Therefore, the exceedance is unlikely to be related to this Contract.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 9 September 2019 and locations of water quality monitoring stations are attached.	

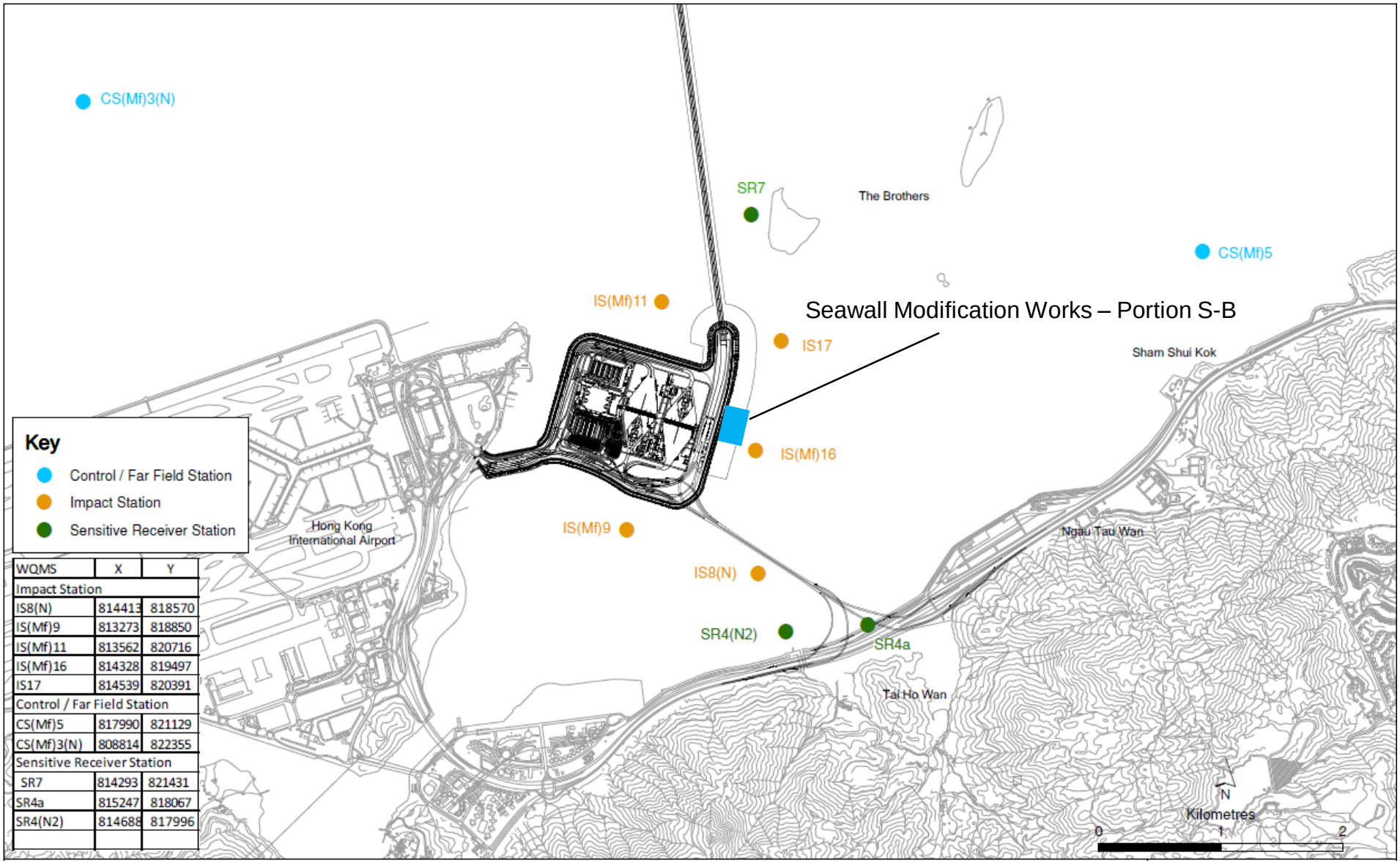
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)5	8:55	Surface	1	1	29.4	7.8	19.2	7.8		1.0		5.3	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)5	8:55	Surface	1	2	29.4	8.0	18.8	7.8	6.4	1.1		5.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)5	8:55	Middle	2	1	28.4	7.8	26.9	5.0		2.2	2.9	4.4	4.6
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)5	8:55	Middle	2	2	28.4	7.8	26.4	5.0		2.5		4.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)5	8:55	Bottom	3	1	27.9	7.8	29.8	4.2	4.2	5.4		3.8	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)5	8:55	Bottom	3	2	27.9	7.8	29.3	4.2		5.1		4.1	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)3(N)	9:57	Surface	1	1	29.6	8.0	15.7	8.3		1.4		4.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)3(N)	9:57	Surface	1	2	29.6	8.0	15.4	8.3	7.4	1.2		4.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)3(N)	9:57	Middle	2	1	29.4	7.9	20.1	6.4		2.5	2.2	4.7	4.5
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)3(N)	9:57	Middle	2	2	29.4	7.8	19.6	6.4		2.0		4.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)3(N)	9:57	Bottom	3	1	28.3	7.7	26.2	4.9	4.9	3.3		4.2	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	CS(Mf)3(N)	9:57	Bottom	3	2	28.3	7.8	25.6	4.9		2.7		5.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)16	10:32	Surface	1	1	30.0	8.1	21.0	11.0		3.6		9.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)16	10:32	Surface	1	2	30.0	8.2	20.6	11.0	11.0	3.1		9.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)16	10:32	Middle	2	1							5.2		8.5
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)16	10:32	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)16	10:32	Bottom	3	1	28.8	8.0	25.7	5.7	5.8	7.2		7.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)16	10:32	Bottom	3	2	28.8	7.9	25.2	5.8		6.7		8.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4a	10:43	Surface	1	1	29.7	8.0	19.5	8.9		1.9		5.8	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4a	10:43	Surface	1	2	29.7	8.0	19.2	8.8	8.9	1.6		5.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4a	10:43	Middle	2	1							3.8		5.8
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4a	10:43	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4a	10:43	Bottom	3	1	28.7	7.8	24.1	5.1	5.1	6.1		5.8	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4a	10:43	Bottom	3	2	28.7	7.8	23.7	5.1		5.6		5.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4(N2)	10:50	Surface	1	1	29.9	8.0	19.2	9.1		4.1		6.3	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4(N2)	10:50	Surface	1	2	29.9	8.1	18.8	9.1	9.1	3.3		7.3	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4(N2)	10:50	Middle	2	1							6.0		7.2
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4(N2)	10:50	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4(N2)	10:50	Bottom	3	1	29.6	7.8	21.6	7.0	7.0	8.5		7.2	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR4(N2)	10:50	Bottom	3	2	29.6	7.9	21.2	7.0		8.0		8.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS8(N)	10:57	Surface	1	1	29.9	8.1	19.0	10.2		1.6		6.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS8(N)	10:57	Surface	1	2	29.9	8.2	18.6	10.3	10.3	1.3		5.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS8(N)	10:57	Middle	2	1							3.4		7.5
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS8(N)	10:57	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS8(N)	10:57	Bottom	3	1	29.9	8.0	20.4	10.1	10.1	5.5		9.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS8(N)	10:57	Bottom	3	2	29.9	8.1	20.0	10.1		5.1		8.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)9	11:05	Surface	1	1									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)9	11:05	Surface	1	2					10.1				
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)9	11:05	Middle	2	1	30.1	8.1	22.2	10.0		10.6	10.6	22.8	24.2
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)9	11:05	Middle	2	2	30.1	8.1	21.7	10.1		10.5		25.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)9	11:05	Bottom	3	1					#DIV/0!				
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)9	11:05	Bottom	3	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)11	9:29	Surface	1	1	29.7	7.9	18.7	8.0		2.5		5.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)11	9:29	Surface	1	2	29.6	8.0	18.3	8.0	6.6	2.1		5.3	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)11	9:29	Middle	2	1	28.7	7.8	23.5	5.2		2.7	2.4	5.8	5.6
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)11	9:29	Middle	2	2	28.7	7.8	23.0	5.2		2.2		4.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)11	9:29	Bottom	3	1	28.0	7.7	28.0	4.8	4.8	2.6		6.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS(Mf)11	9:29	Bottom	3	2	28.0	7.8	27.5	4.7		2.3		5.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR7	9:21	Surface	1	1	29.7	7.9	17.3	8.4		1.6		6.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR7	9:21	Surface	1	2	29.7	8.0	17.0	8.4	8.4	1.4		5.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR7	9:21	Middle	2	1							1.9		5.7
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR7	9:21	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR7	9:21	Bottom	3	1	29.4	7.8	19.2	7.2	7.2	2.1		5.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	SR7	9:21	Bottom	3	2	29.4	7.9	18.8	7.2		2.3		6.3	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS17	10:25	Surface	1	1	29.6	7.9	21.4	8.8		2.2		19.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS17	10:25	Surface	1	2	29.6	8.0	20.9	8.8	7.3	2.0		17.1	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS17	10:25	Middle	2	1	28.7	7.8	23.8	5.9		4.1	4.4	5.4	12.8
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS17	10:25	Middle	2	2	28.7	7.8	23.3	5.8		3.4		5.5	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/09/09	Mid-Ebb	IS17	10:25	Bottom	3	1	28.0	7.8	28.1	4.8	4.9	7.6		15.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-Ebb	IS17	10:25	Bottom	3	2	28.0	7.7	27.5	4.9		6.9		14.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)5	18:04	Surface	1	1	29.2	7.9	22.0	7.9	6.5	1.2	3.8	6.0	6.1
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)5	18:04	Surface	1	2	29.2	7.9	21.6	7.9		1.0		6.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)5	18:04	Middle	2	1	28.3	7.9	28.1	5.0		2.0		6.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)5	18:04	Middle	2	2	28.3	7.8	27.6	5.0		1.9		5.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)5	18:04	Bottom	3	1	28.1	8.0	29.3	4.6	4.7	8.7		5.2	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)5	18:04	Bottom	3	2	28.1	7.8	28.7	4.7		7.8		6.2	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)3(N)	17:07	Surface	1	1	31.2	8.1	12.0	11.2	10.6	4.1	5.6	5.7	8.3
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)3(N)	17:07	Surface	1	2	31.2	8.1	11.7	11.2		3.3		4.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)3(N)	17:07	Middle	2	1	30.5	8.0	15.9	10.0		6.7		7.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)3(N)	17:07	Middle	2	2	30.4	8.0	15.7	9.9		5.9		8.2	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)3(N)	17:07	Bottom	3	1	28.7	8.0	23.5	5.2	5.2	6.9		11.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	CS(Mf)3(N)	17:07	Bottom	3	2	28.7	7.8	23.0	5.2		6.5		12.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)16	16:33	Surface	1	1	30.6	8.2	19.1	14.1	14.2	3.5	5.6	8.0	7.6
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)16	16:33	Surface	1	2	30.6	8.1	18.8	14.3		2.9		7.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)16	16:33	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)16	16:33	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)16	16:33	Bottom	3	1	29.5	7.9	22.1	8.7	8.7	8.5		6.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)16	16:33	Bottom	3	2	29.5	7.7	21.7	8.6		7.5		7.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4a	16:23	Surface	1	1	30.5	8.1	19.5	12.9	13.0	4.9	5.8	9.8	8.3
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4a	16:23	Surface	1	2	30.5	8.0	19.2	13.1		4.1		9.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4a	16:23	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4a	16:23	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4a	16:23	Bottom	3	1	29.6	7.8	21.3	8.2	8.3	7.6		7.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4a	16:23	Bottom	3	2	29.6	7.7	20.9	8.3		6.7		7.1	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4(N2)	16:17	Surface	1	1	30.8	8.2	19.2	14.7	14.8	2.4	3.8	6.4	5.8
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4(N2)	16:17	Surface	1	2	30.8	8.2	18.9	14.9		2.3		5.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4(N2)	16:17	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4(N2)	16:17	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4(N2)	16:17	Bottom	3	1	29.9	8.1	20.3	11.8	11.9	5.4		5.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR4(N2)	16:17	Bottom	3	2	29.9	7.9	19.9	11.9		4.9		6.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS8(N)	16:10	Surface	1	1	30.4	8.1	18.8	12.7	12.8	3.9	4.6	8.0	8.8
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS8(N)	16:10	Surface	1	2	30.4	8.0	18.5	12.8		3.8		8.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS8(N)	16:10	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS8(N)	16:10	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS8(N)	16:10	Bottom	3	1	30.3	8.0	19.2	12.1	12.2	5.9		9.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS8(N)	16:10	Bottom	3	2	30.3	8.0	18.8	12.2		4.9		8.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)9	16:00	Surface	1	1					10.2		5.5		7.8
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)9	16:00	Surface	1	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)9	16:00	Middle	2	1	29.8	7.9	20.8	10.1		5.8		8.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)9	16:00	Middle	2	2	29.9	7.8	20.3	10.3		5.2		7.5	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)9	16:00	Bottom	3	1					#DIV/0!				
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)9	16:00	Bottom	3	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)11	17:35	Surface	1	1	30.2	8.0	19.0	11.0	8.3	4.1	8.7	6.0	8.6
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)11	17:35	Surface	1	2	30.2	8.1	18.6	11.0		3.3		5.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)11	17:35	Middle	2	1	28.4	7.8	26.0	5.5		11.2		6.7	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)11	17:35	Middle	2	2	28.4	7.8	25.4	5.5		10.6		7.5	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)11	17:35	Bottom	3	1	28.3	7.9	26.8	4.7	4.7	11.7		12.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS(Mf)11	17:35	Bottom	3	2	28.2	7.8	26.3	4.7		11.2		13.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR7	17:43	Surface	1	1	30.8	8.2	16.8	12.6	12.7	2.5	3.8	5.6	5.9
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR7	17:43	Surface	1	2	30.8	8.2	16.6	12.7		2.3		6.6	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR7	17:43	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR7	17:43	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR7	17:43	Bottom	3	1	29.8	8.1	20.6	9.3	9.3	5.5		6.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	SR7	17:43	Bottom	3	2	29.8	8.0	20.3	9.3		4.9		5.3	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS17	16:39	Surface	1	1	30.9	8.2	17.6	14.5	11.8	2.3	4.0	8.0	7.0
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS17	16:39	Surface	1	2	30.9	8.2	17.3	14.7		2.1		7.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS17	16:39	Middle	2	1	29.5	8.0	21.8	8.9		3.0		6.0	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS17	16:39	Middle	2	2	29.5	7.8	21.5	8.9		2.9		6.9	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS17	16:39	Bottom	3	1	28.2	7.9	27.4	4.6	4.7	7.0		7.4	
TMCLKL	HY/2012/08	2019/09/09	Mid-flood	IS17	16:39	Bottom	3	2	28.2	7.8	26.8	4.7		6.4		6.8	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	23 September 2019

Dear Sir or Madam,

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

Action Level Exceedance

0212330_16 September 2019_ Bottom DO_E_Station SR4a
0212330_16 September 2019_ Surface & Middle DO_E_Station IS8(N)
0212330_16 September 2019_ Bottom DO_E_Station IS17
0212330_16 September 2019_ Surface & Middle DO_F_Station IS(Mf)11
0212330_16 September 2019_ Surface & Middle DO_F_Station SR7
0212330_16 September 2019_ Surface & Middle DO_F_Station IS17
0212330_16 September 2019_ Bottom DO_F_Station IS17

A total of seven Action Level exceedance was recorded on 16 September 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u>** **0212330_16 September 2019_ Bottom DO_E_Station SR4a** **0212330_16 September 2019_ Surface & Middle DO_E_Station IS8(N)** **0212330_16 September 2019_ Bottom DO_E_Station IS17** **0212330_16 September 2019_ Surface & Middle DO_F_Station IS(Mf)11** **0212330_16 September 2019_ Surface & Middle DO_F_Station SR7** **0212330_16 September 2019_ Surface & Middle DO_F_Station IS17** **0212330_16 September 2019_ Bottom DO_F_Station IS17** **[Total No. of Exceedances = 7]**		
Date	16 September 2019 (Measured) 18 September 2019 (*In situ* results received by ERM) 24 September 2019 (Laboratory results received by ERM)		
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11		
Parameter(s) with Exceedance(s)	Dissolved Oxygen (mg/L)		
Action Levels	DO	Surface and Middle 5.0 mg/L	Bottom 4.7 mg/L
Limit Levels	DO	Surface and Middle 4.2 mg/L	Bottom 3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at SR4a (Bottom-depth DO = 4.2 mg/L) 2. Mid-ebb at IS8(N) (Surface & Middle-depth DO = 4.9 mg/L) 3. Mid-ebb at IS17 (Bottom-depth DO = 4.4 mg/L) 4. Mid-flood at IS(Mf)11 (Surface & Middle-depth DO = 4.8 mg/L) 5. Mid-flood at SR7 (Surface & Middle-depth DO = 4.9 mg/L) 6. Mid-flood at IS17 (Surface & Middle-depth DO = 4.9 mg/L) 7. Mid-flood at IS17 (Bottom-depth DO = 4.6 mg/L)		
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 16 September 2019.		

Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except DO, 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. • SR4a, IS8(N), IS(Mf)11 and SR7 are far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • The DO pattern at SR4a and IS17 during mid-ebb tide were similar to their corresponding control station where the bottom-depth DO levels were generally lower. Lower bottom-depth DO levels may be possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level. • Bottom-depth DO levels at IS17 was similar to the corresponding control stations, CS(Mf)5, during mid-flood tide, in which the recorded Bottom-depth DO levels at the corresponding control station were below Action Level. • Surface & Middle-depth DO levels at IS(Mf)11, SR7 and IS17 were similar to the corresponding control stations, CS(Mf)5, during mid-flood tide, in which the recorded Surface & Middle-depth DO levels at the corresponding control station were below Action Level. • As reported by the marine mammal observer, no discharge of organic matters into waters from landside works area was recorded. Moreover, no exceedance was recorded at IS(Mf)16 which is the closest station to the Seawall Modification Works Area during both mid-ebb and mid-flood tide. Therefore, exceedances recorded at IS8(N) during mid-ebb tide are unlikely to be caused by the marine works of this Contract.
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 16 September 2019 and locations of water quality monitoring stations are attached.

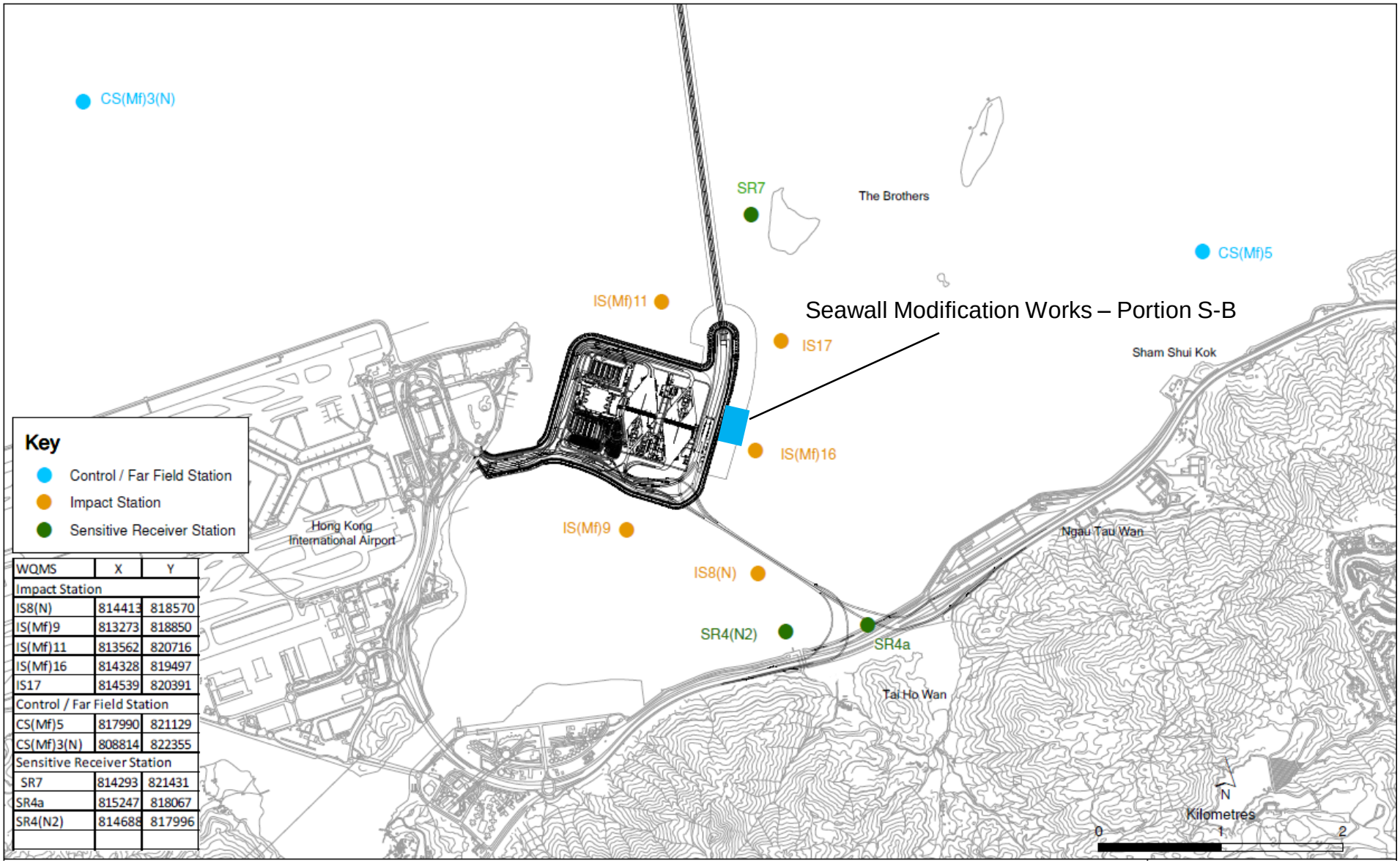
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)5	14:54	Surface	1	1	28.8	7.8	24.7	5.1	4.8	7.6	10.2	10.6	11.4
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)5	14:54	Surface	1	2	29.7	7.9	24.3	5.1		7.9		10.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)5	14:54	Middle	2	1	28.3	7.9	26.5	4.6		9.4		12.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)5	14:54	Middle	2	2	29.3	7.9	26.0	4.5		9.3		12.2	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)5	14:54	Bottom	3	1	28.3	7.9	26.8	4.6	4.6	13.3		11.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)5	14:54	Bottom	3	2	29.2	7.9	26.3	4.5		13.9		12.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)3(N)	14:06	Surface	1	1	29.2	7.8	22.7	5.6	5.4	4.0	7.0	4.6	5.0
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)3(N)	14:06	Surface	1	2	30.1	7.9	22.3	5.6		4.1		5.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)3(N)	14:06	Middle	2	1	29.1	7.8	23.4	5.2		5.3		5.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)3(N)	14:06	Middle	2	2	30.1	7.9	23.0	5.3		5.3		4.9	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)3(N)	14:06	Bottom	3	1	28.4	7.9	23.2	5.0	4.9	11.8		5.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	CS(Mf)3(N)	14:06	Bottom	3	2	29.3	7.9	25.5	4.8		11.6		5.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)16	13:19	Surface	1	1	28.8	8.0	25.2	5.1	5.1	6.8	5.9	7.8	9.0
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)16	13:19	Surface	1	2	29.7	7.9	24.7	5.0		6.9		8.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)16	13:19	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)16	13:19	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)16	13:19	Bottom	3	1	28.1	8.0	27.4	4.7	4.7	4.8		10.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)16	13:19	Bottom	3	2	29.1	7.9	26.8	4.7		4.9		9.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4a	13:09	Surface	1	1	28.9	7.9	24.1	5.2	5.2	3.2	8.2	3.7	3.1
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4a	13:09	Surface	1	2	29.8	7.9	23.7	5.2		3.1		3.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4a	13:09	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4a	13:09	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4a	13:09	Bottom	3	1	28.6	7.9	25.2	4.2	4.2	13.1		2.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4a	13:09	Bottom	3	2	29.6	7.9	24.8	4.1		13.5		2.8	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4(N2)	13:02	Surface	1	1	28.9	8.0	24.1	5.2	5.2	5.9	7.6	4.2	4.2
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4(N2)	13:02	Surface	1	2	29.9	7.9	23.7	5.2		5.8		4.9	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4(N2)	13:02	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4(N2)	13:02	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4(N2)	13:02	Bottom	3	1	28.7	8.0	24.5	4.8	4.8	9.4		4.1	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR4(N2)	13:02	Bottom	3	2	29.7	8.0	24.1	4.8		9.2		3.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS8(N)	12:54	Surface	1	1	28.8	8.0	24.7	4.9	4.9	8.9	11.2	5.9	6.1
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS8(N)	12:54	Surface	1	2	29.8	8.0	24.2	4.9		9.0		6.9	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS8(N)	12:54	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS8(N)	12:54	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS8(N)	12:54	Bottom	3	1	28.8	8.0	24.9	4.9	4.9	13.5		6.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS8(N)	12:54	Bottom	3	2	29.7	8.1	24.5	4.8		13.4		5.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)9	12:46	Surface	1	1	29.5	8.0	24.4	5.5	5.5	5.0	5.6	5.1	5.5
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)9	12:46	Surface	1	2	30.5	8.0	24.0	5.4		4.9		5.1	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)9	12:46	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)9	12:46	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)9	12:46	Bottom	3	1	29.0	8.0	24.5	5.3	5.3	6.2		5.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)9	12:46	Bottom	3	2	30.0	8.0	24.1	5.3		6.2		6.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)11	14:27	Surface	1	1	29.1	7.8	23.6	5.4	5.2	5.4	8.0	4.1	4.3
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)11	14:27	Surface	1	2	30.1	7.8	23.2	5.3		5.3		3.9	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)11	14:27	Middle	2	1	28.8	7.8	24.4	5.0		7.8		4.2	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)11	14:27	Middle	2	2	29.8	7.7	24.0	5.0		8.1		4.9	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)11	14:27	Bottom	3	1	28.6	7.8	25.5	4.9	4.9	10.0		4.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS(Mf)11	14:27	Bottom	3	2	29.6	7.9	25.0	4.8		11.2		4.2	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR7	14:36	Surface	1	1	28.8	7.8	24.8	5.1	5.1	6.9	7.2	8.8	10.1
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR7	14:36	Surface	1	2	29.8	7.9	24.4	5.0		6.9		9.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR7	14:36	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR7	14:36	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR7	14:36	Bottom	3	1	28.8	7.8	24.9	5.2	5.2	7.4		10.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	SR7	14:36	Bottom	3	2	29.7	7.9	24.5	5.2		7.5		11.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS17	13:27	Surface	1	1	30.1	7.9	22.2	5.6	5.3	7.5	7.2	8.1	9.7
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS17	13:27	Surface	1	2	30.0	7.9	23.8	5.6		7.5		7.1	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS17	13:27	Middle	2	1	28.7	7.9	25.4	4.9		7.4		10.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS17	13:27	Middle	2	2	29.7	7.9	24.9	4.9		7.4		10.0	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/09/16	Mid-Ebb	IS17	13:27	Bottom	3	1	28.1	8.0	27.4	4.4	4.4	6.8		10.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-Ebb	IS17	13:27	Bottom	3	2	29.1	7.8	26.9	4.4		6.8		12.1	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)5	7:11	Surface	1	1	28.6	7.8	24.4	5.1	4.9	4.2	5.3	5.7	5.0
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)5	7:11	Surface	1	2	29.6	8.0	24.0	5.0		4.1		5.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)5	7:11	Middle	2	1	28.4	7.8	25.8	4.7		4.3		4.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)5	7:11	Middle	2	2	29.3	7.9	25.5	4.7		4.2		4.8	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)5	7:11	Bottom	3	1	27.8	7.9	28.5	4.4	4.4	7.3		5.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)5	7:11	Bottom	3	2	28.7	8.0	28.1	4.4		7.5		4.8	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)3(N)	8:07	Surface	1	1	28.8	7.8	23.6	5.1	5.1	8.9	10.5	15.6	16.6
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)3(N)	8:07	Surface	1	2	29.8	7.9	23.2	5.1		9.8		16.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)3(N)	8:07	Middle	2	1	28.8	7.8	23.6	5.1		10.2		16.3	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)3(N)	8:07	Middle	2	2	29.8	7.9	23.2	5.1		10.1		17.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)3(N)	8:07	Bottom	3	1	28.8	7.8	23.6	5.1	5.1	12.1		17.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	CS(Mf)3(N)	8:07	Bottom	3	2	29.7	7.9	23.2	5.1		12.1		17.4	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)16	8:52	Surface	1	1	28.6	8.0	24.6	5.2	5.2	4.1	5.5	4.6	5.2
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)16	8:52	Surface	1	2	29.6	8.1	24.1	5.1		4.2		4.6	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)16	8:52	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)16	8:52	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)16	8:52	Bottom	3	1	28.6	8.0	24.9	5.0	5.0	6.8		5.9	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)16	8:52	Bottom	3	2	29.5	8.1	24.4	5.0		7.0		5.6	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4a	9:02	Surface	1	1	29.6	8.1	23.7	5.0	5.0	4.5	4.8	6.6	5.5
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4a	9:02	Surface	1	2	29.6	8.1	23.7	5.0		4.4		6.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4a	9:02	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4a	9:02	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4a	9:02	Bottom	3	1	29.6	8.1	24.0	4.7	4.7	5.0		4.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4a	9:02	Bottom	3	2	29.6	8.1	24.0	4.7		5.2		3.8	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4(N2)	9:09	Surface	1	1	29.6	8.1	23.8	5.0	5.1	4.9	5.0	3.5	3.6
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4(N2)	9:09	Surface	1	2	29.6	8.1	23.8	5.1		4.7		4.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4(N2)	9:09	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4(N2)	9:09	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4(N2)	9:09	Bottom	3	1	29.6	8.1	23.9	5.2	5.2	5.2		2.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR4(N2)	9:09	Bottom	3	2	29.6	8.1	23.9	5.1		5.2		3.6	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS8(N)	9:16	Surface	1	1	28.7	8.0	24.0	5.3	5.3	6.0	7.9	5.5	5.6
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS8(N)	9:16	Surface	1	2	29.7	8.1	23.5	5.3		5.9		6.2	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS8(N)	9:16	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS8(N)	9:16	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS8(N)	9:16	Bottom	3	1	28.7	8.0	24.2	5.4	5.4	9.8		4.8	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS8(N)	9:16	Bottom	3	2	29.7	8.1	23.7	5.3		9.7		5.8	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)9	9:24	Surface	1	1	28.7	8.0	24.3	5.2	5.2	6.4	6.0	8.5	7.1
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)9	9:24	Surface	1	2	29.7	8.2	23.8	5.1		6.6		7.7	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)9	9:24	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)9	9:24	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)9	9:24	Bottom	3	1	28.7	8.0	24.4	5.2	5.2	5.5		6.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)9	9:24	Bottom	3	2	29.6	8.2	24.0	5.2		5.3		5.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)11	7:44	Surface	1	1	28.6	7.9	24.6	4.9	4.8	9.6	10.1	10.1	11.2
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)11	7:44	Surface	1	2	29.6	8.0	24.2	4.9		9.9		10.1	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)11	7:44	Middle	2	1	28.4	7.9	25.8	4.7		9.4		11.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)11	7:44	Middle	2	2	29.4	8.0	25.3	4.6		9.3		12.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)11	7:44	Bottom	3	1	28.3	7.9	26.1	4.7	4.7	11.1		12.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS(Mf)11	7:44	Bottom	3	2	29.3	8.0	25.7	4.6		11.1		12.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR7	7:36	Surface	1	1	28.5	7.9	25.0	4.9	4.9	8.9	10.0	5.7	6.5
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR7	7:36	Surface	1	2	29.5	8.0	24.5	4.8		8.9		6.6	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR7	7:36	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR7	7:36	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR7	7:36	Bottom	3	1	28.4	7.9	25.6	4.7	4.7	11.0		7.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	SR7	7:36	Bottom	3	2	29.4	8.0	25.1	4.7		11.1		6.0	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS17	8:42	Surface	1	1	28.7	7.8	24.7	4.9	4.9	3.9	5.2	8.7	5.1
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS17	8:42	Surface	1	2	29.6	8.0	24.2	4.9		3.9		8.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS17	8:42	Middle	2	1	28.6	7.9	25.1	4.8		4.2		4.5	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS17	8:42	Middle	2	2	29.5	8.0	24.7	4.8		4.0		3.6	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS17	8:42	Bottom	3	1	28.1	7.8	27.2	4.6	4.6	7.8		2.6	
TMCLKL	HY/2012/08	2019/09/16	Mid-flood	IS17	8:42	Bottom	3	2	29.1	8.0	26.7	4.6		7.6		2.9	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	23 September 2019

Dear Sir or Madam,

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

Action Level Exceedance

0212330_18 September 2019_ Surface & Middle DO_E_Station IS8(N)
0212330_18 September 2019_ Surface & Middle DO_E_Station IS(Mf)9
0212330_18 September 2019_ Surface & Middle DO_E_Station IS(Mf)11
0212330_18 September 2019_ Bottom DO_E_Station IS(Mf)11
0212330_18 September 2019_ Surface & Middle DO_E_Station IS17
0212330_18 September 2019_ Bottom DO_E_Station IS17
0212330_18 September 2019_ Surface & Middle DO_F_Station IS(Mf)16
0212330_18 September 2019_ Surface & Middle DO_F_Station SR4a
0212330_18 September 2019_ Surface & Middle DO_F_Station SR4(N2)
0212330_18 September 2019_ Bottom DO_F_Station SR4(N2)
0212330_18 September 2019_ Surface & Middle DO_F_Station IS(Mf)9
0212330_18 September 2019_ Surface & Middle DO_F_Station IS(Mf)11
0212330_18 September 2019_ Bottom DO_F_Station IS(Mf)11
0212330_18 September 2019_ Surface & Middle DO_F_Station SR7
0212330_18 September 2019_ Bottom DO_F_Station SR7
0212330_18 September 2019_ Surface & Middle DO_F_Station IS17
0212330_18 September 2019_ Bottom DO_F_Station IS17

A total of seventeen Action Level exceedance was recorded on 18 September 2019.

Email message

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u>** **0212330_18 September 2019_ Surface & Middle DO_E_Station IS8(N)** **0212330_18 September 2019_ Surface & Middle DO_E_Station IS(Mf)9** **0212330_18 September 2019_ Surface & Middle DO_E_Station IS(Mf)11** **0212330_18 September 2019_ Bottom DO_E_Station IS(Mf)11** **0212330_18 September 2019_ Surface & Middle DO_E_Station IS17** **0212330_18 September 2019_ Bottom DO_E_Station IS17** **0212330_18 September 2019_ Surface & Middle DO_F_Station IS(Mf)16** **0212330_18 September 2019_ Surface & Middle DO_F_Station SR4a** **0212330_18 September 2019_ Surface & Middle DO_F_Station SR4(N2)** **0212330_18 September 2019_ Bottom DO_F_Station SR4(N2)** **0212330_18 September 2019_ Surface & Middle DO_F_Station IS(Mf)9** **0212330_18 September 2019_ Surface & Middle DO_F_Station IS(Mf)11** **0212330_18 September 2019_ Bottom DO_F_Station IS(Mf)11** **0212330_18 September 2019_ Surface & Middle DO_F_Station SR7** **0212330_18 September 2019_ Bottom DO_F_Station SR7** **0212330_18 September 2019_ Surface & Middle DO_F_Station IS17** **0212330_18 September 2019_ Bottom DO_F_Station IS17** **[Total No. of Exceedances = 17]**		
Date	18 September 2019 (Measured) 20 September 2019 (*In situ* results received by ERM) 25 September 2019 (Laboratory results received by ERM)		
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11		
Parameter(s) with Exceedance(s)	Dissolved Oxygen (mg/L)		
Action Levels	DO	Surface and Middle 5.0 mg/L	Bottom 4.7 mg/L
Limit Levels	DO	Surface and Middle 4.2 mg/L	Bottom 3.6 mg/L

Measured Levels	Action Level Exceedance 1. Mid-ebb at IS8(N) (Surface & Middle-depth DO = 4.9 mg/L) 2. Mid-ebb at IS(Mf)9 (Surface & Middle-depth DO = 4.9 mg/L) 3. Mid-ebb at IS(Mf)11 (Surface & Middle-depth DO = 4.8 mg/L) 4. Mid-ebb at IS(Mf)11 (Bottom-depth DO = 4.4 mg/L) 5. Mid-ebb at IS17 (Surface & Middle-depth DO = 4.7 mg/L) 6. Mid-ebb at IS17 (Bottom-depth DO = 4.3 mg/L) 7. Mid-flood at IS(Mf)16 (Surface & Middle-depth DO = 4.8 mg/L) 8. Mid-flood at SR4a (Surface & Middle-depth DO = 4.8 mg/L) 9. Mid-flood at SR4(N2) (Surface & Middle-depth DO = 4.8 mg/L) 10. Mid-flood at SR4(N2) (Bottom-depth DO = 4.6 mg/L) 11. Mid-flood at IS(Mf)9 (Surface & Middle-depth DO = 4.9 mg/L) 12. Mid-flood at IS(Mf)11 (Surface & Middle-depth DO = 4.6 mg/L) 13. Mid-flood at IS(Mf)11 (Bottom-depth DO = 4.4 mg/L) 14. Mid-flood at SR7 (Surface & Middle-depth DO = 4.6 mg/L) 15. Mid-flood at SR7 (Bottom-depth DO = 4.6 mg/L) 16. Mid-flood at IS17 (Surface & Middle-depth DO = 4.8 mg/L) 17. Mid-flood at IS17 (Surface & Middle-depth DO = 4.2 mg/L)
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 18 September 2019.
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except DO, 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. • IS8(N), IS(Mf)9, IS(Mf)11, SR4a, SR4(N2) and SR7 are far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • Bottom-depth DO levels at IS(Mf)11 and IS17 was similar to the corresponding control stations, CS(Mf)3(N), during mid-ebb tide, in which the recorded Bottom-depth DO levels at the corresponding control station were below Action Level. • Surface & Middle-depth DO levels at IS8(N), IS(Mf)9, IS(Mf)11 and IS17 were similar to the corresponding control stations, CS(Mf)3(N), during mid-ebb tide, in which the recorded Surface & Middle-depth DO levels at the corresponding control station were below Action Level. • Bottom-depth DO levels at SR4(N2), IS(Mf)11, SR7 and IS17 was similar to the corresponding control stations, CS(Mf)5, during mid-flood tide, in which the recorded Bottom-depth DO levels at the corresponding control station were below Action Level. • Surface & Middle-depth DO levels at IS(Mf)16, SR4a, SR4(N2), IS(Mf)9, IS(Mf)11, SR7 and IS17 were similar to the corresponding control stations, CS(Mf)5, during mid-flood tide, in which the recorded Surface & Middle-depth DO levels at the corresponding control station were below Action Level. • As reported by the marine mammal observer, no discharge of organic matters into waters from landside works area was recorded. Therefore, the recorded exceedances are unlikely to be caused by the marine works of this Contract.
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 18 September 2019 and locations of water quality monitoring stations are attached.

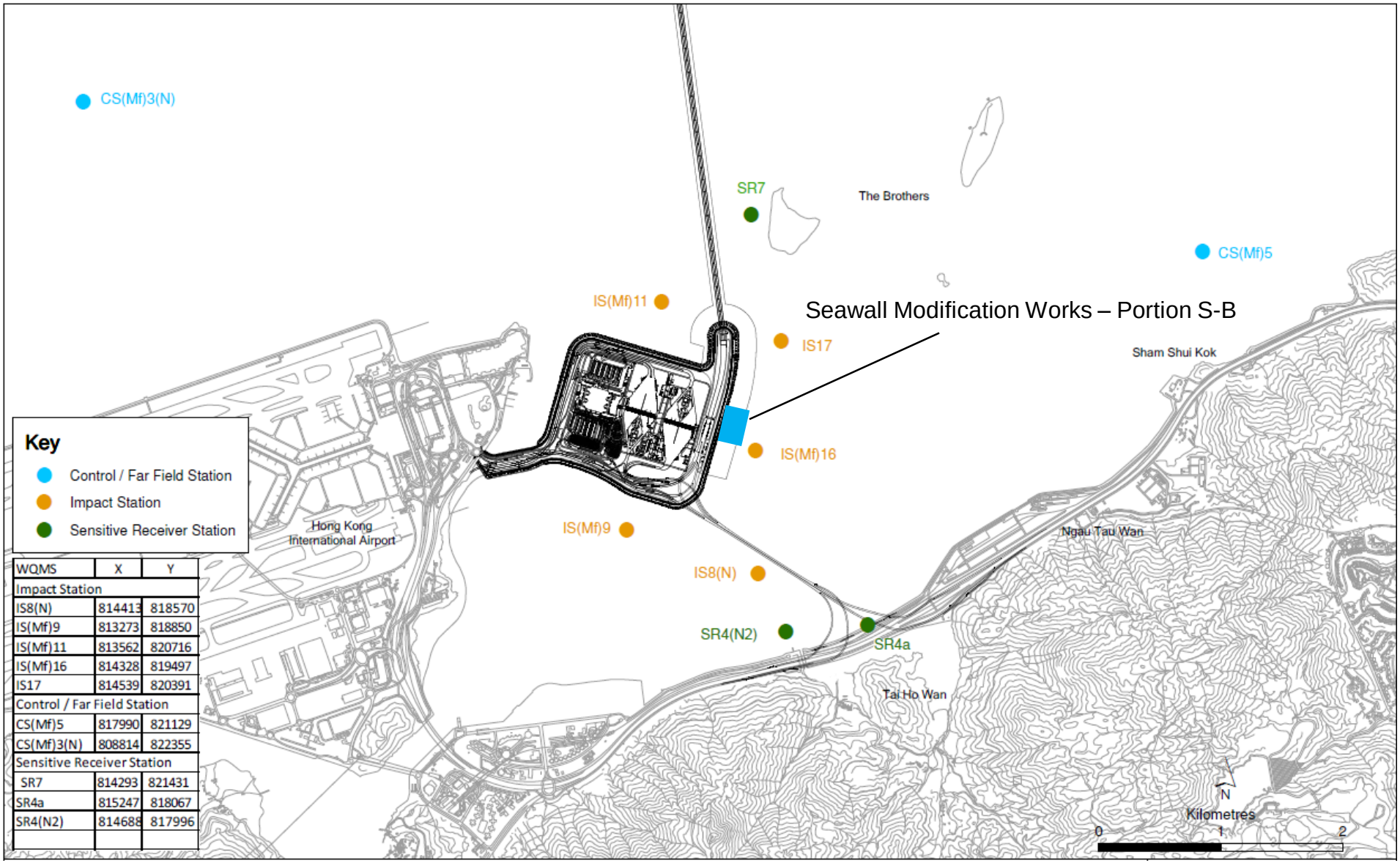
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)5	15:25	Surface	1	1	29.7	8.2	25.7	4.7	4.6	4.6	6.7	5.4	4.9
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)5	15:25	Surface	1	2	28.7	8.1	26.2	4.8		4.6		4.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)5	15:25	Middle	2	1	29.2	8.1	26.3	4.4		5.5		4.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)5	15:25	Middle	2	2	28.2	8.1	26.8	4.4		5.4		5.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)5	15:25	Bottom	3	1	28.8	8.2	27.9	4.3	4.3	9.9		5.3	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)5	15:25	Bottom	3	2	27.9	8.2	28.5	4.3		10.1		4.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)3(N)	14:44	Surface	1	1	29.8	8.1	23.5	4.9	4.8	4.8	6.6	6.1	6.6
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)3(N)	14:44	Surface	1	2	28.8	8.1	24.0	5.0		5.0		6.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)3(N)	14:44	Middle	2	1	29.4	8.0	24.7	4.6		7.1		6.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)3(N)	14:44	Middle	2	2	28.4	8.1	25.3	4.6		7.1		6.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)3(N)	14:44	Bottom	3	1	29.3	8.0	25.4	4.5	4.6	7.7		6.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	CS(Mf)3(N)	14:44	Bottom	3	2	28.3	8.1	25.9	4.6		7.6		7.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)16	13:57	Surface	1	1	30.2	8.1	24.5	5.0	5.1	8.0	9.2	5.6	5.2
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)16	13:57	Surface	1	2	29.2	8.1	25.0	5.1		8.0		4.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)16	13:57	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)16	13:57	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)16	13:57	Bottom	3	1	29.3	8.1	26.1	4.7	4.7	10.4		5.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)16	13:57	Bottom	3	2	28.3	8.1	26.6	4.7		10.4		5.3	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4a	13:48	Surface	1	1	30.3	8.1	23.6	5.5	5.5	4.2	6.9	3.7	3.1
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4a	13:48	Surface	1	2	29.2	8.1	24.2	5.5		4.1		3.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4a	13:48	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4a	13:48	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4a	13:48	Bottom	3	1	29.5	8.1	24.4	4.6	4.7	9.7		2.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4a	13:48	Bottom	3	2	28.5	8.1	24.8	4.7		9.6		2.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4(N2)	13:44	Surface	1	1	30.3	8.0	21.9	5.6	5.6	4.4	7.3	3.5	3.9
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4(N2)	13:44	Surface	1	2	29.3	8.0	22.4	5.6		4.4		3.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4(N2)	13:44	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4(N2)	13:44	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4(N2)	13:44	Bottom	3	1	29.5	8.1	24.4	4.7	4.7	10.3		4.4	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR4(N2)	13:44	Bottom	3	2	28.5	8.0	24.9	4.7		10.1		4.3	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS8(N)	13:37	Surface	1	1	29.8	8.0	24.0	4.9	4.9	10.2	10.6	15.7	14.5
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS8(N)	13:37	Surface	1	2	28.8	7.9	24.5	4.9		9.9		14.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS8(N)	13:37	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS8(N)	13:37	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS8(N)	13:37	Bottom	3	1	29.8	8.1	24.1	4.8	4.8	11.1		13.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS8(N)	13:37	Bottom	3	2	28.8	8.0	24.6	4.8		11.3		14.4	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)9	13:30	Surface	1	1	29.9	8.0	23.7	4.9	4.9	6.5	9.4	15.0	14.2
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)9	13:30	Surface	1	2	28.9	8.0	24.2	4.9		6.7		13.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)9	13:30	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)9	13:30	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)9	13:30	Bottom	3	1	29.7	8.0	24.3	4.9	4.9	12.1		13.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)9	13:30	Bottom	3	2	28.7	8.0	24.8	4.9		12.2		14.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)11	14:11	Surface	1	1	30.0	8.1	23.6	5.0	4.8	4.5	5.8	4.5	4.0
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)11	14:11	Surface	1	2	29.1	8.1	24.1	5.1		4.6		4.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)11	14:11	Middle	2	1	29.5	8.1	25.1	4.5		6.6		4.3	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)11	14:11	Middle	2	2	28.5	8.0	25.6	4.6		6.6		4.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)11	14:11	Bottom	3	1	29.0	8.2	27.1	4.4	4.4	6.1		3.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS(Mf)11	14:11	Bottom	3	2	28.0	8.0	27.6	4.4		6.2		3.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR7	15:08	Surface	1	1	29.9	8.1	22.8	5.2	5.2	3.9	5.2	4.3	3.5
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR7	15:08	Surface	1	2	28.9	8.2	23.3	5.2		3.9		3.4	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR7	15:08	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR7	15:08	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR7	15:08	Bottom	3	1	29.5	8.1	25.5	4.8	4.9	6.5		3.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	SR7	15:08	Bottom	3	2	28.6	8.1	26.0	4.9		6.6		3.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS17	14:02	Surface	1	1	30.0	8.2	25.1	5.0	4.7	7.2	9.6	5.6	5.2
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS17	14:02	Surface	1	2	29.0	8.2	25.6	5.0		7.3		4.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS17	14:02	Middle	2	1	29.2	8.1	26.3	4.3		7.2		5.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS17	14:02	Middle	2	2	28.3	8.1	26.8	4.3		7.2		4.8	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/09/18	Mid-Ebb	IS17	14:02	Bottom	3	1	29.0	8.1	26.9	4.3	4.3	14.2		4.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-Ebb	IS17	14:02	Bottom	3	2	28.1	8.1	27.4	4.3		14.3		5.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)5	8:06	Surface	1	1	29.5	8.1	24.2	4.9	4.8	3.8	4.4	9.5	8.8
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)5	8:06	Surface	1	2	28.5	7.9	24.7	4.9		3.7		9.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)5	8:06	Middle	2	1	29.4	8.0	24.9	4.6		4.5		8.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)5	8:06	Middle	2	2	28.4	8.0	25.4	4.7		4.4		9.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)5	8:06	Bottom	3	1	28.8	8.1	27.7	4.1	4.2	4.9		8.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)5	8:06	Bottom	3	2	27.9	8.0	28.2	4.2		5.0		8.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)3(N)	8:52	Surface	1	1	29.7	7.9	23.6	4.9	5.0	7.0	8.8	9.6	10.1
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)3(N)	8:52	Surface	1	2	28.7	8.1	24.0	4.9		6.8		8.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)3(N)	8:52	Middle	2	1	29.6	8.2	23.6	5.0		9.3		9.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)3(N)	8:52	Middle	2	2	28.7	8.1	24.1	5.0		9.4		9.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)3(N)	8:52	Bottom	3	1	29.3	8.2	23.7	5.1	5.2	10.1		10.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	CS(Mf)3(N)	8:52	Bottom	3	2	28.4	8.1	24.2	5.2		10.2		12.8	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)16	9:44	Surface	1	1	29.5	8.1	24.4	4.7	4.8	9.8	9.9	2.5	3.3
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)16	9:44	Surface	1	2	28.6	8.0	24.8	4.8		9.7		2.4	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)16	9:44	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)16	9:44	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)16	9:44	Bottom	3	1	29.5	8.1	24.5	4.8	4.8	10.2		4.3	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)16	9:44	Bottom	3	2	28.5	8.0	25.0	4.8		10.0		4.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4a	9:53	Surface	1	1	29.6	8.1	23.7	4.8	4.8	4.2	5.4	4.3	3.7
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4a	9:53	Surface	1	2	28.6	8.1	24.2	4.8		4.0		3.4	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4a	9:53	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4a	9:53	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4a	9:53	Bottom	3	1	29.4	8.1	24.3	4.9	4.9	6.8		3.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4a	9:53	Bottom	3	2	28.4	8.1	24.8	4.8		6.6		3.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4(N2)	9:58	Surface	1	1	29.5	8.1	23.9	4.8	4.8	5.4	6.4	7.2	6.8
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4(N2)	9:58	Surface	1	2	28.5	8.1	24.4	4.8		5.4		7.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4(N2)	9:58	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4(N2)	9:58	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4(N2)	9:58	Bottom	3	1	29.4	8.1	24.2	4.6	4.6	7.2		5.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR4(N2)	9:58	Bottom	3	2	28.5	8.1	24.7	4.6		7.4		6.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS8(N)	10:04	Surface	1	1	29.7	8.1	23.6	5.1	5.1	4.5	4.6	5.6	5.2
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS8(N)	10:04	Surface	1	2	28.7	8.1	24.1	5.1		4.9		4.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS8(N)	10:04	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS8(N)	10:04	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS8(N)	10:04	Bottom	3	1	29.7	8.1	23.6	5.2	5.2	4.4		5.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS8(N)	10:04	Bottom	3	2	28.7	8.1	24.1	5.2		4.7		5.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)9	10:10	Surface	1	1	29.5	8.2	24.2	4.9	4.9	10.3	11.2	12.4	12.7
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)9	10:10	Surface	1	2	28.5	8.1	24.7	4.9		10.2		10.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)9	10:10	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)9	10:10	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)9	10:10	Bottom	3	1	29.5	8.2	24.2	5.0	5.0	12.0		13.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)9	10:10	Bottom	3	2	28.5	8.1	24.7	5.0		12.1		14.2	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)11	9:27	Surface	1	1	29.5	8.1	24.2	4.8	4.6	6.0	9.9	7.6	6.1
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)11	9:27	Surface	1	2	28.5	8.1	24.7	4.9		6.0		15.7	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)11	9:27	Middle	2	1	29.3	8.0	25.3	4.4		7.4		4.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)11	9:27	Middle	2	2	28.3	8.1	25.8	4.4		7.7		3.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)11	9:27	Bottom	3	1	29.2	8.0	25.5	4.4	4.4	16.2		2.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS(Mf)11	9:27	Bottom	3	2	28.3	8.1	26.0	4.4		16.2		2.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR7	8:27	Surface	1	1	29.4	8.1	24.9	4.6	4.6	7.2	11.2	14.6	13.4
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR7	8:27	Surface	1	2	28.4	8.2	25.4	4.6		7.0		14.0	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR7	8:27	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR7	8:27	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR7	8:27	Bottom	3	1	29.3	8.0	25.3	4.6	4.6	15.2		12.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	SR7	8:27	Bottom	3	2	28.3	8.1	25.8	4.6		15.2		12.4	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS17	9:36	Surface	1	1	29.6	8.1	23.8	5.0	4.8	3.0	5.8	2.5	3.7
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS17	9:36	Surface	1	2	28.7	7.9	24.3	5.1		3.0		3.5	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS17	9:36	Middle	2	1	29.4	8.1	24.9	4.6		3.9		3.6	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS17	9:36	Middle	2	2	28.4	8.0	25.4	4.6		4.1		3.9	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS17	9:36	Bottom	3	1	29.1	8.1	26.5	4.2	4.2	10.2		4.1	
TMCLKL	HY/2012/08	2019/09/18	Mid-flood	IS17	9:36	Bottom	3	2	28.1	8.0	27.0	4.2		10.3		4.3	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	24 September 2019

Dear Sir or Madam,

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

Action Level Exceedance

0212330_20 September 2019_ Surface & Middle DO_E_Station IS17
0212330_20 September 2019_ Bottom DO_E_Station IS17
0212330_20 September 2019_ Bottom DO_F_Station SR4(N2)
0212330_20 September 2019_ Surface & Middle DO_F_Station IS(Mf)11
0212330_20 September 2019_ Bottom DO_F_Station IS(Mf)11
0212330_20 September 2019_ Surface & Middle DO_F_Station SR7
0212330_20 September 2019_ Surface & Middle DO_F_Station IS17
0212330_20 September 2019_ Bottom DO_F_Station IS17

A total of eight Action Level exceedances were recorded on 20 September 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**Action Level Exceedance** **0212330_20 September 2019_ Surface & Middle DO_E_Station IS17** **0212330_20 September 2019_ Bottom DO_E_Station IS17** **0212330_20 September 2019_ Bottom DO_F_Station SR4(N2)** **0212330_20 September 2019_ Surface & Middle DO_F_Station IS(Mf)11** **0212330_20 September 2019_ Bottom DO_F_Station IS(Mf)11** **0212330_20 September 2019_ Surface & Middle DO_F_Station SR7** **0212330_20 September 2019_ Surface & Middle DO_F_Station IS17** **0212330_20 September 2019_ Bottom DO_F_Station IS17** **[Total No. of Exceedances = 8]**		
Date	20 September 2019 (Measured) 23 September 2019 (*In situ* results received by ERM) 2 October 2019 (Laboratory results received by ERM)		
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11		
Parameter(s) with Exceedance(s)	Dissolved Oxygen (mg/L)		
Action Levels	DO	Surface and Middle 5.0 mg/L	Bottom 4.7 mg/L
Limit Levels	DO	Surface and Middle 4.2 mg/L	Bottom 3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS17 (Surface & Middle -depth DO = 4.5 mg/L) 2. Mid-ebb at IS17 (Bottom-depth DO = 4.5 mg/L) 3. Mid-flood at SR4(N2) (Bottom-depth DO = 4.6 mg/L) 4. Mid-flood at IS(Mf)11 (Surface & Middle-depth DO = 4.7 mg/L) 5. Mid-flood at IS(Mf)11 (Bottom-depth DO = 4.5 mg/L) 6. Mid-flood at SR7 (Surface & Middle-depth DO = 4.7 mg/L) 7. Mid-flood at IS17 (Surface & Middle -depth DO = 4.8 mg/L) 8. Mid-flood at IS17 (Bottom-depth DO = 4.6 mg/L)		
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 20 September 2019.		

Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except DO, 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. • SR4(N2), IS(Mf)11 and SR7 are far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • Bottom-depth DO levels at SR4(N2), IS(Mf)11 and IS17 were similar to the corresponding control stations, CS(Mf)5, during mid-flood tide, in which the recorded Bottom-depth DO levels at the corresponding control station were below Action Level. • Surface & Middle-depth DO levels at IS(Mf)11, SR7 and IS17 were similar to the corresponding control stations, CS(Mf)5, during mid-flood tide, in which the recorded Surface & Middle-depth DO levels at the corresponding control station were below Action Level. • As reported by the marine mammal observer, no discharge of organic matters into waters from landside works area was recorded. Moreover, no exceedance was recorded at IS(Mf)16 which is the closest station to the Seawall Modification Works Area during both mid-ebb and mid-flood tide. Therefore, exceedances recorded at IS17 during mid-ebb tide are unlikely to be caused by the marine works of this Contract.
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 20 September 2019 and locations of water quality monitoring stations are attached.

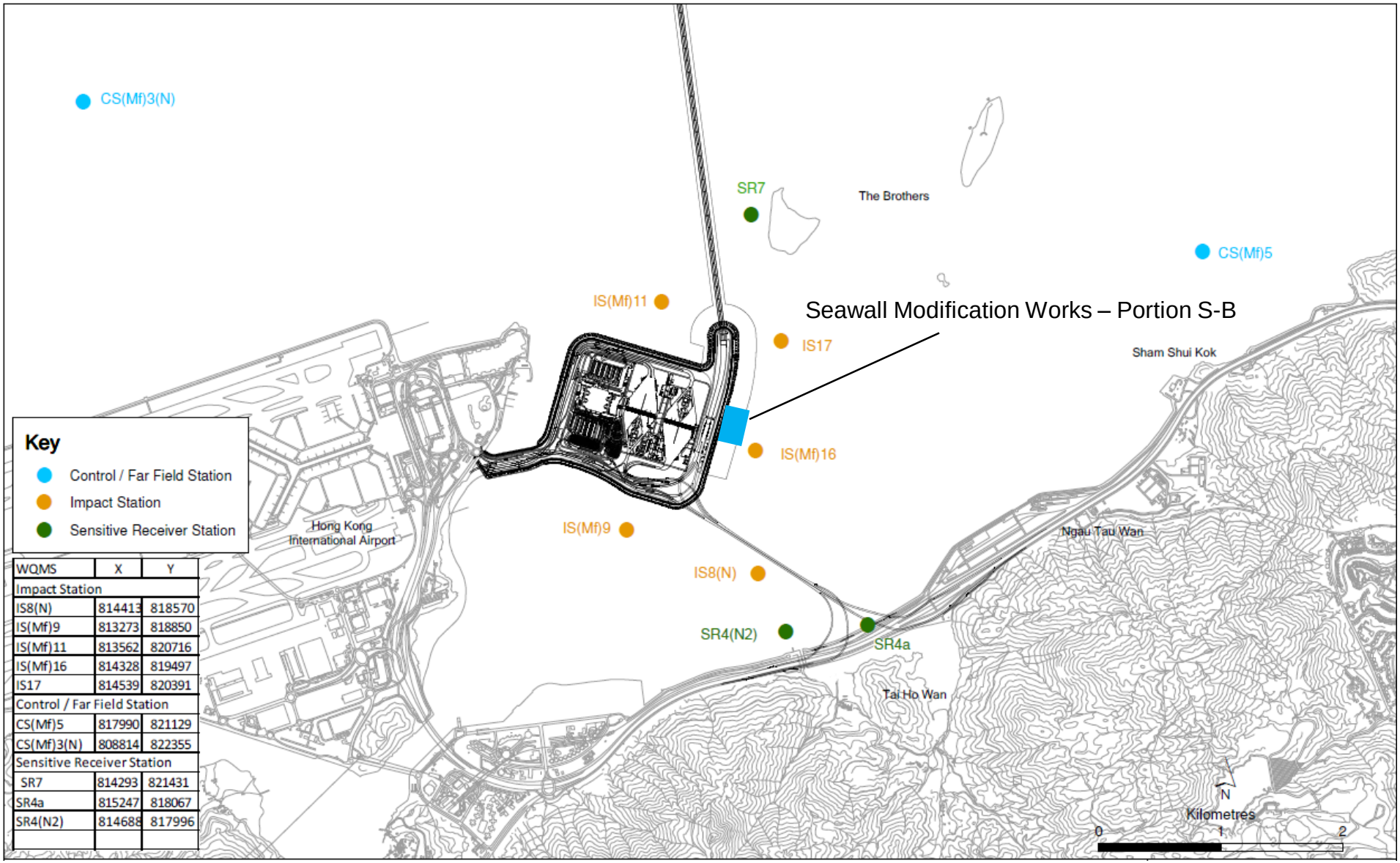
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)5	16:44	Surface	1	1	28.9	7.8	26.8	5.6	5.3	2.1	3.1	3.3	4.1
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)5	16:44	Surface	1	2	28.9	7.8	26.7	5.6		2.1		4.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)5	16:44	Middle	2	1	28.4	7.8	28.5	5.0		3.4		3.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)5	16:44	Middle	2	2	28.4	7.8	28.2	5.0		3.4		4.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)5	16:44	Bottom	3	1	28.1	7.8	29.5	4.6	4.6	3.8		4.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)5	16:44	Bottom	3	2	28.1	7.8	29.5	4.6		3.9		5.4	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)3(N)	16:02	Surface	1	1	28.9	7.9	22.9	6.2	5.7	2.7	5.5	3.7	4.4
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)3(N)	16:02	Surface	1	2	29.0	7.9	22.8	6.2		2.7		4.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)3(N)	16:02	Middle	2	1	28.7	8.0	24.5	5.2		4.0		3.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)3(N)	16:02	Middle	2	2	28.7	8.0	24.5	5.1		4.0		4.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)3(N)	16:02	Bottom	3	1	28.3	8.0	27.0	5.1	5.1	9.7		5.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	CS(Mf)3(N)	16:02	Bottom	3	2	28.3	8.0	27.0	5.1		9.7		4.4	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)16	15:21	Surface	1	1	28.5	7.9	26.3	5.0	5.0	7.5	7.4	10.6	10.1
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)16	15:21	Surface	1	2	28.5	7.9	26.3	5.0		7.4		9.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)16	15:21	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)16	15:21	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)16	15:21	Bottom	3	1	28.5	8.0	26.4	5.2	5.2	7.4		9.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)16	15:21	Bottom	3	2	28.5	8.0	26.5	5.2		7.3		10.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4a	15:13	Surface	1	1	29.0	7.9	25.6	5.8	5.8	3.4	4.0	5.0	4.8
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4a	15:13	Surface	1	2	29.0	7.9	25.6	5.8		3.4		4.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4a	15:13	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4a	15:13	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4a	15:13	Bottom	3	1	28.7	7.9	26.0	5.0	5.1	4.6		4.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4a	15:13	Bottom	3	2	28.7	7.9	26.0	5.1		4.5		4.6	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4(N2)	15:09	Surface	1	1	28.9	7.9	25.7	5.6	5.6	4.6	7.1	8.0	7.3
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4(N2)	15:09	Surface	1	2	28.9	7.9	25.7	5.6		4.6		7.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4(N2)	15:09	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4(N2)	15:09	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4(N2)	15:09	Bottom	3	1	28.5	7.9	26.2	4.9	4.9	9.7		6.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR4(N2)	15:09	Bottom	3	2	28.6	7.9	26.2	4.9		9.5		7.3	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS8(N)	15:04	Surface	1	1	29.0	8.1	25.9	6.6	6.6	8.4	8.3	11.5	11.8
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS8(N)	15:04	Surface	1	2	29.0	8.1	25.9	6.6		8.4		11.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS8(N)	15:04	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS8(N)	15:04	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS8(N)	15:04	Bottom	3	1	28.9	8.1	26.0	6.3	6.4	8.2		11.6	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS8(N)	15:04	Bottom	3	2	28.9	8.1	26.0	6.4		8.2		12.4	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)9	14:57	Surface	1	1	28.9	8.1	26.1	5.6	5.6	5.7	5.9	9.5	8.9
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)9	14:57	Surface	1	2	28.9	8.1	26.1	5.6		5.8		9.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)9	14:57	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)9	14:57	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)9	14:57	Bottom	3	1	28.9	8.0	26.1	5.7	5.7	6.0		8.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)9	14:57	Bottom	3	2	28.9	8.0	26.1	5.6		6.0		8.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)11	15:35	Surface	1	1	28.9	7.9	25.9	5.5	5.3	4.7	5.6	5.0	6.6
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)11	15:35	Surface	1	2	28.9	7.9	25.9	5.5		4.7		4.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)11	15:35	Middle	2	1	28.7	7.9	26.4	5.1		5.3		7.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)11	15:35	Middle	2	2	28.7	7.9	26.4	5.1		5.2		7.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)11	15:35	Bottom	3	1	28.3	7.9	27.6	4.7	4.7	7.0		8.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS(Mf)11	15:35	Bottom	3	2	28.3	7.9	27.6	4.7		6.9		7.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR7	16:27	Surface	1	1	28.9	7.9	24.5	6.1	6.1	3.1	3.4	3.4	4.3
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR7	16:27	Surface	1	2	28.9	7.9	24.5	6.1		3.1		4.4	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR7	16:27	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR7	16:27	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR7	16:27	Bottom	3	1	28.7	7.9	24.9	5.7	5.8	3.8		4.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	SR7	16:27	Bottom	3	2	28.7	7.9	24.8	5.9		3.7		5.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS17	15:27	Surface	1	1	28.4	7.9	27.5	4.5	4.5	6.7	6.0	7.6	9.1
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS17	15:27	Surface	1	2	28.4	7.9	27.5	4.5		6.6		8.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS17	15:27	Middle	2	1	28.2	8.0	28.6	4.5		4.6		9.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS17	15:27	Middle	2	2	28.2	8.0	28.6	4.5		4.6		9.6	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/09/20	Mid-Ebb	IS17	15:27	Bottom	3	1	28.1	8.0	29.2	4.5	4.5	6.9		9.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-Ebb	IS17	15:27	Bottom	3	2	28.1	8.0	29.2	4.5		6.8		10.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)5	10:09	Surface	1	1	28.4	7.9	26.6	4.9	4.7	3.3	3.3	3.3	4.8
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)5	10:09	Surface	1	2	28.4	7.9	26.5	4.9		3.3		3.6	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)5	10:09	Middle	2	1	28.3	7.9	27.9	4.5		3.4		4.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)5	10:09	Middle	2	2	28.3	7.9	27.8	4.5		3.4		5.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)5	10:09	Bottom	3	1	28.3	7.9	28.1	4.6	4.6	3.2		6.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)5	10:09	Bottom	3	2	28.3	7.9	28.1	4.5		3.1		5.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)3(N)	11:00	Surface	1	1	28.7	7.9	23.4	5.5	5.4	3.2	6.1	4.0	7.3
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)3(N)	11:00	Surface	1	2	28.7	7.9	23.4	5.5		3.2		4.9	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)3(N)	11:00	Middle	2	1	28.6	8.0	24.7	5.2		7.4		6.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)3(N)	11:00	Middle	2	2	28.5	8.0	24.8	5.2		7.4		6.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)3(N)	11:00	Bottom	3	1	28.5	7.9	25.1	5.1	5.1	7.7		11.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	CS(Mf)3(N)	11:00	Bottom	3	2	28.5	7.9	25.1	5.1		7.7		11.5	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)16	11:44	Surface	1	1	28.5	7.8	25.9	5.0	5.0	8.2	8.2	9.1	9.4
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)16	11:44	Surface	1	2	28.5	7.8	25.9	5.0		8.2		8.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)16	11:44	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)16	11:44	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)16	11:44	Bottom	3	1	28.4	7.9	26.1	5.0	5.0	8.1		10.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)16	11:44	Bottom	3	2	28.4	7.9	26.1	5.0		8.1		10.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4a	11:55	Surface	1	1	28.6	7.8	25.9	5.1	5.1	4.3	4.6	6.2	7.0
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4a	11:55	Surface	1	2	28.7	7.8	25.8	5.1		4.3		5.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4a	11:55	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4a	11:55	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4a	11:55	Bottom	3	1	28.5	7.8	26.0	5.0	5.0	4.9		7.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4a	11:55	Bottom	3	2	28.5	7.8	26.0	5.0		4.9		8.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4(N2)	11:59	Surface	1	1	28.6	7.8	25.9	5.1	5.1	4.6	6.2	6.4	7.5
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4(N2)	11:59	Surface	1	2	28.6	7.8	25.9	5.1		4.6		5.4	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4(N2)	11:59	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4(N2)	11:59	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4(N2)	11:59	Bottom	3	1	28.4	7.8	26.2	4.6	4.6	7.9		8.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR4(N2)	11:59	Bottom	3	2	28.4	7.8	26.2	4.6		7.8		9.6	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS8(N)	12:06	Surface	1	1	28.7	7.7	25.5	5.3	5.3	4.5	5.1	7.9	7.7
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS8(N)	12:06	Surface	1	2	28.7	7.7	25.5	5.3		4.5		8.4	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS8(N)	12:06	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS8(N)	12:06	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS8(N)	12:06	Bottom	3	1	28.6	7.7	25.6	5.2	5.2	5.8		7.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS8(N)	12:06	Bottom	3	2	28.6	7.7	25.6	5.2		5.7		6.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)9	12:14	Surface	1	1	28.6	7.8	26.0	5.1	5.1	6.3	7.0	7.7	10.3
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)9	12:14	Surface	1	2	28.6	7.8	26.0	5.1		6.3		8.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)9	12:14	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)9	12:14	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)9	12:14	Bottom	3	1	28.7	7.9	26.0	5.3	5.3	7.7		12.6	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)9	12:14	Bottom	3	2	28.6	7.9	26.0	5.3		7.7		12.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)11	10:35	Surface	1	1	28.4	8.0	25.8	4.9	4.7	6.4	13.3	10.1	16.4
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)11	10:35	Surface	1	2	28.4	8.0	25.7	4.9		6.4		9.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)11	10:35	Middle	2	1	28.3	7.9	27.4	4.4		16.3		18.0	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)11	10:35	Middle	2	2	28.3	7.9	27.3	4.4		16.2		17.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)11	10:35	Bottom	3	1	28.3	7.8	27.4	4.5	4.5	17.1		21.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS(Mf)11	10:35	Bottom	3	2	28.3	7.8	27.4	4.4		17.1		22.8	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR7	10:28	Surface	1	1	28.4	7.8	26.8	4.7	4.7	9.1	11.2	9.5	10.2
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR7	10:28	Surface	1	2	28.4	7.8	26.8	4.7		9.0		9.6	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR7	10:28	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR7	10:28	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR7	10:28	Bottom	3	1	28.4	7.7	27.2	4.7	4.7	13.4		11.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	SR7	10:28	Bottom	3	2	28.3	7.7	27.2	4.7		13.4		10.3	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS17	11:37	Surface	1	1	28.5	7.9	26.2	4.9	4.8	3.5	3.8	4.0	5.0
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS17	11:37	Surface	1	2	28.5	7.9	26.1	4.9		3.5		4.2	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS17	11:37	Middle	2	1	28.4	7.9	26.5	4.7		3.6		4.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS17	11:37	Middle	2	2	28.4	7.9	26.4	4.8		3.5		5.7	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS17	11:37	Bottom	3	1	28.3	7.9	27.3	4.6	4.6	4.3		6.1	
TMCLKL	HY/2012/08	2019/09/20	Mid-flood	IS17	11:37	Bottom	3	2	28.3	7.9	27.2	4.6		4.3		5.2	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	26 September 2019

Dear Sir or Madam,

Please find the Notification of Exceedance (NOE) of the following Log no.:
Action Level Exceedance
0212330_23 September 2019_ Surface & Middle DO_E_Station SR4(N2)
0212330_23 September 2019_ Bottom DO_E_Station SR4(N2)

A total of two Action Level exceedances were recorded on 23 September 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u>** **0212330_23 September 2019_ Surface & Middle DO_E_Station SR4(N2)** **0212330_23 September 2019_ Bottom DO_E_Station SR4(N2)** **[Total No. of Exceedances = 2]**		
Date	23 September 2019 (Measured) 24 September 2019 (*In situ* results received by ERM) 4 October 2019 (Laboratory results received by ERM)		
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11		
Parameter(s) with Exceedance(s)	Dissolved Oxygen (mg/L)		
Action Levels	DO	Surface and Middle 5.0 mg/L	Bottom 4.7 mg/L
Limit Levels	DO	Surface and Middle 4.2 mg/L	Bottom 3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at SR4(N2) (Surface & Middle -depth DO = 4.7 mg/L) 2. Mid-ebb at SR4(N2) (Bottom-depth DO = 4.6 mg/L)		
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 23 September 2019.		
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except DO, 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. • SR4(N2) is far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • As reported by the marine mammal observer, no discharge of organic matters into waters from landside works area was recorded. Moreover, no exceedance was recorded at IS(Mf)16 which is the closest station to the Seawall Modification Works Area during both mid-ebb and mid-flood tide. Therefore, exceedances recorded at SR4(N2) during mid-ebb tide are unlikely to be caused by the marine works of this Contract.		
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.		
Remarks	The monitoring results on 23 September 2019 and locations of water quality monitoring stations are attached.		

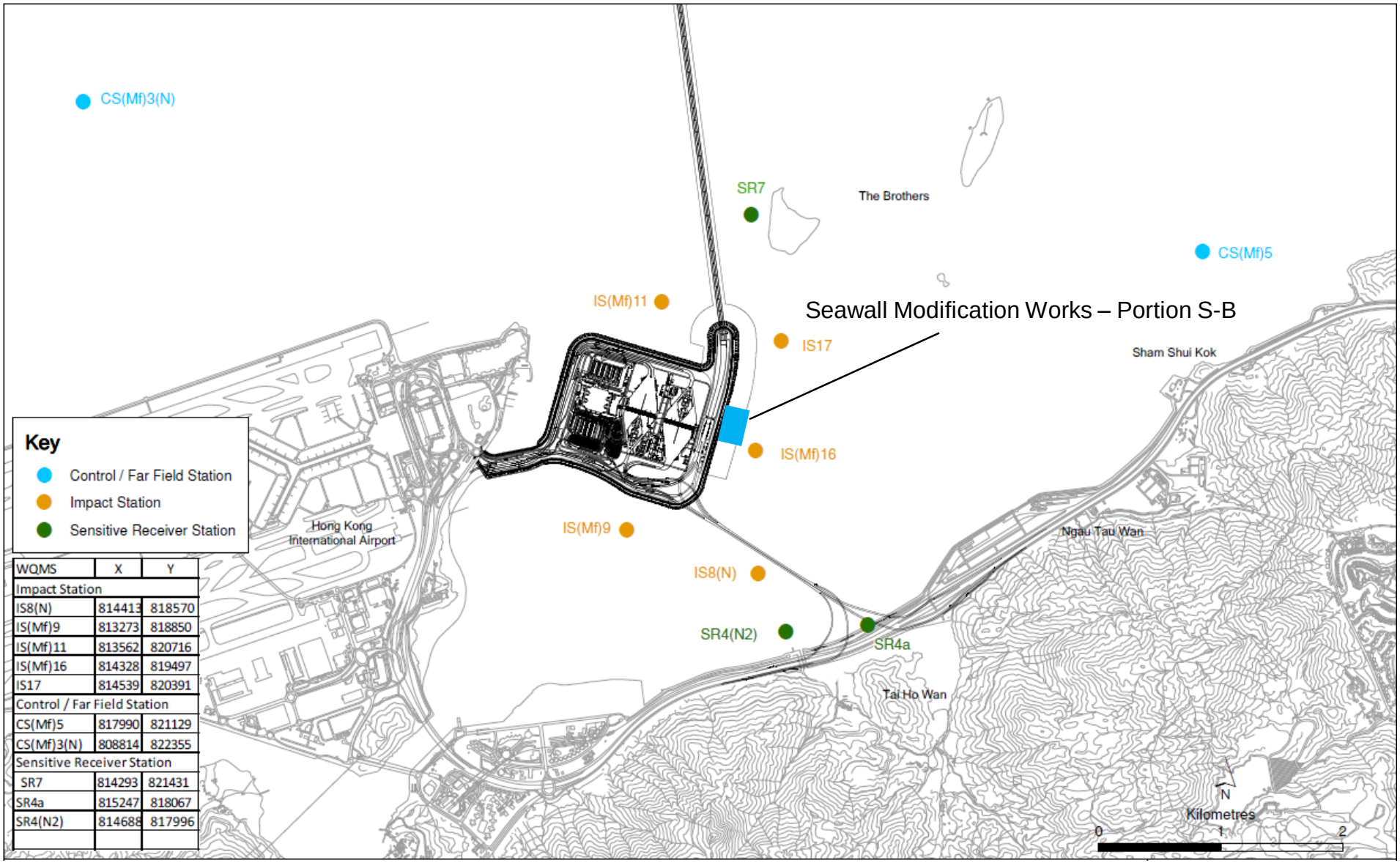
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)5	5:48	Surface	1	1	26.8	8.2	28.2	6.5	5.8	2.5	2.8	5.1	6.4
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)5	5:48	Surface	1	2	27.8	8.1	27.1	6.5		2.7		5.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)5	5:48	Middle	2	1	28.2	8.1	31.9	5.0		2.2		5.8	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)5	5:48	Middle	2	2	29.1	8.1	30.7	5.0		2.4		6.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)5	5:48	Bottom	3	1	28.1	8.0	32.3	5.4	5.4	3.5		7.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)5	5:48	Bottom	3	2	29.1	8.1	31.1	5.3		3.2		7.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)3(N)	6:49	Surface	1	1	27.1	8.1	28.7	6.3	6.3	2.0	3.6	7.9	9.5
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)3(N)	6:49	Surface	1	2	28.0	8.2	27.6	6.3		2.1		8.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)3(N)	6:49	Middle	2	1	27.2	8.1	28.9	6.3		2.3		9.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)3(N)	6:49	Middle	2	2	28.1	8.2	27.8	6.3		2.3		9.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)3(N)	6:49	Bottom	3	1	27.5	8.1	30.3	6.2	6.2	6.6		11.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	CS(Mf)3(N)	6:49	Bottom	3	2	28.4	8.2	29.0	6.1		6.5		11.0	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)16	7:26	Surface	1	1	27.9	8.1	30.5	5.1	5.1	3.5	3.7	15.9	17.3
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)16	7:26	Surface	1	2	28.9	8.1	29.2	5.1		3.7		16.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)16	7:26	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)16	7:26	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)16	7:26	Bottom	3	1	28.0	8.1	31.5	5.4	5.4	3.7		18.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)16	7:26	Bottom	3	2	29.0	8.1	30.3	5.3		3.7		18.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4a	7:36	Surface	1	1	27.5	8.0	28.4	5.3	5.3	4.0	6.1	10.9	11.3
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4a	7:36	Surface	1	2	28.5	8.1	27.3	5.2		4.2		11.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4a	7:36	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4a	7:36	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4a	7:36	Bottom	3	1	28.0	8.0	30.4	4.8	4.9	8.1		11.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4a	7:36	Bottom	3	2	28.9	8.1	29.2	5.0		8.1		11.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4(N2)	7:40	Surface	1	1	28.0	8.0	29.6	4.7	4.7	7.6	9.1	9.2	10.0
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4(N2)	7:40	Surface	1	2	28.9	8.1	28.4	4.7		7.7		9.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4(N2)	7:40	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4(N2)	7:40	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4(N2)	7:40	Bottom	3	1	28.0	8.0	30.4	4.5	4.6	10.5		10.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR4(N2)	7:40	Bottom	3	2	28.9	8.1	29.2	4.7		10.4		10.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS8(N)	7:46	Surface	1	1	27.6	8.1	28.7	5.9	5.9	5.7	5.9	12.4	12.6
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS8(N)	7:46	Surface	1	2	28.5	8.1	27.5	5.9		5.4		12.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS8(N)	7:46	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS8(N)	7:46	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS8(N)	7:46	Bottom	3	1	27.8	8.0	29.7	4.9	4.9	6.2		13.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS8(N)	7:46	Bottom	3	2	28.8	8.1	28.5	4.9		6.4		12.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)9	7:55	Surface	1	1					6.4		4.4		17.3
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)9	7:55	Surface	1	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)9	7:55	Middle	2	1	27.1	8.2	27.8	6.4		4.3		17.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)9	7:55	Middle	2	2	28.1	8.2	26.7	6.4		4.4		17.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)9	7:55	Bottom	3	1					#DIV/0!				
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)9	7:55	Bottom	3	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)11	6:20	Surface	1	1	27.1	8.1	28.9	6.1	5.5	2.4	3.2	8.7	8.6
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)11	6:20	Surface	1	2	28.1	8.1	27.8	6.0		2.5		9.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)11	6:20	Middle	2	1	28.1	8.1	31.1	5.0		3.0		8.8	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)11	6:20	Middle	2	2	29.0	8.1	29.9	5.0		3.0		8.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)11	6:20	Bottom	3	1	28.1	8.2	31.6	5.0	5.0	4.4		8.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS(Mf)11	6:20	Bottom	3	2	29.1	8.1	30.3	5.0		4.0		8.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR7	6:13	Surface	1	1	27.2	8.1	29.2	6.2	6.2	2.2	2.3	6.7	8.3
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR7	6:13	Surface	1	2	28.1	8.2	28.1	6.1		2.1		6.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR7	6:13	Middle	2	1									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR7	6:13	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR7	6:13	Bottom	3	1	27.2	8.2	29.4	6.2	6.2	2.4		10.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	SR7	6:13	Bottom	3	2	28.1	8.1	28.3	6.2		2.3		9.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS17	7:19	Surface	1	1	27.1	8.1	28.9	5.9	5.9	3.3	4.3	12.3	13.9
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS17	7:19	Surface	1	2	28.1	8.1	27.8	5.9		3.2		12.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS17	7:19	Middle	2	1	27.2	8.1	29.1	5.8		3.6		14.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS17	7:19	Middle	2	2	28.1	8.1	27.9	5.8		3.6		14.7	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/09/23	Mid-Ebb	IS17	7:19	Bottom	3	1	28.0	8.1	31.5	5.2	5.3	6.1		14.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-Ebb	IS17	7:19	Bottom	3	2	29.0	8.1	30.3	5.3		6.1		14.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)5	20:18	Surface	1	1	27.9	8.2	31.6	5.5		3.9		3.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)5	20:18	Surface	1	2	28.9	8.1	30.4	5.5	5.4	3.7		3.8	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)5	20:18	Middle	2	1	28.0	8.2	32.2	5.3		4.7	4.6	4.1	4.1
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)5	20:18	Middle	2	2	28.9	8.1	30.9	5.4		4.4		4.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)5	20:18	Bottom	3	1	28.0	8.1	32.3	5.4	5.5	5.5		4.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)5	20:18	Bottom	3	2	28.9	8.1	31.0	5.5		5.5		4.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)3(N)	19:24	Surface	1	1	27.7	8.1	29.5	6.6		3.3		10.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)3(N)	19:24	Surface	1	2	28.7	8.2	28.3	6.6	6.4	3.3		10.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)3(N)	19:24	Middle	2	1	27.8	8.2	30.5	6.1		9.9	8.1	8.1	9.1
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)3(N)	19:24	Middle	2	2	28.8	8.2	29.2	6.1		10.0		8.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)3(N)	19:24	Bottom	3	1	27.8	8.1	30.7	6.1	6.1	11.1		8.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	CS(Mf)3(N)	19:24	Bottom	3	2	28.8	8.2	29.5	6.1		11.1		9.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)16	18:43	Surface	1	1	27.9	8.3	29.6	8.1		5.1		21.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)16	18:43	Surface	1	2	28.9	8.3	28.3	8.1	8.1	5.3		21.8	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)16	18:43	Middle	2	1							7.9		22.4
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)16	18:43	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)16	18:43	Bottom	3	1	27.9	8.1	30.6	5.8	5.8	10.7		22.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)16	18:43	Bottom	3	2	28.8	8.1	29.4	5.7		10.4		23.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4a	18:33	Surface	1	1	27.9	8.2	29.5	6.6		5.2		7.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4a	18:33	Surface	1	2	28.8	8.2	28.3	6.6	6.6	5.0		8.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4a	18:33	Middle	2	1							5.7		7.8
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4a	18:33	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4a	18:33	Bottom	3	1	27.8	8.2	29.7	6.2	6.2	6.3		7.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4a	18:33	Bottom	3	2	28.7	8.2	28.4	6.2		6.2		7.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4(N2)	18:29	Surface	1	1	27.9	8.2	29.3	6.8		6.7		8.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4(N2)	18:29	Surface	1	2	28.9	8.2	28.1	6.8	6.8	6.6		8.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4(N2)	18:29	Middle	2	1							8.2		9.1
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4(N2)	18:29	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4(N2)	18:29	Bottom	3	1	27.9	8.1	29.4	6.5	6.5	9.5		9.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR4(N2)	18:29	Bottom	3	2	28.8	8.2	28.2	6.5		9.8		9.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS8(N)	18:24	Surface	1	1	27.8	8.1	29.6	7.2		10.0		12.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS8(N)	18:24	Surface	1	2	28.8	8.1	28.3	7.3	7.3	10.3		11.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS8(N)	18:24	Middle	2	1							10.1		12.4
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS8(N)	18:24	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS8(N)	18:24	Bottom	3	1	27.8	8.2	29.6	7.0	7.1	10.1		12.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS8(N)	18:24	Bottom	3	2	28.8	8.2	28.3	7.1		10.1		12.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)9	18:19	Surface	1	1									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)9	18:19	Surface	1	2					8.2				
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)9	18:19	Middle	2	1	28.0	8.1	29.4	8.2		4.4	4.4	14.0	13.8
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)9	18:19	Middle	2	2	28.9	8.2	28.1	8.2		4.3		13.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)9	18:19	Bottom	3	1					#DIV/0!				
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)9	18:19	Bottom	3	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)11	18:56	Surface	1	1	27.9	8.2	30.1	6.1		4.2		6.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)11	18:56	Surface	1	2	28.9	8.1	28.9	6.1	5.6	4.3		6.1	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)11	18:56	Middle	2	1	28.0	8.1	31.0	5.0		7.1	6.3	6.7	6.6
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)11	18:56	Middle	2	2	28.9	8.1	29.8	5.0		7.2		6.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)11	18:56	Bottom	3	1	28.0	8.1	31.1	5.1	5.1	7.5		6.6	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS(Mf)11	18:56	Bottom	3	2	28.9	8.1	29.8	5.1		7.4		6.8	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR7	19:54	Surface	1	1	27.6	8.2	30.1	7.8		2.4		9.2	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR7	19:54	Surface	1	2	28.6	8.2	28.9	7.8	7.8	2.6		9.4	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR7	19:54	Middle	2	1							3.8		9.2
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR7	19:54	Middle	2	2									
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR7	19:54	Bottom	3	1	27.8	8.2	30.5	6.7	6.7	5.1		9.0	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	SR7	19:54	Bottom	3	2	28.8	8.2	29.2	6.7		5.1		9.0	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS17	18:49	Surface	1	1	27.7	8.2	29.9	7.1		3.1		11.7	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS17	18:49	Surface	1	2	28.7	8.2	28.7	7.2	6.7	3.1		11.5	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS17	18:49	Middle	2	1	27.7	8.1	30.7	6.2		2.6	3.3	12.0	12.8
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS17	18:49	Middle	2	2	28.6	8.2	29.4	6.2		2.7		12.3	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS17	18:49	Bottom	3	1	27.8	8.1	31.5	5.4	5.4	4.2		14.9	
TMCLKL	HY/2012/08	2019/09/23	Mid-flood	IS17	18:49	Bottom	3	2	28.8	8.1	30.2	5.4		4.0		14.6	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	17 October 2019

Dear Sir or Madam,

Please find the Notification of Exceedance (NOE) of the following Log no.:
Action Level Exceedance
0212330_2 October 2019_ Depth_averaged SS_F_Station SR7

A total of one Action Level exceedance was recorded on 2 October 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**Action Level Exceedance** **0212330_2 October 2019_ Depth_averaged SS_F_Station SR7** **[Total No. of Exceedances = 1]**	
Date	2 October 2019 (Measured) 4 October 2019 (*In situ* results received by ERM) 11 October 2019 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11	
Parameter(s) with Exceedance(s)	Suspended solids (mg/L)	
Action Levels	SS	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
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L
Measured Levels	Action Level Exceedance 1. Mid-flood at SR7 (Depth-averaged SS = 26.2 mg/L)	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 2 October 2019.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except 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. • SR7 is far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • No exceedance was recorded at IS(Mf)16 which is the closest station to the Seawall Modification Works Area during both mid-ebb and mid-flood tide. Therefore, exceedance recorded at SR7 during mid-flood tide is unlikely to be caused by the marine works of this Contract.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 2 October 2019 and locations of water quality monitoring stations are attached.	

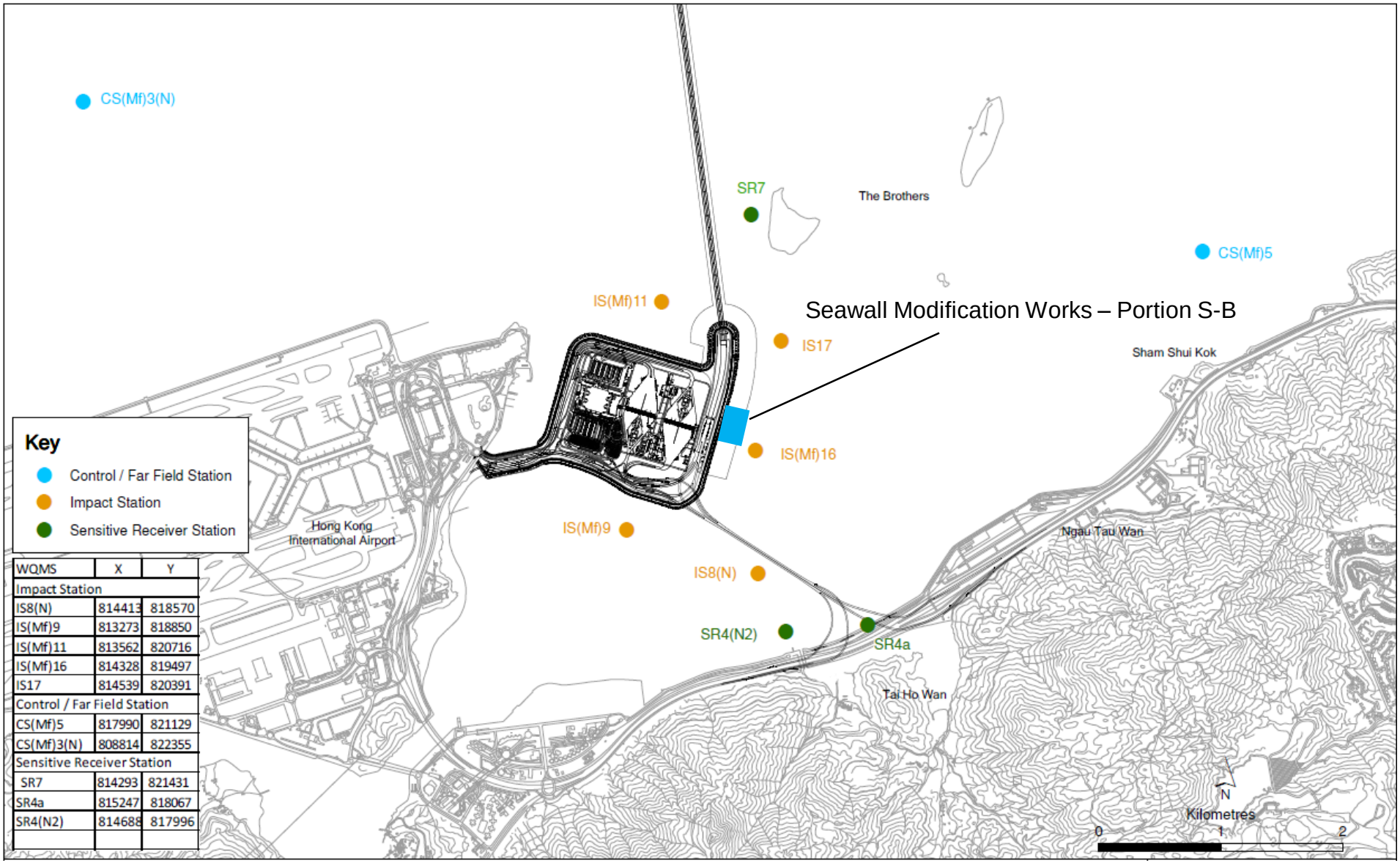
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)5	15:37	Surface	1	1	29.6	7.9	26.4	5.3	5.4	5.0	8.5	8.9	9.9
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)5	15:37	Surface	1	2	28.6	7.9	25.0	5.5		4.9		8.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)5	15:37	Middle	2	1	29.5	7.9	26.7	5.2		6.4		9.8	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)5	15:37	Middle	2	2	28.5	7.9	25.1	5.4		6.1		10.2	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)5	15:37	Bottom	3	1	29.3	7.9	26.6	5.1	5.2	14.4		11.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)5	15:37	Bottom	3	2	28.4	7.9	25.5	5.3		14.2		10.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)3(N)	14:58	Surface	1	1	29.7	7.9	26.6	5.6	5.5	4.9	9.3	8.4	10.5
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)3(N)	14:58	Surface	1	2	28.7	7.9	24.2	5.7		4.6		8.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)3(N)	14:58	Middle	2	1	29.4	7.9	26.5	5.3		9.8		10.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)3(N)	14:58	Middle	2	2	28.4	7.9	24.5	5.5		9.2		10.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)3(N)	14:58	Bottom	3	1	29.4	7.9	26.5	5.3	5.4	13.9		12.2	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	CS(Mf)3(N)	14:58	Bottom	3	2	28.4	7.9	24.7	5.5		13.2		12.5	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)16	14:14	Surface	1	1	29.7	7.9	26.4	5.7	5.8	5.3	5.6	11.6	12.0
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)16	14:14	Surface	1	2	28.7	7.9	24.9	5.9		5.4		11.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)16	14:14	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)16	14:14	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)16	14:14	Bottom	3	1	29.7	7.9	26.7	5.7	5.8	6.0		12.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)16	14:14	Bottom	3	2	28.7	7.9	25.0	5.9		5.7		12.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4a	14:04	Surface	1	1	29.6	7.9	26.6	5.8	5.9	4.5	5.2	8.0	8.5
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4a	14:04	Surface	1	2	28.9	7.9	24.7	6.0		4.5		7.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4a	14:04	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4a	14:04	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4a	14:04	Bottom	3	1	29.5	7.9	26.5	5.5	5.6	6.0		8.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4a	14:04	Bottom	3	2	28.5	7.9	24.9	5.6		5.8		9.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4(N2)	14:00	Surface	1	1	30.0	7.9	26.6	5.8	5.9	5.1	5.4	8.3	8.3
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4(N2)	14:00	Surface	1	2	29.0	7.9	24.7	6.0		5.0		8.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4(N2)	14:00	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4(N2)	14:00	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4(N2)	14:00	Bottom	3	1	30.0	7.9	26.5	5.9	6.0	5.4		8.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR4(N2)	14:00	Bottom	3	2	29.0	7.9	24.7	6.1		6.0		8.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS8(N)	13:54	Surface	1	1	29.9	7.9	26.3	5.8	5.9	5.6	6.1	11.2	11.2
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS8(N)	13:54	Surface	1	2	28.9	7.9	24.8	6.0		5.5		11.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS8(N)	13:54	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS8(N)	13:54	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS8(N)	13:54	Bottom	3	1	29.8	7.9	26.7	5.8	5.9	6.2		11.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS8(N)	13:54	Bottom	3	2	28.8	7.9	24.9	6.0		6.9		11.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)9	13:48	Surface	1	1	29.8	7.9	26.5	5.6	5.7	7.4	10.5	10.8	12.0
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)9	13:48	Surface	1	2	28.8	7.9	25.1	5.7		7.3		10.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)9	13:48	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)9	13:48	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)9	13:48	Bottom	3	1	29.5	7.9	26.5	5.4	5.5	13.5		13.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)9	13:48	Bottom	3	2	28.5	7.9	25.1	5.5		13.6		13.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)11	14:29	Surface	1	1	29.8	7.9	26.7	5.6	5.6	5.4	6.6	9.7	10.9
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)11	14:29	Surface	1	2	28.8	7.9	24.4	5.7		5.1		10.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)11	14:29	Middle	2	1	29.6	7.9	26.4	5.4		6.2		11.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)11	14:29	Middle	2	2	28.6	7.9	24.8	5.6		6.6		12.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)11	14:29	Bottom	3	1	29.5	7.9	26.6	5.4	5.5	8.1		10.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS(Mf)11	14:29	Bottom	3	2	28.5	7.9	24.9	5.6		8.1		11.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR7	15:21	Surface	1	1	29.7	7.9	26.4	5.6	5.7	6.4	7.4	9.0	9.7
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR7	15:21	Surface	1	2	28.7	7.9	24.3	5.7		6.4		8.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR7	15:21	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR7	15:21	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR7	15:21	Bottom	3	1	29.5	7.9	26.7	5.6	5.7	8.7		10.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	SR7	15:21	Bottom	3	2	28.5	7.9	24.6	5.7		8.0		10.8	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS17	14:21	Surface	1	1	29.7	7.9	26.4	5.4	5.5	6.8	8.5	8.3	9.4
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS17	14:21	Surface	1	2	28.7	7.9	24.8	5.6		6.4		8.2	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS17	14:21	Middle	2	1	29.5	7.9	26.6	5.3		9.3		8.8	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS17	14:21	Middle	2	2	28.5	7.9	25.0	5.5		10.0		9.4	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019/10/02	Mid-Ebb	IS17	14:21	Bottom	3	1	29.5	7.9	26.6	5.4	5.5	9.5		10.8	
TMCLKL	HY/2012/08	2019/10/02	Mid-Ebb	IS17	14:21	Bottom	3	2	28.5	7.9	25.1	5.6		9.2		10.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)5	9:05	Surface	1	1	29.5	7.9	26.7	5.4	5.4	5.1	10.7	8.7	8.9
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)5	9:05	Surface	1	2	28.5	7.9	24.8	5.5		5.1		8.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)5	9:05	Middle	2	1	29.3	7.9	26.6	5.2		11.7		8.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)5	9:05	Middle	2	2	28.3	7.9	25.1	5.4		12.6		8.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)5	9:05	Bottom	3	1	29.3	7.9	26.5	5.1	5.2	14.9		9.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)5	9:05	Bottom	3	2	28.3	7.9	25.5	5.2		15.0		9.2	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)3(N)	9:48	Surface	1	1	29.4	7.9	26.1	5.4	5.5	10.3	14.1	20.2	22.6
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)3(N)	9:48	Surface	1	2	28.4	7.9	24.3	5.6		10.2		20.5	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)3(N)	9:48	Middle	2	1	29.4	7.9	26.4	5.4		13.6		23.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)3(N)	9:48	Middle	2	2	28.4	7.9	24.3	5.6		13.9		23.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)3(N)	9:48	Bottom	3	1	29.4	7.9	26.7	5.5	5.6	18.3		24.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	CS(Mf)3(N)	9:48	Bottom	3	2	28.4	7.9	24.3	5.7		18.2		24.2	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)16	10:31	Surface	1	1	29.4	7.9	26.5	5.5	5.6	13.3	12.8	21.0	21.3
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)16	10:31	Surface	1	2	28.5	7.9	24.7	5.7		13.1		21.2	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)16	10:31	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)16	10:31	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)16	10:31	Bottom	3	1	29.4	7.9	26.6	5.5	5.6	12.4		21.5	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)16	10:31	Bottom	3	2	28.4	7.9	24.8	5.7		12.2		21.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4a	10:40	Surface	1	1	29.3	7.9	26.4	5.4	5.5	5.8	5.8	9.3	10.1
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4a	10:40	Surface	1	2	28.3	7.9	24.9	5.6		5.9		9.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4a	10:40	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4a	10:40	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4a	10:40	Bottom	3	1	29.3	7.9	26.5	5.5	5.6	6.0		10.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4a	10:40	Bottom	3	2	28.3	7.9	25.0	5.7		5.3		11.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4(N2)	10:45	Surface	1	1	29.3	7.9	26.4	5.4	5.5	8.2	10.1	11.1	15.1
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4(N2)	10:45	Surface	1	2	28.3	7.9	25.0	5.6		8.6		10.7	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4(N2)	10:45	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4(N2)	10:45	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4(N2)	10:45	Bottom	3	1	29.3	7.9	26.6	5.4	5.5	11.7		19.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR4(N2)	10:45	Bottom	3	2	28.3	7.9	25.0	5.6		11.7		19.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS8(N)	10:51	Surface	1	1	29.5	7.9	26.5	5.6	5.7	5.6	6.0	8.4	8.6
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS8(N)	10:51	Surface	1	2	28.5	7.9	24.7	5.7		5.4		8.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS8(N)	10:51	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS8(N)	10:51	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS8(N)	10:51	Bottom	3	1	29.5	7.9	26.7	5.7	5.8	6.4		8.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS8(N)	10:51	Bottom	3	2	28.5	7.9	24.8	5.8		6.7		9.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)9	10:59	Surface	1	1	29.4	7.9	26.5	5.4	5.5	8.2	8.6	11.9	12.7
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)9	10:59	Surface	1	2	28.4	7.9	25.1	5.6		8.6		12.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)9	10:59	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)9	10:59	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)9	10:59	Bottom	3	1	29.3	7.9	26.2	5.5	5.6	8.8		13.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)9	10:59	Bottom	3	2	28.3	7.9	25.1	5.7		8.9		13.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)11	10:17	Surface	1	1	29.4	7.9	26.3	5.4	5.5	13.7	15.2	17.7	18.6
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)11	10:17	Surface	1	2	28.4	7.9	24.8	5.6		13.9		18.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)11	10:17	Middle	2	1	29.3	7.9	26.5	5.3		15.1		22.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)11	10:17	Middle	2	2	28.3	7.9	24.8	5.5		15.7		21.6	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)11	10:17	Bottom	3	1	29.3	7.9	26.8	5.4	5.5	16.3		16.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS(Mf)11	10:17	Bottom	3	2	28.3	7.9	24.9	5.5		16.4		16.0	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR7	9:24	Surface	1	1	29.4	7.9	26.4	5.4	5.5	10.8	11.8	24.1	26.2
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR7	9:24	Surface	1	2	28.4	7.9	24.7	5.5		10.8		24.4	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR7	9:24	Middle	2	1									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR7	9:24	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR7	9:24	Bottom	3	1	29.4	7.9	26.5	5.4	5.5	12.7		28.3	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	SR7	9:24	Bottom	3	2	28.4	7.9	24.7	5.6		12.9		27.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS17	10:24	Surface	1	1	29.5	7.9	26.8	5.4	5.4	7.6	13.1	10.5	15.3
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS17	10:24	Surface	1	2	28.5	8.0	24.9	5.5		7.3		10.8	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS17	10:24	Middle	2	1	29.3	7.9	26.6	5.3		14.3		14.9	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS17	10:24	Middle	2	2	28.3	7.9	24.9	5.5		14.4		15.1	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS17	10:24	Bottom	3	1	29.3	7.9	26.3	5.4	5.6	17.7		19.8	
TMCLKL	HY/2012/08	2019/10/02	Mid-flood	IS17	10:24	Bottom	3	2	28.3	7.9	24.9	5.7		17.2		20.4	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	6 November 2019

ERM

Dear Sir or Madam,

Please find the Notification of Exceedance (NOE) of the following Log no.:
Action Level Exceedance
0212330_28 October 2019_ Depth_averaged SS_F_Station SR7

A total of one Action Level exceedance was recorded on 28 October 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK –
NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_28 October 2019_ Depth_averaged SS_F_Station SR7 [Total No. of Exceedances = 1]**	
Date	28 October 2019 (Measured) 29 October 2019 (*In situ* results received by ERM) 5 November 2019 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11	
Parameter(s) with Exceedance(s)	Suspended solids (mg/L)	
Action Levels	SS	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
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L
Measured Levels	Action Level Exceedance 1. Mid-flood at SR7 (Depth-averaged SS = 25.4 mg/L)	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, Seawall Modification Works was carried out on 28 October 2019.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except 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. • SR7 is far away (>2 km) from the Seawall Modification Works Area *(Figure 1)*, thus the observed exceedance should not be affected by the marine works under this Contract. Therefore, the exceedance is unlikely to be related to this Contract. • No exceedance was recorded at IS(Mf)16 which is the closest station to the Seawall Modification Works Area during both mid-ebb and mid-flood tide. Therefore, exceedance recorded at SR7 during mid-flood tide is unlikely to be caused by the marine works of this Contract.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 28 October 2019 and locations of water quality monitoring stations are attached.	

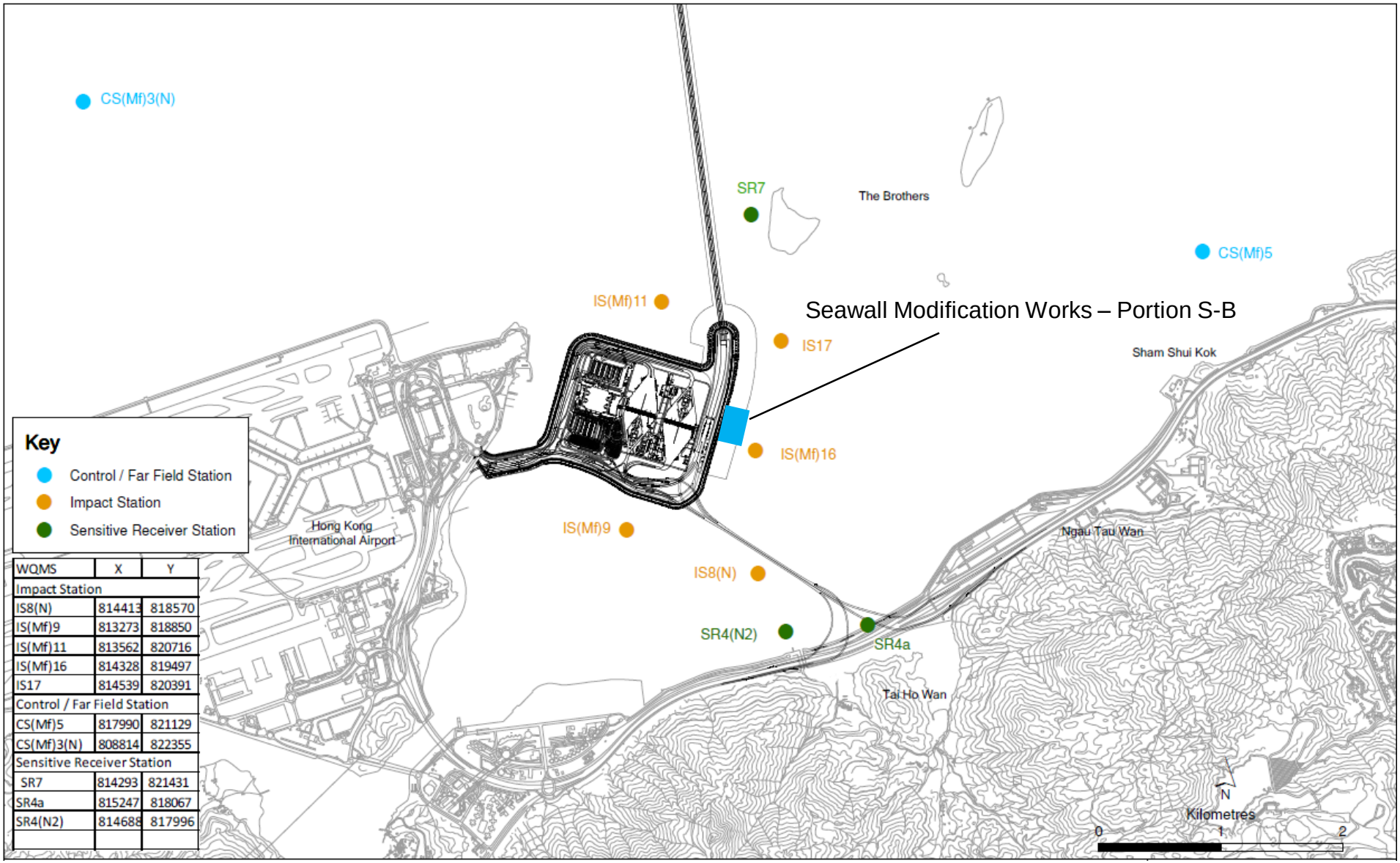
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)5	13:26	Surface	1	1	27.6	8.2	30.1	5.6		12.1		25.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)5	13:26	Surface	1	2	27.6	8.2	29.9	5.6	5.6	12.2		26.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)5	13:26	Middle	2	1	27.6	8.2	30.1	5.6		11.2	13.1	25.0	26.1
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)5	13:26	Middle	2	2	27.6	8.2	29.9	5.6		11.2		25.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)5	13:26	Bottom	3	1	27.6	8.3	30.1	5.6	5.6	16.0		27.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)5	13:26	Bottom	3	2	27.6	8.3	29.9	5.6		16.1		27.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)3(N)	12:40	Surface	1	1	27.5	8.2	29.5	5.8		9.6		15.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)3(N)	12:40	Surface	1	2	27.5	8.2	29.3	5.8	5.8	9.4		14.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)3(N)	12:40	Middle	2	1	27.5	8.3	29.7	5.9		11.7	11.9	14.5	13.9
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)3(N)	12:40	Middle	2	2	27.5	8.3	29.5	5.8		11.6		14.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)3(N)	12:40	Bottom	3	1	27.4	8.3	30.0	5.9	5.9	14.2		12.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	CS(Mf)3(N)	12:40	Bottom	3	2	27.4	8.3	29.9	5.9		14.6		12.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)16	11:45	Surface	1	1	27.6	8.2	29.7	5.7		12.8		13.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)16	11:45	Surface	1	2	27.6	8.2	29.6	5.7	5.7	12.8		13.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)16	11:45	Middle	2	1							15.4		15.6
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)16	11:45	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)16	11:45	Bottom	3	1	27.5	8.2	30.0	5.6	5.6	18.0		17.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)16	11:45	Bottom	3	2	27.5	8.2	29.9	5.6		17.9		18.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4a	11:34	Surface	1	1	27.6	8.3	29.7	5.7		5.4		5.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4a	11:34	Surface	1	2	27.6	8.3	29.6	5.7	5.7	5.2		5.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4a	11:34	Middle	2	1							6.0		6.1
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4a	11:34	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4a	11:34	Bottom	3	1	27.5	8.3	29.7	5.9	5.9	6.8		6.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4a	11:34	Bottom	3	2	27.5	8.3	29.6	5.8		6.7		6.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4(N2)	11:28	Surface	1	1	27.4	8.3	29.7	5.6		8.1		9.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4(N2)	11:28	Surface	1	2	27.4	8.3	29.5	5.6	5.6	8.0		9.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4(N2)	11:28	Middle	2	1							8.3		9.5
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4(N2)	11:28	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4(N2)	11:28	Bottom	3	1	27.4	8.3	29.7	5.8	5.8	8.5		9.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR4(N2)	11:28	Bottom	3	2	27.4	8.3	29.5	5.7		8.4		9.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS8(N)	11:21	Surface	1	1	27.5	8.4	29.5	5.8		8.6		9.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS8(N)	11:21	Surface	1	2	27.5	8.4	29.4	5.8	5.8	8.4		8.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS8(N)	11:21	Middle	2	1							9.0		9.4
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS8(N)	11:21	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS8(N)	11:21	Bottom	3	1	27.4	8.4	29.5	6.0	6.0	9.7		10.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS8(N)	11:21	Bottom	3	2	27.4	8.4	29.4	6.0		9.4		9.5	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)9	11:16	Surface	1	1	27.5	8.4	29.6	5.8		6.5		4.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)9	11:16	Surface	1	2	27.5	8.4	29.5	5.8	5.8	6.4		4.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)9	11:16	Middle	2	1							6.8		4.7
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)9	11:16	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)9	11:16	Bottom	3	1	27.5	8.4	29.7	5.9	5.9	7.0		5.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)9	11:16	Bottom	3	2	27.5	8.4	29.6	5.9		7.1		4.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)11	12:03	Surface	1	1	27.8	8.2	29.6	5.9		6.2		6.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)11	12:03	Surface	1	2	27.8	8.2	29.5	5.9	5.8	6.2		7.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)11	12:03	Surface	2	1	27.5	8.2	29.8	5.6		9.1	9.4	10.3	10.4
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)11	12:03	Surface	2	2	27.5	8.2	29.7	5.6		8.9		9.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)11	12:03	Surface	3	1	27.6	8.2	30.3	5.6	5.6	12.8		14.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS(Mf)11	12:03	Surface	3	2	27.6	8.2	30.2	5.6		12.9		14.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR7	13:07	Surface	1	1	27.6	8.3	29.3	5.9		9.7		10.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR7	13:07	Surface	1	2	27.7	8.3	29.1	5.9	5.9	9.4		11.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR7	13:07	Surface	2	1							10.2		10.8
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR7	13:07	Surface	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR7	13:07	Surface	3	1	27.6	8.3	29.4	6.0	6.0	10.7		10.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	SR7	13:07	Surface	3	2	27.6	8.3	29.3	6.0		10.8		10.7	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS17	11:53	Surface	1	1	27.5	8.2	29.9	5.6		12.1		19.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS17	11:53	Surface	1	2	27.5	8.2	29.8	5.6	5.6	11.9		19.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS17	11:53	Surface	2	1	27.5	8.2	30.1	5.6		12.4	13.6	20.2	19.9
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS17	11:53	Surface	2	2	27.5	8.2	29.9	5.6		12.2		20.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS17	11:53	Surface	3	1	27.5	8.2	30.2	5.8	5.8	16.4		20.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-Ebb	IS17	11:53	Surface	3	2	27.5	8.2	30.0	5.7		16.6		19.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)5	6:15	Surface	1	1	27.5	8.0	29.7	5.7		6.7		7.5	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)5	6:15	Surface	1	2	27.5	8.0	29.6	5.7	5.6	6.8		8.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)5	6:15	Middle	2	1	27.5	8.0	30.1	5.5		9.0	10.1	11.4	10.0
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)5	6:15	Middle	2	2	27.5	8.0	29.9	5.5		8.8		11.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)5	6:15	Bottom	3	1	27.6	8.0	30.4	5.5	5.5	14.5		10.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)5	6:15	Bottom	3	2	27.6	8.0	30.3	5.5		14.6		10.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)3(N)	7:07	Surface	1	1	27.3	8.1	29.0	6.0		12.6		17.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)3(N)	7:07	Surface	1	2	27.3	8.1	28.8	6.0	6.0	12.8		17.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)3(N)	7:07	Middle	2	1	27.3	8.1	29.0	6.0		14.3	14.5	20.1	20.2
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)3(N)	7:07	Middle	2	2	27.3	8.1	28.8	6.0		14.5		20.5	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)3(N)	7:07	Bottom	3	1	27.4	8.1	29.1	6.1	6.1	16.7		22.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	CS(Mf)3(N)	7:07	Bottom	3	2	27.4	8.1	29.0	6.1		16.3		22.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)16	7:52	Surface	1	1	27.4	8.1	29.6	5.8		10.4		12.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)16	7:52	Surface	1	2	27.4	8.1	29.5	5.8	5.8	10.3		11.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)16	7:52	Middle	2	1							11.5		13.0
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)16	7:52	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)16	7:52	Bottom	3	1	27.4	8.1	29.6	6.0	6.0	12.6		13.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)16	7:52	Bottom	3	2	27.4	8.1	29.5	6.0		12.6		14.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4a	8:04	Surface	1	1	27.3	8.1	29.5	5.6		6.0		7.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4a	8:04	Surface	1	2	27.3	8.1	29.4	5.6	5.6	5.9		8.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4a	8:04	Middle	2	1							7.0		9.8
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4a	8:04	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4a	8:04	Bottom	3	1	27.3	8.1	29.7	5.9	5.9	8.1		11.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4a	8:04	Bottom	3	2	27.3	8.1	29.5	5.9		8.0		12.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4(N2)	8:08	Surface	1	1	27.4	8.1	29.5	5.5		7.4		9.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4(N2)	8:08	Surface	1	2	27.3	8.1	29.3	5.5	5.5	7.0		9.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4(N2)	8:08	Middle	2	1							7.2		10.8
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4(N2)	8:08	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4(N2)	8:08	Bottom	3	1	27.3	8.1	29.5	5.7	5.7	7.1		12.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR4(N2)	8:08	Bottom	3	2	27.3	8.1	29.4	5.6		7.3		12.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS8(N)	8:15	Surface	1	1	27.4	8.1	29.6	5.7		9.3		8.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS8(N)	8:15	Surface	1	2	27.4	8.1	29.4	5.7	5.7	9.2		9.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS8(N)	8:15	Middle	2	1							9.4		9.4
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS8(N)	8:15	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS8(N)	8:15	Bottom	3	1	27.4	8.1	29.6	5.7	5.7	9.6		9.3	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS8(N)	8:15	Bottom	3	2	27.4	8.1	29.5	5.7		9.6		10.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)9	8:23	Surface	1	1	27.4	8.1	29.7	5.7		8.2		9.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)9	8:23	Surface	1	2	27.4	8.1	29.6	5.7	5.7	7.9		9.6	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)9	8:23	Middle	2	1							9.1		10.8
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)9	8:23	Middle	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)9	8:23	Bottom	3	1	27.4	8.1	29.8	5.9	5.9	10.2		12.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)9	8:23	Bottom	3	2	27.4	8.1	29.6	5.9		10.1		12.5	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)11	6:43	Surface	1	1	27.5	8.1	29.7	5.7		13.1		16.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)11	6:43	Surface	1	2	27.5	8.1	29.6	5.7	5.7	13.0		16.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)11	6:43	Surface	2	1	27.5	8.1	29.7	5.7		12.4	14.2	19.6	19.6
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)11	6:43	Surface	2	2	27.5	8.1	29.6	5.7		12.3		19.1	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)11	6:43	Surface	3	1	27.5	8.1	29.7	5.7	5.7	17.0		22.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS(Mf)11	6:43	Surface	3	2	27.5	8.1	29.6	5.7		17.1		23.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR7	6:34	Surface	1	1	27.4	8.0	29.5	5.9		14.1		24.8	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR7	6:34	Surface	1	2	27.4	8.0	29.3	5.9	5.9	14.2		25.2	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR7	6:34	Surface	2	1							15.9		25.4
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR7	6:34	Surface	2	2									
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR7	6:34	Surface	3	1	27.4	8.0	29.6	6.1	6.1	17.8		25.5	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	SR7	6:34	Surface	3	2	27.4	8.0	29.4	6.1		17.5		25.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS17	7:44	Surface	1	1	27.5	8.1	29.8	5.7		14.4		20.0	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS17	7:44	Surface	1	2	27.5	8.1	29.7	5.7	5.7	14.8		20.7	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS17	7:44	Surface	2	1	27.5	8.1	29.8	5.8		17.0	16.6	17.9	18.4
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS17	7:44	Surface	2	2	27.5	8.1	29.7	5.7		16.8		17.4	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS17	7:44	Surface	3	1	27.5	8.1	29.8	6.0	6.0	18.5		16.9	
TMCLKL	HY/2012/08	2019/10/28	Mid-flood	IS17	7:44	Surface	3	2	27.5	8.1	29.6	6.0		18.2		17.3	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Water Quality Impact Monitoring
Date	19 November 2019

ERM

Dear Sir or Madam,

Please find the Notification of Exceedance (NOE) of the following Log no.:
Action Level Exceedance
0212330_1 November 2019_ Depth_averaged SS_E_Station IS(Mf)16

A total of one Action Level exceedance was recorded on 1 November 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	**Action Level Exceedance** **0212330_1 November 2019_ Depth_averaged SS_E_Station IS(Mf)16** **[Total No. of Exceedances = 1]**	
Date	1 November 2019 (Measured) 4 November 2019 (*In situ* results received by ERM) 12 November 2019 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4(N2), IS8(N), IS(Mf)16, IS(Mf)9, CS(Mf)3(N), SR7, IS17, IS(Mf)11	
Parameter(s) with Exceedance(s)	Suspended solids (mg/L)	
Action Levels	SS	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
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS(Mf)16 (Depth-averaged SS = 24.8 mg/L)	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, no marine works was carried out on 1 November 2019.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Contract, in view of the following: • All monitored parameters, except 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. • As no marine works was carried out on 1 November 2019, the exceedance is unlikely to be caused by the marine works of this Contract. • As reported by the Contractor, no discharge of organic matters into waters from landside works area was recorded. Therefore, exceedance recorded at IS(Mf)16 during mid-ebb tide is unlikely to be caused by the marine works of this Contract.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 1 November 2019 and locations of water quality monitoring stations are attached.	

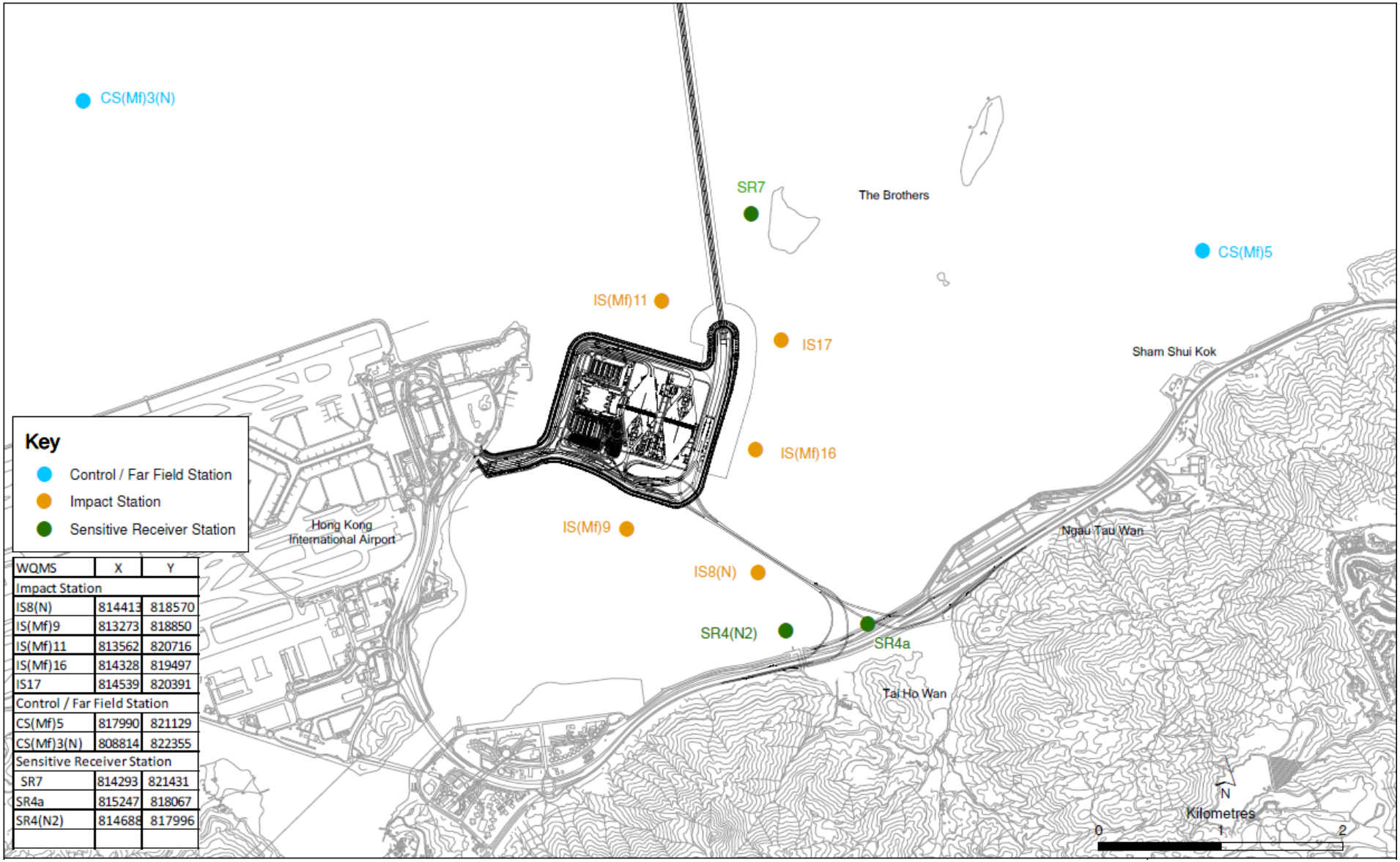
Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)5	16:08	Surface	1	1	26.8	8.1	32.1	5.6	5.5	4.2	5.5	6.8	6.9
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)5	16:08	Surface	1	2	26.8	8.1	32.1	5.6		4.0		6.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)5	16:08	Middle	2	1	26.7	8.1	32.5	5.5		5.7		6.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)5	16:08	Middle	2	2	26.7	8.1	32.4	5.4		5.5		6.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)5	16:08	Bottom	3	1	26.7	8.1	32.6	5.5	5.5	6.7		7.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)5	16:08	Bottom	3	2	26.7	8.1	32.6	5.5		6.6		7.5	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)3(N)	15:21	Surface	1	1	26.6	8.1	30.5	6.1	6.1	4.9	8.1	8.2	9.8
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)3(N)	15:21	Surface	1	2	26.7	8.2	30.3	6.1		4.2		8.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)3(N)	15:21	Middle	2	1	26.3	8.1	31.6	6.2		9.3		9.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)3(N)	15:21	Middle	2	2	26.4	8.2	31.4	6.1		8.5		8.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)3(N)	15:21	Bottom	3	1	26.3	8.1	31.8	6.3	6.3	10.9		12.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	CS(Mf)3(N)	15:21	Bottom	3	2	26.3	8.2	31.8	6.2		10.9		11.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)16	14:38	Surface	1	1	26.6	8.1	31.6	6.0	6.0	8.6	9.2	23.1	24.8
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)16	14:38	Surface	1	2	26.7	8.2	31.6	6.0		8.6		23.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)16	14:38	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)16	14:38	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)16	14:38	Bottom	3	1	26.4	8.1	31.6	6.1	6.1	9.7		26.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)16	14:38	Bottom	3	2	26.4	8.2	31.6	6.0		9.7		26.5	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4a	14:28	Surface	1	1	26.6	8.1	31.5	5.9	5.9	6.4	7.4	11.5	10.2
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4a	14:28	Surface	1	2	26.6	8.2	31.5	5.9		5.9		11.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4a	14:28	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4a	14:28	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4a	14:28	Bottom	3	1	26.6	8.1	31.5	6.1	6.0	8.8		8.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4a	14:28	Bottom	3	2	26.5	8.2	31.5	5.9		8.5		9.0	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4(N2)	14:24	Surface	1	1	26.8	8.1	31.4	6.0	6.0	4.9	5.0	5.3	7.4
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4(N2)	14:24	Surface	1	2	26.8	8.2	31.4	6.0		4.8		5.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4(N2)	14:24	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4(N2)	14:24	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4(N2)	14:24	Bottom	3	1	26.7	8.1	31.5	6.1	6.1	5.1		9.0	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR4(N2)	14:24	Bottom	3	2	26.7	8.2	31.4	6.1		5.1		9.5	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS8(N)	14:20	Surface	1	1	26.6	8.1	31.4	6.0	6.0	11.8	11.9	6.5	8.2
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS8(N)	14:20	Surface	1	2	26.6	8.2	31.4	5.9		11.5		6.8	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS8(N)	14:20	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS8(N)	14:20	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS8(N)	14:20	Bottom	3	1	26.6	8.1	31.4	6.0	6.0	12.1		9.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS8(N)	14:20	Bottom	3	2	26.6	8.2	31.4	6.0		12.2		10.2	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)9	14:14	Surface	1	1	26.4	8.1	31.5	6.0	6.0	11.9	12.1	12.9	13.5
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)9	14:14	Surface	1	2	26.4	8.2	31.4	6.0		11.4		12.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)9	14:14	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)9	14:14	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)9	14:14	Bottom	3	1	26.3	8.1	31.5	6.1	6.1	12.7		14.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)9	14:14	Bottom	3	2	26.3	8.2	31.5	6.1		12.5		14.2	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)11	14:52	Surface	1	1	26.5	8.1	31.6	6.1	6.0	7.0	10.2	11.0	11.3
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)11	14:52	Surface	1	2	26.7	8.2	31.6	6.1		5.6		10.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)11	14:52	Surface	2	1	26.2	8.1	31.6	5.8		11.7		11.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)11	14:52	Surface	2	2	26.2	8.2	31.6	5.8		10.6		11.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)11	14:52	Surface	3	1	26.2	8.1	31.6	6.0	6.0	12.8		11.8	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS(Mf)11	14:52	Surface	3	2	26.2	8.2	31.6	5.9		13.4		11.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR7	15:47	Surface	1	1	26.7	8.1	31.8	6.0	6.0	5.7	7.3	10.0	10.2
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR7	15:47	Surface	1	2	26.7	8.2	31.7	6.0		5.1		9.8	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR7	15:47	Surface	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR7	15:47	Surface	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR7	15:47	Surface	3	1	26.4	8.1	31.8	6.1	6.1	9.1		10.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	SR7	15:47	Surface	3	2	26.5	8.2	31.8	6.0		9.1		10.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS17	14:44	Surface	1	1	26.8	8.1	31.8	5.9	5.9	4.2	5.2	5.1	6.7
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS17	14:44	Surface	1	2	26.9	8.2	31.8	5.9		4.1		5.8	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS17	14:44	Surface	2	1	26.4	8.1	31.7	5.9		5.7		6.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS17	14:44	Surface	2	2	26.4	8.2	31.7	5.9		5.5		7.1	

Project	Contract	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	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/2012/08	2019-11-01	Mid-Ebb	IS17	14:44	Surface	3	1	26.4	8.1	31.7	6.1	6.1	5.9		7.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-Ebb	IS17	14:44	Surface	3	2	26.4	8.2	31.7	6.1		5.9		8.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)5	9:14	Surface	1	1	26.3	8.2	31.8	5.8	5.8	5.2	8.7	7.7	7.7
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)5	9:14	Surface	1	2	26.3	8.0	31.8	5.8		5.1		7.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)5	9:14	Middle	2	1	26.3	8.1	31.8	5.8		10.4		7.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)5	9:14	Middle	2	2	26.3	8.0	31.8	5.8		10.5		7.8	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)5	9:14	Bottom	3	1	26.3	8.1	31.8	5.8	5.8	10.3		7.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)5	9:14	Bottom	3	2	26.3	8.0	31.8	5.8		10.7		7.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)3(N)	10:07	Surface	1	1	26.3	8.2	30.6	6.0	6.1	5.3	8.0	7.4	7.3
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)3(N)	10:07	Surface	1	2	26.3	8.1	30.6	6.0		5.3		7.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)3(N)	10:07	Middle	2	1	26.1	8.2	30.8	6.1		8.2		7.0	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)3(N)	10:07	Middle	2	2	26.2	8.1	30.8	6.1		7.5		7.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)3(N)	10:07	Bottom	3	1	26.1	8.2	30.9	6.1	6.1	11.0		7.5	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	CS(Mf)3(N)	10:07	Bottom	3	2	26.1	8.1	30.9	6.1		10.8		7.2	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)16	10:55	Surface	1	1	26.3	8.2	31.6	5.9	5.9	15.0	15.1	19.6	22.0
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)16	10:55	Surface	1	2	26.3	8.1	31.6	5.8		14.8		19.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)16	10:55	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)16	10:55	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)16	10:55	Bottom	3	1	26.3	8.2	31.6	6.0	6.0	15.2		24.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)16	10:55	Bottom	3	2	26.3	8.1	31.6	6.0		15.5		24.2	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4a	11:05	Surface	1	1	26.3	8.2	31.5	5.7	5.7	6.9	7.1	10.6	11.1
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4a	11:05	Surface	1	2	26.3	8.1	31.5	5.7		6.6		11.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4a	11:05	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4a	11:05	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4a	11:05	Bottom	3	1	26.3	8.1	31.6	5.9	5.9	7.5		11.5	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4a	11:05	Bottom	3	2	26.4	8.1	31.6	5.9		7.4		11.2	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4(N2)	11:10	Surface	1	1	26.3	8.2	31.4	6.0	6.0	5.9	9.4	3.7	4.0
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4(N2)	11:10	Surface	1	2	26.3	8.1	31.4	6.0		6.0		3.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4(N2)	11:10	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4(N2)	11:10	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4(N2)	11:10	Bottom	3	1	26.4	8.2	31.3	6.1	6.1	12.6		4.2	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR4(N2)	11:10	Bottom	3	2	26.4	8.1	31.3	6.1		12.9		4.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS8(N)	11:15	Surface	1	1	26.3	8.2	31.6	6.1	6.1	8.5	8.6	7.9	7.9
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS8(N)	11:15	Surface	1	2	26.3	8.1	31.6	6.0		8.2		7.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS8(N)	11:15	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS8(N)	11:15	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS8(N)	11:15	Bottom	3	1	26.3	8.2	31.6	6.2	6.2	8.7		8.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS8(N)	11:15	Bottom	3	2	26.3	8.2	31.6	6.2		8.8		7.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)9	11:23	Surface	1	1	26.3	8.2	31.6	5.9	5.9	15.4	16.8	12.9	13.3
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)9	11:23	Surface	1	2	26.3	8.1	31.6	5.9		14.7		13.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)9	11:23	Middle	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)9	11:23	Middle	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)9	11:23	Bottom	3	1	26.3	8.2	31.7	6.1	6.1	18.5		13.1	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)9	11:23	Bottom	3	2	26.3	8.1	31.7	6.0		18.4		13.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)11	10:38	Surface	1	1	26.2	8.2	31.6	5.9	5.9	9.9	12.7	10.1	11.2
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)11	10:38	Surface	1	2	26.2	8.1	31.6	5.9		9.0		10.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)11	10:38	Surface	2	1	26.1	8.2	31.6	5.9		12.8		11.5	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)11	10:38	Surface	2	2	26.1	8.1	31.6	5.9		12.7		11.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)11	10:38	Surface	3	1	26.1	8.2	31.6	6.0	6.0	15.8		11.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS(Mf)11	10:38	Surface	3	2	26.1	8.1	31.6	6.0		15.7		11.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR7	9:40	Surface	1	1	26.1	8.2	31.6	6.2	6.2	10.0	10.0	9.6	10.3
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR7	9:40	Surface	1	2	26.1	8.1	31.6	6.1		9.9		9.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR7	9:40	Surface	2	1									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR7	9:40	Surface	2	2									
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR7	9:40	Surface	3	1	26.0	8.1	31.7	6.3	6.3	9.9		10.9	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	SR7	9:40	Surface	3	2	26.1	8.1	31.6	6.2		10.3		10.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS17	10:47	Surface	1	1	26.2	8.2	31.7	5.9	6.0	5.0	5.5	6.4	7.8
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS17	10:47	Surface	1	2	26.2	8.1	31.7	5.9		5.0		6.3	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS17	10:47	Surface	2	1	26.1	8.2	31.7	6.0		5.1		7.7	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS17	10:47	Surface	2	2	26.1	8.1	31.7	6.0		5.0		7.4	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS17	10:47	Surface	3	1	26.1	8.2	31.7	6.2	6.2	6.2		9.6	
TMCLKL	HY/2012/08	2019-11-01	Mid-flood	IS17	10:47	Surface	3	2	26.1	8.1	31.7	6.1		6.4		9.2	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 1

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Impact Dolphin Monitoring
Date	20 February 2020

ERM

Dear Sir or Madam,

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

0212330_Sep2019/Nov2019_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact dolphin monitoring data between September and November 2019.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
TUEN MUN – CHEK LAP KOK LINK – NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Impact Dolphin Monitoring
Notification of Exceedance

Log No.	**0212330_ Sep2019/Nov2019_dolphin_STG&ANI_NEL&NWL** **[Total No. of Exceedances = 1 Limit Level Exceedance]**	
Date	September - November 2019 (monitored) 7 February 2020 (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 = 0.62 & ANI = 1.55
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between September to November 2019. The exceedance was reported in the approved *Seventy-third Monthly EM&A Report* dated 11 December 2019.	
Statistical Analyses	Further to the review of the available and relevant dolphin monitoring data in the EM&A programme by this Contract, statistical analyses were conducted as follows: • A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present impact quarter, September 2019 to November 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 ($p = 0.0018$) and ANI ($p = 0.0124$) 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 November 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 ($p = 0.00001$) between Cumulative Period and Location were detected. *Note: The commencement date under *Contract No. HY/2012/08* is 1 November 2013.	
Works Undertaken (in the monitoring quarter)	In the quarter between September to November 2019, Seawall Modification Works was undertaken under Contract No. HY/2012/08.	

Possible Reason for Action or Limit Level Exceedance(s)	The potential factors that may have contributed to the observed exceedance are reviewed below: • Blocking of CWD travelling corridor: The *Monitoring of Marine Mammals in Hong Kong Waters (2018 – 19)* (1) reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to this Contract), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau. • Marine works of the Contract: As per the findings from the EIA report (*Section 8.11.9*), the major influences on the Chinese White Dolphin (CWD) *Sousa chinensis* under this Contract are marine traffics, reclamation and dredging works. The Contractor implemented the marine traffic control in the reporting period as per the requirements in the *EP-354/2009/D* and the updated *EM&A Manual*. 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. During this quarter of dolphin monitoring, no adverse 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 September 2019 and November 2019, there were thirty-five (35) Action Level of Dissolved Oxygen and four (4) 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 *Appendix J of the 24th Quarterly EM&A Report (September to November 2019).* 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.
Actions Taken / To Be Taken	In the quarter between September and November 2019, Seawall Modification Works were carried out. 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). ET shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractors to ensure the relevant measures are fully implemented. 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 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 / transhipment are not allowed except a permit is obtained. The HZMB works vessels should avoid the BMP. The marine works footprint and vessels for the marine works should also be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible. 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 Sky Pier. The CWDs in the area should be closely followed.
Remarks	The results of impact dolphin monitoring, the status of implemented marine ecological mitigation measures are documented in the approved *Seventy-First* to *Seventy-third Monthly EM&A Reports*.

(1) Hung S K Y (2019). Prepared for AFCD. Available at: https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2018_19.pdf

Appendix K

Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: HyD **Contract No. / Works Order No.: HY/2012/08**

Monthly Summary Waste Flow Table for November 2019 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of Inert Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	2224.407	0.000	76.754	585.369	1562.284
Jan-2019	299.831	0.000	53.419	215.427	30.985
Feb-2019	133.335	0.000	46.021	67.707	19.607
Mar-2019	120.224	0.000	50.455	20.964	48.805
Apr-2019	130.329	0.000	58.956	0.000	71.373
May-2019	67.355	0.000	51.297	0.000	16.058
Jun-2019	4.134	0.000	0.000	0.000	4.134
Half Year Sub-total	755.208	0.000	260.148	304.098	190.962
Jul-2019	3.821	0.000	0.000	0.000	3.821
Aug-2019	2.388	0.000	0.000	0.000	2.388
Sep-2019	4.191	0.000	0.000	0.000	4.191
Oct-2019	8.366	0.000	0.000	0.000	8.366
Nov-2019	6.215	0.000	0.000	0.000	6.215
Dec-2019					
Project Total Quantities	3004.606	0.000	336.902	889.467	1778.227

Month	**Actual Quantities of Non-inert Construction Waste Generated Monthly**								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	6763.82	6763.82	7.74	7.74	8.70	8.70	60.35	60.35	13.989
Jan-2019	394.55	394.55	0.00	0.00	0.00	0.00	0.00	0.00	0.538
Feb-2019	103.72	103.72	0.62	0.62	0.00	0.00	1.672	1.672	0.578
Mar-2019	88.20	88.20	0.46	0.46	0.00	0.00	0.00	0.00	0.692
Apr-2019	260.89	260.89	0.00	0.00	3.90	3.90	1.045	1.045	0.707
May-2019	0.66	0.66	1.46	1.46	0.00	0.00	0.00	0.00	0.798
Jun-2019	136.75	136.75	0.66	0.66	0.00	0.00	4.14	4.14	0.751
Half Year Sub-total	984.77	984.77	3.20	3.20	3.90	3.90	6.857	6.857	4.064
Jul-2019	444.37	444.37	1.20	1.20	0.00	0.00	0.00	0.00	0.730
Aug-2019	505.93	505.93	0.00	0.00	1.58	1.58	3.80	3.80	0.703
Sep-2019	397.10	397.10	0.60	0.60	1.62	1.62	8.00	8.00	0.737
Oct-2019	523.05	523.05	0.00	0.00	1.04	1.04	5.80	5.80	0.754
Nov-2019	271.73	271.73	1.90	1.90	0.00	0.00	1.00	1.00	0.525
Dec-2019									
Project Total Quantities	9890.77	9890.77	14.64	14.64	16.84	16.84	85.807	85.807	21.502

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill
(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
3200.000	0.000	350.000	1000.000	2000.000

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 ton)
10500.00	20.00	20.00	100.00	30.000

Notes:
(1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
(2) The waste flow table shall also include C&D materials to be imported for use at the Site.
(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m^3. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).