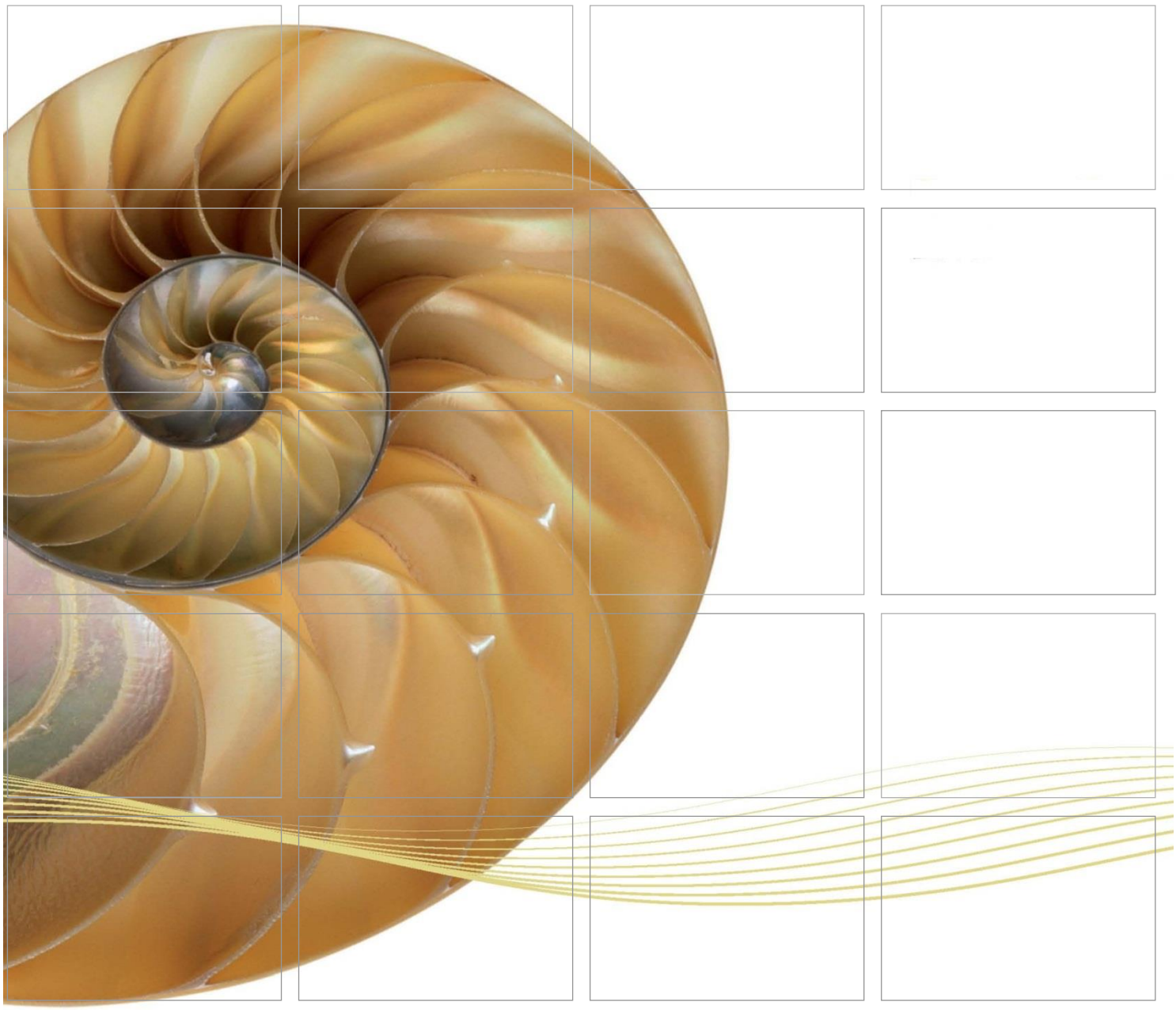
Report



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

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

22 July 2020

Environmental Resources Management
2507, 25/F
One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone 2271 3000
Facsimile 2723 5660
www.erm.com

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The business of sustainability

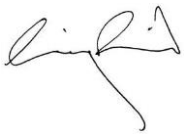
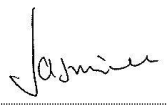
Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

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

Document Code: 0212330_26th Quarterly EM&A_20200722.doc

Environmental Resources Management

2507, 25/F
One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660
E-mail: post.hk@erm.com
http://www.erm.com

Client: DBJV	Project No: 0212330
Summary: This document presents the Twenty-sixth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.	Date: 22 July 2020 Approved by:  *Mr Craig Reid* *Partner* Certified by:  *Dr Jasmine Ng* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	26th Quarterly EM&A Report	VAR	JN	CAR	22/07/20

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Ref.: HYDHZMBEEM00_0_8124L.20

23 July 2020

By Fax (2293 6300) and By Post

AECOM Asia Co. Ltd.
Supervising Officer Representative's Office
No.8 Mong Fat Street, Tuen Mun, New Territories, 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
26th Quarterly EM&A Summary Report for March 2020 to May 2020

Reference is made to the ET's submission of 26th Quarterly EM&A Summary Report for March 2020 to May 2020 (ET's ref.: "*0212330_26th Quarterly EM&A_20200722.doc*" dated 22 July 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,

Manson Yeung
Independent Environmental Checker
Tuen Mun – Chek Lap Kok Link

c.c.

HyD	Mr. Patrick Ng	(By Fax: 3188 6614)
HyD	Mr. Andy Ho	(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
21/F, BEA Harbour View Centre, 56 Gloucester Road, Wan Chai, Hong Kong Tel: 852.3465 2888 Fax: 852.3465 2899
www.ramboll.com

TABLE OF CONTENTS

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 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-sixth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 March to 31 May 2020 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

- Road & Drainage works – Portion S-A, S-B & S-C and Northern Landfall;
- Fireboard installation –Tunnel;
- UU installation - Portion S-A, S-B & S-C and Northern Landfall.

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
Post –Construction Water Quality Monitoring	12 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	13 sessions

Implementation of Marine Mammal Exclusion Zone

No marine works were undertaken since 30 December 2019, therefore, daily 250 m marine mammal exclusion zone monitoring was not undertaken since 30 December 2019.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

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

Dolphin Monitoring

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March and May 2020, 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

There was no reporting change in the reporting period.

Upcoming Works for the Next Reporting Period

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

Land-based Works

- Road & Drainage works – Portion S-A, S-B & S-C and Northern Landfall;
- UU installation - Portion S-A, S-B & S-C and Northern Landfall.

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 and waste management issues.

1 INTRODUCTION

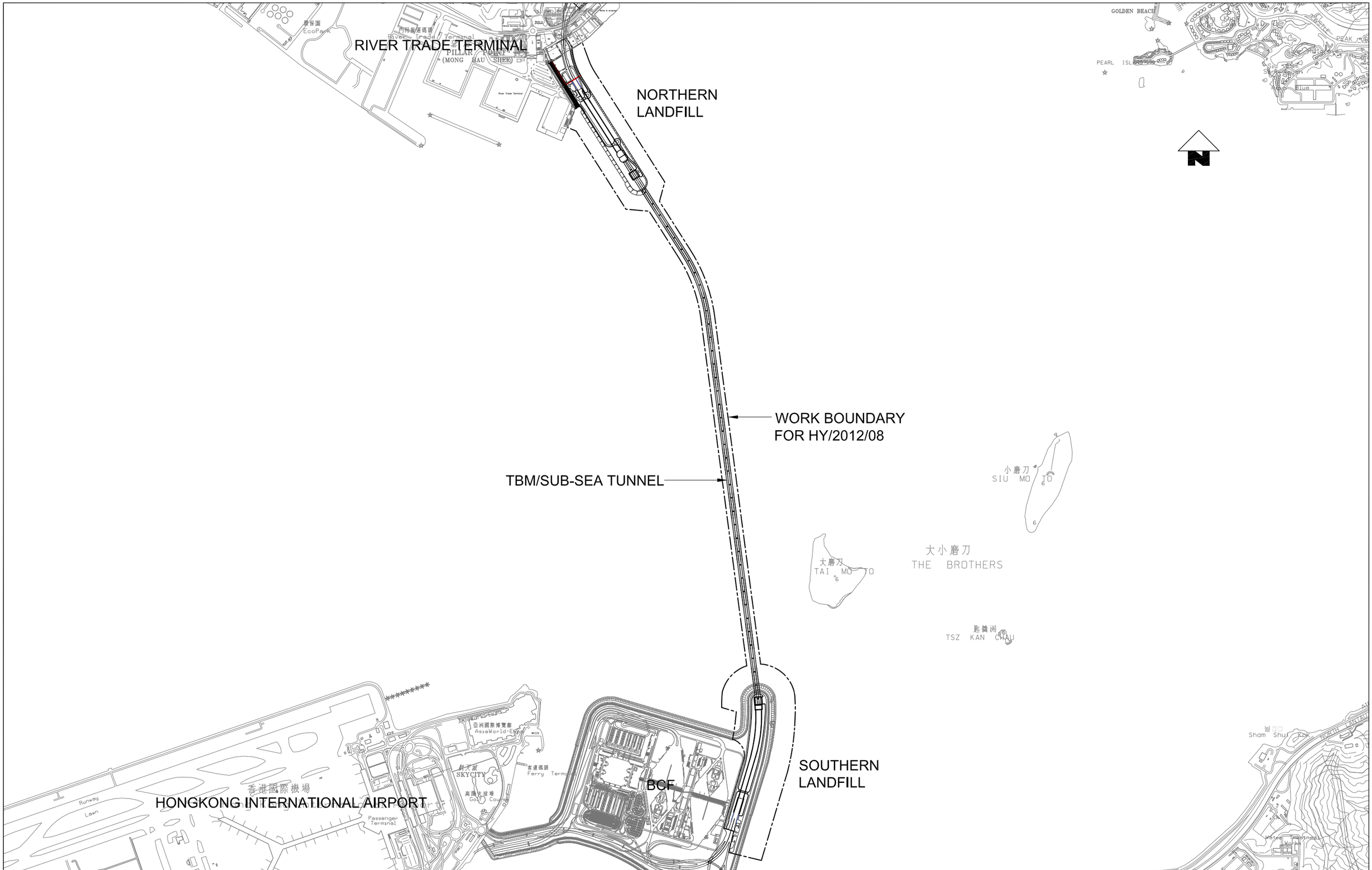
1.1 BACKGROUND

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*.



				Designed By	PKV
				Drawn By	DAI
				Approved By	SPo PP
A	FIRST ISSUE	11SEP13	PKV	Date	11SEP2013
Rev.	Description	Date	Checked		

Main Contractor

香寶嘉 Dragages HongKong

A member of the Bouygues Construction group

BOUYGUES TRAVAUX PUBLICS

Dragages - Bouygues Joint Venture 寶嘉 - 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 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-sixth 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 March 2020 to 31 May 2020.

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
ENPO / IEC (Ramboll Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
		Manson Yeung (1)	9700 6767	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) The role and responsibilities as the IEC of the Contract has been taken up by Mr Manson Yeung instead of Dr. F.C. Tsang since 18 May 2020.

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*.

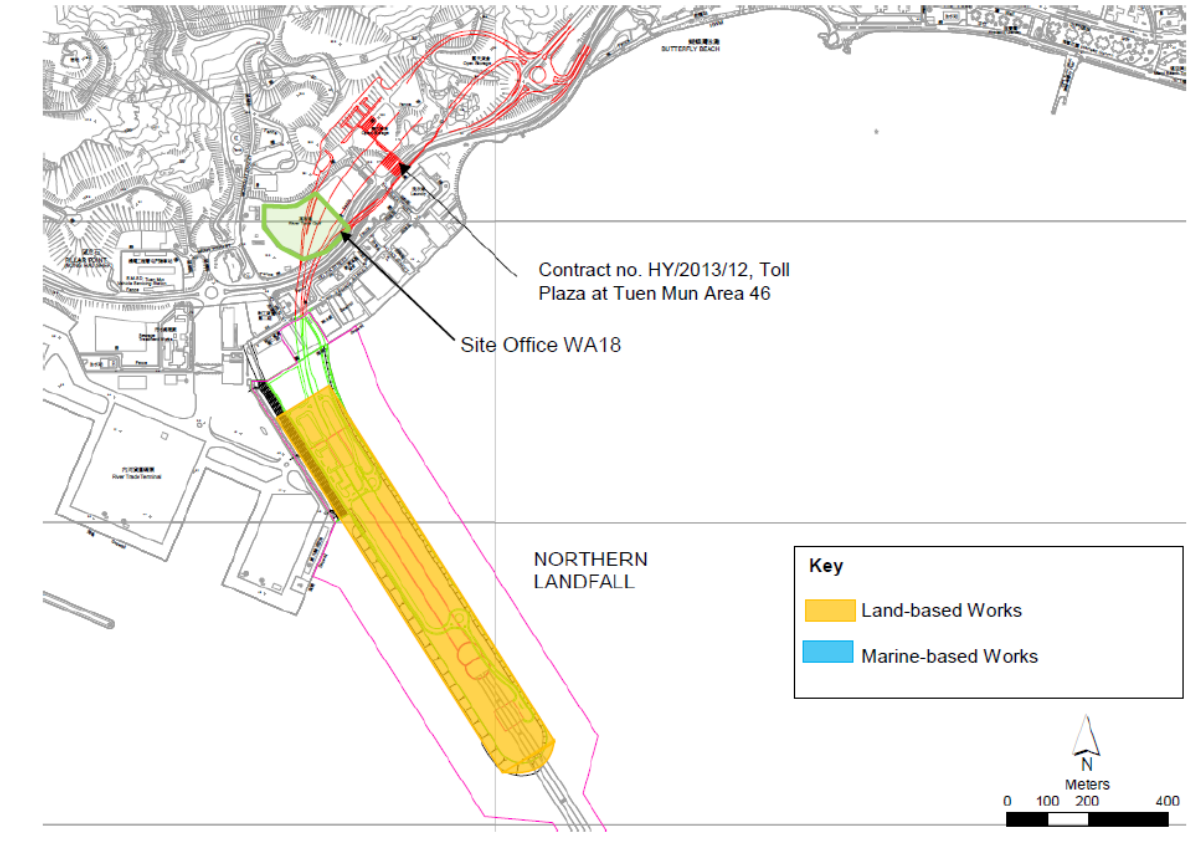
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Contract are shown in *Figure 1.3*.

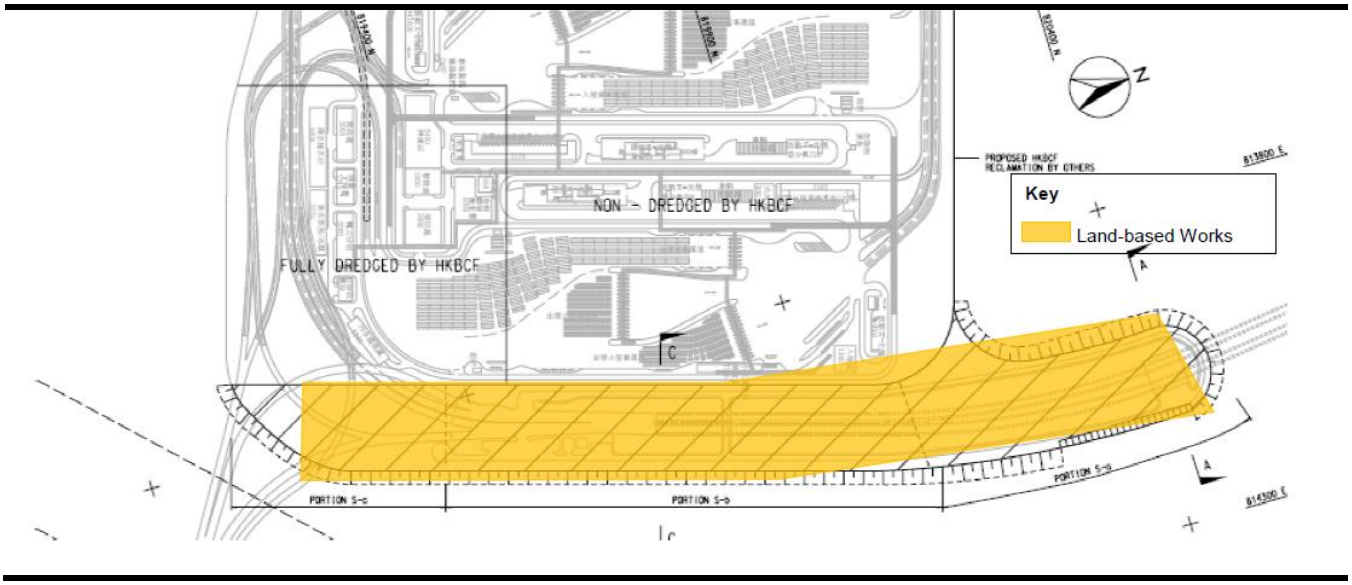
The implementation schedule of environmental mitigation measures is presented in *Appendix C*.

Table 1.2 Summary of Construction Activities Undertaken during the Reporting Period

Construction Activities Undertaken
Land-based Works
• Road & Drainage works – Portion S-A, S-B & S-C and Northern Landfall; • Fireboard installation –Tunnel; • UU installation - Portion S-A, S-B & S-C and Northern Landfall.

Figure 1.2 Locations of Construction Activities – March to May 2020




NON - DREDGED BY HKBCF
FULLY DREDGED BY HKBCF
PROPOSED HKBCF RECLAMATION BY OTHERS
Key
Land-based Works
PORTION S-c
PORTION S-b
PORTION S-a

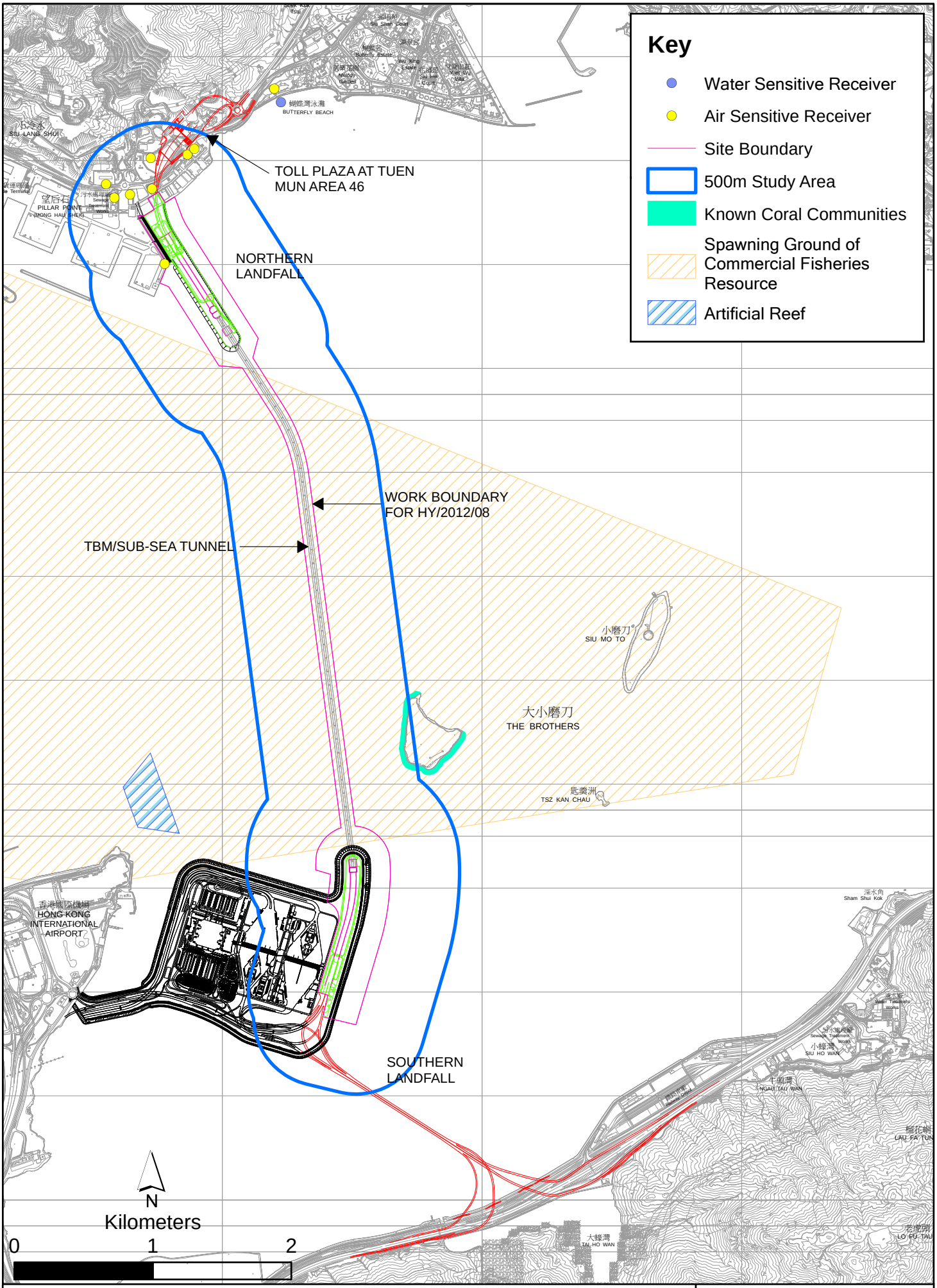


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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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	3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 March 2020	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
ASR5	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 April 2020	Pillar Point Fire Station	Office	
AQMS1	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 May 2020	Previous River Trade Golf	Bare ground	
ASR6		Butterfly Beach Laundry	Office	Enhanced TSP monitoring (commenced on 24 October 2014) • 1-hour Total Suspended Particulates (1-hour TSP,

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

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 G* and detailed impact air quality monitoring data were reported in the *Seventy-seventh* to *Seventy-ninth Monthly EM&A Reports*.

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)
March to May 2020	ASR 1	143	13 - 673	331	500
	ASR 5	163	14 - 384	340	500
	AQMS1	105	14 - 225	335	500
	ASR6	106	14 - 267	338	500
	ASR10	71	14 - 160	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)
March to May	ASR 1	84	35 - 153	213	260

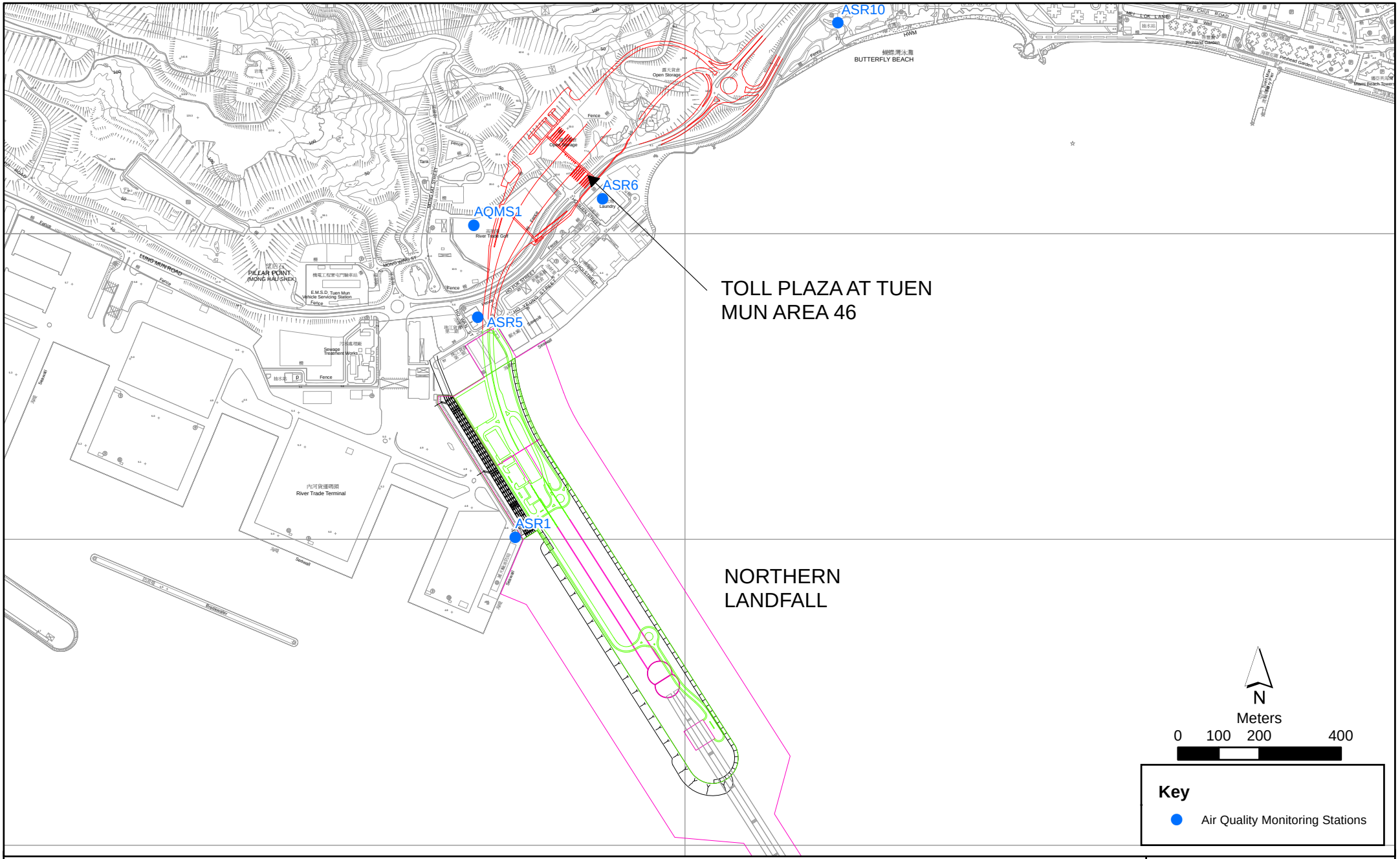

Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

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Month/Year	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
2020	ASR 5	90	42 - 123	238	260
	AQMS1	60	28 - 93	213	260
	ASR6	62	28 - 109	238	260
	ASR10	44	19 - 85	214	260

Four (4) Action Level and One (1) Limit Level exceedances of 1-hour TSP Monitoring 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

2.2.1 Monitoring Requirements & Equipment

According to the Updated EM&A Manual, a post-construction water quality monitoring shall be carried out upon completion of all marine-based construction activities. Post-construction water quality monitoring was undertaken three days per week for at least 4 weeks in accordance with the Updated EM&A Manual. The proposal for post-construction water quality monitoring was approved by EPD on 5 March 2020. The post construction water quality monitoring was conducted between 17 March 2020 and 11 April 2020. Locations of water quality monitoring stations presented in *Figure 2.2* and *Figure 2.3* and in *Table 2.5*.

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) • SS (mg/L)	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. If the water depth is less than 3m, mid-depth sampling only. If water depth less than 6m, mid-	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS17	Impact Station (Close to HKBCF construction site)	814539	820391			
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			

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
IS8(N)	Impact Station (Close to HKBCF construction site)	814413	818570		depth may be omitted.	
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			
IS12	Impact Station (Close to TMCLKL construction site)	813218	823681			
IS13	Impact Station (Close to TMCLKL construction site)	813667	824325			
IS14	Impact Station (Close to TMCLK construction site)	812592	824172			
IS15	Impact Station (Close to TMCLK construction site)	813356	825008			
SR8	Sensitive receiver (Gazettal beaches in Tuen Mun)	816306	825715			
SR9	Sensitive receiver (Butterfly Beach)	813601	825858			
SR10A(N)	Sensitive receiver (Ma Wan FCZ)	823644	823484			
CS4	Control Station	810025	824004			
CS6	Control Station	817028	823992			

*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.

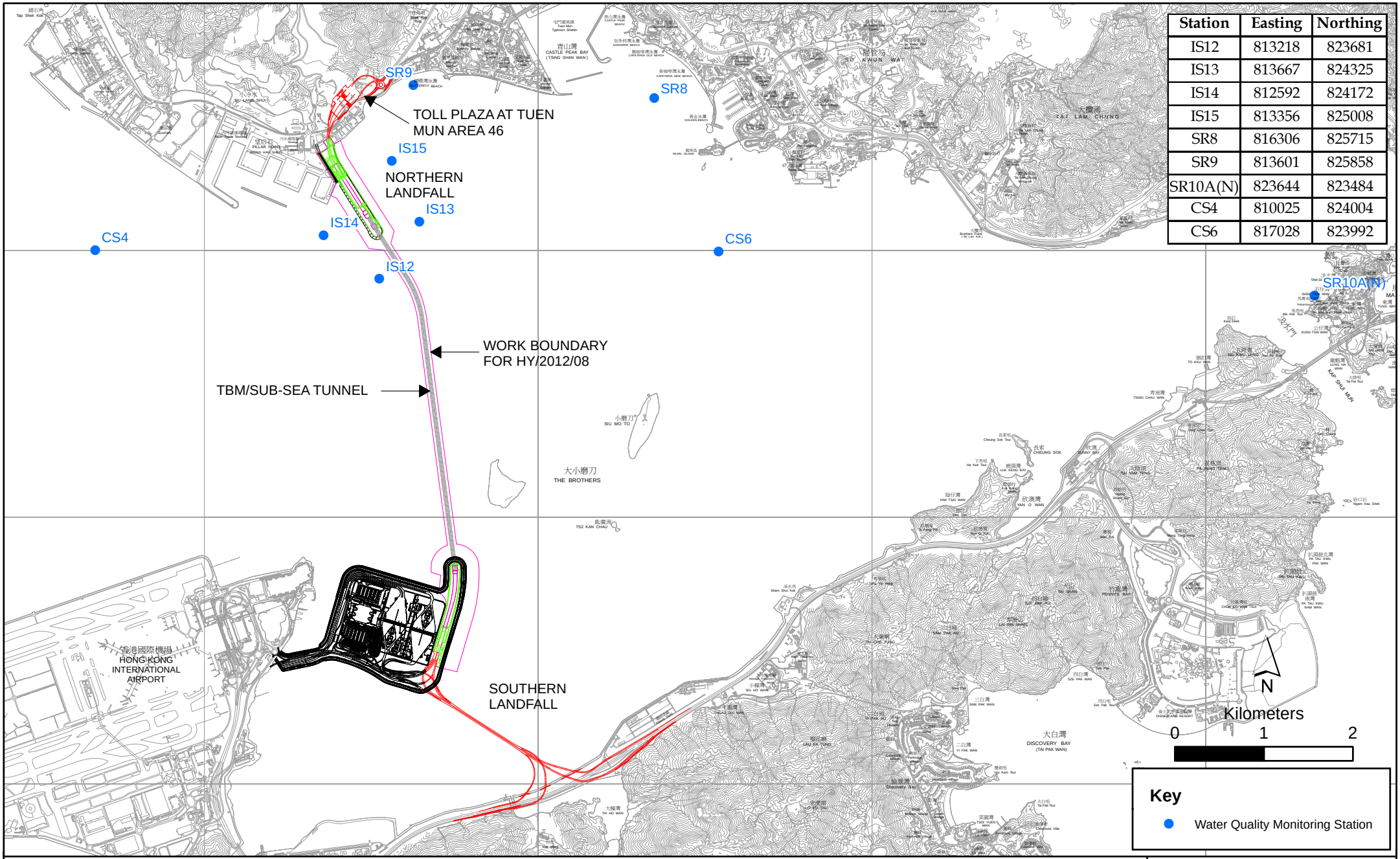
Water Quality Monitoring Station CS(Mf)3 was relocated to CS(Mf)3(N) since 2 May 2017.

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.

Water Quality Monitoring Station SR10A was relocated to SR10A(N) since 5 March 2020.



Station	Easting	Northing
IS12	813218	823681
IS13	813667	824325
IS14	812592	824172
IS15	813356	825008
SR8	816306	825715
SR9	813601	825858
SR10A(N)	823644	823484
CS4	810025	824004
CS6	817028	823992

Figure 2.2

Water Quality Monitoring Station

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Date: 15/11/2013

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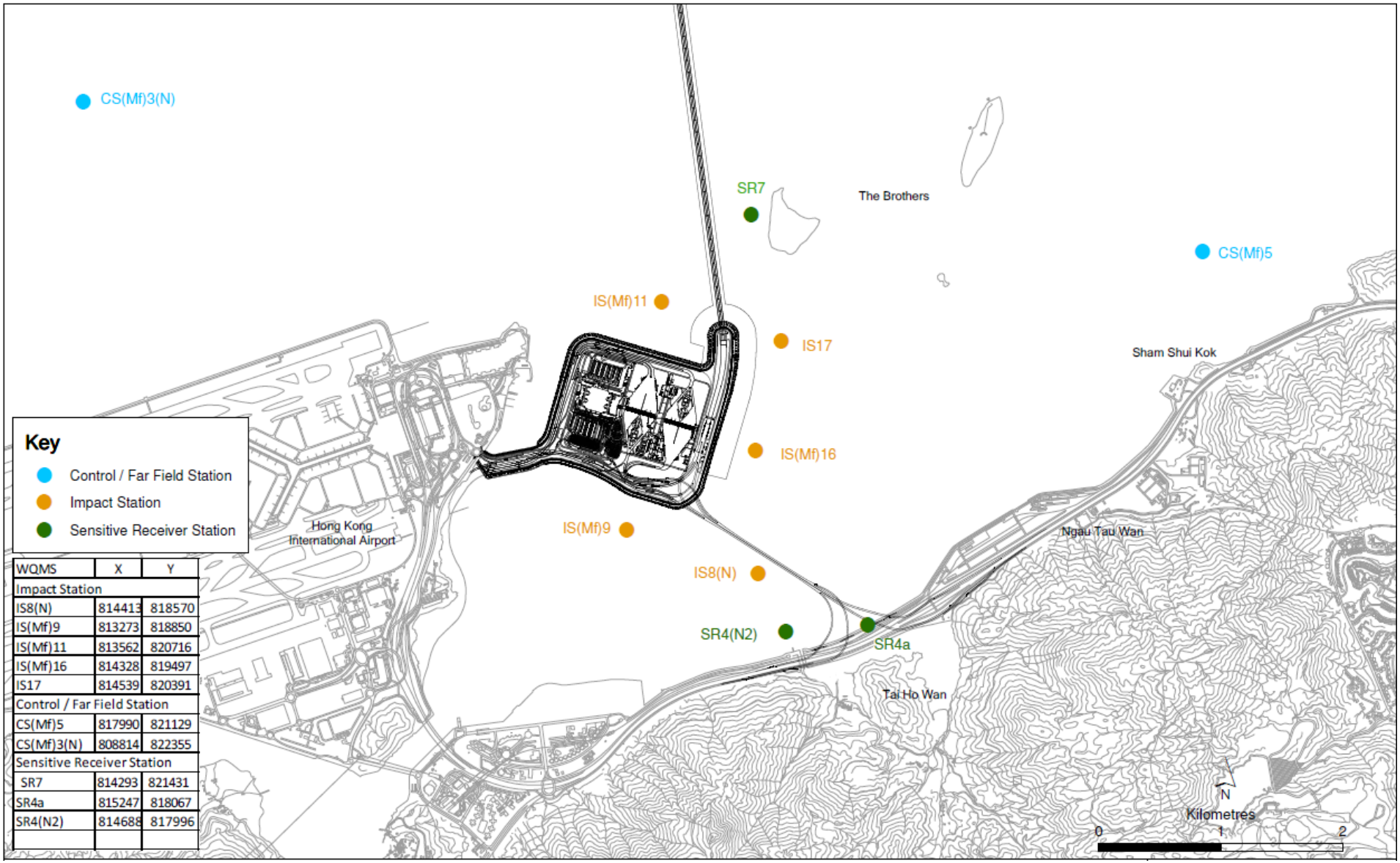

WQMS	X	Y
Impact Station		
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR7	814293	821431
SR4a	815247	818067
SR4(N2)	814688	817996

Figure 2.3

Water Quality Monitoring Stations

Environmental Resources Management

ERM

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 00019CB2
Multi-Parameters	YSI ProDss 0001C6A7
Multi-Parameters	YSI ProDss 16H104234
Multi-Parameters	YSI ProDss 17H105557
Multi-Parameters	YSI ProDss 17E100747
Multi-Parameters	YSI ProDss 18A104824
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4

2.2.2 Monitoring Schedule for the Reporting Period

The schedule for water quality monitoring in the reporting quarter is provided in *Appendix E.*

2.2.3 Results and Observations

In total of 12 monitoring events for post-construction water quality monitoring were conducted at all designated monitoring stations in the reporting period. Results and graphical presentations of impact water quality monitoring are presented in *Appendix G.* Detailed water quality monitoring data were reported in the *Seventy-seventh* and *Seventy-eighth Monthly EM&A Reports*.

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 2.4*. 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

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 772.01 km of survey effort was conducted, with 98.4% 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, 290.10 km and 481.91 km of survey effort were conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 569.64 km and 202.37 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 2 groups of 2 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All dolphin sightings were made during on-effort search and 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*.

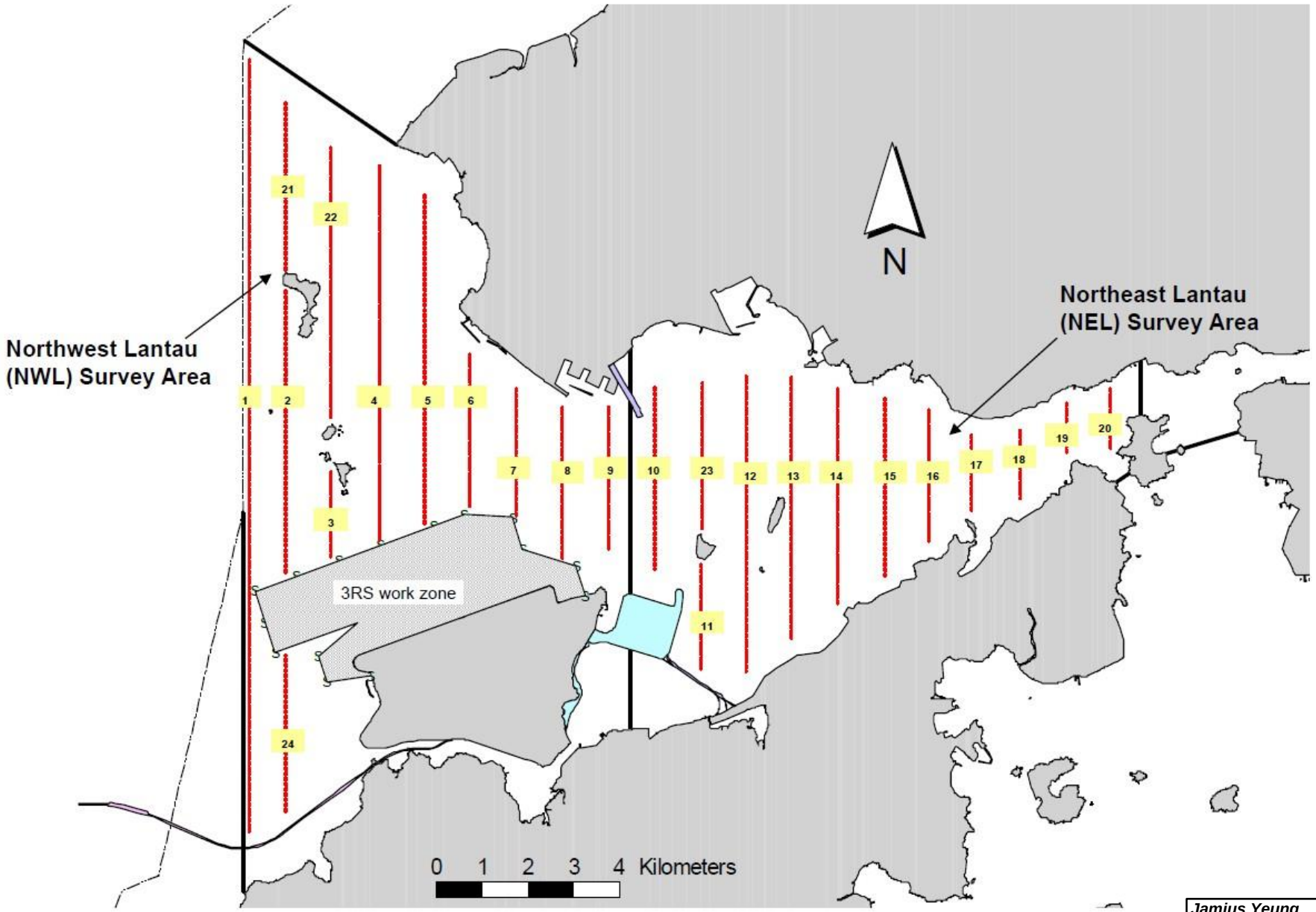

Figure 2.4

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

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Figure 2.2

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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 (3 & 9 Mar 2020)	0.00	0.00
	Set 2 (18 & 25 Mar 2020)	0.00	0.00
	Set 3 (8 & 14 Apr 2020)	0.00	0.00
	Set 4 (21 & 22 Apr 2020)	0.00	0.00
	Set 5 (5 & 12 May 2020)	0.00	0.00
	Set 6 (18 & 25 May 2020)	0.00	0.00
NWL	Set 1 (3 & 9 Mar 2020)	1.66	1.66
	Set 2 (18 & 25 Mar 2020)	0.00	0.00
	Set 3 (8 & 14 Apr 2020)	1.68	1.68
	Set 4 (21 & 22 Apr 2020)	0.00	0.00
	Set 5 (5 & 12 May 2020)	0.00	0.00
	Set 6 (18 & 25 May 2020)	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)**	
	March – May 2020	**September – November 2011**	**March – May 2020**	**September – November 2011**
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	0.56 ± 0.86	9.85 ± 5.85	0.56 ± 0.86	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 were singletons in North Lantau region during March to May 2020. 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	
	March – May 2020	**September – November 2011**
Overall	1.00 ± 0.00 (n = 2)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	1.00 ± 0.00 (n = 2)	3.92 ± 3.40 (n = 49)

Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between March and May 2020, 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

No marine works were undertaken since 30 December 2019, therefore, daily 250 m marine mammal exclusion zone monitoring was not undertaken since 30 December 2019.

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 March 2020; 1, 8, 15, 22 and 29 April 2020 and 6, 13, 20 and 27 May 2020.

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 March 2020	Works Area – ML02 • Chemical container was not placed in drip tray. • Cementitious grout bags should be covered with tarpaulin sheet.	Works Area – ML02 • The Contractor was reminded to place chemical container in drip tray. • The Contractor was reminded to cover the cementitious grout bags with tarpaulin sheet.
11 March 2020	Site office WA18 near Canteen • The caps of some water-filled barriers were missing and the barriers were not sealed. Cell 8 • A container was not covered with tarpaulin sheet and was filled with water.	Site office WA18 near Canteen • The Contractor was reminded to seal the water-filled barriers with cap or with other materials if the cap was missing. Cell 8 • The Contractor was reminded to cover the container with tarpaulin sheet to avoid accumulation of retained water.
18 March 2020	Northern Landfall • General refuse should be cleared. • Chemical waste labels should be clearly displayed.	Northern Landfall • The Contractor was reminded to clear refuse regularly. • The Contractor was reminded to display a clear chemical waste label on the waste containers.
25 March 2020	Southern Landfall near South Ventilation Building • Chemical containers were not placed in drip tray.	Southern Landfall near South Ventilation Building • The Contractor was reminded to place chemical containers in drip tray.
1 April 2020	Tunnel • Residuals were observed at site.	Tunnel • The Contractor was reminded to keep better housekeeping.
8 April 2020	Tunnel • Chemical should be placed in drip tray. Southern Landfall nearby Cell 15 • Stockpile should be covered with tarpaulin sheet or apply watering to avoid windblown dust.	Tunnel • The Contractor was reminded to place chemical in drip tray. Southern Landfall nearby Cell 15 • The Contractor was reminded to cover or water the stockpile.
15 April 2020	Near Carpark • Chemical should be placed in drip tray.	Near Carpark • The Contractor was reminded to place chemical in drip tray.
22 April 2020	South Ventilation Building • Chemical should be placed in drip tray.	South Ventilation Building • The Contractor was reminded to place chemical in drip tray.
29 April 2020	Northern Landfall (Pumpsum) • Chemical should be placed in drip tray. • Accumulated residuals were observed on site.	Northern Landfall (Pumpsum) • The Contractor was reminded to place chemical in drip tray. • The Contractor was reminded to keep better housekeeping.
6 May 2020	Northern Landfall (Pumpsum) • Chemical should be placed in drip tray. • Accumulated residuals were observed on site.	Northern Landfall (Pumpsum) • The Contractor was reminded to place the chemical in drip tray. • The Contractor was reminded to keep better housekeeping.
13 May 2020	Carpark • Residuals were observed on site.	Carpark • The Contractor was reminded to keep better housekeeping.

Inspection Date	Environmental Observations	Recommendations/ Remarks
20 May 2020	South Ventilation Building • Accumulated residuals were observed on site.	South Ventilation Building • The Contractor was reminded to clear accumulated residuals.
27 May 2020	Box Culvert • NRMM label was in green color instead of blue.	Box Culvert • 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)
March 2020	3,252	0	1,226	0	0	0	0	0
April 2020	4,200	0	521	1,300	6,400	0	0	0
May 2020	7,015	0	536	6,740	600	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
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)
Construction Noise Permit	GW-RW0406-18	17 October 2019	15 April 2020	DBJV	Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0181-20	29 April 2020	14 October 2020	DBJV	Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RS1137-19	26 December 2019	5 June 2020	DBJV	Southern Landfall
Construction Noise Permit	GW-RW0144-20	14 April 2020	31 August 2020	DBJV	WA23 Tsing Yi Storage Area

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

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.

2.7 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 Four (4) Action Level and One (1) Limit Level exceedances of 1-hour TSP 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	2020-04-08 2020-04-08	-	2	-
	Limit Level	2020-04-14	-	1	-
ASR5	Action Level	2020-03-12 2020-04-08	-	2	-
	Limit Level		-	-	-
ASR6	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR10	Action Level	-	-		-
	Limit Level	-	-	-	-
Total number of Action level Exceedances:				**4**	**0**
Total number of Limit level Exceedances:				**1**	**0**

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March and May 2020, 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*.

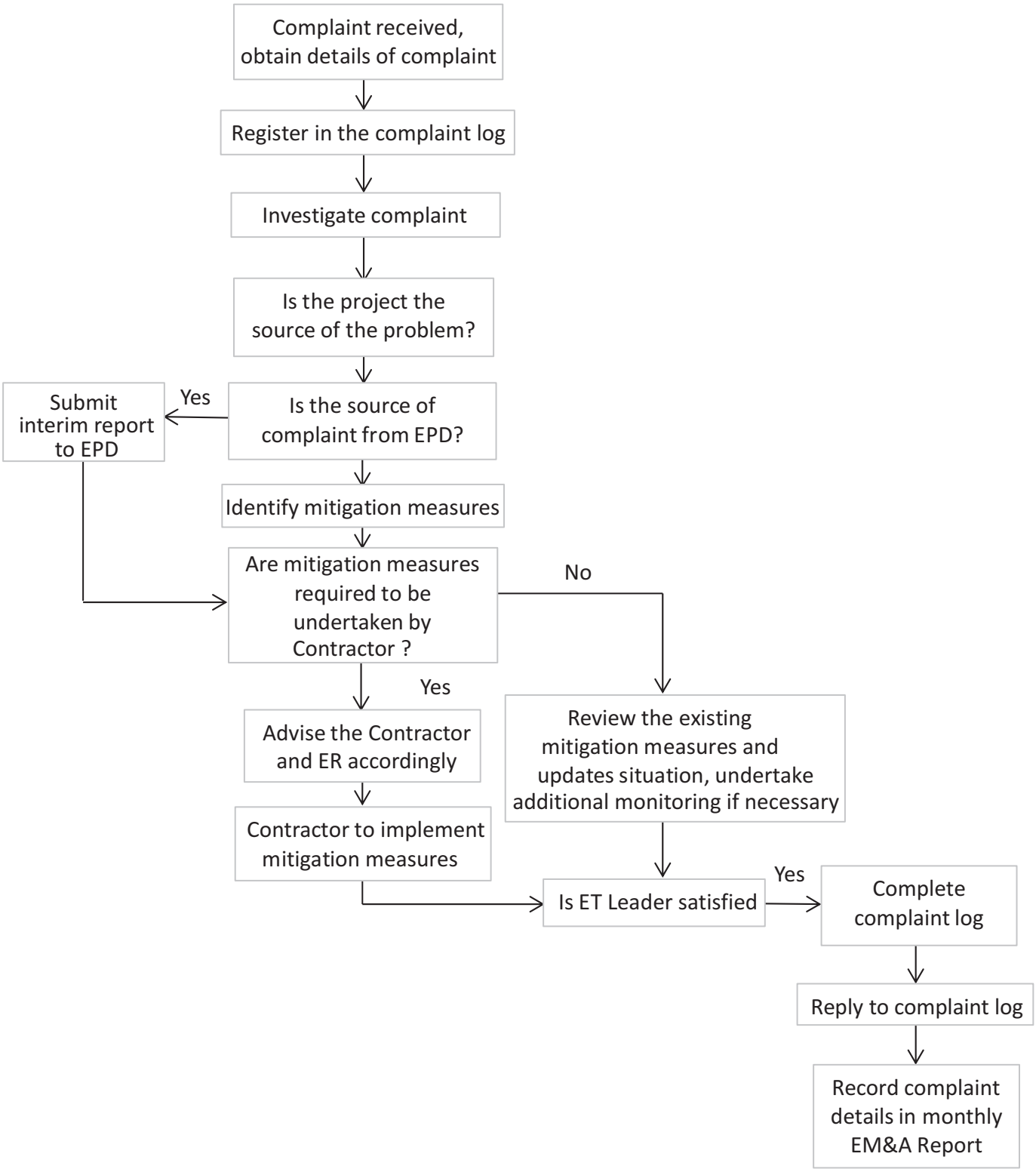
2.8 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

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*.



Environmental Complaint Handling Procedure

Figure 2.5

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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
• Road & Drainage works – Portion S-A, S-B & S-C and Northern Landfall;
• UU installation - Portion S-A, S-B & S-C and Northern Landfall.

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 and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality is 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-sixth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 March to 31 May 2020, 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. Four (4) Action level and one (1) Limit Level exceedances of 1-hour TSP were recorded in this reporting period.

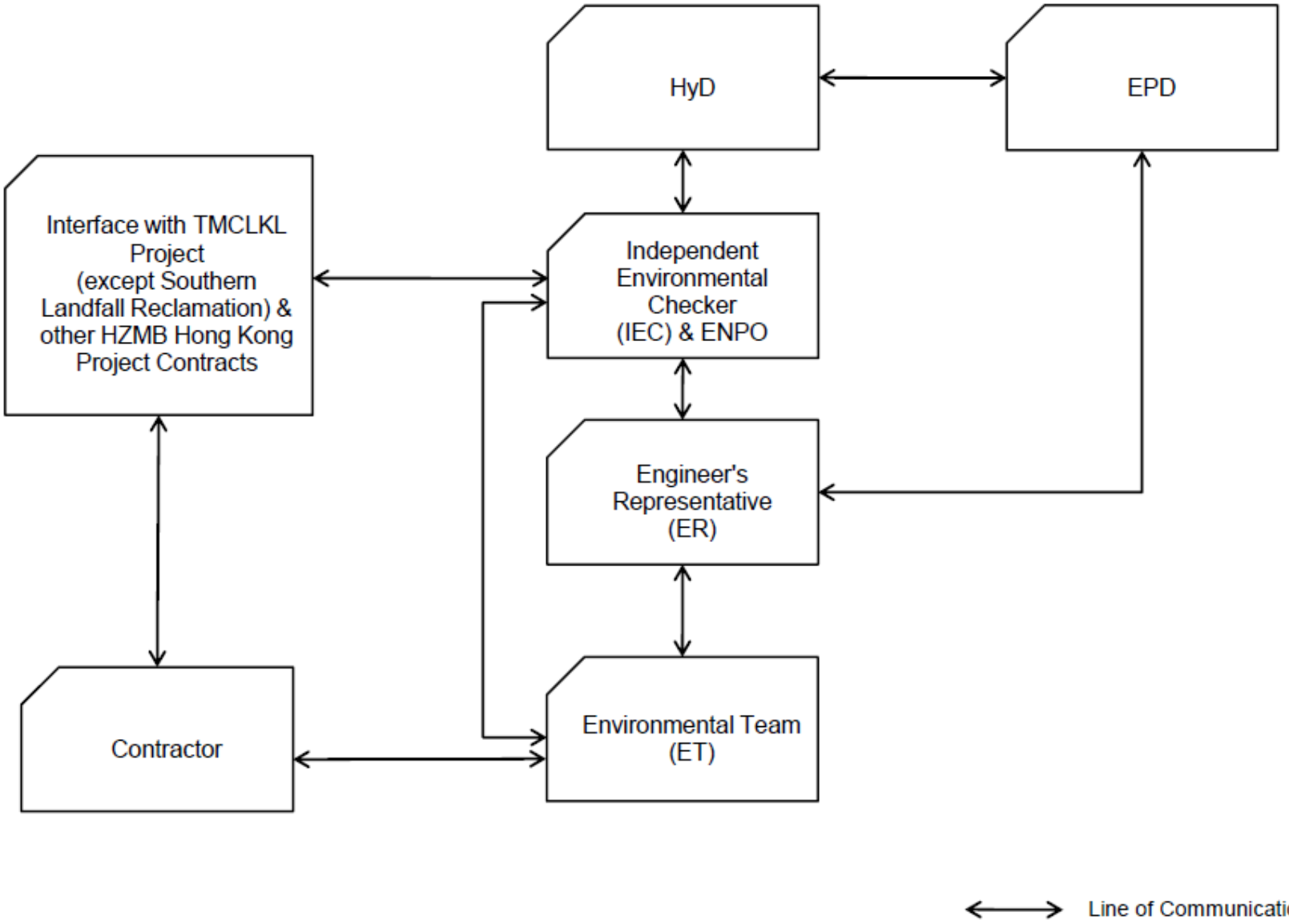
A total of 2 groups of 2 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All seven dolphin sightings were made during on-effort search and were made on primary lines. Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between March and May 2020, 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

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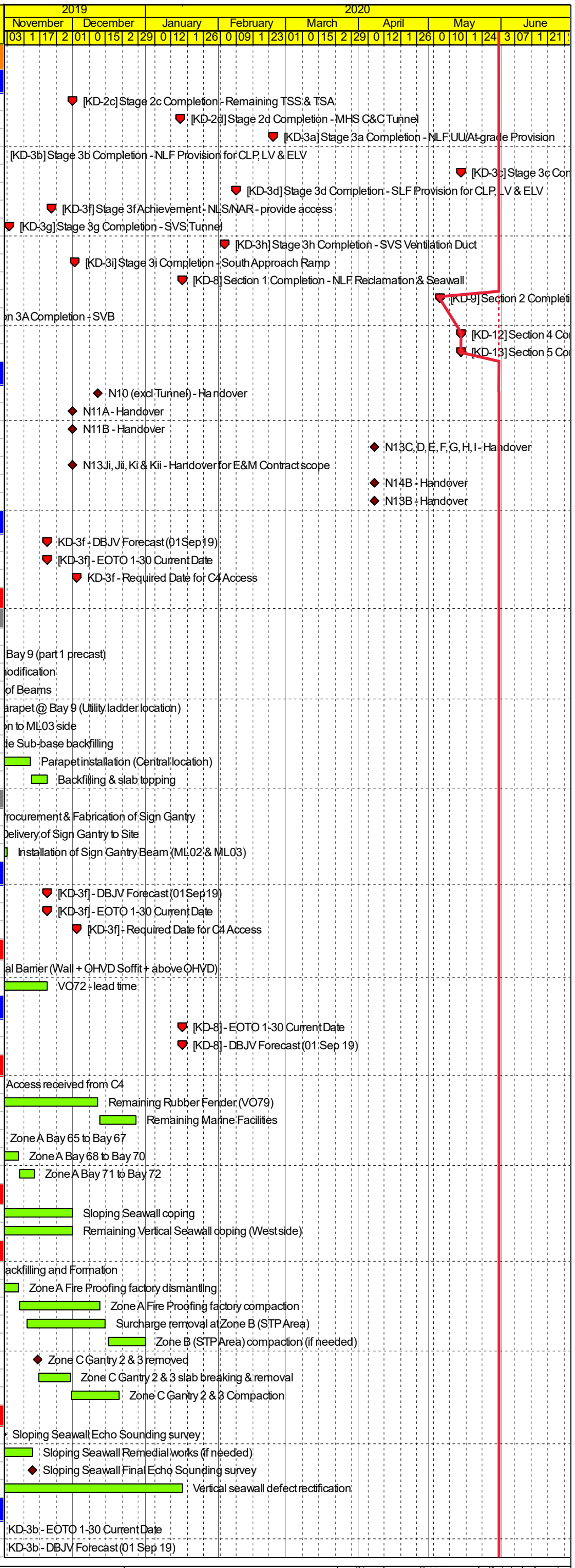
Appendix B

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		15-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		30-Oct-19*
7	[KD-3c] Stage 3c Completion - SLF UU & At-grade works provision	0		14-May-20*
8	[KD-3d] Stage 3d Completion - SLF Provision for CLP, LV & ELV	0		08-Feb-20*
9	[KD-3f] Stage 3f Achievement - NLS/NAR - provide access	0		21-Nov-19*
10	[KD-3g] Stage 3g Completion - SVS Tunnel	0		03-Nov-19*
11	[KD-3h] Stage 3h Completion - SVS Ventilation Duct	0		03-Feb-20*
12	[KD-3i] Stage 3i Completion - South Approach Ramp	0		01-Dec-19*
13	[KD-8] Section 1 Completion - NLF Reclamation & Seawall	0		16-Jan-20*
14	[KD-9] Section 2 Completion - Tunnels and Approach Ramp	0		05-May-20*
15	[KD-10] Section 3A Completion - SVB	0		30-Sep-19*
16	[KD-12] Section 4 Completion - SLF At-grade Road	0		14-May-20*
17	[KD-13] Section 5 Completion - Preservation and Protection of Trees	0		14-May-20*
18	**Portion Handover Dates**			
19	N10 (excl Tunnel) - Handover	0		11-Dec-19*
20	N11A - Handover	0		30-Nov-19*
21	N11B - Handover	0		30-Nov-19*
22	N13C, D, E, F, G, H, I - Handover	0		07-Apr-20*
23	N13Ji, Jii, Ki & Kii - Handover for E&M Contract scope	0		30-Nov-19*
24	N14B - Handover	0		07-Apr-20*
25	N13B - Handover	0		07-Apr-20
26	**North Approach Ramp KD-3f**			
27	KD-3f - DBJV Forecast (01Sep19)	0		19-Nov-19
28	[KD-3f] - EOTO 1-30 Current Date	0		19-Nov-19*
29	KD-3f - Required Date for C4 Access	0		02-Dec-19*
30	**North Approach Ramp**			
31	*Internal Structure*			
32	Parapet grouting works	12	27-Aug-19A	09-Sep-19
33	Parapet installation @ Bay 9 (part 1 precast)	4	10-Sep-19	13-Sep-19
34	Utility Ladder modification	12	16-Sep-19	28-Sep-19
35	Breaking of Beams	6	30-Sep-19	08-Oct-19
36	In-situ Parapet @ Bay 9 (Utility ladder location)	3	09-Oct-19	11-Oct-19
37	Road divertion to ML03 side	0		02-Oct-19*
38	ML02 side Sub-base backfilling	6	03-Oct-19	10-Oct-19
39	Parapet installation (Central location)	28	11-Oct-19	12-Nov-19
40	Backfilling & slab topping	6	13-Nov-19	19-Nov-19
41	*Sign Gantry*			
42	Procurement & Fabrication of Sign Gantry	41	05-Sep-19*	25-Oct-19
43	Delivery of Sign Gantry to Site	1	26-Oct-19	26-Oct-19
44	Installation of Sign Gantry Beam (ML02 & ML03)	6	28-Oct-19	02-Nov-19
45	**North Launching Shaft KD-3f**			
46	[KD-3f] - DBJV Forecast (01Sep19)	0		19-Nov-19
47	[KD-3f] - EOTO 1-30 Current Date	0		19-Nov-19*
48	[KD-3f] - Required Date for C4 Access	0		02-Dec-19*
49	**North Launching Shaft**			
50	Thermal Barrier (Wall + OHVD Soffit + above OHVD)	70	22-Jul-19A	14-Oct-19
51	VO72 - lead time	31	15-Oct-19	19-Nov-19
52	**Remaining North Reclamation KD-8**			
53	[KD-8] - EOTO 1-30 Current Date	0		16-Jan-20*
54	[KD-8] - DBJV Forecast (01 Sep 19)	0		16-Jan-20
55	**Vertical Seawall**			
56	Access received from C4	0		28-Oct-19*
57	Remaining Rubber Fender (VO79)	38	29-Oct-19	11-Dec-19
58	Remaining Marine Facilities	12	12-Dec-19	27-Dec-19
59	Zone A Bay 65 to Bay 67	7	23-Oct-19	30-Oct-19
60	Zone A Bay 68 to Bay 70	7	31-Oct-19	07-Nov-19
61	Zone A Bay 71 to Bay 72	6	08-Nov-19	14-Nov-19
62	**Sloping Seawall**			
63	Sloping Seawall coping	75	02-Sep-19	30-Nov-19
64	Remaining Vertical Seawall coping (West side)	34	23-Oct-19	30-Nov-19
65	**Removal, Backfilling & Compaction**			
66	NAR & NLS Backfilling and Formation	51	01-Aug-19A	30-Sep-19
67	Zone A Fire Proofing factory dismantling	21	15-Oct-19*	07-Nov-19
68	Zone A Fire Proofing factory compaction	30	08-Nov-19	12-Dec-19
69	Surcharge removal at Zone B (STP Area)	30	11-Nov-19*	14-Dec-19
70	Zone B (STP Area) compaction (if needed)	12	16-Dec-19	31-Dec-19
71	Zone C Gantry 2 & 3 removed	0		15-Nov-19*
72	Zone C Gantry 2 & 3 slab breaking & removal	12	16-Nov-19	29-Nov-19
73	Zone C Gantry 2 & 3 Compaction	18	30-Nov-19	20-Dec-19
74	**Overall**			
75	Sloping Seawall Echo Sounding survey	0		31-Oct-19*
76	Sloping Seawall Remedial works (if needed)	12	31-Oct-19	13-Nov-19
77	Sloping Seawall Final Echo Sounding survey	0		13-Nov-19
78	Vertical seawall defect rectification	88	02-Oct-19	16-Jan-20
79	**NLF Demobilization & At-grade works**			
80	KD-3b - EOTO 1-30 Current Date	0		29-Oct-19*
81	KD-3b - DBJV Forecast (01 Sep 19)	0		29-Oct-19*



Planned Bar
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TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. K

Three Months Rolling Programme

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

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22-Dec-17	Rev.H	WYu	
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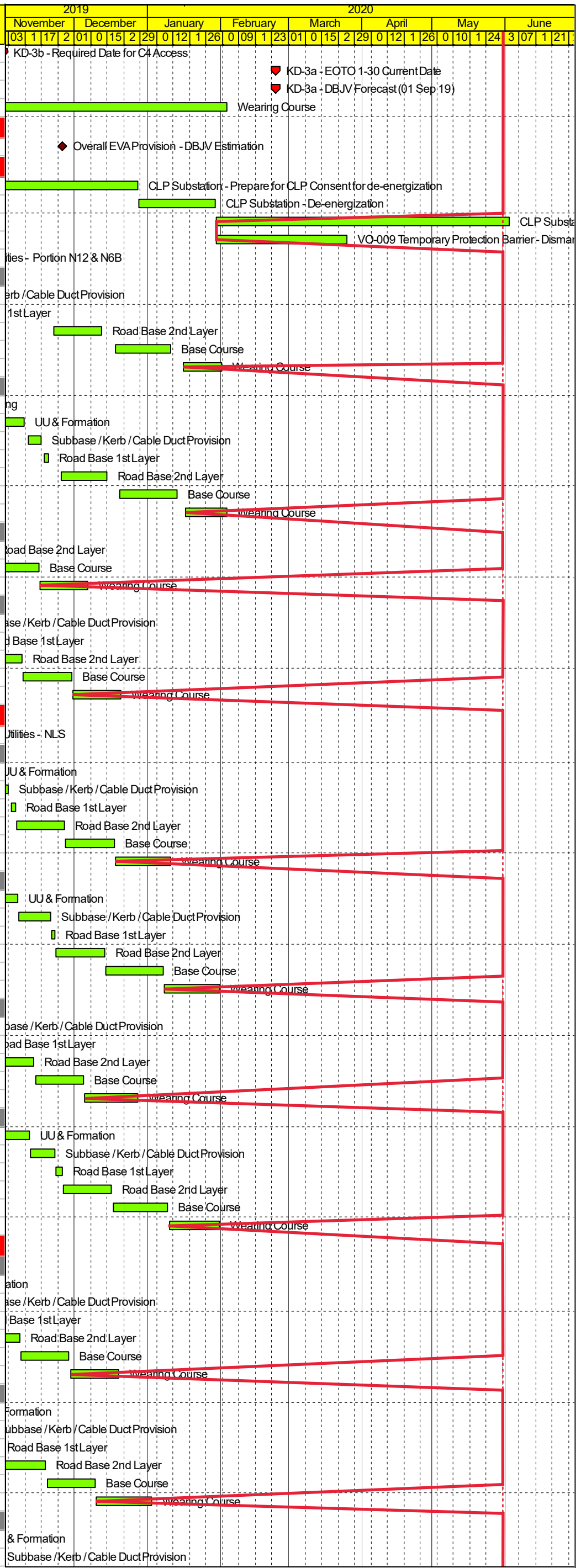
04-Jun-18	Rev.J	WYu	
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
82	KD-3b - Required Date for C4 Access	0		31-Oct-19*
83	KD-3a - EOTO 1-30 Current Date	0		24-Feb-20*
84	KD-3a - DBJV Forecast (01 Sep 19)	0		24-Feb-20
85	Wearing Course	115	12-Sep-19*	03-Feb-20
86	**Requirement**			
87	Overall EVA Provision - DBJV Estimation	0		25-Nov-19*
88	**Portion N12 & Portion N6B**			
89	CLP Substation - Prepare for CLP Consent for de-energization	96	02-Sep-19	27-Dec-19
90	CLP Substation - De-energization	24	28-Dec-19	29-Jan-20
91	CLP Substation - Dismantling & Removal	85	30-Jan-20	02-Jun-20
92	VO-009 Temporary Protection Barrier - Dismantling & Removal	32	30-Jan-20	25-Mar-20
93	Provision for Utilities - Portion N12 & N6B	133	15-Apr-19A	25-Sep-19
94	**NPO5 (ML03)**			
95	Subbase / Kerb / Cable Duct Provision	25	02-Sep-19	02-Oct-19
96	Road Base 1st Layer	2	03-Oct-19	04-Oct-19
97	Road Base 2nd Layer	18	22-Nov-19	12-Dec-19
98	Base Course	18	18-Dec-19	10-Jan-20
99	Wearing Course	12	16-Jan-20	01-Feb-20
100	**NPO5 (ML02) + NP05 (MD)**			
101	Concrete Road breaking	6	07-Sep-19	13-Sep-19
102	UU & Formation	30	05-Oct-19	09-Nov-19
103	Subbase / Kerb / Cable Duct Provision	6	11-Nov-19	16-Nov-19
104	Road Base 1st Layer	2	18-Nov-19	19-Nov-19
105	Road Base 2nd Layer	18	25-Nov-19	14-Dec-19
106	Base Course	18	20-Dec-19	13-Jan-20
107	Wearing Course	12	17-Jan-20	03-Feb-20
108	**Portion N6**			
109	Road Base 2nd Layer	16	08-Oct-19*	25-Oct-19
110	Base Course	18	26-Oct-19	15-Nov-19
111	Wearing Course	18	16-Nov-19	06-Dec-19
112	**Retaining Wall A**			
113	Subbase / Kerb / Cable Duct Provision	11	02-Oct-19*	15-Oct-19
114	Road Base 1st Layer	3	16-Oct-19	18-Oct-19
115	Road Base 2nd Layer	18	19-Oct-19	08-Nov-19
116	Base Course	18	09-Nov-19	29-Nov-19
117	Wearing Course	18	30-Nov-19	20-Dec-19
118	**North Launching Shaft**			
119	Provision for Utilities - NLS	48	05-Aug-19A	30-Sep-19
120	**Roundabout at NLS**			
121	UU & Formation	18	05-Oct-19	26-Oct-19
122	Subbase / Kerb / Cable Duct Provision	6	28-Oct-19	02-Nov-19
123	Road Base 1st Layer	2	04-Nov-19	05-Nov-19
124	Road Base 2nd Layer	18	06-Nov-19	26-Nov-19
125	Base Course	18	27-Nov-19	17-Dec-19
126	Wearing Course	18	18-Dec-19	10-Jan-20
127	**Carpark**			
128	UU & Formation	15	21-Oct-19	06-Nov-19
129	Subbase / Kerb / Cable Duct Provision	12	07-Nov-19	20-Nov-19
130	Road Base 1st Layer	2	21-Nov-19	22-Nov-19
131	Road Base 2nd Layer	18	23-Nov-19	13-Dec-19
132	Base Course	18	14-Dec-19	07-Jan-20
133	Wearing Course	18	08-Jan-20	31-Jan-20
134	**Retaining Wall A to B**			
135	Subbase / Kerb / Cable Duct Provision	32	09-Sep-19	18-Oct-19
136	Road Base 1st Layer	4	19-Oct-19	23-Oct-19
137	Road Base 2nd Layer	18	24-Oct-19	13-Nov-19
138	Base Course	18	14-Nov-19	04-Dec-19
139	Wearing Course	18	05-Dec-19	27-Dec-19
140	**NPO3**			
141	UU & Formation	20	19-Oct-19	11-Nov-19
142	Subbase / Kerb / Cable Duct Provision	10	12-Nov-19	22-Nov-19
143	Road Base 1st Layer	2	23-Nov-19	25-Nov-19
144	Road Base 2nd Layer	18	26-Nov-19	16-Dec-19
145	Base Course	18	17-Dec-19	09-Jan-20
146	Wearing Course	16	10-Jan-20	31-Jan-20
147	**Sloping Seawall**			
148	**Workshop 14-9**			
149	UU & Formation	127	06-May-19A	05-Oct-19
150	Subbase / Kerb / Cable Duct Provision	7	08-Oct-19	15-Oct-19
151	Road Base 1st Layer	2	16-Oct-19	17-Oct-19
152	Road Base 2nd Layer	18	18-Oct-19	07-Nov-19
153	Base Course	18	08-Nov-19	28-Nov-19
154	Wearing Course	18	29-Nov-19	19-Dec-19
155	**Workshop 9-1**			
156	UU & Formation	107	07-Jun-19A	15-Oct-19
157	Subbase / Kerb / Cable Duct Provision	8	16-Oct-19	24-Oct-19
158	Road Base 1st Layer	3	25-Oct-19	28-Oct-19
159	Road Base 2nd Layer	18	29-Oct-19	18-Nov-19
160	Base Course	18	19-Nov-19	09-Dec-19
161	Wearing Course	18	10-Dec-19	02-Jan-20
162	**Outfall C 1/2**			
163	UU & Formation	86	10-Jul-19A	21-Oct-19
164	Subbase / Kerb / Cable Duct Provision	6	22-Oct-19	28-Oct-19



Data Date: 01-Sep-19

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Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

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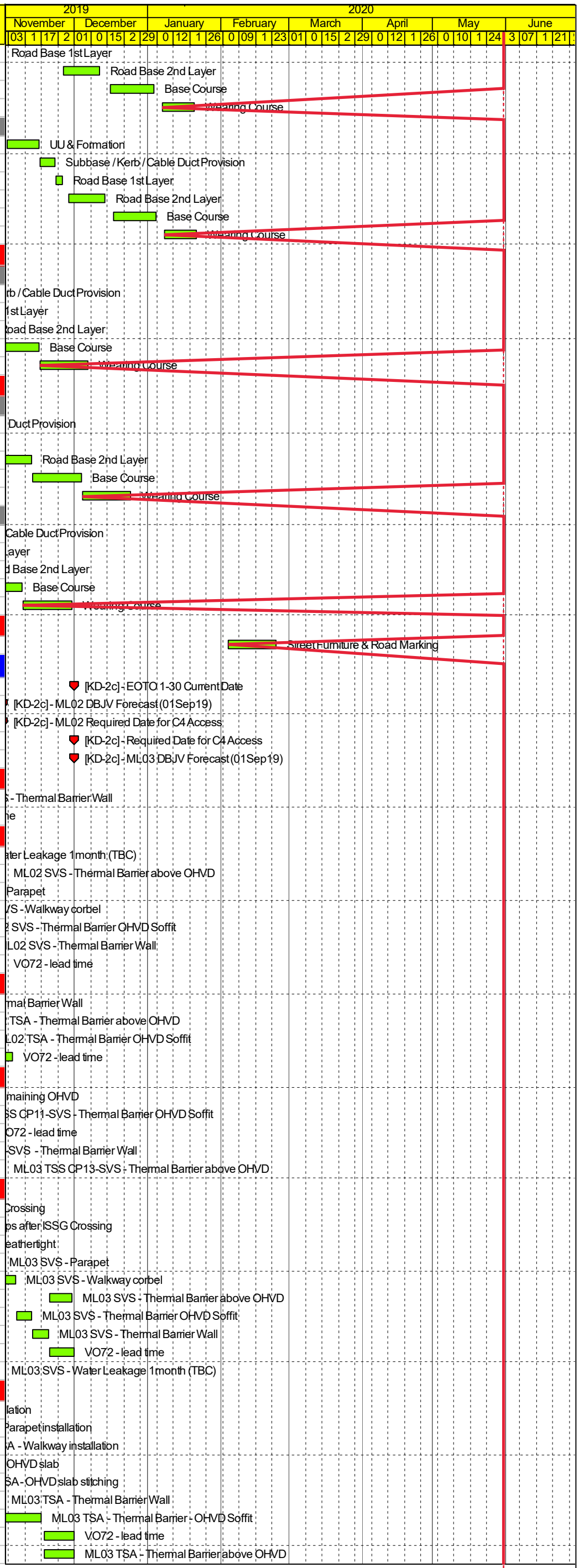
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu

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



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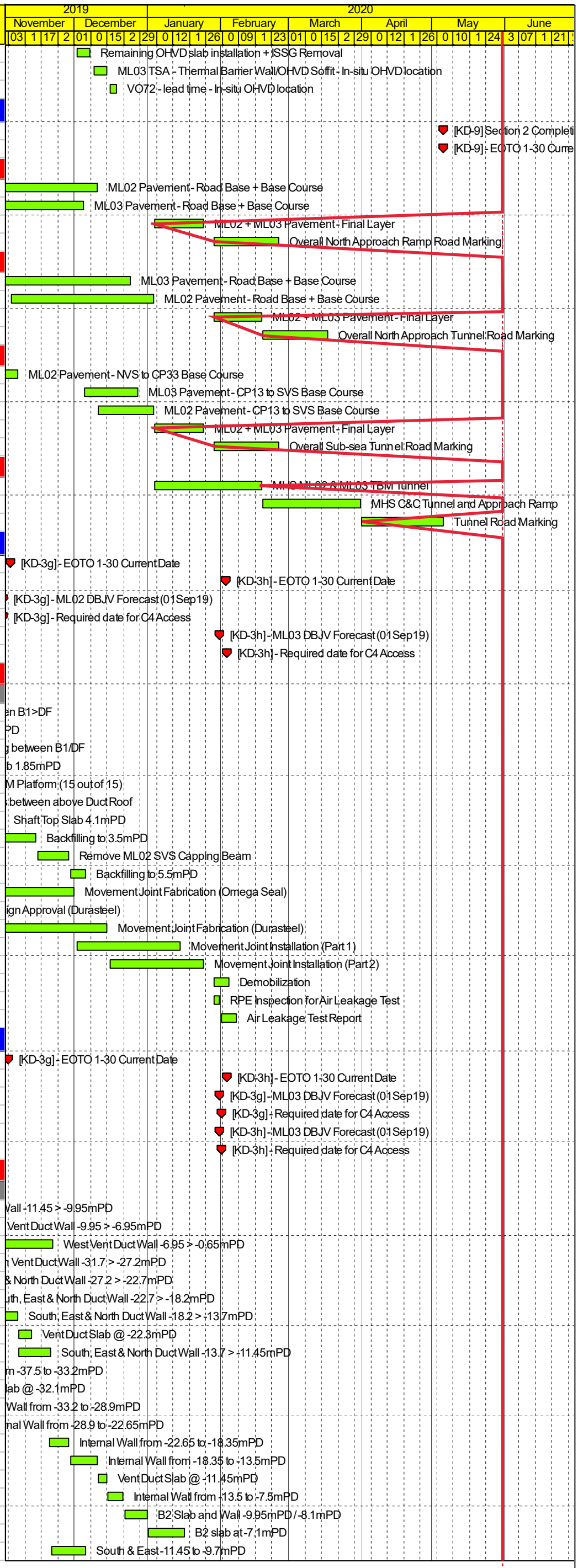
11-Nov-19	Rev K	SPa	WYu
22-Jan-20	Rev K1	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
247	Remaining OHVD slab installation + ISSG Removal	6	02-Dec-19	07-Dec-19
248	ML03 TSA - Thermal Barrier Wall/OHVD Soffit - In-situ OHVD locati	6	09-Dec-19	14-Dec-19
249	VO72 - lead time - In-situ OHVD location	3	16-Dec-19	18-Dec-19
250	**Tunnel Roadworks**			
251	[KD-9] Section 2 Completion - Tunnels and Approach Ramp	0		05-May-20
252	[KD-9] - EOTO 1-30 Current Date	0		05-May-20*
253	**North Approach Ramp & North Launching Shaft**			
254	ML02 Pavement - Road Base + Base Course	38	28-Oct-19*	10-Dec-19
255	ML03 Pavement - Road Base + Base Course	83	27-Aug-19 A	04-Dec-19
256	ML02 + ML03 Pavement - Final Layer	18	04-Jan-20	24-Jan-20
257	Overall North Approach Ramp Road Marking	8	29-Jan-20	25-Feb-20
258	**North Approach Tunnel to North Ventilation Shaft**			
259	ML03 Pavement - Road Base + Base Course	72	30-Sep-19*	24-Dec-19
260	ML02 Pavement - Road Base + Base Course	50	04-Nov-19*	03-Jan-20
261	ML02 + ML03 Pavement - Final Layer	7	29-Jan-20	18-Feb-20
262	Overall North Approach Tunnel Road Marking	19	19-Feb-20	17-Mar-20
263	**Sub-sea Tunnel**			
264	ML02 Pavement - NVS to CP33 Base Course	21	14-Oct-19*	06-Nov-19
265	ML03 Pavement - CP13 to SVS Base Course	18	05-Dec-19	27-Dec-19
266	ML02 Pavement - CP13 to SVS Base Course	18	11-Dec-19	03-Jan-20
267	ML02 + ML03 Pavement - Final Layer	18	04-Jan-20	24-Jan-20
268	Overall Sub-sea Tunnel Road Marking	8	29-Jan-20	25-Feb-20
269	**MHS TBM Tunnel, Cut & Cover & South Approach Ramp**			
270	MHS ML02 & ML03 TBM Tunnel	25	04-Jan-20	18-Feb-20
271	MHS C&C Tunnel and Approach Ramp	31	19-Feb-20	31-Mar-20
272	Tunnel Road Marking	24	01-Apr-20	05-May-20
273	**ML02 South Ventilation Shaft**			
274	[KD-3g] - EOTO 1-30 Current Date	0		03-Nov-19*
275	[KD-3h] - EOTO 1-30 Current Date	0		03-Feb-20*
276	[KD-3g] - ML02 DBJV Forecast (01Sep19)	0		31-Oct-19
277	[KD-3g] - Required date for C4 Access	0		31-Oct-19*
278	[KD-3h] - ML03 DBJV Forecast (01Sep19)	0		31-Jan-20
279	[KD-3h] - Required date for C4 Access	0		03-Feb-20*
280	**ML02 SVS Structure**			
281	*Above Tunnel Vent Duct*			
282	Walls between B1>DF	30	27-Aug-19 A	02-Oct-19
283	Backfilling to -0.65mPD	12	02-Sep-19	16-Sep-19
284	Dwall opening between B1/DF	12	17-Sep-19	30-Sep-19
285	DF Slab 1.85mPD	9	03-Oct-19	14-Oct-19
286	E&M Platform (15 out of 15)	6	15-Oct-19	21-Oct-19
287	Walls between above Duct Roof	3	15-Oct-19	17-Oct-19
288	Shaft Top Slab 4.1mPD	12	18-Oct-19	31-Oct-19
289	Backfilling to 3.5mPD	12	01-Nov-19	14-Nov-19
290	Remove ML02 SVS Capping Beam	12	15-Nov-19	28-Nov-19
291	Backfilling to 5.5mPD	6	29-Nov-19	05-Dec-19
292	Movement Joint Fabrication (Omega Seal)	136	21-Jun-19 A	30-Nov-19
293	Movement Joint Design Approval (Durasteel)	0		16-Sep-19*
294	Movement Joint Fabrication (Durasteel)	75	17-Sep-19	14-Dec-19
295	Movement Joint Installation (Part 1)	35	02-Dec-19	14-Jan-20
296	Movement Joint Installation (Part 2)	32	16-Dec-19	24-Jan-20
297	Demobilization	6	29-Jan-20	04-Feb-20
298	RPE Inspection for Air Leakage Test	3	29-Jan-20	31-Jan-20
299	Air Leakage Test Report	4	01-Feb-20	07-Feb-20
300	**ML03 South Ventilation Shaft**			
301	[KD-3g] - EOTO 1-30 Current Date	0		02-Nov-19*
302	[KD-3h] - EOTO 1-30 Current Date	0		03-Feb-20*
303	[KD-3g] - ML03 DBJV Forecast (01Sep19)	0		31-Jan-20
304	[KD-3g] - Required date for C4 Access	0		01-Feb-20*
305	[KD-3h] - ML03 DBJV Forecast (01Sep19)	0		31-Jan-20
306	[KD-3h] - Required date for C4 Access	0		01-Feb-20*
307	**ML03 SVS Structure**			
308	*Above Tunnel Vent Duct*			
309	West Vent Duct Wall -11.45 > -9.95mPD	23	28-Aug-19 A	24-Sep-19
310	West Vent Duct Wall -9.95 > -6.95mPD	18	25-Sep-19	17-Oct-19
311	West Vent Duct Wall -6.95 > -0.65mPD	30	18-Oct-19	21-Nov-19
312	South, East & North Vent Duct Wall -31.7 > -27.2mPD	21	27-Aug-19 A	20-Sep-19
313	South, East & North Duct Wall -27.2 > -22.7mPD	10	21-Sep-19	03-Oct-19
314	South, East & North Duct Wall -22.7 > -18.2mPD	14	04-Oct-19	21-Oct-19
315	South, East & North Duct Wall -18.2 > -13.7mPD	14	22-Oct-19	06-Nov-19
316	Vent Duct Slab @ -22.3mPD	5	07-Nov-19	12-Nov-19
317	South, East & North Duct Wall -13.7 > -11.45mPD	12	07-Nov-19	20-Nov-19
318	Internal Wall from -37.5 to -33.2mPD	6	20-Sep-19*	26-Sep-19
319	Vent Duct Slab @ -32.1mPD	6	27-Sep-19	04-Oct-19
320	Internal Wall from -33.2 to -28.9mPD	6	05-Oct-19	12-Oct-19
321	Internal Wall from -28.9 to -22.65mPD	6	14-Oct-19	19-Oct-19
322	Internal Wall from -22.65 to -18.35mPD	8	20-Nov-19	28-Nov-19
323	Internal Wall from -18.35 to -13.5mPD	12	29-Nov-19	10-Dec-19
324	Vent Duct Slab @ -11.45mPD	4	11-Dec-19	14-Dec-19
325	Internal Wall from -13.5 to -7.5mPD	7	15-Dec-19	21-Dec-19
326	B2 Slab and Wall -9.95mPD / -8.1mPD	10	22-Dec-19	31-Dec-19
327	B2 slab at -7.1mPD	16	01-Jan-20	16-Jan-20
328	South & East -11.45 to -9.7mPD	15	21-Nov-19	05-Dec-19



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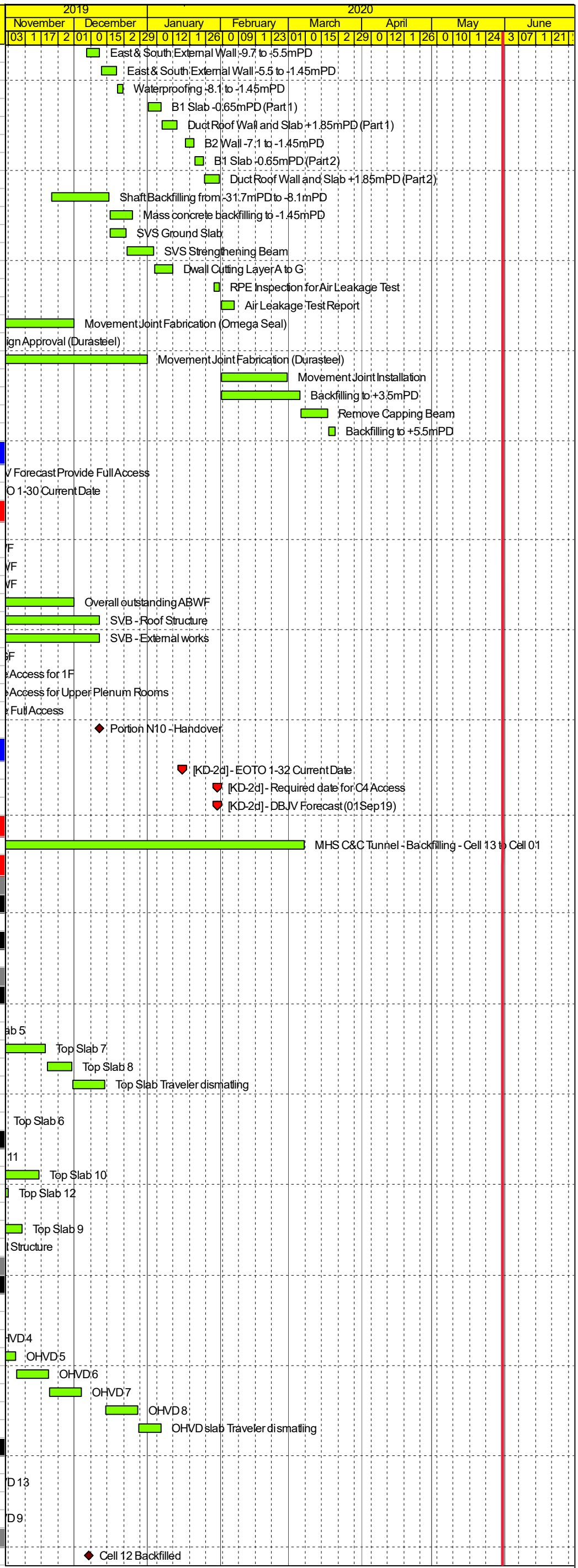
#	Activity Name	Orig Dur	Start	Finish
329	East & South External Wall -9.7 to -5.5mPD	6	06-Dec-19	11-Dec-19
330	East & South External Wall -5.5 to -1.45mPD	7	12-Dec-19	18-Dec-19
331	Waterproofing -8.1 to -1.45mPD	3	19-Dec-19	21-Dec-19
332	B1 Slab -0.65mPD (Part 1)	6	01-Jan-20	06-Jan-20
333	Duct Roof Wall and Slab +1.85mPD (Part 1)	7	07-Jan-20	13-Jan-20
334	B2 Wall -7.1 to -1.45mPD	4	17-Jan-20	20-Jan-20
335	B1 Slab -0.65mPD (Part 2)	4	21-Jan-20	24-Jan-20
336	Duct Roof Wall and Slab +1.85mPD (Part 2)	7	25-Jan-20	31-Jan-20
337	Shaft Backfilling from -31.7mPD to -8.1mPD	25	21-Nov-19	15-Dec-19
338	Mass concrete backfilling to -1.45mPD	10	16-Dec-19	25-Dec-19
339	SVS Ground Slab	7	16-Dec-19	22-Dec-19
340	SVS Strengthening Beam	12	23-Dec-19	03-Jan-20
341	Dwall Cutting Layer A to G	8	04-Jan-20	11-Jan-20
342	RPE Inspection for Air Leakage Test	3	29-Jan-20	31-Jan-20
343	Air Leakage Test Report	6	01-Feb-20	06-Feb-20
344	Movement Joint Fabrication (Omega Seal)	136	21-Jun-19A	30-Nov-19
345	Movement Joint Design Approval (Durasteel)	0		16-Sep-19*
346	Movement Joint Fabrication (Durasteel)	87	17-Sep-19	31-Dec-19
347	Movement Joint Installation	29	01-Feb-20	29-Feb-20
348	Backfilling to +3.5mPD	34	01-Feb-20	05-Mar-20
349	Remove Capping Beam	12	06-Mar-20	17-Mar-20
350	Backfilling to +5.5mPD	3	18-Mar-20	20-Mar-20
351	**South Ventilation Building KD-10**			
352	[KD-10] - DBJV Forecast Provide Full Access	0		30-Sep-19
353	[KD-10] - EOTO 1-30 Current Date	0		30-Sep-19*
354	**ABWF**			
355	SVB - BL1 ABWF	79	20-Jun-19A	21-Sep-19
356	SVB - GF ABWF	85	20-Jun-19A	28-Sep-19
357	SVB - 1F ABWF	42	12-Aug-19A	30-Sep-19
358	SVB - 2F ABWF	27	29-Aug-19A	30-Sep-19
359	Overall outstanding ABWF	51	02-Oct-19	30-Nov-19
360	SVB - Roof Structure	60	02-Oct-19	11-Dec-19
361	SVB - External works	60	02-Oct-19	11-Dec-19
362	SVB - Provide Access for GF	0		04-Sep-19*
363	SVB - Provide Access for 1F	0		30-Sep-19*
364	SVB - Provide Access for Upper Plenum Rooms	0		30-Sep-19*
365	SVB - Provide Full Access	0		30-Sep-19
366	Portion N10 - Handover	0		11-Dec-19*
367	**MHS Cut-and-cover Tunnel KD-2d**			
368	[KD-2d] - EOTO 1-32 Current Date	0		15-Jan-20*
369	[KD-2d] - Required date for C4 Access	0		30-Jan-20*
370	[KD-2d] - DBJV Forecast (01Sep19)	0		30-Jan-20
371	**MHS C&C Tunnel Backfilling**			
372	MHS C&C Tunnel - Backfilling - Cell 13 to Cell 01	183	10-Jul-19A	07-Mar-20
373	**South MHS Cut-and-cover KD-2d**			
374	**Wall**			
375	**Traveller Formworks**			
376	Wall 9 - Cell 6	22	09-Aug-19A	03-Sep-19
377	**Traditional Formworks**			
378	Wall 12 - Cell 8	40	31-Jul-19A	16-Sep-19
379	**Top Slab**			
380	**Traveller Formworks**			
381	Top Slab 3	22	12-Aug-19A	05-Sep-19
382	Top Slab 5	15	25-Sep-19	14-Oct-19
383	Top Slab 7	15	01-Nov-19	18-Nov-19
384	Top Slab 8	10	19-Nov-19	29-Nov-19
385	Top Slab Traveler dismatling	12	30-Nov-19	13-Dec-19
386	Top Slab 4	15	06-Sep-19	24-Sep-19
387	Top Slab 6	15	15-Oct-19	31-Oct-19
388	**Traditional Formworks**			
389	Top Slab 11	21	12-Sep-19	09-Oct-19
390	Top Slab 10	26	17-Oct-19	15-Nov-19
391	Top Slab 12	30	27-Sep-19	02-Nov-19
392	Top Slab 14	31	12-Aug-19A	17-Sep-19
393	Top Slab 9	18	19-Oct-19	08-Nov-19
394	Portal Structure	24	18-Sep-19	17-Oct-19
395	**OHVD**			
396	**Traveller Formworks**			
397	OHVD 2	20	29-Aug-19A	21-Sep-19
398	OHVD 3	12	23-Sep-19	08-Oct-19
399	OHVD 4	12	09-Oct-19	22-Oct-19
400	OHVD 5	12	23-Oct-19	05-Nov-19
401	OHVD 6	12	06-Nov-19	19-Nov-19
402	OHVD 7	12	20-Nov-19	03-Dec-19
403	OHVD 8	10	14-Dec-19	27-Dec-19
404	OHVD slab Traveler dismatling	7	28-Dec-19	06-Jan-20
405	**Traditional Formworks**			
406	OHVD 12	25	28-Aug-19A	26-Sep-19
407	OHVD 13	21	23-Sep-19	18-Oct-19
408	OHVD 10	21	24-Aug-19A	18-Sep-19
409	OHVD 9	18	26-Sep-19	18-Oct-19
410	**Backfilling**			
411	Cell 12 Backfilled	0		07-Dec-19*



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TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. K

Three Months Rolling Programme

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev.H	WYu	
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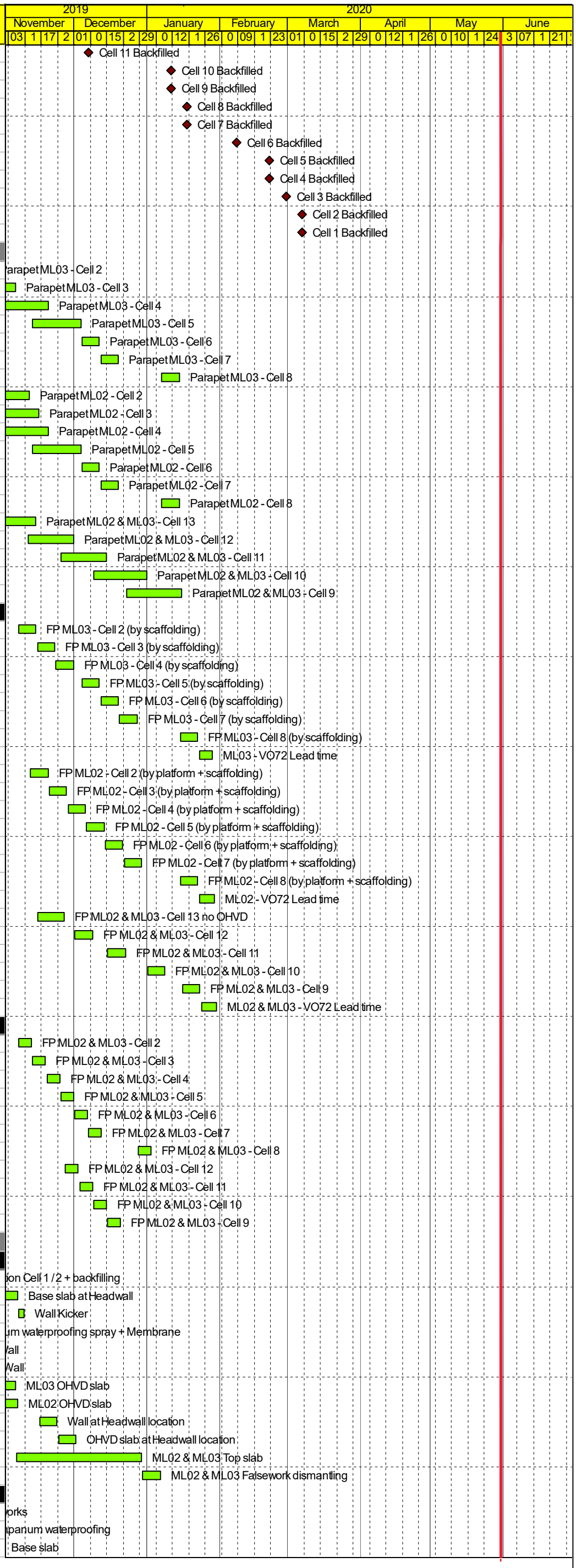
07-Mar-18	Rev.I	WYu	
04-Jun-18	Rev.J	WYu	
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
412	Cell 11 Backfilled	0		07-Dec-19*
413	Cell 10 Backfilled	0		11-Jan-20*
414	Cell 9 Backfilled	0		11-Jan-20*
415	Cell 8 Backfilled	0		18-Jan-20*
416	Cell 7 Backfilled	0		18-Jan-20*
417	Cell 6 Backfilled	0		08-Feb-20*
418	Cell 5 Backfilled	0		22-Feb-20*
419	Cell 4 Backfilled	0		22-Feb-20*
420	Cell 3 Backfilled	0		29-Feb-20*
421	Cell 2 Backfilled	0		07-Mar-20*
422	Cell 1 Backfilled	0		07-Mar-20*
423	**Parapet Installation**			
424	Parapet ML03 - Cell 2	18	04-Oct-19	25-Oct-19
425	Parapet ML03 - Cell 3	18	16-Oct-19	05-Nov-19
426	Parapet ML03 - Cell 4	18	30-Oct-19	19-Nov-19
427	Parapet ML03 - Cell 5	18	13-Nov-19	03-Dec-19
428	Parapet ML03 - Cell 6	7	04-Dec-19	11-Dec-19
429	Parapet ML03 - Cell 7	7	12-Dec-19	19-Dec-19
430	Parapet ML03 - Cell 8	7	07-Jan-20	14-Jan-20
431	Parapet ML02 - Cell 2	18	22-Oct-19	11-Nov-19
432	Parapet ML02 - Cell 3	18	26-Oct-19	15-Nov-19
433	Parapet ML02 - Cell 4	18	30-Oct-19	19-Nov-19
434	Parapet ML02 - Cell 5	18	13-Nov-19	03-Dec-19
435	Parapet ML02 - Cell 6	7	04-Dec-19	11-Dec-19
436	Parapet ML02 - Cell 7	7	12-Dec-19	19-Dec-19
437	Parapet ML02 - Cell 8	7	07-Jan-20	14-Jan-20
438	Parapet ML02 & ML03 - Cell 13	18	25-Oct-19	14-Nov-19
439	Parapet ML02 & ML03 - Cell 12	18	11-Nov-19	30-Nov-19
440	Parapet ML02 & ML03 - Cell 11	18	25-Nov-19	14-Dec-19
441	Parapet ML02 & ML03 - Cell 10	18	09-Dec-19	31-Dec-19
442	Parapet ML02 & ML03 - Cell 9	18	23-Dec-19	15-Jan-20
443	**Thermal Barrier (Wall + OHVD Soffit)**			
444	FP ML03 - Cell 2 (by scaffolding)	8	07-Nov-19	14-Nov-19
445	FP ML03 - Cell 3 (by scaffolding)	8	15-Nov-19	22-Nov-19
446	FP ML03 - Cell 4 (by scaffolding)	8	23-Nov-19	30-Nov-19
447	FP ML03 - Cell 5 (by scaffolding)	8	04-Dec-19	11-Dec-19
448	FP ML03 - Cell 6 (by scaffolding)	8	12-Dec-19	19-Dec-19
449	FP ML03 - Cell 7 (by scaffolding)	8	20-Dec-19	27-Dec-19
450	FP ML03 - Cell 8 (by scaffolding)	8	15-Jan-20	22-Jan-20
451	ML03 - VO72 Lead time	6	23-Jan-20	28-Jan-20*
452	FP ML02 - Cell 2 (by platform + scaffolding)	8	12-Nov-19	19-Nov-19
453	FP ML02 - Cell 3 (by platform + scaffolding)	8	20-Nov-19	27-Nov-19
454	FP ML02 - Cell 4 (by platform + scaffolding)	8	28-Nov-19	05-Dec-19
455	FP ML02 - Cell 5 (by platform + scaffolding)	8	06-Dec-19	13-Dec-19
456	FP ML02 - Cell 6 (by platform + scaffolding)	8	14-Dec-19	21-Dec-19
457	FP ML02 - Cell 7 (by platform + scaffolding)	8	22-Dec-19	29-Dec-19
458	FP ML02 - Cell 8 (by platform + scaffolding)	8	15-Jan-20	22-Jan-20
459	ML02 - VO72 Lead time	7	23-Jan-20	29-Jan-20*
460	FP ML02 & ML03 - Cell 13 no OHVD	12	15-Nov-19	26-Nov-19
461	FP ML02 & ML03 - Cell 12	8	01-Dec-19	08-Dec-19
462	FP ML02 & ML03 - Cell 11	8	15-Dec-19	22-Dec-19
463	FP ML02 & ML03 - Cell 10	8	01-Jan-20	08-Jan-20
464	FP ML02 & ML03 - Cell 9	8	16-Jan-20	23-Jan-20
465	ML02 & ML03 - VO72 Lead time	7	24-Jan-20	30-Jan-20*
466	**Thermal Barrier (above OHVD)**			
467	FP ML02 & ML03 - Cell 2	6	07-Nov-19	12-Nov-19
468	FP ML02 & ML03 - Cell 3	6	13-Nov-19	18-Nov-19
469	FP ML02 & ML03 - Cell 4	6	19-Nov-19	24-Nov-19
470	FP ML02 & ML03 - Cell 5	6	25-Nov-19	30-Nov-19
471	FP ML02 & ML03 - Cell 6	6	01-Dec-19	06-Dec-19
472	FP ML02 & ML03 - Cell 7	6	07-Dec-19	12-Dec-19
473	FP ML02 & ML03 - Cell 8	6	28-Dec-19	02-Jan-20
474	FP ML02 & ML03 - Cell 12	6	27-Nov-19	02-Dec-19
475	FP ML02 & ML03 - Cell 11	6	03-Dec-19	08-Dec-19
476	FP ML02 & ML03 - Cell 10	6	09-Dec-19	14-Dec-19
477	FP ML02 & ML03 - Cell 9	6	15-Dec-19	20-Dec-19
478	**Cell 1 Interface**			
479	**SCC Section + Headwall**			
480	Base slab connection Cell 1 / 2 + backfilling	26	26-Aug-19 A	20-Sep-19
481	Base slab at Headwall	7	31-Oct-19	06-Nov-19
482	Wall Kicker	3	07-Nov-19	09-Nov-19
483	Tympanum waterproofing spray + Membrane	15	26-Sep-19	10-Oct-19
484	ML03 Wall	21	21-Sep-19	11-Oct-19
485	ML02 Wall	17	27-Sep-19	13-Oct-19
486	ML03 OHVD slab	25	12-Oct-19	05-Nov-19
487	ML02 OHVD slab	24	14-Oct-19	06-Nov-19
488	Wall at Headwall location	8	16-Nov-19	23-Nov-19
489	OHVD slab at Headwall location	8	24-Nov-19	01-Dec-19
490	ML02 & ML03 Top slab	54	06-Nov-19	29-Dec-19
491	ML02 & ML03 Falsework dismantling	8	30-Dec-19	06-Jan-20
492	**Transition Structure**			
493	Preparation works	36	19-Aug-19 A	30-Sep-19
494	Tympanum waterproofing	20	01-Oct-19	20-Oct-19
495	Base slab	10	21-Oct-19	30-Oct-19



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TMCLKL Northern Connection Sub-sea Tunnel Section

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

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22-Dec-17	Rev.H	WYu	
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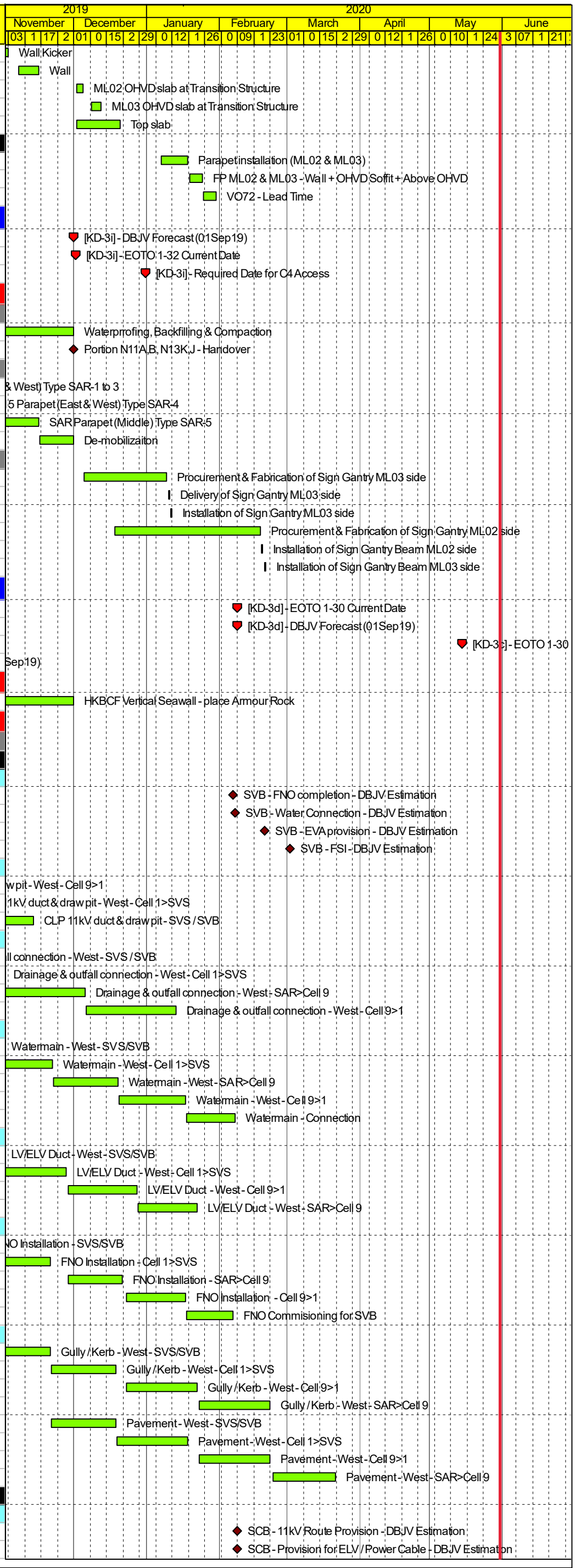
04-Jun-18	Rev.J	WYu	
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
496	Wall Kicker	3	31-Oct-19	02-Nov-19
497	Wall	9	07-Nov-19	15-Nov-19
498	ML02 OHVD slab at Transition Structure	3	02-Dec-19	04-Dec-19
499	ML03 OHVD slab at Transition Structure	5	08-Dec-19	12-Dec-19
500	Top slab	19	02-Dec-19	20-Dec-19
501	**Internal Structure**			
502	Parapet installation (ML02 & ML03)	12	07-Jan-20	18-Jan-20
503	FP ML02 & ML03 - Wall + OHVD Soffit + Above OHVD	6	19-Jan-20	24-Jan-20
504	VO72 - Lead Time	6	25-Jan-20	30-Jan-20*
505	**MHS Approach Ramp KD-3i**			
506	[KD-3i] - DBJV Forecast (01Sep19)	0		30-Nov-19
507	[KD-3i] - EOTO 1-32 Current Date	0		01-Dec-19*
508	[KD-3i] - Required Date for C4 Access	0		31-Dec-19*
509	**South Approach Ramp**			
510	**RC Structure**			
511	Waterprrofing, Backfilling & Compaction	217	11-Mar-19A	30-Nov-19
512	Portion N11A,B, N13K,J - Handover	0		30-Nov-19
513	**Internal Structure**			
514	SAR Parapet (East & West) Type SAR-1 to 3	40	02-Aug-19A	18-Sep-19
515	Cell 14/15 Parapet (East & West) Type SAR-4	18	19-Sep-19	11-Oct-19
516	SAR Parapet (Middle) Type SAR-5	30	12-Oct-19	15-Nov-19
517	De-mobilizaiton	13	16-Nov-19	30-Nov-19
518	**Sign Gantry**			
519	Procurement & Fabrication of Sign Gantry ML03 side	28	05-Dec-19*	09-Jan-20
520	Delivery of Sign Gantry ML03 side	1	10-Jan-20	10-Jan-20
521	Installation of Sign Gantry ML03 side	1	11-Jan-20	11-Jan-20
522	Procurement & Fabrication of Sign Gantry ML02 side	37	18-Dec-19*	18-Feb-20
523	Installation of Sign Gantry Beam ML02 side	0	19-Feb-20	19-Feb-20
524	Installation of Sign Gantry Beam ML03 side	0	20-Feb-20	20-Feb-20
525	**Southern Landfall - Surface**			
526	[KD-3d] - EOTO 1-30 Current Date	0		08-Feb-20*
527	[KD-3d] - DBJV Forecast (01Sep19)	0		08-Feb-20
528	[KD-3c] - EOTO 1-30 Current Date	0		14-May-20*
529	[KD-3c] - DBJV Forecast (01Sep19)	0		01-Sep-19
530	**HKBCF Seawall Modification (schedule TBC)**			
531	HKBCF Vertical Seawall - place Armour Rock	81	26-Aug-19A	30-Nov-19
532	**UU / At-grade works**			
533	**South Road & Drain**			
534	**South Ventilation Building - Provision for FSI**			
535	**Requirement**			
536	SVB - FNO completion - DBJV Estimation	0		06-Feb-20
537	SVB - Water Connection - DBJV Estimation	0		07-Feb-20
538	SVB - EVA provision - DBJV Estimation	0		20-Feb-20
539	SVB - FSI - DBJV Estimation	0		02-Mar-20
540	**CLP 11kV**			
541	CLP 11kV duct & draw pit - West - Cell 9>1	51	18-Jul-19A	16-Sep-19
542	CLP 11kV duct & draw pit - West - Cell 1>SVS	24	17-Sep-19	16-Oct-19
543	CLP 11kV duct & draw pit - SVS / SVB	24	17-Oct-19	13-Nov-19
544	**Drainage**			
545	Drainage & outfall connection - West - SVS / SVB	30	20-Aug-19A	24-Sep-19
546	Drainage & outfall connection - West - Cell 1>SVS	30	25-Sep-19	31-Oct-19
547	Drainage & outfall connection - West - SAR>Cell 9	30	01-Nov-19	05-Dec-19
548	Drainage & outfall connection - West - Cell 9>1	30	06-Dec-19	13-Jan-20
549	**Watermain**			
550	Watermain - West - SVS/SVB	24	02-Oct-19*	30-Oct-19
551	Watermain - West - Cell 1>SVS	18	01-Nov-19	21-Nov-19
552	Watermain - West - SAR>Cell 9	24	22-Nov-19	19-Dec-19
553	Watermain - West - Cell 9>1	22	20-Dec-19	17-Jan-20
554	Watermain - Connection	13	18-Jan-20	07-Feb-20
555	**LV/ELV**			
556	LV/ELV Duct - West - SVS/SVB	24	02-Oct-19*	30-Oct-19
557	LV/ELV Duct - West - Cell 1>SVS	24	31-Oct-19	27-Nov-19
558	LV/ELV Duct - West - Cell 9>1	24	28-Nov-19	27-Dec-19
559	LV/ELV Duct - West - SAR>Cell 9	21	28-Dec-19	22-Jan-20
560	**Provision for FNO**			
561	FNO Installation - SVS/SVB	18	02-Oct-19	23-Oct-19
562	FNO Installation - Cell 1>SVS	18	31-Oct-19	20-Nov-19
563	FNO Installation - SAR>Cell 9	21	28-Nov-19	21-Dec-19
564	FNO Installation - Cell 9>1	20	23-Dec-19	17-Jan-20
565	FNO Commisioning for SVB	13	18-Jan-20	06-Feb-20
566	**Gully / Kerb / Pavement**			
567	Gully / Kerb - West - SVS/SVB	24	24-Oct-19*	20-Nov-19
568	Gully / Kerb - West - Cell 1>SVS	24	21-Nov-19	18-Dec-19
569	Gully / Kerb - West - Cell 9>1	24	23-Dec-19	22-Jan-20
570	Gully / Kerb - West - SAR>Cell 9	9	23-Jan-20	22-Feb-20
571	Pavement - West - SVS/SVB	24	21-Nov-19	18-Dec-19
572	Pavement - West - Cell 1>SVS	24	19-Dec-19	18-Jan-20
573	Pavement - West - Cell 9>1	9	23-Jan-20	22-Feb-20
574	Pavement - West - SAR>Cell 9	23	24-Feb-20	21-Mar-20
575	**Satellite Control Building and Kiosk - Provision for FSI**			
576	**Requirement**			
577	SCB - 11kV Route Provision - DBJV Estimation	0		08-Feb-20
578	SCB - Provision for ELV / Power Cable - DBJV Estimation	0		08-Feb-20



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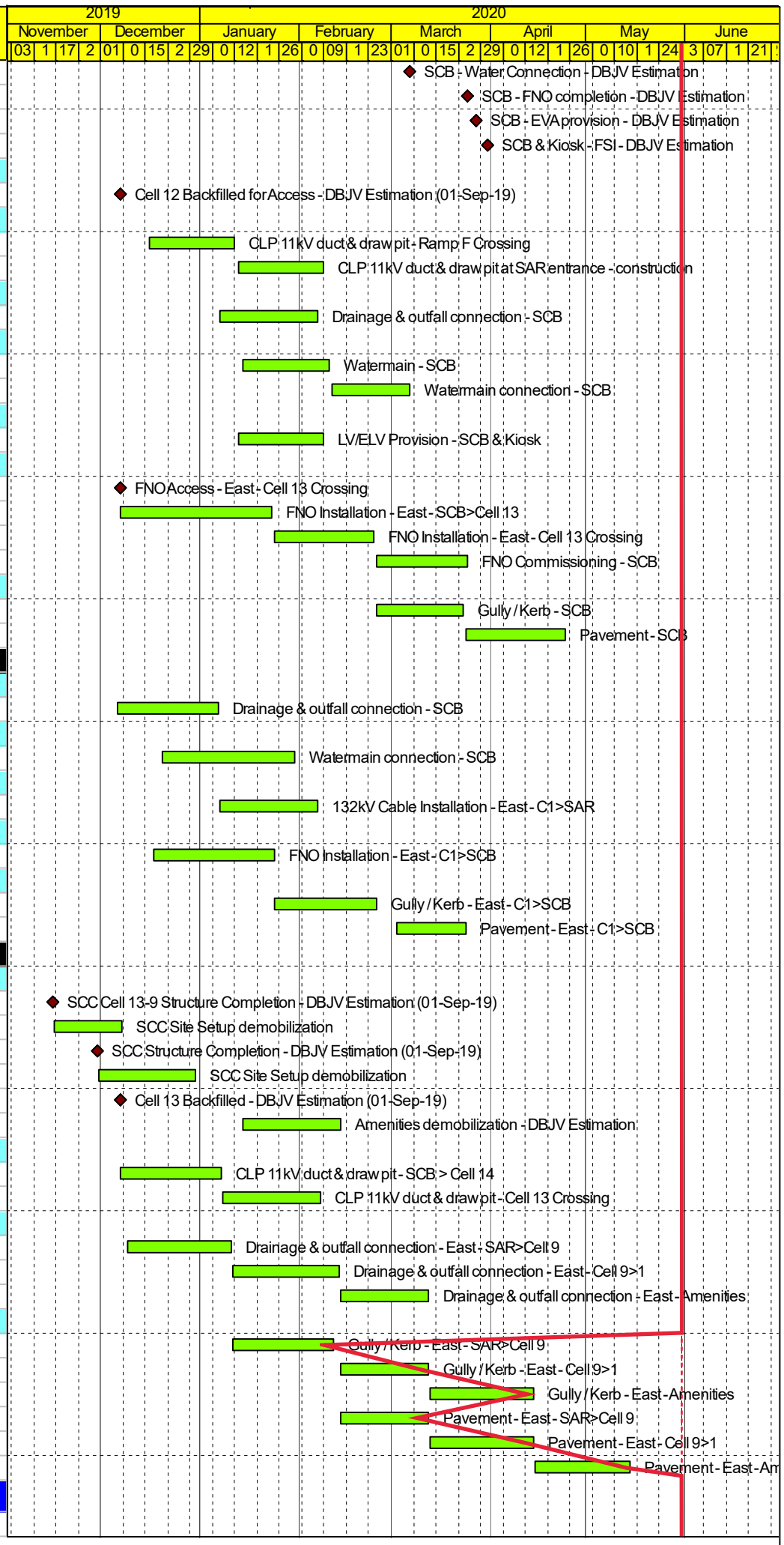
22-Jan-20	Rev.K1	SPa	WYu

#	Activity Name	Orig Dur	Start	Finish
579	SCB - Water Connection - DBJV Estimation	0		06-Mar-20
580	SCB - FNO completion - DBJV Estimation	0		24-Mar-20
581	SCB - EVA provision - DBJV Estimation	0		27-Mar-20
582	SCB & Kiosk - FSI - DBJV Estimation	0		31-Mar-20
583	**Interface Activities**			
584	Cell 12 Backfilled for Access - DBJV Estimation (01-Sep-19)	0		07-Dec-19*
585	**CLP 11kV**			
586	CLP 11kV duct & draw pit - Ramp F Crossing	21	16-Dec-19*	11-Jan-20
587	CLP 11kV duct & draw pit at SAR entrance - construction	18	13-Jan-20	08-Feb-20
588	**Drainage**			
589	Drainage & outfall connection - SCB	23	07-Jan-20	06-Feb-20
590	**Watermain**			
591	Watermain - SCB	17	14-Jan-20	10-Feb-20
592	Watermain connection - SCB	10	11-Feb-20	06-Mar-20
593	**LV/ELV**			
594	LV/ELV Provision - SCB & Kiosk	18	13-Jan-20	08-Feb-20
595	**Provision for FNO**			
596	FNO Access - East - Cell 13 Crossing	0	07-Dec-19	
597	FNO Installation - East - SCB>Cell 13	38	07-Dec-19	23-Jan-20
598	FNO Installation - East - Cell 13 Crossing	8	24-Jan-20	24-Feb-20
599	FNO Commissioning - SCB	25	25-Feb-20	24-Mar-20
600	**Gully / Kerb / Pavement**			
601	Gully / Kerb - SCB	24	25-Feb-20	23-Mar-20
602	Pavement - SCB	24	24-Mar-20	24-Apr-20
603	**Remaining - East - SCB to C1**			
604	**Drainage**			
605	Drainage & outfall connection - SCB	24	06-Dec-19	06-Jan-20
606	**Watermain**			
607	Watermain connection - SCB	30	20-Dec-19	30-Jan-20
608	**CLP 132kV**			
609	132kV Cable Installation - East - C1>SAR	23	07-Jan-20	06-Feb-20
610	**Provision for FNO**			
611	FNO Installation - East - C1>SCB	30	17-Dec-19	24-Jan-20
612	**Gully / Kerb / Pavement**			
613	Gully / Kerb - East - C1>SCB	8	24-Jan-20	25-Feb-20
614	Pavement - East - C1>SCB	18	02-Mar-20	24-Mar-20
615	**Remaining - East - Cell 13 to SVB**			
616	**Interface Activities**			
617	SCC Cell 13-9 Structure Completion - DBJV Estimation (01-Sep-	0		15-Nov-19
618	SCC Site Setup demobilization	19	16-Nov-19	07-Dec-19
619	SCC Structure Completion - DBJV Estimation (01-Sep-19)	0		29-Nov-19
620	SCC Site Setup demobilization	24	30-Nov-19	30-Dec-19
621	Cell 13 Backfilled - DBJV Estimation (01-Sep-19)	0		07-Dec-19*
622	Amenities demobilization - DBJV Estimation	17	14-Jan-20	14-Feb-20
623	**CLP 11kV**			
624	CLP 11kV duct & draw pit - SCB > Cell 14	24	07-Dec-19	07-Jan-20
625	CLP 11kV duct & draw pit - Cell 13 Crossing	22	08-Jan-20	07-Feb-20
626	**Drainage**			
627	Drainage & outfall connection - East - SAR>Cell 9	26	09-Dec-19	10-Jan-20
628	Drainage & outfall connection - East - Cell 9>1	19	11-Jan-20	13-Feb-20
629	Drainage & outfall connection - East - Amenities	15	14-Feb-20	12-Mar-20
630	**Gully / Kerb / Pavement**			
631	Gully / Kerb - East - SAR>Cell 9	19	11-Jan-20	11-Feb-20
632	Gully / Kerb - East - Cell 9>1	15	14-Feb-20	12-Mar-20
633	Gully / Kerb - East - Amenities	24	13-Mar-20	14-Apr-20
634	Pavement - East - SAR>Cell 9	15	14-Feb-20	12-Mar-20
635	Pavement - East - Cell 9>1	24	13-Mar-20	14-Apr-20
636	Pavement - East - Amenities	24	15-Apr-20	14-May-20
637	**As-built**			
638	NewActivity	1	02-Sep-19	02-Sep-19



Planned Bar
Planned Milestone
Key Date
Progress Milestone
Progress Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. K

Three Months Rolling Programme

Dragages · Bouygues Joint Venture 寶嘉 · 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev H	WYu	
06-Feb-18	Rev IAC	WYu	
07-Mar-18	Rev I	WYu	
04-Jun-18	Rev J	WYu	
11-Nov-19	Rev K	SPa	WYu
22-Jan-20	Rev K1	SPa	WYu

Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
Air Quality									
4.8.1	3.8	An effective watering programme of 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		✓
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		✓

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						D	C	O	
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		✓
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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						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									
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

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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	-	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 Guidelines. DASO permit conditions.		Y		✓
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		✓

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						D	C	O	
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		✓
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		✓
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		✓

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						D	C	O	
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		✓

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Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

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						D	C	O	
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 Ordinance		Y		✓
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		✓

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						D	C	O	
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	**Post-construction water quality monitoring was undertaken between 17 March 2020 and 11 April 2020.**
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		✓
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		✓

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						D	C	O	
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									
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									

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

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						D	C	O	
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		✓
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.	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	
		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; *f* Adequate ventilation; *f* Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and *f* 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		✓
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		✓

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	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 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 D3 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 - March 2020

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Mar	02-Mar	03-Mar	04-Mar	05-Mar	06-Mar	07-Mar
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
08-Mar	09-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar
	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-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
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
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar
		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-Mar	30-Mar	31-Mar				
	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 - April 2020

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Apr	02-Apr	03-Apr	04-Apr
				1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
05-Apr	06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr
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
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr		
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 Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - May 2020

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

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - March 2020

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - April 2020

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - May 2020

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

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar
8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar
15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
		ebb tide 18:14 - 21:23 flood tide 5:19 - 8:49		ebb tide 9:23 - 12:23 flood tide 13:40 - 17:10		ebb tide 10:25 - 13:55 flood tide 5:10 - 8:20
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar
		ebb tide 11:44 - 15:14 flood tide 5:56 - 9:26		ebb tide 12:34 - 16:04 flood tide 6:28 - 9:58		ebb tide 13:32 - 17:02 flood tide 7:06 - 10:36
29-Mar	30-Mar	31-Mar				
		ebb tide 15:39 - 18:09 flood tide 8:16 - 11:46				

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-Apr	2-Apr	3-Apr	4-Apr
				ebb tide 18:04 - 21:05 flood tide 6:09 - 8:53		ebb tide 9:05 - 12:23 flood tide 13:50 - 17:20
5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr
		ebb tide 10:52 - 14:22 flood tide 4:58 - 8:28		ebb tide 12:08 - 15:38 flood tide 5:59 - 9:29		ebb tide 13:35 - 17:05 flood tide 7:02 - 10:32
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr
19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
26-Apr	27-Apr	28-Apr	29-Apr	30-Apr		

Appendix F

Impact Air Quality Monitoring Results

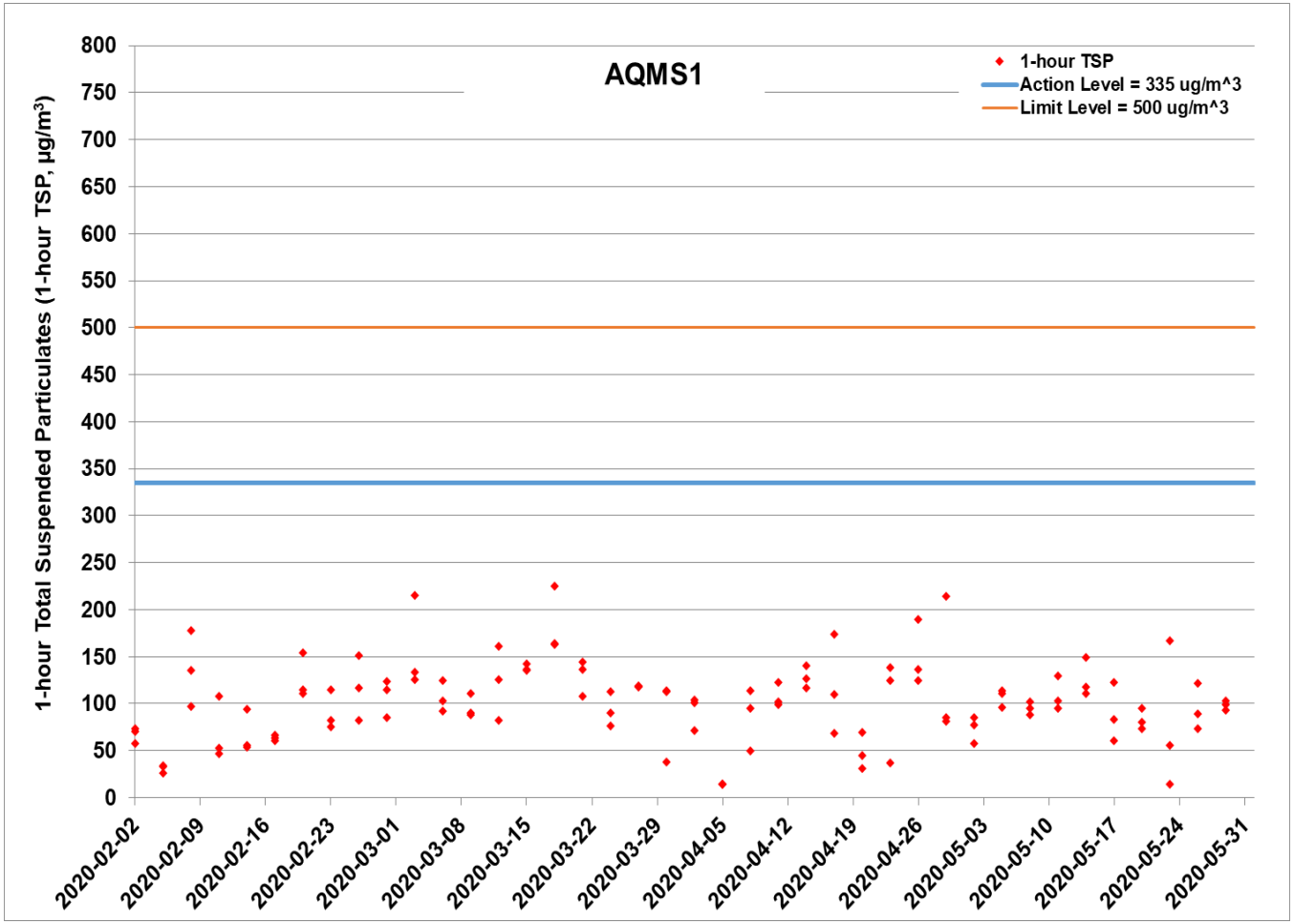


Figure F.1 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

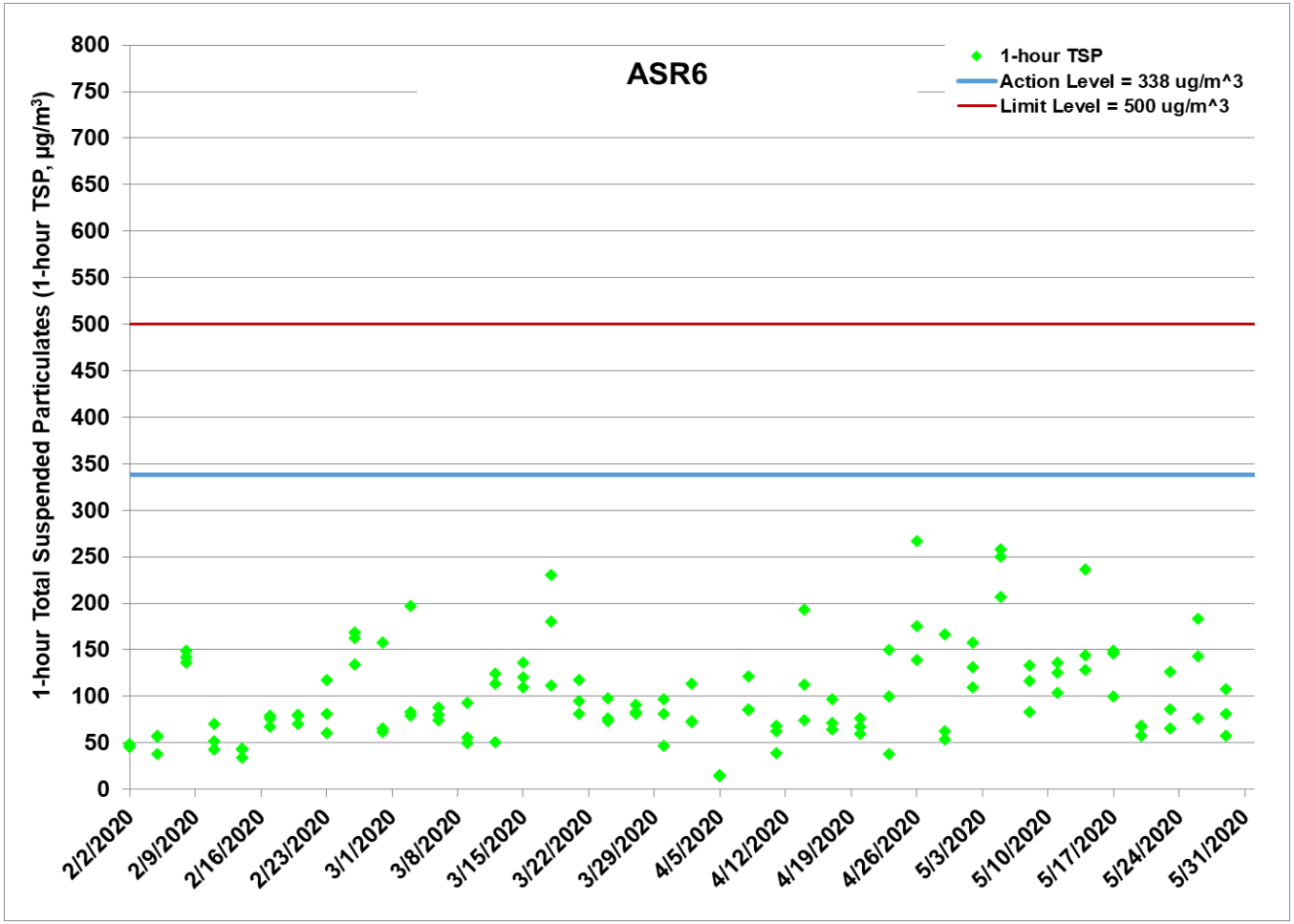


Figure F.2 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

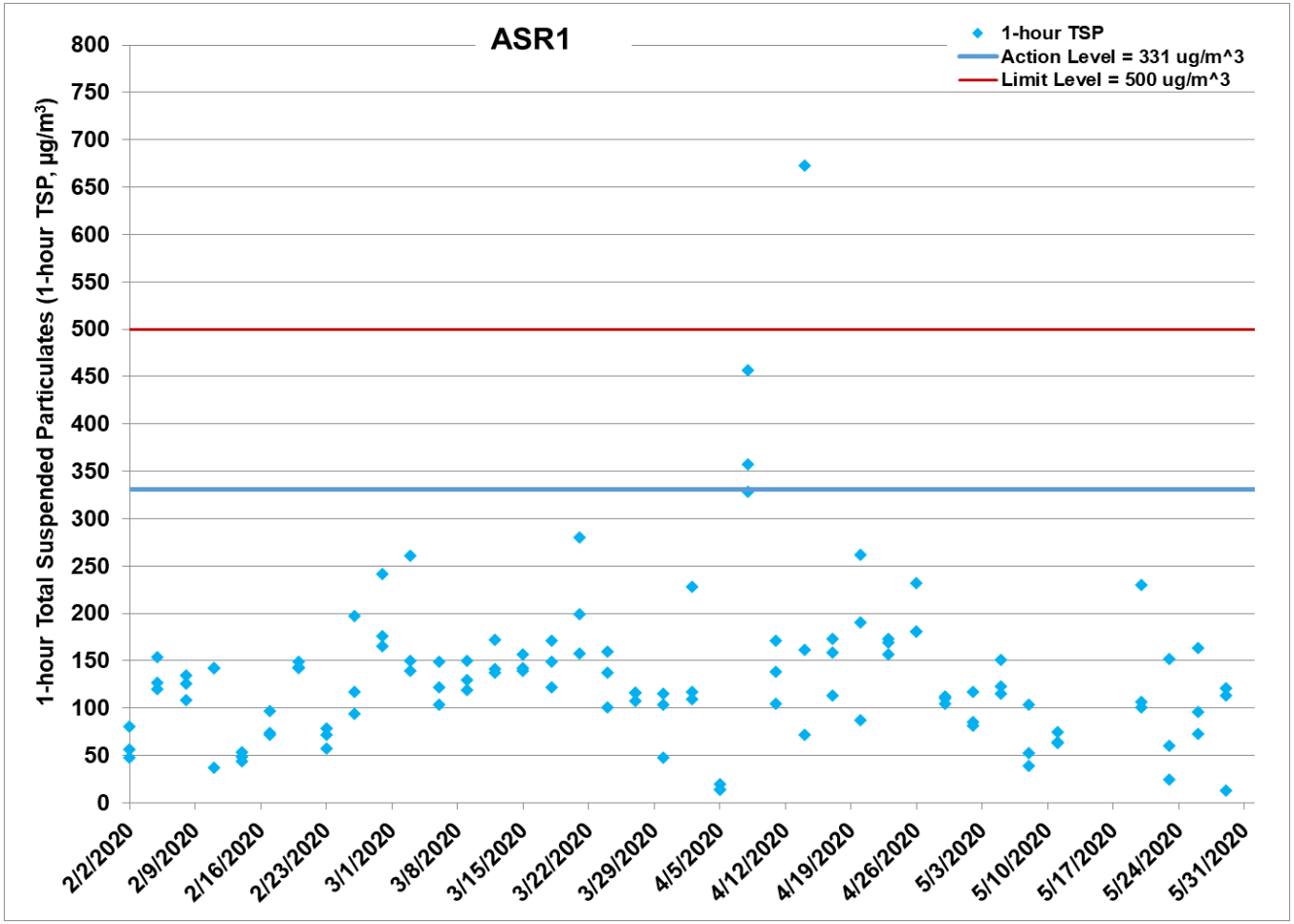


Figure F.3 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

ERM

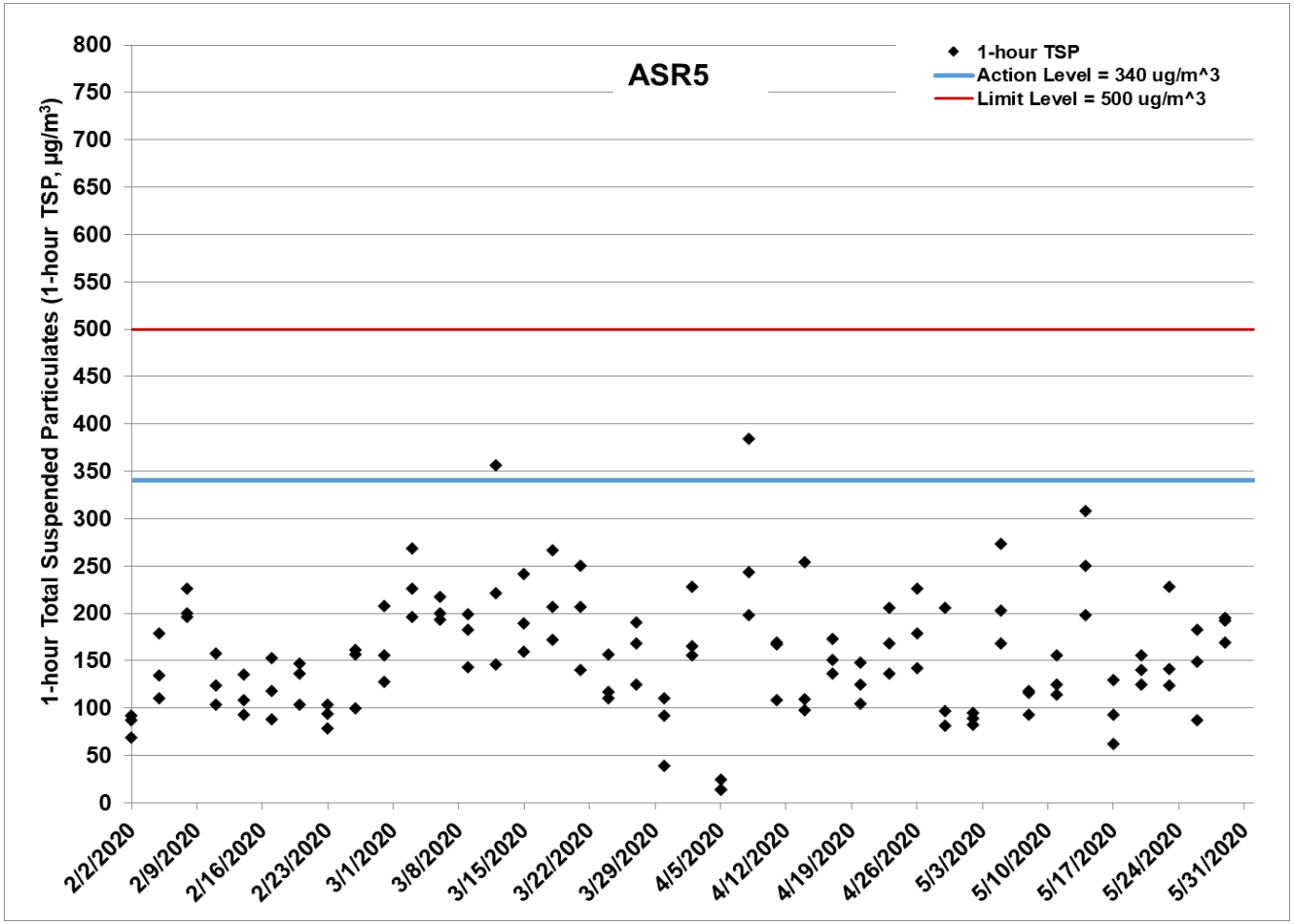


Figure F.4 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

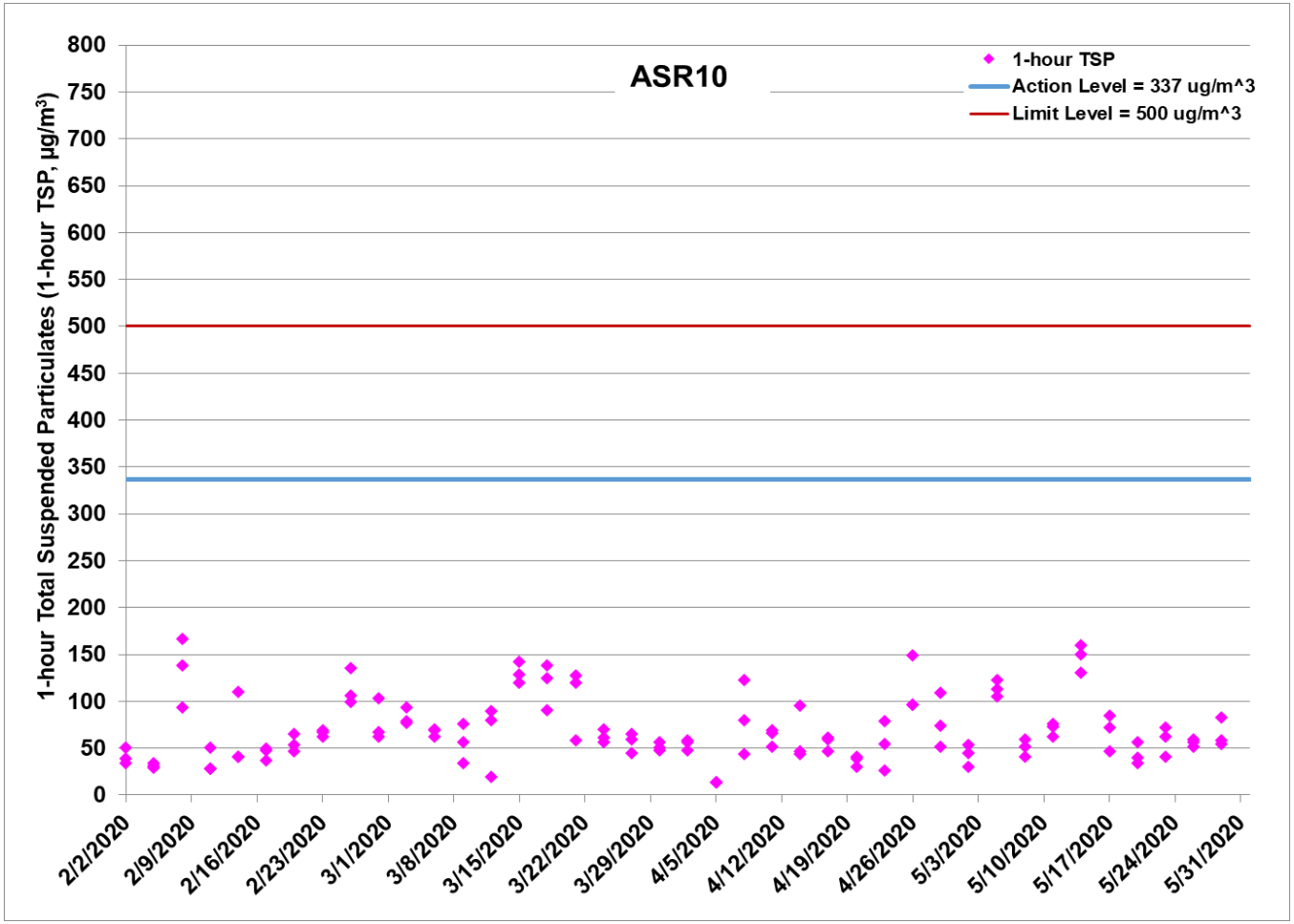


Figure F.5 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

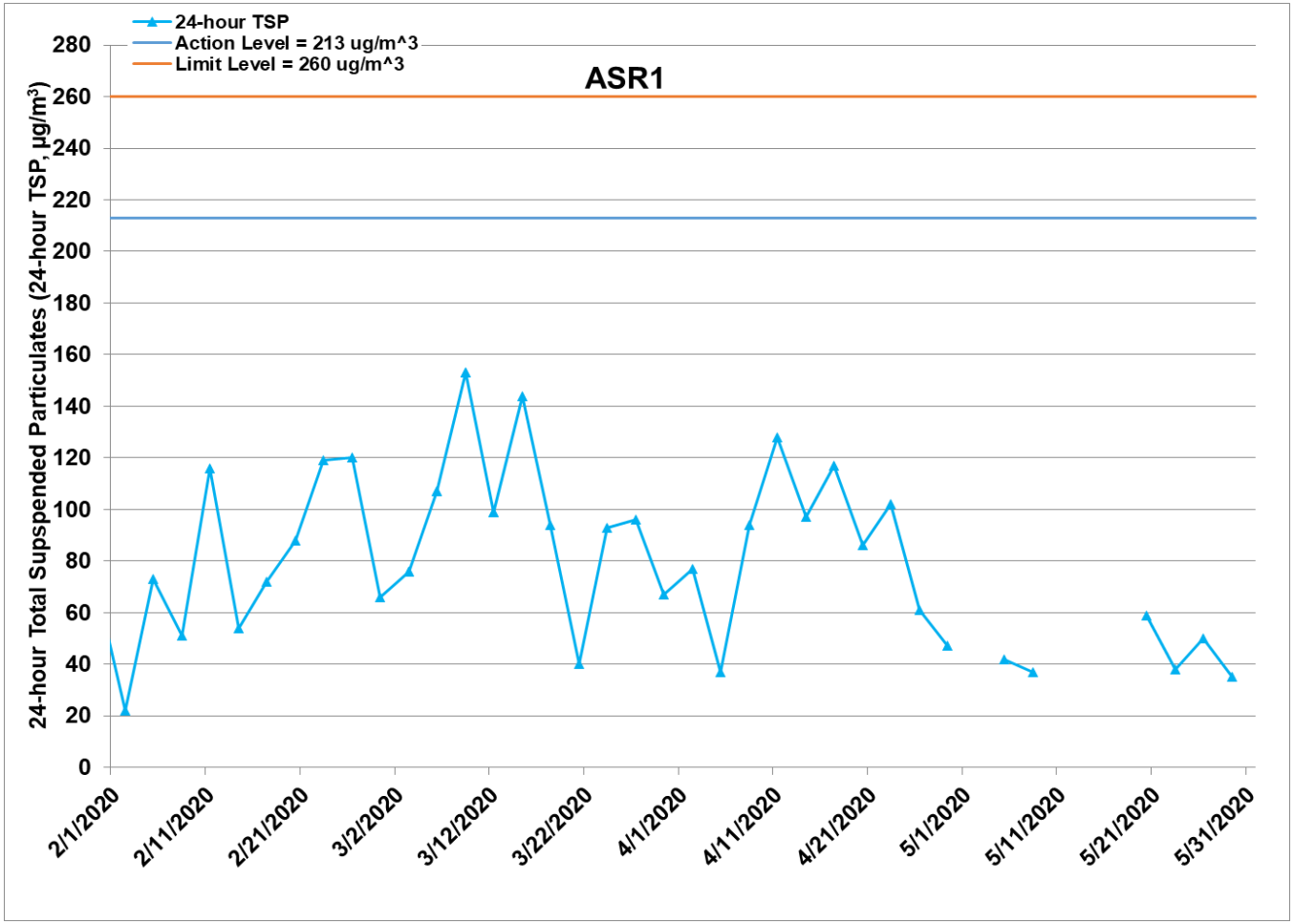


Figure F.6 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

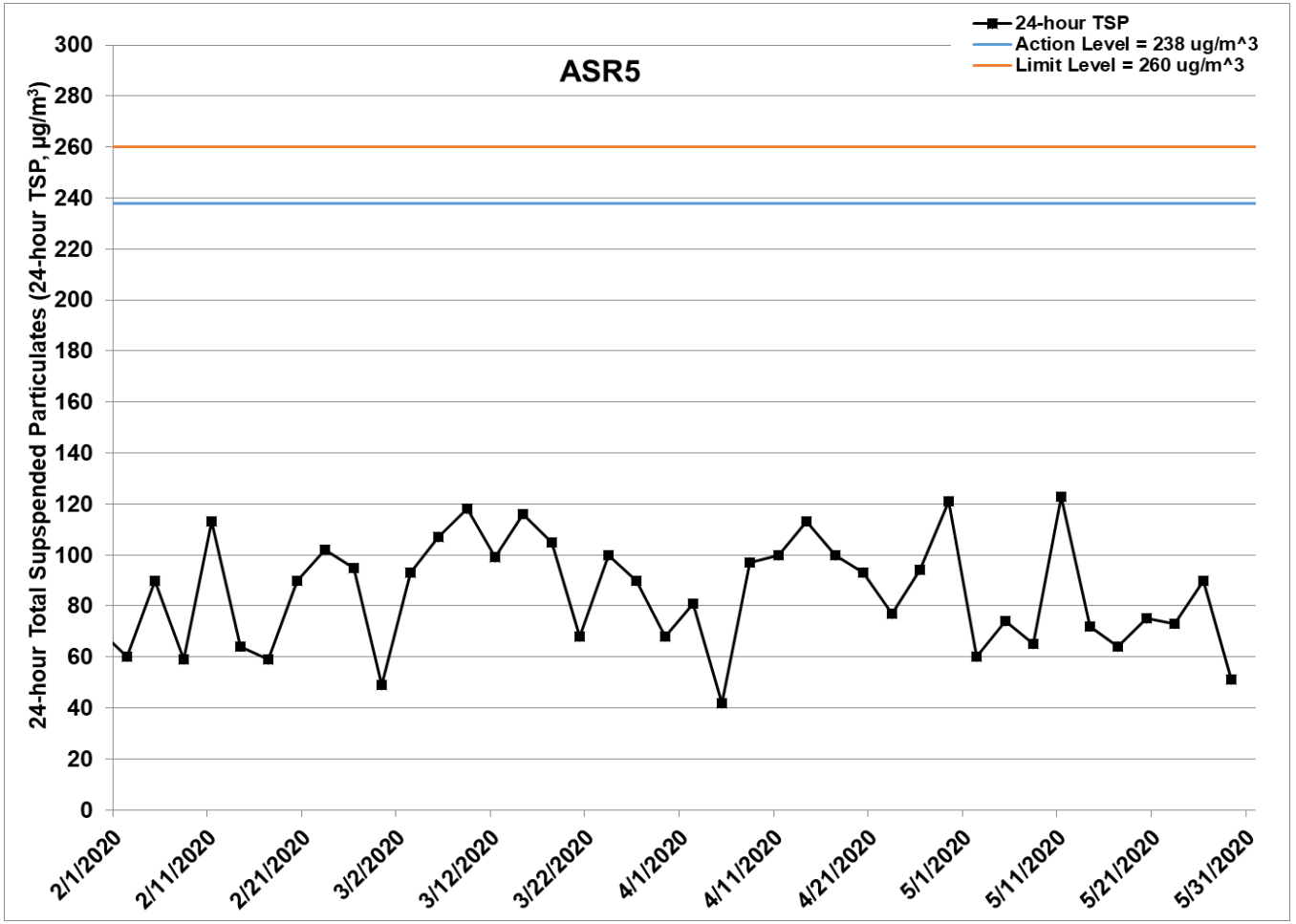


Figure F.7 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

ERM

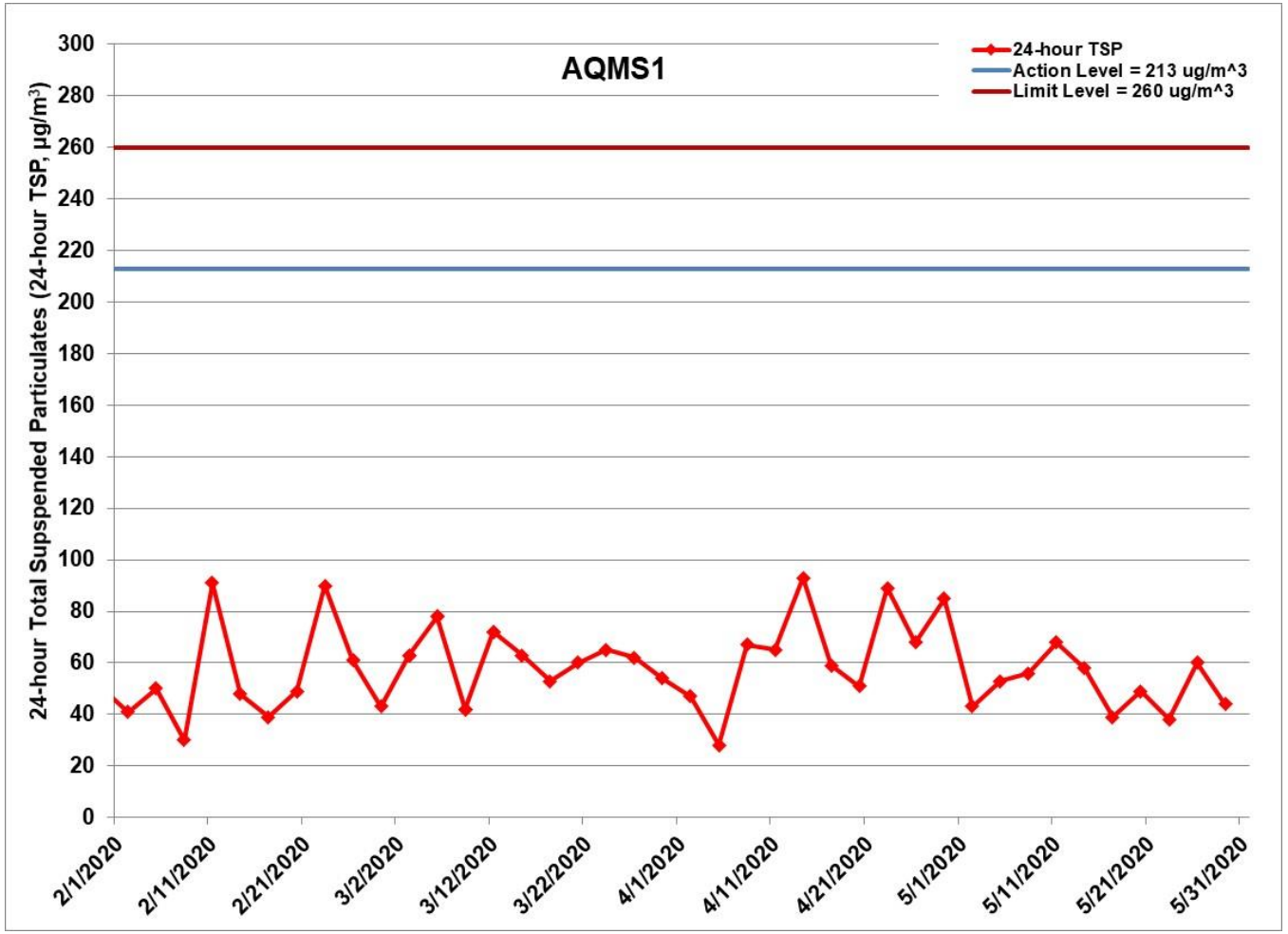


Figure F.8 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

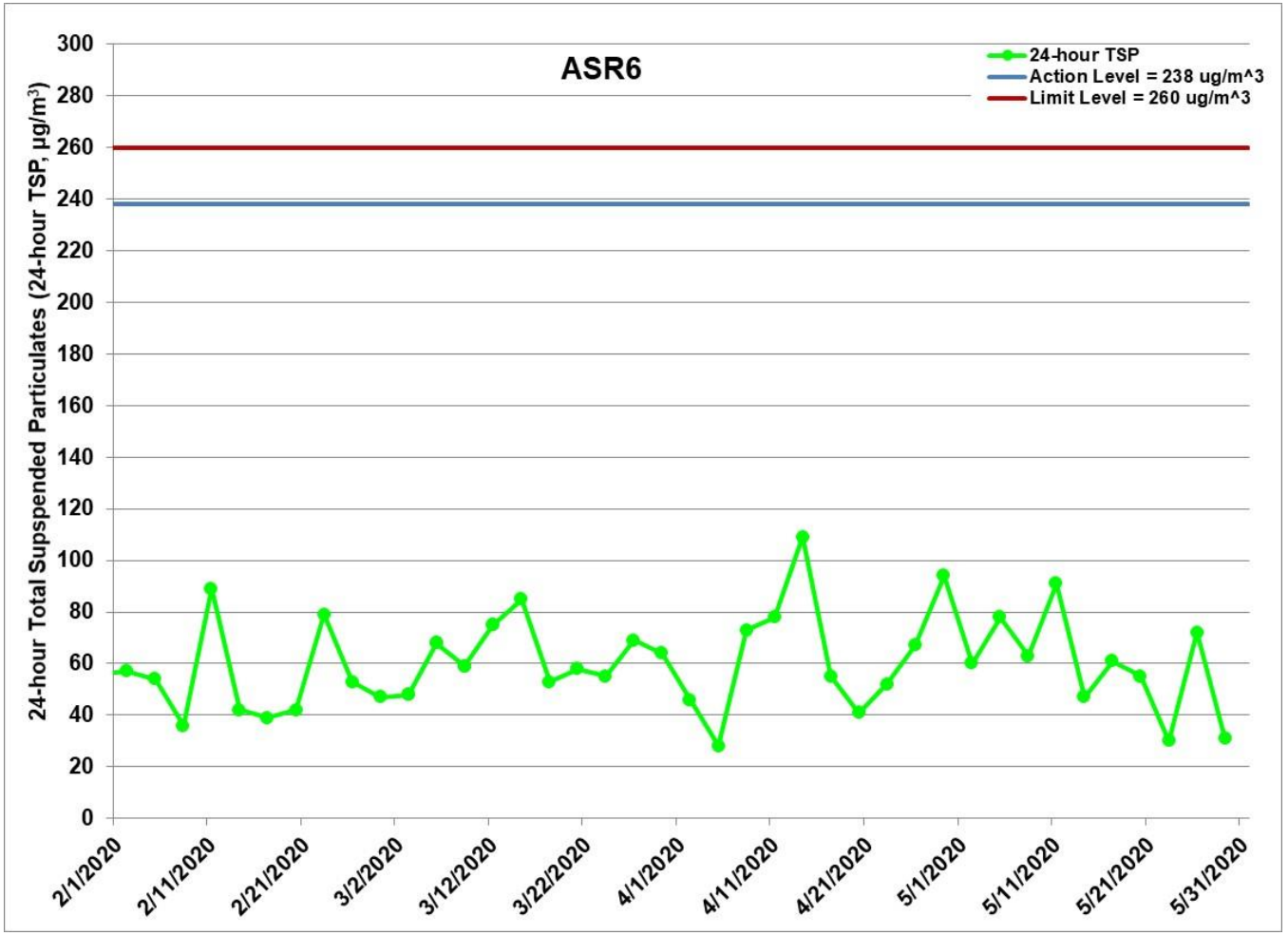


Figure F.9 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

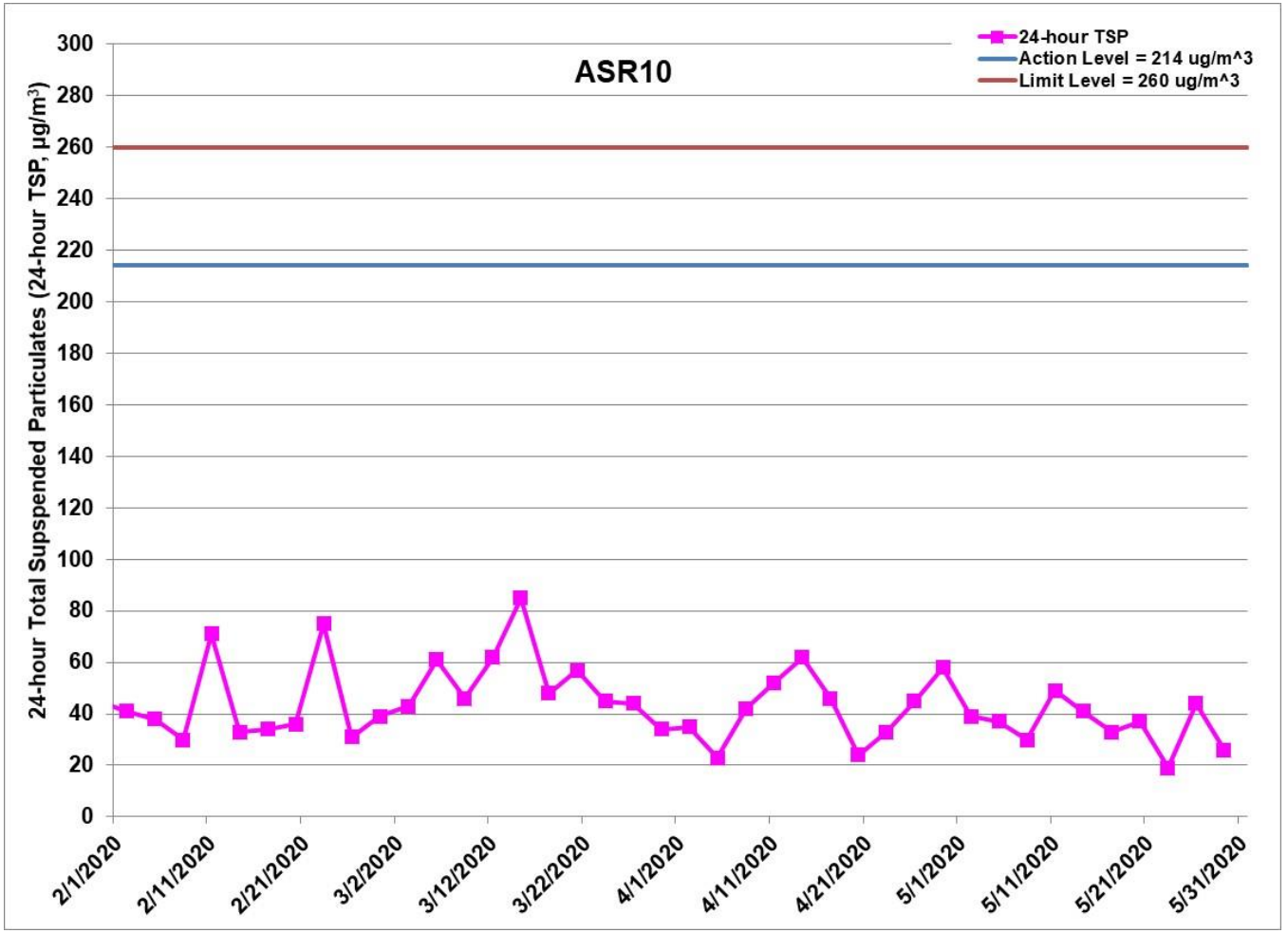


Figure F.10 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 February 2020 and 31 May 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Road and Drainage Works at Northern Landfall and Southern Landfall, UU installation at Northern Landfall and Southern Landfall and Fireboard installation in Tunnel (1/2/2020 – 31/5/2020)

Ref: 0212330_Impact AQM graphs_May 2020.xlsx

Appendix G

Post-Construction Water Quality Monitoring Results

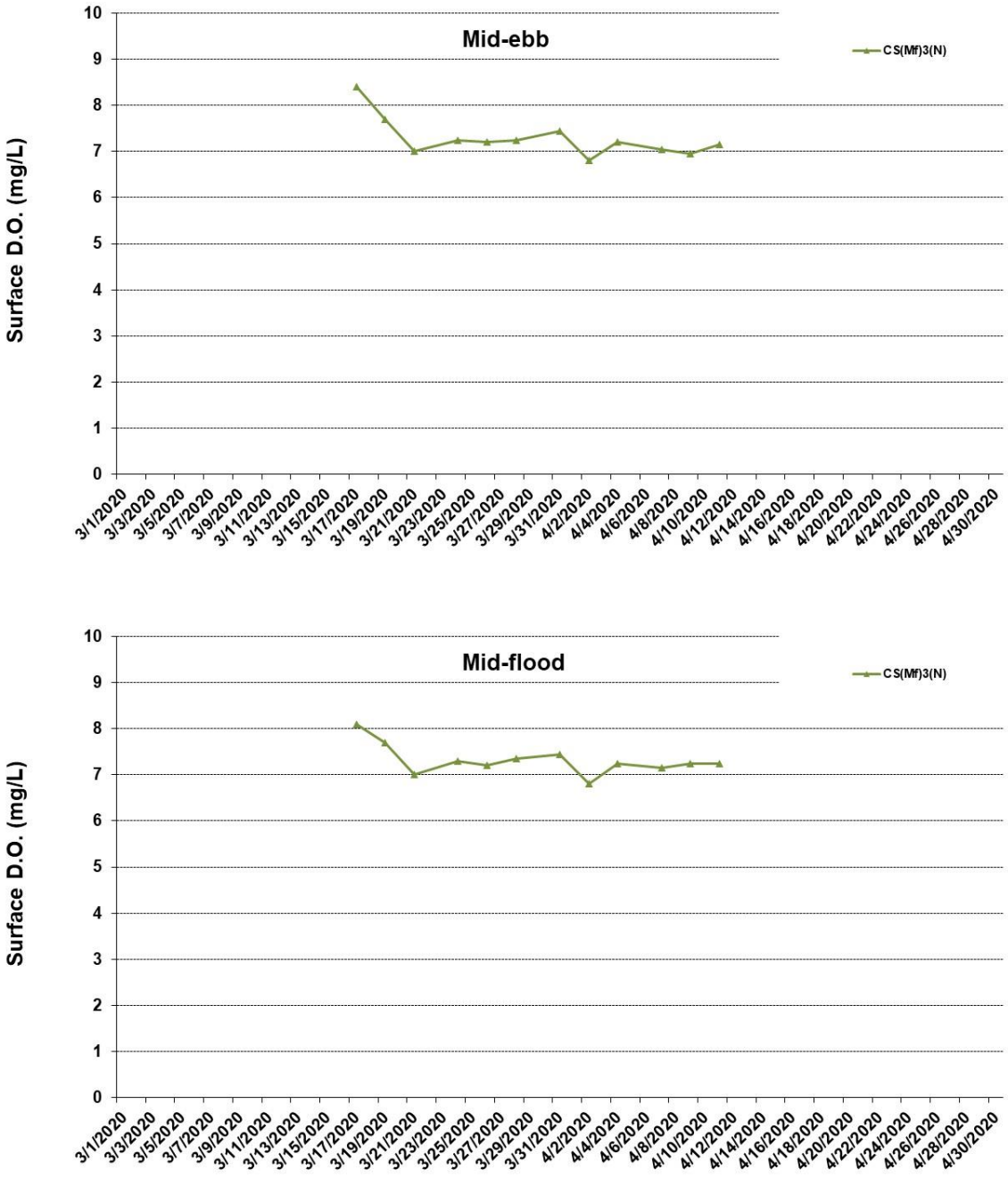


Figure G1 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

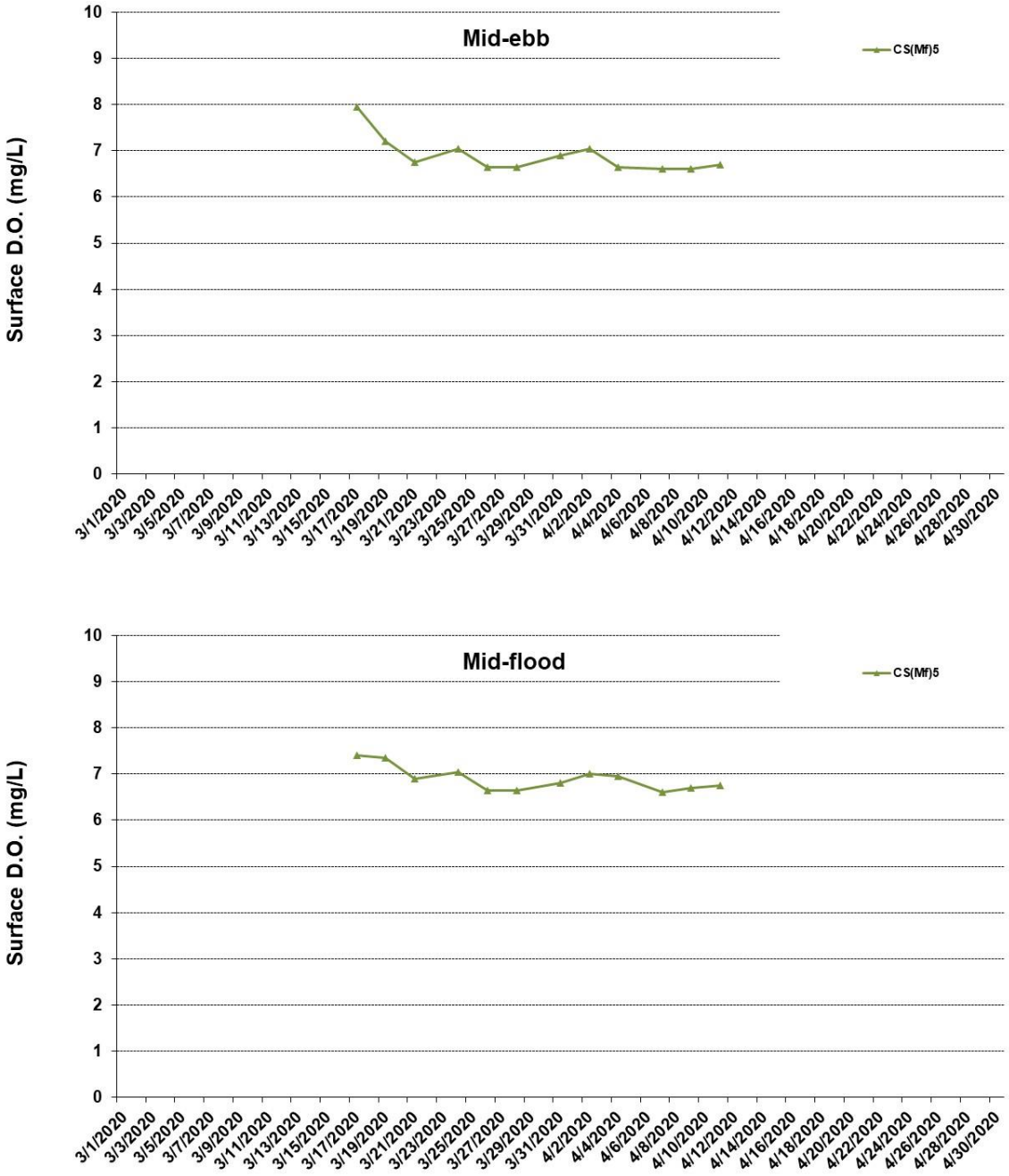


Figure G2 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

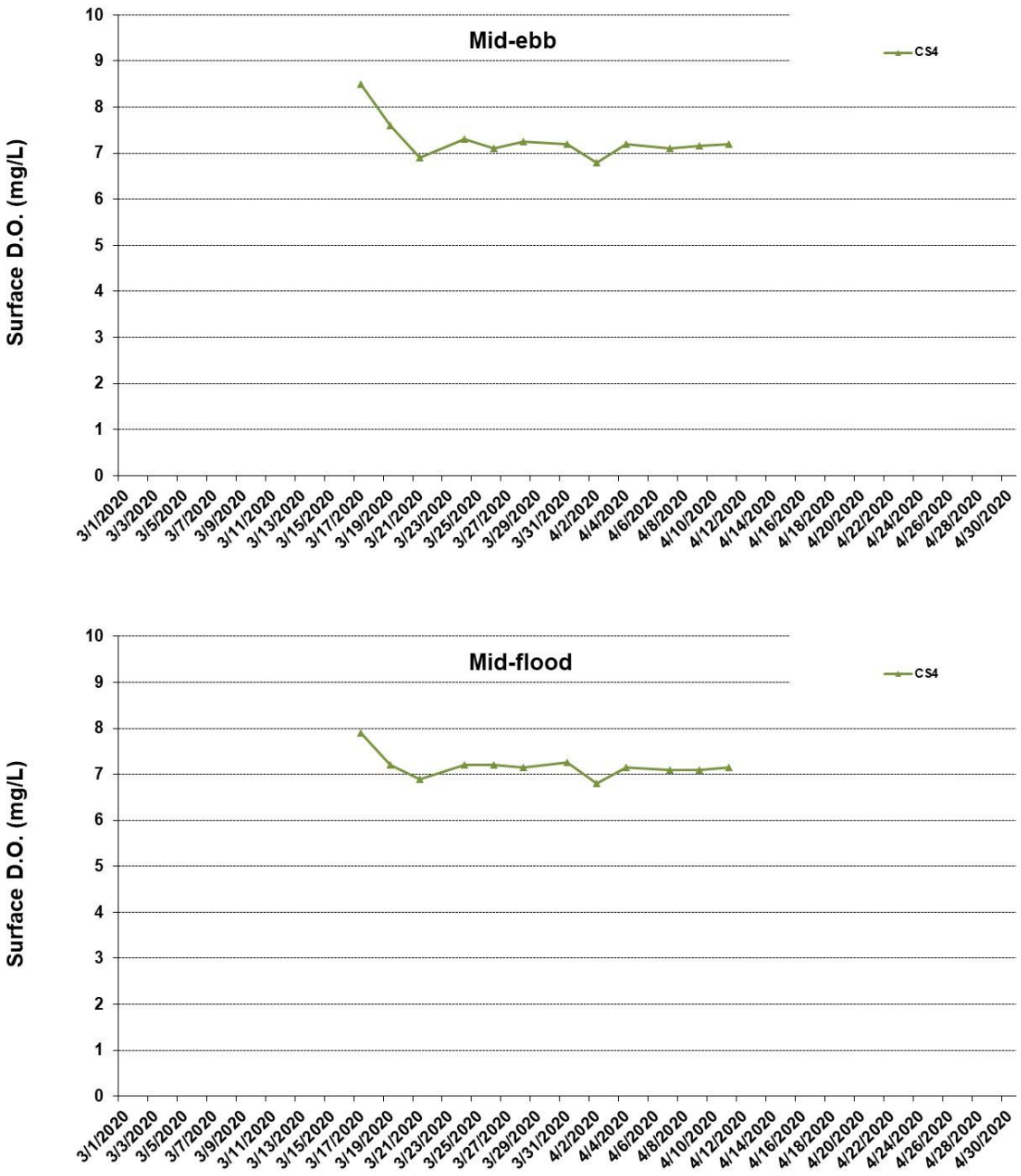


Figure G3 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at CS4. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

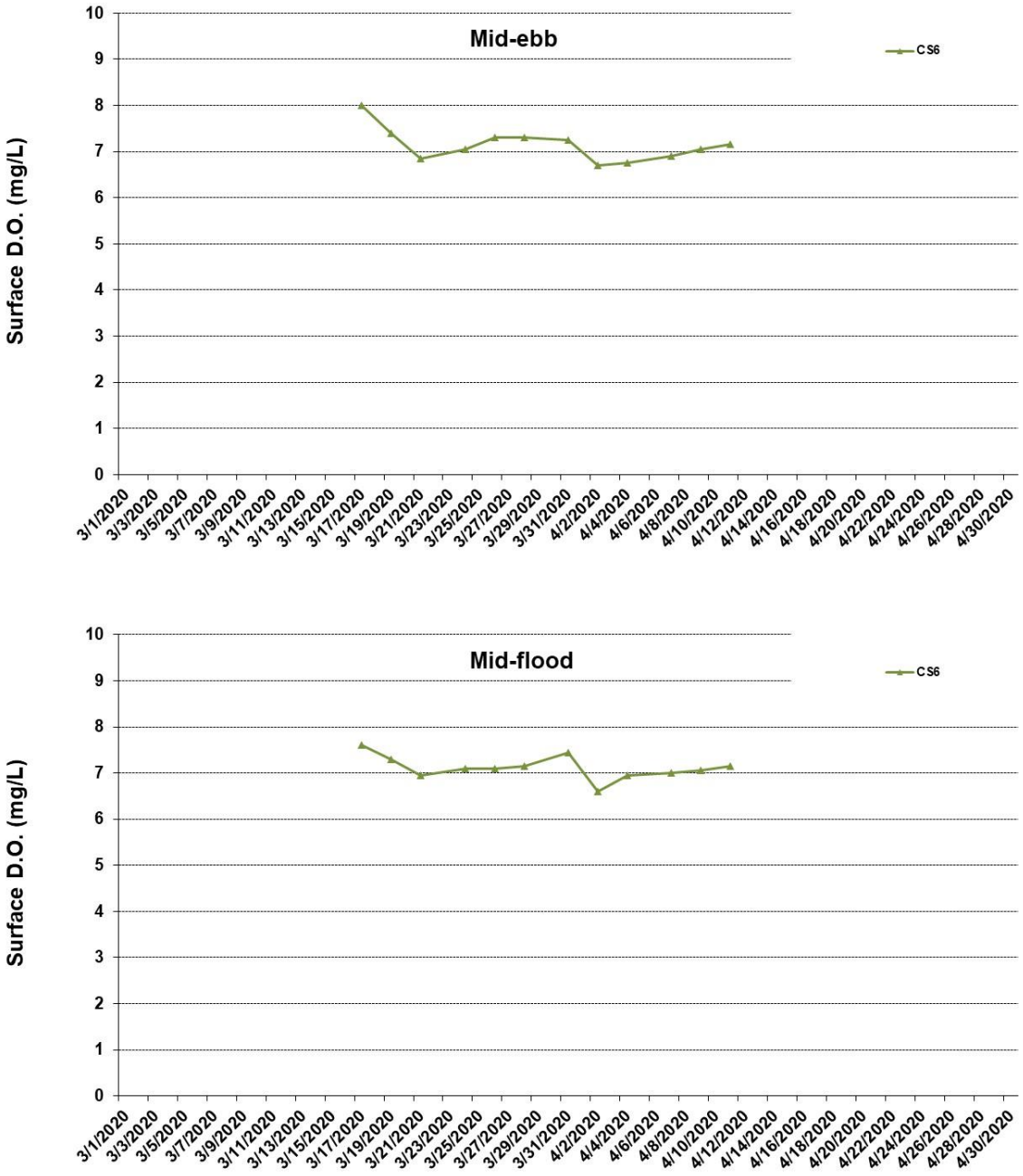


Figure G4 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at CS6. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

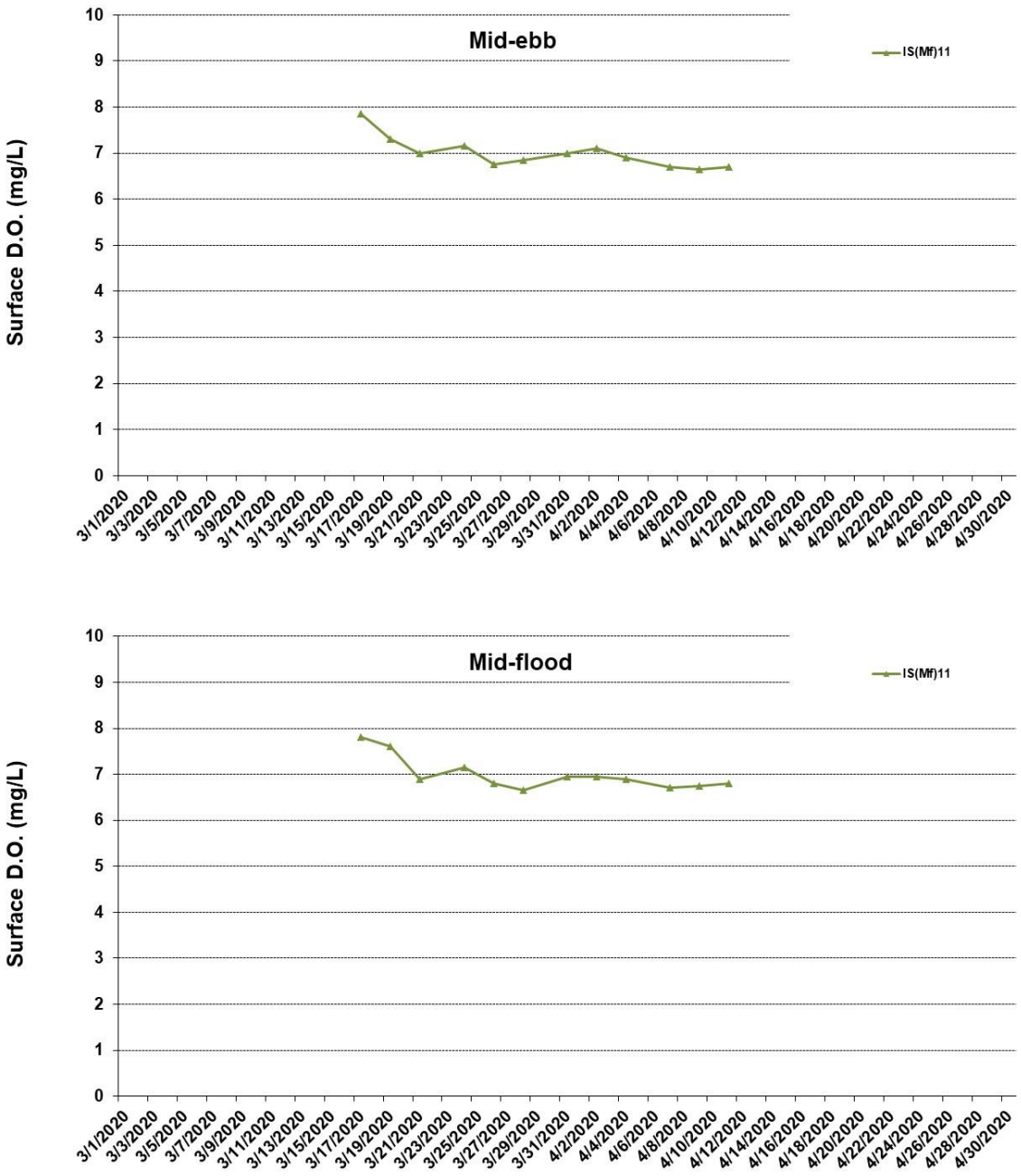


Figure G5 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

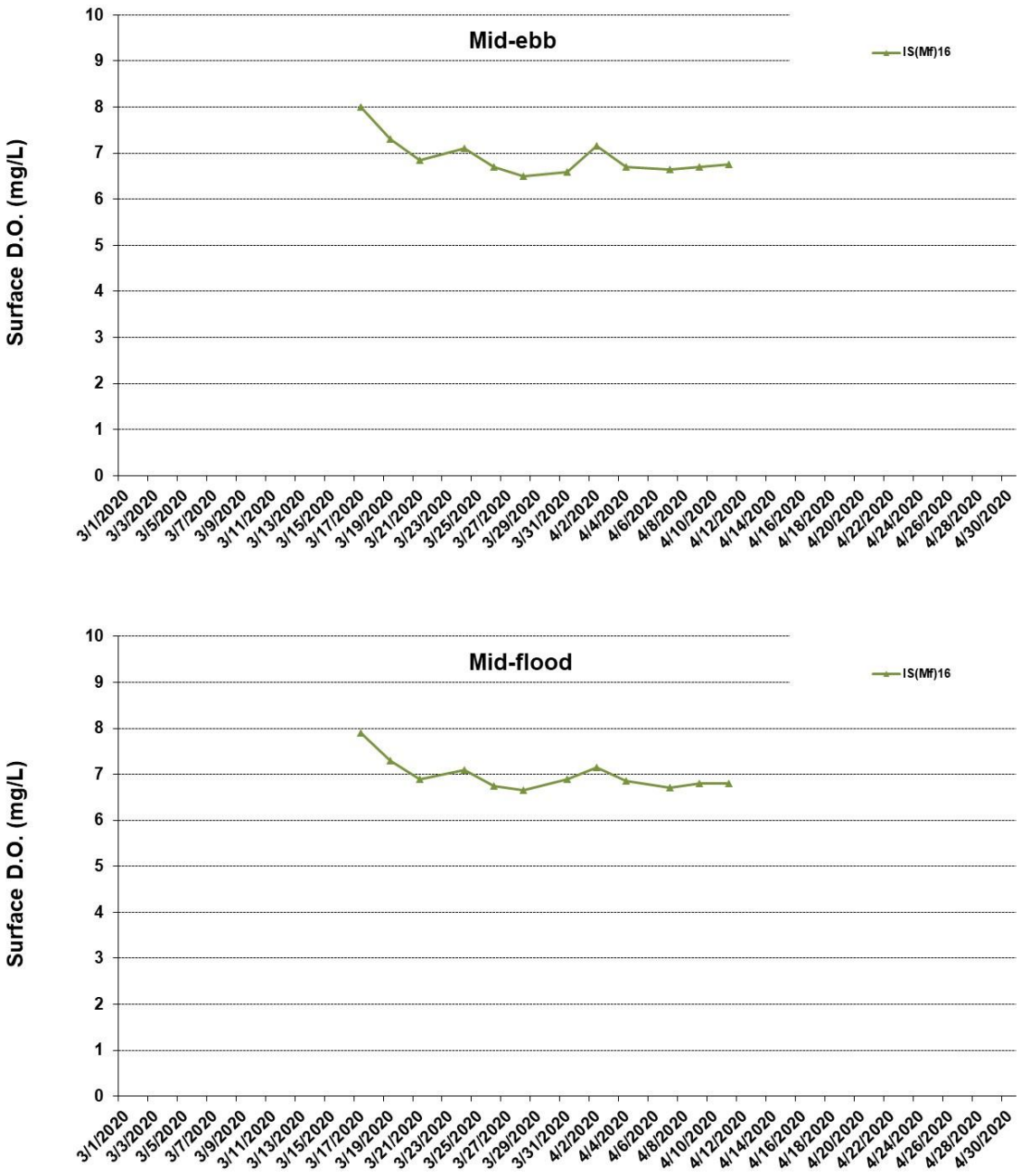
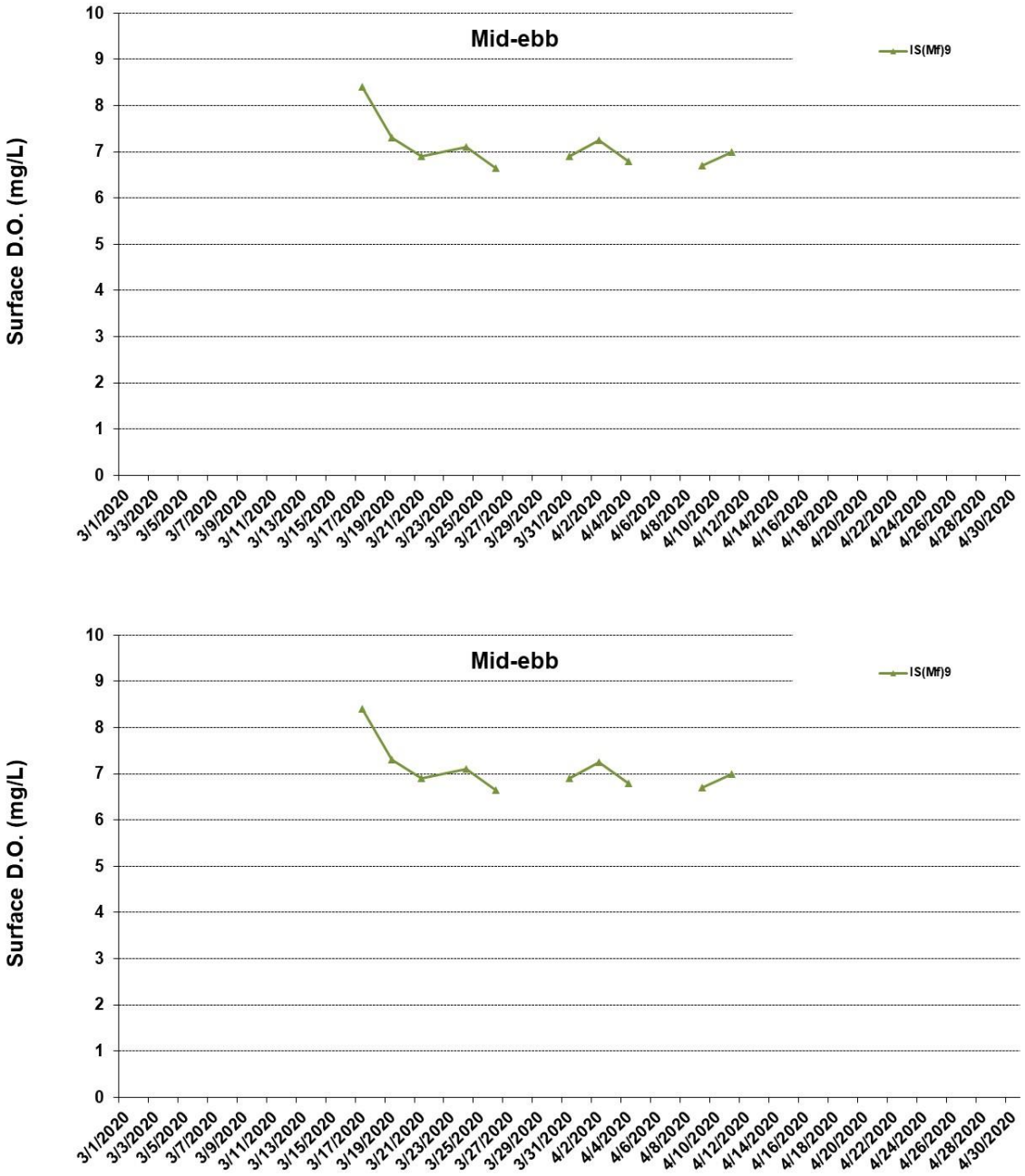


Figure G6 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



Mid-ebb
IS(Mf)9
Surface D.O. (mg/L)

Figure G7 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

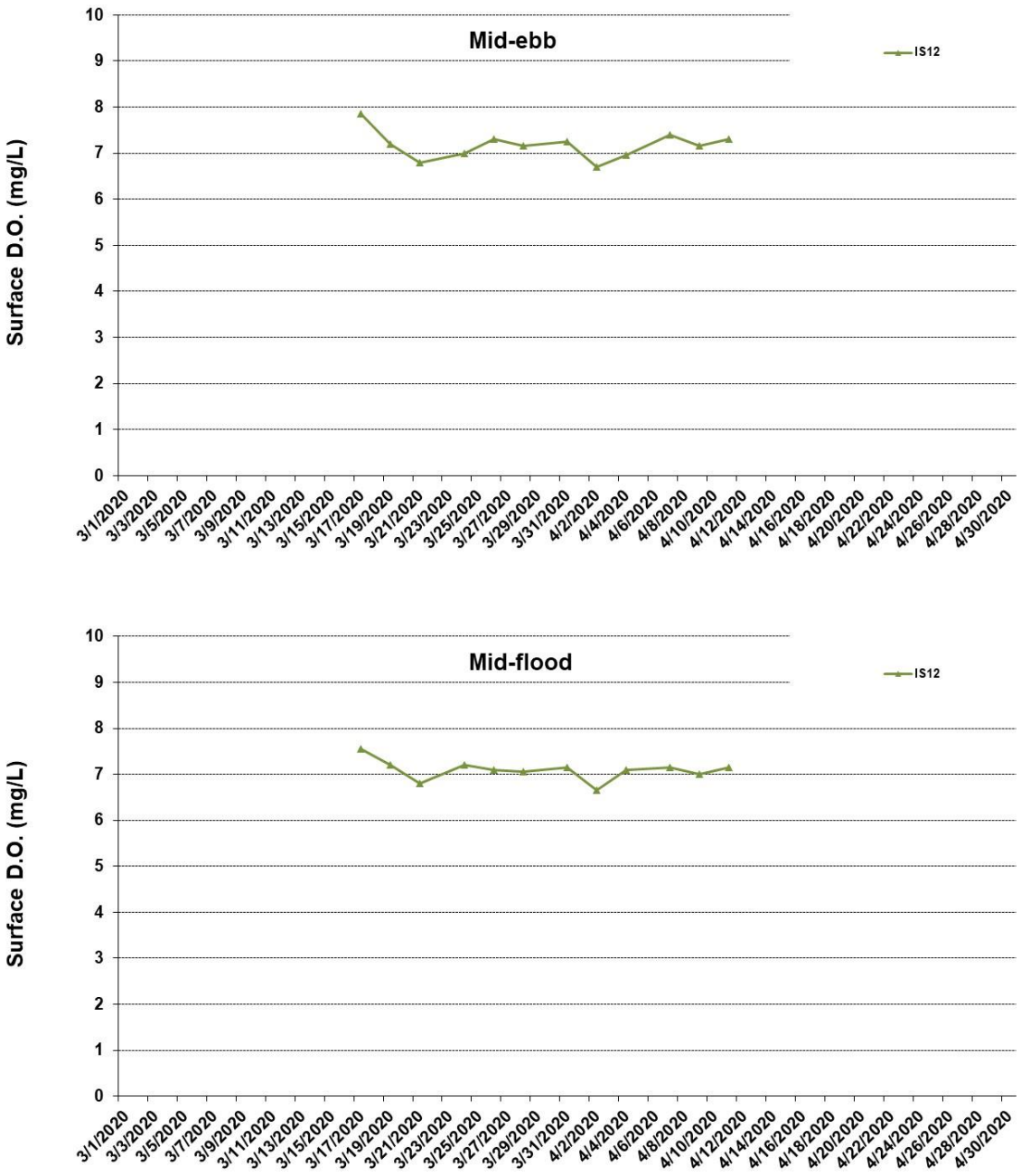


Figure G8 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS12. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

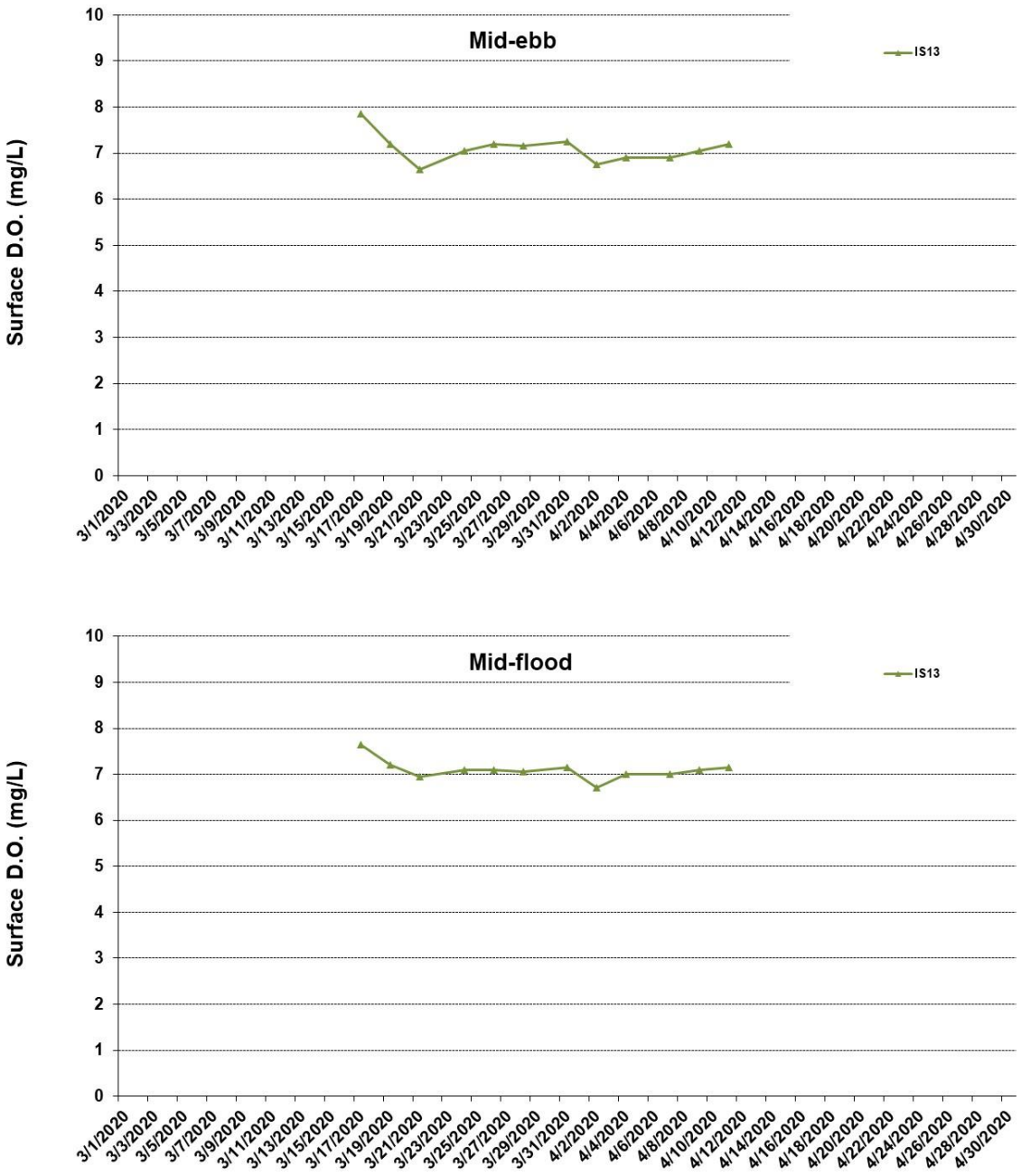


Figure G9 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS13. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

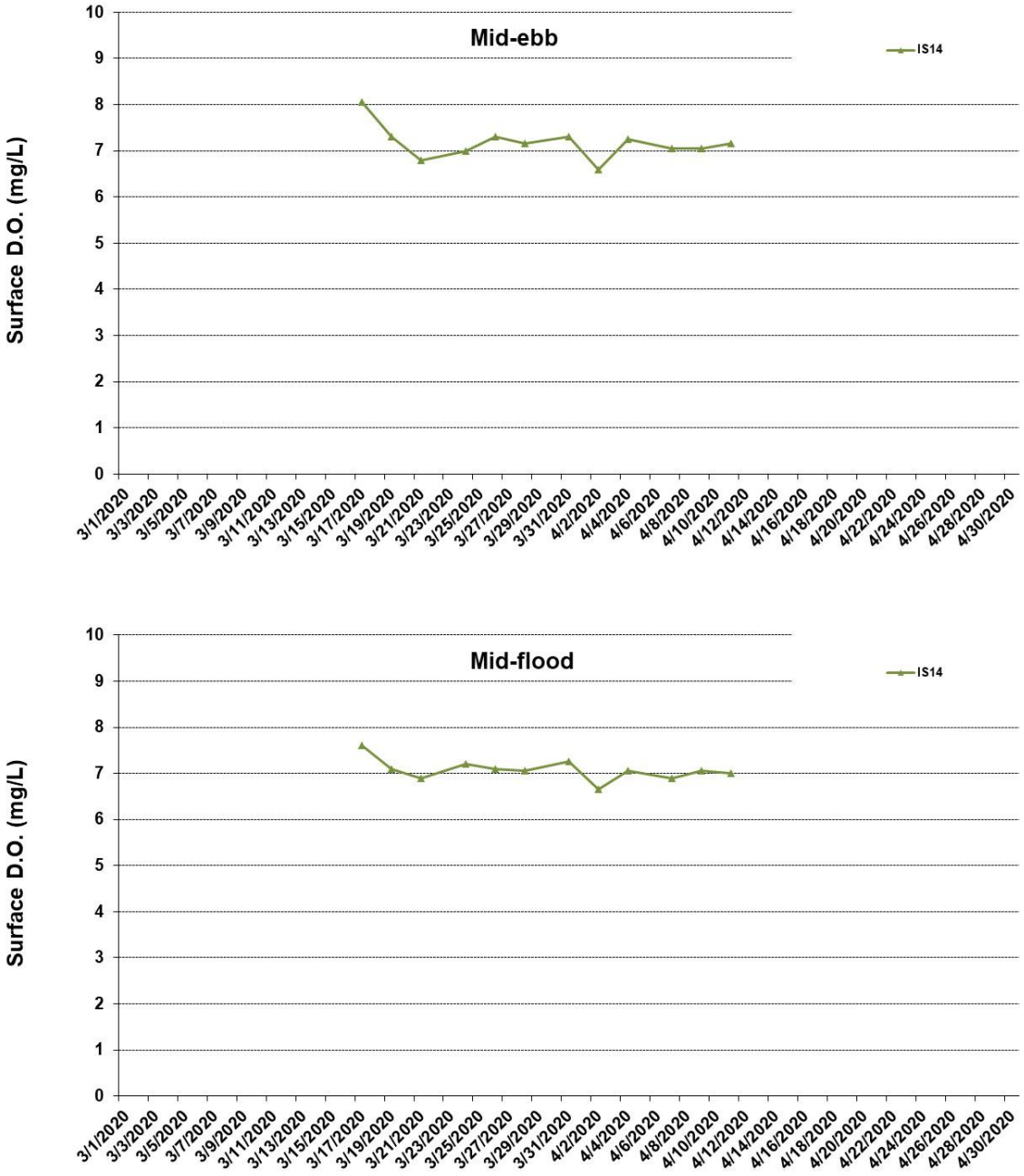
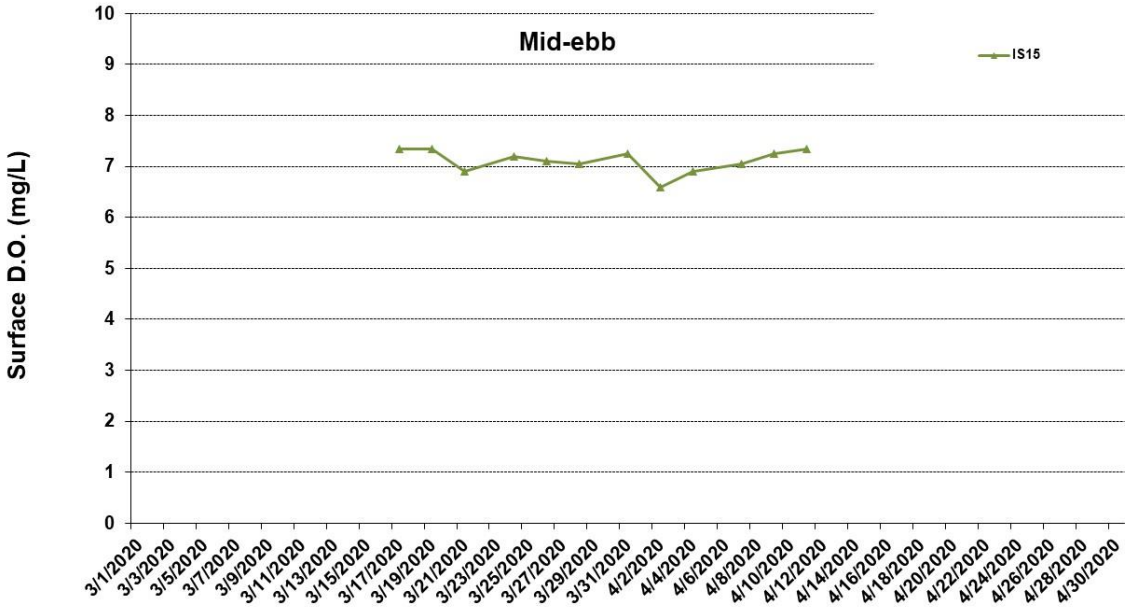


Figure G10 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS14. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



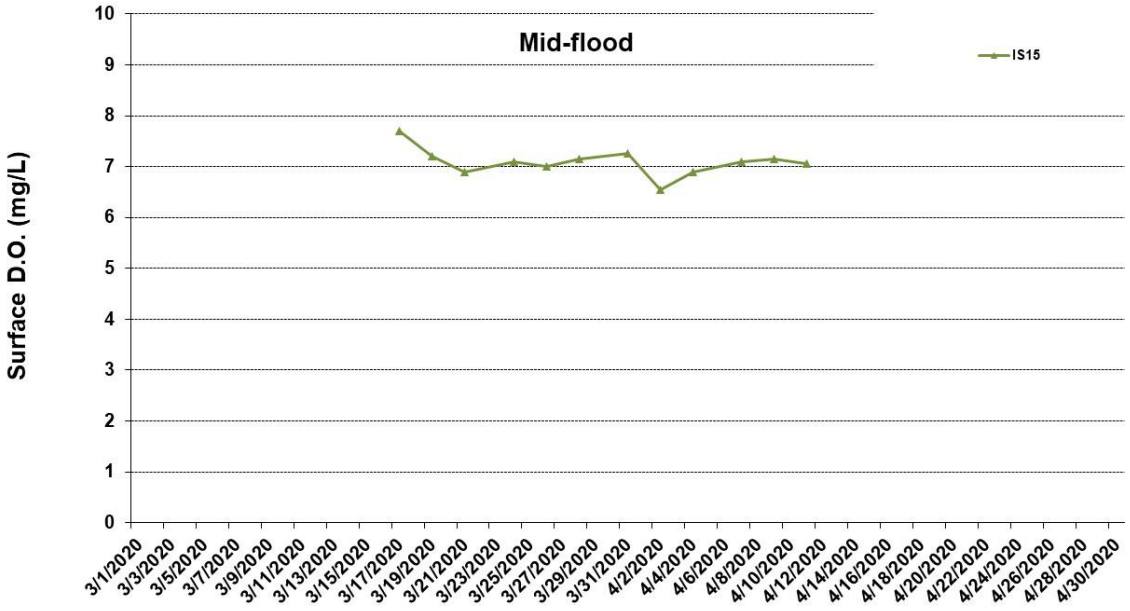


Figure G11 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS15. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

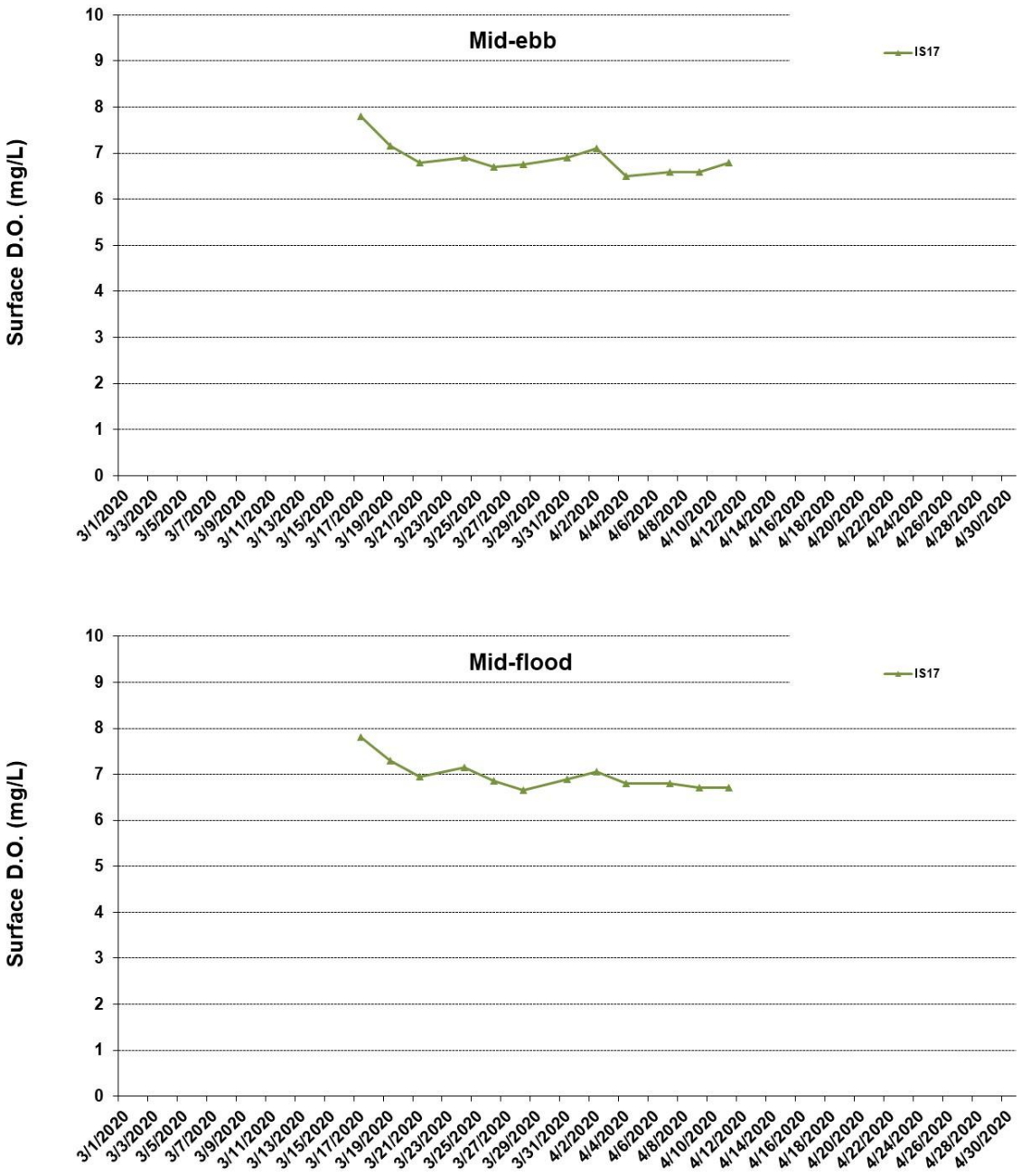
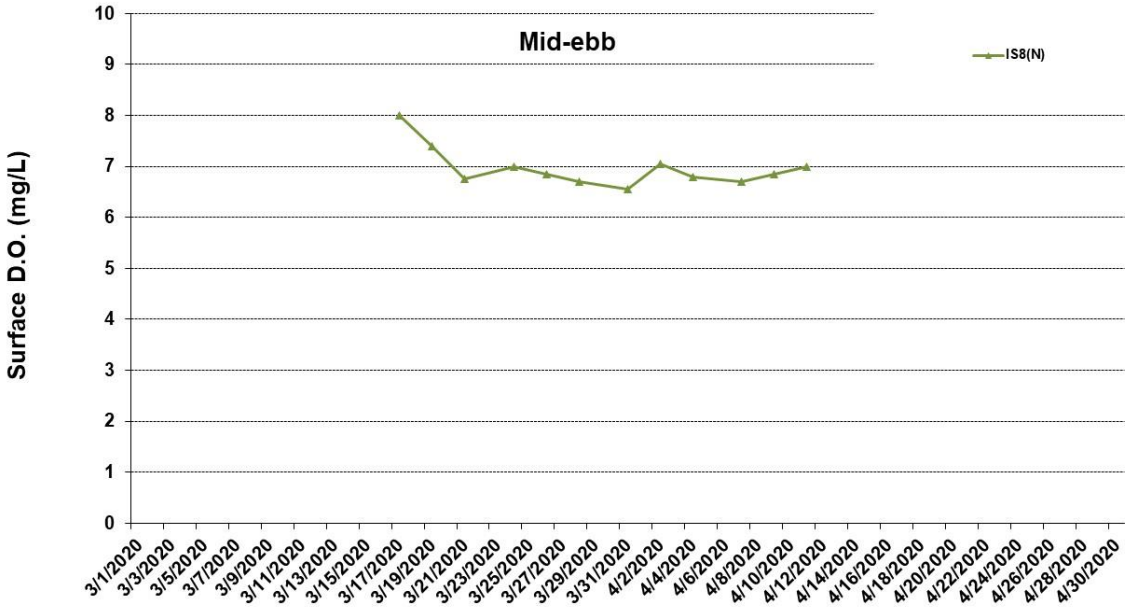


Figure G12 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



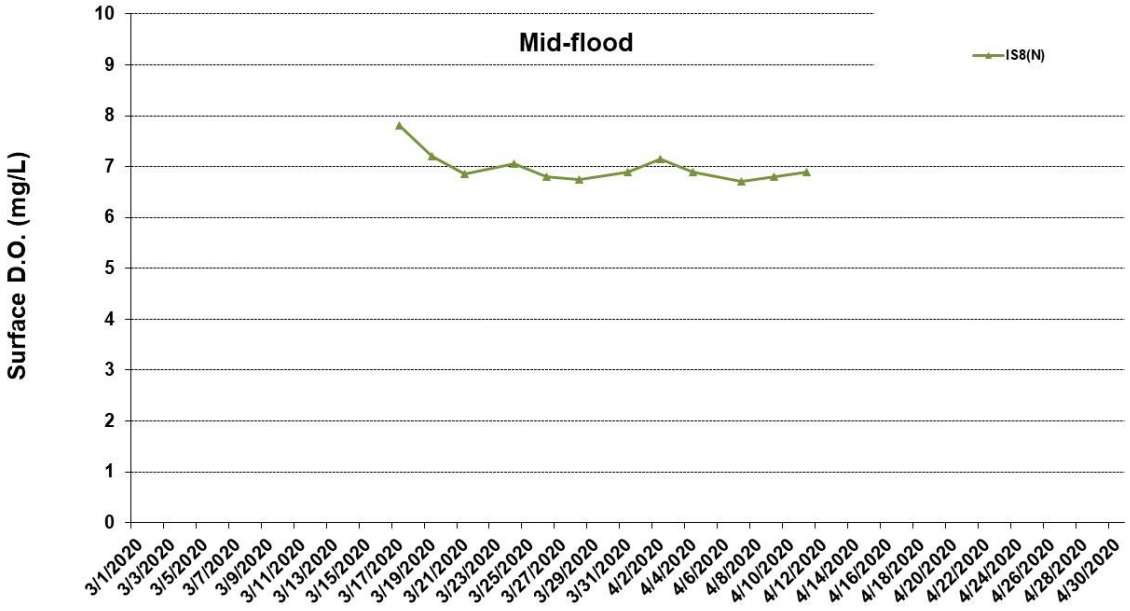
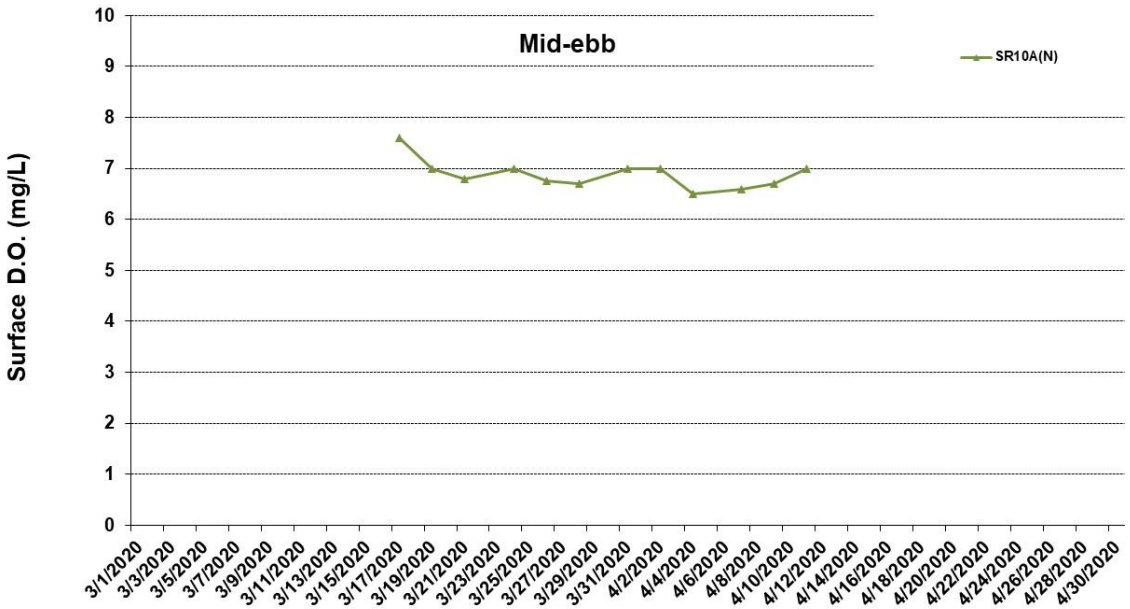


Figure G13 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



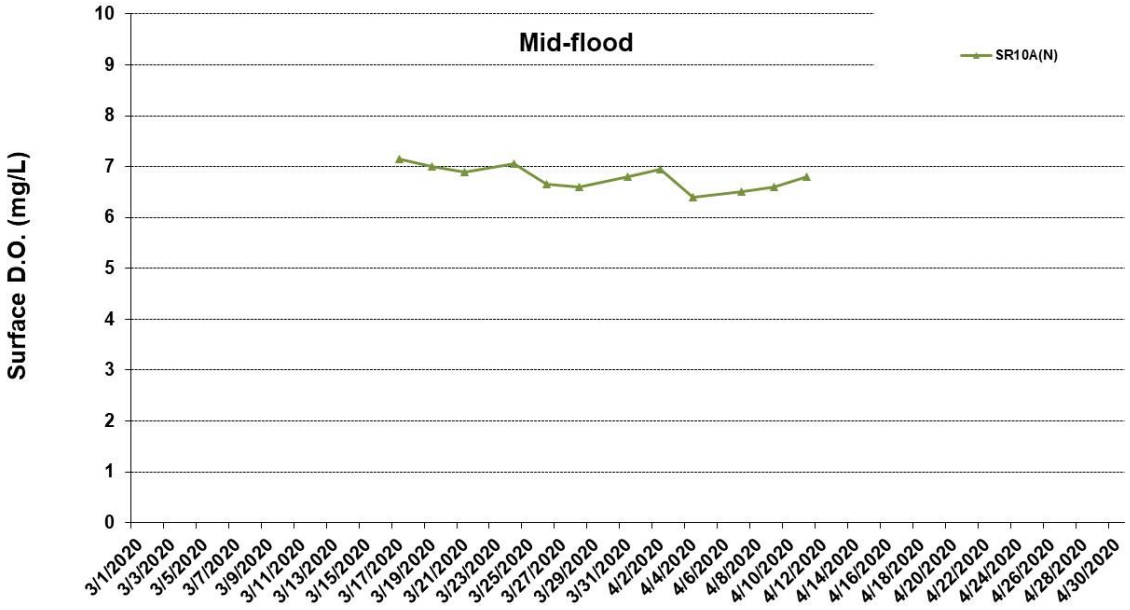
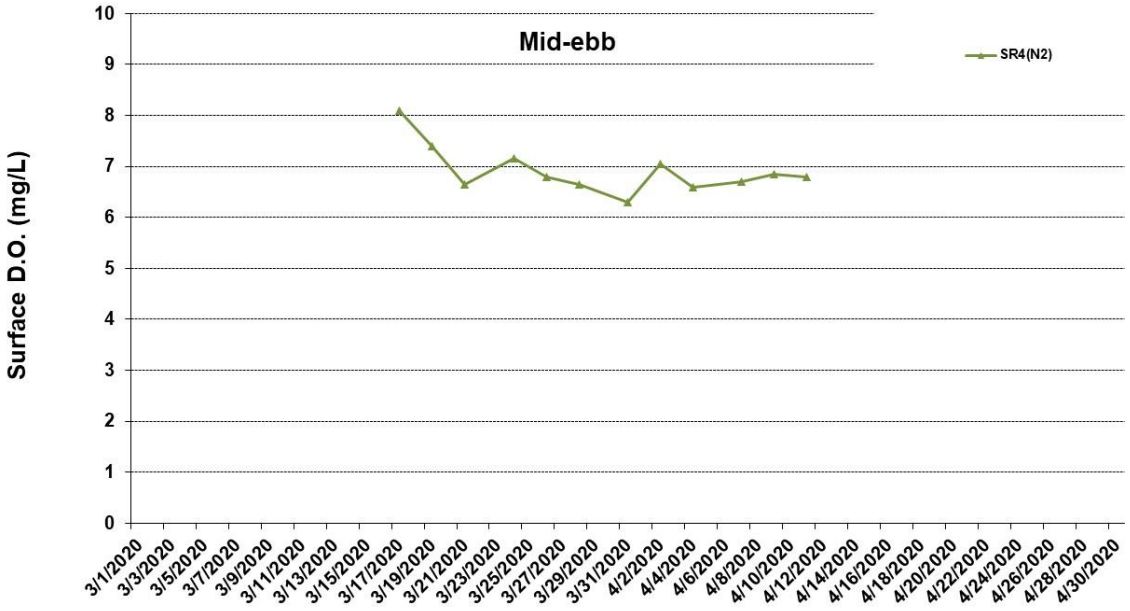


Figure G14 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at SR10A(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



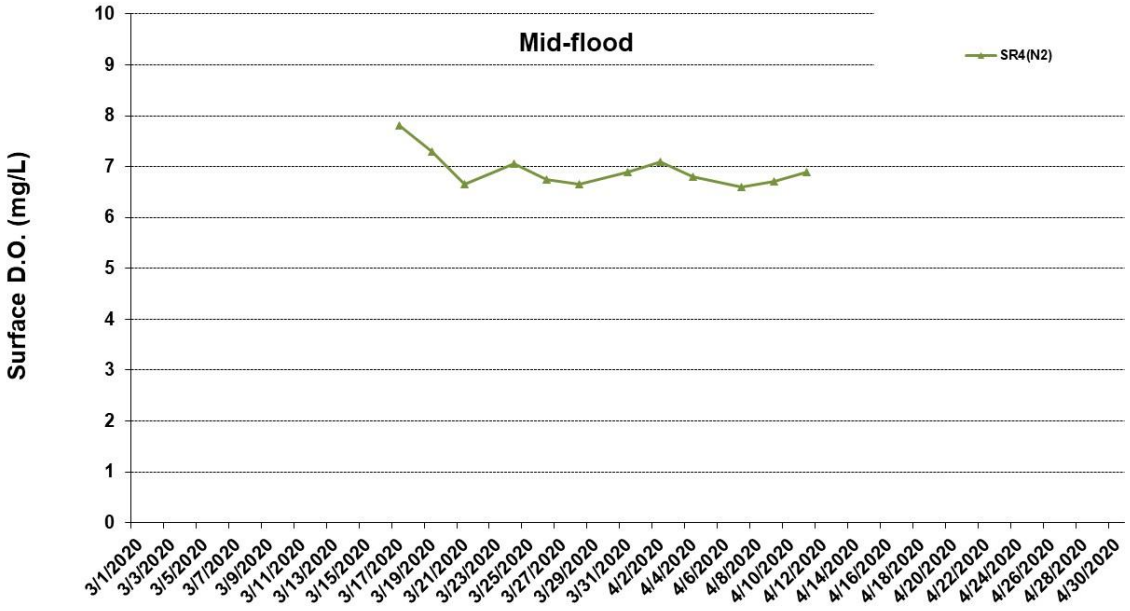


Figure G15 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

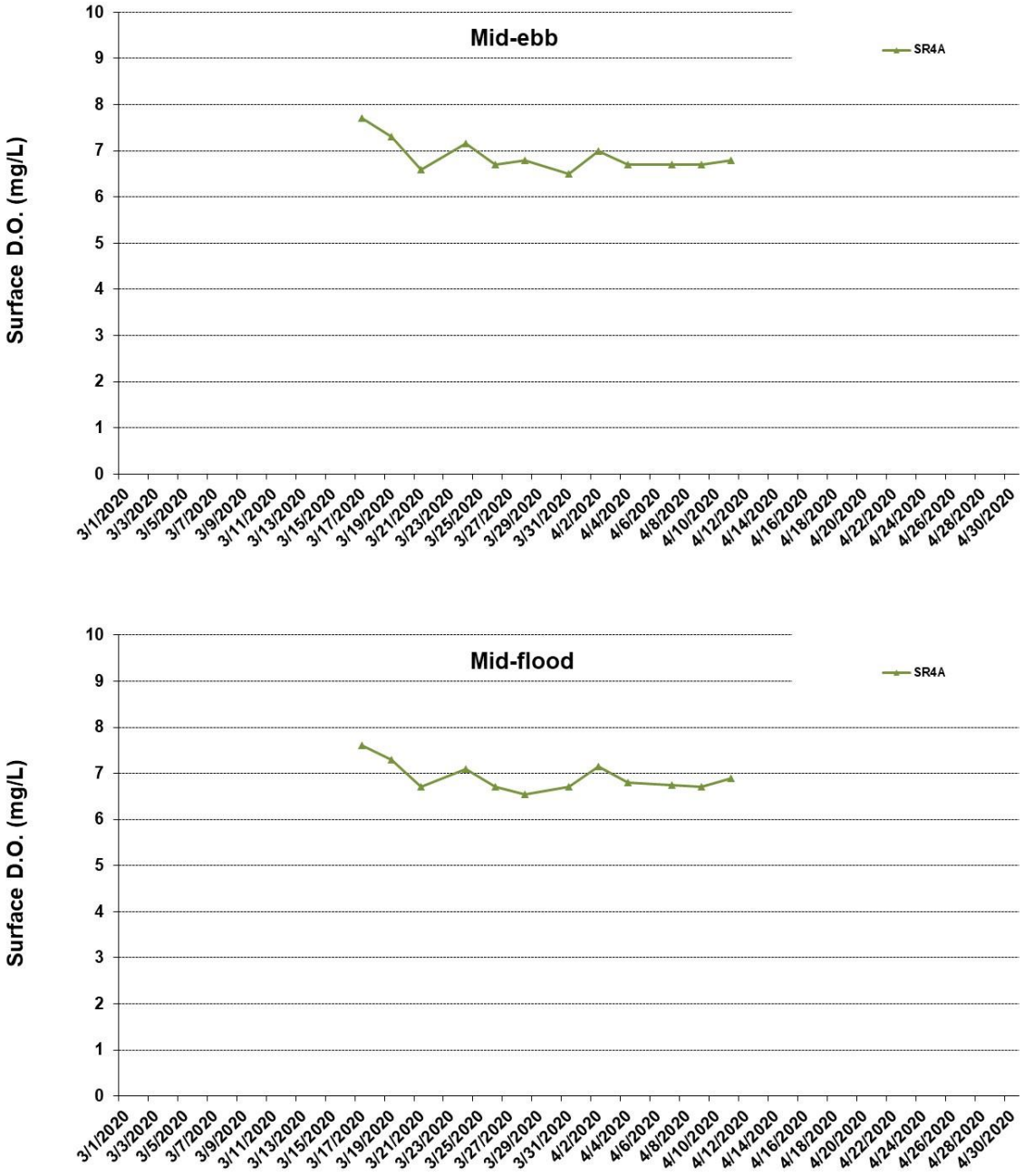
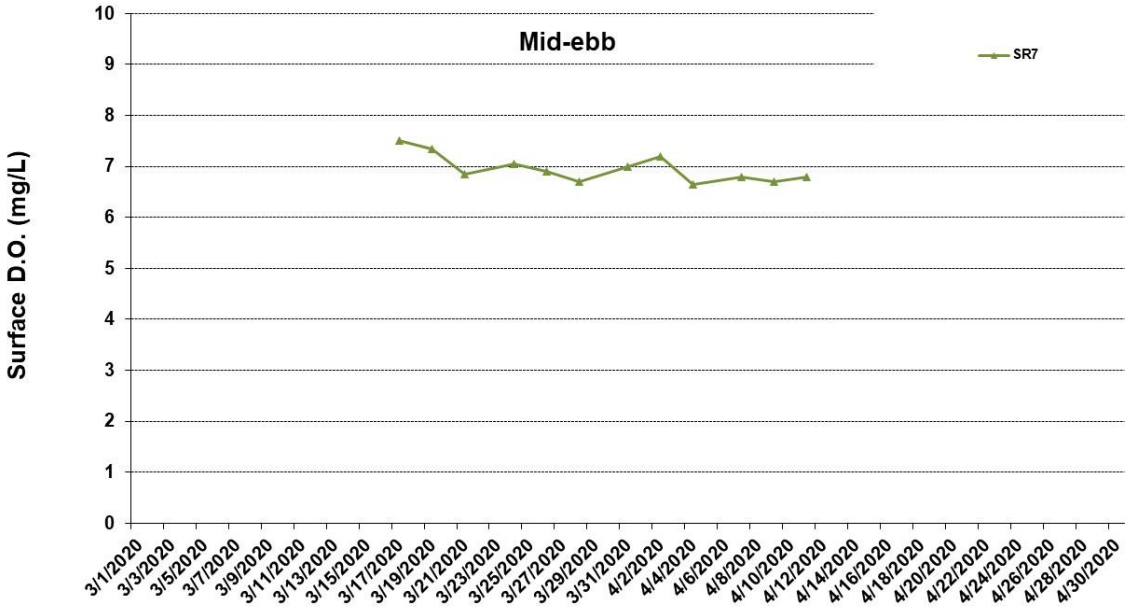


Figure G16 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at SR4A. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



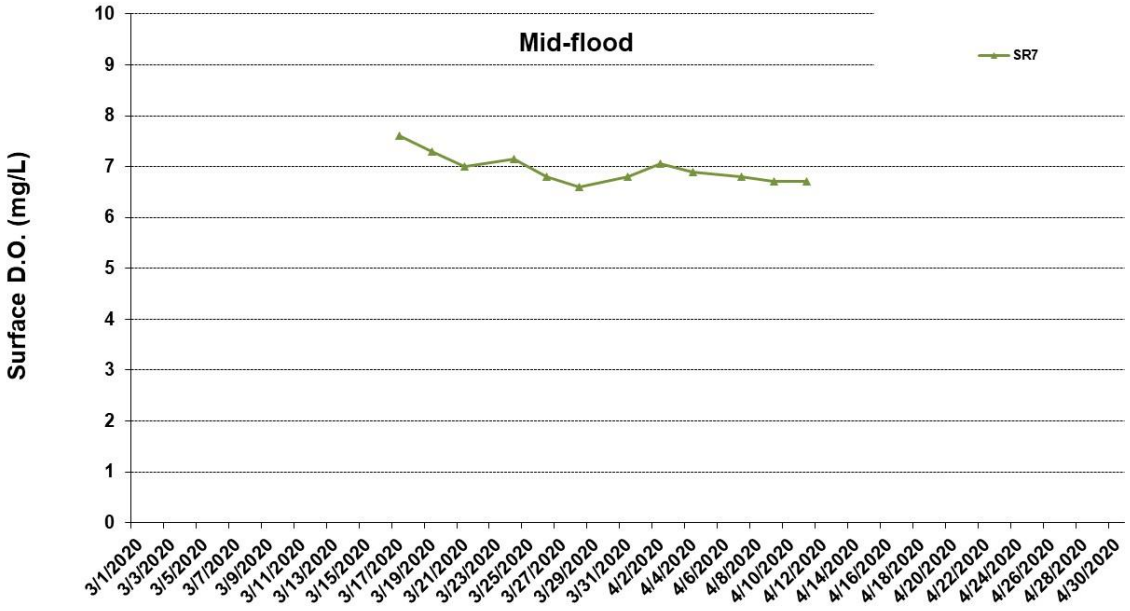
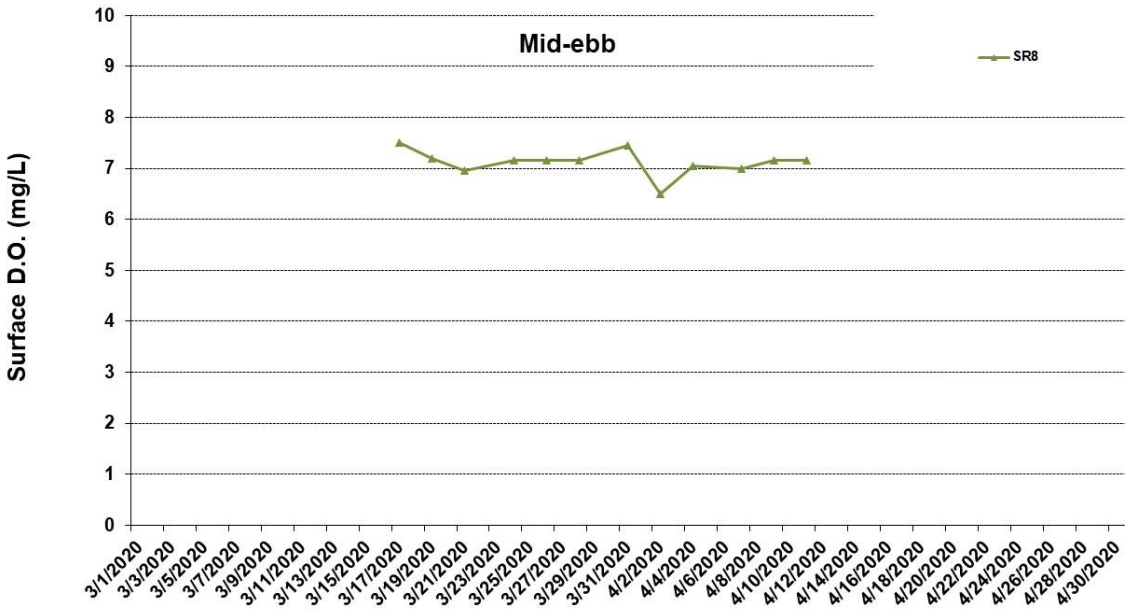


Figure G17 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



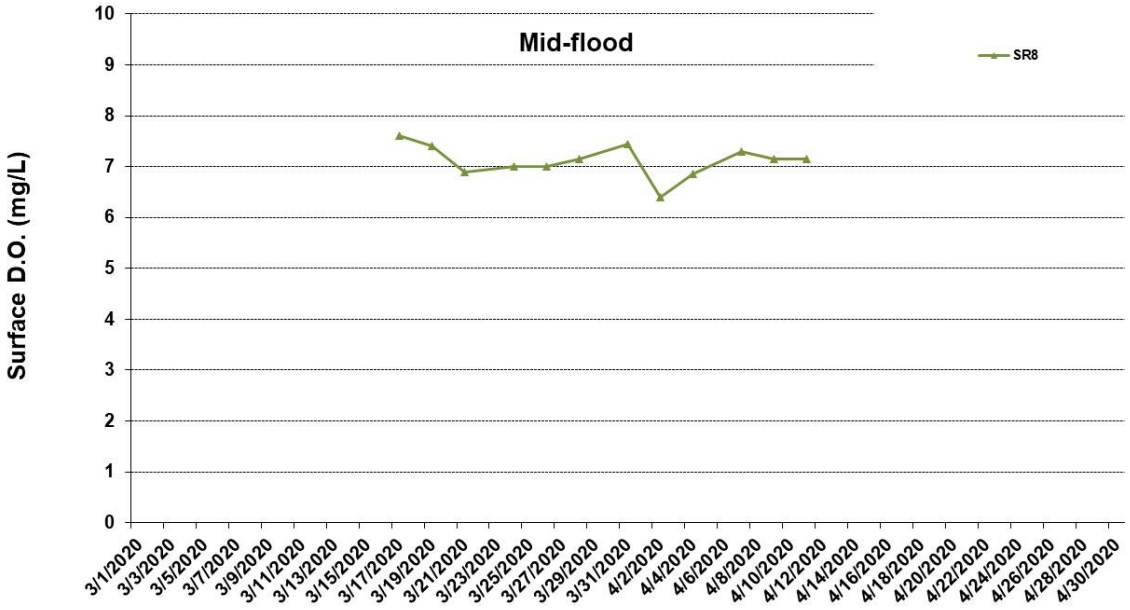
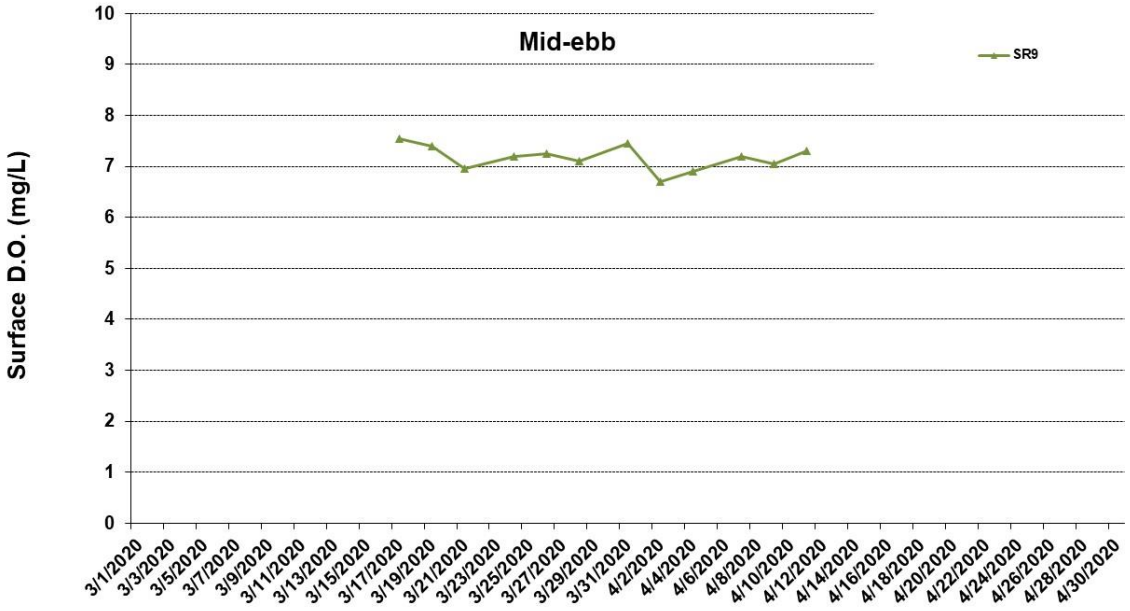


Figure G18 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at SR8. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



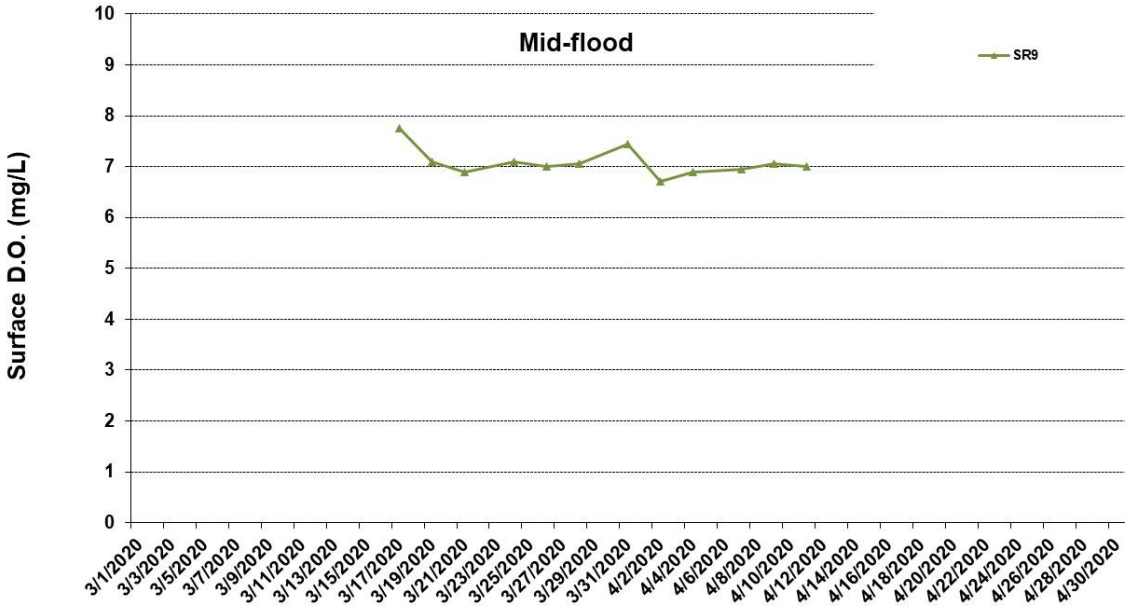


Figure G19 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 17 March 2020 and 11 April 2020 at SR4A. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

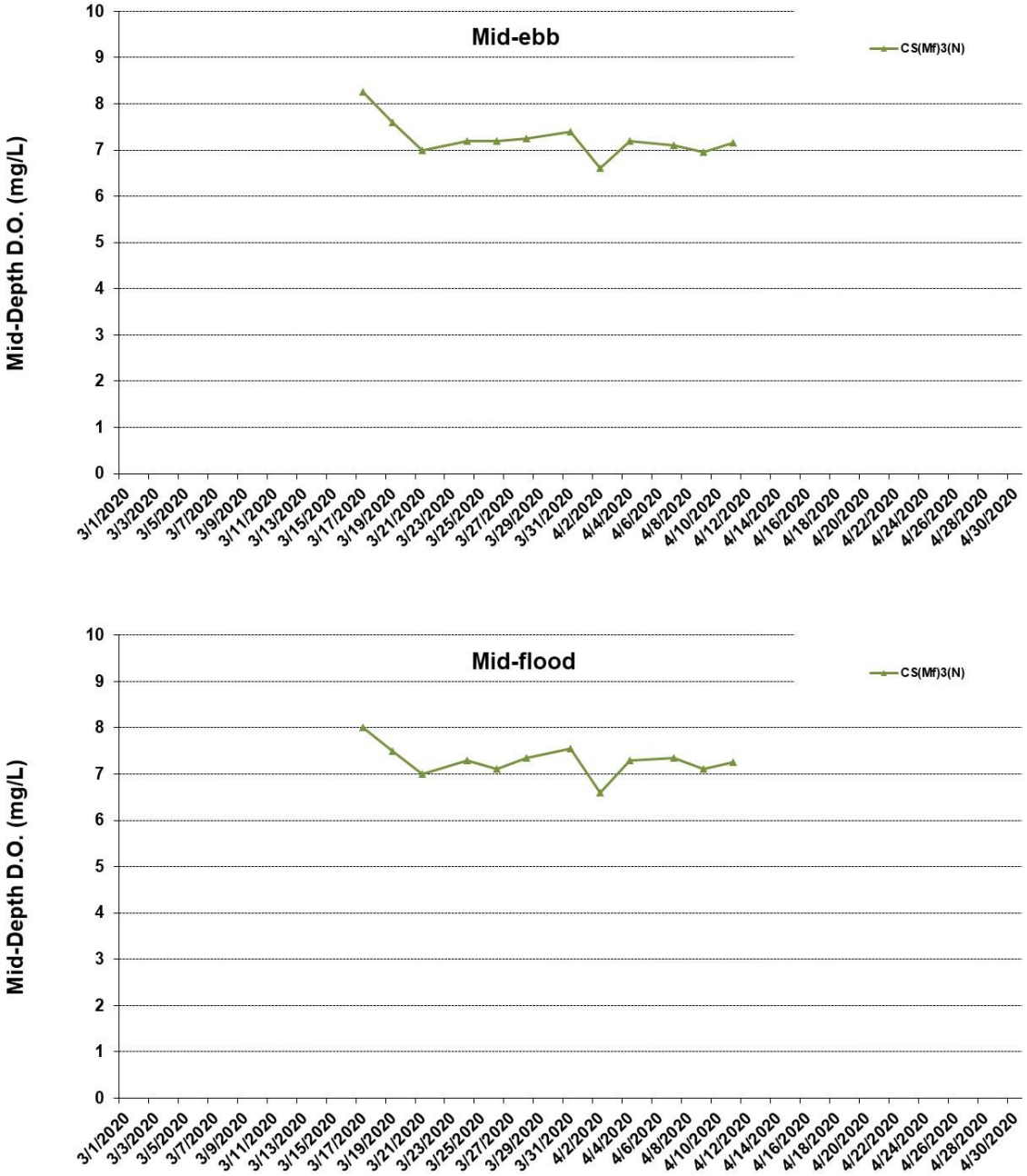


Figure G20 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 17 March 2020 and 11 April 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

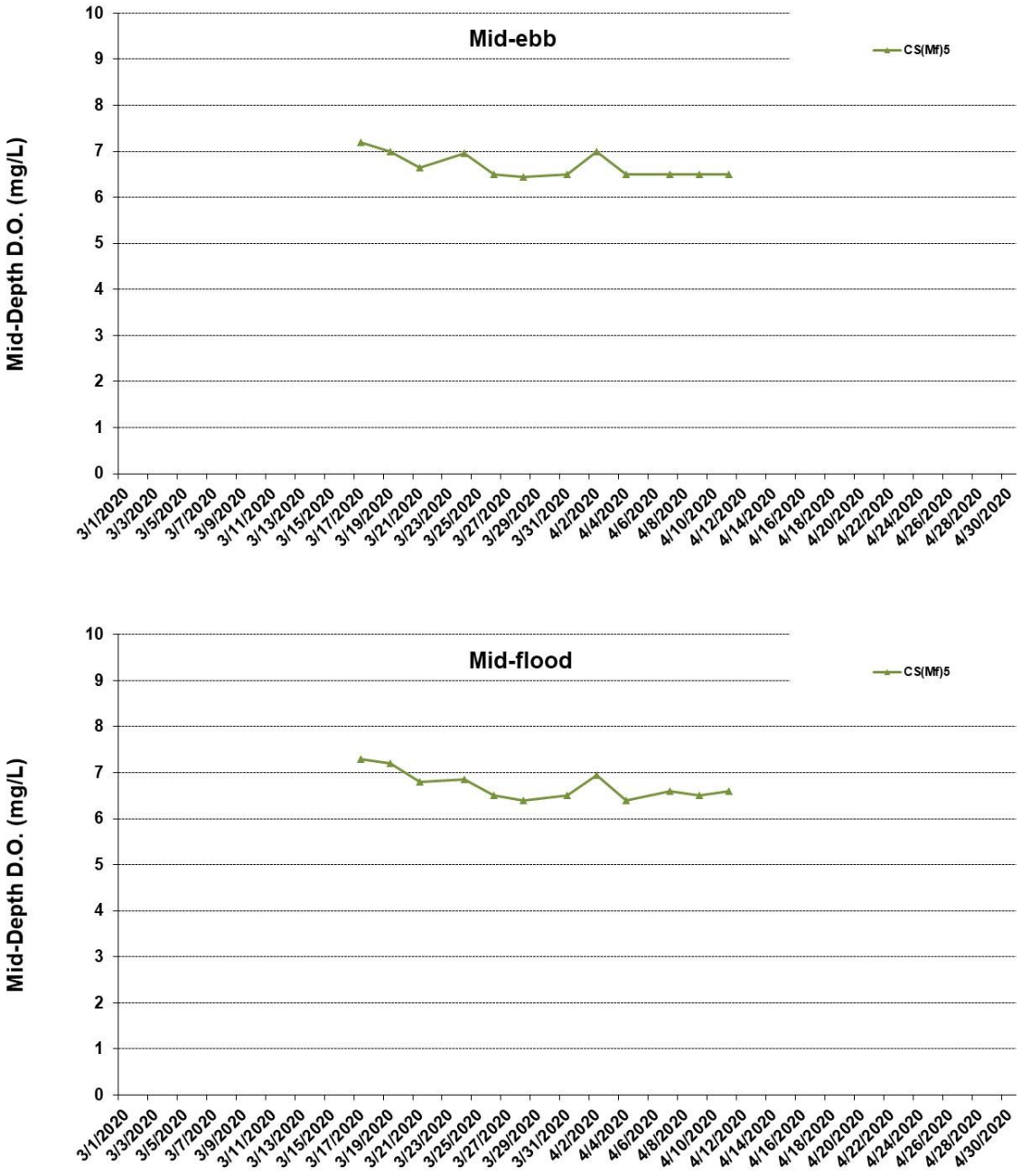


Figure G21 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 17 March 2020 and 11 April 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

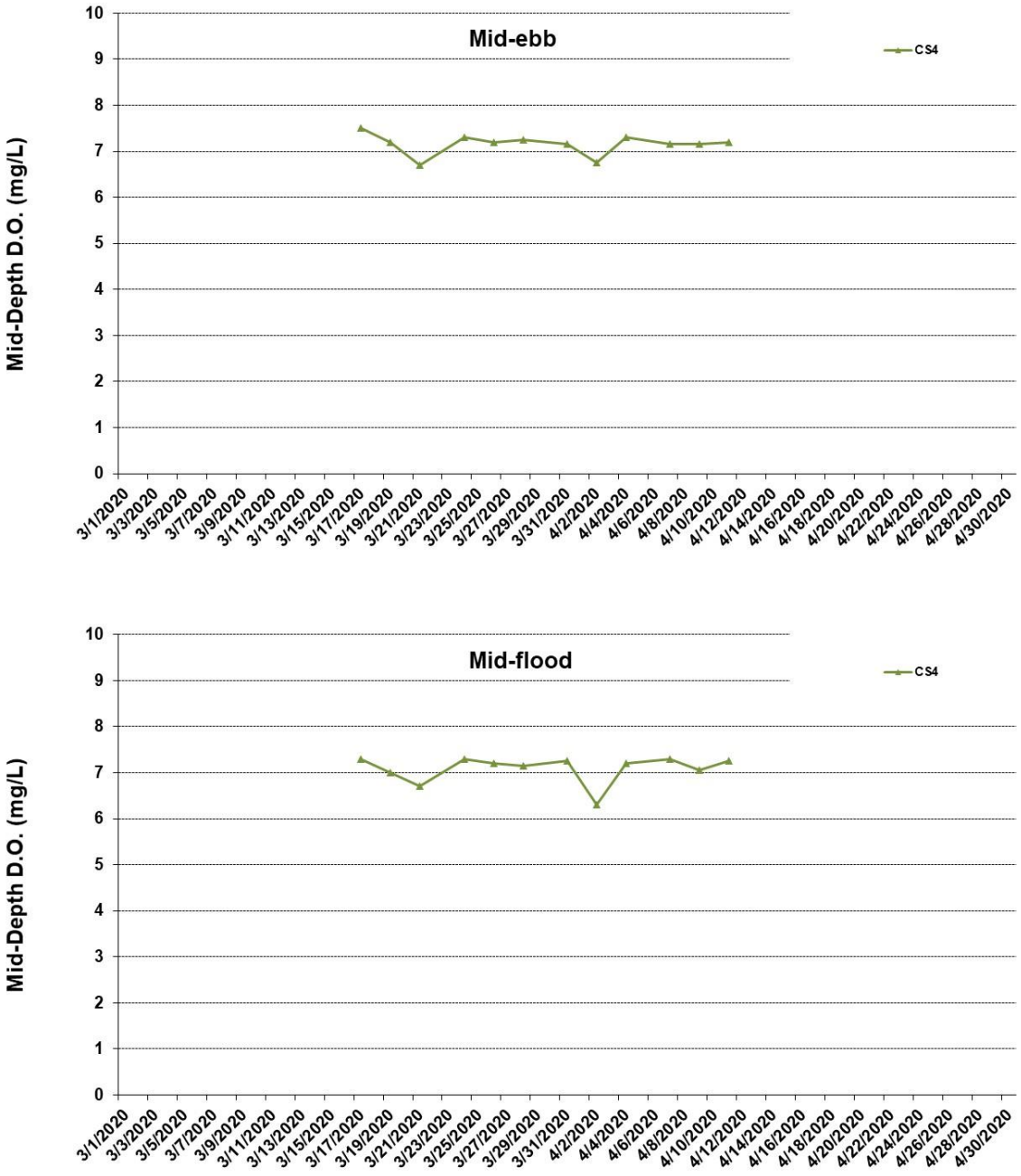


Figure G22 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 17 March 2020 and 11 April 2020 at CS4. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

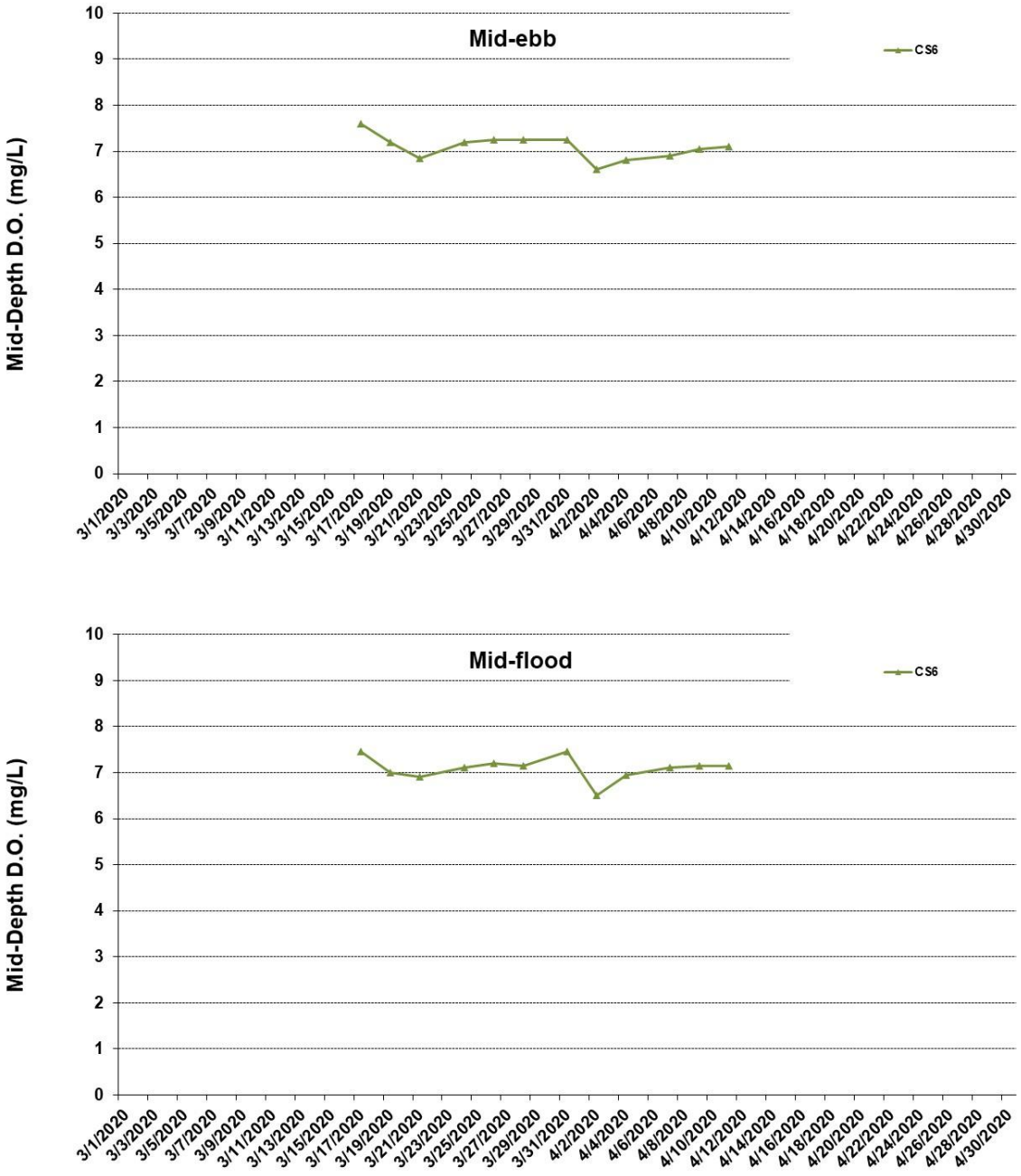


Figure G23 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 17 March 2020 and 11 April 2020 at CS6. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

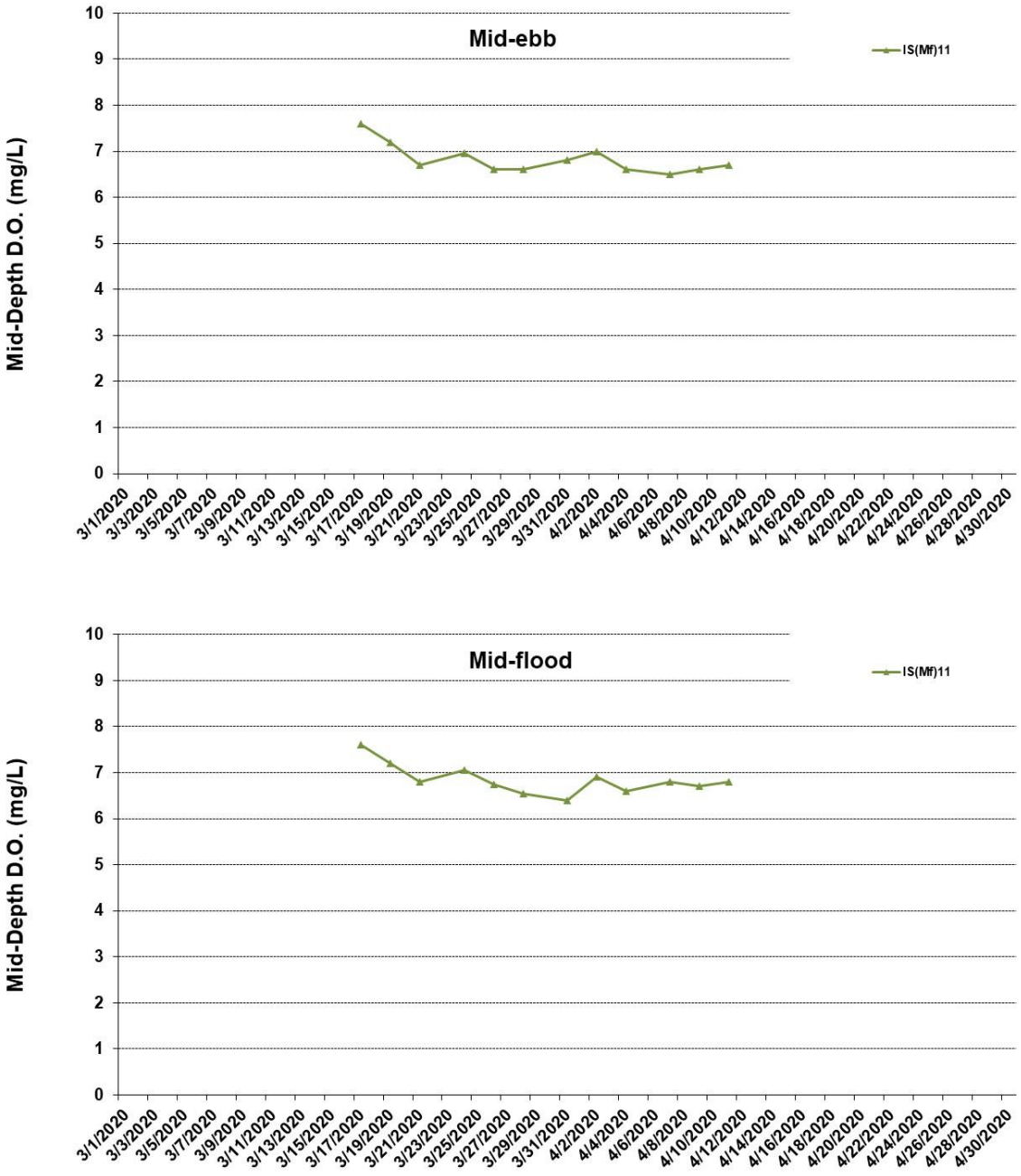
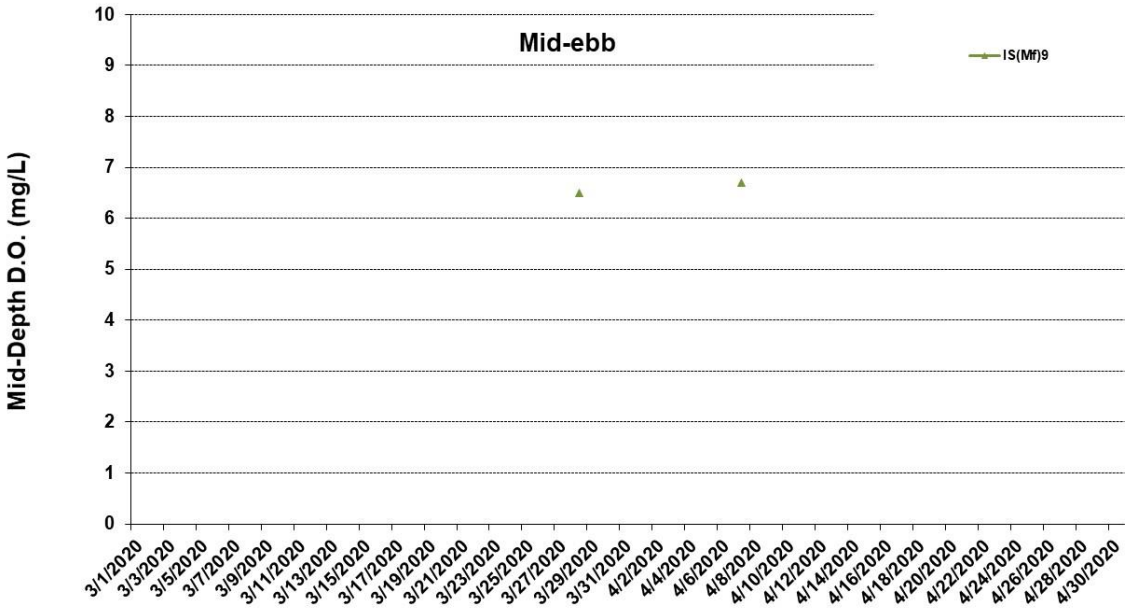


Figure G24 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



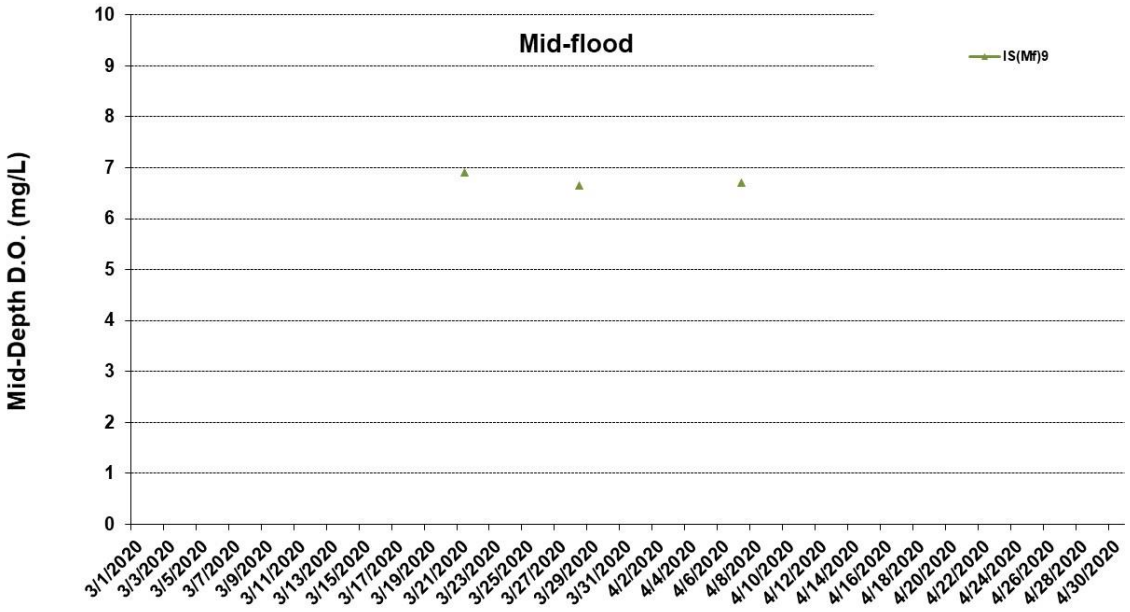
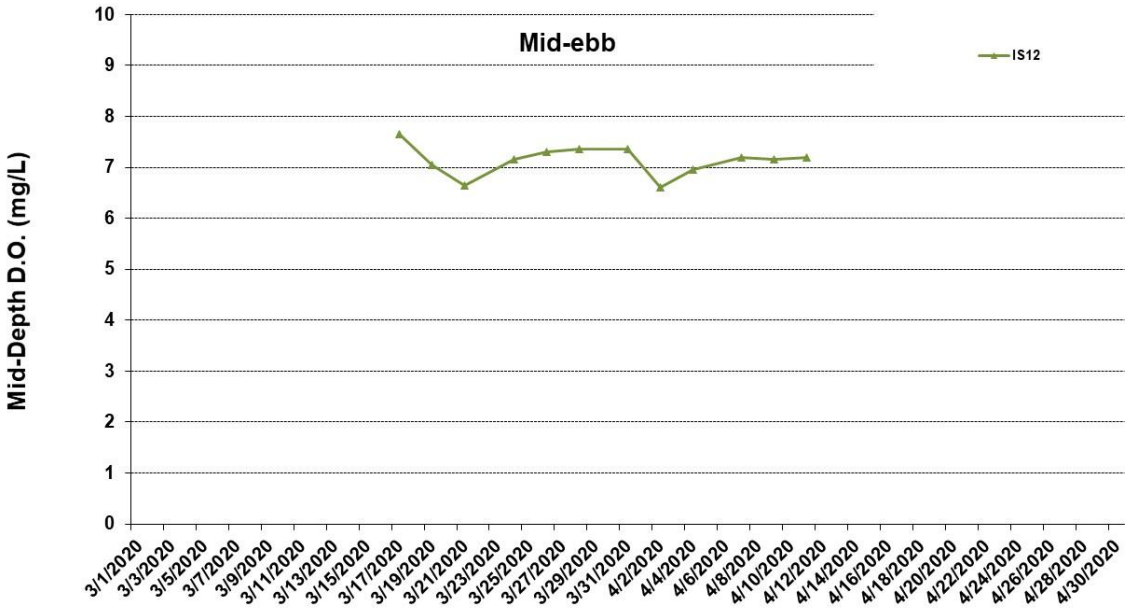


Figure G25 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



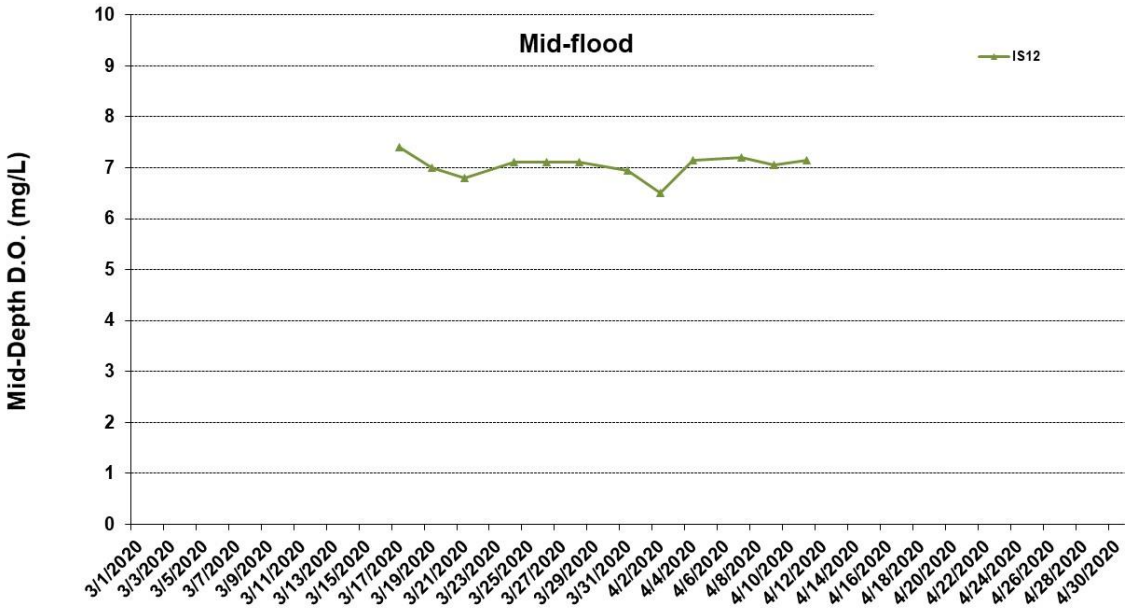
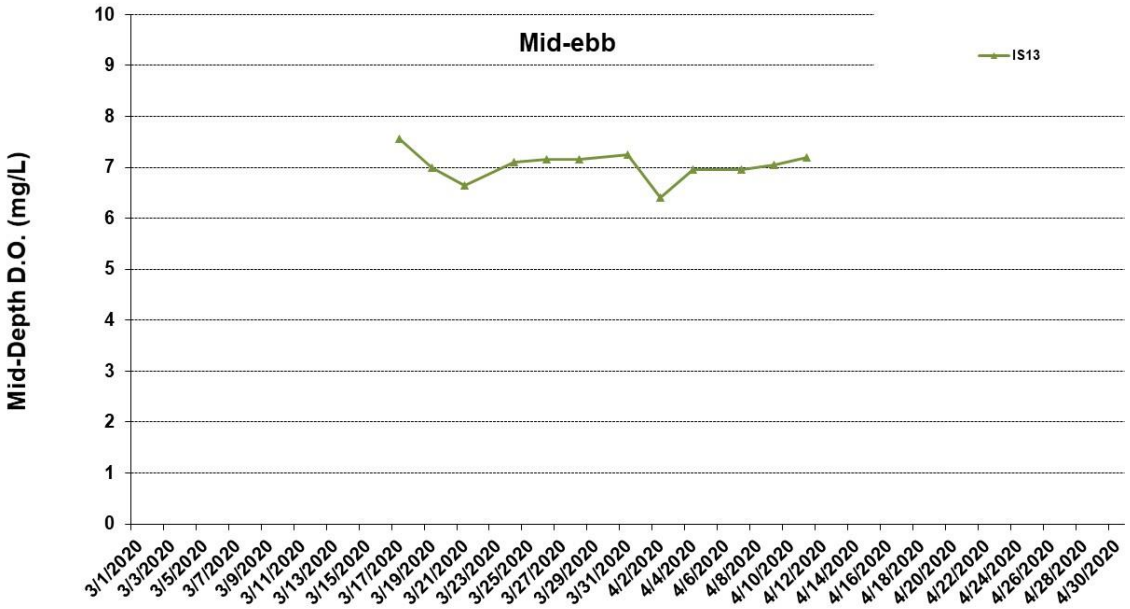


Figure G26 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS12. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



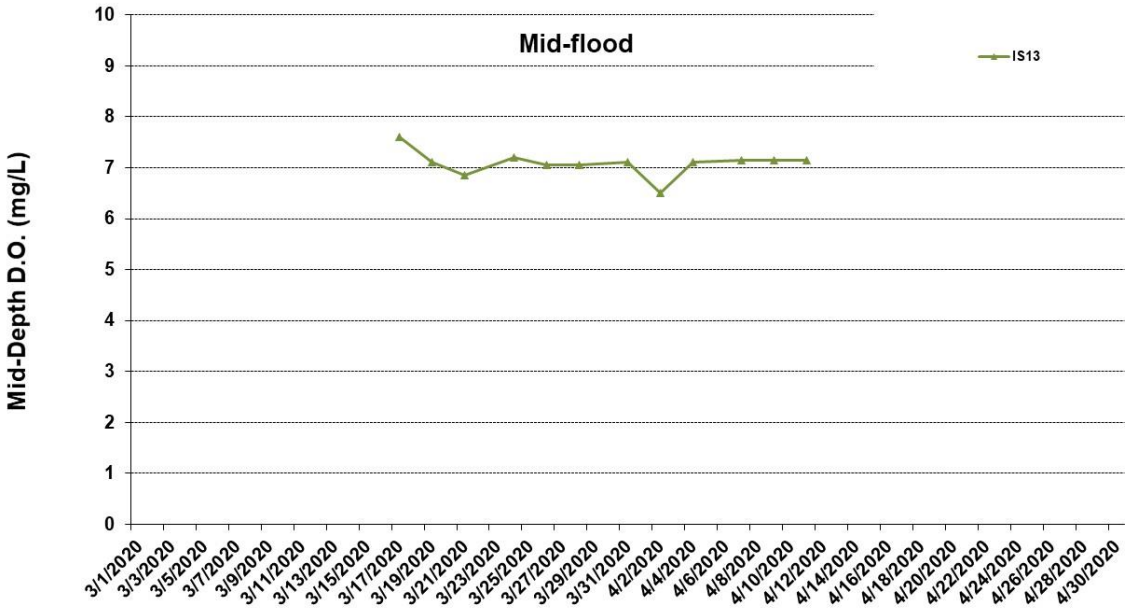
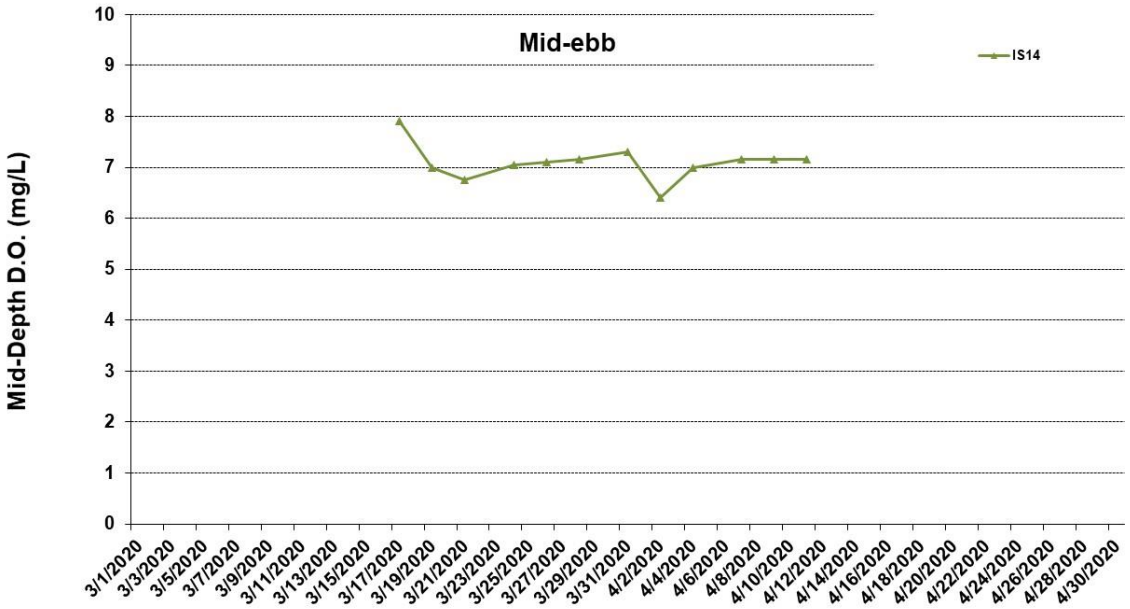


Figure G27 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS13. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



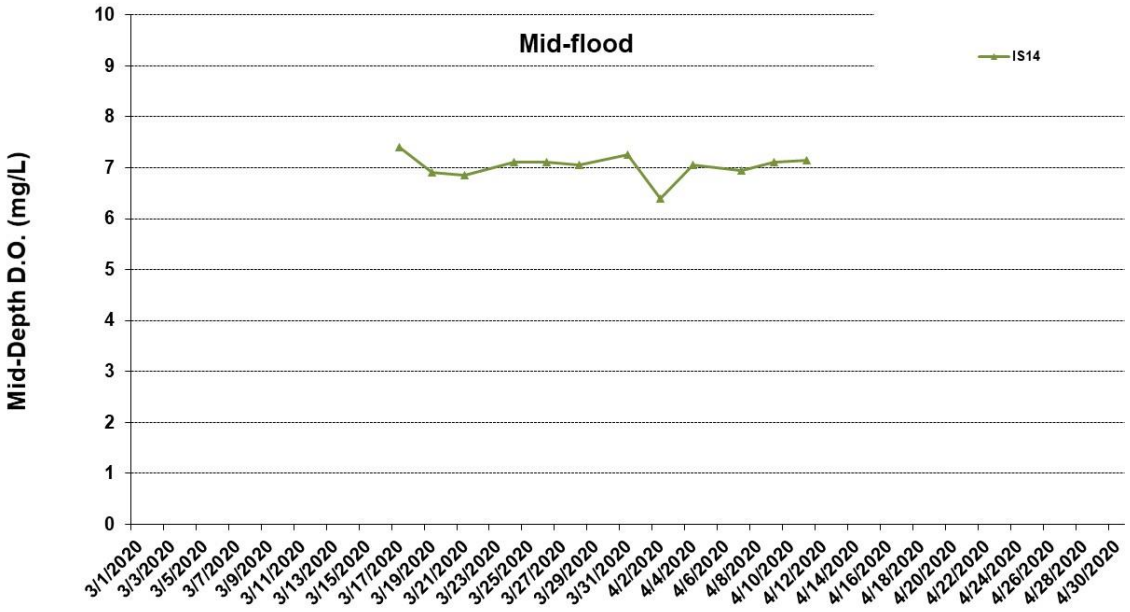


Figure G28 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS14. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

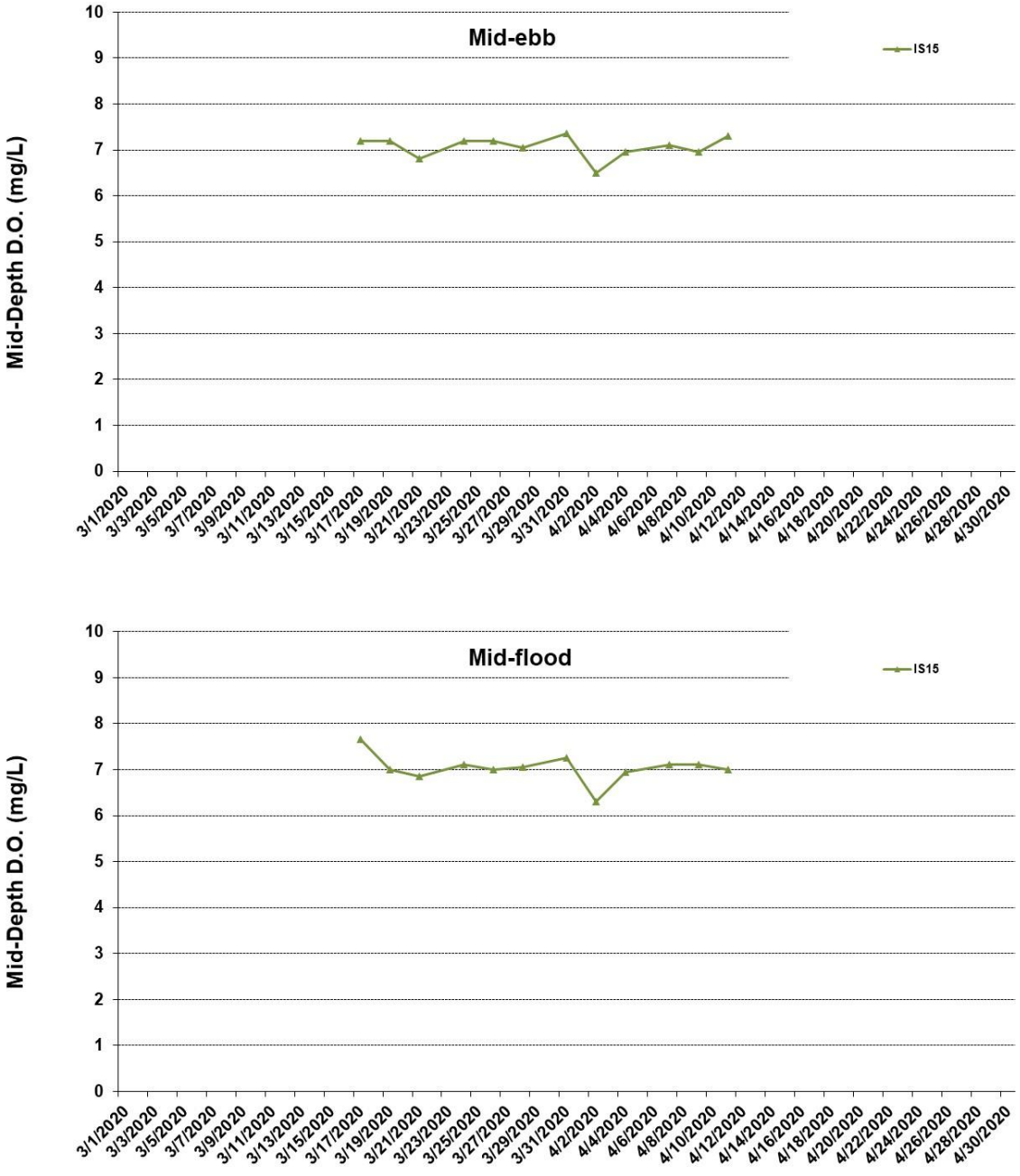
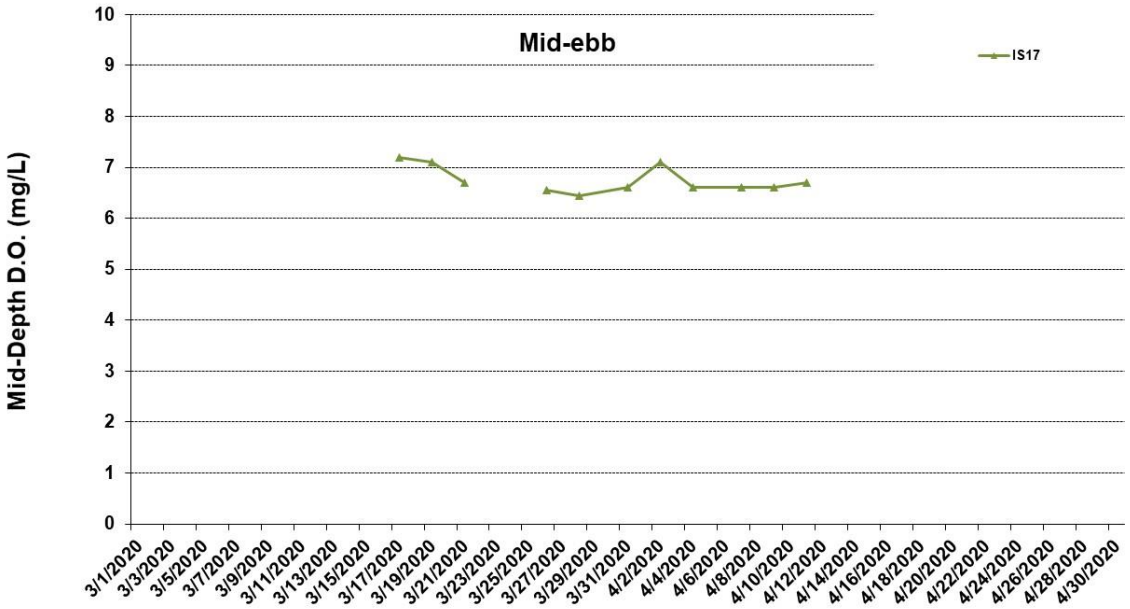


Figure G29 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS15. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



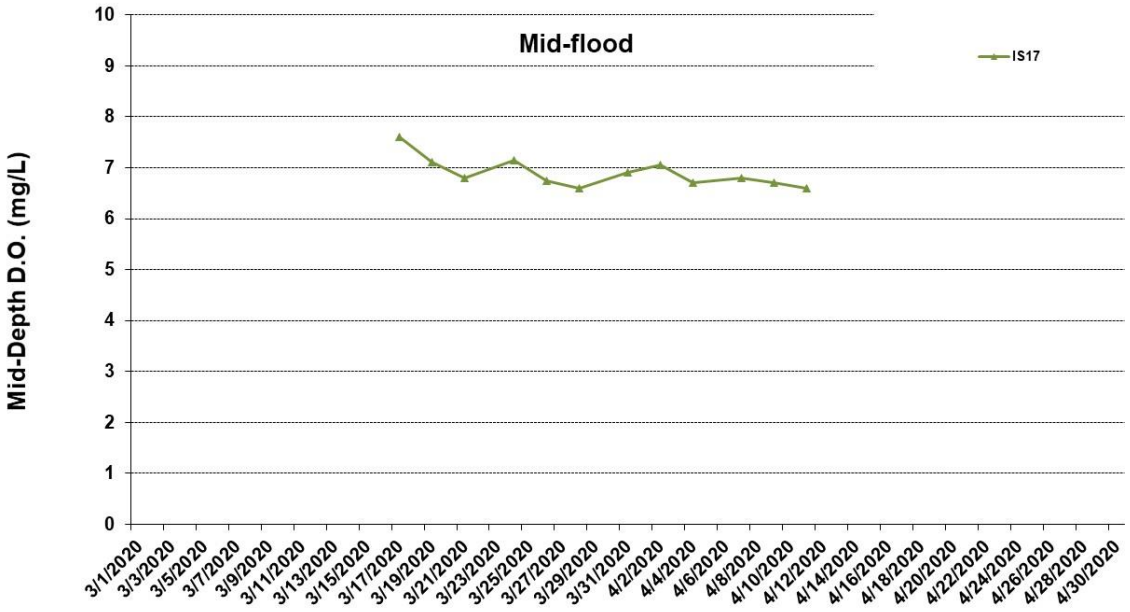


Figure G30 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

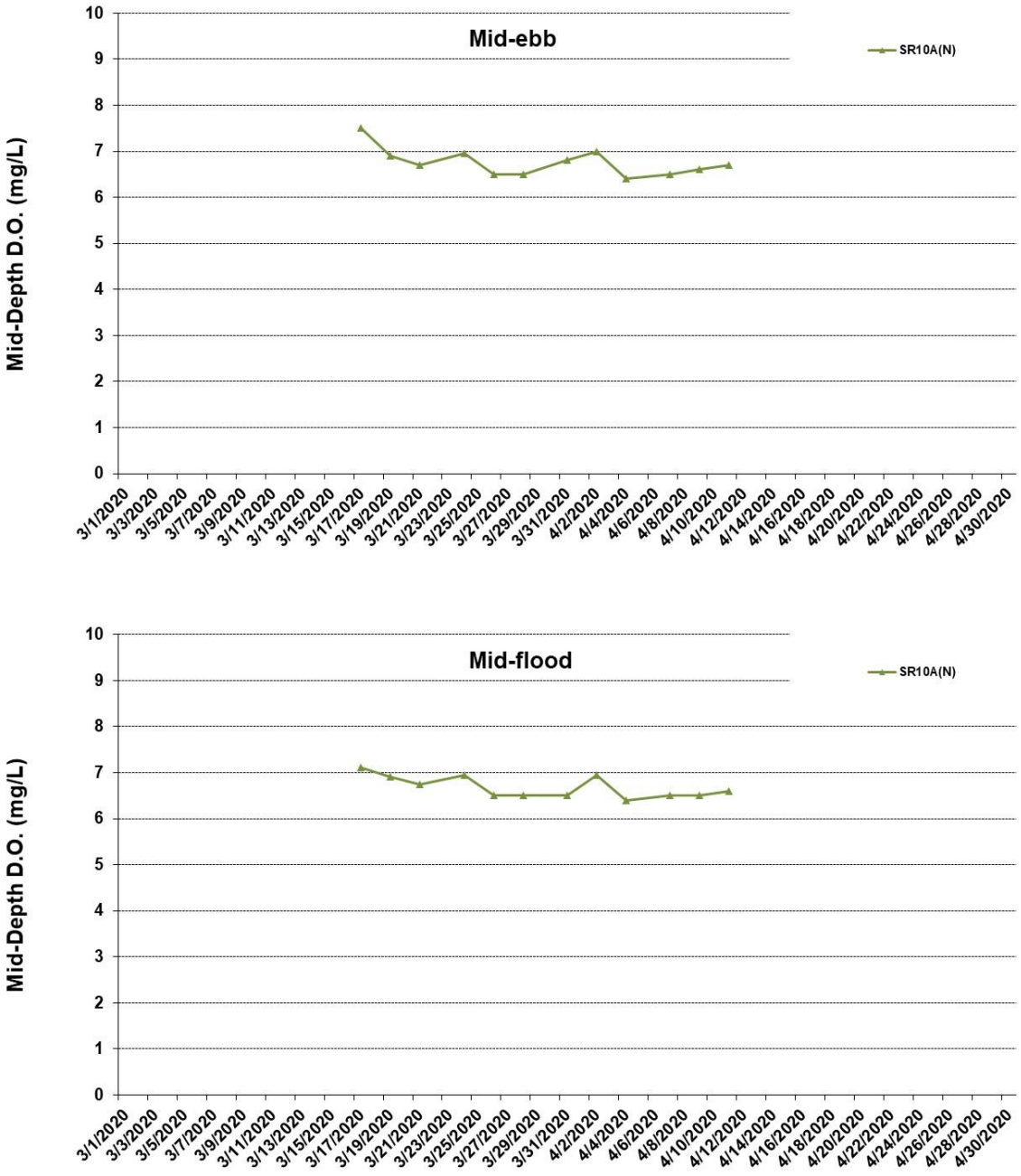
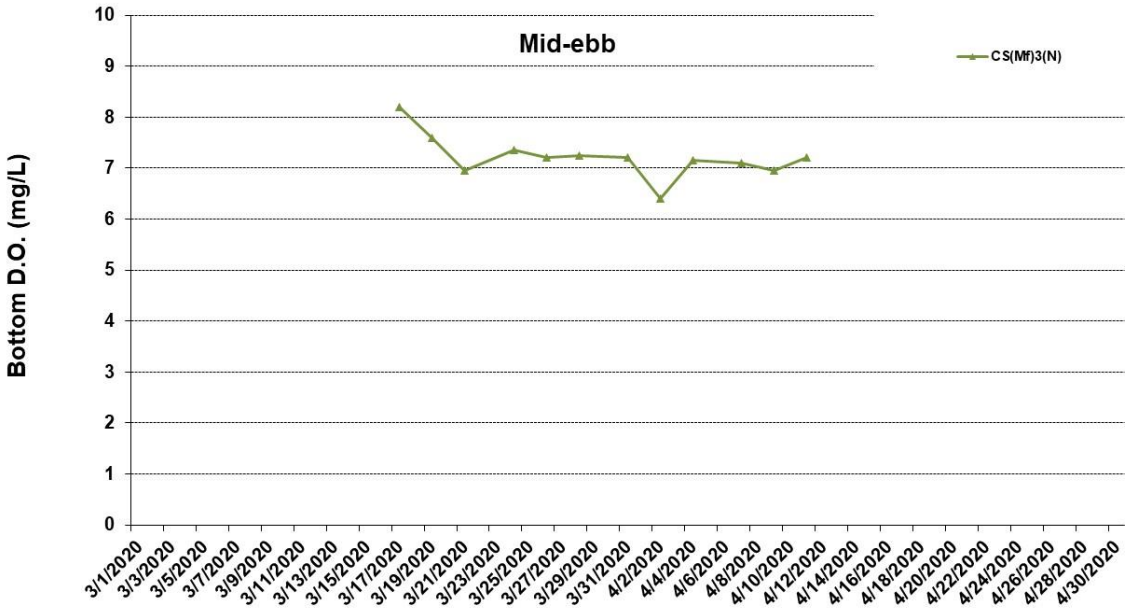


Figure G31 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth water between 17 March 2020 and 11 April 2020 at SR10A(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



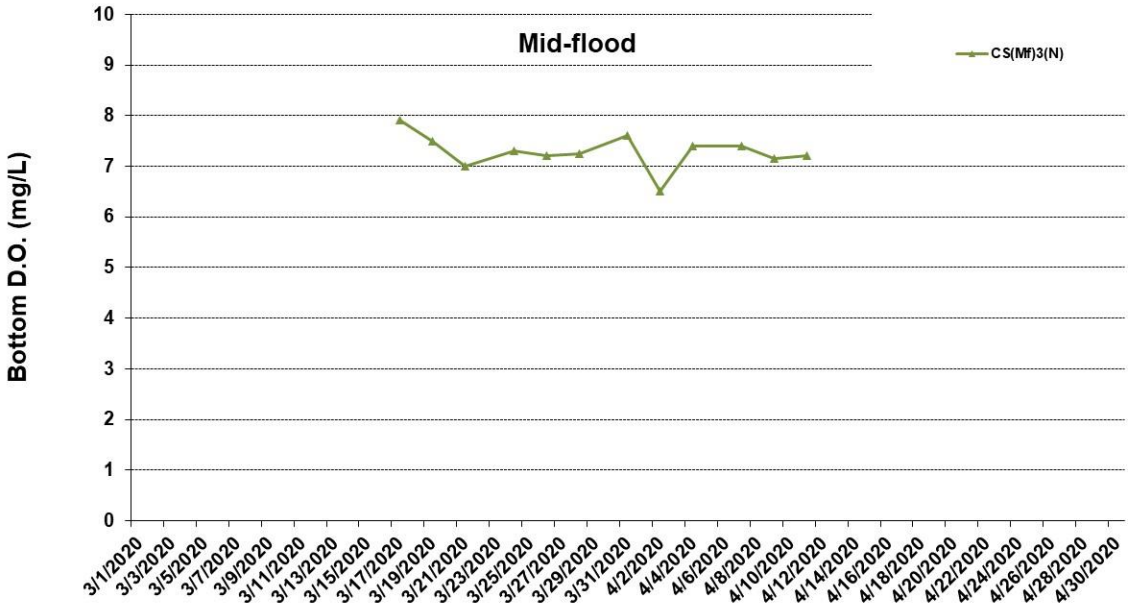


Figure G32 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

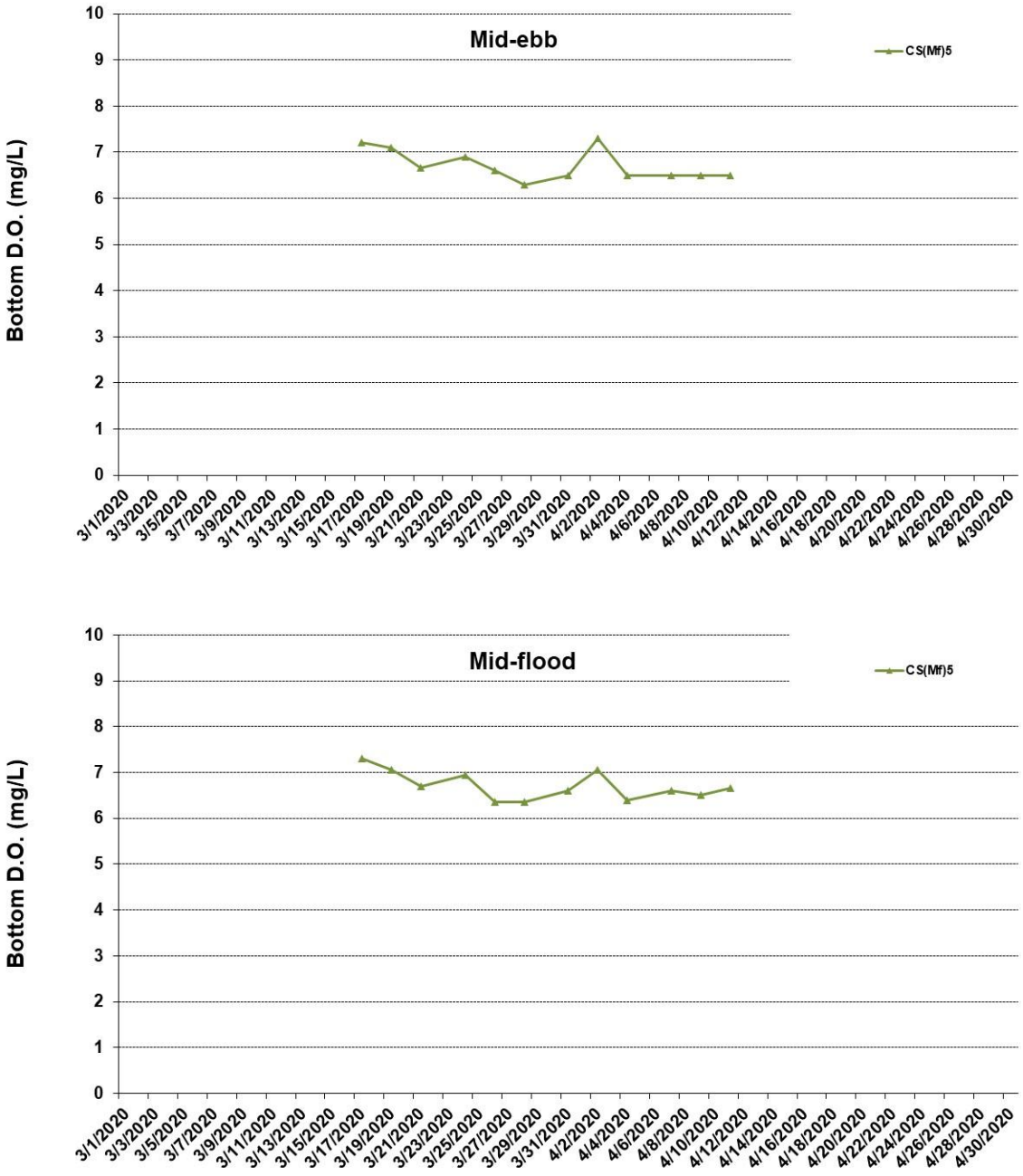


Figure G33 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

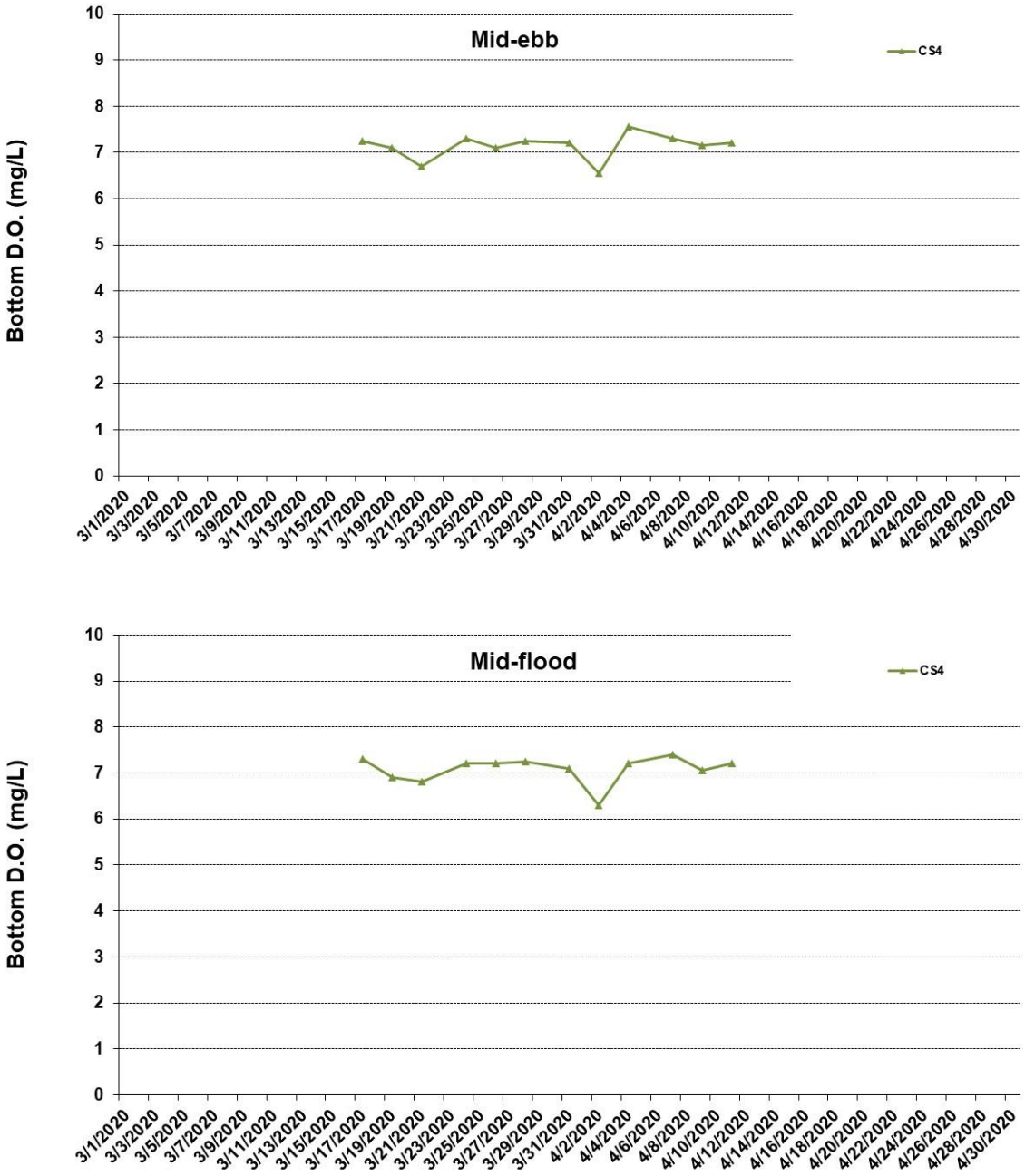


Figure G34 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at CS4. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

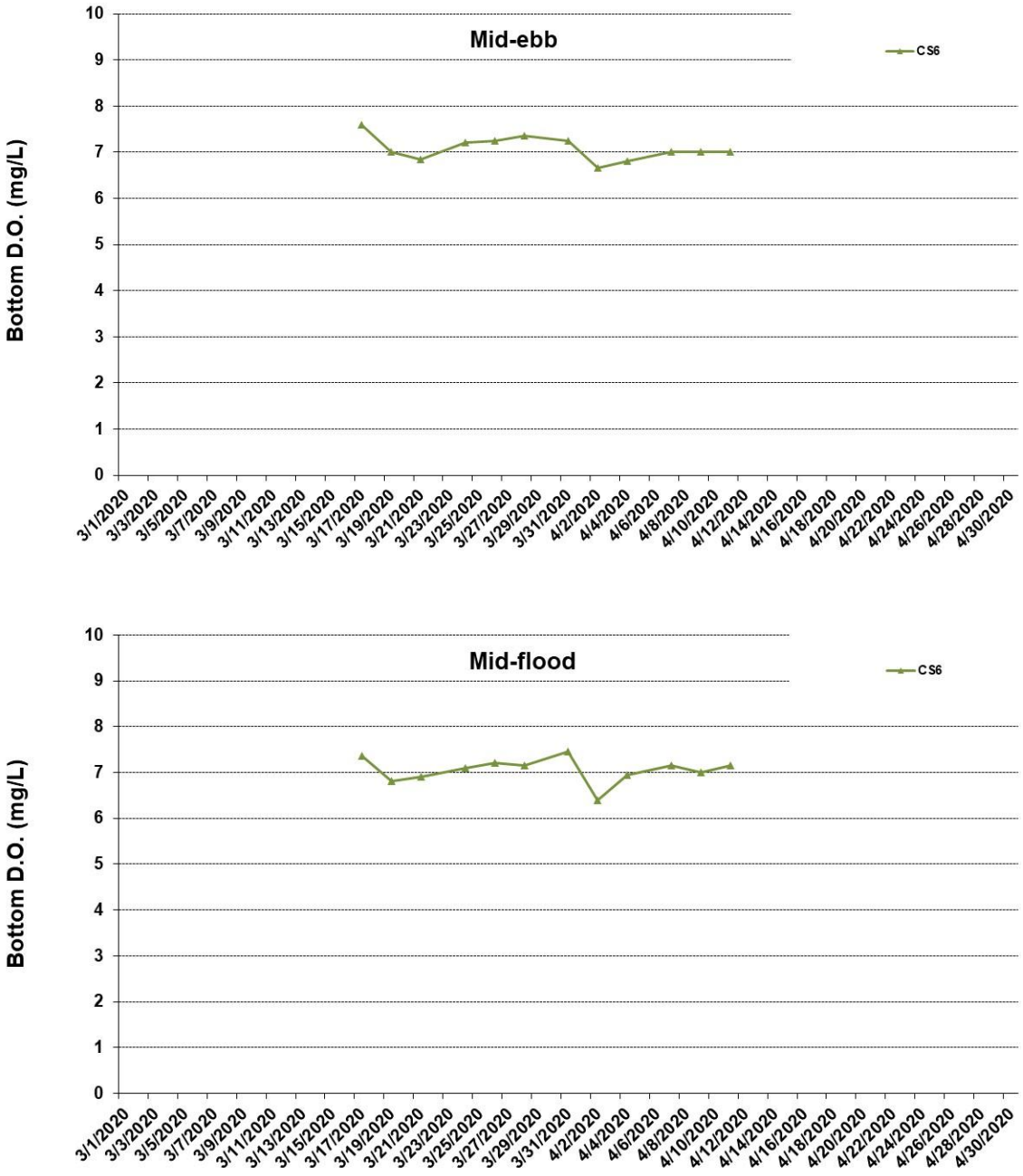


Figure G35 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at CS6. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

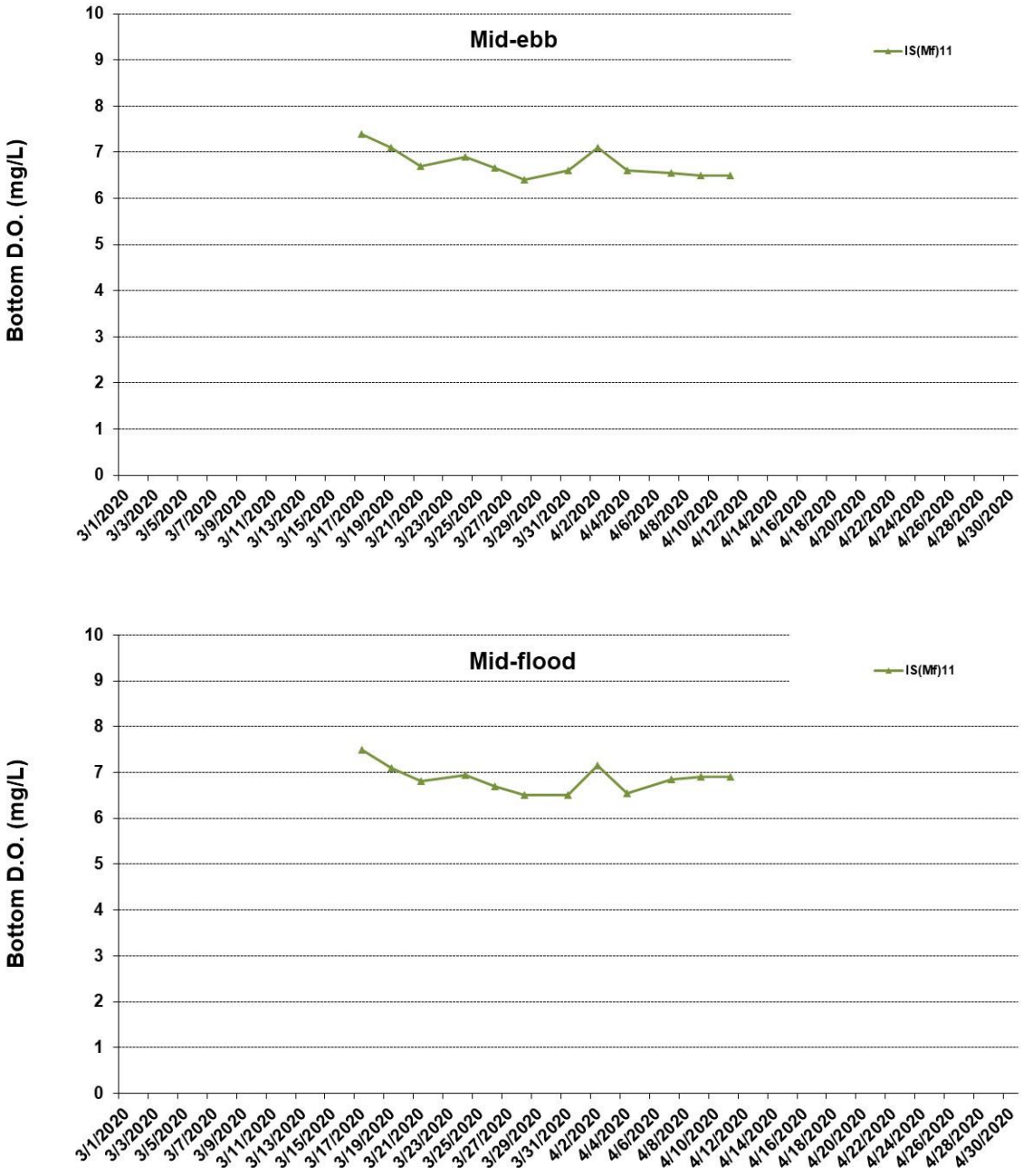


Figure G36 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

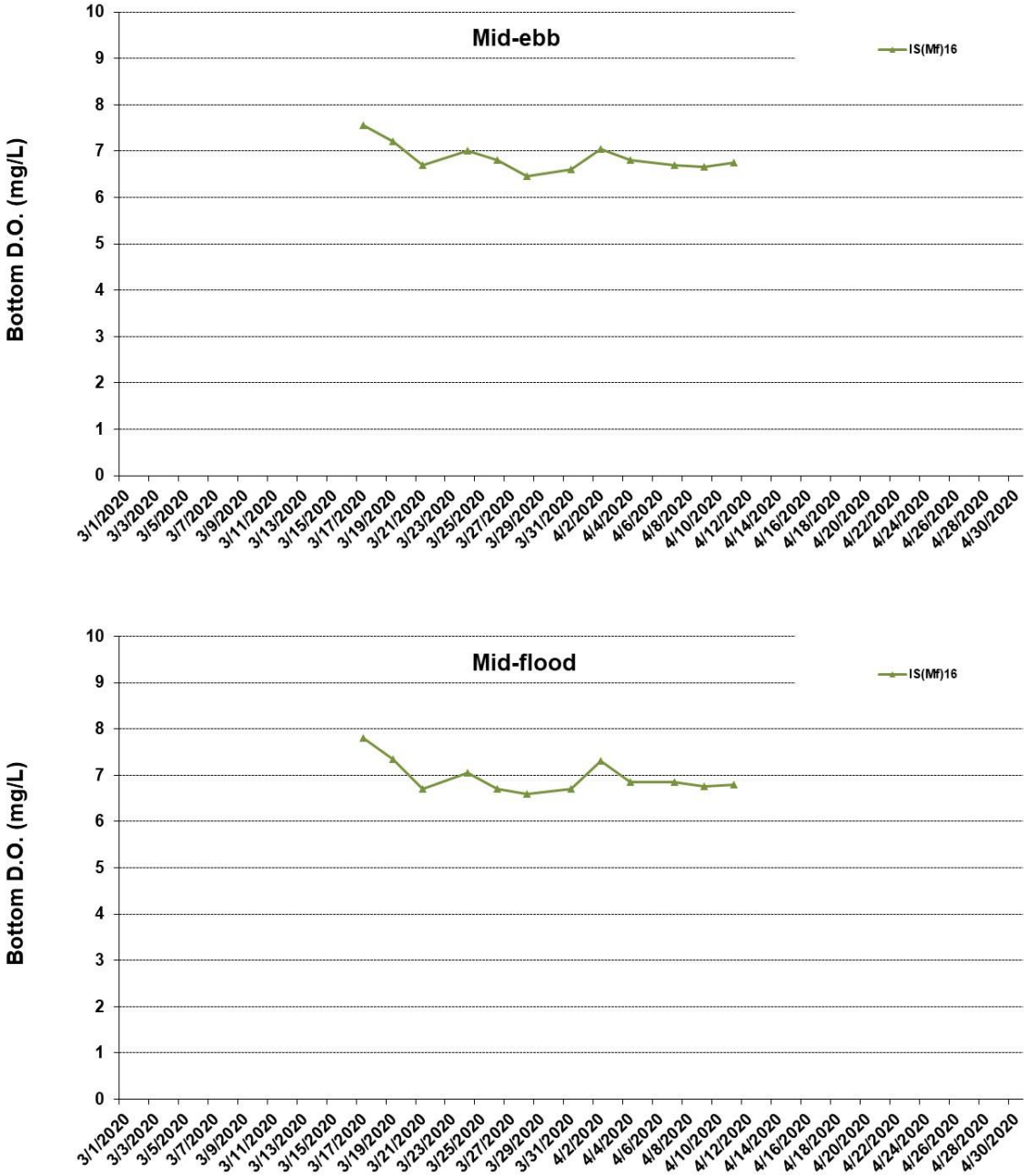


Figure G37 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

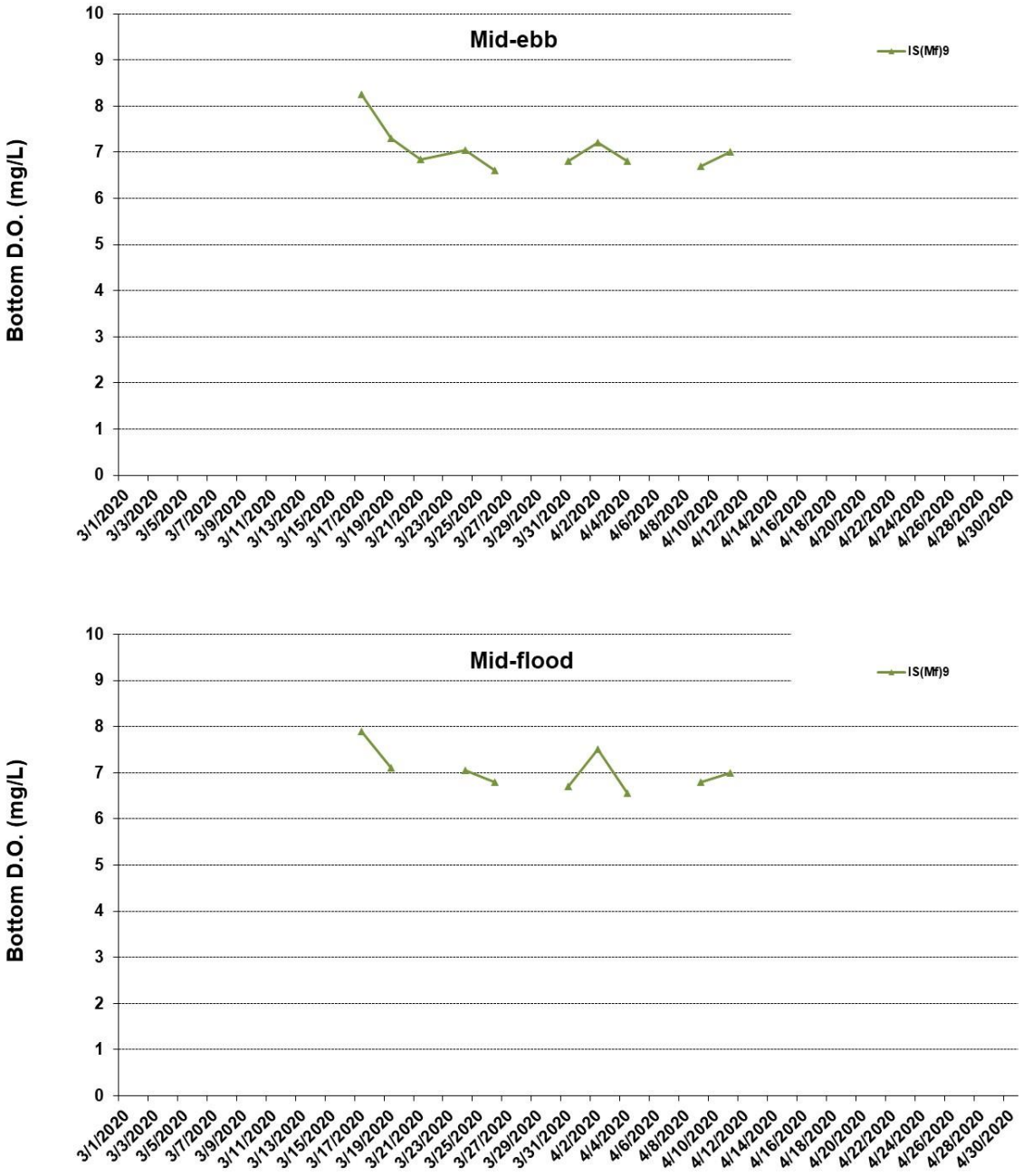


Figure G38 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

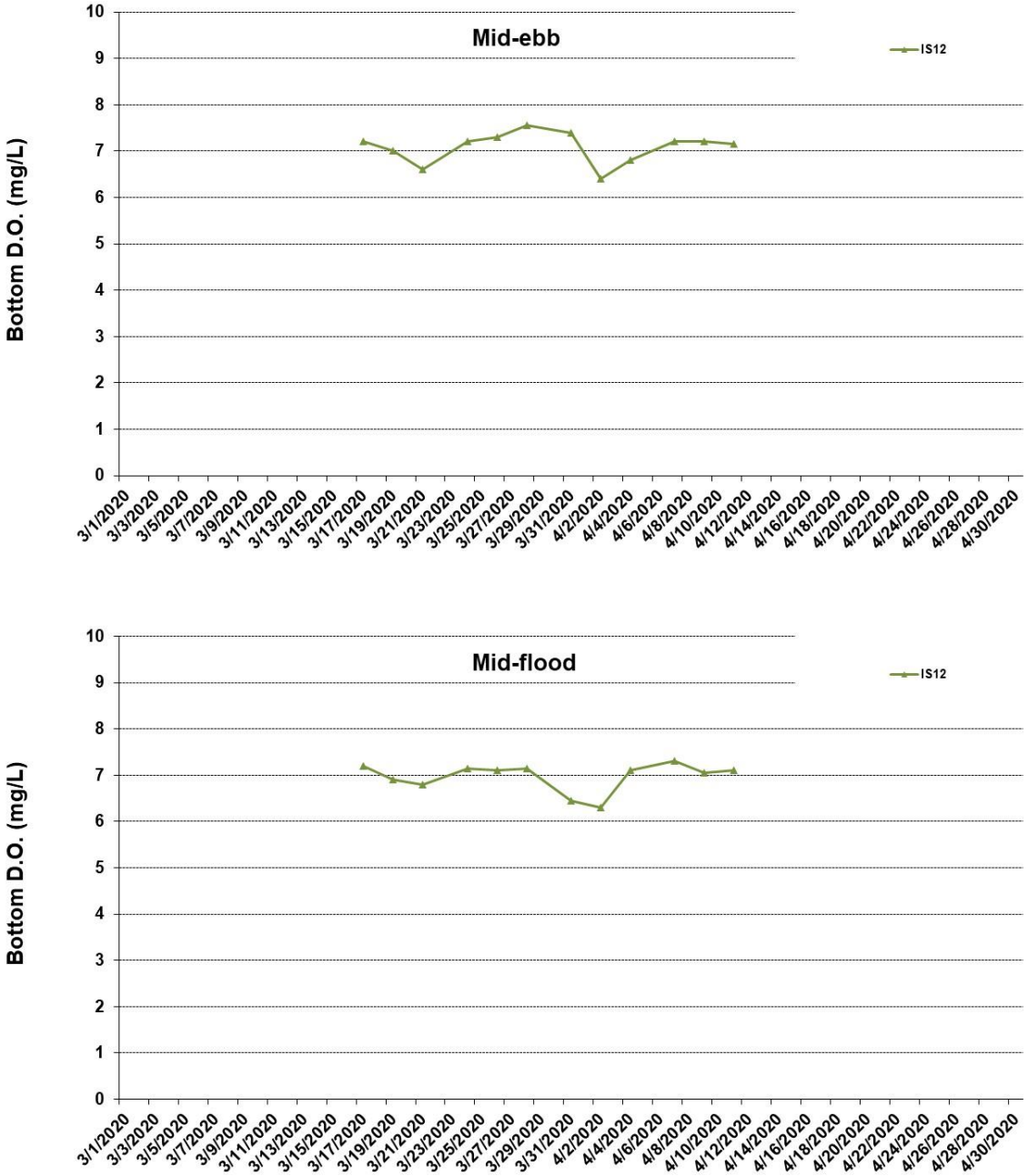


Figure G39 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS12. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

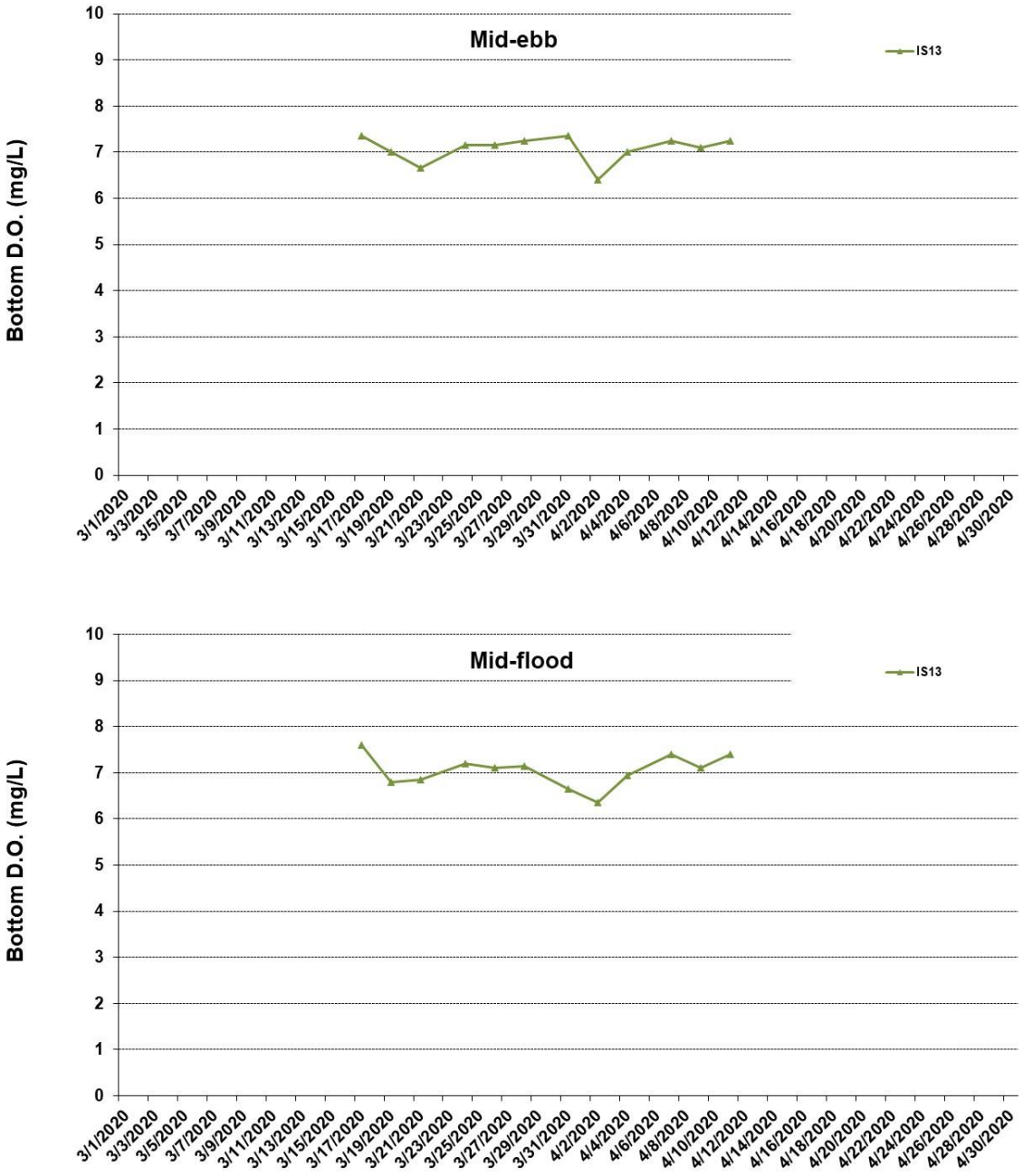


Figure G40 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS13. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

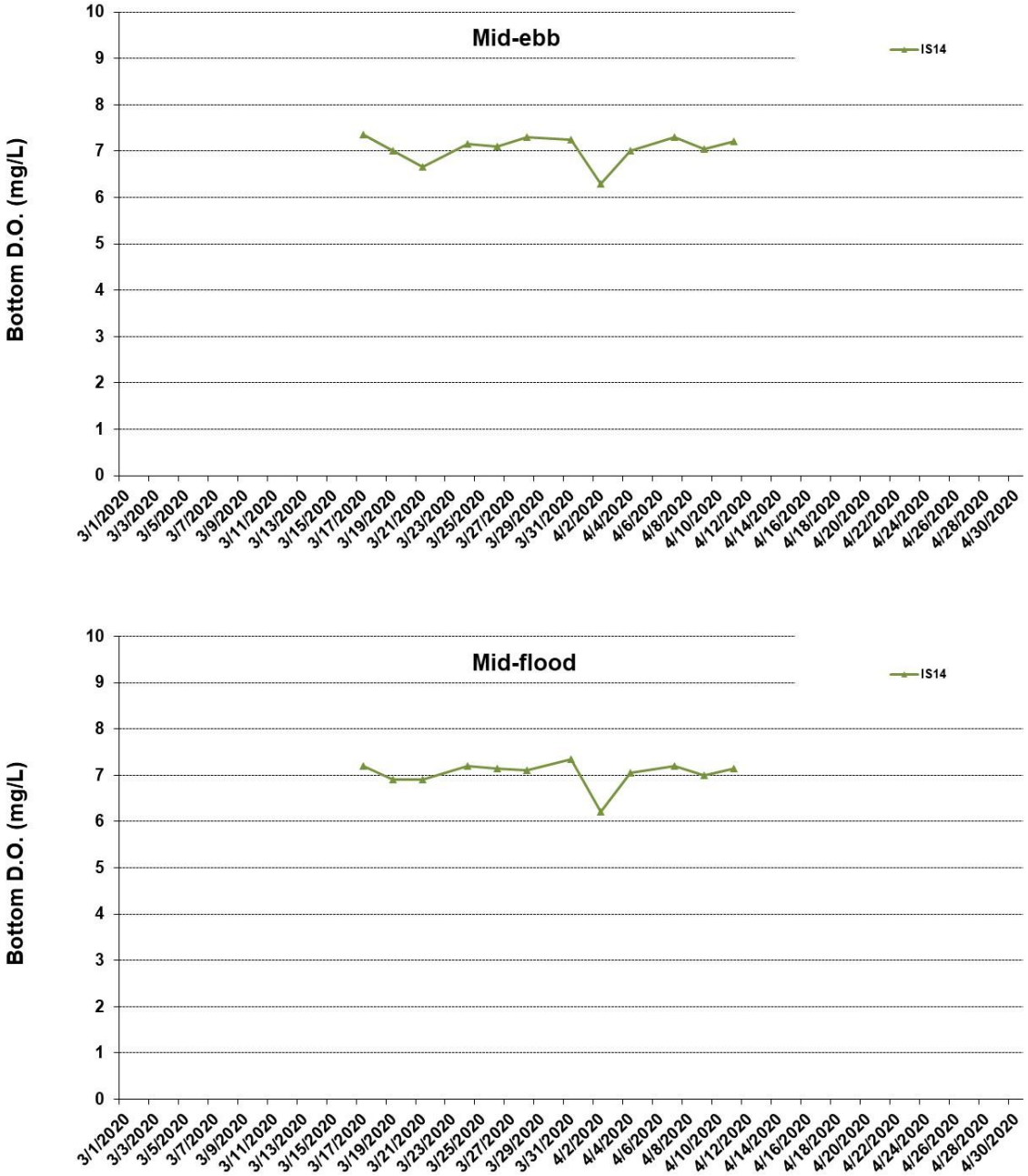


Figure G41 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS14. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

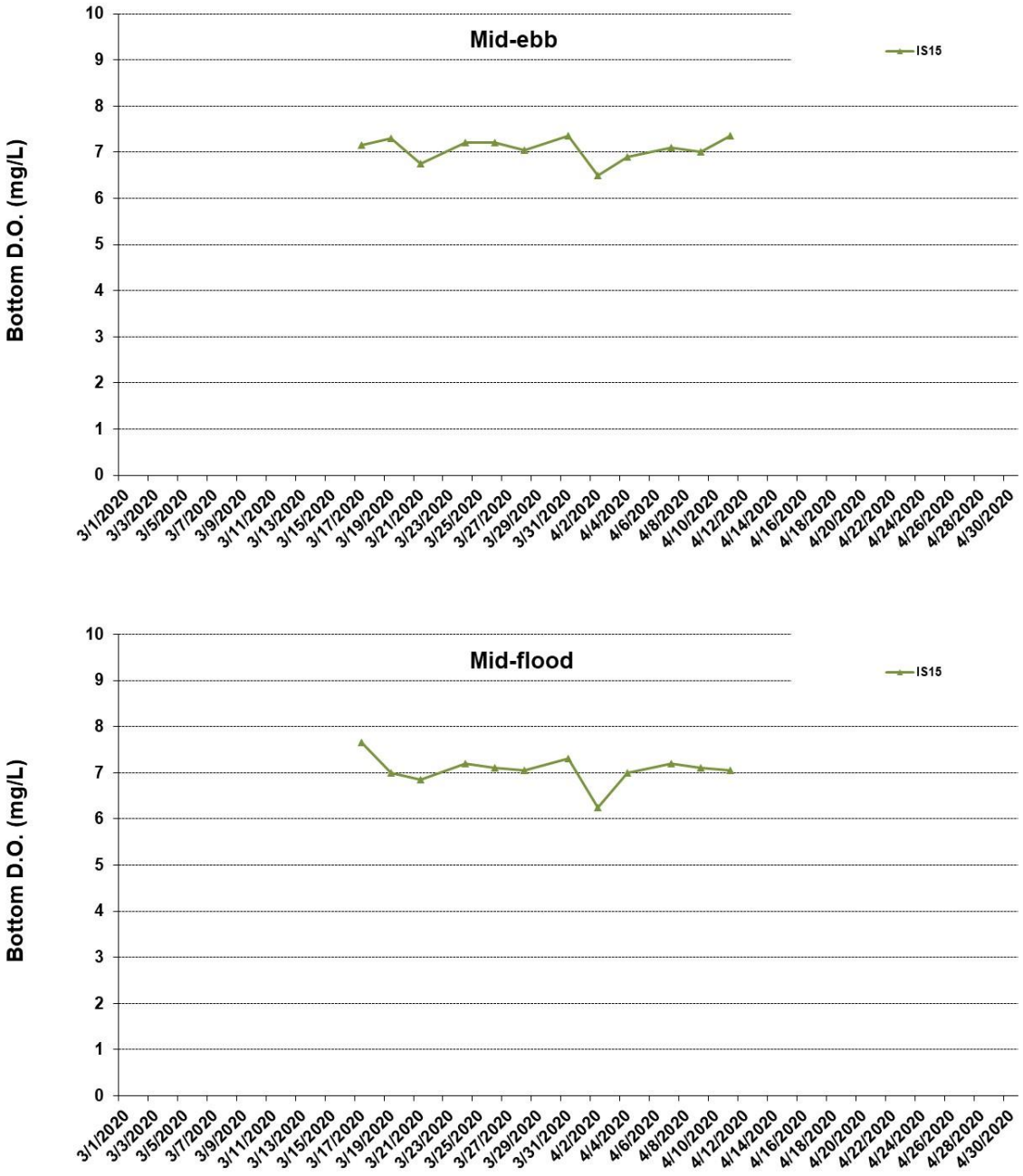


Figure G42 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS15. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

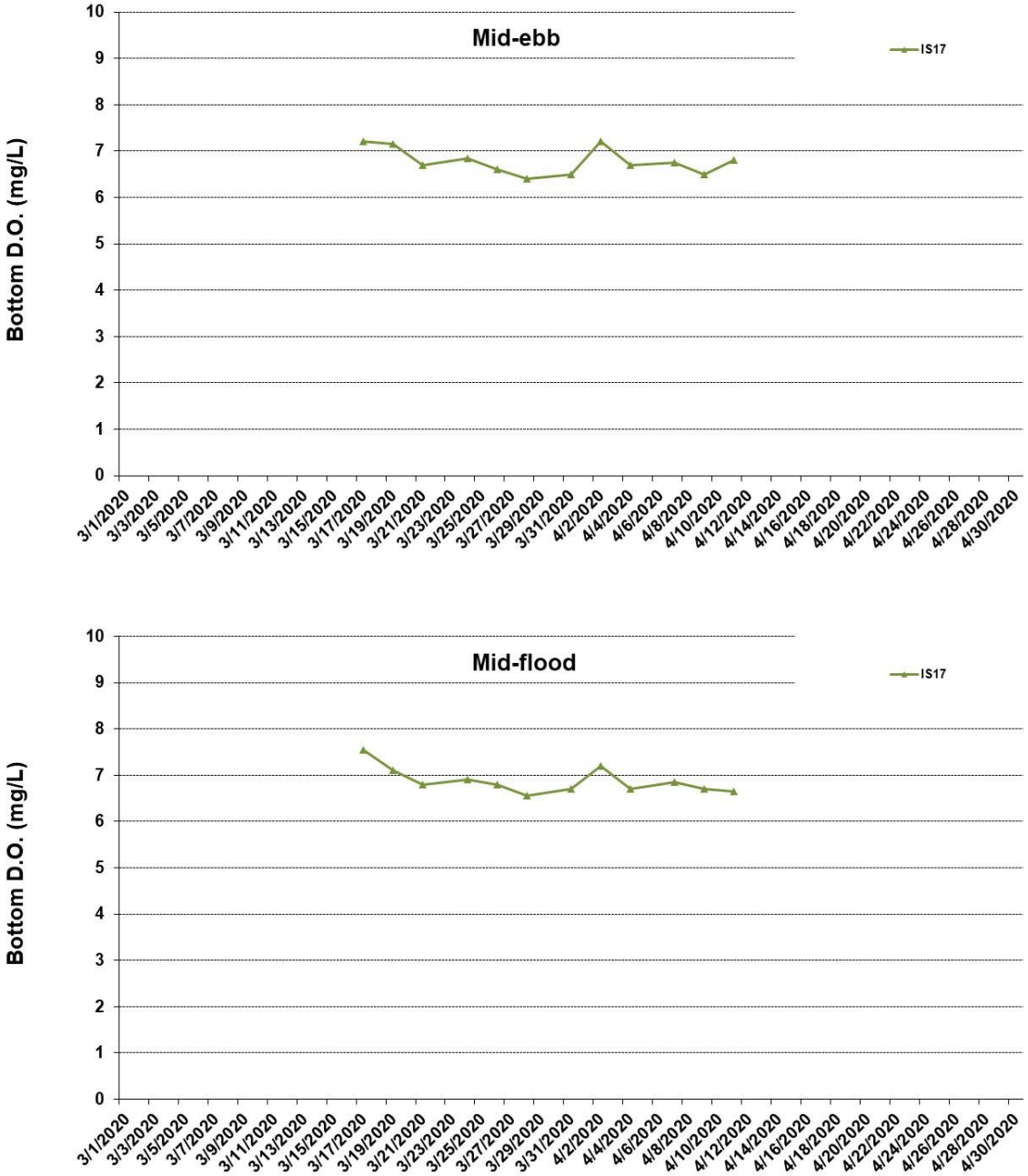


Figure G43 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

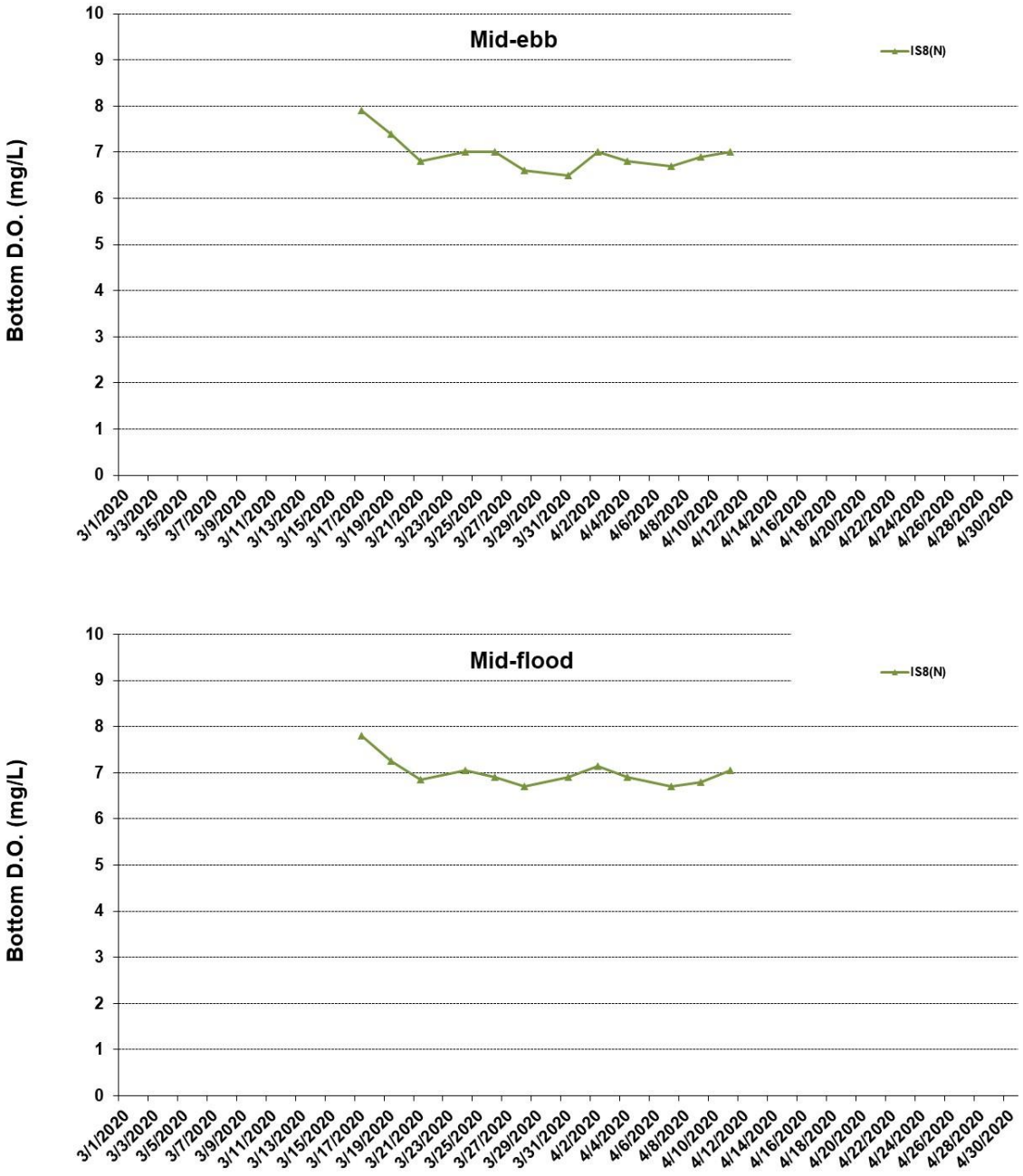


Figure G44 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

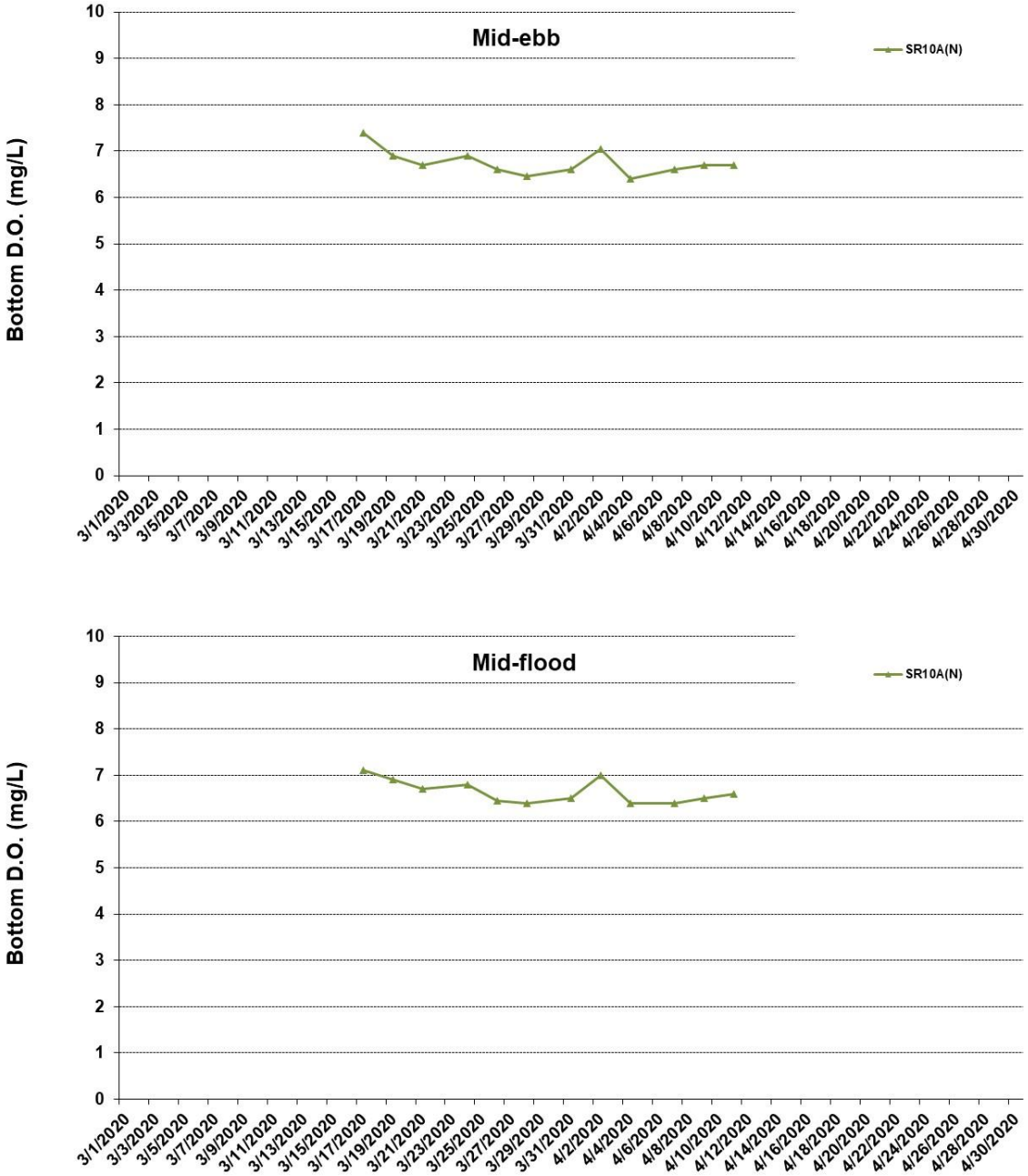


Figure G45 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR10A(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

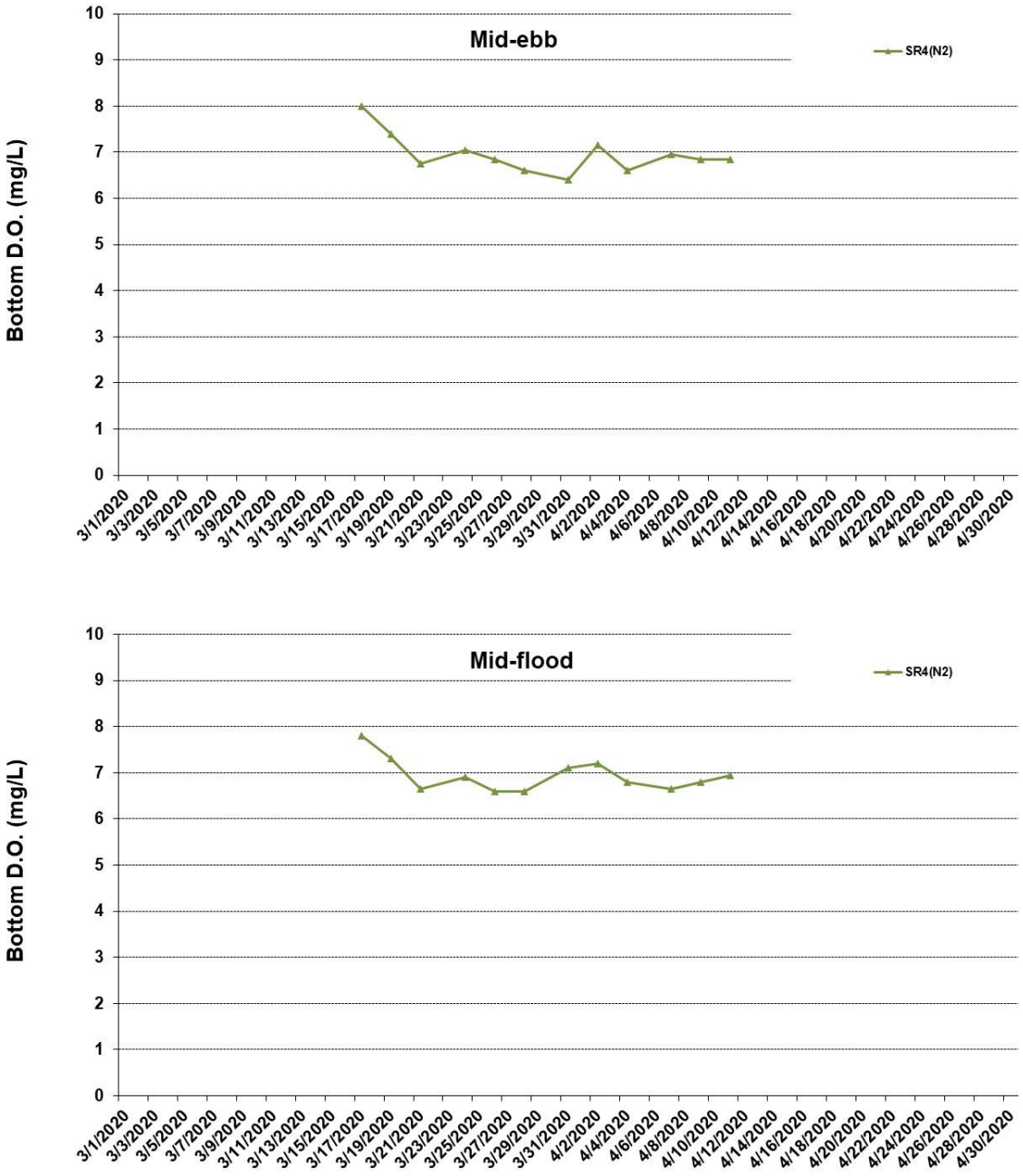


Figure G46 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

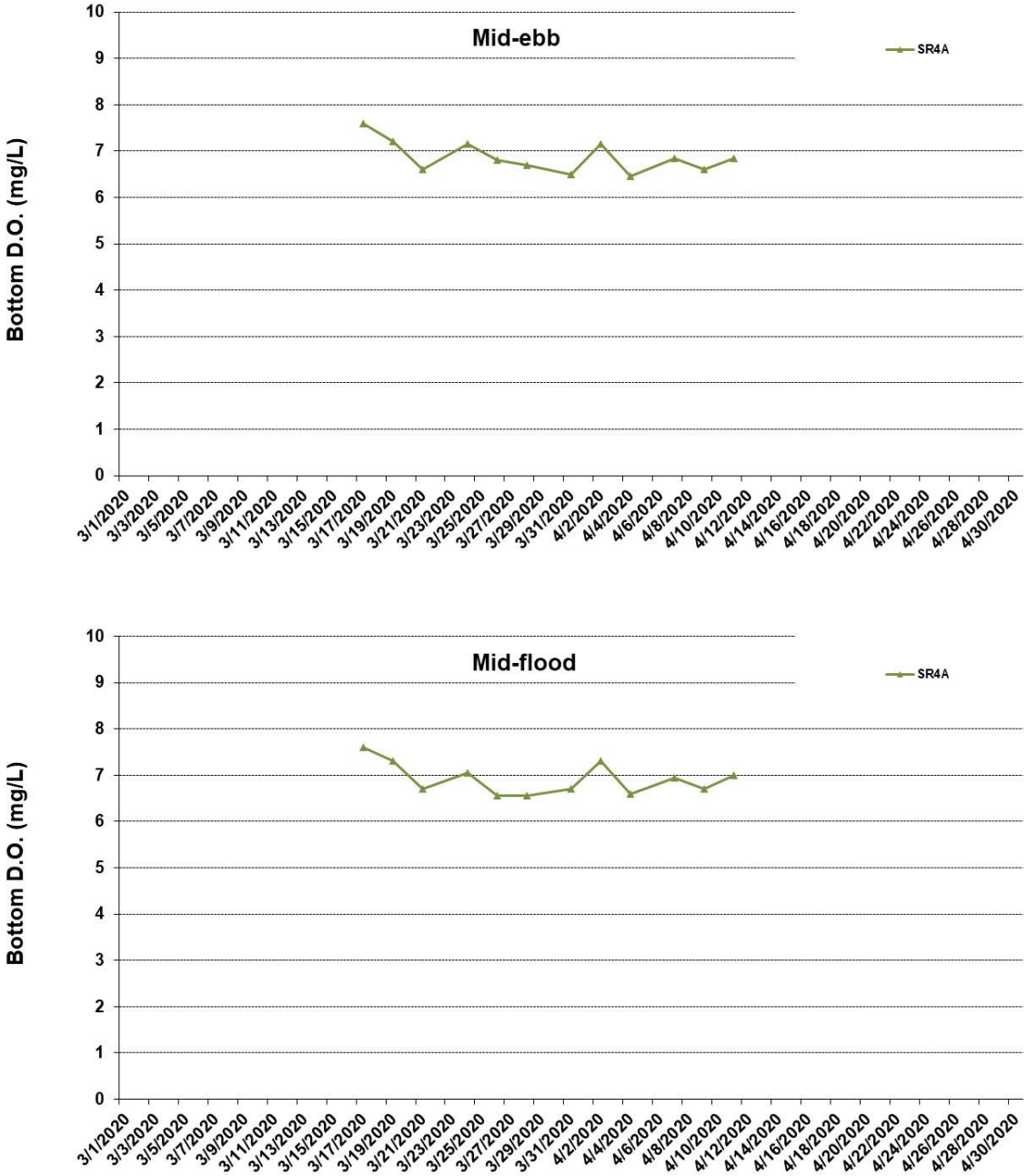


Figure G47 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR4A. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

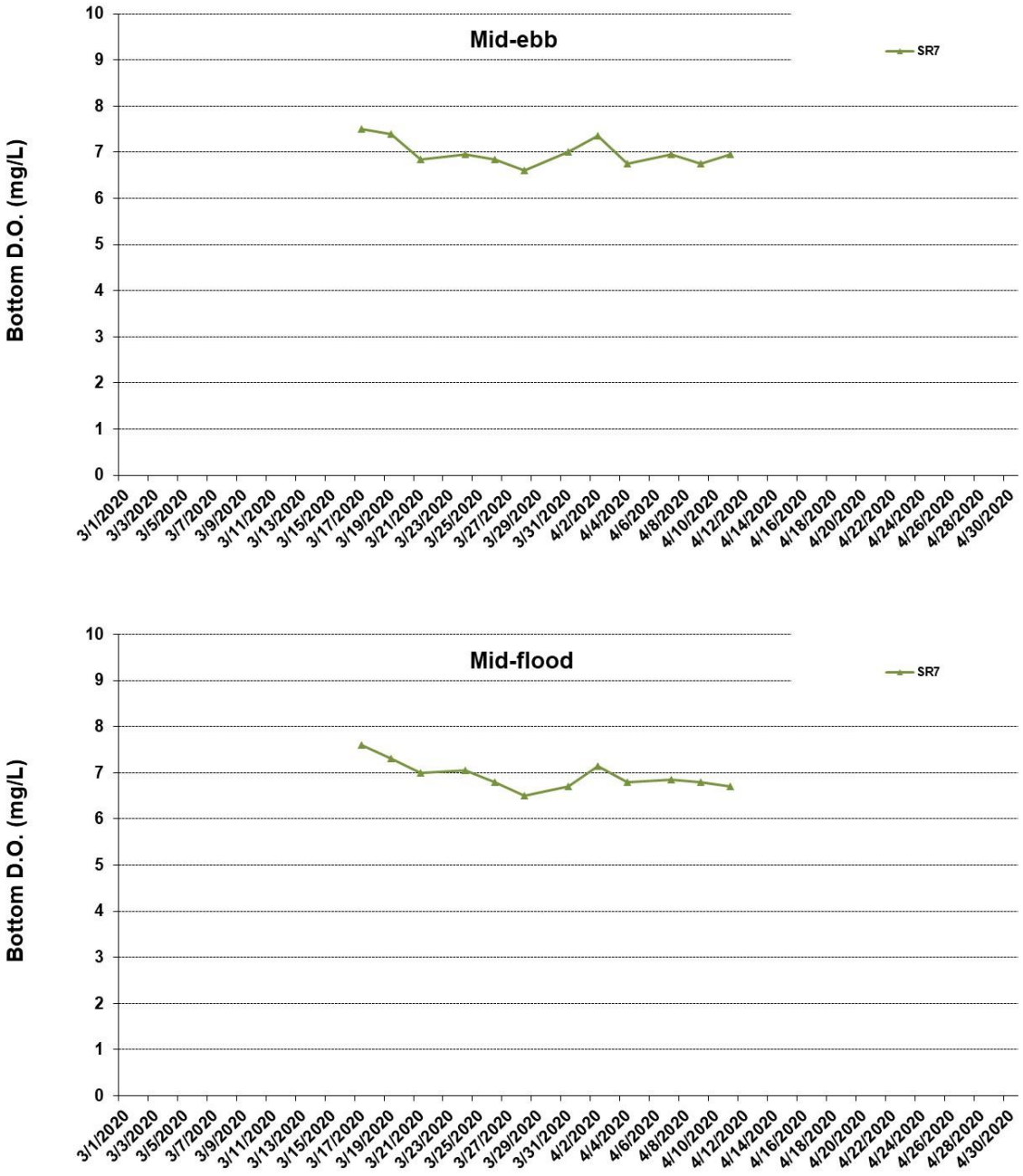


Figure G48 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

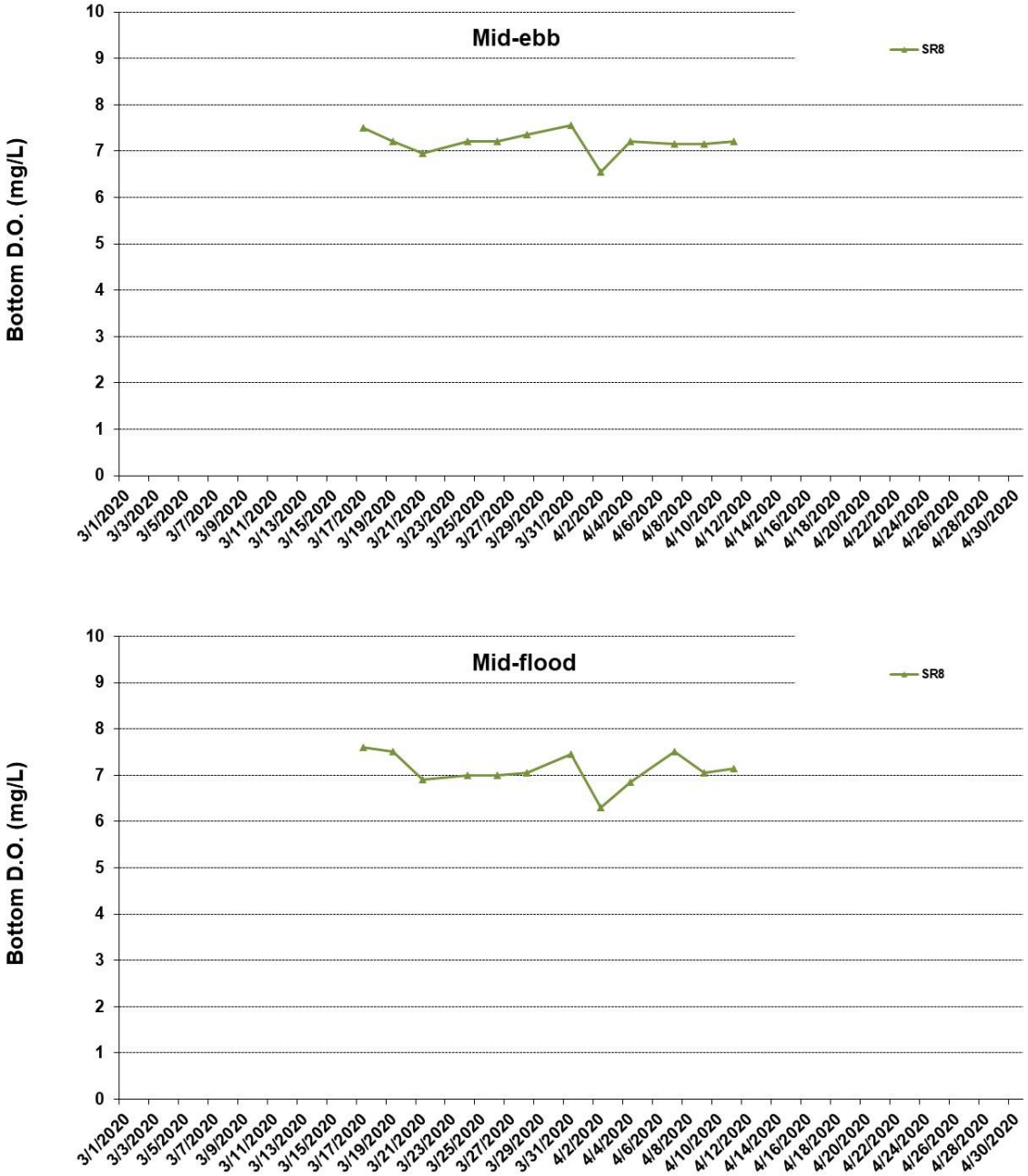


Figure G49 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR8. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

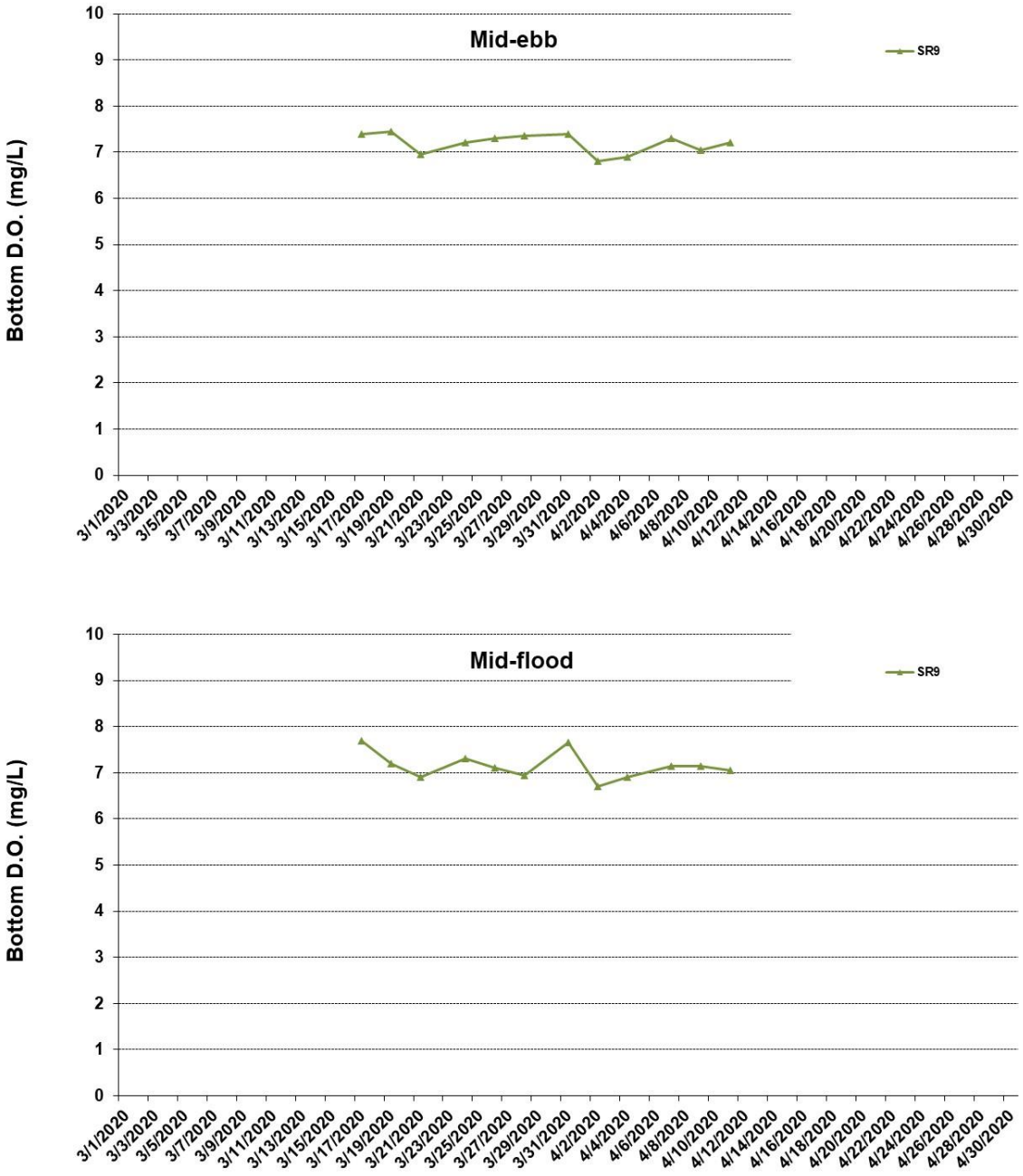


Figure G50 Post Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 17 March 2020 and 11 April 2020 at SR9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

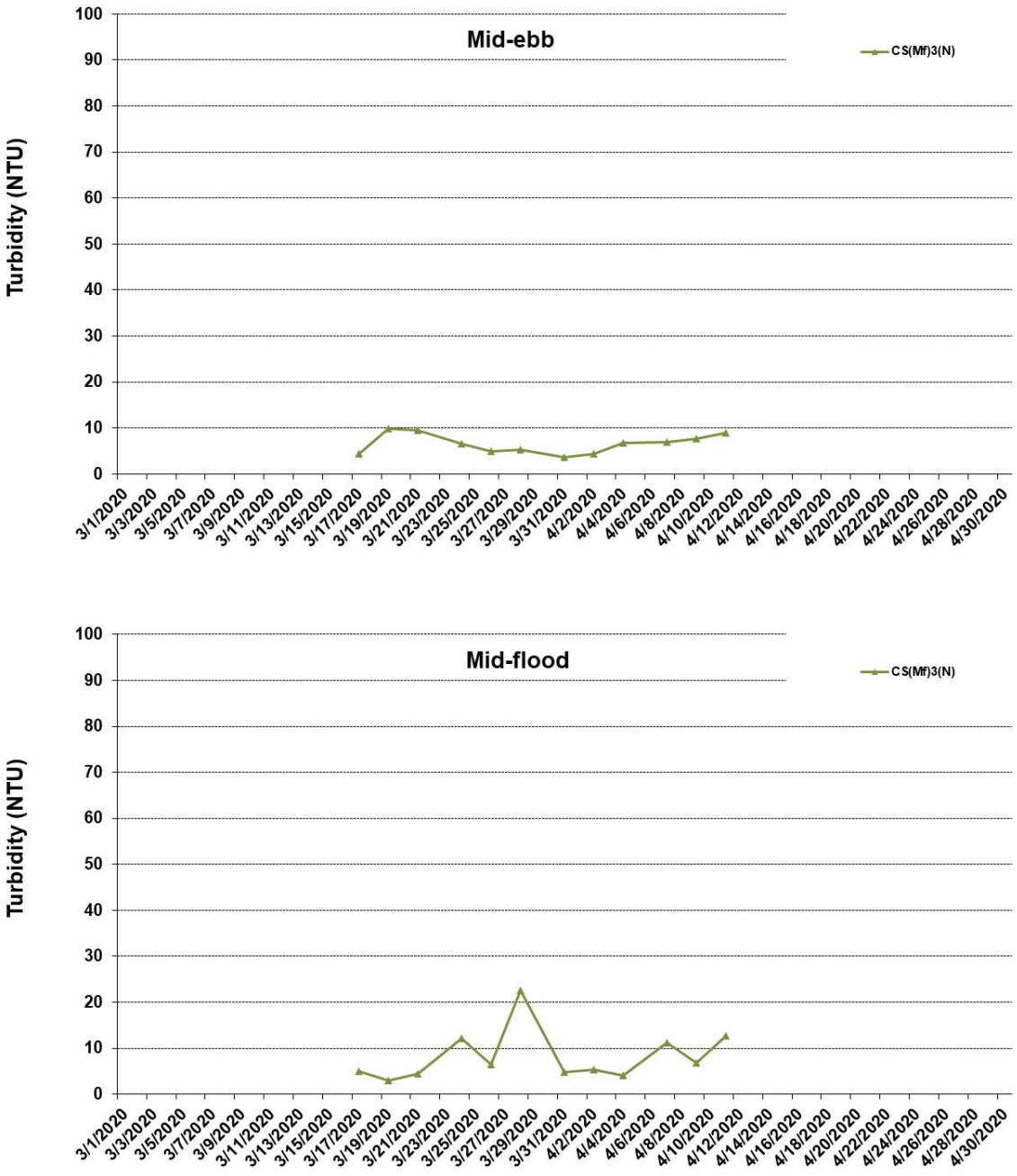


Figure G51 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

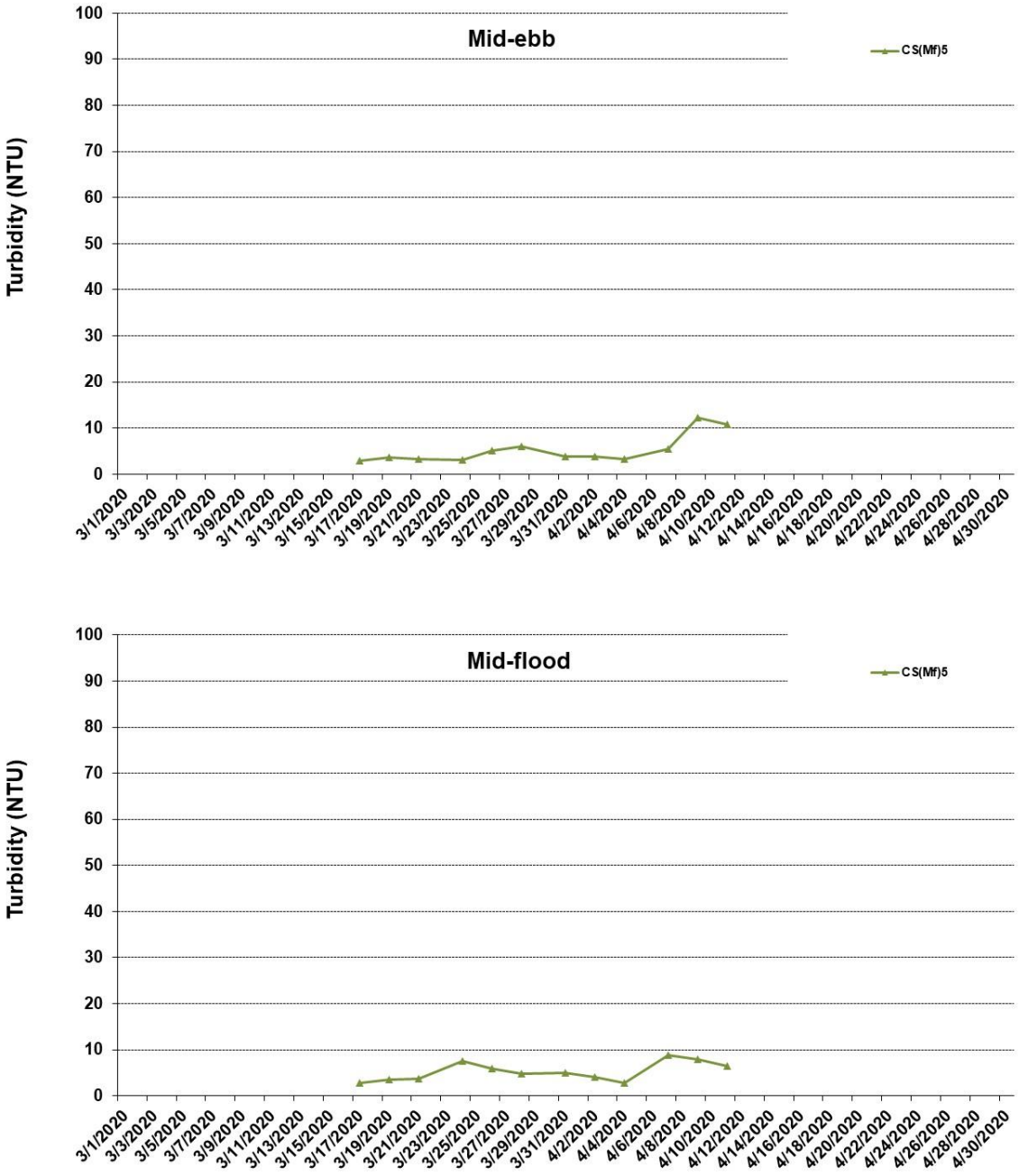


Figure G52 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

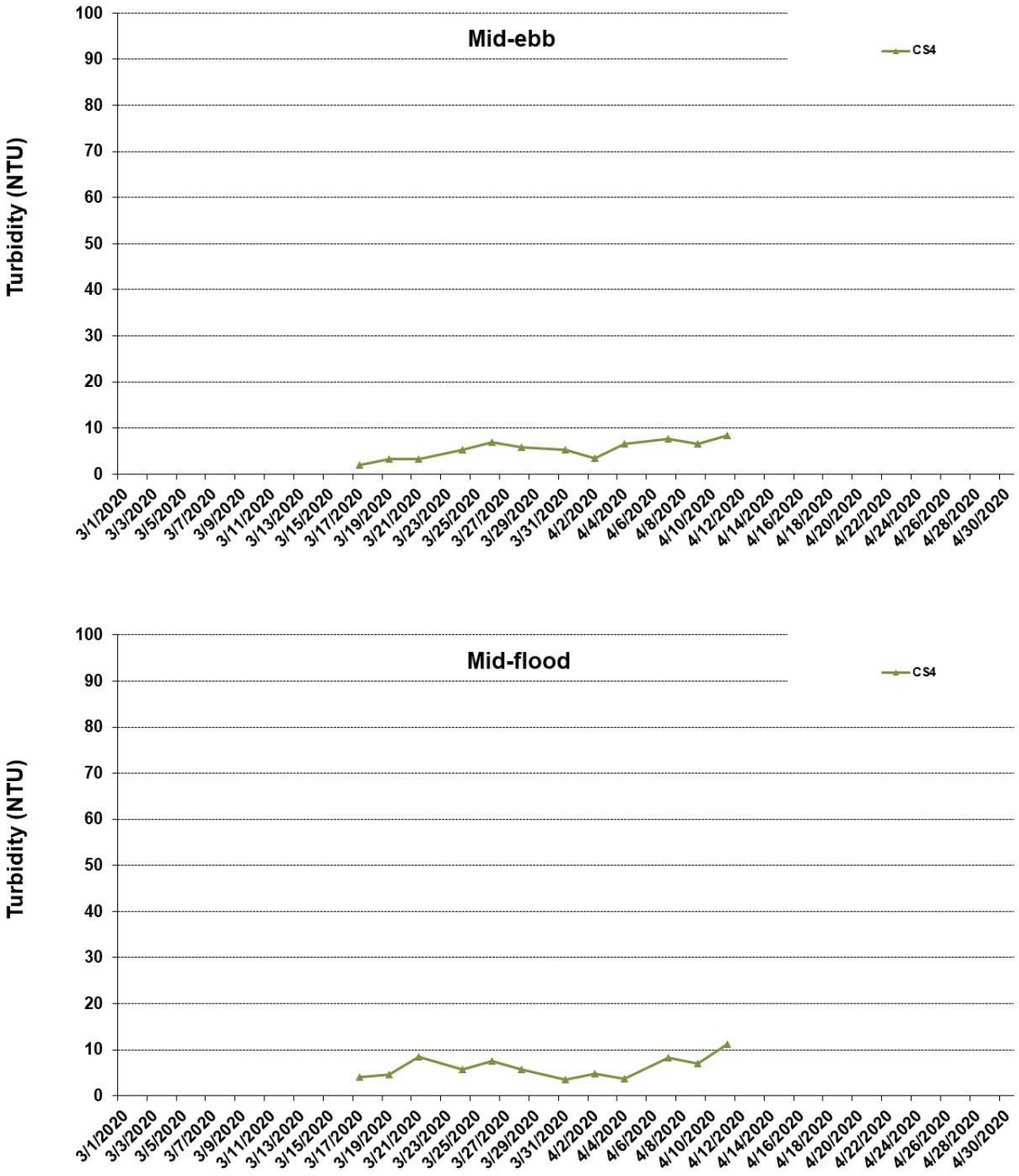


Figure G53 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at CS4. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

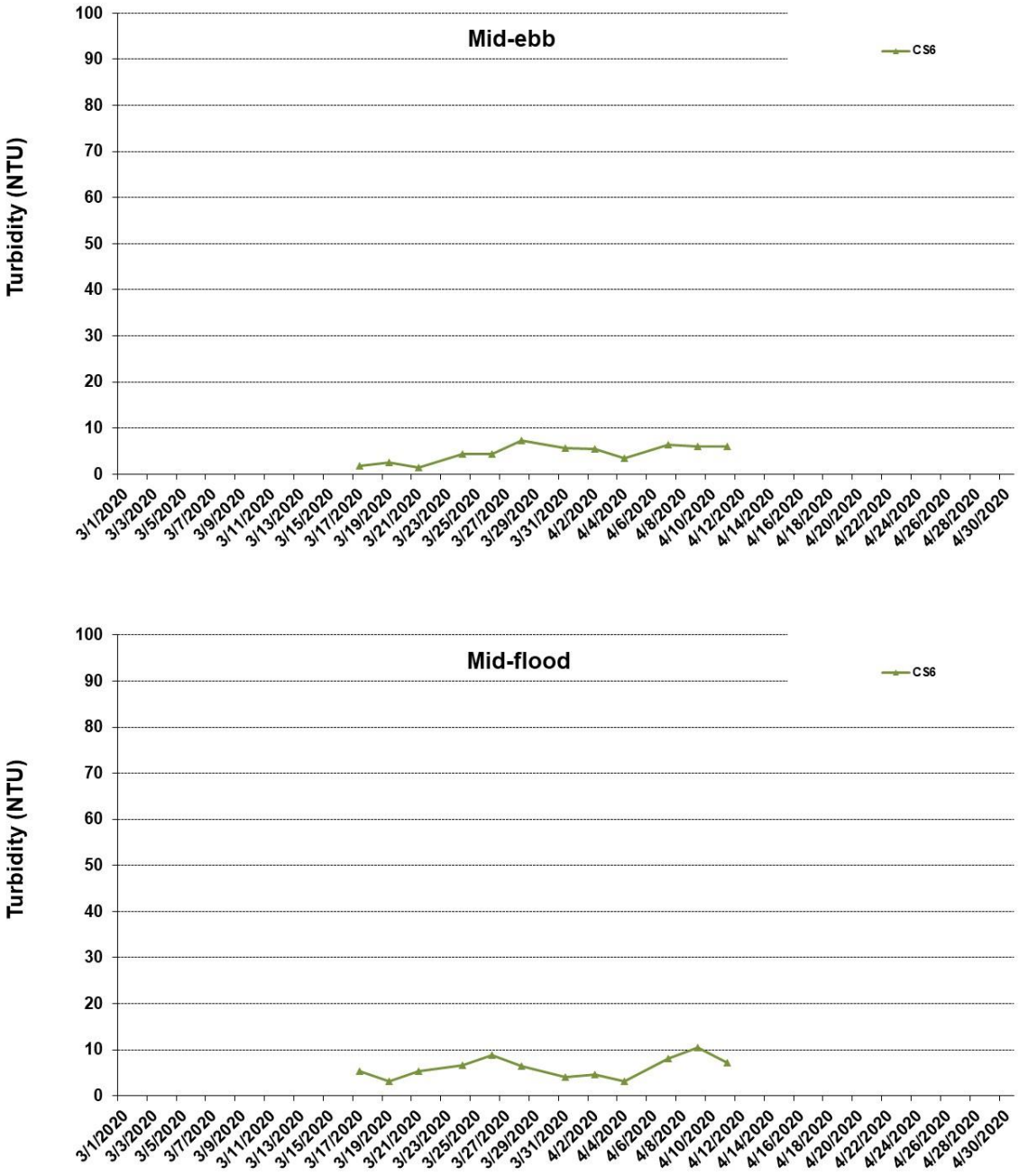


Figure G54 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at CS6. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

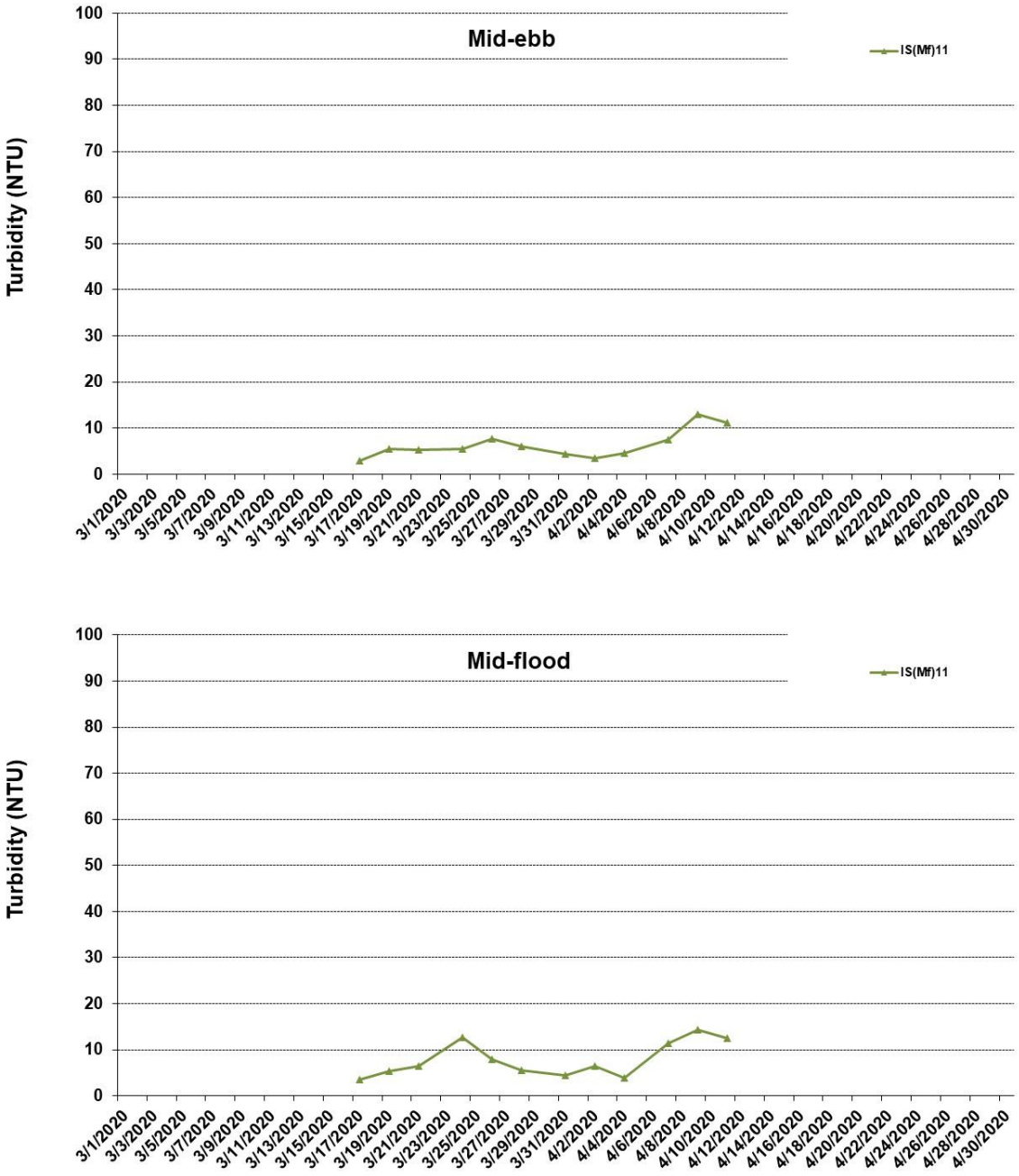


Figure G55 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

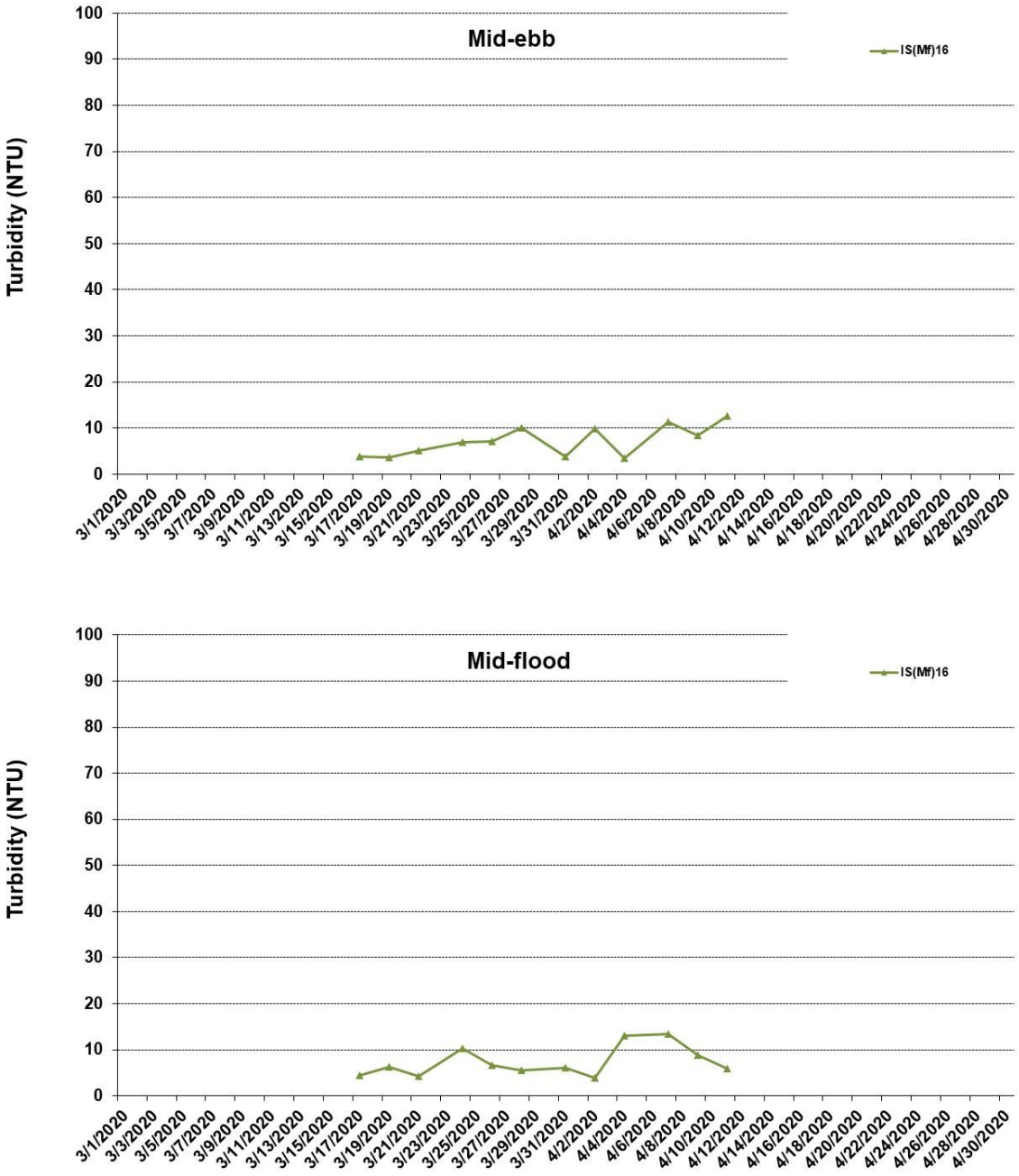


Figure G56 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

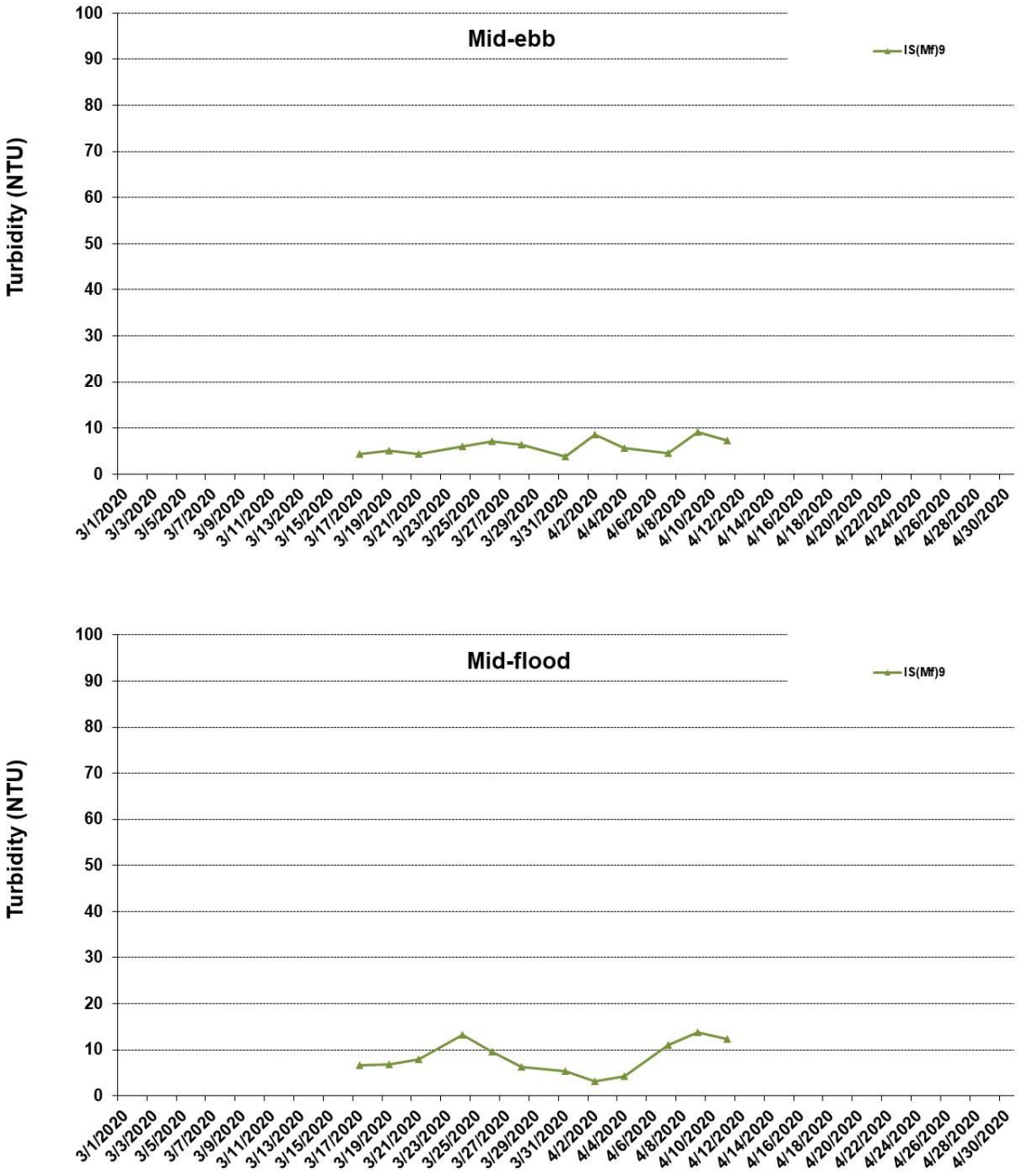


Figure G57 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

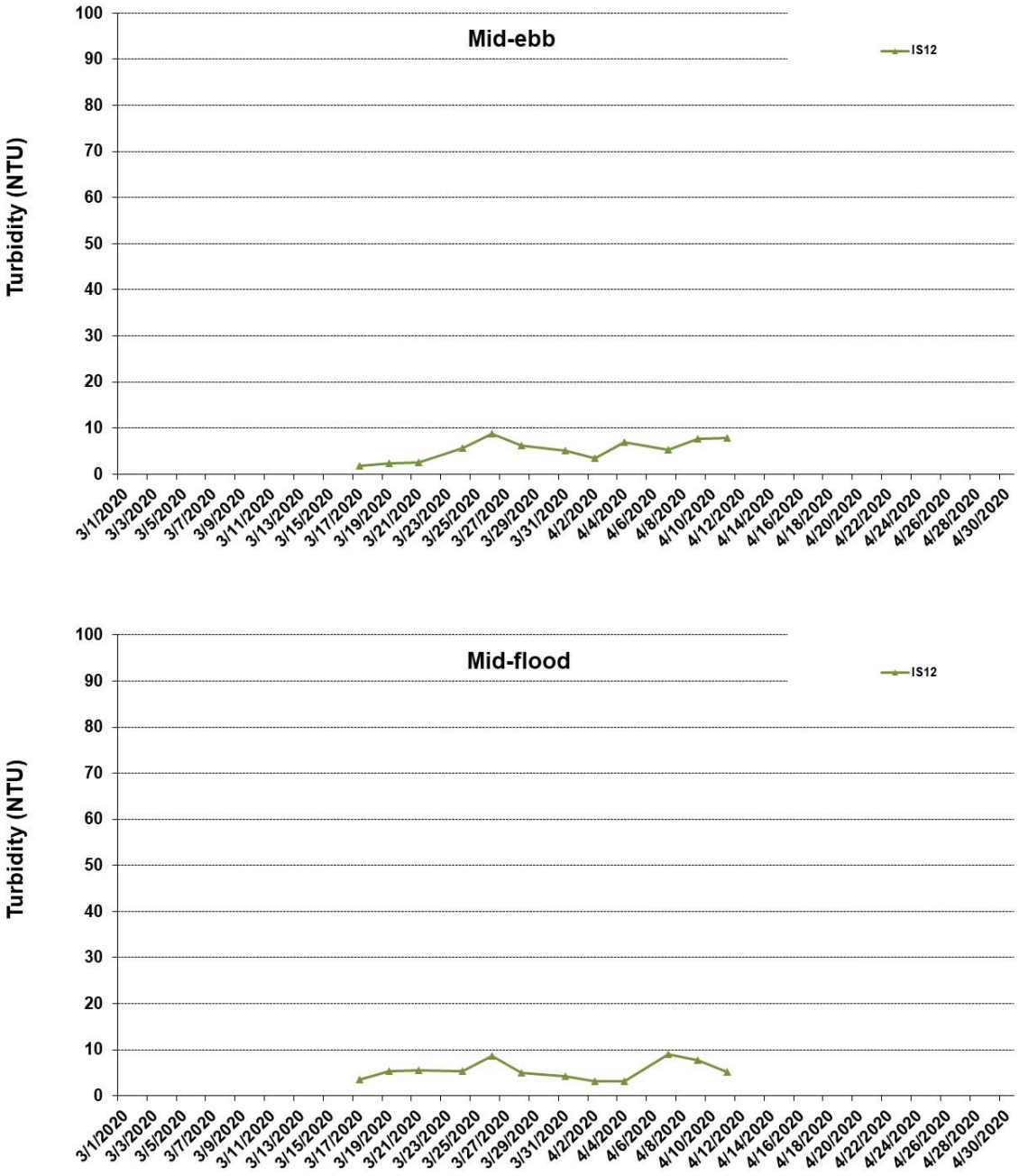


Figure G58 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS12. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

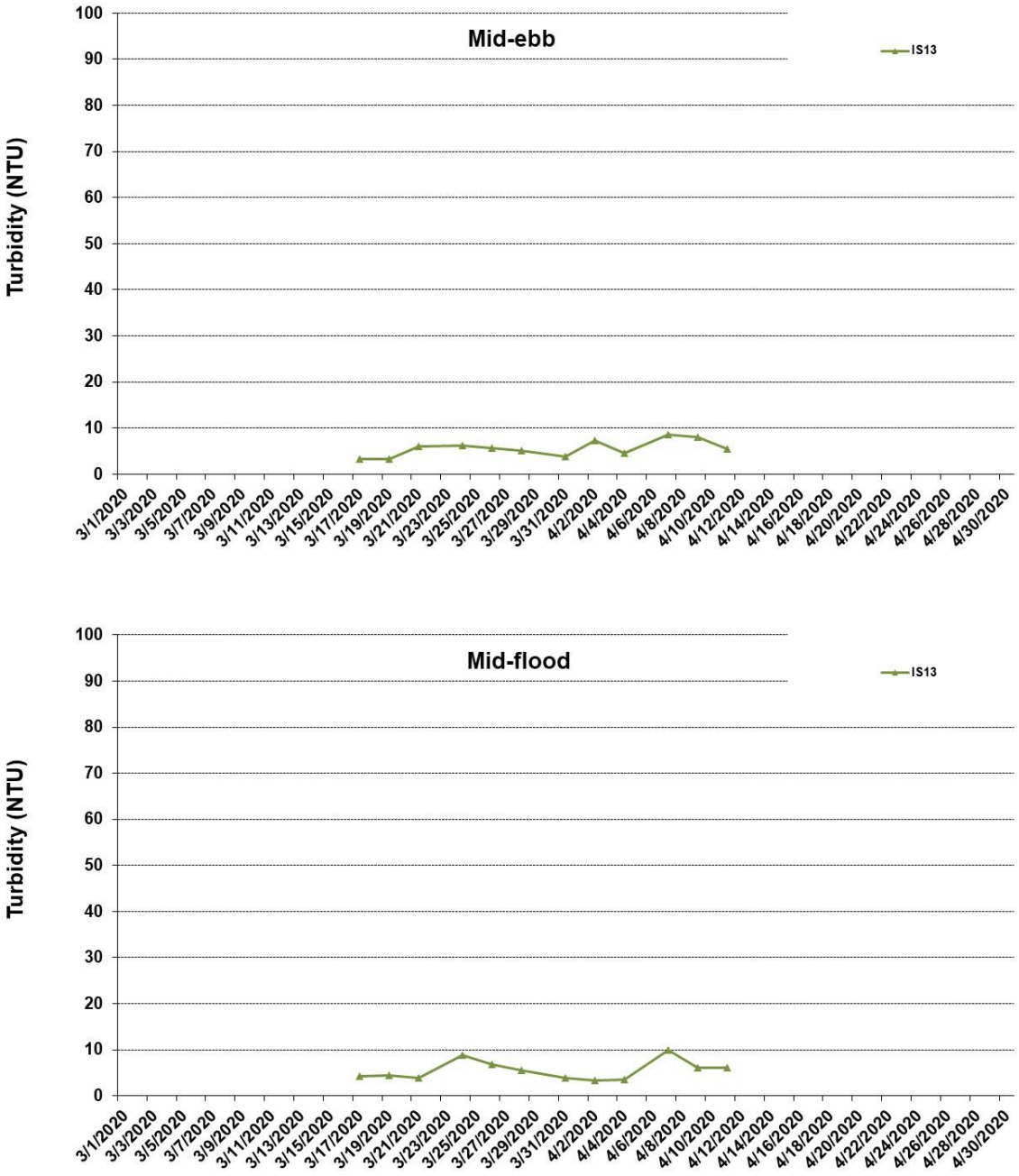


Figure G59 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS13. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

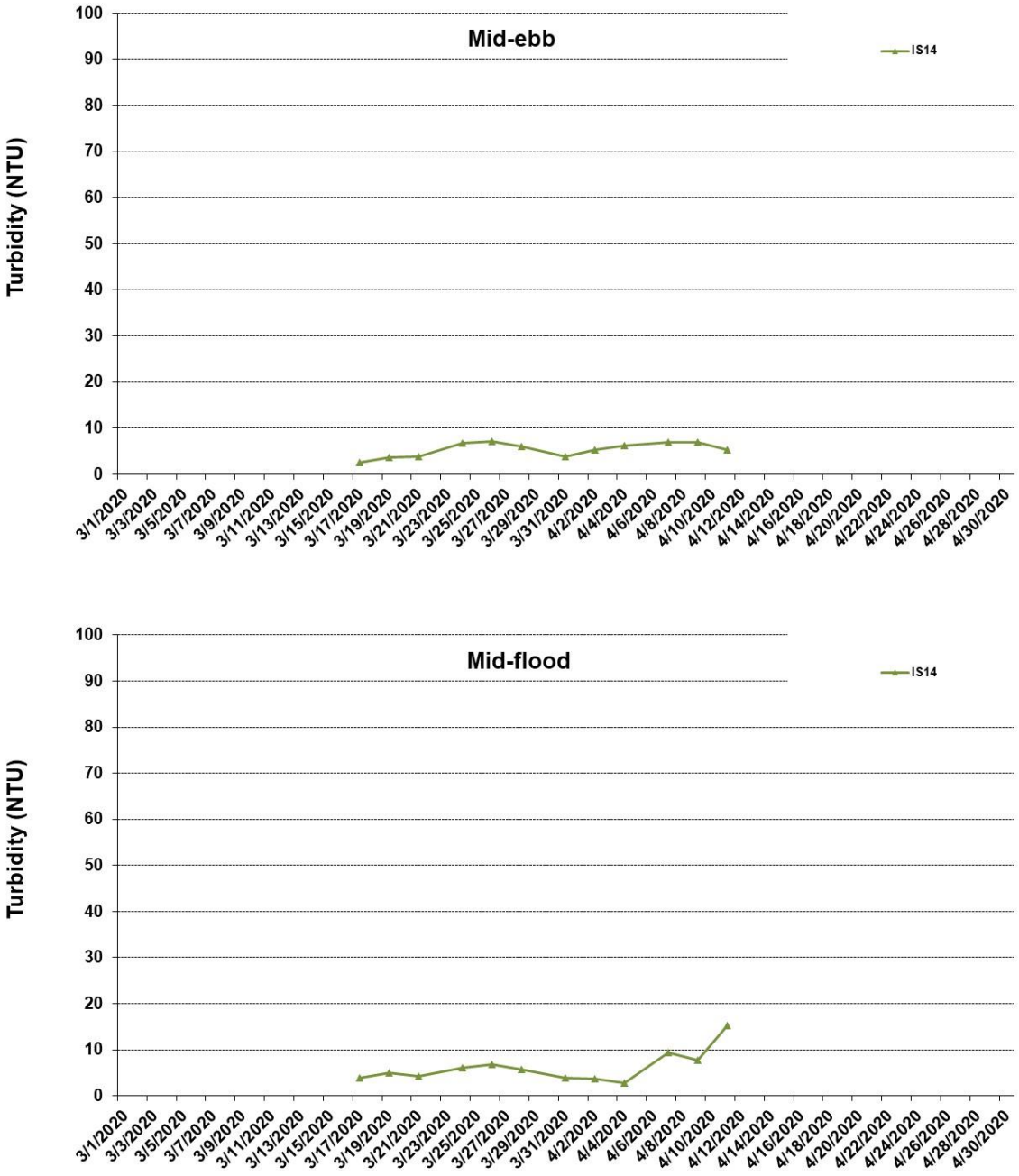


Figure G60 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS14. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

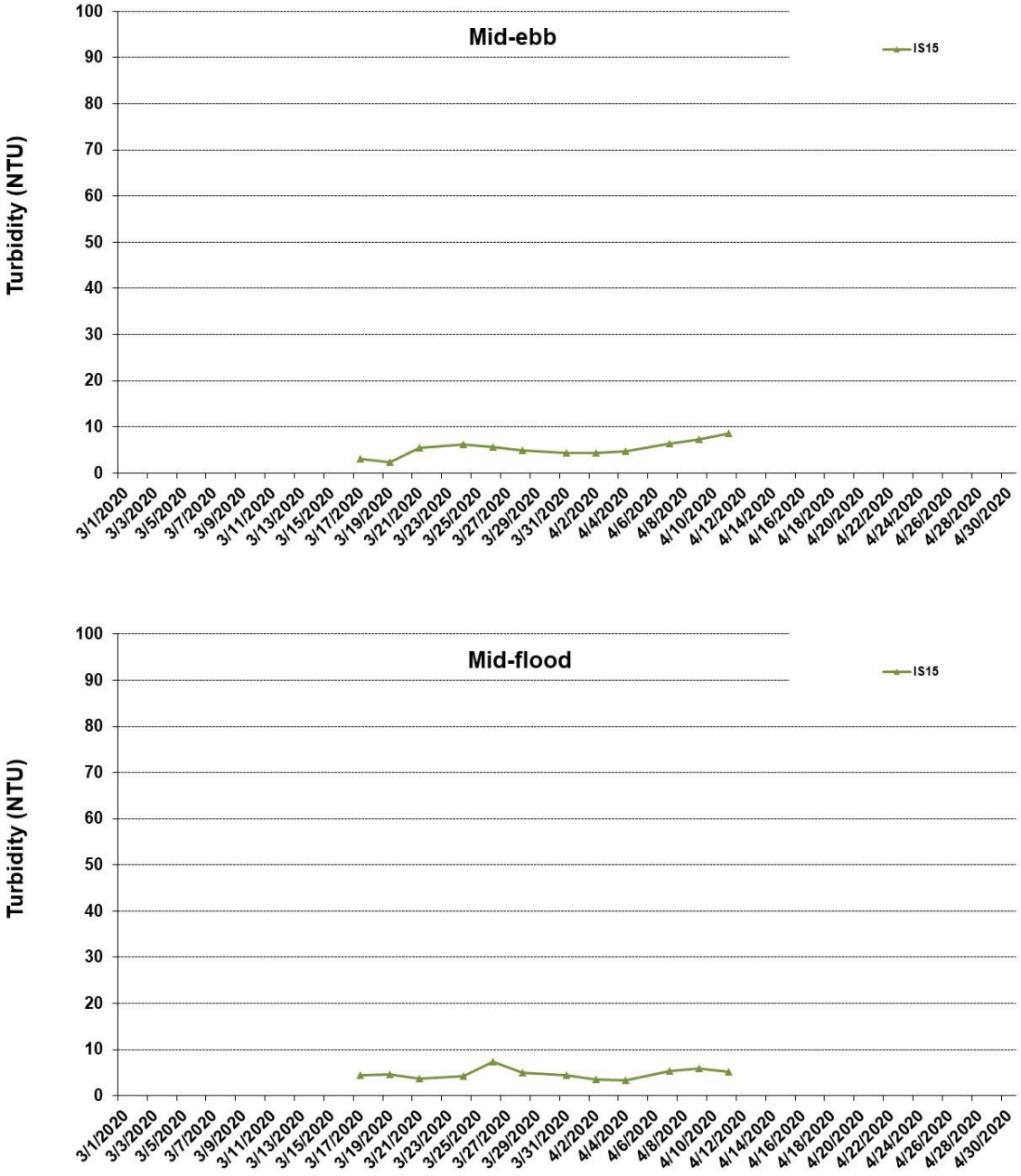


Figure G61 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS15. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

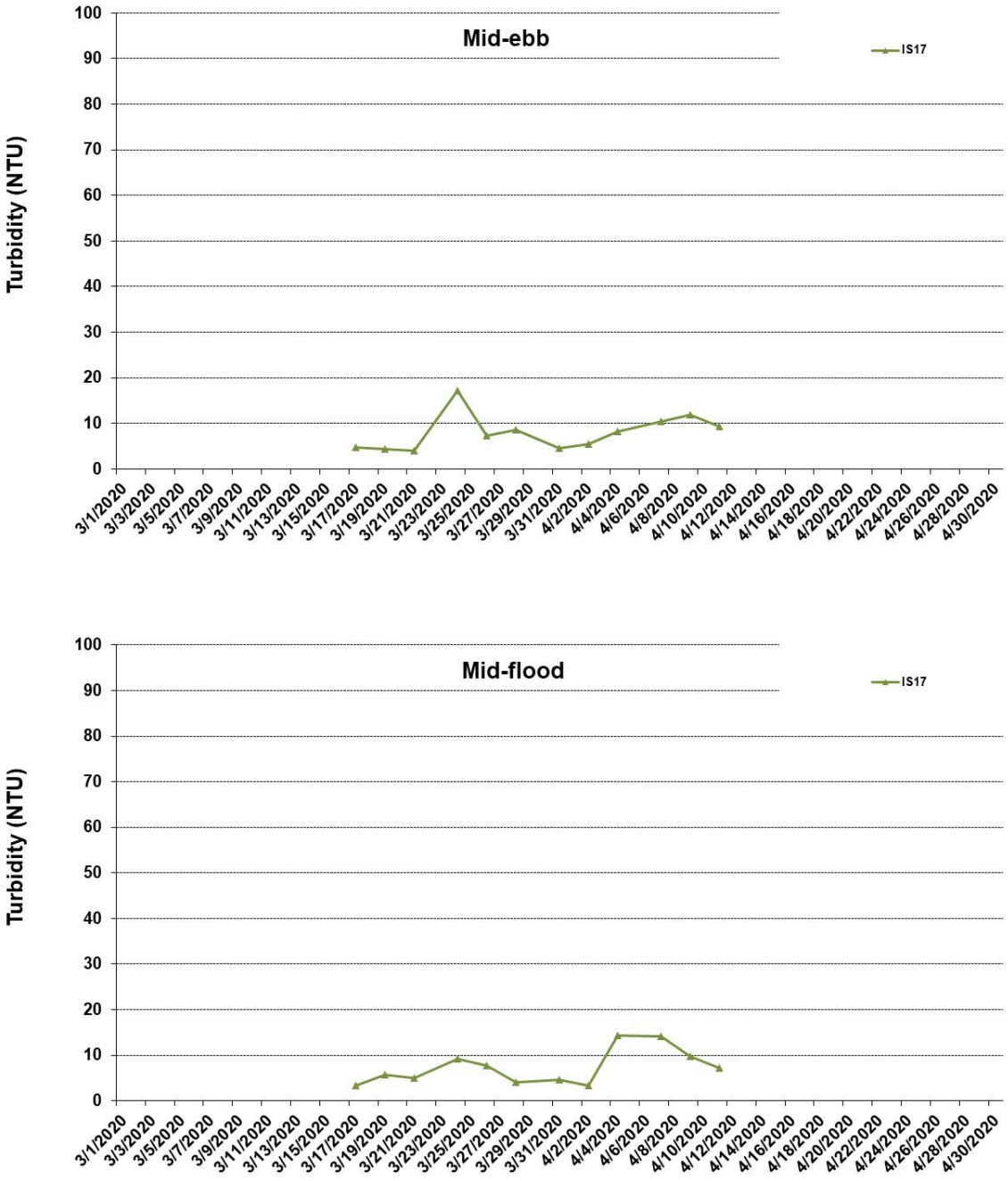


Figure G62 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

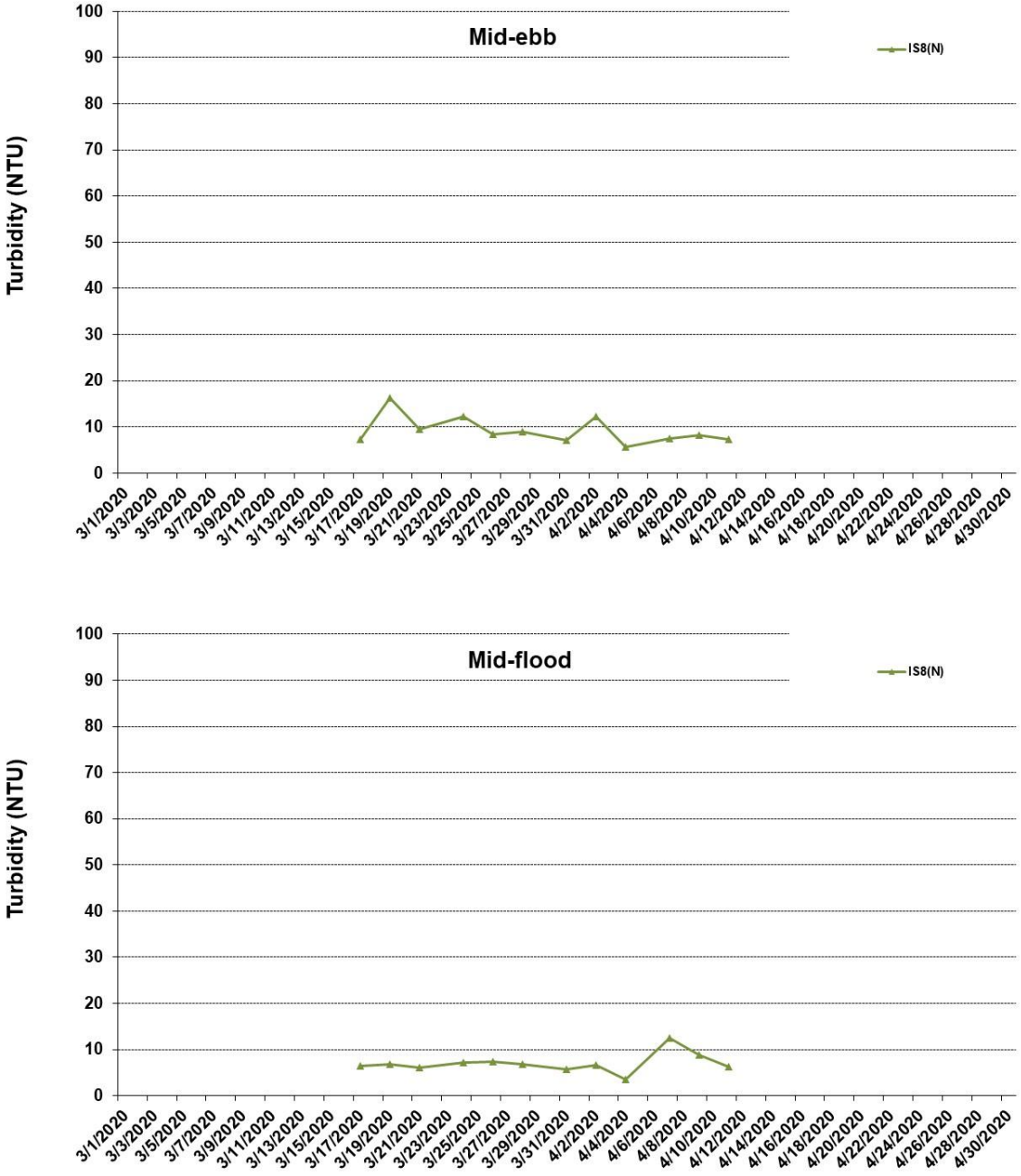


Figure G63 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

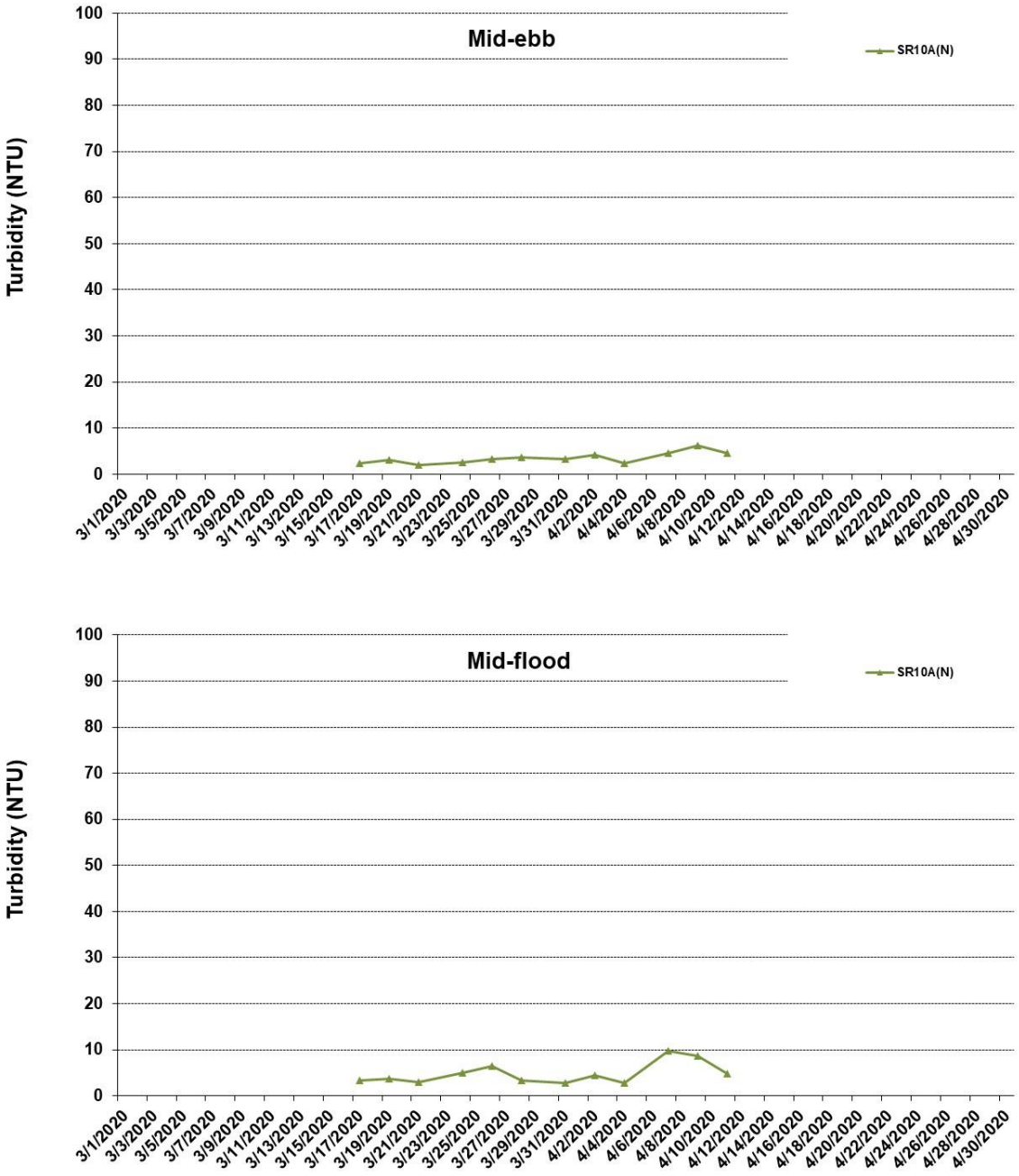


Figure G64 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at SR10A(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

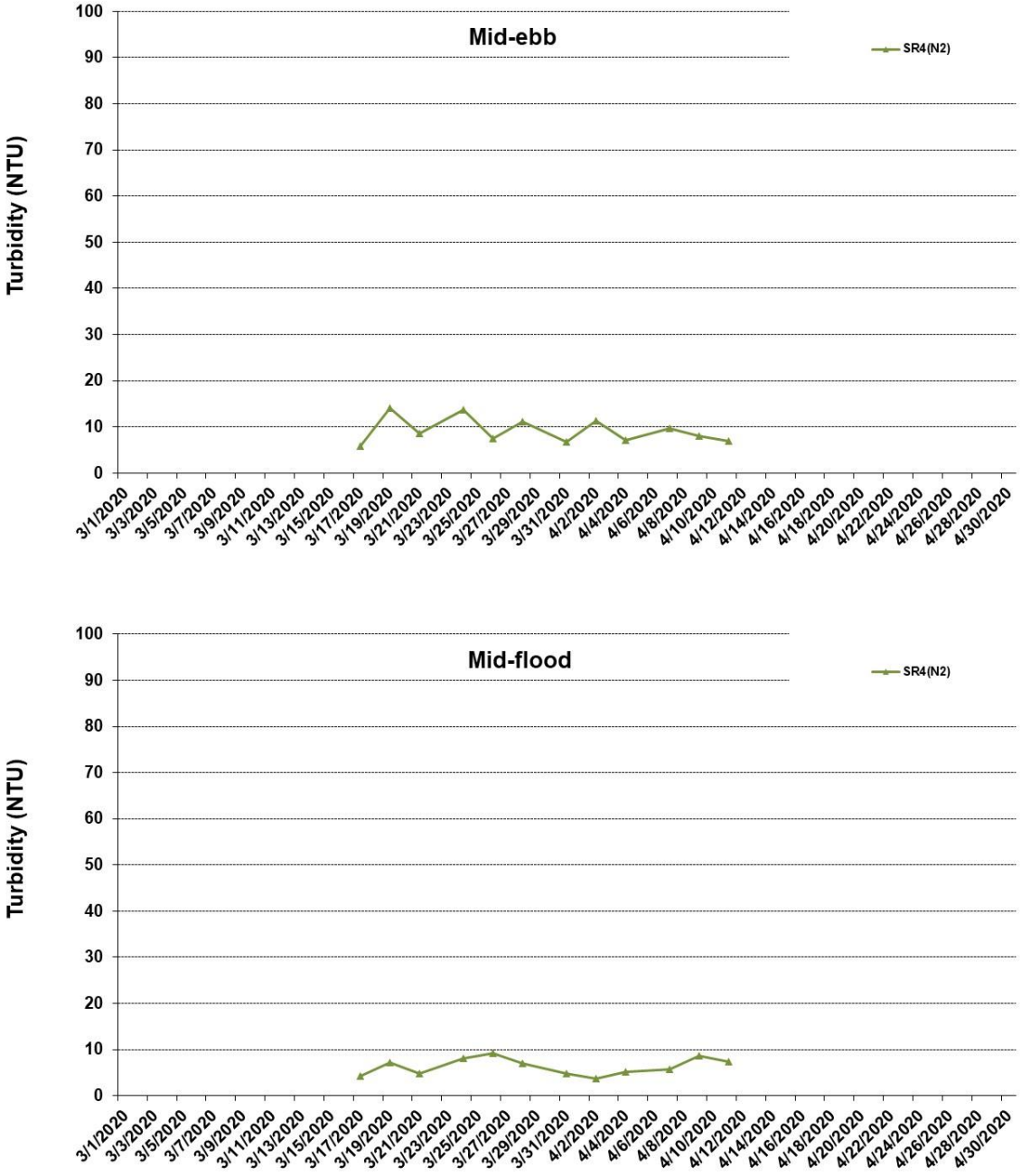


Figure G65 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

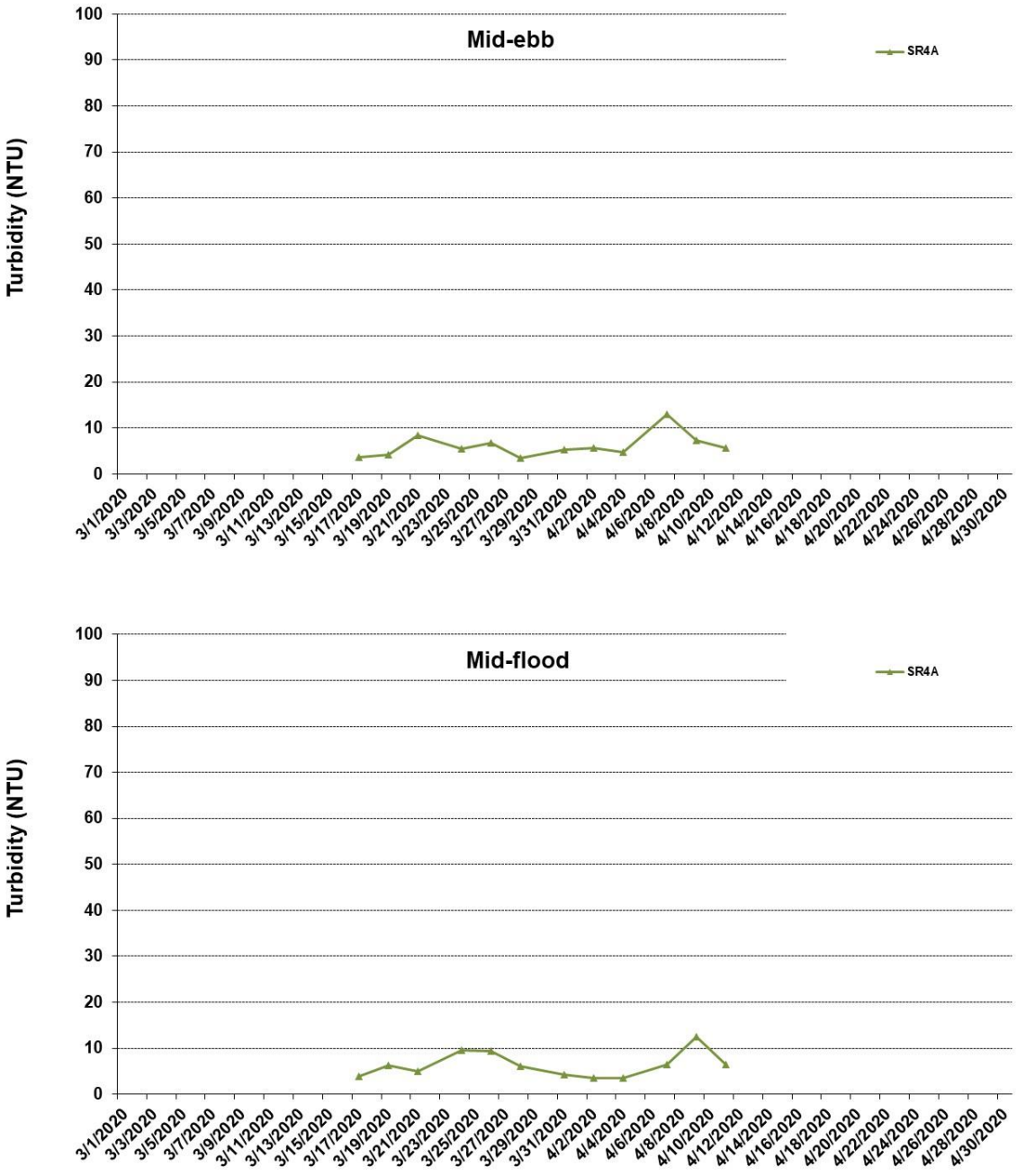


Figure G66 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at SR4. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

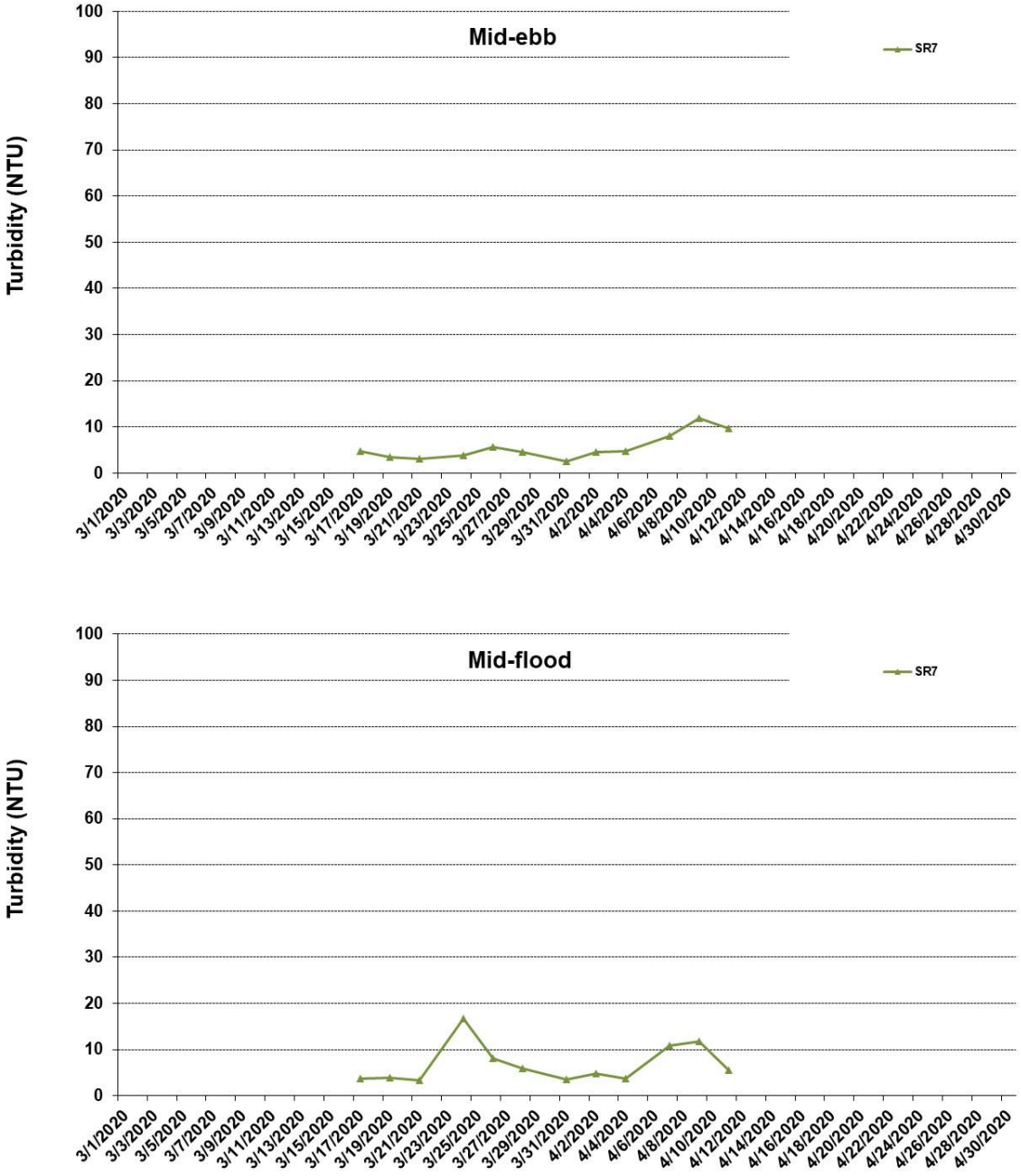
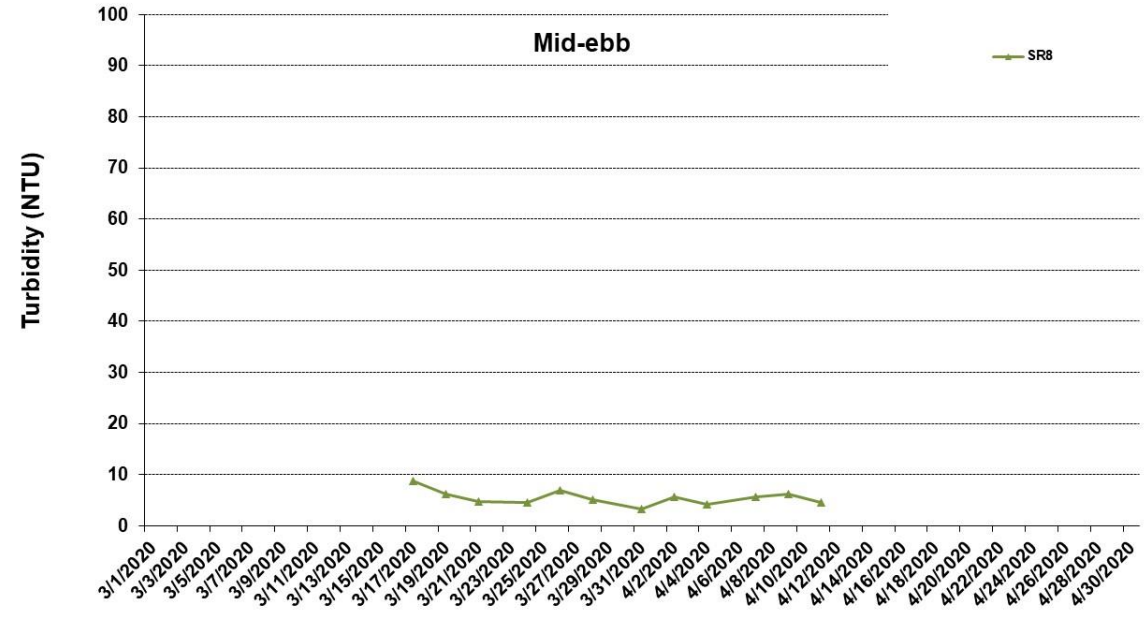


Figure G67 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.



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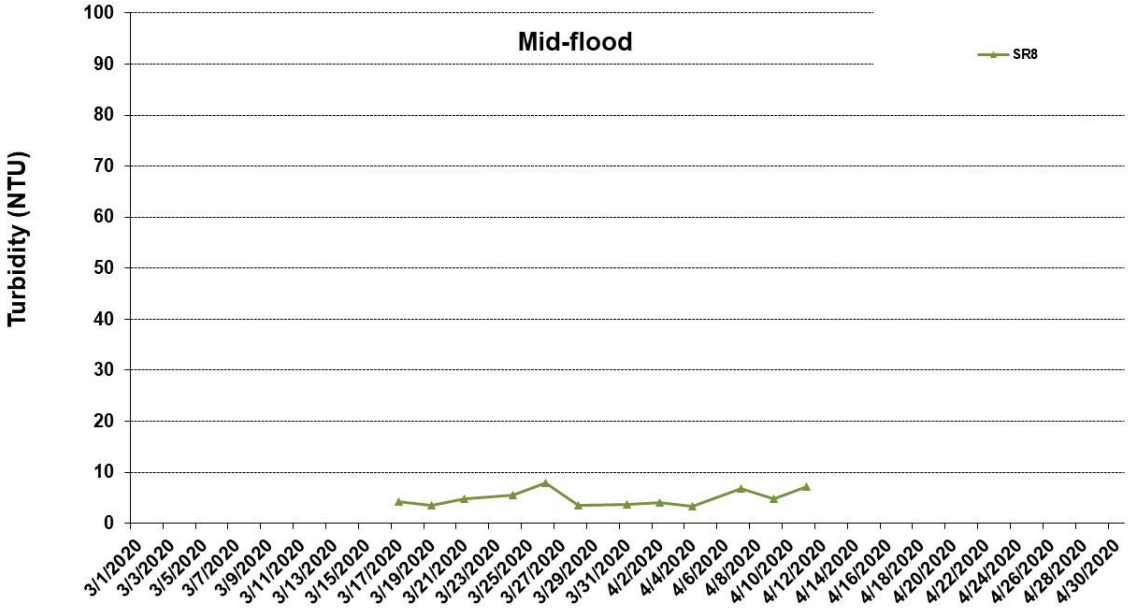

Figure G68 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at SR8. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

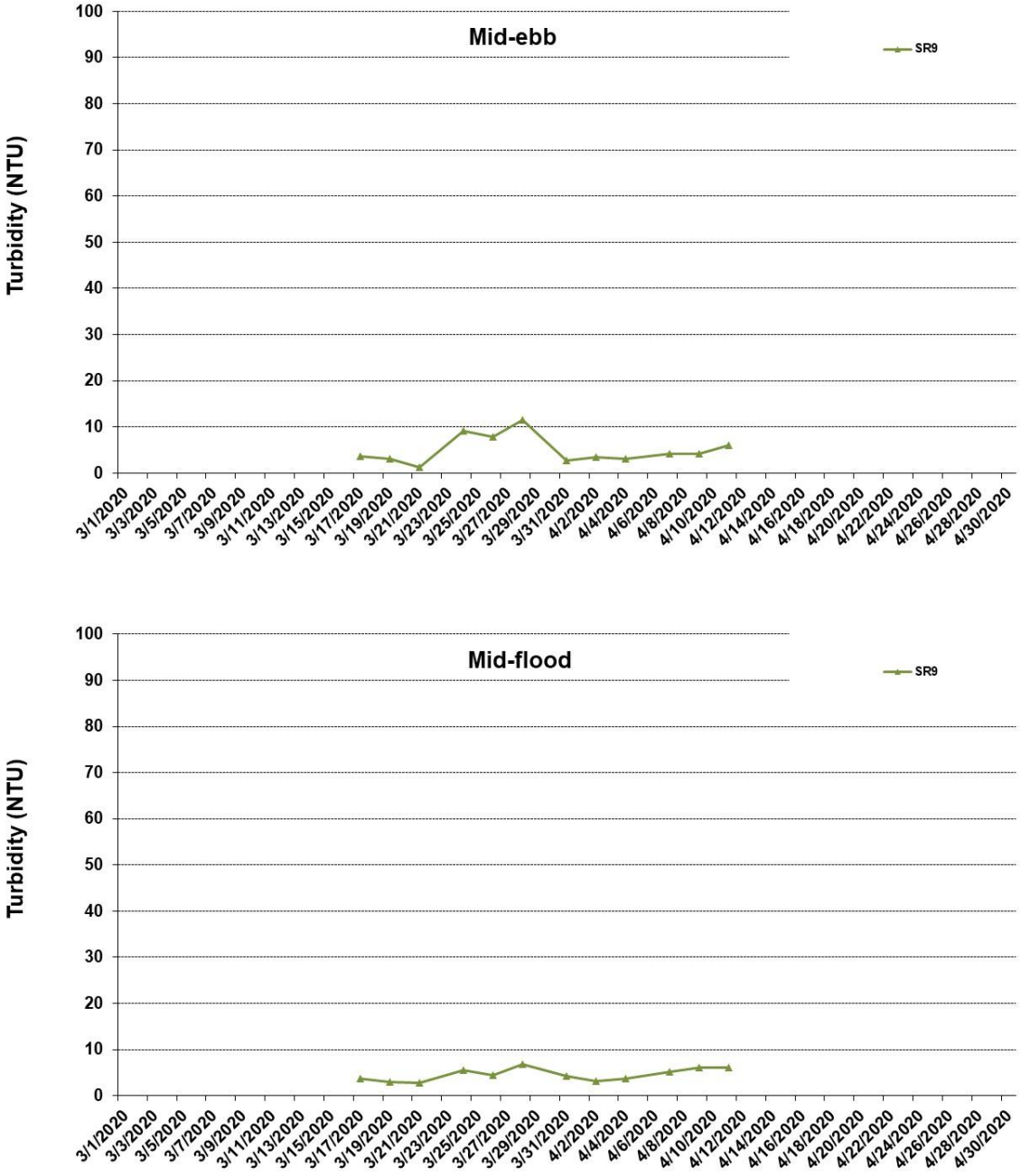

Figure G69 Post Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 17 March 2020 and 11 April 2020 at SR9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

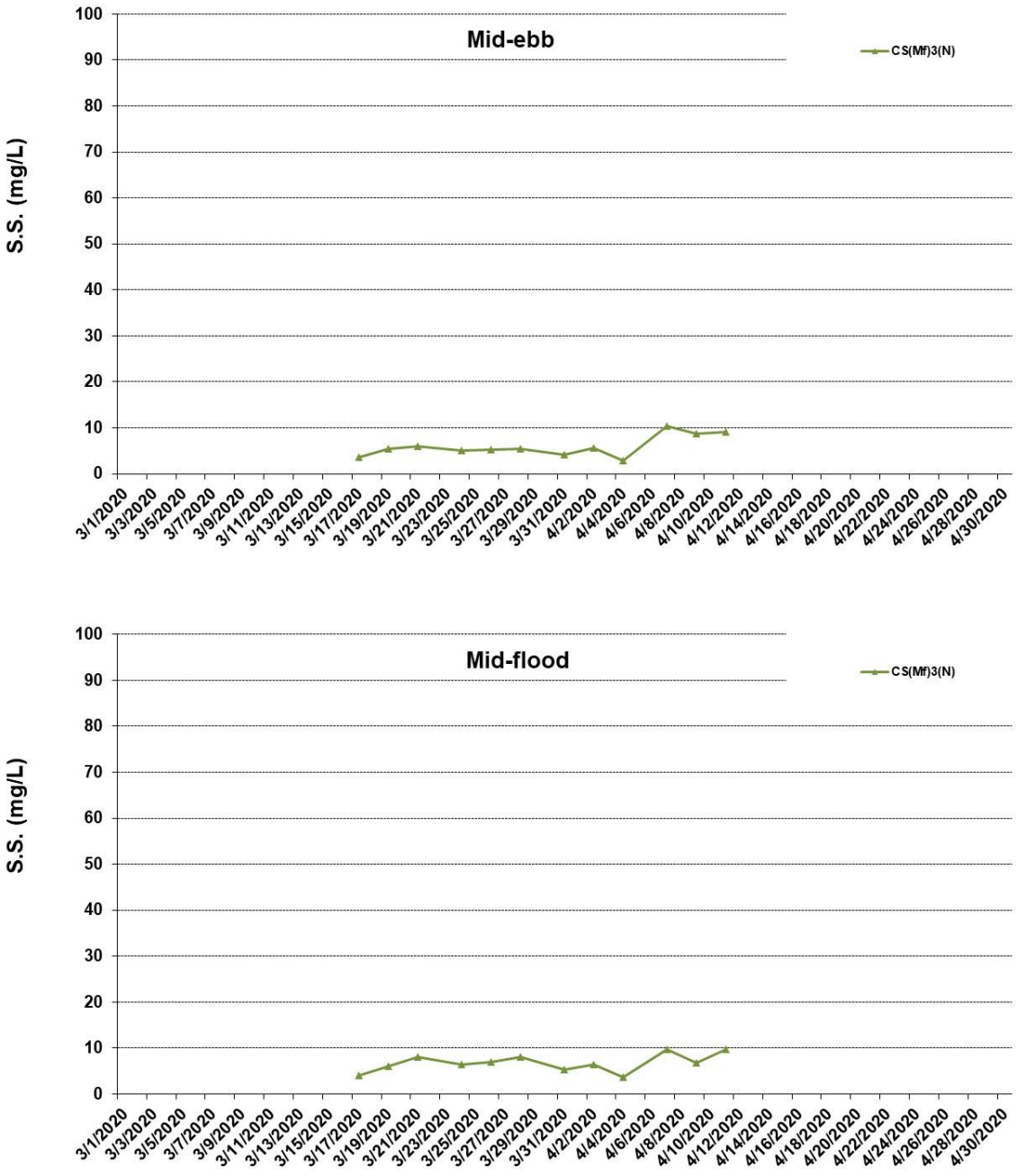

Figure G70 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

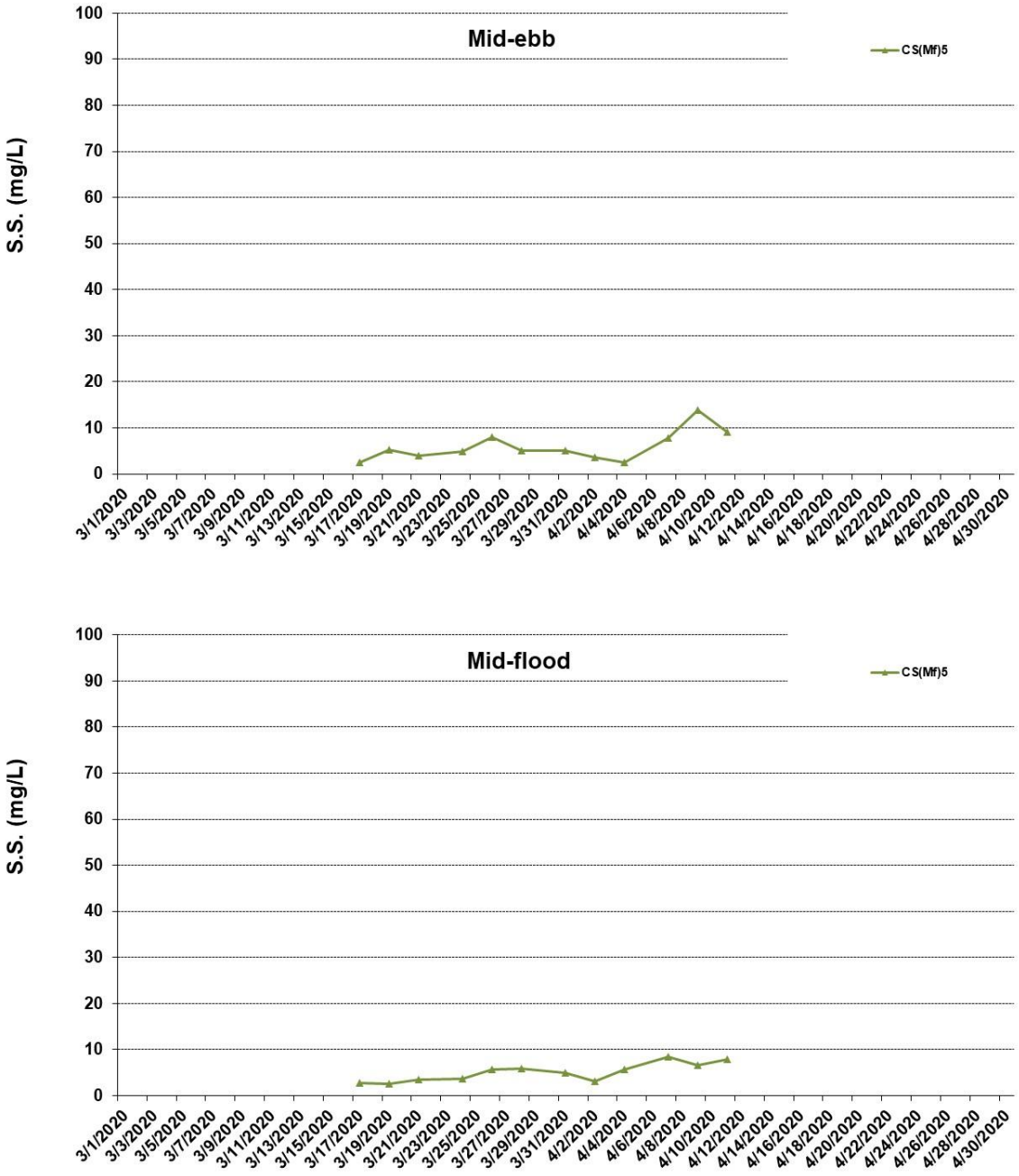

Figure G71 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

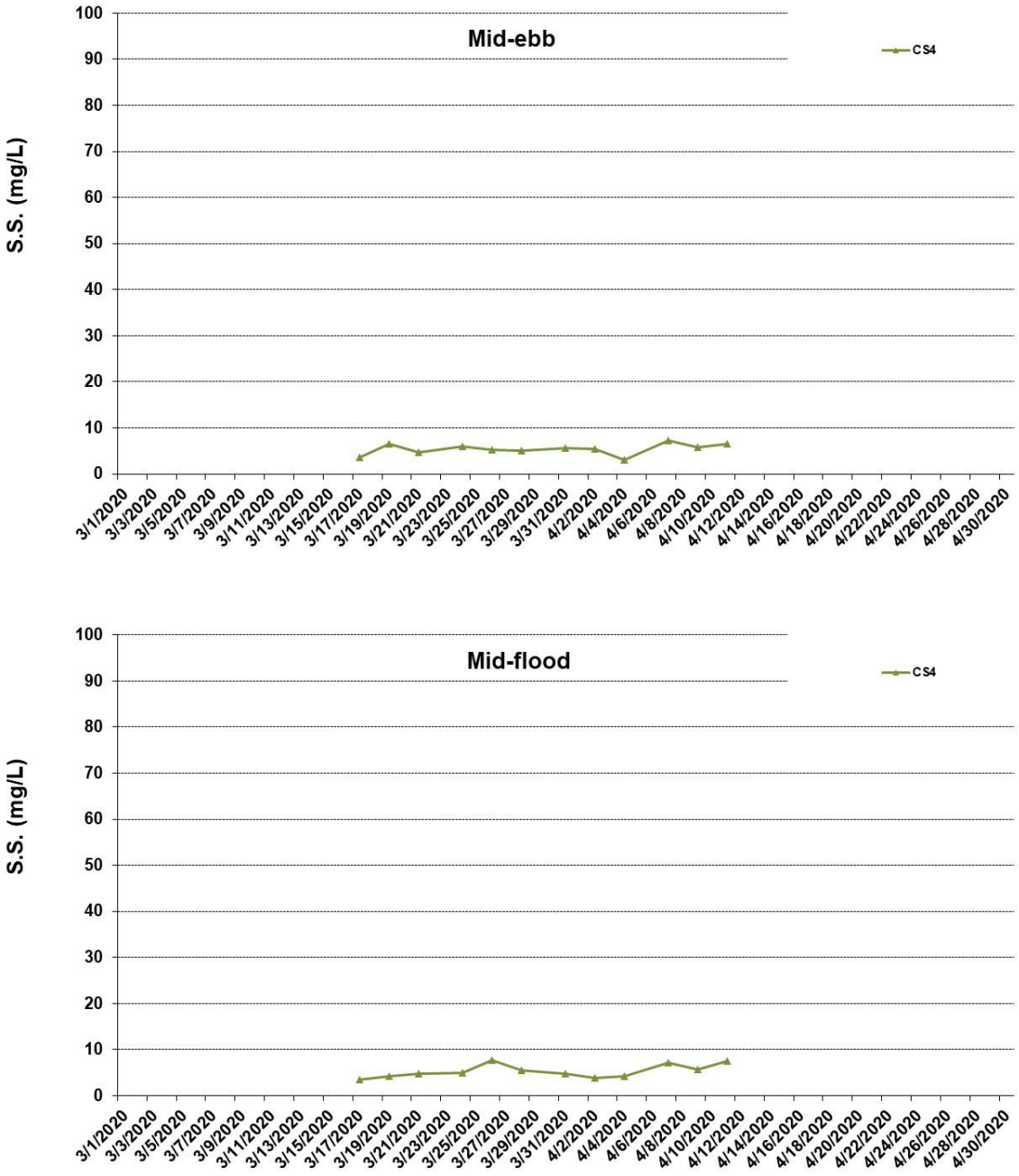

Figure G72 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at CS4. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

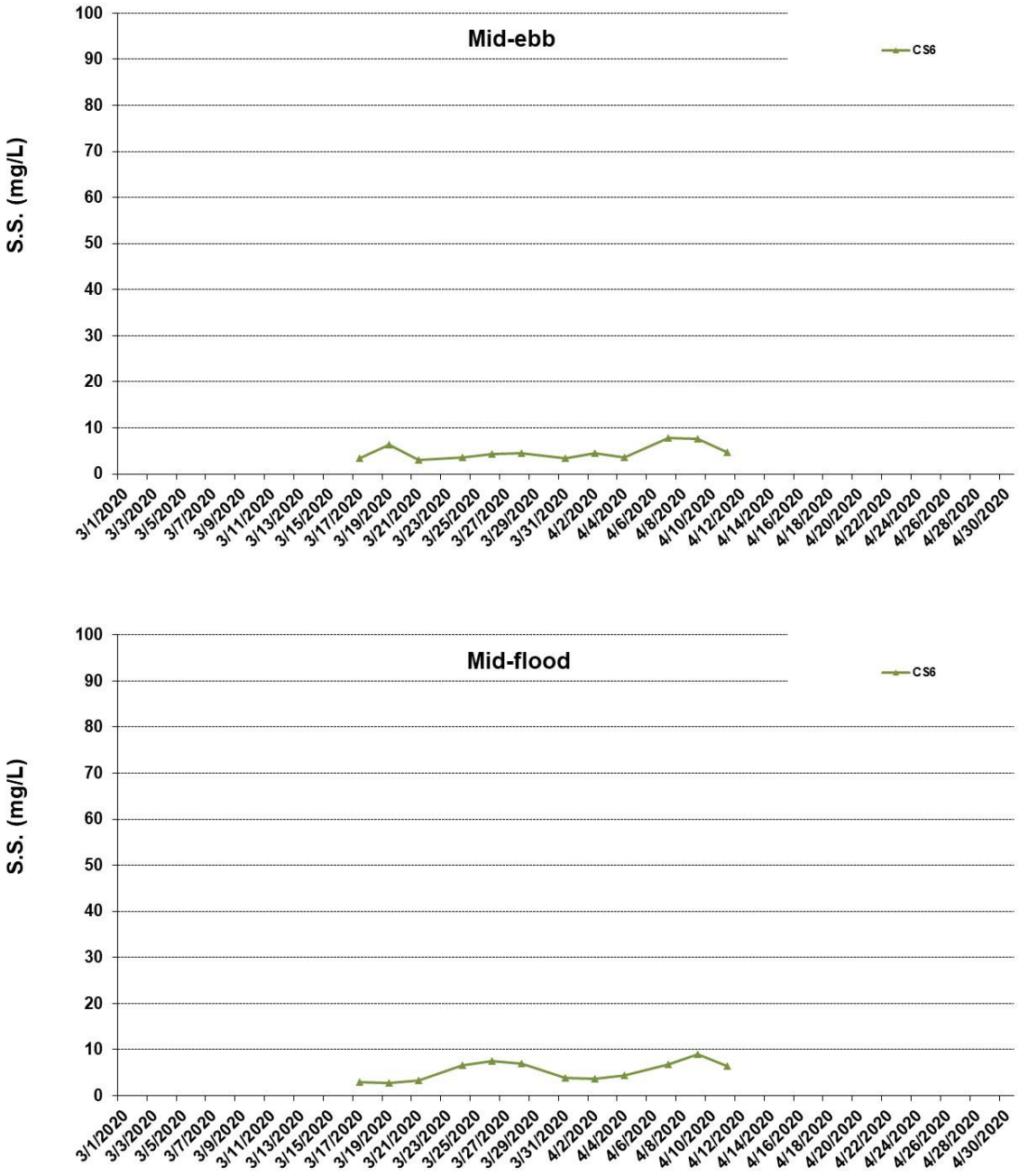

Figure G73 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at CS6. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

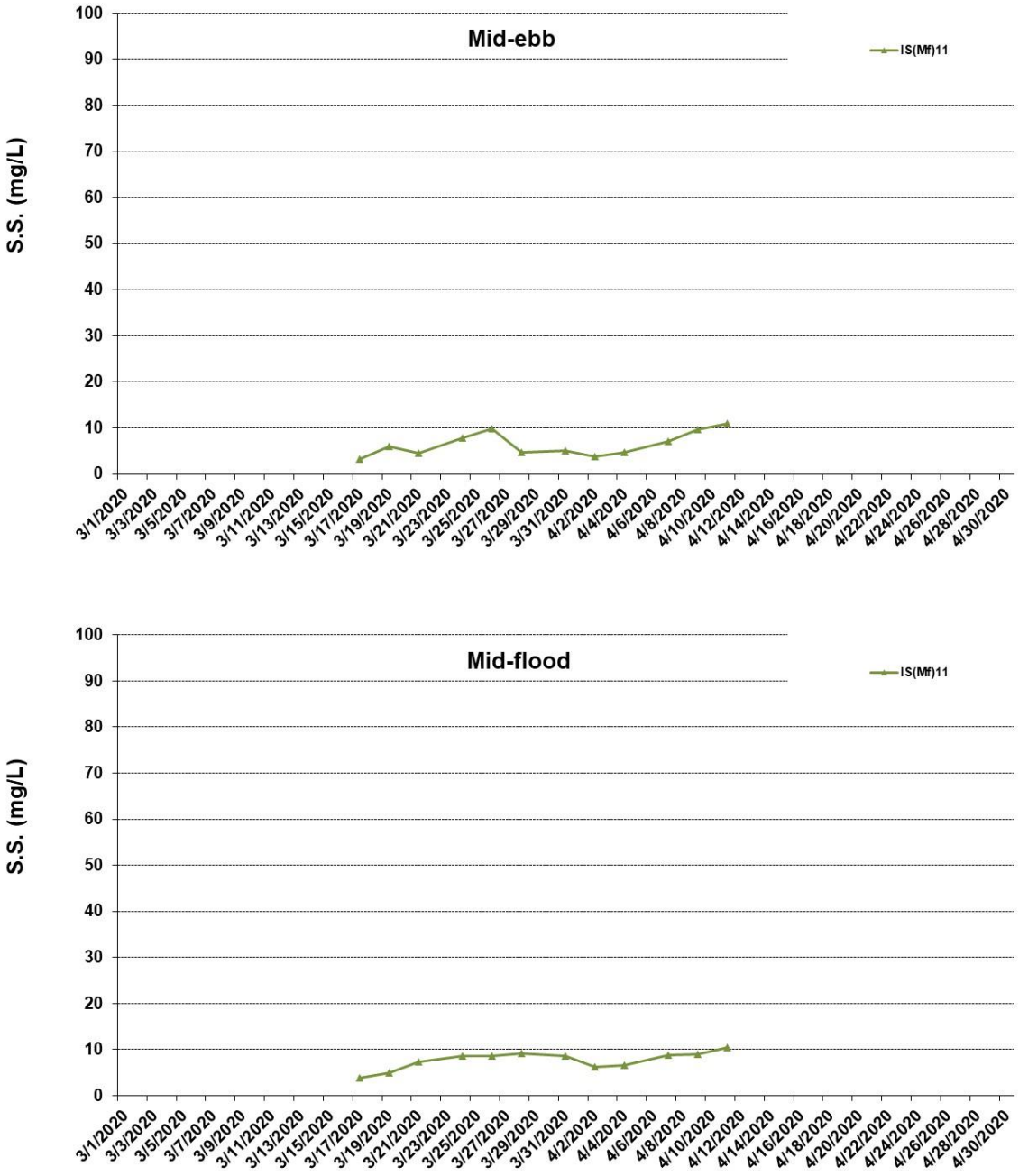

Figure G74 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

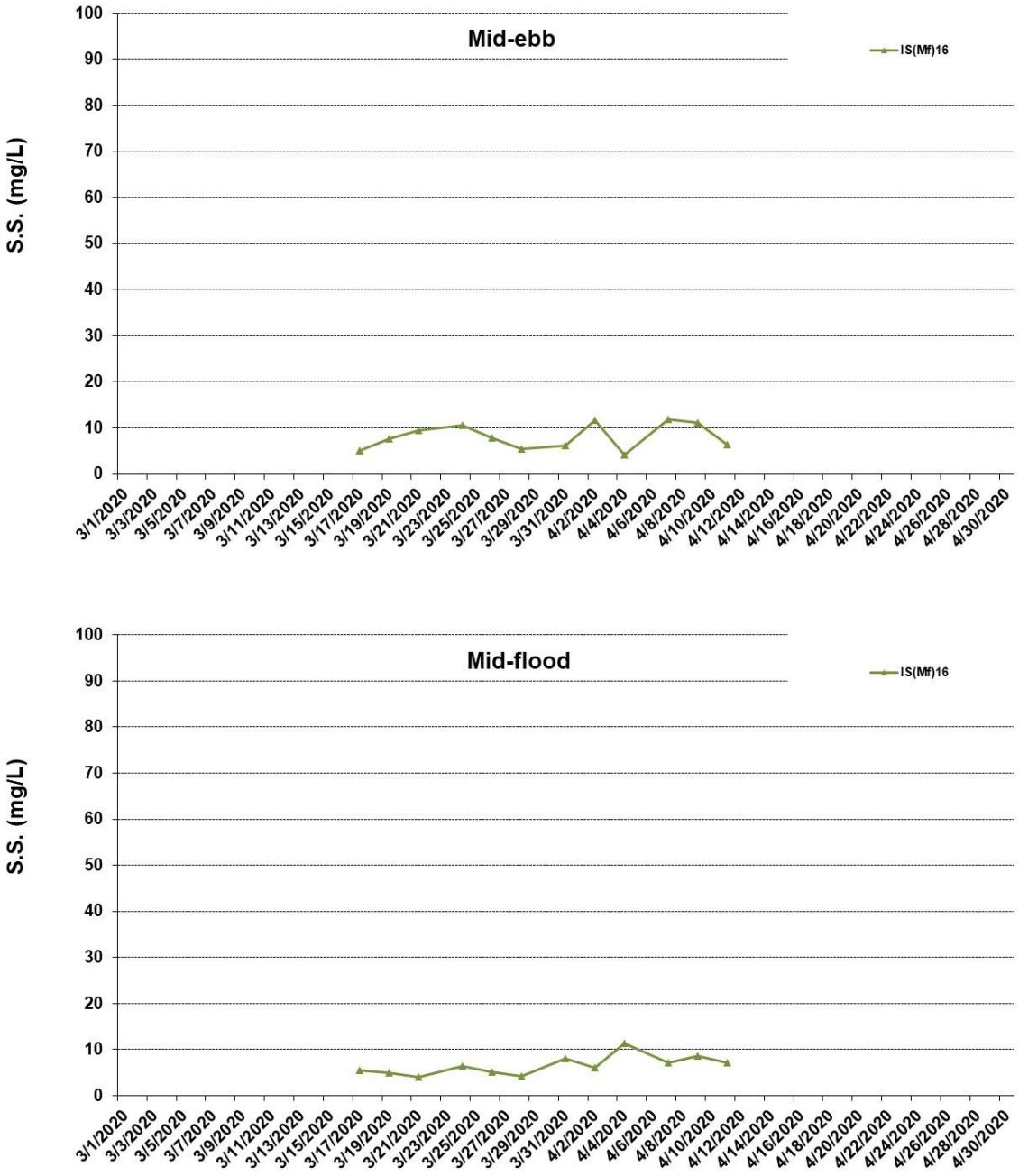

Figure G75 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

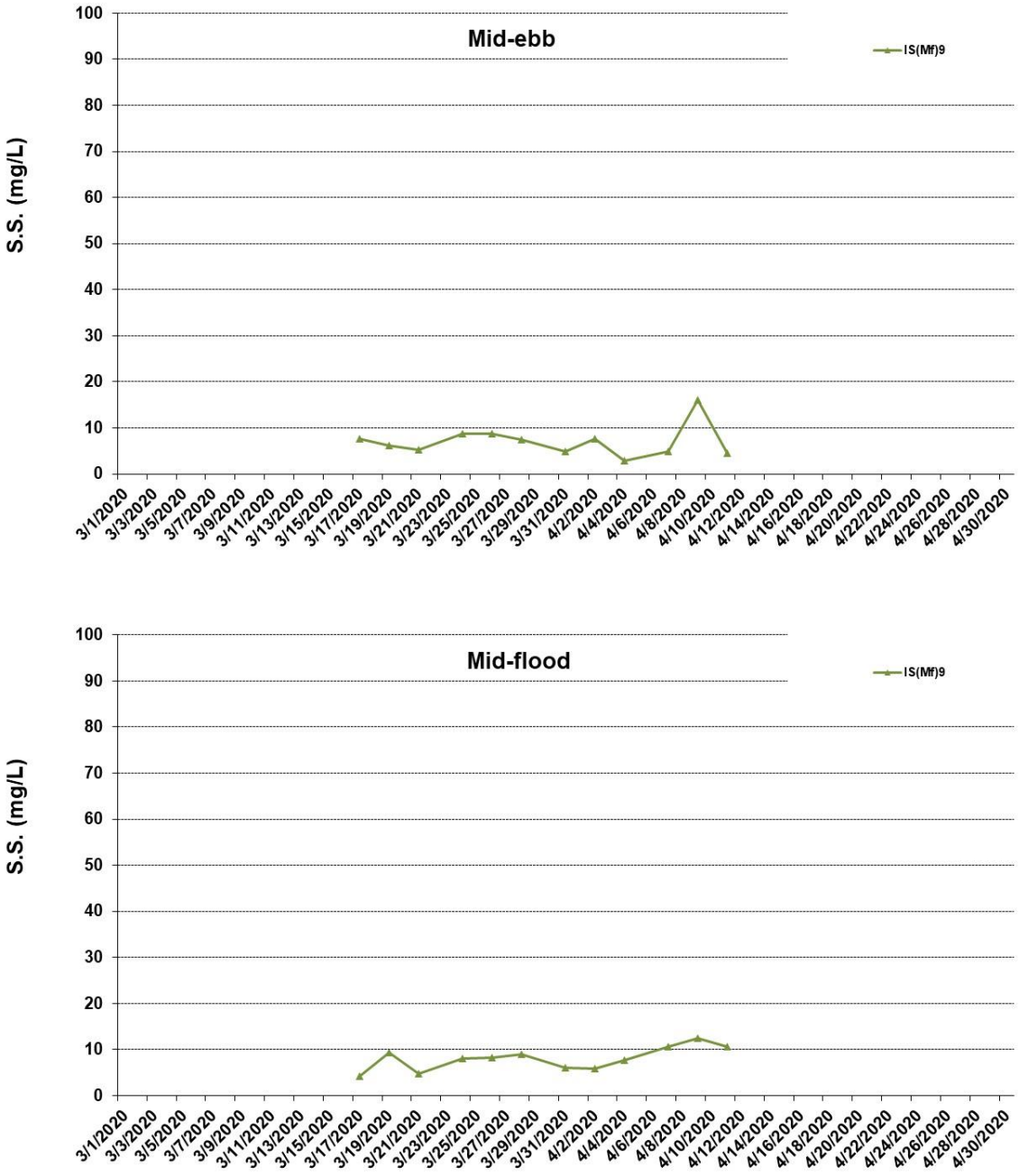

Figure G76 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

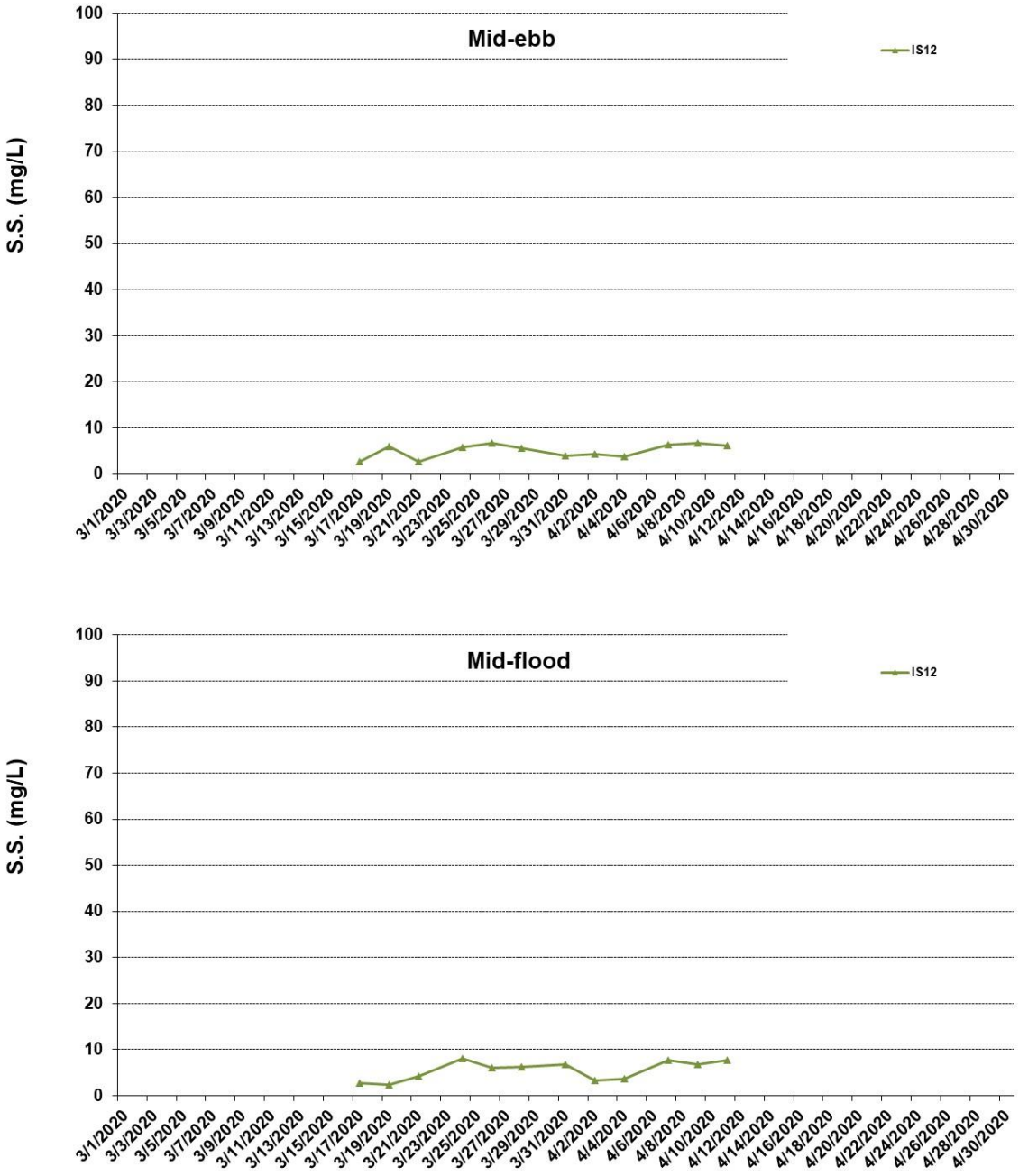

Figure G77 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS12. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

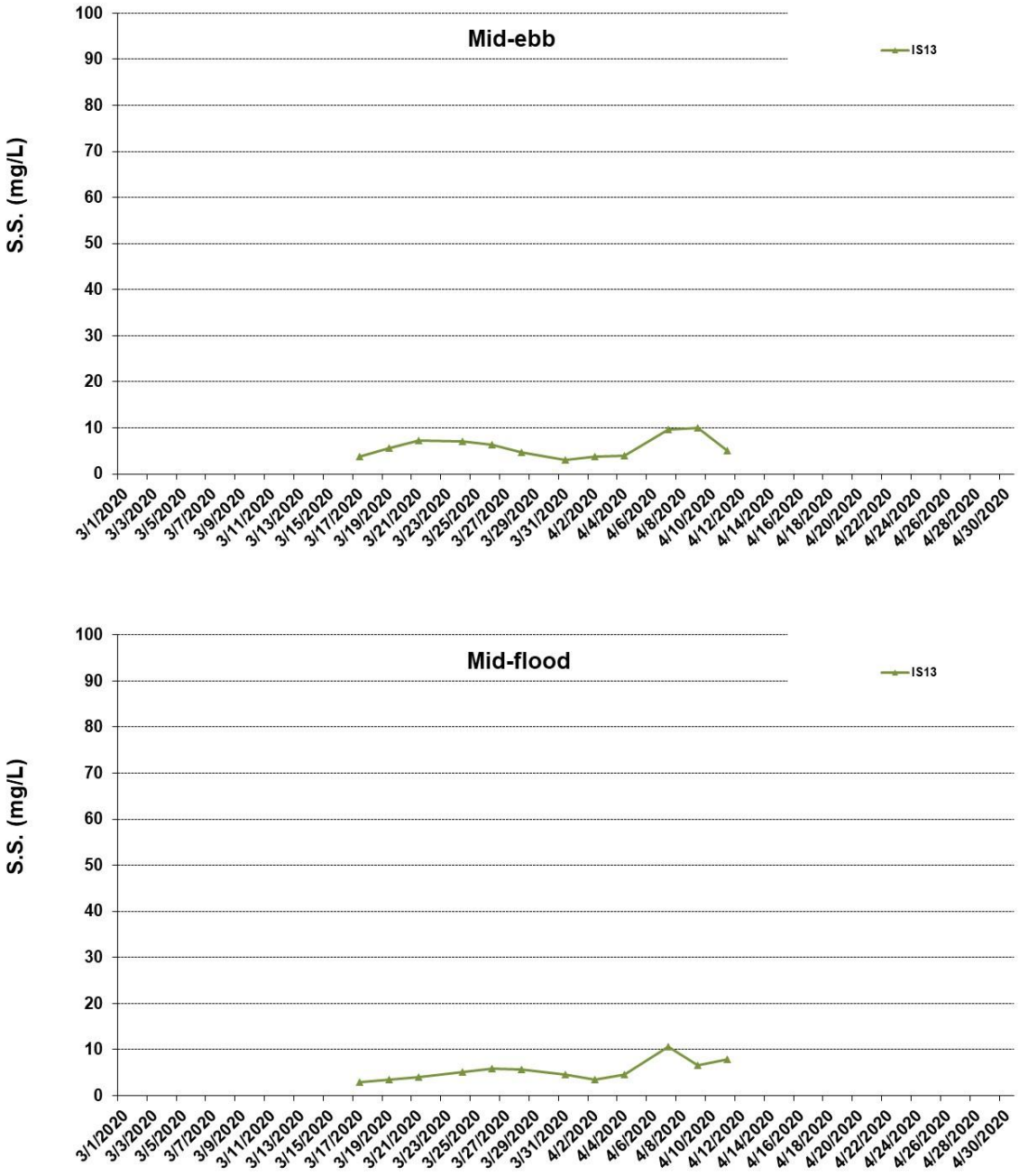

Figure G78 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS13. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

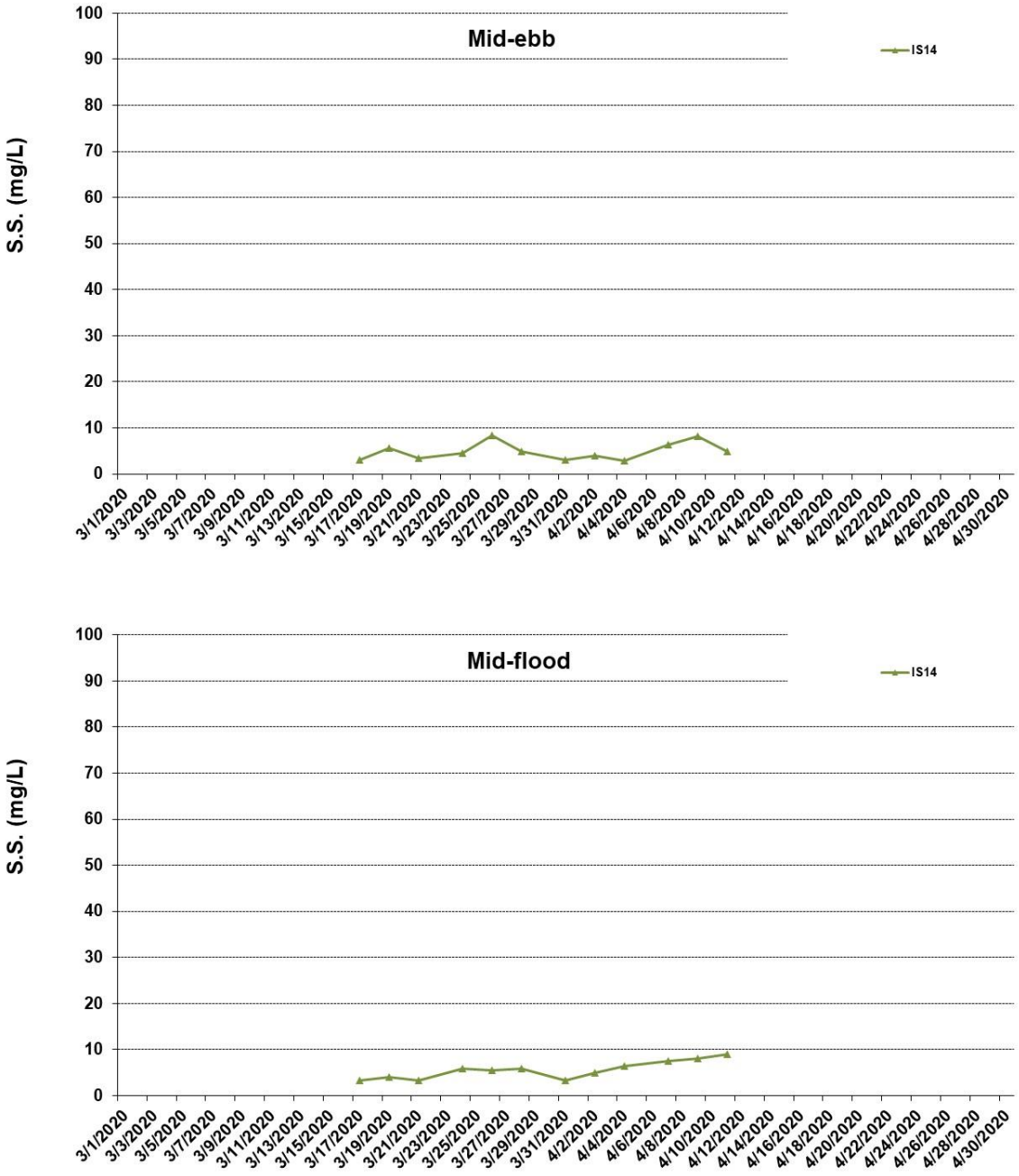

Figure G79 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS14. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

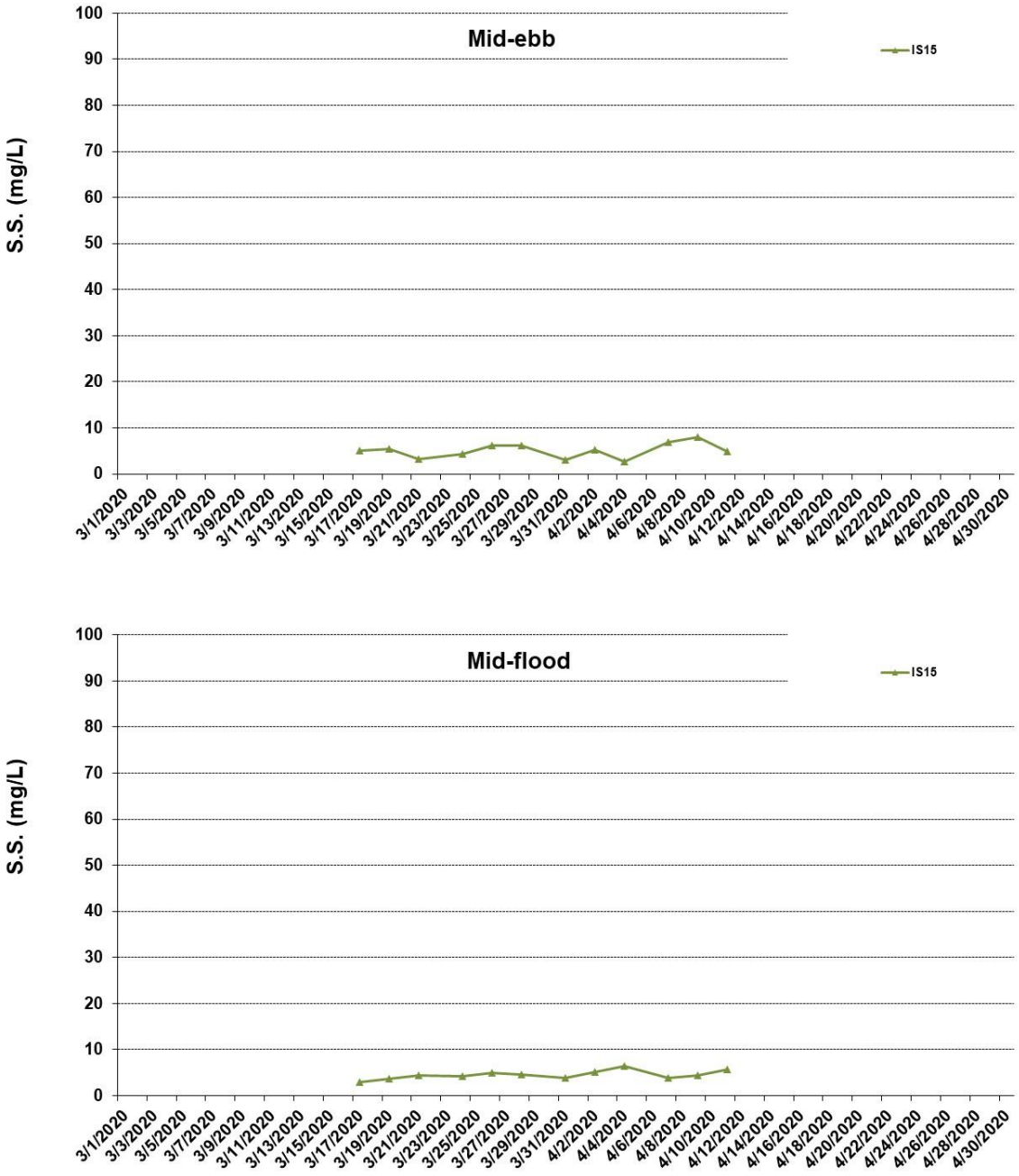

Figure G80 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS15. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

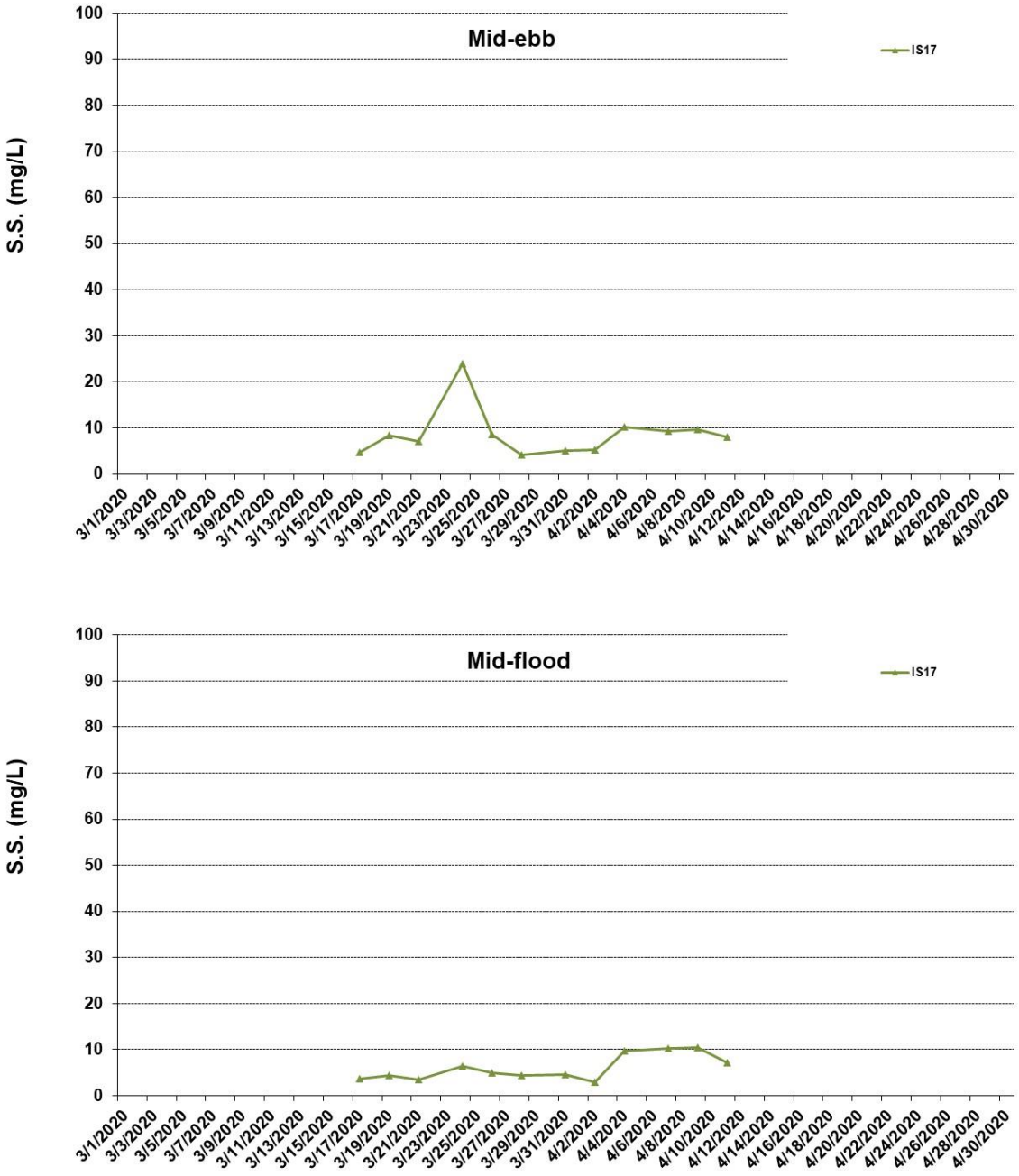

Figure G81 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

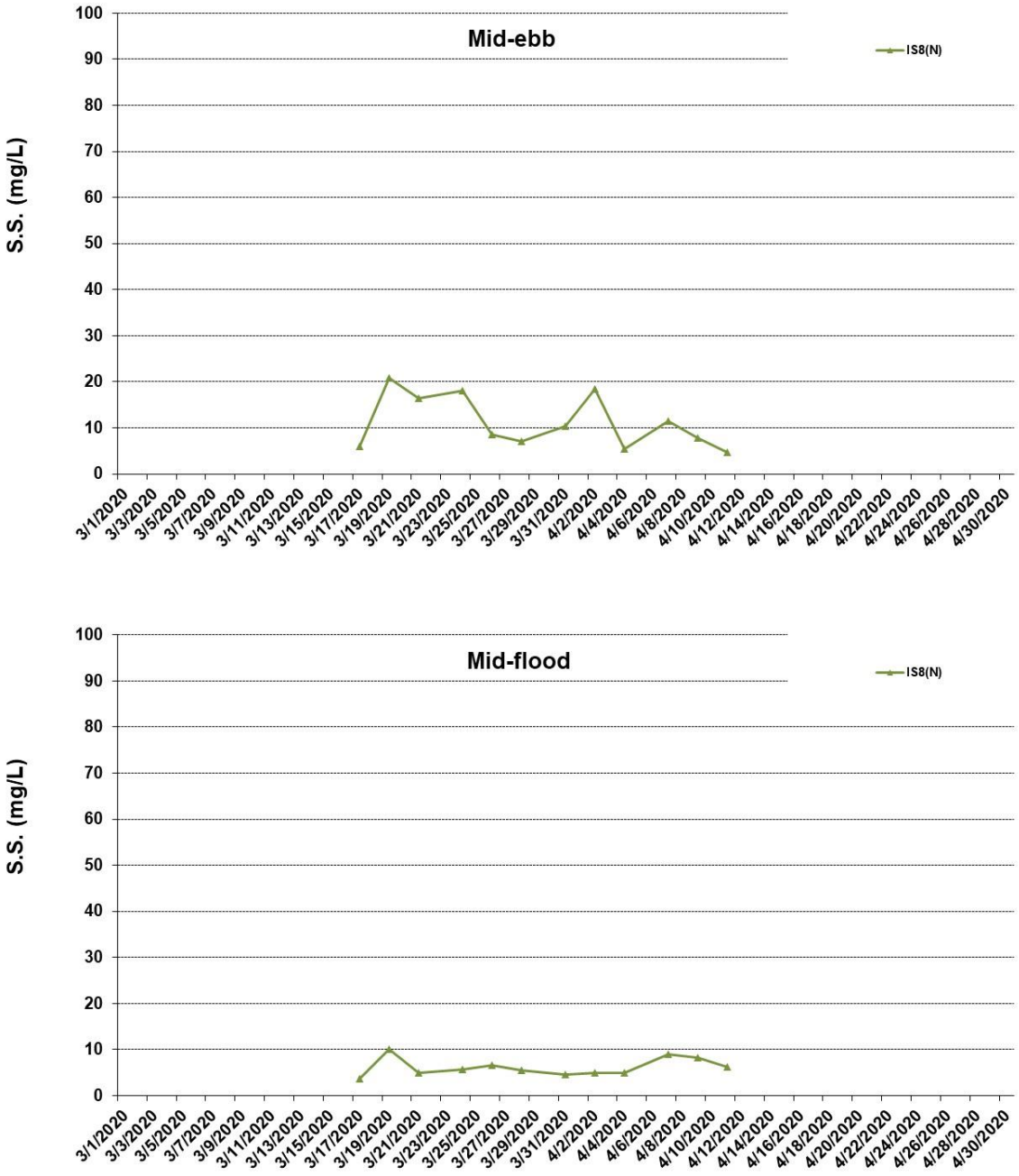

Figure G82 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

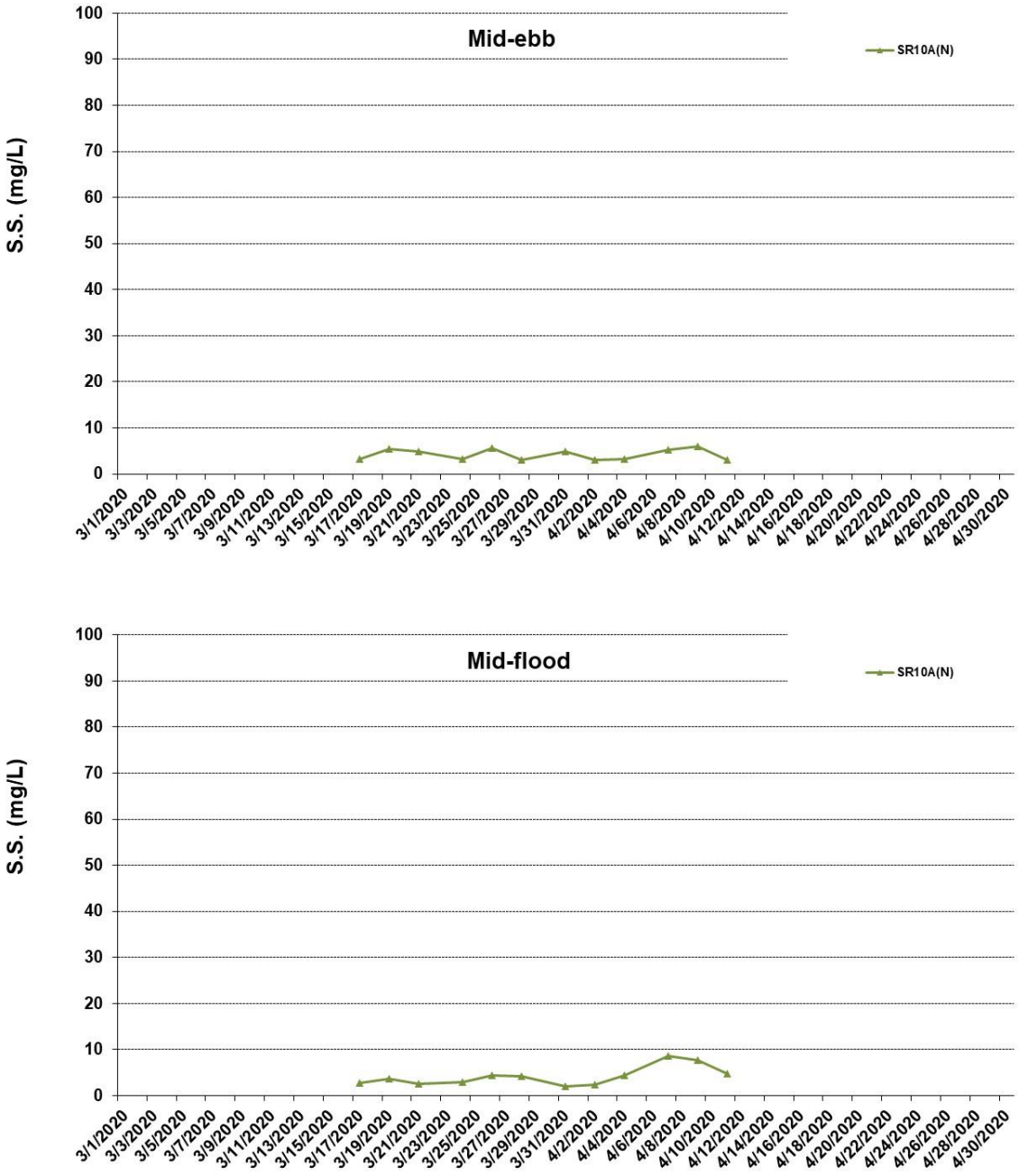

Figure G83 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at SR10A(N). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

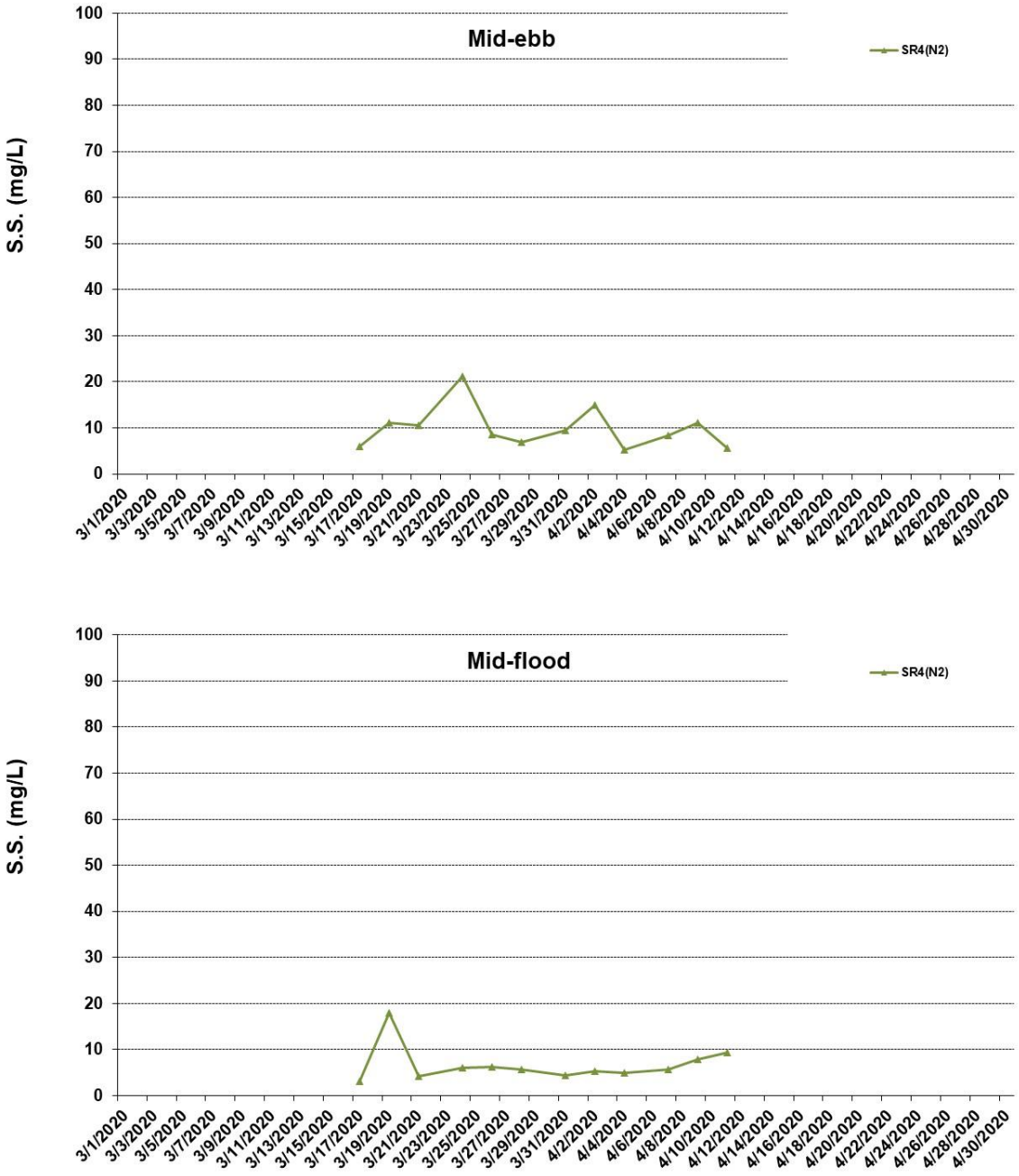

Figure G84 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

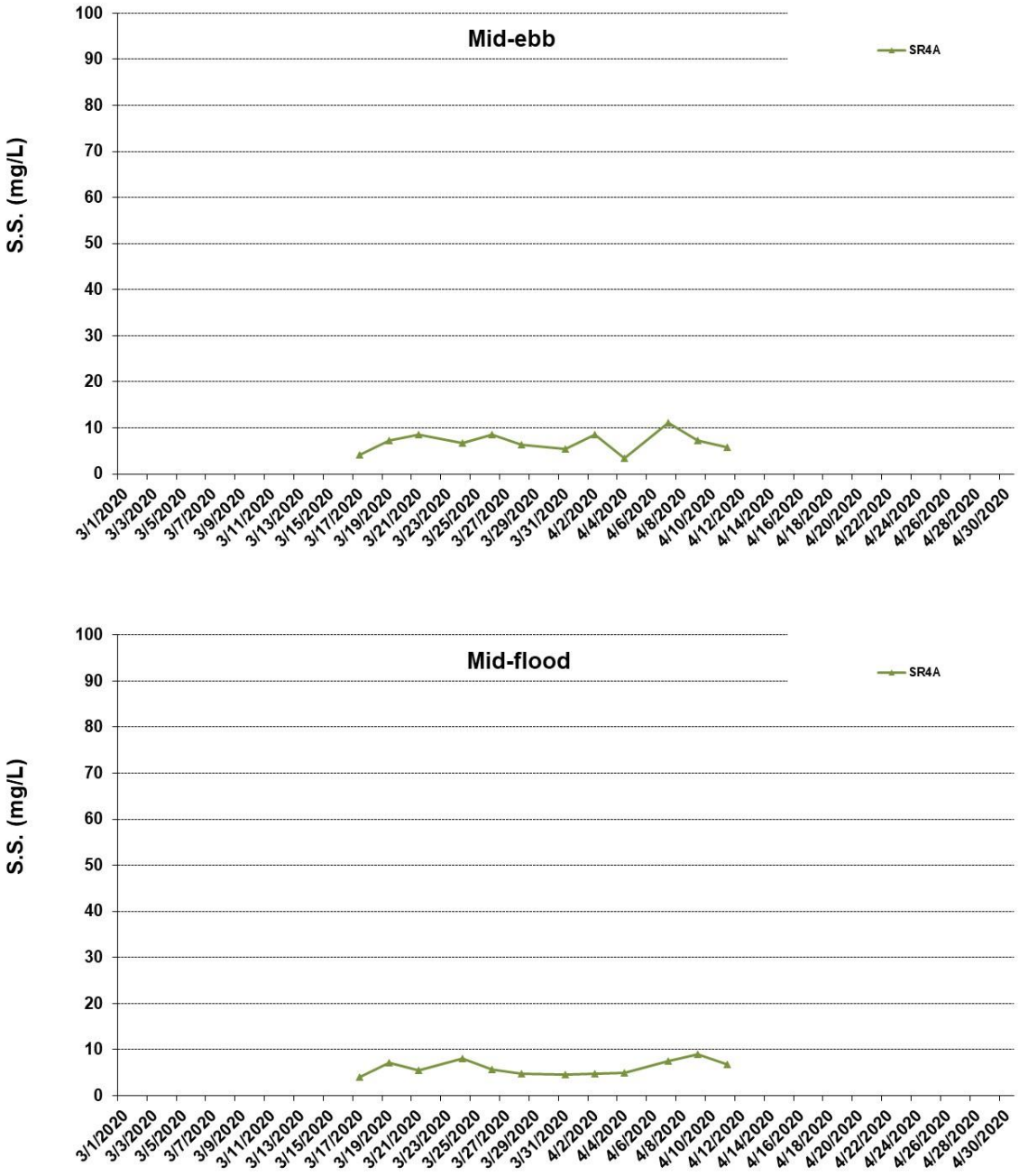

Figure G85 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at SR4A. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

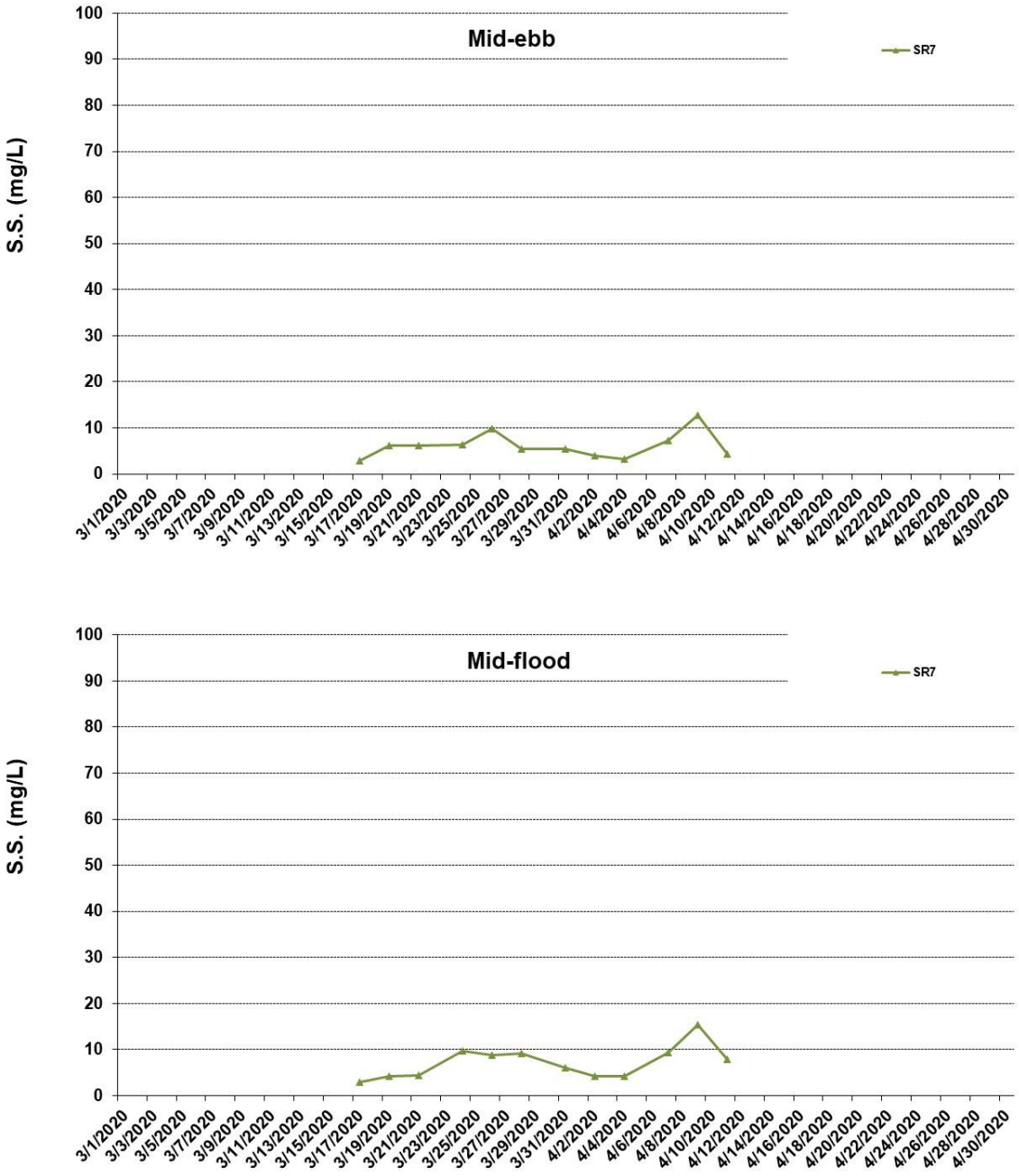

Figure G86 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

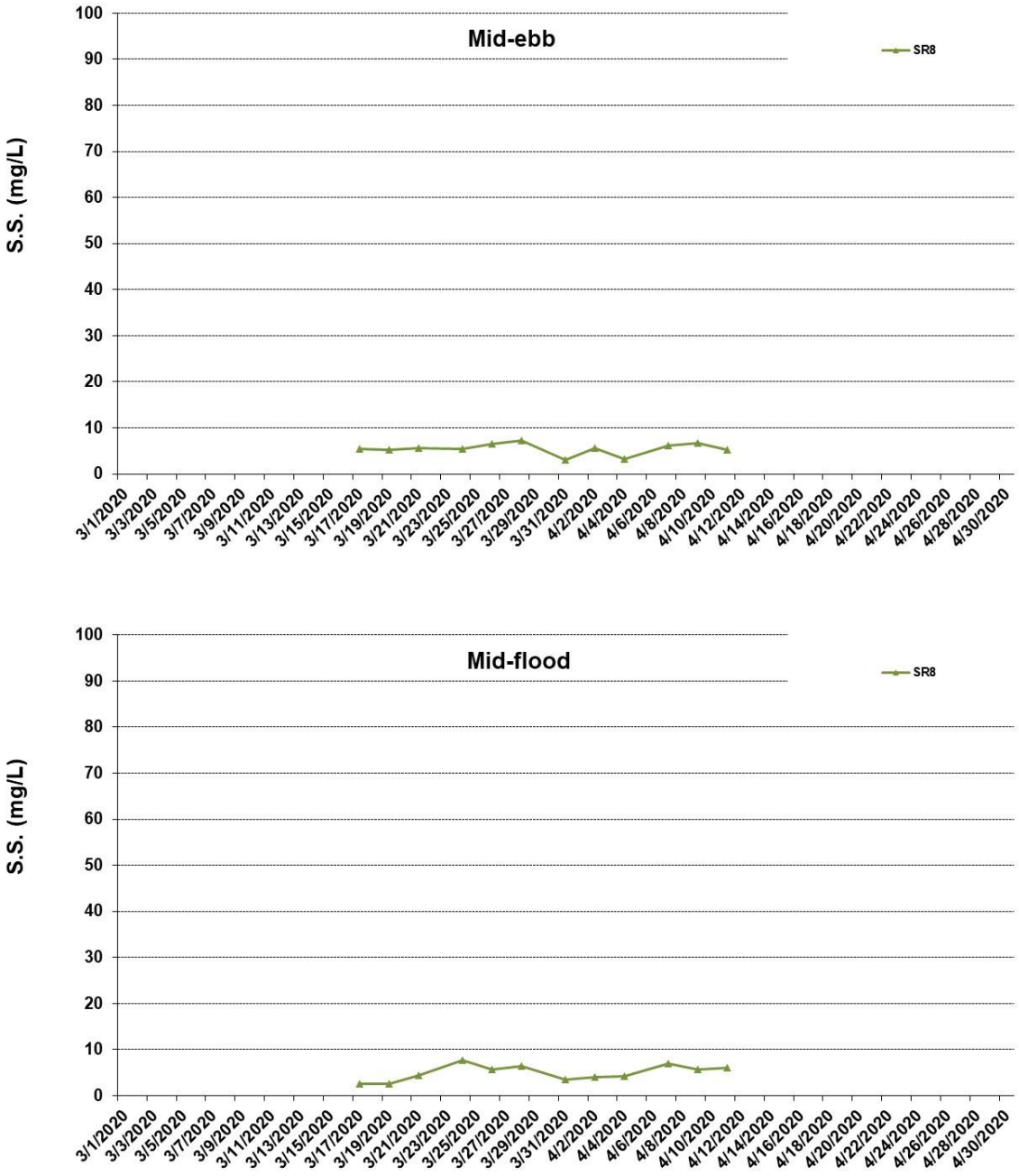

Figure G87 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at SR8. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

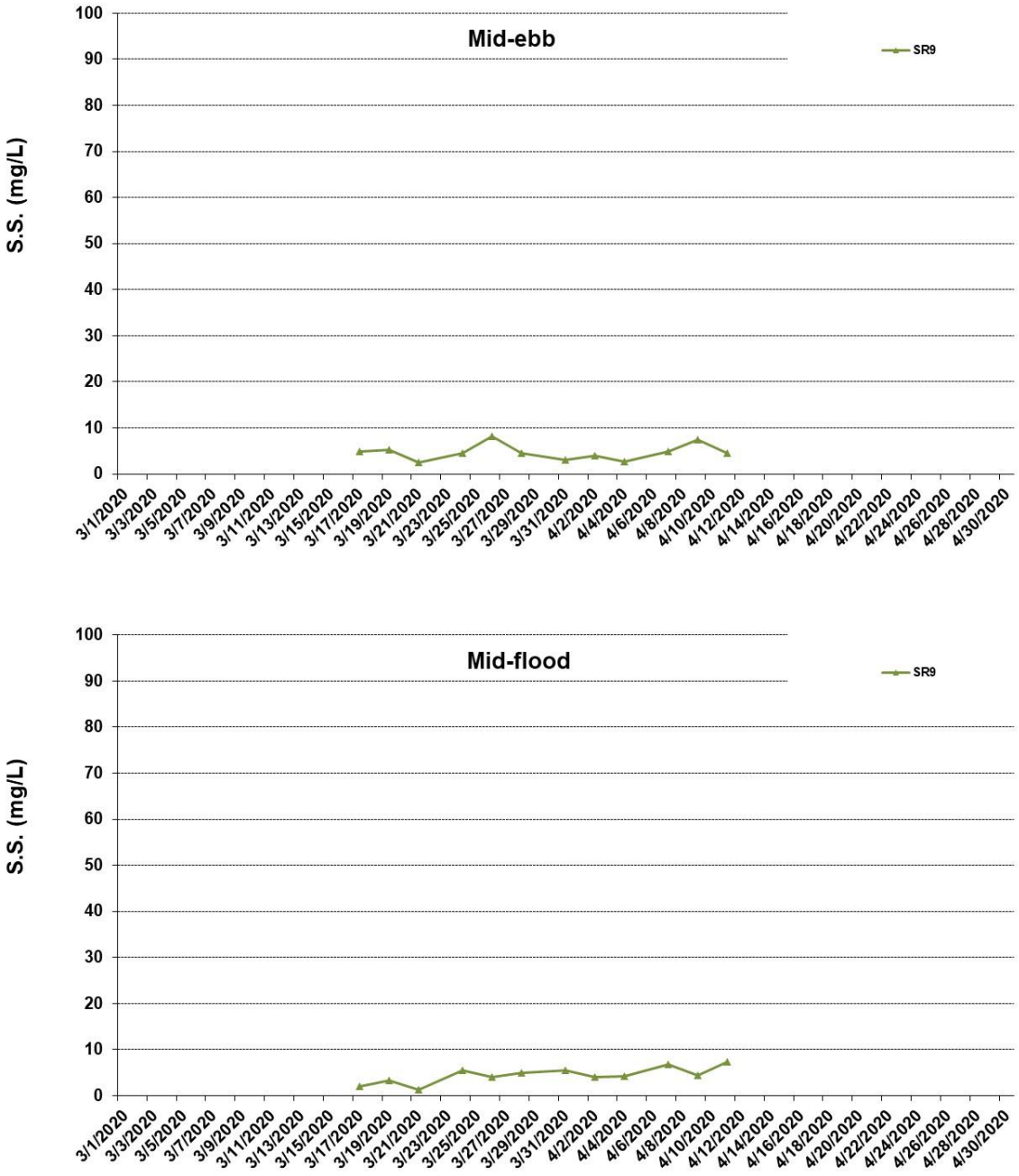

Figure G88 Post Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 17 March 2020 and 11 April 2020 at SR9. The weather conditions during the monitoring period varied mostly from sunny to rainy. No marine works was carried out in the reporting period.

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

26th Quarterly Progress Report (March-May 2020)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.

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

20 July 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 26th quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, which summarizes the results of the survey findings during the period of March to May 2020 by utilizing the survey data collected by 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 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 TMCLKL08 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2018). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270^{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 TMCLKL08 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.

2.2.2. A professional digital camera (*Canon* EOS 7D model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.

2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).

2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. Data Analysis

2.3.1. Distribution Analysis – The line-transect survey data was integrated with the Geographic Information System (GIS) in order to visualize and interpret different spatial and temporal patterns of dolphin distribution using sighting positions. Location data of dolphin groups were plotted on map layers of Hong Kong using a desktop GIS (ArcView© 3.1) to examine their distribution patterns in details. The dataset was also stratified into

different subsets to examine distribution patterns of dolphin groups with different categories of group sizes, young calves and activities.

2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collect under Beaufort 3 or below condition would be used for the encounter rate analyses. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

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

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

2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-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:

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

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 March to May 2020, six sets of systematic line-transect vessel surveys were conducted under the TMCLKL08 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.

3.1.2. From these TMCLKL08 surveys, a total of 772.01 km of survey effort was collected, with 98.4% 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, 290.10 km and 481.91 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 569.64 km, while the effort on secondary lines was 202.37 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 TMCLKL08 monitoring surveys from March to May 2020, only two groups of two Chinese White Dolphins were sighted (i.e. both were single individuals). Both dolphin sightings were made on primary lines during on-effort search in this quarter. A summary table of dolphin sightings is shown in Appendix II.

3.1.5. In this quarterly period, both 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 the HKLR03/TMCLKL08 monitoring surveys.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during the TMCLKL08 monitoring surveys from March to May 2020 is shown in Figure 1. Both sightings were made to the west of the airport platform at the southwestern portion of the NWL survey area, with one of them located adjacent to the HKLR alignment (Figure 1). As consistently recorded in the previous monitoring quarters in recent years, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).

3.2.2. Notably, both dolphin sightings were located far away from the TMCLKL alignment as well as the HKBCF and HKLR03 reclamation sites during the quarterly period (Figure 1).

3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period 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 seven years of HKLR03/TMCLKL08 impact phase monitoring, which has resulted in zero to extremely low dolphin encounter rates in this area.

3.2.4. In NWL survey area, dolphin occurrences were also drastically different between the baseline and impact phase periods. During the present impact monitoring period, dolphins were rarely sighted here, and only at the southwestern 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 spring months in 2015-20 (Figure 2). Dolphins were sighted infrequently and mostly around the Sha Chau and Lung Kwu Chau Marine Park in NWL waters during the first five spring quarters, but their occurrence was diminished even further and only restricted to the southwestern portion of North Lantau region in the spring quarter of 2020 (Figure 2). Notably, they 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 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 March-May 2020

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 (3 & 9 Mar 2020)	0.00	0.00
	Set 2 (18 & 25 Mar 2020)	0.00	0.00
	Set 3 (8 & 14 Apr 2020)	0.00	0.00
	Set 4 (21 & 22 Apr 2020)	0.00	0.00
	Set 5 (5 & 12 May 2020)	0.00	0.00
	Set 6 (18 & 25 May 2020)	0.00	0.00
Northwest Lantau	Set 1 (3 & 9 Mar 2020)	1.66	1.66
	Set 2 (18 & 25 Mar 2020)	0.00	0.00
	Set 3 (8 & 14 Apr 2020)	1.68	1.68
	Set 4 (21 & 22 Apr 2020)	0.00	0.00
	Set 5 (5 & 12 May 2020)	0.00	0.00
	Set 6 (18 & 25 May 2020)	0.00	0.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (March-May 2020) 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)	
	March – May 2020	September – November 2011	March – May 2020	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	0.56 ± 0.86	9.85 ± 5.85	0.56 ± 0.86	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 0.43 sightings and 0.43 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 quarterly 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 spring quarters throughout the HKLR03/TMCLKL08 monitoring in the past seven consecutive years (Table 4).

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from the same spring quarters of HKLR03/TMCLKL08 impact monitoring period since 2012 and the 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
March-May 2013 (Impact)	0.42 ± 1.03	0.42 ± 1.03
March-May 2014 (Impact)	0.00	0.00
March-May 2015 (Impact)	0.00	0.00
March-May 2016 (Impact)	0.00	0.00
March-May 2017 (Impact)	0.00	0.00
March-May 2018 (Impact)	0.00	0.00
March-May 2019 (Impact)	0.00	0.00
March-May 2020 (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 94.3% and 98.7% 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 to the past seven spring quarters in 2013-19, the quarterly encounter rates in 2020 continued to plummet to the lowest level among all spring 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 while all construction activities of HZMB works has recently been completed.

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from the same spring quarters of HKLR03/TMCLKL08 impact monitoring period since 2012 and the 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
March-May 2013 (Impact)	7.75 ± 3.96	24.23 ± 18.05
March-May 2014 (Impact)	6.51 ± 3.34	19.14 ± 7.19
March-May 2015 (Impact)	0.47 ± 0.73	2.36 ± 4.07
March-May 2016 (Impact)	0.98 ± 1.10	4.78 ± 6.85
March-May 2017 (Impact)	0.93 ± 1.03	5.25 ± 9.53
March-May 2018 (Impact)	2.88 ± 4.81	11.12 ± 22.46
March-May 2019 (Impact)	1.13 ± 1.39	2.54 ± 3.00
March-May 2020 (Impact)	0.56 ± 0.86	0.56 ± 0.86

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 HKLR03/TMCLKL08 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 (30th quarter of the HKLR03/TMCLKL08 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0019 and 0.0021 respectively. Even if the alpha value is set at 0.01, significant differences were detected between the baseline period and present quarter 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 of the HKLR03/TMCLKL08 impact phase (i.e. the first 30 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 and dramatically reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented throughout the HKLR03/TMCLKL08 construction period.

3.3.10. Even though all marine works associated with the HZMB construction have already 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 since late 2016, apparently there has been no sign of recovery of dolphin usage in North Lantau waters at all, while such usage has continued to diminish to the lowest ever level.

3.4. Group size

3.4.1. Group size of both Chinese White Dolphin sightings were singletons in North Lantau region during March to March 2020. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

Table 6. Comparison of average dolphin group sizes from impact monitoring period (March – May 2020) and baseline monitoring period (September – November 2011) (Note: ± denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	March – May 2020	**September – November 2011**
Overall	1.00 ± 0.00 (n = 2)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	1.00 ± 0.00 (n = 2)	3.92 ± 3.40 (n = 49)

3.4.2. The average dolphin group size in NWL waters during the present quarter 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 two dolphin groups in the present quarter was only a tiny fraction of the 66 dolphin groups sighted during the baseline period (Table 6).

3.5. Habitat use

3.5.1. From March to May 2020, only two grids in North Lantau waters recorded dolphin occurrences, and both of them recorded very low 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. 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.

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, both grids with dolphin records were distributed at the southwestern end of the NWL survey area in very low densities during the present impact phase period (Figure 4).

3.6. Mother-calf pairs

3.6.1. During the present quarterly period, no mother-calf pair was sighted.

3.7. Activities and associations with fishing boats

3.7.1. From March to May 2020, neither of the two dolphin groups was engaged in any activities, and both groups were not associated with any operating fishing vessel during this impact phase period.

3.8. Summary of photo-identification works

3.8.1. From March to May 2020, about 150 digital photographs of Chinese White Dolphins were taken during the present impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, two individuals sighted twice were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). Both re-sightings were made in NWL.

3.8.3. Notably, one of the two individuals (WL232) was also sighted in WL waters during the HKLR09 monitoring surveys under the same three-month period of March-May 2020.

3.9. Individual range use

3.9.1. Ranging patterns of the two individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.

3.9.2. Both 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, both individuals (WL232 and WL268) has extended its range use from WL waters to NWL waters during the quarterly period (Appendix V), and such movements between North and West Lantau have been quite frequent among many individuals in the past several years of HKLR03 impact phase monitoring. However, it should also be noted that their re-sightings were only made at the juncture of West and Northwest Lantau survey areas during this quarterly period, which is in close proximity to their primary ranges in WL waters (Appendix V).

4. Conclusion

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

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

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

5. References

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

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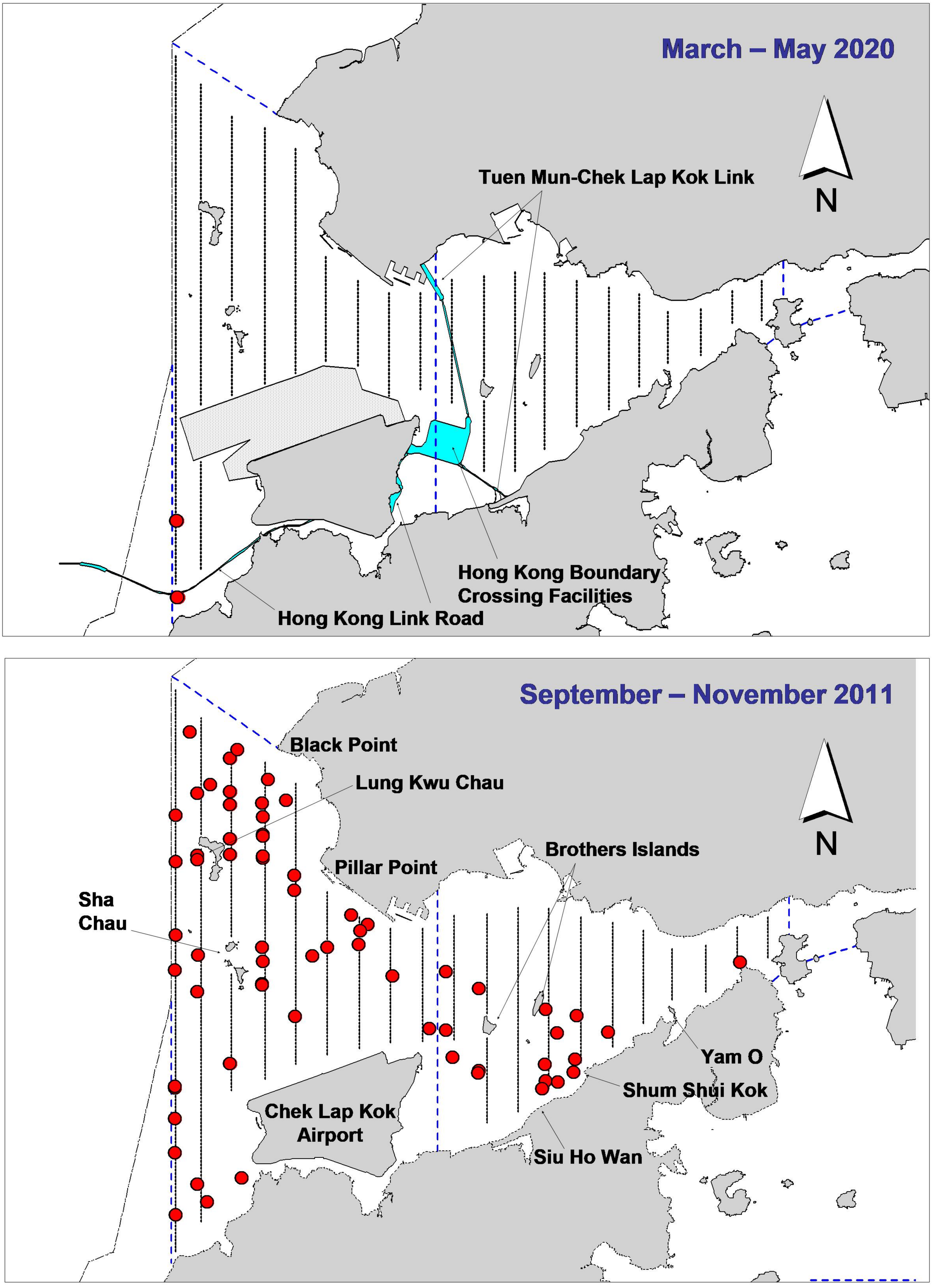
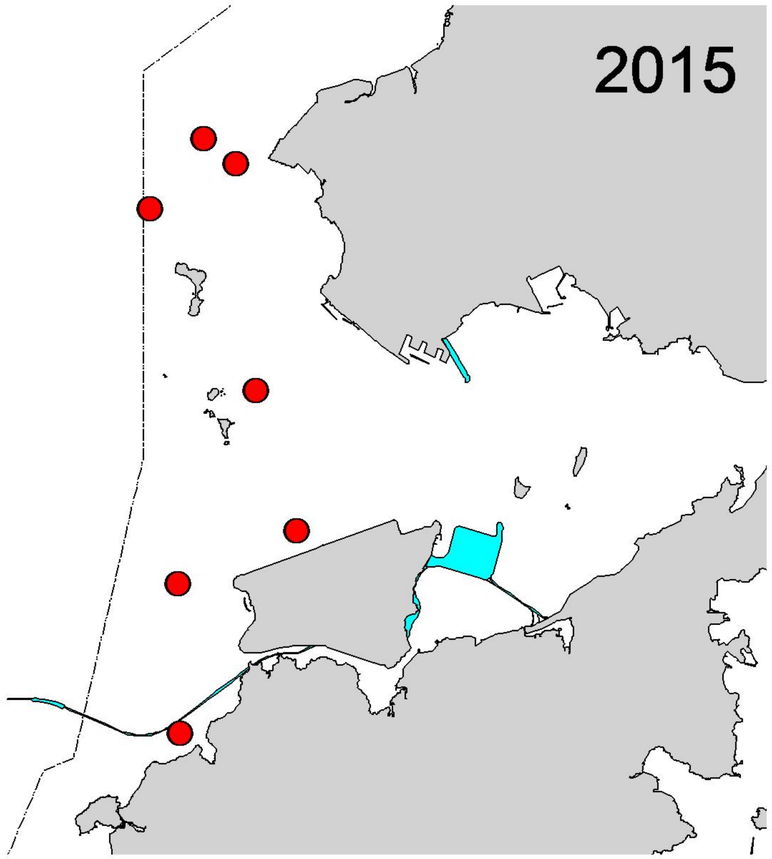
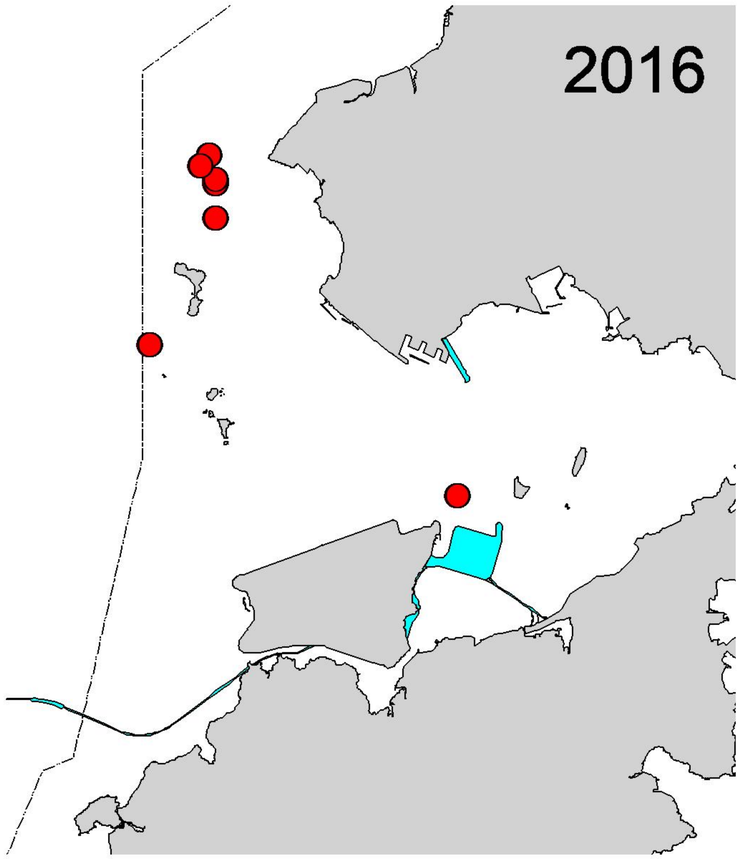
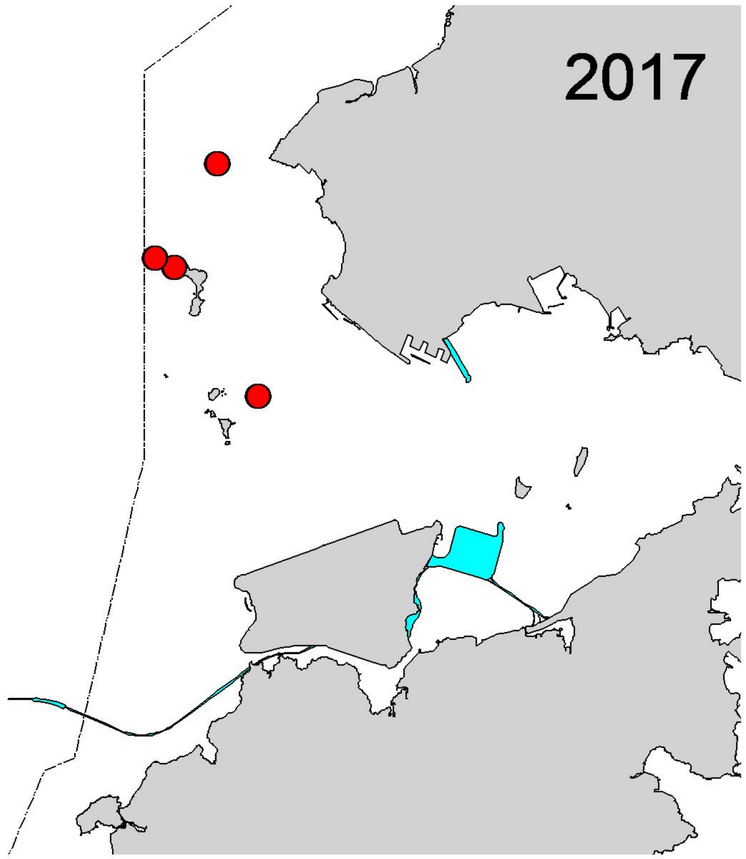
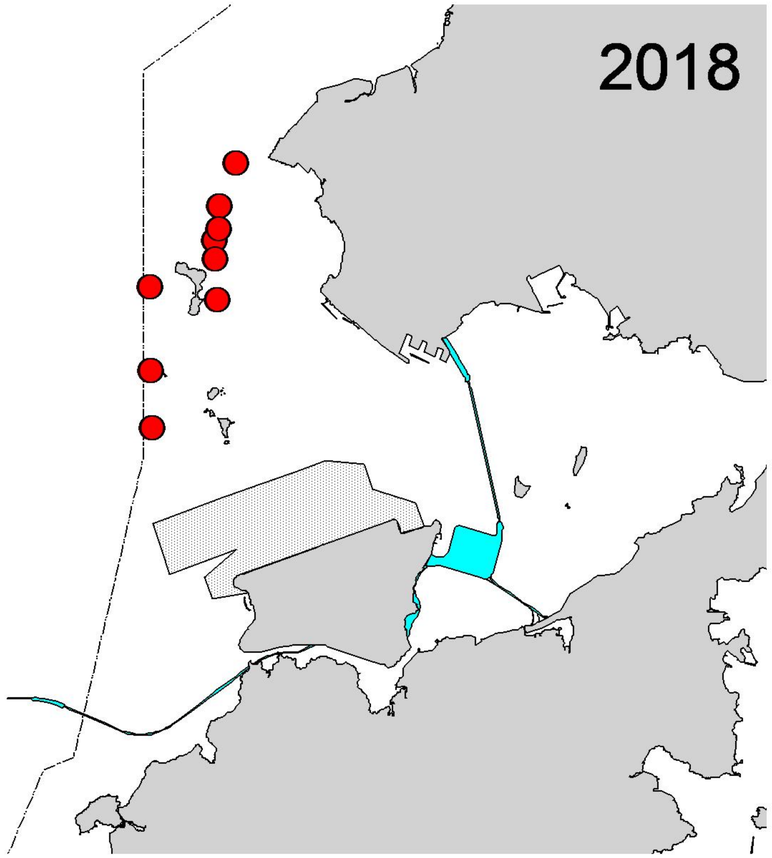


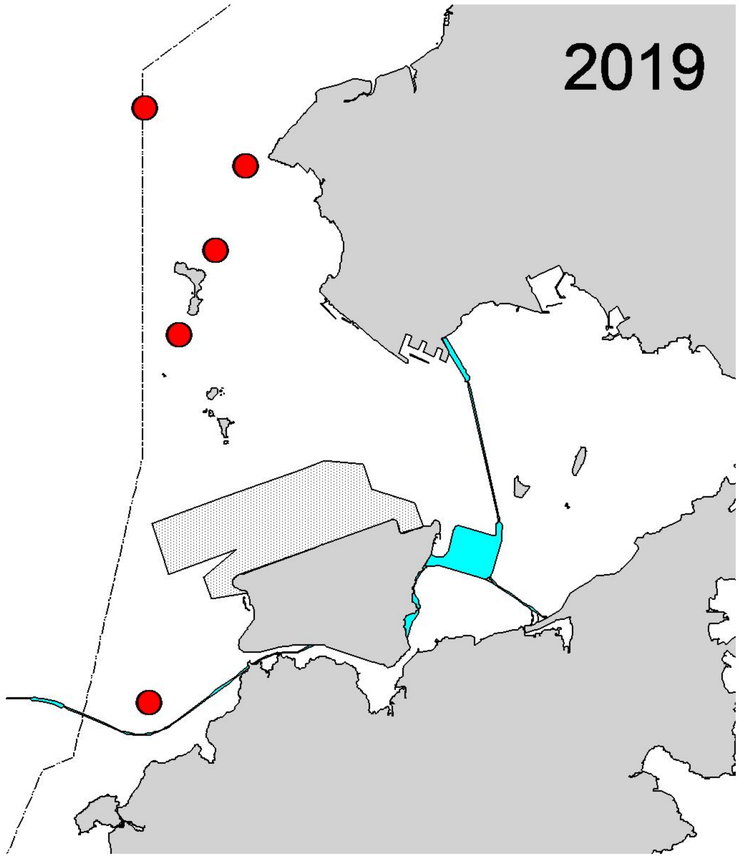
Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during TMCLKL08 impact phase (top) and baseline monitoring surveys (bottom)











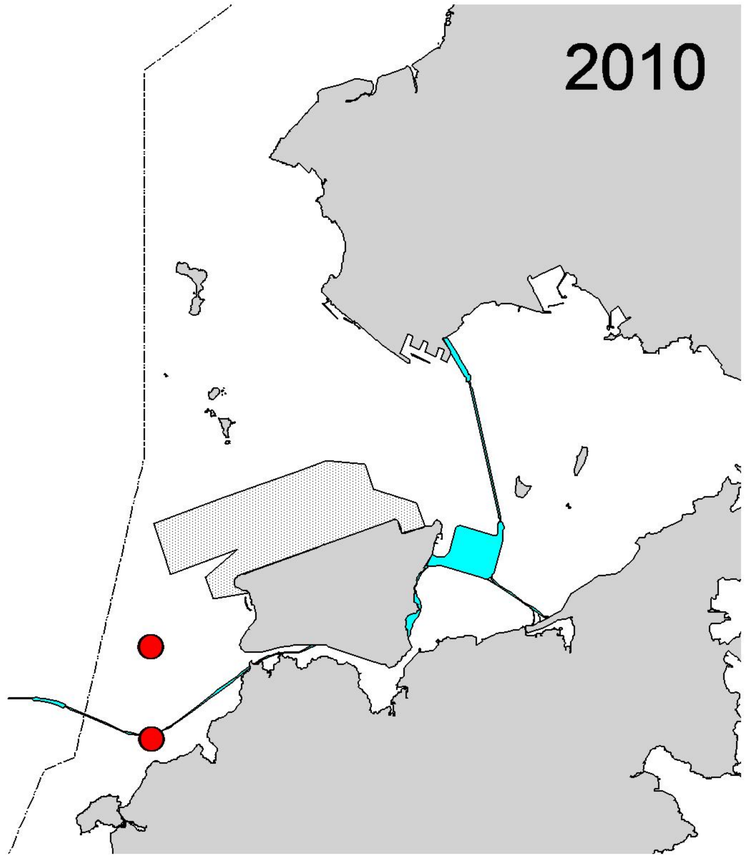


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six spring quarters (March-May) of HKLR03/TMCLKL08 impact phase in 2015-20

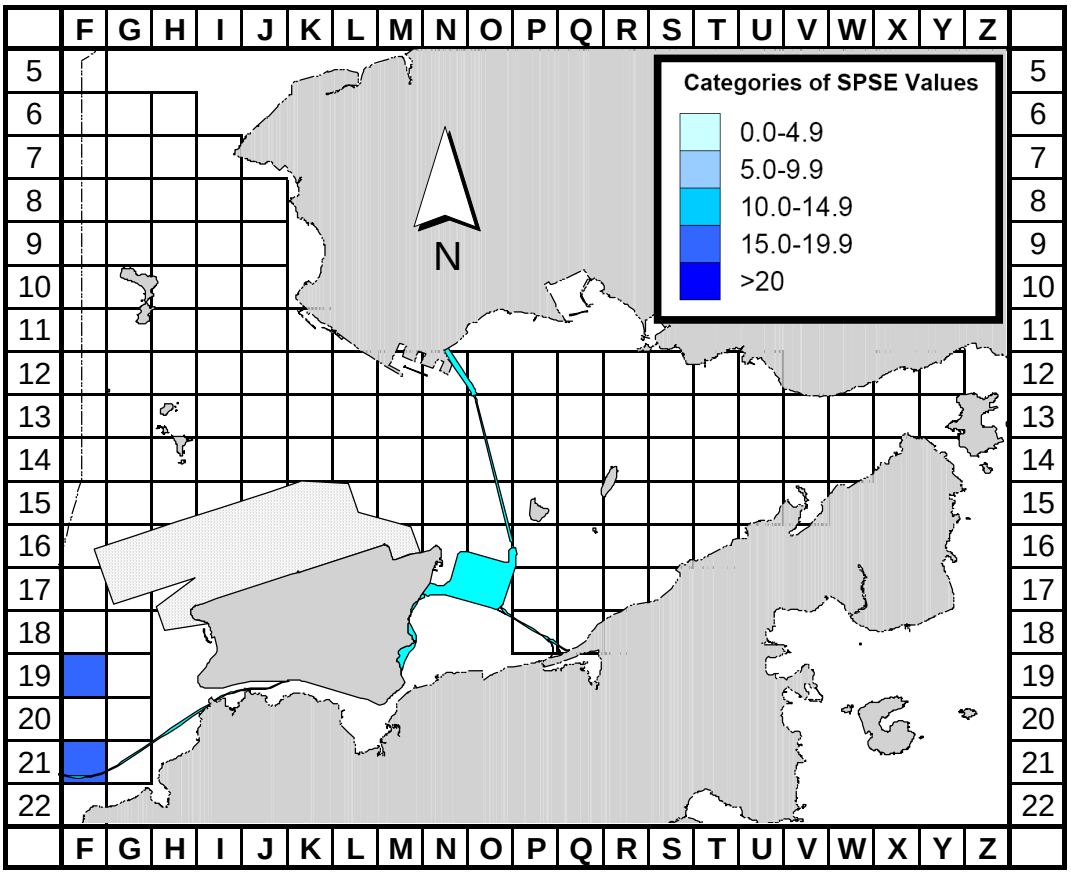


Figure 3a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL08 impact monitoring period (March-May 2020) (SPSE = no. of on-effort sightings per 100 units of survey effort)

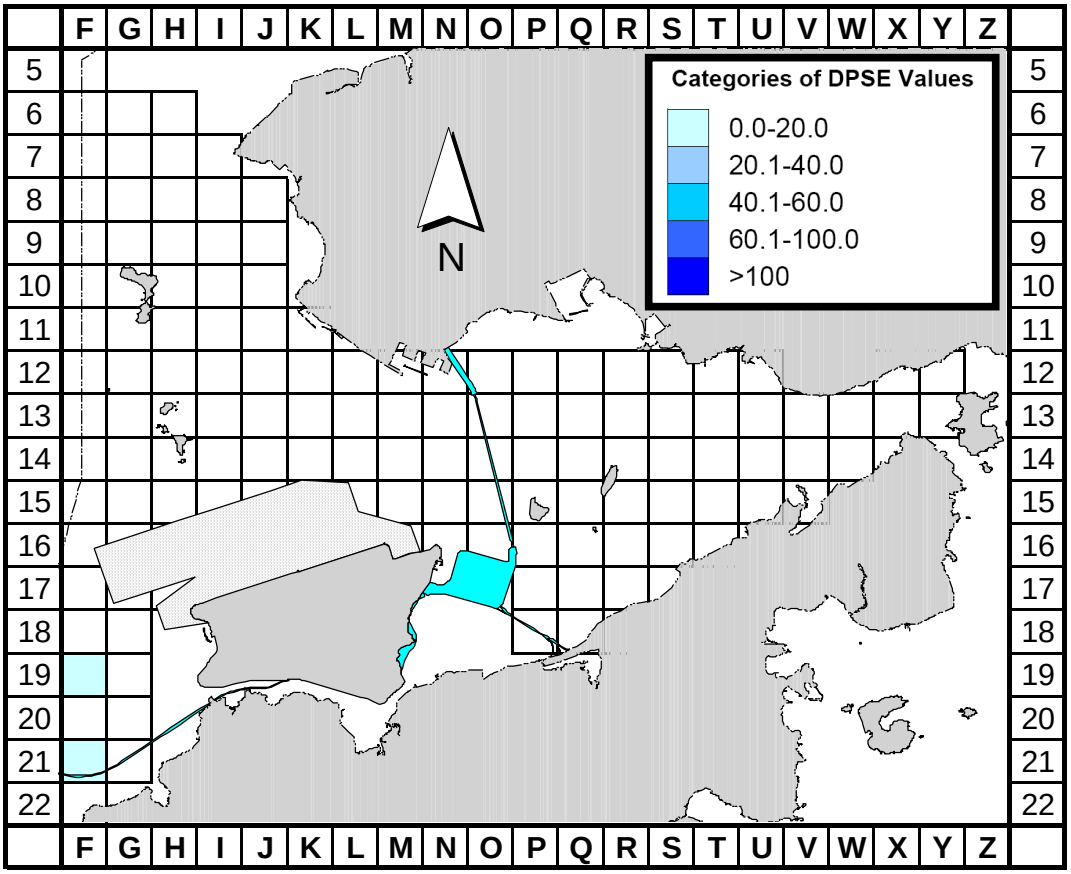


Figure 3b. Density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL08 impact monitoring period (March-May 2020) (DPSE = no. of dolphins per 100 units of survey effort)

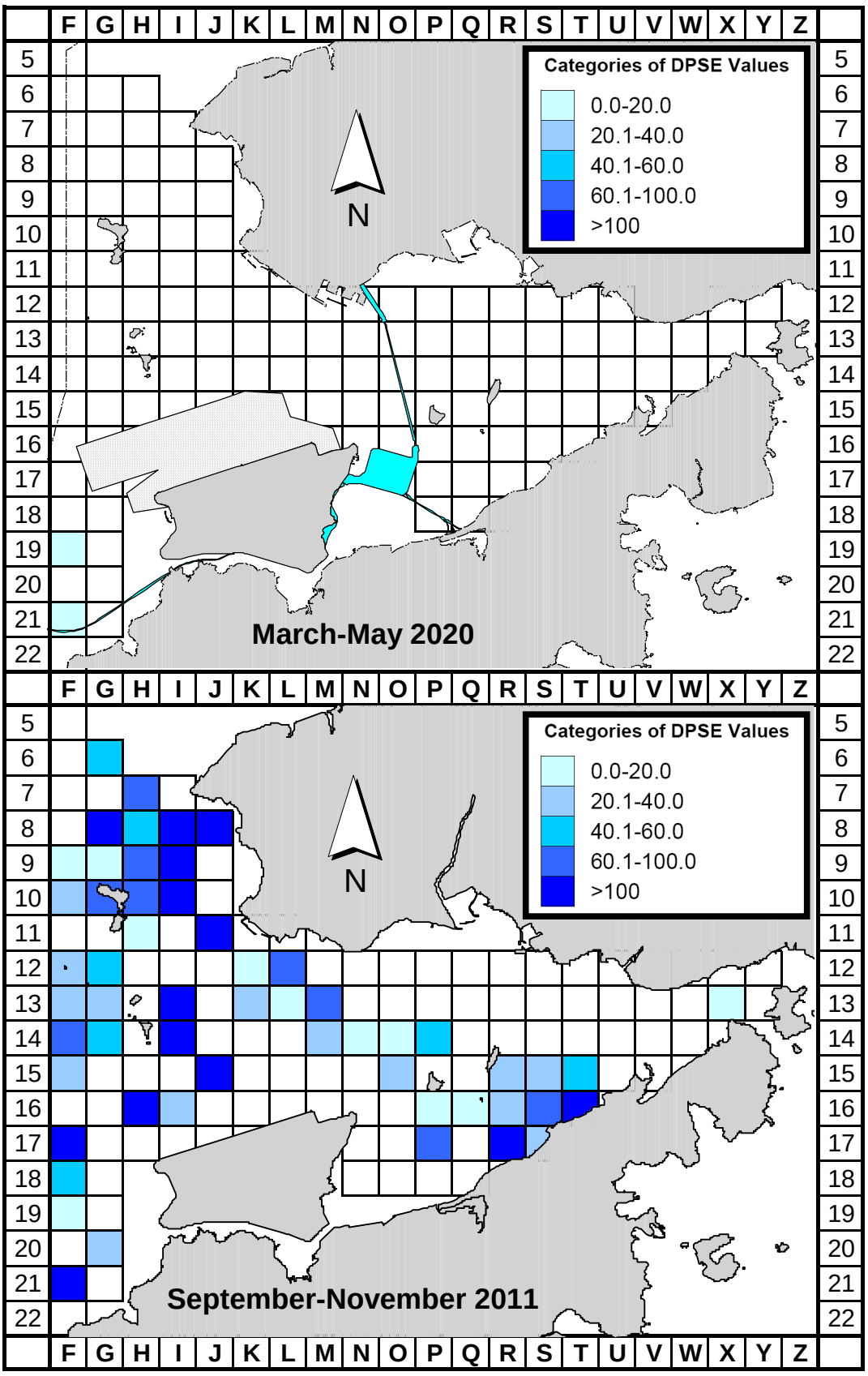


Figure 4. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in Northwest and Northeast Lantau survey area between the TMCLKL08 impact monitoring period (March-May 2020) and baseline monitoring period (September-November 2011)
(DPSE = no. of dolphins per 100 units of survey effort)

Appendix I. TMCLKL08 Survey Effort Database (March-May 2020)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
3-Mar-20	NW LANTAU	2	7.92	SPRING	STANDARD36826	TMCLKL	P
3-Mar-20	NW LANTAU	3	24.49	SPRING	STANDARD36826	TMCLKL	P
3-Mar-20	NW LANTAU	2	7.77	SPRING	STANDARD36826	TMCLKL	S
3-Mar-20	NW LANTAU	3	3.20	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NW LANTAU	2	13.90	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NW LANTAU	3	13.86	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NW LANTAU	2	6.20	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NW LANTAU	3	4.74	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NE LANTAU	2	29.58	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NE LANTAU	3	5.14	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NE LANTAU	2	10.81	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NE LANTAU	3	1.87	SPRING	STANDARD36826	TMCLKL	S
18-Mar-20	NW LANTAU	1	2.30	SPRING	STANDARD36826	TMCLKL	P
18-Mar-20	NW LANTAU	2	13.75	SPRING	STANDARD36826	TMCLKL	P
18-Mar-20	NW LANTAU	3	16.02	SPRING	STANDARD36826	TMCLKL	P
18-Mar-20	NW LANTAU	1	1.66	SPRING	STANDARD36826	TMCLKL	S
18-Mar-20	NW LANTAU	2	6.73	SPRING	STANDARD36826	TMCLKL	S
18-Mar-20	NW LANTAU	3	0.90	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NE LANTAU	2	25.17	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NE LANTAU	3	11.60	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NE LANTAU	2	11.93	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NE LANTAU	3	2.00	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NW LANTAU	2	20.01	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NW LANTAU	3	5.90	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NW LANTAU	2	9.43	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NW LANTAU	3	2.64	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NW LANTAU	1	10.88	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NW LANTAU	2	11.06	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NW LANTAU	3	4.40	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NW LANTAU	2	12.06	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NW LANTAU	3	1.50	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NE LANTAU	1	1.70	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NE LANTAU	2	18.30	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NE LANTAU	3	15.66	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NE LANTAU	1	1.10	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NE LANTAU	2	7.05	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NE LANTAU	3	5.19	SPRING	STANDARD36826	TMCLKL	S
14-Apr-20	NW LANTAU	1	1.46	SPRING	STANDARD36826	TMCLKL	P
14-Apr-20	NW LANTAU	2	31.85	SPRING	STANDARD36826	TMCLKL	P
14-Apr-20	NW LANTAU	2	3.95	SPRING	STANDARD36826	TMCLKL	S
21-Apr-20	NW LANTAU	1	1.20	SPRING	STANDARD36826	TMCLKL	P
21-Apr-20	NW LANTAU	2	19.06	SPRING	STANDARD36826	TMCLKL	P
21-Apr-20	NW LANTAU	3	11.81	SPRING	STANDARD36826	TMCLKL	P
21-Apr-20	NW LANTAU	1	1.80	SPRING	STANDARD36826	TMCLKL	S
21-Apr-20	NW LANTAU	2	9.33	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NW LANTAU	3	19.50	SPRING	STANDARD36826	TMCLKL	P
22-Apr-20	NW LANTAU	4	8.95	SPRING	STANDARD36826	TMCLKL	P
22-Apr-20	NW LANTAU	3	7.42	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NW LANTAU	4	3.33	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NE LANTAU	2	4.00	SPRING	STANDARD36826	TMCLKL	P
22-Apr-20	NE LANTAU	3	31.97	SPRING	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
22-Apr-20	NE LANTAU	2	3.50	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NE LANTAU	3	9.53	SPRING	STANDARD36826	TMCLKL	S
5-May-20	NW LANTAU	2	7.25	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NW LANTAU	3	20.75	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NW LANTAU	3	11.20	SPRING	STANDARD36826	TMCLKL	S
5-May-20	NE LANTAU	2	24.87	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NE LANTAU	3	9.60	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NE LANTAU	2	9.29	SPRING	STANDARD36826	TMCLKL	S
5-May-20	NE LANTAU	3	3.34	SPRING	STANDARD36826	TMCLKL	S
12-May-20	NW LANTAU	2	32.61	SPRING	STANDARD36826	TMCLKL	P
12-May-20	NW LANTAU	2	6.74	SPRING	STANDARD36826	TMCLKL	S
12-May-20	NW LANTAU	3	1.85	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NW LANTAU	1	1.50	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NW LANTAU	2	9.00	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NW LANTAU	3	16.13	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NW LANTAU	2	5.20	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NW LANTAU	3	7.27	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NE LANTAU	1	6.72	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NE LANTAU	2	23.97	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NE LANTAU	3	4.22	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NE LANTAU	1	3.53	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NE LANTAU	2	8.46	SPRING	STANDARD36826	TMCLKL	S
25-May-20	NW LANTAU	1	1.31	SPRING	STANDARD36826	TMCLKL	P
25-May-20	NW LANTAU	2	26.44	SPRING	STANDARD36826	TMCLKL	P
25-May-20	NW LANTAU	3	3.83	SPRING	STANDARD36826	TMCLKL	P
25-May-20	NW LANTAU	2	9.85	SPRING	STANDARD36826	TMCLKL	S

Appendix II. TMCLKL08 Chinese White Dolphin Sighting Database (March-May 2020)

(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
3-Mar-20	1	1310	1	NW LANTAU	3	3	ON	TMCLKL	817341	804686	SPRING	NONE	P
14-Apr-20	1	1002	1	NW LANTAU	2	210	ON	TMCLKL	815038	804702	SPRING	NONE	P

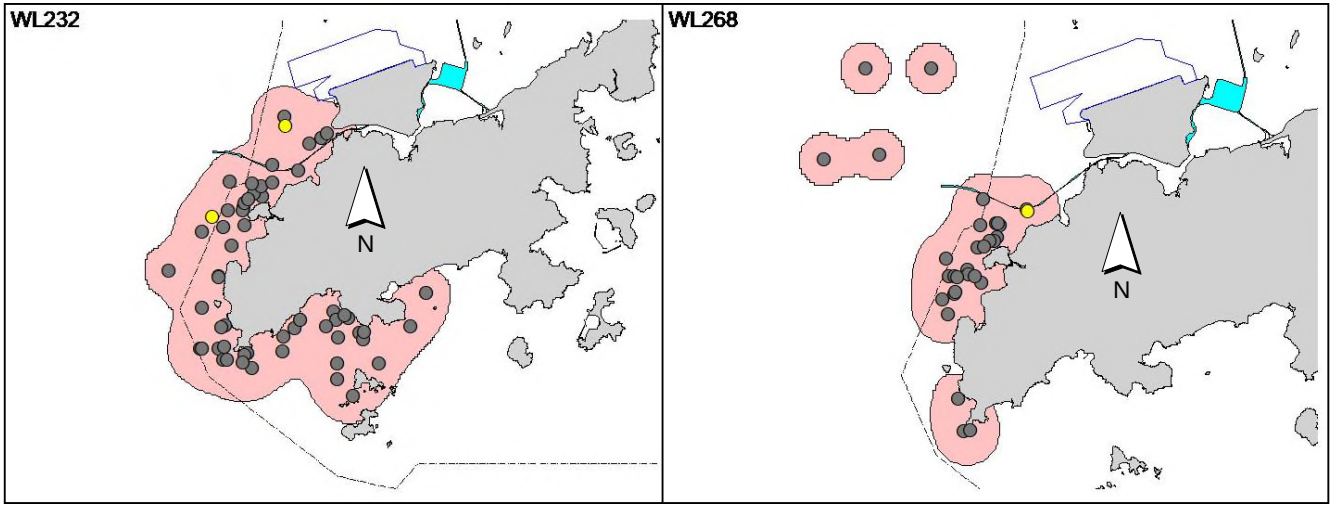
Appendix III. Individual dolphins identified during TMCLKL08 monitorin surveys in March-May 2020

ID#	DATE	STG#	AREA
WL232	03/03/20	1	NW LANTAU
WL268	14/04/20	1	NW LANTAU

Appendix IV. Two individual dolphins that were identified between March-May 2020 under TMCLKL08 monitoring surveys

Appendix V. Ranging patterns (95% kernel ranges) of two individual dolphins that were sighted during TMCLKL08 impact phase monitoring period

(note: yellow dots indicate sightings made in March-May 2020 during TMCLKL08 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 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	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	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.	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

EVENT	ACTION			
	ET	**IEC**	**SOR**	**Contractor**
	seasonal differences; 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.	discuss with ET, SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise 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.	2. If SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, 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.	monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

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	4	109
	Limit	1	13
24-Hr TSP	Action	0	10
	Limit	0	4
Water Quality	Action	0	167
	Limit	0	19
Impact Dolphin Monitoring	Action	0	11
	Limit	1	19

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 (March 2020 to May 2020)	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	12 March 2020

ERM

Dear Sir or Madam,

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

0212330_12March2020_1hrTSP_Station ASR5

One Action Level Exceedance was recorded on 12 March 2020.

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_12March2020_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]**	
Date	13 March 2020 (Measured) 23 March 2020 (Laboratory results received by ERM)	
Monitoring Station	ASR5	
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 (356 µg/m³) during 0928 - 1028.	
Works Undertaken (at the time of monitoring event)	On 12 March 2020, Tunnel internal structure 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 Tunnel internal structure works were carried out on site on 12 March 2020. • 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 72° and 87°, blowing from a easterly direction) and wind speed (2.7 m/s) during the works period, Station ASR5 is located upstream to the construction works at the Tunnel, which is unlikely impacted by the construction works under this Project. 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 12/3/2020								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2020-03-12	AQMS1	Cloudy	8:49:00	1-hour TSP	82	ug/m3
TMCLKL	HY/2012/08	2020-03-12	AQMS1	Cloudy	9:51:00	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2020-03-12	AQMS1	Cloudy	10:53:00	1-hour TSP	126	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR1	Cloudy	8:37:00	1-hour TSP	137	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR1	Cloudy	9:39:00	1-hour TSP	172	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR1	Cloudy	10:41:00	1-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR10	Cloudy	8:03:00	1-hour TSP	19	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR10	Cloudy	9:05:00	1-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR10	Cloudy	10:07:00	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR5	Cloudy	8:26:00	1-hour TSP	146	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR5	Cloudy	9:28:00	1-hour TSP	356	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR5	Cloudy	10:30:00	1-hour TSP	221	ug/m3
TMCLKL	HY/2012/08	2020-03-12	AQMS1	Cloudy	11:55:00	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR1	Cloudy	11:43:00	24-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR10	Cloudy	11:09:00	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR5	Cloudy	11:32:00	24-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2020-03-12	ASR6	Cloudy	11:20:00	24-hour TSP	75	ug/m3

Action level exceedance
Limit level exceedance

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)**
20/03/12	0:00	2.2	38
20/03/12	1:00	2.7	63
20/03/12	2:00	4	91
20/03/12	3:00	3.6	74
20/03/12	4:00	2.7	79
20/03/12	5:00	2.7	73
20/03/12	6:00	2.2	70
20/03/12	7:00	2.7	61
20/03/12	8:00	2.2	72
20/03/12	9:00	2.7	72
20/03/12	10:00	2.7	87
20/03/12	11:00	2.2	76
20/03/12	12:00	1.8	70
20/03/12	13:00	0.9	36
20/03/12	14:00	0.9	99
20/03/12	15:00	0.9	60
20/03/12	16:00	1.3	39
20/03/12	17:00	1.3	49
20/03/12	18:00	1.3	56
20/03/12	19:00	1.3	56
20/03/12	20:00	0.9	39
20/03/12	21:00	1.3	34
20/03/12	22:00	0.9	41
20/03/12	23:00	1.3	29

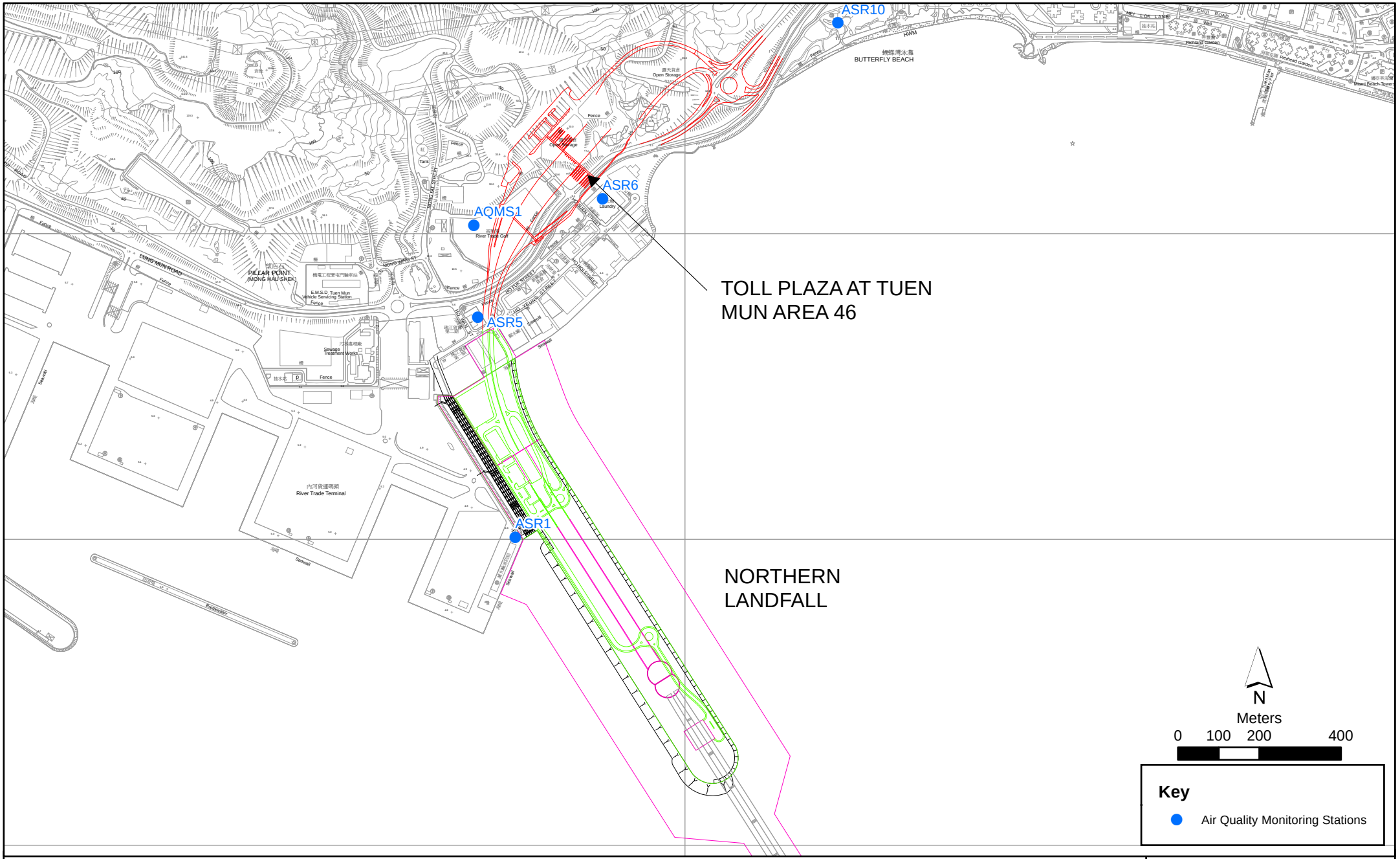


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

File: T:\GIS\CONTRACT\0212330\Mxd\0212330_ASR_for_Enhanced_TSP_monitoring.mxd
Date: 21/2/2014

Environmental Resources Management

ERM

Dragages - Bouygues Joint Venture 寶嘉 - 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: 09 Mar 2020 to 至 15 Mar 2020

	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	8 April 2020

ERM

Dear Sir or Madam,

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

0212330_8April2020_1hrTSP_Station ASR5
0212330_8April2020_1hrTSP_Station ASR1
0212330_8April2020_1hrTSP_Station ASR1

Three Action Level Exceedances were recorded on 8 April 2020.

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.	**Action Level Exceedance** **0212330_8April2020_1hrTSP_Station ASR5** **0212330_8April2020_1hrTSP_Station ASR1** **0212330_8April2020_1hrTSP_Station ASR1** **[Total No. of Exceedances = 3]**	
Date	8 April 2020 (Measured) 20 April 2020 (Laboratory results received by ERM)	
Monitoring Station	ASR5 and ASR1	
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 (384 µg/m³) during 1540 - 1640. Action Level Exceedance for 1-hr TSP is observed at ASR1 (357 µg/m³) during 1449 – 1549. Action Level Exceedance for 1-hr TSP is observed at ASR1 (457 µg/m³) during 1551 – 1651.	
Works Undertaken (at the time of monitoring event)	On 8 April 2020, Carpark Formation works were carried out on site (refer to *Figure 2*).	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to this Contract, in view of the following: • According to the construction information provided by the Contractor, Carpark formation works were carried out on site on 8 April 2020. • With reference to the recorded wind direction (1400-1500: 128°; 1500-1600: 124°; 1600-1700: 84°), blowing from a south-easterly/easterly direction) and wind speed (1400-1500: 1.8 m/s; 1500-1600: 2.7 m/s; 1600-1700: 0.9 m/s) during the works period. Although Station ASR5 and ASR1 are located downstream to the construction works, Carpark Formation works were carried out with the implementation of dust mitigation measures. • 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 (refer to *Watering Record*). Based on the above, the exceedances are 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 8/4/2020								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2020-04-08	ASR10	Sunny	13:13:00	1-hour TSP	44	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR10	Sunny	14:15:00	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR10	Sunny	15:17:00	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR6	Sunny	13:42:00	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR6	Sunny	14:26:00	1-hour TSP	86	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR6	Sunny	15:28:00	1-hour TSP	121	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR5	Sunny	13:36:00	1-hour TSP	198	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR5	Sunny	14:38:00	1-hour TSP	243	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR5	Sunny	15:40:00	1-hour TSP	384	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR1	Sunny	13:47:00	1-hour TSP	328	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR1	Sunny	14:49:00	1-hour TSP	357	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR1	Sunny	15:51:00	1-hour TSP	457	ug/m3
TMCLKL	HY/2012/08	2020-04-08	AQMS1	Sunny	13:58:00	1-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2020-04-08	AQMS1	Sunny	15:00:00	1-hour TSP	95	ug/m3
TMCLKL	HY/2012/08	2020-04-08	AQMS1	Sunny	16:02:00	1-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR10	Sunny	16:19:00	24-hour TSP	42	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR6	Sunny	16:30:00	24-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR5	Sunny	16:42:00	24-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	2020-04-08	ASR1	Sunny	16:53:00	24-hour TSP	94	ug/m3
TMCLKL	HY/2012/08	2020-04-08	AQMS1	Sunny	17:04:00	24-hour TSP	67	ug/m3

Action level exceedance
Limit level exceedance

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)**
20/04/08	0:00	0	1
20/04/08	1:00	0	354
20/04/08	2:00	0	355
20/04/08	3:00	0	48
20/04/08	4:00	0	73
20/04/08	5:00	0.9	50
20/04/08	6:00	0.4	31
20/04/08	7:00	0.9	52
20/04/08	8:00	1.3	84
20/04/08	9:00	1.3	99
20/04/08	10:00	1.3	99
20/04/08	11:00	0.9	95
20/04/08	12:00	1.3	90
20/04/08	13:00	1.8	86
20/04/08	14:00	1.8	128
20/04/08	15:00	2.7	124
20/04/08	16:00	0.9	84
20/04/08	17:00	1.3	91
20/04/08	18:00	0.9	81
20/04/08	19:00	0.9	68
20/04/08	20:00	0.9	98
20/04/08	21:00	1.8	80
20/04/08	22:00	1.8	93
20/04/08	23:00	0.9	96

Figure 1

Locations of air quality monitoring stations

DATE: 06/03/2013

Environmental Resources Management

ERM

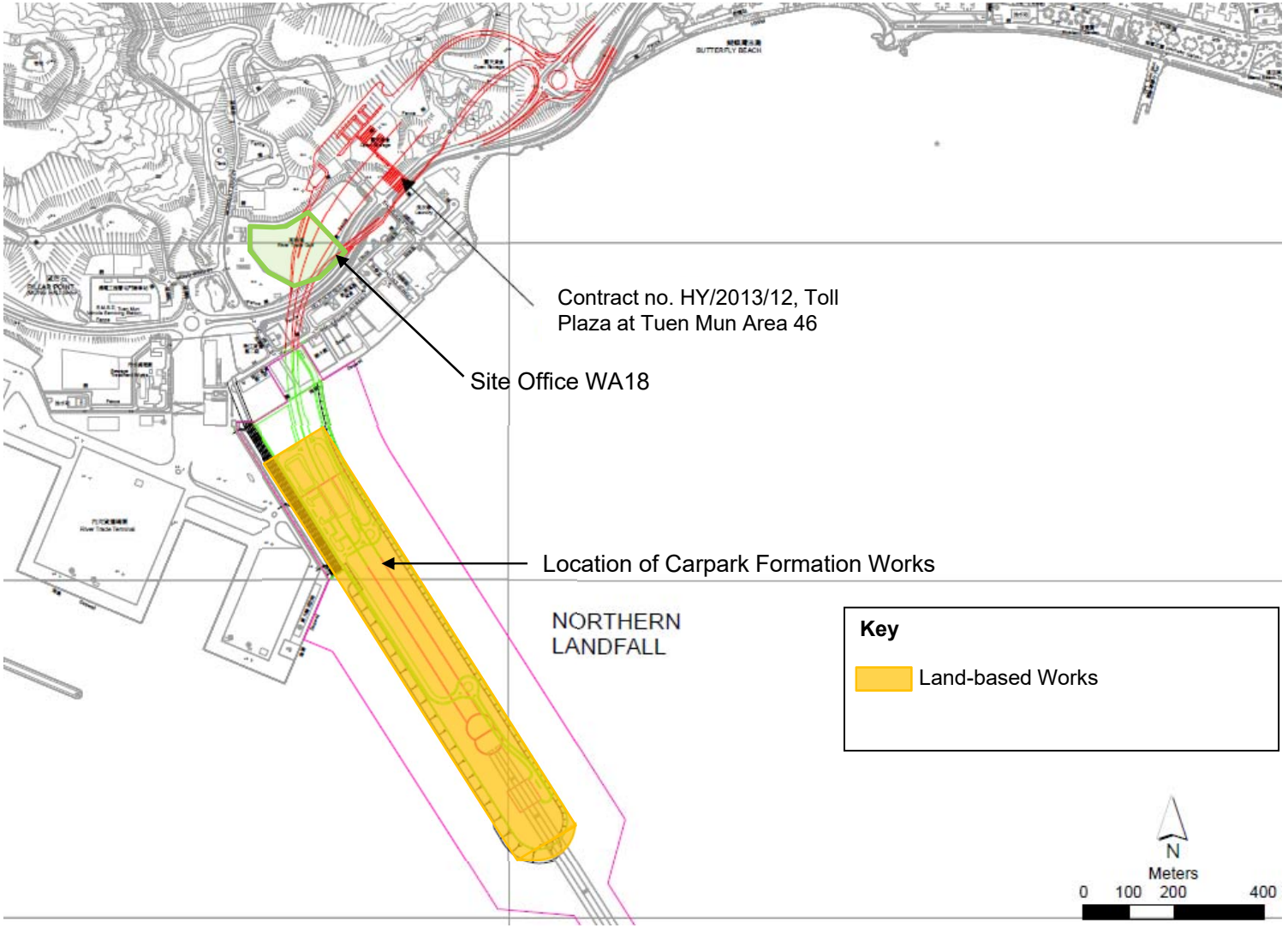


Figure 2

HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
Work Location

Environmental Resources Management

ERM

Dragages - Bouygues Joint Venture	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: 02 Mar 2020 to 至 08 Mar 2020

	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	5 May 2020

ERM

Dear Sir or Madam,

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

0212330_14April2020_1hrTSP_Station ASR1

One Limit Level Exceedance was recorded on 14 April 2020.

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_14April2020_1hrTSP_Station ASR1** **[Total No. of Exceedances = 1]**	
Date	14 April 2020 (Measured) 27 April 2020 (Laboratory results received by ERM)	
Monitoring Station	ASR1	
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	Limit Level Exceedance for 1-hr TSP is observed at ASR1 (673 µg/m³) during 1400 – 1500.	
Works Undertaken (at the time of monitoring event)	On 14 April 2020, Carpark Formation works were carried out on site (refer to *Figure 2*).	
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 Carpark formation works were carried out on site on 14 April 2020. • With reference to the recorded wind direction (80°), blowing from a north-easterly direction) and wind speed (1.3 m/s) during the works period. Although Station ASR1 is located downstream to the construction works, Carpark Formation works were carried out with the implementation of dust mitigation measures. • 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 (refer to *Watering Record*). 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 14/4/2020								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2020-04-14	ASR10	Sunny	13:27:00	1-hour TSP	95	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR10	Sunny	14:29:00	1-hour TSP	44	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR10	Sunny	15:31:00	1-hour TSP	47	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR6	Sunny	13:38:00	1-hour TSP	193	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR6	Sunny	14:40:00	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR6	Sunny	15:42:00	1-hour TSP	74	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR5	Sunny	13:50:00	1-hour TSP	254	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR5	Sunny	14:52:00	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR5	Sunny	15:54:00	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR1	Sunny	14:00:00	1-hour TSP	673	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR1	Sunny	15:02:00	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR1	Sunny	16:04:00	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2020-04-14	AQMS1	Sunny	14:12:00	1-hour TSP	140	ug/m3
TMCLKL	HY/2012/08	2020-04-14	AQMS1	Sunny	15:14:00	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2020-04-14	AQMS1	Sunny	16:16:00	1-hour TSP	127	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR10	Sunny	16:33:00	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR6	Sunny	16:44:00	24-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR5	Sunny	16:54:00	24-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2020-04-14	ASR1	Sunny	17:06:00	24-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	2020-04-14	AQMS1	Sunny	17:18:00	24-hour TSP	93	ug/m3

Action level exceedance
Limit level exceedance

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)**
20/04/14	0:00	0	24
20/04/14	1:00	0	25
20/04/14	2:00	0	6
20/04/14	3:00	0	347
20/04/14	4:00	0	350
20/04/14	5:00	1.3	309
20/04/14	6:00	0.4	347
20/04/14	7:00	0	333
20/04/14	8:00	0	123
20/04/14	9:00	0	104
20/04/14	10:00	0	102
20/04/14	11:00	0.4	127
20/04/14	12:00	0.9	139
20/04/14	13:00	1.3	96
20/04/14	14:00	1.3	80
20/04/14	15:00	1.3	142
20/04/14	16:00	0.9	200
20/04/14	17:00	1.3	212
20/04/14	18:00	1.3	197
20/04/14	19:00	0.4	119
20/04/14	20:00	0.9	83
20/04/14	21:00	0.9	139
20/04/14	22:00	0.4	61
20/04/14	23:00	0.4	83

Figure 1

Locations of air quality monitoring stations

DATE: 06/03/2013

Environmental Resources Management

ERM

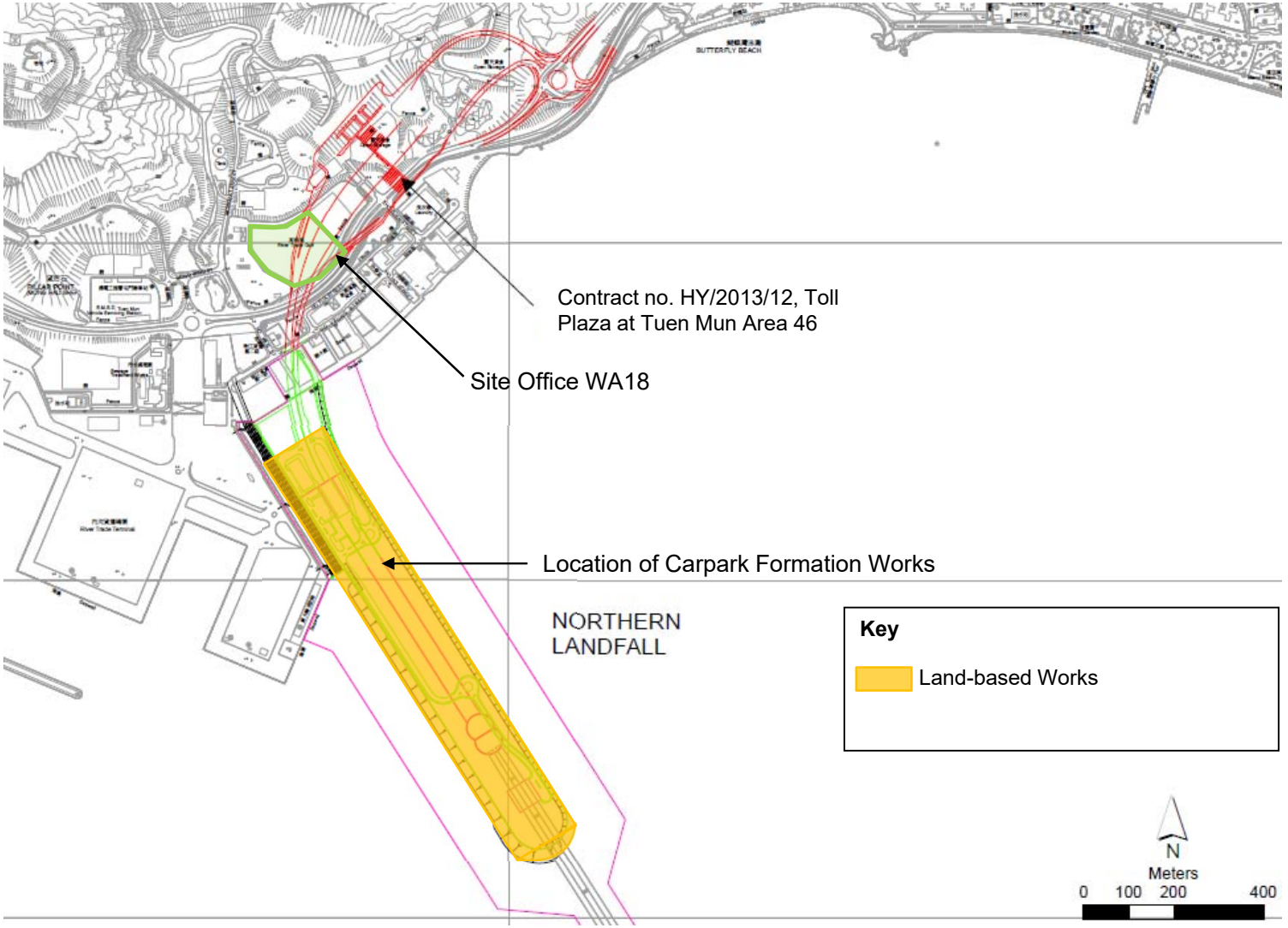


Figure 2

HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
Work Location

Environmental Resources Management

ERM

Dragages Hong Kong 香港寶嘉 | Dragages - Bouygues Joint Venture 寶嘉·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: 13 Apr 2020 to 至 19 Apr 2020

	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 Impact Dolphin Monitoring
Date	21 July 2020

ERM

Dear Sir or Madam,

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

0212330_Mar2020/May2020_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact dolphin monitoring data between March and May 2020.

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_ Mar2020/May2020_dolphin_STG&ANI_NEL&NWL** **[Total No. of Exceedances = 1 Limit Level Exceedance]**	
Date	March 2020 – May 2020 (monitored) 20 July 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 March and May 2020. The exceedance was reported in the approved *Seventy-ninth Monthly EM&A Report* dated 9 June 2020.	
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, March to May 2020) 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 $\alpha = 0.01$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0019$) and ANI ($p = 0.0021$) were detected between Periods. • A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: baseline vs impact – cumulative quarters, December 2012 to May 2020) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and cumulative impact monitoring quarter. By setting $\alpha = 0.00001$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000000$) and in ANI ($p = 0.000000$) between Cumulative Period and Location were detected. *Note: The commencement date under *Contract No. HY/2012/08* is 1 November 2013.	
Works Undertaken (in the monitoring quarter)	No marine works was undertaken in the reporting period.	

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: No marine works was undertaken in the reporting period. Post-construction water quality monitoring was conducted between 17 March 2020 and 11 April 2020. 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	No marine works was undertaken in the reporting period. 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-Seventh* to *Seventy-Ninth 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 May 2020 [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	3008.812	0.000	336.902	889.467	1782.443
Jan-2020	174.69	0.000	0.000	0.000	174.69
Feb-2020	1.455	0.000	0.000	0.000	1.455
Mar-2020	3.252	0.000	0.000	0.000	3.252
Apr-2020	4.200	0.000	0.000	0.000	4.200
May-2020	7.015	0.000	0.000	0.000	7.015
Jun-2020					
Half Year Sub-total					
Jul-2020					
Aug-2020					
Sep-2020					
Oct-2020					
Nov-2020					
Dec-2020					
Project Total Quantities	3199.424	0.000	336.902	889.467	1973.055

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	9890.77	9890.77	14.64	14.64	16.84	16.84	85.807	85.807	21.943
Jan-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.54
Feb-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.349
Mar-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.226
Apr-2020	22.14	22.14	1.30	1.30	0.00	0.00	6.40	6.40	0.521
May-2020	6.2	6.2	0.54	0.54	0.00	0.00	0.6	0.6	0.536
Jun-2020									
Half Year Sub-total									
Jul-2020									
Aug-2020									
Sep-2020									
Oct-2020									
Nov-2020									
Dec-2020									
Project Total Quantities	9919.11	9919.11	16.48	16.48	16.84	16.84	92.608	92.608	27.115

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)
10000.00	20.00	18.00	95.00	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).