

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

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

20 November 2017

Environmental Resources Management
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Ref.: HYDHZMBEEM00_0_6026L.17

23 November 2017

AECOM
Supervising Officer Representative's Office
No.8 Mong Fat Street, Tuen Mun,
New Territories, Hong Kong

By Fax (2293 6300) and By Post

Attention: Messrs. Andy Westmoreland / Roger Man

Dear Sirs,

**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
Thirteenth Quarterly EM&A Report (December 2016 – February 2017)**

Reference is made to the Thirteenth Quarterly Environmental Monitoring and Audit (EM&A) Report (December 2016 - February 2017) (ET's ref.: "0212330_13th Quarterly EM&A_20171115.doc" dated 20 November 2017) certified by the ET Leader and provided to us via e-mail on 20 November 2017.

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

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

Yours sincerely,



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

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
HyD – Mr. Vico Cheung (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Mr. Jovy Tam (By Fax: 2723 5660)
Dragages – Bouygues JV - Mr. C. F. Kwong (By Fax: 2293 7499)

Internal: DY, YH, ENPO Site

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

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

Document Code: 0212330_13th Quarterly EM&A_20171115.doc

Client: DBJV		Project No: 0212330			
Summary: This document presents the Thirteen Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.		Date: 20 November 2017			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Mr Jovy Tam ET Leader			
	13 th Quarterly EM&A Report	VAR	JT	CAR	20/11/17
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p>			
		 			

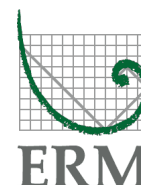


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EXECUTIVE SUMMARY

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 Environ 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 Project commenced on 1 November 2013 and will tentatively be completed by the end of 2018. 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 Thirteenth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 December 2016 to 28 February 2017 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the “Project”) 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

- Box Culvert Extension at Works Area – Portion N-A;
- Shaft Structure and Backfilling – Portion N-C;
- Construction of Cross Passage Tympanum – TBM tunnel;
- Cross Passage Lining Installation – TBM Tunnel;
- Corbel Construction – TBM Tunnel;
- Excavation of Sub-sea Tunnel – TBM tunnel;
- Sub-sea Tunnel Gallery Installation – TBM tunnel;
- Deep Band Drain Installation – Portion S-A; and
- Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.

Marine-based Works

- Installation of silt curtain – Portion N-A;
- Dredging – Portion N-A;
- Construction of Vertical Seawall at Portion N-A;
- Band drain installation at Portion N-A; and
- Filling works at Portion N-A.

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

24-hour TSP Monitoring	30 sessions
1-hour TSP Monitoring	30 sessions
Water Quality Monitoring	27 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	12 sessions

Implementation of Marine Mammal Exclusion Zone

Daily marine mammal exclusion zone was in effect during the period of dredging, reclamation or marine sheet piling works in open waters under this Contract. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when dredging, reclamation or marine sheet piling works were carried out outside the daylight hours under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded in February 2017 during the exclusion zone monitoring.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

No exceedances were recorded from the air quality monitoring in this reporting period.

Breaches of Action and Limit Levels for Water Quality

No exceedances were recorded from the water quality monitoring in this reporting period.

Dolphin Monitoring

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2016 and February 2017, 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.

One (1) environmental complaint case regarding hammering Noise from unidentified Sources was referred by EPD on 14 December 2016.

One (1) environmental complaint case regarding sewage discharge at the east of the artificial island of the Hong Kong – Zhuhai-Macao Bridge was referred by IEC on 16 January 2017. One (1) environmental complaint case regarding trespassing of construction vessels in Brothers Marine Park was referred by IEC on 17 January 2017.

One (1) environmental complaint case regarding muddy water discharge at the site area near Ho Yeung Street was referred by EPD on 14 February 2017.

The complaint investigation reports are provided in Appendix J.

No notification of summons or successful prosecution recorded in the reporting period.

Reporting Change

There was no reporting change required in the reporting period.

Upcoming Works for the Next Reporting Period

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

Marine-based Works

- Construction of Vertical Seawall at Portion N-A; and
- Band drain and Filling works at Portion N-A

Land-based Works

- Box Culvert Extension at Works Area – Portion N-A;
- Construction of North Ventilation Building – Portion N-C;
- Construction of Cross Passage Tympanum – TBM tunnel;
- Cross Passage Lining Installation – TBM Tunnel;
- Excavation of Sub-sea Tunnel – TBM tunnel;
- Corbel Construction – TBM Tunnel;
- Sub-sea Tunnel Gallery Installation – TBM tunnel;
- Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.

Future Key Issues

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

1.1

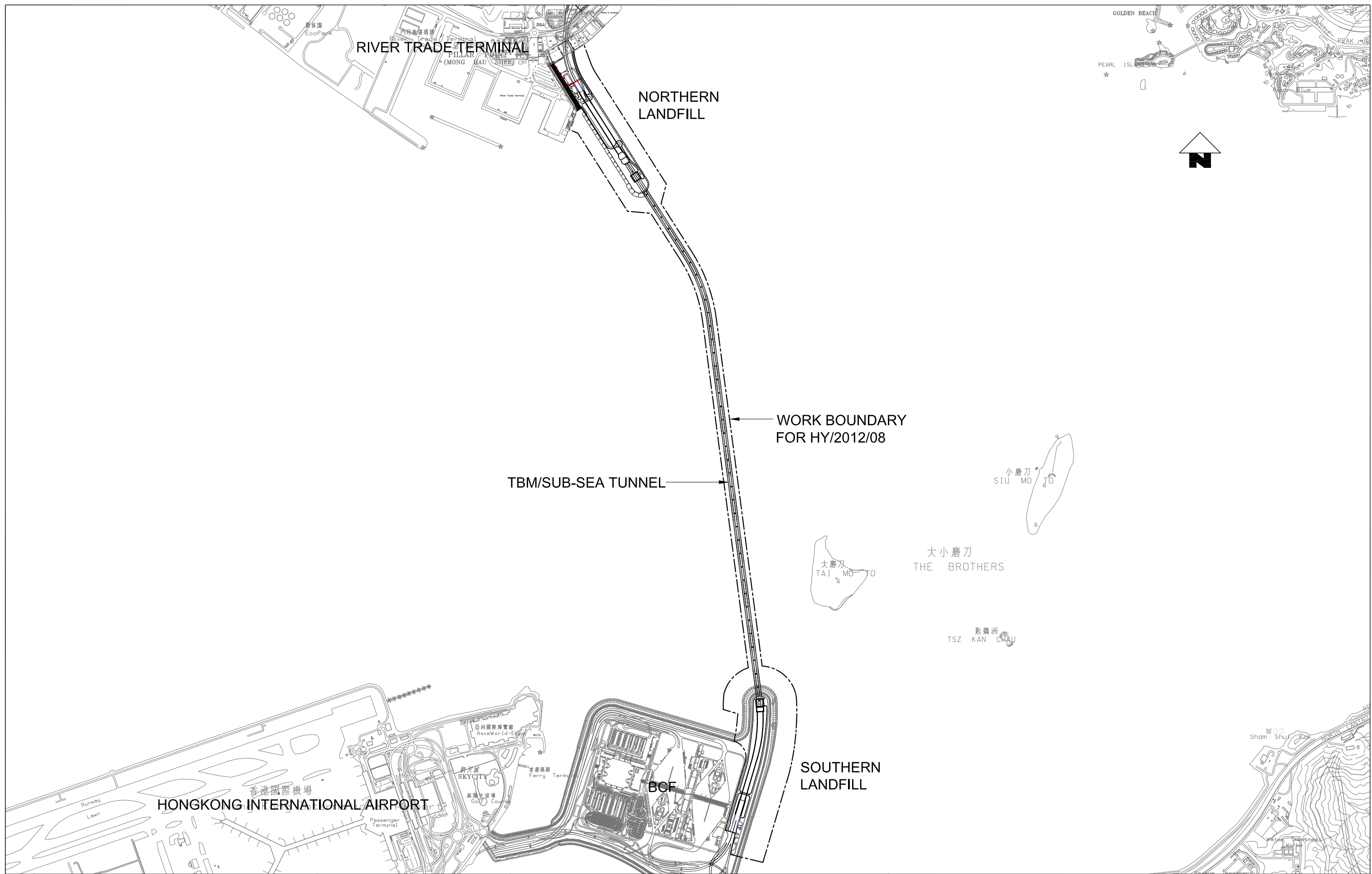
BACKGROUND

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-354/2009A) 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 Environ 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
Date	11SEP2013
Rev.	Description
A	FIRST ISSUE
	11SEP13
	PKV
	Checked

Main Contractor

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 by 2018. 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 Thirteenth 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 December 2016 to 28 February 2017.

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 22/HZMB	Chow Man Lung, Andrew	2762 4110	2762 4110
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Roger Man	2293 6388	2293 6300
		Andrew Westmoreland	2293 6360	2293 6300
ENPO / IEC (Ramboll Environ Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
Contractor (Dragages – Bouygues Joint Venture)	Environmental Manager	C.F. Kwong	2293 7322	2293 7499
	Environmental Officer	Bryan Lee	2293 7323	2293 7499
	Environmental Officer	David Ho	6628 8684	2293 7499
	24-hour complaint hotline	Rachel Lam	2293 7330	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

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*.

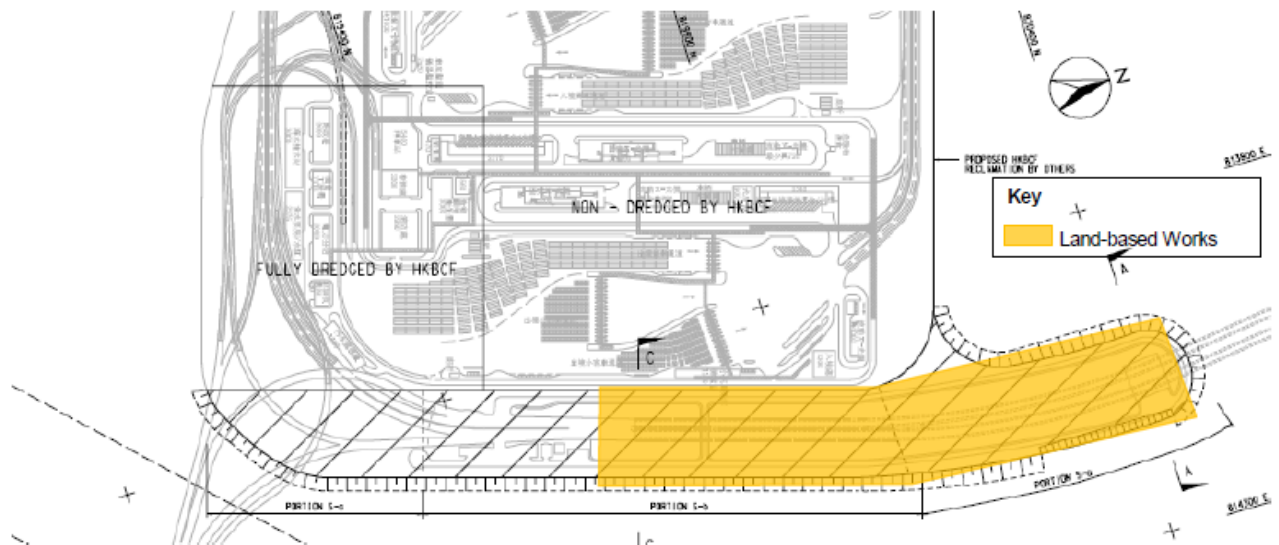
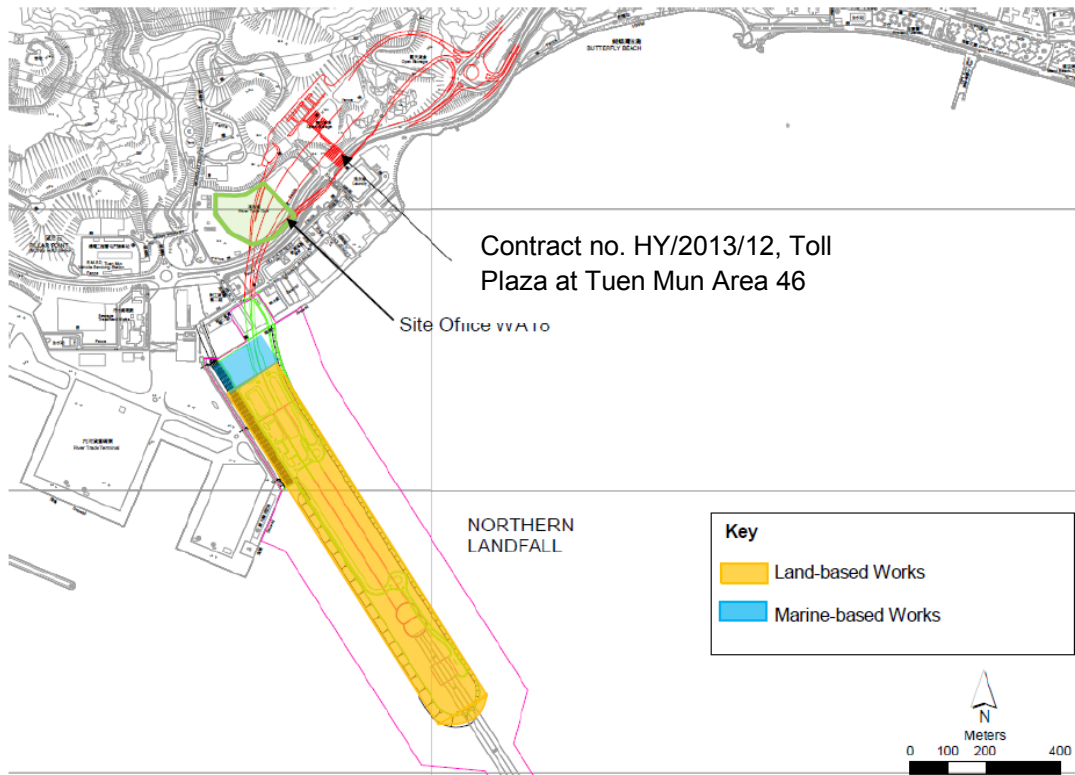
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

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
<i>Land-based Works</i>
<ul style="list-style-type: none"> • Box Culvert Extension at Works Area – Portion N-A; • Shaft Structure and Backfilling – Portion N-C; • Construction of Cross Passage Tympanum – TBM tunnel; • Cross Passage Lining Installation – TBM Tunnel; • Corbel Construction – TBM Tunnel; • Excavation of Sub-sea Tunnel – TBM tunnel; • Sub-sea Tunnel Gallery Installation – TBM tunnel; • Deep Band Drain Installation – Portion S-A; and • Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.
<i>Marine-based Works</i>
<ul style="list-style-type: none"> • Installation of silt curtain – Portion N-A; • Dredging – Portion N-A; • Construction of Vertical Seawall at Portion N-A; • Band drain installation at Portion N-A; and • Filling works at Portion N-A.

Figure 1.2 Locations of Construction Activities – December 2016 to February 2017



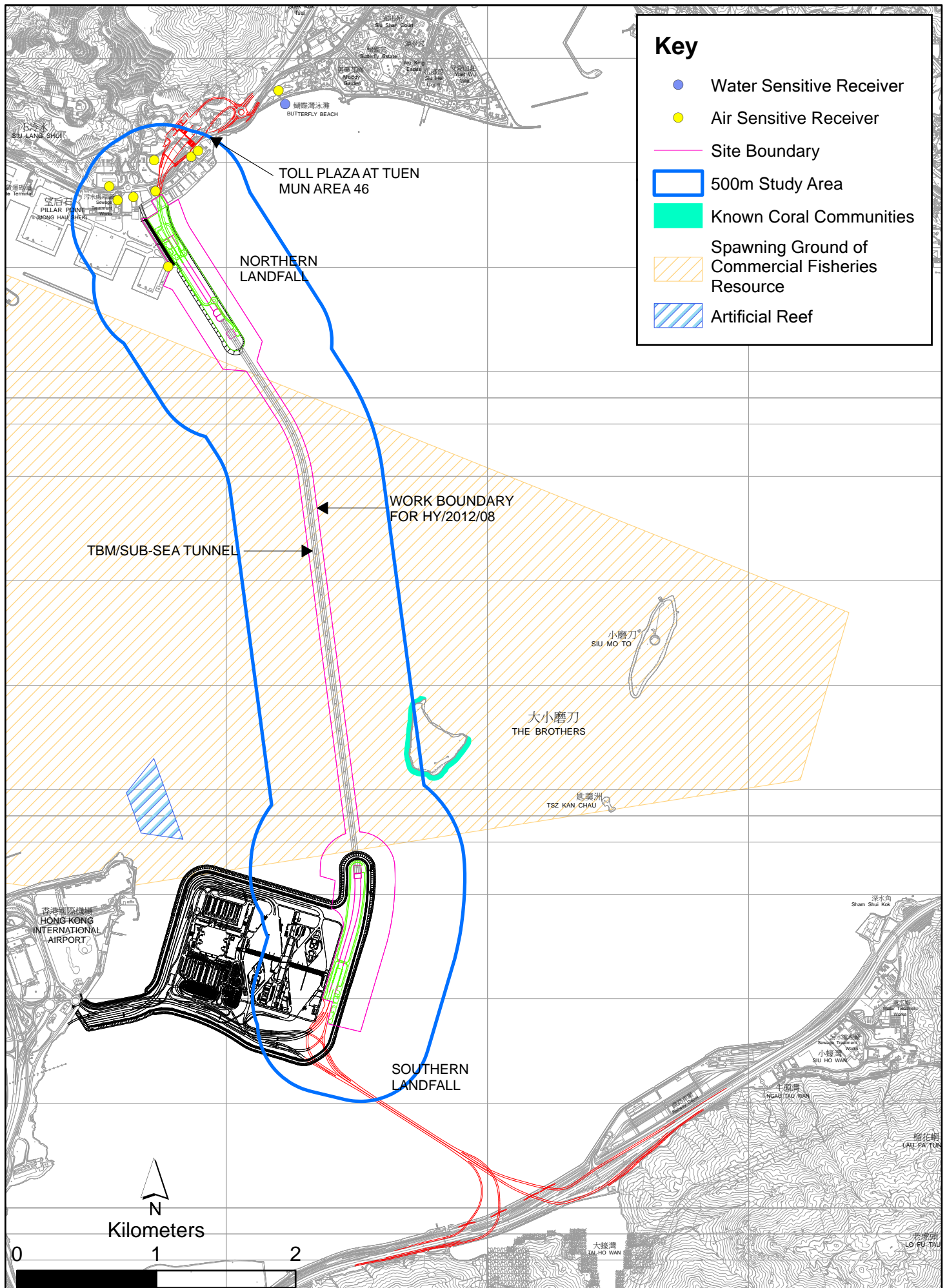


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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Date: 15/4/2014

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	1, 4, 7, 10, 13, 16, 19, 22, 25, 28 and 31 December 2016	Tuen Mun Fireboat Station	Office	TSP monitoring
ASR5	3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 January 2017	Pillar Point Fire Station	Office	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times in every 6 days 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 6 days
AQMS1	2, 5, 8, 11, 14, 17, 20, 23 and 26 February 2017	Previous River Trade Golf	Bare ground	Enhanced TSP monitoring (commenced on 24 October 2014)
ASR6		Butterfly Beach Laundry	Office	<ul style="list-style-type: none"> 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.

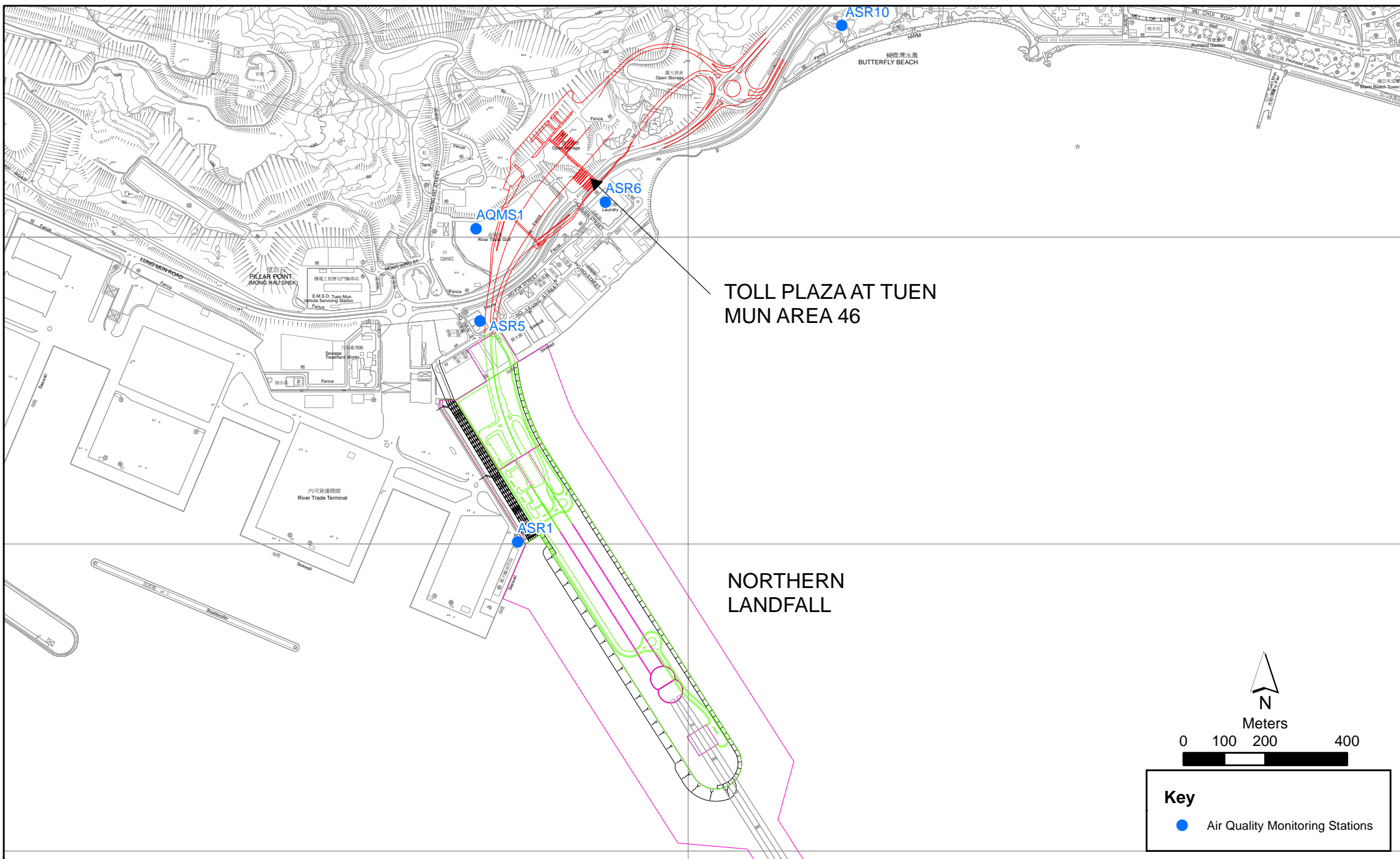


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR10		Butterfly Beach Park	Recreational uses	$\mu\text{g}/\text{m}^3$, 3 times in every 3 days • 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), 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 I*.

2.1.3 *Monitoring Schedule for the Reporting Quarter*

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

2.1.4 *Results and Observations*

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

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3* and *2.4*, respectively. Monitoring results are presented graphically in *Appendix F* and detailed impact air quality monitoring data were reported in the *Thirty-eighth to Fortieth Monthly EM&A Report*.

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

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
December 2016 to	ASR 1	149	50 - 301	331	500
	ASR 5	170	56 - 318	340	500
February 2017	AQMS1	111	47 - 202	335	500
	ASR6	150	60 - 282	338	500
	ASR10	91	42 - 168	337	500

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

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
December	ASR 1	79	44 - 137	213	260

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
2016 to	ASR 5	90	48 - 161	238	260
February	AQMS1	72	49 - 113	213	260
2017	ASR6	79	42 - 112	238	260
	ASR10	65	44 - 110	214	260

No Action or Limit Level exceedances for 1-hr TSP were recorded. No Action or Limit Level exceedances for 24-hr TSP were recorded. 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

In accordance with the Updated EM&A Manual, impact water quality monitoring was carried out three days per week during the construction period at nine (9) water quality monitoring stations (*Figure 2.2; 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			
IS12	Impact Station	813218	823681	<ul style="list-style-type: none"> • Temperature($^{\circ}\text{C}$) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) • DO (mg/L and % of saturation) • SS (mg/L) 	3 water depths: 1m	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS13	Impact Station	813667	824325		below sea surface,	
IS14	Impact Station	812592	824172		mid-depth and 1m	
IS15	Impact Station	813356	825008		above sea bed. If	
CS4	Control / Far Field Station	810025	824004		the water depth is less than 3m, mid-depth sampling only. If water	
CS6	Control / Far Field Station	817028	823992		depth less than 6m, mid-depth may be omitted.	
SR8	Sensitive receiver (Gazettal beaches in Tuen Mun)	816306	825715			
SR9	Sensitive receiver (Butterfly Beach)	813601	825858			
SR10A	Sensitive receiver (Ma Wan FCZ)	823741	823495			

*Notes:

In addition to the parameters presented monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or works underway nearby were also recorded.

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

Table 2.6 *Water Quality Monitoring Equipment*

Equipment	Model
ENVIRONMENTAL RESOURCES MANAGEMENT 0212330_13TH QUARTERLY EM&A_20171115.DOC	DBJV 20 NOVEMBER 2017

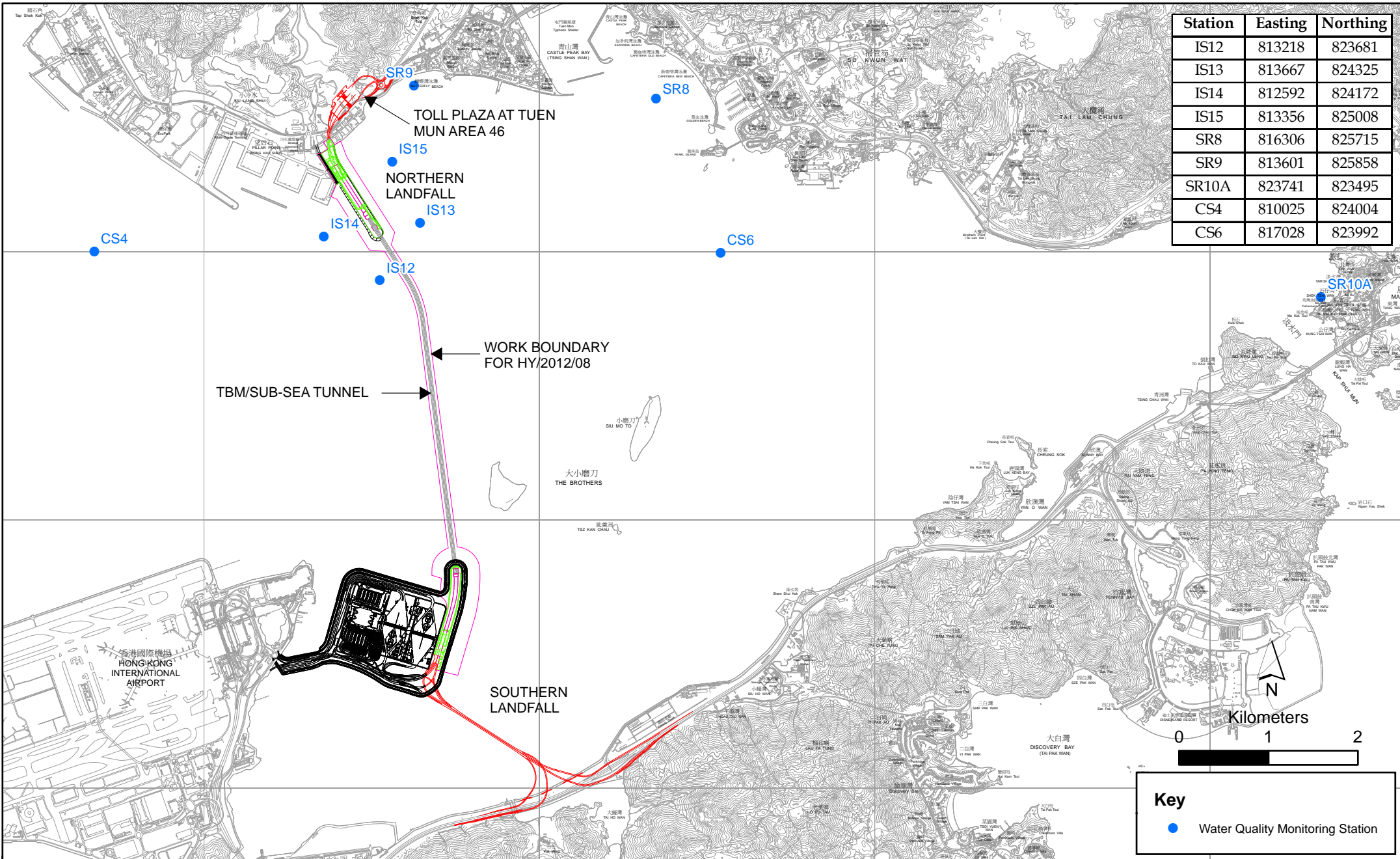


Figure 2.2

Water Quality Monitoring Station

Equipment	Model
Water Sampler	Kahlsico Water-Bottle Model 135DW 150
Dissolved Oxygen Meter	YSI Pro 2030
pH Meter	HANNA HI 8314 HANNA HI 9125
Turbidity Meter	HACH 2100Q
Monitoring Position Equipment	“Magellan” Handheld GPS Model explorist GC DGPS Koden KGP913MK2 ⁽¹⁾

2.2.2 *Action & Limit Levels*

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

2.2.3 *Monitoring Schedule for the Reporting Month*

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

2.2.4 *Results and Observations*

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

Since marine works for Phase 2 reclamation commenced on 27 December 2016, impact water quality monitoring resumed on 27 December 2016. In this reporting quarter, a total of twenty-seven monitoring events were undertaken in which no Action Level or Limit Levels of exceedances for impact water quality monitoring was recorded.

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, the on-going impact line transect dolphin monitoring data collected by HyD’s *Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge. Hong Kong Link Road - Section between Scenic Hill and Hong Kong Boundary Crossing Facilities* on the monthly basis is adopted to avoid duplicates of survey effort.

2.3.2 *Monitoring Equipment*

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

Table 2.7 *Dolphin Monitoring Equipment*

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

2.3.3 *Monitoring Parameter, Frequencies & Duration*

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

2.3.4 *Monitoring Location*

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

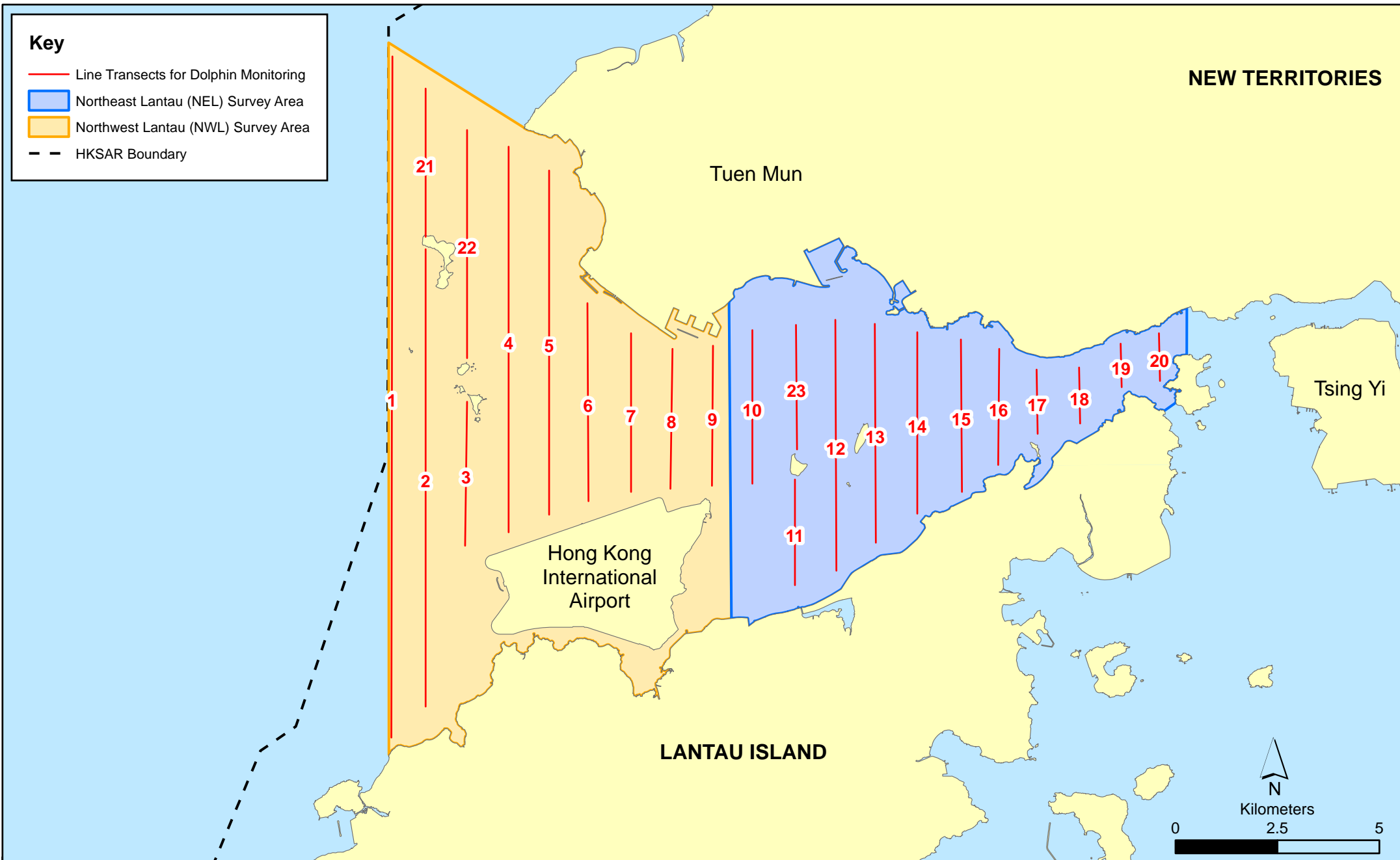


Figure 2.3

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

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	805475	815913	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820880	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	820872	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				
12	End Point	815542	824882				

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 878.35 km of survey effort was conducted, with 86.5% 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, 340.00 km and 538.35 km of survey effort were conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 632.39 km and 245.96 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 17 groups of 62 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. Fourteen of the 17 dolphin sightings were made during on-effort search, and all except one on-effort dolphin sightings were made on primary lines. During this reporting quarter, all dolphin groups were sighted in NWL, while no dolphin was sighted in NEL.

Encounter rates of Chinese White Dolphins are deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below with good visibility) in the reporting quarter with the results and comparison with baseline results present in *Tables 2.9* and *2.10*.

Table 2.9 *Individual Survey Event Encounter Rates*

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
NEL	Set 1: Dec 1 st /6 th	0.00	0.00
	Set 2: Dec 16 th /19 th	0.00	0.00
	Set 3: Jan 10 th /12 th	0.00	0.00
	Set 4: Jan 16 th /20 th	0.00	0.00
	Set 5: Feb 7 th /9 th	0.00	0.00
	Set 6: Feb 16 th /21 st	0.00	0.00
NWL	Set 1: Dec 1 st /6 th	1.58	1.58
	Set 2: Dec 16 th /19 th	5.99	22.45
	Set 3: Jan 10 th /12 th	0.00	0.00
	Set 4: Jan 16 th /20 th	6.27	20.38
	Set 5: Feb 7 th /9 th	0.00	0.00
	Set 6: Feb 16 th /21 st	8.99	42.71

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)	
	December 2016 - February 2017	September - November 2011	December 2016 - February 2017	September - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	3.80 ± 3.79	9.85 ± 5.85	14.52 ± 17.21	44.66 ± 29.85

Note: Encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions.

Group size of Chinese White Dolphins ranged from 1 - 8 individuals per group in North Lantau region during December 2016 to February 2017. 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	
	December 2016 - February 2017	September - November 2011
Overall	3.65 ± 2.37 (n = 17)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	3.65 ± 2.37 (n = 17)	3.92 ± 3.40 (n = 49)

Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between December 2016 and February 2017, no unacceptable impact from the construction activities of this Contract was recorded from the general observations.

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

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

2.3.8 *Implementation of Marine Mammal Exclusion Zone*

Daily marine mammal exclusion zone was in effect during the period of dredging, reclamation or marine sheet piling works in open waters under this Contract. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when dredging, reclamation or marine sheet piling works were carried out outside the daylight hours under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded in January 2017 during the exclusion zone monitoring.

2.4 *EM&A SITE INSPECTION*

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Thirteen (13) site inspections were carried out in the reporting quarter on 7, 14, 21 and 28 December 2016; 4, 11, 18 and 25 January 2017; 1, 8, 15 and 22 February 2017.

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
7 December 2016	<p>Works Area - TBM Tunnel</p> <ul style="list-style-type: none"> Unwanted chemical drum should be removed. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Proper labels should be provided to the chemical containers. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Chemical drums should be stored in the storage containers. 	<p>Works Area - TBM Tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the unwanted chemical drum. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide proper labels to the chemical containers. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to store the chemical drums in the storage containers.
14 December 2016	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The cement bags should be covered with tarpaulin sheets. Chemical containers should be removed. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The earth bund should be repaired in order to enclose the chemical containers. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Drip tray should be provided to the chemical drums. 	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bags with tarpaulin sheets. The Contractor was reminded to remove the chemical containers. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The Contractor was reminded to repair the earth bund in order to enclose the chemical containers. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray to the chemical drums.

Inspection Date	Environmental Observations	Recommendations/ Remarks
21 December 2016	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The cement bags should be covered with tarpaulin sheets. Drip tray should be provided to the chemical drums. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The fuel pumping tools should be stored properly to prevent oil spillage. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The accumulated concrete slurry on the ground should be removed. 	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bags with tarpaulin sheets. The Contractor was reminded to provide drip tray to the chemical drums. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to store the fuel pumping tools properly to prevent oil spillage. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the accumulated concrete slurry.
28 December 2016	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The rubbish trapped in the silt curtain should be removed. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Sand bags should be provided to properly direct wastewater to wastewater treatment facilities. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Chemical drums should be removed. 	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the rubbish trapped in the silt curtain. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide sand bags to properly direct wastewater to wastewater treatment facilities. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the chemical drums.
4 January 2017	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Chemical labels should be provided to the chemical drums. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> Drip tray and chemical labels should be provided to the chemical drums. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Concrete sand should be covered by tarpaulin sheet. Water spraying should be applied during dry conditions. 	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide chemical labels to the chemical drums. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray and chemical labels to the chemical drums. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the concrete sand by tarpaulin sheet. The Contractor was reminded to apply water spraying during dry conditions.
11 January 2017	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Accumulated waste in the skip should be removed. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Drip tray should be provided to the chemical drums. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the accumulated waste in the skip. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray to the chemical drums.
18 January 2017	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Earth bund or sand bag barrier should be provided to prevent leakage of muddy substances to the sea. Chemical substances should be removed from the site. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Drip tray should be provided to the chemicals. Accumulated rubbish bags should be removed. 	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide earth bund or sand bag barrier to prevent leakage of muddy substances to the sea. The Contractor was reminded to remove chemical substances from the site. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray to the chemicals. The Contractor was reminded to remove accumulated rubbish bags.

Inspection Date	Environmental Observations	Recommendations/ Remarks
25 January 2017	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Floating rubbish should be cleared. <p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Drip trays should be provided for the chemical containers. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Water spraying should be applied more often during dry conditions. Accumulated general refuse should be cleared. 	<p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to clear the floating rubbish. <p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip trays for the chemical containers. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying more often during dry conditions. The Contractor was reminded to clear the accumulated general refuse.
1 February 2017	<p>Works Area - TBM Tunnel</p> <ul style="list-style-type: none"> Housekeeping should be maintained. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Chemical waste should be cleared. The breaker head should be covered with tarpaulin sheet. 	<p>Works Area - TBM Tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bag properly. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to clear the chemical waste. The Contractor was reminded to cover the breaker head with tarpaulin sheet.
8 February 2017	<p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> Water spraying should be applied during dry conditions. Drip tray and chemical labels should be provided to the chemicals <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Drip tray should be provided to the chemical drum. 	<p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying during dry conditions. The Contractor was reminded to provide drip tray and chemical labels to the chemicals. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray to the chemical drum.
15 February 2017	<p>Works Area -Portion N-C</p> <ul style="list-style-type: none"> Muddy substance trapped in the surface channel should be removed. Drip tray and chemical labels should be provided to the chemicals. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Muddy substances and rubbish should be removed. Sandbags should be provided to prevent leakage of wasteater to the sea. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray and chemical labels should be provided to the chemicals.. Accumulated rubbish bags should be removed. 	<p>Works Area -Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the muddy substance trapped in the surface channel. The Contractor was reminded to provide drip tray and chemical labels to the chemicals. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the muddy substances and rubbish and provide sandbags to prevent leakage of wastewater to the sea. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray and chemical labels to the chemicals. The Contractor was reminded to remove the accumulated rubbish bags.

Inspection Date	Environmental Observations	Recommendations/ Remarks
22 February 2017	Works Area - Portion N-A <ul style="list-style-type: none"> Drip tray and chemical labels should be provided to the chemicals. Works Area - Portion N-B <ul style="list-style-type: none"> Muddy substance and water should be removed. Works Area - Portion S-A <ul style="list-style-type: none"> Chemical labels should be provided to the chemicals. Cement surface runoff should be avoided. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray and chemical labels to the chemicals. Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to remove the muddy substance and water. Works Area - Portion S-A <ul style="list-style-type: none"> The Contractor was reminded to provide chemical labels to the chemicals. The Contractor was reminded to avoid cement surface runoff.

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) and recyclable materials. 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
December 2016	25,662	0	288	0	0	550	0
January 2017	60,781	0	673	0	3,400	2,750	8,200
February 2017	17,367	0	340	200	0	550	0
Total	103,810	0	1,301	200	3,400	3,850	8,200

Notes:

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

The Contractor was advised to properly maintain on site C&D materials and waste collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse/ recycle of C&D materials and wastes. The Contractor was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.

For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in

accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.6 *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-D2516-01	10 September 2013	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Chemical Waste Registration	5213-422-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Construction Waste Disposal Account	7021715	12 January 2017	12 April 2017	DBJV	Vessel disposal
Waste Water Discharge License	WT00017707-2013	18 November 2013	30 November 2018	DBJV	For site WA18
Waste Water Discharge License	WT00019248-2014	5 June 2014	30 June 2019	DBJV	For site Portion N6 and Reclamation Area E
Waste Water Discharge License	WT00025944-2016	15 December 2016	31 December 2021	DBJV	Southern Landfall
Marine Dumping Permit	EP/MD/17-103	16 December 2016	13 June 2017	DBJV	Northern Landfall
Marine Dumping Permit	EP/MD/17-121	16 December 2016	15 January 2017	DBJV	Northern Landfall
Marine Dumping Permit	EP/MD/17-164	16 January 2017	15 February 2017	DBJV	Northern Landfall
Construction Noise Permit	GW-RW0644-16	30 November 2016	29 May 2017	DBJV	For Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0666-16	13 December 2016	12 June 2017	DBJV	For site WA23A+B
Construction Noise Permit	GW-RW0533-16	29 September 2016	28 March 2017	DBJV	For Portion N6
Construction Noise Permit	GW-RS0860-16	25 August 2016	24 February 2017	DBJV	For Southern Landfall
Notes:					
HyD = Highways Department					
DBJV = Dragages - Bouygues Joint Venture					
VEP = Variation of Environmental Permit					

2.7 **IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES**

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

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

2.8 **SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT**

For air quality impact monitoring, a total of thirty monitoring events were undertaken in which no Action Level or Limit Level exceedances for 1-hr TSP; no Action Level exceedances or Limit Level exceedances for 24-hr TSP were recorded in this reporting quarter (*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	-	-	0	0
	Limit Level	-	-	0	0
ASR1	Action Level	-	-	0	0
	Limit Level	-	-	0	0
ASR5	Action Level	-	-	0	0
	Limit Level	-	-	0	0
ASR6	Action Level	-	-	0	0
	Limit Level	-	-	0	0
ASR10	Action Level	-	-	0	0
	Limit Level	-	-	0	0
Total number of Action level Exceedances:				0	0
Total number of Limit level Exceedances:				0	0

For marine water quality impact monitoring, a total of twenty-seven monitoring events were undertaken in which no Action Level or Limit Level exceedances were recorded (*Table 2.17*). In addition, the construction impact on depth-averaged SS was assessed to compare the quarterly mean values of depth-averaged SS with the relevant ambient mean values. Results showed that the quarterly mean values of depth-averaged SS at all monitoring stations are well below the ambient mean values (*Table 2.16*), thus no further action is required in accordance with the Updated EM&A Manual.

Table 2.16 *Comparison between Quarterly Mean and Ambient Mean Values of Depth-averaged Suspended Solids*

Station	Baseline Mean		Ambient Mean ^(a)		Quarterly Mean (December 2016 to February 2017)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS4	10.2	9.0	13.3	11.7	10.1	9.8
CS6	10.9	11.7	14.1	15.2	9.9	9.7
IS12	9.2	9.5	12.0	12.3	9.6	9.2
IS13	10.0	10.5	13.0	13.7	9.7	9.3
IS14	10.4	9.7	13.5	12.6	8.7	8.4
IS15	9.6	11.0	12.5	14.2	9.4	9.5
SR10A	10.3	10.2	13.3	13.3	8.7	8.6
SR8	10.1	11.3	13.1	14.7	8.7	8.5
SR9	8.8	9.9	11.4	12.8	8.8	8.4
Grand Total	10.0	10.3	13.0	13.4	9.3	9.0

Notes:

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

Table 2.17 Summary of Exceedances for Marine Water Quality Impact Monitoring in this Reporting Quarter

Station	Exceedance Level ^(a)	DO (Surface and Middle)		DO (Bottom)		Turbidity (depth-averaged)		SS (depth-averaged)	
		Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS4	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
CS6	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS12	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS13	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS14	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS15	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR8	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR9	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR10	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
Total AL Exceedances:		0	0	0	0	0	0	0	0
Total LL Exceedances:		0	0	0	0	0	0	0	0

Notes:

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

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2016 and February 2017, whilst no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations.

Cumulative statistics are provided in *Appendix J*.

2.9 **SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

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

One (1) environmental complaint case regarding hammering Noise from unidentified Sources was referred by EPD on 14 December 2016.

One (1) environmental complaint case regarding sewage discharge at the east of the artificial island of the Hong Kong – Zhuhai–Macao Bridge was referred by IEC on 16 January 2017. One (1) environmental complaint case regarding trespassing of construction vessels in Brothers Marine Park was referred by IEC on 17 January 2017.

One (1) environmental complaint case regarding muddy water discharge at the site area near Ho Yeung Street was referred by EPD on 14 February 2017.

The complaint investigation reports are provided in *Appendix J*.

No notification of summons or successful prosecution recorded in the reporting period.

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

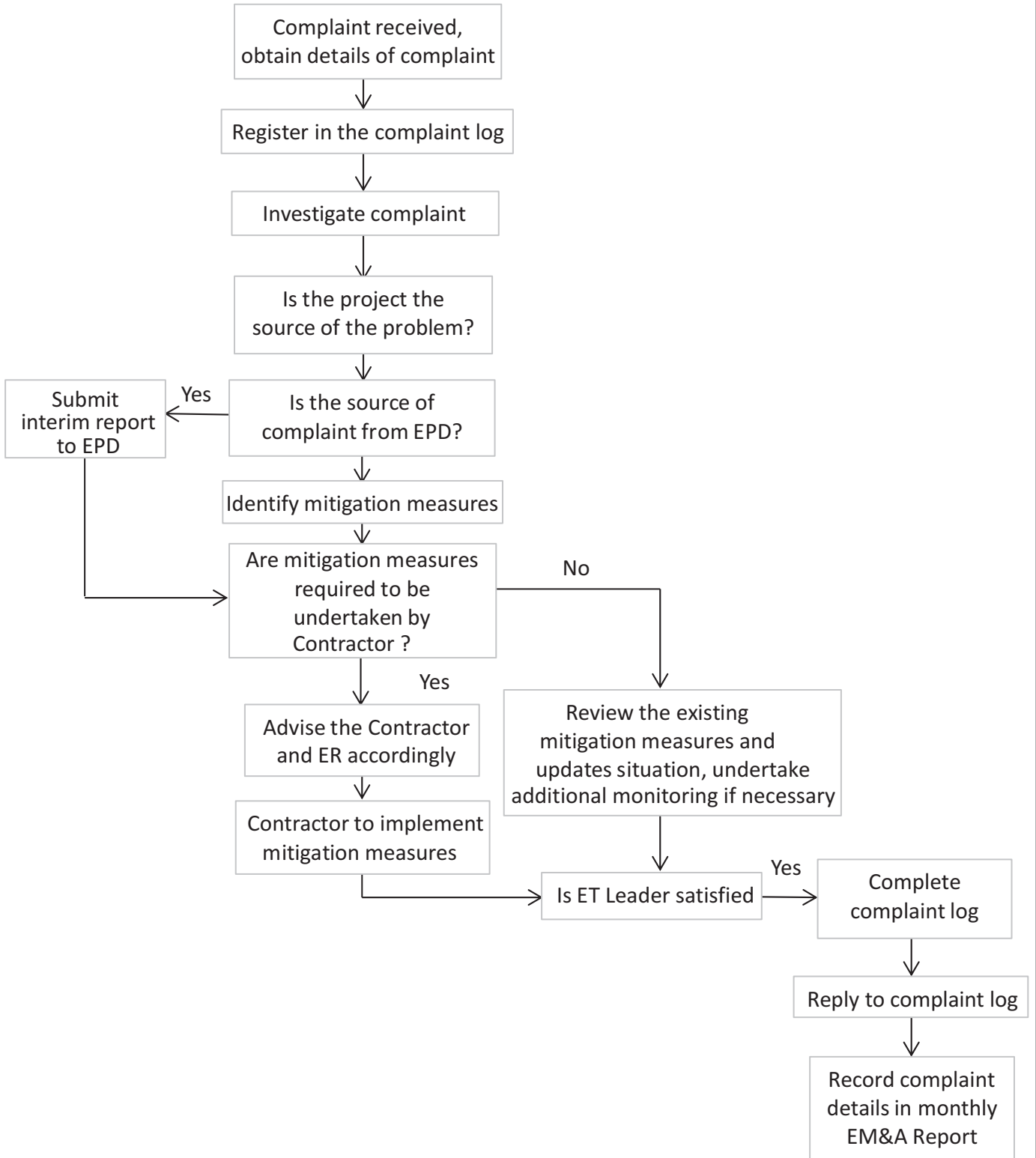


Figure 2.4

Environmental Complaint Handling Procedure

3 FUTURE KEY ISSUES

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER

As informed by the Contractor, the major works for the Project 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
<i>Marine-based Works</i>
<ul style="list-style-type: none">• Construction of Vertical Seawall at Portion N-A; and• Band drain and Filling works at Portion N-A
<i>Land-based Works</i>
<ul style="list-style-type: none">• Box Culvert Extension at Works Area – Portion N-A;• Construction of North Ventilation Building – Portion N-C;• Construction of Cross Passage Tympanum – TBM tunnel;• Cross Passage Lining Installation – TBM Tunnel;• Excavation of Sub-sea Tunnel – TBM tunnel;• Corbel Construction – TBM Tunnel;• Sub-sea Tunnel Gallery Installation – TBM tunnel;• Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.

3.2 KEY ISSUES FOR THE COMING QUARTER

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

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality, marine water quality and marine ecology (include dolphin monitoring) are scheduled to be conducted 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.

This Thirteen Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 December 2016 to 28 February 2017, 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) and dolphin monitoring were carried out in the reporting period. No Action or Limit Level exceedances for 1-hr TSP were recorded. No Action or Limit Level exceedances for 24-hr TSP were recorded.

A total of 17 groups of 62 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. Fourteen of the 17 dolphin sightings were made during on-effort search, and all except one on-effort dolphin sightings were made on primary lines. Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between December 2016 and February 2017, 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.

Twelve 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.

One (1) environmental complaint case regarding hammering Noise from unidentified Sources was referred by EPD on 14 December 2016.

One (1) environmental complaint case regarding sewage discharge at the east of the artificial island of the Hong Kong – Zhuhai–Macao Bridge was referred by IEC on 16 January 2017. One (1) environmental complaint case regarding trespassing of construction vessels in Brothers Marine Park was referred by IEC on 17 January 2017.

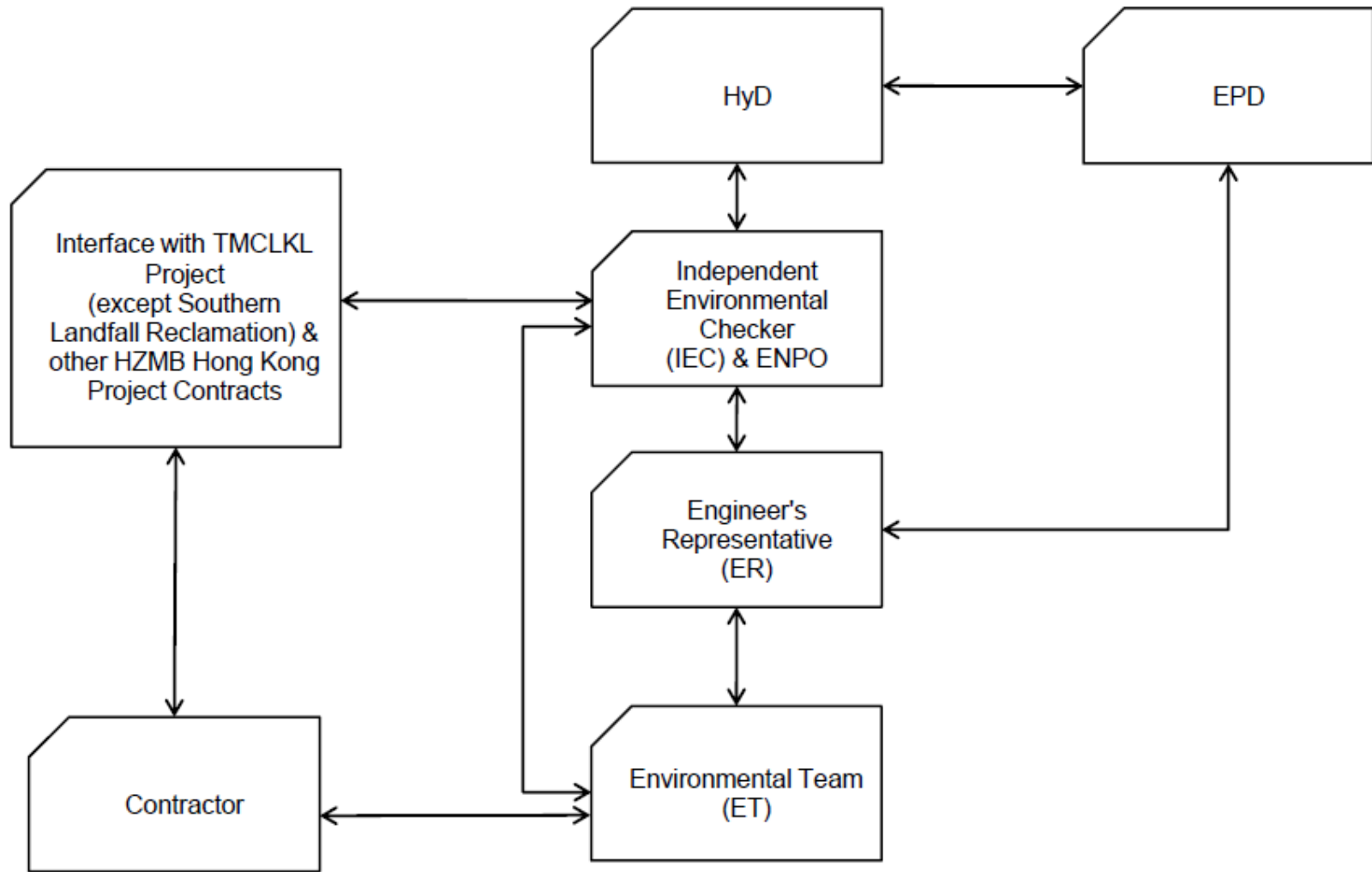
One (1) environmental complaint case regarding muddy water discharge at the site area near Ho Yeung Street was referred by EPD on 14 February 2017.

No notification of summons or successful prosecution recorded in the reporting period. The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not recommended at this stage. The

monitoring programme will be evaluated as appropriate in the next reporting period. The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A

Project Organization for Environmental Works



↔ Line of Communication

Appendix B

Construction Programme

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016							
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TMCLK - Northern Connection Sub-Sea Tunnel Section												
Contract Dates												
Site Possession Date												
Portions: X1, (N10,11,13 & 14) - Sth Landfall	0	06-Aug-15		0%								
Handover Date												
Portions: N8A, N8B(above +3), N8C	0		03-Dec-15	0%								
General Submissions												
Environmental												
Environmental Permit Submissions												
Supplementary WMP of C&C Tunnel at Sth.Landfall												
Supplementary WMP of C&C Tunnel at Sth.Landfall	0		28-Jun-14	0%								
Sediment Quality Report/Dumping Permit												
Southern Landfall												
Southern landfall - Commencement of Shaft & C&C Tunnel Dwall	0	03-Oct-15		0%								
Sediment Sampling & Testing Plan (SSTP) - if required												
Complete SSTP and Obtain EPD's approval	24	17-Feb-15	23-Mar-15	50%								
Sediment Quality Report (SQR) - if required												
Advance Ground Investigation works for Sediment sampling	24	24-Mar-15	24-Apr-15	90%								
Sediment Sample Testing & Report preparation	120	25-Apr-15	16-Sep-15	0%								
Dumping Permit for Load Dumping (Loading Permit) - if required												
Finalize the application document and submit to EPD - for Dwall	24	20-Jan-15	16-Feb-15	0%								
Notify the results and issue Loading Permit for Local & Cross Boundary Crossing - for Dwall	24	17-Feb-15	23-Mar-15	0%								
General Design Submissions												
(G6) IFA for Tunnel GBP												
SO's Review	35	29-Apr-14	02-Jun-14	94%								
SO Approval with Condition Received	0		03-Jun-14	0%								
PAYMENT MILESTONE												
Design and Design Checking of the Works												
MS 2.20.3 Approve DDA for Cross Passages by the Supervising Officer by the Supervising Officer	0		31-Mar-15	100%								
MS 2.32 Approve DDA for Approach Ramp Structures to Cut-and-cover Tunnels by the Supervising Officer	0		30-Apr-15	0%								
MS 2.44 Approve DDA for South Ventilation Building by the Supervising Officer	0		30-Jun-15	0%								
MS 2.48 Approve DDA for North Ventilation Building by the Supervising Officer	0		31-Jan-15	0%								
MS 2.51 Submit DDA for Facilities Provision for TCSS	0		29-Nov-14	0%								
MS 2.52 Approve DDA for Facilities Provision for TCSS by the Supervising Officer	0		28-Feb-15	0%								
MS 2.56 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Southern Landfall by the Supervi	0		30-Apr-15	0%								
MS 2.60 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Northern Landfall by the Supervi	0		31-Dec-14	0%								
MS 2.69 Submit draft Operation and Maintenance Manual for all Tunnels and Cross Passgaes	0		29-Feb-16	0%								
MS 2.70 Accept Operation and Maintenance Manual for all Tunnels and Cross Passgaes by the Supervising	0		30-Jun-16	0%								
MS 2.71 Submit draft Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes	0		29-Feb-16	0%								
MS 2.72 Accept Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes by the	0		30-Jun-16	0%								
TBM Tunnel												
MS 3.3.4 Complete walls of retrieval shaft	0		30-Jan-16	100%								
MS 3.3.7 Completion of excavation, support and permanent lining for 1% of the total length (measured on pla	0		31-Dec-15	100%								
MS 3.3.8 Completion of excavation, support and permanent lining for 2% of the total length (measured on pla	0		31-Dec-15	100%								
MS 3.3.9 Completion of excavation, support and permanent lining for 3% of the total length (measured on pla	0		31-Dec-15	100%								
MS 3.3.10 Completion of excavation, support and permanent lining for 4% of the total length (measured on pl	0		30-Jan-16	100%								
MS 3.3.11 Completion of excavation, support and permanent lining for 5% of the total length (measured on pl	0		30-Jan-16	100%								
MS 3.3.12 Completion of excavation, support and permanent lining for 6% of the total length (measured on pl	0		30-Jan-16	100%								
MS 3.3.13 Completion of excavation, support and permanent lining for 7% of the total length (measured on pl	0		30-Jan-16	100%								
MS 3.3.14 Completion of excavation, support and permanent lining for 8% of the total length (measured on pl	0		29-Feb-16	100%								
MS 3.3.15 Completion of excavation, support and permanent lining for 9% of the total length (measured on pl	0		29-Feb-16	100%								
MS 3.3.16 Completion of excavation, support and permanent lining for 10% of the total length (measured on p	0		29-Feb-16	100%								
MS 3.3.17 Completion of excavation, support and permanent lining for 11% of the total length (measured on p	0		29-Feb-16	100%								
MS 3.3.18 Completion of excavation, support and permanent lining for 12% of the total length (measured on p	0		31-Mar-16	100%								
MS 3.3.19 Completion of excavation, support and permanent lining for 13% of the total length (measured on p	0		31-Mar-16	0%								
MS 3.3.20 Completion of excavation, support and permanent lining for 14% of the total length (measured on p	0		31-Mar-16	0%								
MS 3.3.21 Completion of excavation, support and permanent lining for 15% of the total length (measured on p	0		31-Mar-16	0%								
MS 3.3.22 Completion of excavation, support and permanent lining for 16% of the total length (measured on p	0		31-Mar-16	0%								
MS 3.3.23 Completion of excavation, support and permanent lining for 17% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.24 Completion of excavation, support and permanent lining for 18% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.25 Completion of excavation, support and permanent lining for 19% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.26 Completion of excavation, support and permanent lining for 20% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.27 Completion of excavation, support and permanent lining for 21% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.28 Completion of excavation, support and permanent lining for 22% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.29 Completion of excavation, support and permanent lining for 23% of the total length (measured on p	0		30-Apr-16	0%								
MS 3.3.30 Completion of excavation, support and permanent lining for 24% of the total length (measured on p	0		31-May-16	0%								
MS 3.3.31 Completion of excavation, support and permanent lining for 25% of the total length (measured on	0		31-May-16	0%								
MS 3.3.32 Completion of excavation, support and permanent lining for 27.5% of the total length (measured on	0		31-May-16	0%								
MS 3.3.33 Completion of excavation, support and permanent lining for 30% of the total length (measured on	0		31-May-16	0%								
MS 3.3.34 Completion of excavation, support and permanent lining for 32.5% of the total length (measured on	0		30-Jun-16	0%								
MS 3.3.35 Completion of excavation, support and permanent lining for 35% of the total length (measured on	0		30-Jun-16	0%								
MS 3.3.36 Completion of excavation, support and permanent lining for 37.5% of the total length (measured on	0		30-Jun-16	0%								
MS 3.3.37 Completion of excavation, support and permanent lining for 40% of the total length (measured on	0		30-Jul-16	0%								
MS 3.3.38 Completion of excavation, support and permanent lining for 42.5% of the total length (measured on	0		30-Jul-16	0%								
MS 3.3.39 Completion of excavation, support and permanent lining for 45% of the total length (measured on	0		30-Jul-16	0%								
MS 3.3.40 Completion of excavation, support and permanent lining for 47.5% of the total length (measured on	0		30-Jul-16	0%								
MS 3.3.41 Completion of excavation, support and permanent lining for 50% of the total length (measured on	0		31-Aug-16	0%								
MS 3.3.42 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on	0		31-Aug-16	0%								
MS 3.3.43 Completion of excavation, support and permanent lining for 55% of the total length (measured on	0		31-Aug-16	0%								
MS 3.3.44 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on	0		31-Aug-16	0%								
MS 3.3.45 Completion of excavation, support and permanent lining for 60% of the total length (measured on	0		31-Aug-16	0%								
MS 3.3.46 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on	0		30-Sep-16	0%								

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
Detailed Works Programme (Rev. F)
Three Months Rolling Programme
Progress as of 31-Aug-16



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG08507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG08507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG08507 Rev. C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG08507 Rev. F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
MS 5.1.8 Complete retaining wall foundation for 30% of the total length (measured on plan) of approach ramp structure	0		30-Nov-15	0%												
MS 5.1.9 Complete retaining wall foundation for 40% of the total length (measured on plan) of approach ramp structure	0		31-Dec-15	0%												
MS 5.1.10 Complete retaining wall foundation for 50% of the total length (measured on plan) of approach ramp structure	0		31-Dec-15	0%												
MS 5.1.11 Complete retaining wall foundation for 60% of the total length (measured on plan) of approach ramp structure	0		30-Jan-16	0%												
MS 5.1.12 Complete retaining wall foundation for 70% of the total length (measured on plan) of approach ramp structure	0		30-Jan-16	0%												
MS 5.1.13 Complete retaining wall foundation for 80% of the total length (measured on plan) of approach ramp structure	0		29-Feb-16	0%												
MS 5.1.14 Complete retaining wall foundation for 90% of the total length (measured on plan) of approach ramp structure	0		29-Feb-16	0%												
MS 5.1.15 Complete retaining wall foundation for 100% of the total length (measured on plan) of approach ramp structure	0		31-Mar-16	0%												
South Ventilation Buildings																
MS 7.1.1 Complete 100% of cofferdam for excavation	0		30-Sep-16	0%												◆ MS 7.1.1 Complete 100% of cofferdam for excavation
MS 7.1.2 Complete 100% of excavation to the formation level	0		30-Sep-16	0%												◆ MS 7.1.2 Complete 100% of excavation to the formation level
MS 7.1.3 Complete 100% of foundation for the ventilation building	0		30-Apr-16	0%												◆ MS 7.1.3 Complete 100% of foundation for the ventilation building
MS 7.1.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building	0		31-Oct-16	0%												◆ MS 7.1.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building
North Ventilation Buildings																
MS 7.2.1 Complete 100% of cofferdam for excavation	0		31-May-16	0%												◆ MS 7.2.1 Complete 100% of cofferdam for excavation
MS 7.2.2 Complete 100% of excavation to the formation level	0		31-May-16	0%												◆ MS 7.2.2 Complete 100% of excavation to the formation level
MS 7.2.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building	0		30-Jul-16	0%												◆ MS 7.2.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building
MS 7.2.5 Complete concreting works of 50% area of the total construction floor area for the ventilation building	0		31-Oct-16	0%												◆ MS 7.2.5 Complete concreting works of 50% area of the total construction floor area for the ventilation building
Facilities Provision for E&M Works for TBM Tunnel, Cut & Cover Tunnels and Cross Passages																
MS 9.1.1 Complete 25% of bonding terminal, opening and accessories, etc.	0		30-Sep-16	0%												◆ MS 9.1.1 Complete 25% of bonding terminal, opening and accessories, etc.
MS 9.1.2 Complete 25% of plinth, hoisting facilities and accessories, etc.	0		30-Sep-16	0%												◆ MS 9.1.2 Complete 25% of plinth, hoisting facilities and accessories, etc.

Construction																
Northern Landfall																
North Reclamation (Phase 1)																
Construction																
Zone B																
Reclamation																
Surcharge Removal - Zone B - (CH598 to 698) stage 1	10	28-Jul-16	08-Aug-16	0%												■ Surcharge Removal - Zone B - (CH598 to 698) stage 1
Surcharge Period - Zone B - (CH648 to 698) stage 2	180	09-Aug-16	04-Feb-17	0%												■ Surcharge Period - Zone B - (CH648 to 698) stage 2
Box Culvert Extension																
Construction																
Ch000-010 Culvert Outfall																
Installation of temporary bulk head	26	10-Aug-15	08-Sep-15	100%												
Removal of public fill at outfall area	4	09-Sep-15	12-Sep-15	100%												
Cut sheet pile wall below water level by diver	18	14-Sep-15	06-Oct-15	100%												
Removal of temporary seawall block	3	07-Oct-15	09-Oct-15	100%												
Preparation & pour blinding concrete base of box culvert outfall	8	10-Oct-15	19-Oct-15	100%												
Install precast culvert element by barge (5 nos.)	21	20-Oct-15	13-Nov-15	100%												
Concreting in-situ Top Slab and stich joint	12	14-Nov-15	27-Nov-15	0%												
Removal of temporary bulk head	18	28-Nov-15	18-Dec-15	0%												
CH000-150 Land Section																
ELS & Structure																
Pile A43/A41 CJ to Pile A41/A39 CJ																
Box Culvert Structure																
Pile cap construction	10	27-May-15	06-Jun-15	100%												
Base slab construction including kicker	6	19-Jun-15	26-Jun-15	100%												
Removal of strut S1	4	27-Jun-15	02-Jul-15	100%												
System formworks delivery & setup	14	03-Jul-15	18-Jul-15	100%												
Walls & top slab construction	6	20-Jul-15	25-Jul-15	100%												
Removal of strut S2 & Backfilling up to required level	6	03-Aug-15	08-Aug-15	0%												
Pile A45/A43 CJ to Pile A43/A41 CJ																
Box Culvert Structure																
Pile cap construction	10	08-Jun-15	18-Jun-15	100%												
Base slab construction including kicker	6	27-Jun-15	04-Jul-15	100%												
Removal of strut S1	4	06-Jul-15	09-Jul-15	100%												
Walls & top slab construction	6	27-Jul-15	01-Aug-15	100%												
Removal of strut S2 & Backfilling up to required level	6	10-Aug-15	15-Aug-15	0%												
Pile A47/A45 CJ to Pile A45/A43 CJ																
Box Culvert Structure																
Pile cap construction	10	19-Jun-15	02-Jul-15	100%												
Base slab construction including kicker	6	06-Jul-15	11-Jul-15	100%												
Removal of strut S1	4	13-Jul-15	16-Jul-15	100%												
Walls & top slab construction	6	03-Aug-15	08-Aug-15	100%												
Removal of strut S2 & Backfilling up to required level	6	17-Aug-15	22-Aug-15	100%												
Pile A49/A47 CJ to Pile A47/A45 CJ																
Box Culvert Structure																
Pile cap construction	10	03-Jul-15	14-Jul-15	100%												
Base slab construction including kicker	6	15-Jul-15	21-Jul-15	100%												
Removal of strut S1	4	22-Jul-15	25-Jul-15	100%												
Walls & top slab construction	6	10-Aug-15	15-Aug-15	100%												
Removal of strut S2 & Backfilling up to required level	6	24-Aug-15	29-Aug-15	100%												
Pile A52/A49 CJ to Pile A49/A47 CJ																
Box Culvert Structure																
Removal of strut S1	4	10-Aug-15	13-Aug-15	100%												
Walls & top slab construction	6	17-Aug-15	22-Aug-15	100%												
Removal of strut S2 & Backfilling up to required level	6	31-Aug-15	05-Sep-15	100%												
Preparation for Temp Access Road for N8 handvoer	24	07-Sep-15	06-Oct-15	100%												
Ch150-250 Marine Section																
ELS & Structure																
Dewatering well installation Ch180-250	12	19-Jun-15	04-Jul-15	100%												
Dewatering well installation Ch100-180	12	06-Jul-15	18-Jul-15	100%												
1st Pumping test	18	20-Jul-15	08-Aug-15	100%												
Toe grouting Ch100-250	95	07-Sep-15	31-Dec-15	94%												

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

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Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
2nd Pumping test Ch100-250	29	02-Jan-16	04-Feb-16	0%												
Pile A41/A39 CJ to Pile A39/A37 CJ																
ELS																
Excavation to 0.5m below strut S2	4	05-Feb-16	16-Feb-16	0%												
Installation of strut S2	6	17-Feb-16	23-Feb-16	0%												
Excavation to 0.5m below strut S1	5	24-Feb-16	29-Feb-16	0%												
Installation of strut S1	5	01-Mar-16	05-Mar-16	0%												
Excavation to FEL	5	07-Mar-16	11-Mar-16	0%												
Box Culvert Structure																
Pile cap construction	10	18-Mar-16	01-Apr-16	0%												
Sliding formworks 1st assembly	18	27-Apr-16	19-May-16	0%												
Walls & top slab construction	6	20-May-16	26-May-16	0%												
Removal of strut S2 & Backfilling up to required level	6	03-Jun-16	10-Jun-16	0%												
Pile A39/A37 CJ to Pile A37/A35 CJ																
ELS																
Excavation to 0.5m below strut S2	4	17-Feb-16	20-Feb-16	0%												
Installation of strut S2	6	22-Feb-16	27-Feb-16	0%												
Excavation to 0.5m below strut S1	5	01-Mar-16	05-Mar-16	0%												
Installation of strut S1	5	07-Mar-16	11-Mar-16	0%												
Excavation to FEL	5	12-Mar-16	17-Mar-16	0%												
Box Culvert Structure																
Removal of strut S1	4	29-Apr-16	04-May-16	0%												
Walls & top slab construction	6	27-May-16	02-Jun-16	0%												
Removal of strut S2 & Backfilling up to required level	6	11-Jun-16	17-Jun-16	0%												
Pile A37/A35 CJ to Pile A35/A33 CJ																
ELS																
Excavation to 0.5m below strut S2	4	22-Feb-16	25-Feb-16	0%												
Installation of strut S2	6	26-Feb-16	03-Mar-16	0%												
Excavation to 0.5m below strut S1	5	07-Mar-16	11-Mar-16	0%												
Installation of strut S1	5	12-Mar-16	17-Mar-16	0%												
Excavation to FEL	5	18-Mar-16	23-Mar-16	0%												
Box Culvert Structure																
Base slab construction including kicker	6	29-Apr-16	06-May-16	0%												
Removal of strut S1	4	07-May-16	11-May-16	0%												
Walls & top slab construction	6	03-Jun-16	10-Jun-16	0%												
Removal of strut S2 & Backfilling up to required level	6	18-Jun-16	24-Jun-16	0%												
Pile A35/A33 CJ to Pile A33/P117 CJ																
ELS																
Excavation to 0.5m below strut S2	4	26-Feb-16	01-Mar-16	0%												
Installation of strut S2	6	02-Mar-16	08-Mar-16	0%												
Excavation to 0.5m below strut S1	5	12-Mar-16	17-Mar-16	0%												
Installation of strut S1	5	18-Mar-16	23-Mar-16	0%												
Excavation to FEL	5	24-Mar-16	01-Apr-16	0%												
Box Culvert Structure																
Pile cap construction	10	27-Apr-16	09-May-16	0%												
Base slab construction including kicker	6	10-May-16	17-May-16	0%												
Removal of strut S1	4	18-May-16	21-May-16	0%												
Walls & top slab construction	6	11-Jun-16	17-Jun-16	0%												
Removal of strut S2 & Backfilling up to required level	6	25-Jun-16	02-Jul-16	0%												
Pile A33/P117 CJ to Pile P113/P109 CJ																
ELS																
Excavation to 0.5m below strut S1	9	09-Mar-16	18-Mar-16	0%												
Installation of strut S1	5	19-Mar-16	24-Mar-16	0%												
Box Culvert Structure																
Base slab construction including kicker	6	18-May-16	24-May-16	0%												
Removal of strut S1	4	25-May-16	28-May-16	0%												
Walls & top slab construction	6	18-Jun-16	24-Jun-16	0%												
Removal of strut S2 & Backfilling up to required level	6	04-Jul-16	09-Jul-16	0%												
Pile P113/P109 CJ to Pile P105/P101 CJ																
ELS																
Excavation to 0.5m below strut S1	9	17-Mar-16	30-Mar-16	0%												
Installation of strut S1	5	31-Mar-16	06-Apr-16	0%												
Box Culvert Structure																
Base slab construction including kicker	6	25-May-16	31-May-16	0%												
Removal of strut S1	4	01-Jun-16	04-Jun-16	0%												
Walls & top slab construction	6	25-Jun-16	02-Jul-16	0%												
Removal of strut S2 & Backfilling up to required level	6	11-Jul-16	16-Jul-16	0%												
Pile P105/P101 CJ to Pile P97/P93 CJ																
ELS																
Excavation to 0.5m below strut S1	9	29-Mar-16	08-Apr-16	0%												
Box Culvert Structure																
Base slab construction including kicker	6	01-Jun-16	07-Jun-16	0%												
Removal of strut S1	4	08-Jun-16	13-Jun-16	0%												
Walls & top slab construction	6	04-Jul-16	09-Jul-16	0%												
Removal of strut S2 & Backfilling up to required level	6	18-Jul-16	23-Jul-16	0%												
Pile P97/P93 CJ to Pile P89/P85 CJ																
ELS																
Excavation to 0.5m below strut S1	9	07-Apr-16	16-Apr-16	0%												
Box Culvert Structure																
Base slab construction including kicker	6	08-Jun-16	15-Jun-16	0%												
Removal of strut S1	4	16-Jun-16	20-Jun-16	0%												
Walls & top slab construction	6	11-Jul-16	16-Jul-16	0%												
Removal of strut S2 & Backfilling up to required level	6	25-Jul-16	30-Jul-16	0%												
Pile P89/P85 CJ to Pile P81/P77 CJ																

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. F)
 Three Months Rolling Programme
 Progress as of 31-Aug-16



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev. C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev. F	WYu	

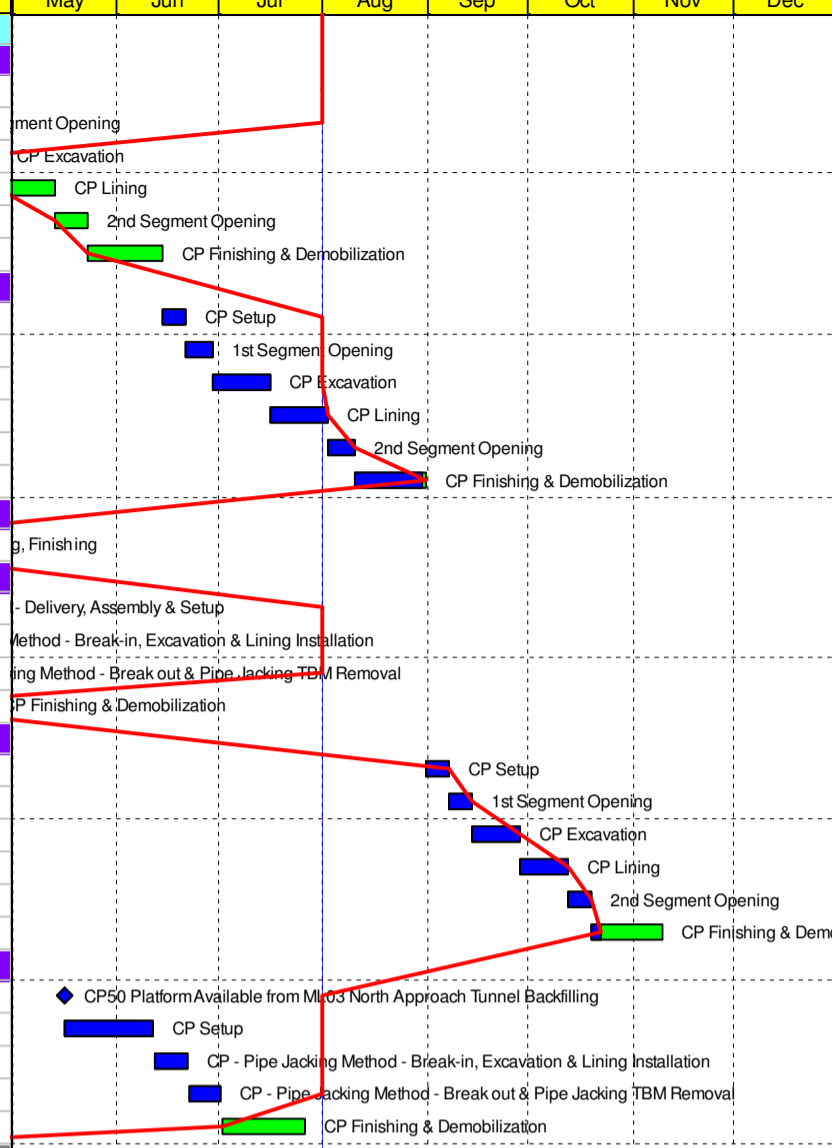
Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
ELS																
Excavation to 0.5m below strut S1	9	15-Apr-16	25-Apr-16	100%	Excavation to 0.5m below strut S1											
Installation of strut S1	5	26-Apr-16	30-Apr-16	100%	Installation of strut S1											
Excavation to FEL	5	03-May-16	07-May-16	0%	Excavation to FEL											
Box Culvert Structure																
Base slab construction including kicker	6	16-Jun-16	22-Jun-16	0%	Base slab construction including kicker											
Removal of strut S1	4	23-Jun-16	27-Jun-16	0%	Removal of strut S1											
Walls & top slab construction	6	18-Jul-16	23-Jul-16	0%	Walls & top slab construction											
Removal of strut S2 & Backfilling up to required level	6	01-Aug-16	06-Aug-16	0%	Removal of strut S2 & Backfilling up to required level											
Pile P81/P77 CJ to Pile P73/P69 CJ																
ELS																
Excavation to 0.5m below strut S1	9	23-Apr-16	04-May-16	100%	Excavation to 0.5m below strut S1											
Installation of strut S1	5	05-May-16	10-May-16	100%	Installation of strut S1											
Excavation to FEL	5	11-May-16	17-May-16	0%	Excavation to FEL											
Box Culvert Structure																
Base slab construction including kicker	6	23-Jun-16	29-Jun-16	0%	Base slab construction including kicker											
Removal of strut S1	4	30-Jun-16	05-Jul-16	0%	Removal of strut S1											
Walls & top slab construction	6	25-Jul-16	30-Jul-16	0%	Walls & top slab construction											
Removal of strut S2 & Backfilling up to required level	6	08-Aug-16	13-Aug-16	0%	Removal of strut S2 & Backfilling up to required level											
Ch250-380 Marine Section																
Installation of Dewatering & Observation Well Ch 250-380	23	04-Nov-15	30-Nov-15	0%	Installation of Dewatering & Observation Well Ch 250-380											
1st Pumping Test & Analysis	17	01-Dec-15	19-Dec-15	0%	1st Pumping Test & Analysis											
Toe Grouting	106	21-Dec-15	07-May-16	0%	Toe Grouting											
2nd Pumping test & Analysis	25	08-Apr-16	07-May-16	0%	2nd Pumping test & Analysis											
Remaining toe grouting Ch250-380	51	09-May-16	09-Jul-16	0%	Remaining toe grouting Ch250-380											
Miscellaneous works																
Inspection Manhole (IM)																
Inspection Manhole IM-01 to IM-04 & backfilling to +6.0mPD	12	29-Sep-15	13-Oct-15	0%	Inspection Manhole IM-01 to IM-04 & backfilling to +6.0mPD											
Inspection Manhole IM-05 to IM-08 & backfilling to +6.0mPD	18	15-Aug-16	03-Sep-16	0%	Inspection Manhole IM-05 to IM-08 & backfilling to +6.0mPD											
Inspection Manhole IM-09 to IM-12 & backfilling to +6.0mPD	18	20-Oct-16	09-Nov-16	0%	Inspection Manhole IM-09 to IM-12 & backfilling to +6.0mPD											
Stop Log Opening (SLO)																
SLO-01 to SLO-05 & backfilling to +6.0mPD	24	14-Oct-15	11-Nov-15	0%	SLO-01 to SLO-05 & backfilling to +6.0mPD											
Balance Hole (BH)																
BH-01 to BH-03 & backfilling to +6.0mPD	18	07-Sep-15	26-Sep-15	0%	BH-01 to BH-03 & backfilling to +6.0mPD											
BH-04 to BH-06 & backfilling to +6.0mPD	18	05-Sep-16	26-Sep-16	0%	BH-04 to BH-06 & backfilling to +6.0mPD											
Desilting Opening (DO)																
DO-01 to DO-04 & backfilling to +6.0mPD	18	27-Sep-16	19-Oct-16	0%	DO-01 to DO-04 & backfilling to +6.0mPD											
North Launching Shaft																
Design Submission																
(C1) DDA for North C&C Tunnel Permanent Structure																
SO's Review	35	24-May-14	27-Jun-14	90%	SO's Review											
SO Approval with Condition Received	0		27-Jun-14	0%	SO Approval with Condition Received											
(C1) DDA for North Approach Ramp Permanent Structure																
IPs Review	28	23-Oct-14	19-Nov-14	92%	IPs Review											
IP's No Objection Received	0		19-Nov-14	0%	IP's No Objection Received											
SO's Review	35	23-Oct-14	26-Nov-14	91%	SO's Review											
SO Approval with Condition Received	0		26-Nov-14	0%	SO Approval with Condition Received											
North Ventilation Shaft																
Construction																
North Ventilation Shaft Structure																
NVS - ML03 Tunnel Structure	47	24-May-16	20-Jul-16	0%	NVS - ML03 Tunnel Structure											
NVS - ML02 Tunnel Structure	44	05-Apr-16	27-May-16	22%	NVS - ML02 Tunnel Structure											
TMCLK VO-008 - Construction of Viaduct Foundations at Portion N6A																
Viaduct Pile Cap																
Construction																
Pier G1c																
Pile Cap G1c - Preparation for ELS	6	24-Oct-14	30-Oct-14	0%	Pile Cap G1c - Preparation for ELS											
Pile Cap G1c - Removal of Existing ground slab	6	31-Oct-14	06-Nov-14	0%	Pile Cap G1c - Removal of Existing ground slab											
Pile Cap G1c - Excavation & ELS Installation	12	07-Nov-14	20-Nov-14	0%	Pile Cap G1c - Excavation & ELS Installation											
Pile Cap G1c - Blinding Concrete	3	21-Nov-14	24-Nov-14	0%	Pile Cap G1c - Blinding Concrete											
Pile Cap G1c - Rebar & Concreting	18	25-Nov-14	15-Dec-14	0%	Pile Cap G1c - Rebar & Concreting											
Pile Cap G1c - Backfilling & Temp Reinstatement	6	16-Dec-14	22-Dec-14	0%	Pile Cap G1c - Backfilling & Temp Reinstatement											
Pier H1c																
Pile Cap H1c - Preparation for ELS	6	02-Nov-15	07-Nov-15	0%	Pile Cap H1c - Preparation for ELS											
Pile Cap H1c - Removal of Existing ground slab	6	09-Nov-15	14-Nov-15	0%	Pile Cap H1c - Removal of Existing ground slab											
Pile Cap H1c - Excavation & ELS Installation	12	16-Nov-15	28-Nov-15	0%	Pile Cap H1c - Excavation & ELS Installation											
North Approach TBM Tunnelling & Cross Passage																
Construction																
North Approach Tunnel Internal Structure - NB																
NB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m) Stage 1	54	01-Apr-16	26-May-16	100%	NB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m) Stage 1											
NB - North TBM Tunnel - Invert Precast Gallery Installation (Ch6870 to 6688 - 182m)	77	29-Dec-15	18-Mar-16	100%	NB - North TBM Tunnel - Invert Precast Gallery Installation (Ch6870 to 6688 - 182m)											
NB - North TBM Tunnel - Invert Precast Gallery Installation (Ch6688 to 6560 - 128m)	54	13-Apr-16	07-Jun-16	100%	NB - North TBM Tunnel - Invert Precast Gallery Installation (Ch6688 to 6560 - 128m)											
NB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m) Stage 2	54	28-Apr-16	23-Jun-16	100%	NB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m) Stage 2											
CP55 - Excavation & Lining completion	0		14-Jun-16	0%	CP55 - Excavation & Lining completion											
CP54 - Excavation & Lining completion	0		31-Aug-16	0%	CP54 - Excavation & Lining completion											
CP52 - Excavation & Lining completion	0		22-Apr-16	100%	CP52 - Excavation & Lining completion											
CP50 - Excavation & Lining completion	0		26-Jul-16	0%	CP50 - Excavation & Lining completion											
NB - North TBM Tunnel - Corbel & Cable Trough installation	42	31-Aug-16	22-Oct-16	0%	NB - North TBM Tunnel - Corbel & Cable Trough installation											
NB - North TBM Tunnel - OHVD Slab installation	42	07-Sep-16	29-Oct-16	0%	NB - North TBM Tunnel - OHVD Slab installation											
NB - North TBM Tunnel - Fire proofing and Provision to E&MS and TCSS Contract for KD1	42	14-Sep-16	05-Nov-16	0%	NB - North TBM Tunnel - Fire proofing and Provision to E&MS and TCSS Contract for KD1											
North Approach Tunnel Internal Structure - SB																
SB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m)	54	21-Mar-16	18-May-16	100%	SB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m)											
SB - North TBM Tunnel - Corbel & Cable Trough installation	42	22-Oct-16	10-Dec-16	0%	SB - North TBM Tunnel - Corbel & Cable Trough installation											
SB - North TBM Tunnel - OHVD Slab installation	42	29-Oct-16	17-Dec-16	0%	SB - North TBM Tunnel - OHVD Slab installation											

■ Planned Bar
■ Planned Bar - Critical
■ Progress bar
◆ Planned Milestone
◆ Progress Milestone



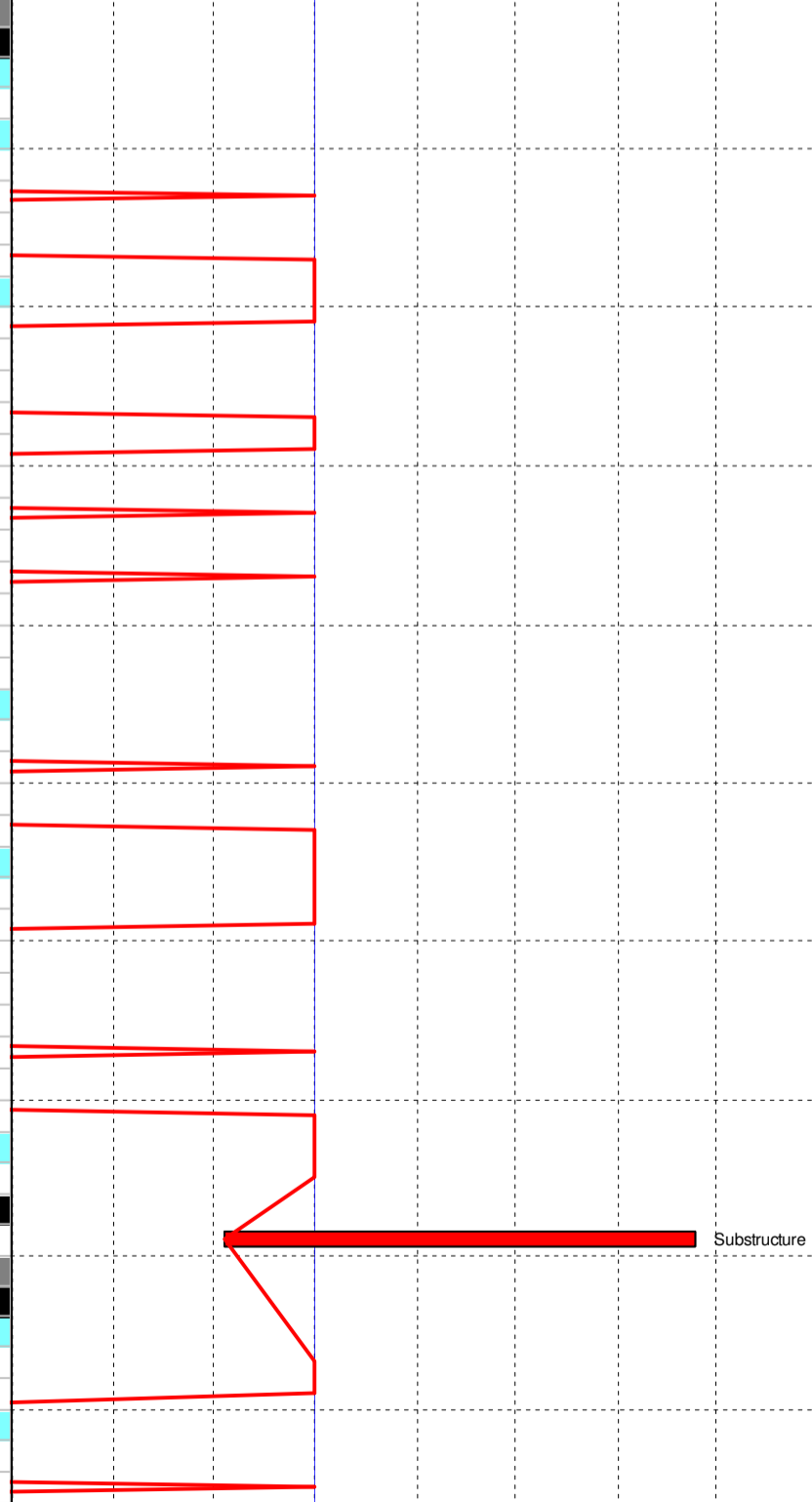
Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev. C	CLA	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev. F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp
North Approach Cross Passage				
CP55 - Traditional Method				
CP Setup	6	21-Mar-16	31-Mar-16	100%
1st Segment Opening	7	31-Mar-16	09-Apr-16	100%
CP Excavation	14	09-Apr-16	26-Apr-16	88%
CP Lining	14	26-Apr-16	13-May-16	0%
2nd Segment Opening	7	13-May-16	23-May-16	0%
CP Finishing & Demobilization	18	23-May-16	14-Jun-16	0%
CP54 - Traditional Method				
CP Setup	6	14-Jun-16	21-Jun-16	100%
1st Segment Opening	7	21-Jun-16	29-Jun-16	100%
CP Excavation	14	29-Jun-16	16-Jul-16	100%
CP Lining	14	16-Jul-16	02-Aug-16	100%
2nd Segment Opening	7	02-Aug-16	10-Aug-16	100%
CP Finishing & Demobilization	18	10-Aug-16	31-Aug-16	100%
CP53 - Pipe Jacking Method				
CP - Waterproofing, Finishing	21	20-Feb-16	16-Mar-16	40%
CP52 - Pipe Jacking Method				
CP - Pipe Jacking TBM - Delivery, Assembly & Setup	23	01-Feb-16	05-Mar-16	100%
CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation	9	05-Mar-16	14-Mar-16	100%
CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal	10	14-Mar-16	24-Mar-16	100%
CP Finishing & Demobilization	21	24-Mar-16	22-Apr-16	0%
CP51 - Traditional Method				
CP Setup	6	31-Aug-16	07-Sep-16	100%
1st Segment Opening	7	07-Sep-16	14-Sep-16	100%
CP Excavation	14	14-Sep-16	28-Sep-16	100%
CP Lining	14	28-Sep-16	12-Oct-16	100%
2nd Segment Opening	7	12-Oct-16	19-Oct-16	100%
CP Finishing & Demobilization	18	19-Oct-16	09-Nov-16	20%
CP50 - Pipe Jacking Method				
CP50 Platform Available from ML03 North Approach Tunnel Backfilling	0	16-May-16		100%
CP Setup	23	16-May-16	11-Jun-16	100%
CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation	9	12-Jun-16	21-Jun-16	100%
CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal	10	22-Jun-16	01-Jul-16	100%
CP Finishing & Demobilization	21	02-Jul-16	26-Jul-16	0%



North Ventilation Building				
Design Submission				
(A11) Submissions to Design Advisory Panel of ArchSD				
ArchSD's comment	30	10-Jun-14	09-Jul-14	93%
(I1) DDA for North Vent.Bldgs. GBP & Arch.Submission				
IPs Review	28	21-Aug-14	17-Sep-14	92%
IP's No Objection Received	0		17-Sep-14	0%
SO's Review	35	21-Aug-14	24-Sep-14	94%
SO Approval with Condition Received	0		24-Sep-14	0%
(I1) DDA for North & South Vent.Bldg. ABWF works				
Preparation of DDANorth & South ABWF	18	25-Sep-14	17-Oct-14	100%
Review & Comment by JV	24	18-Oct-14	14-Nov-14	91%
Designer prepare DDA	15	15-Nov-14	02-Dec-14	0%
Formal Submission of DDA to ICE/ IPs	0		02-Dec-14	0%
Advanced Submission to SO	0		02-Dec-14	0%
IPs/ SO's Advance Comments/ ICE Comments	28	03-Dec-14	30-Dec-14	0%
Comments Received	0		30-Dec-14	0%
Designer to Reply RIC + Update Submission	21	31-Dec-14	24-Jan-15	0%
Submit Updated DDA to SO/ ICE/ IPs	0	26-Jan-15		0%
ICE Approval & Issue Check Cert	18	26-Jan-15	14-Feb-15	0%
IPs Review	28	26-Jan-15	22-Feb-15	0%
SO's Review	35	26-Jan-15	01-Mar-15	0%
(I2) DDA for North Vent.Bldgs.Structural Design incl.Vent.Connections				
IPs Review	28	24-Dec-14	20-Jan-15	92%
IP's No Objection Received	0		20-Jan-15	0%
SO's Review	35	24-Dec-14	27-Jan-15	92%
SO Approval with Condition Received	0		27-Jan-15	0%
(I3) DDA for North & South Vent.Bldgs. Service and E&M Provision				
Designer to Reply RIC + Update Submission	21	18-Dec-14	14-Jan-15	100%
Submit Updated DDA to SO/ ICE/ IPs	0	15-Jan-15		100%
ICE Approval & Issue Check Cert	12	15-Jan-15	28-Jan-15	0%
Submit ICE Check Cert to SO	6	29-Jan-15	04-Feb-15	0%
IPs Review	28	15-Jan-15	11-Feb-15	92%
IP's No Objection Received	0		11-Feb-15	0%
SO's Review	35	15-Jan-15	18-Feb-15	91%
SO Approval with Condition Received	0		18-Feb-15	0%
(C3) DDA for North Vent Shaft & Duct Permanent Structure				
ICE Approval & Issue Check Cert	12	22-Nov-14	05-Dec-14	100%

Construction				
Substructure	120	04-Jul-16	24-Nov-16	0%
North Surface Roadworks, Utility & Drainage works				
Design Submission				
(A20) DDA for Traffic Sign, Road Marking, Street Furnitures, Sign Gantry & etc				
SO's Review	35	11-Dec-14	14-Jan-15	100%
SO Approval with Condition Received	0		14-Jan-15	100%
(C2) DDA for Sewerage, Drainage, Waterworks & Utility works for North Landfall				
IPs Review	28	08-Nov-14	05-Dec-14	92%
IP's No Objection Received	0		05-Dec-14	0%



- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG08507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG08507 Rev.B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG08507 Rev.C	CLA	WYu
30-Oct-15	TMCLKDBJGEN-PRG08507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
SO's Review	35	08-Nov-14	12-Dec-14	94%												
SO Approval with Condition Received	0		12-Dec-14	0%												
Sub-sea Tunnel																
Sub-sea TBM Tunnelling																
Major Procurement																
Precast Segment ID12.40 - Production for Sub-sea TBM Tunnel																
ID12.40 TBM Segment Ring Fabrication - 12 rings per day	300	22-Nov-14	19-Dec-15	67%												
Design Submission																
(B6) Risk Assessment of Submarine Cable - Tunnelling Works																
CLP Review (4 weeks)	28	17-Mar-15	13-Apr-15	100%												
CLP Comment Received	0		13-Apr-15	100%												
SO's Condition Approval	35	12-Mar-15	15-Apr-15	100%												
(G1) DDA for TBM Tunnel Lining Structural Design - Sub-sea tunnel																
Sub-sea TBM Tunnel Segment - Fabrication	265	06-Oct-14	29-Aug-15	75%												
(G3) DDA for TBM Tunnel Internal Structures (Sub-sea)																
Sub-sea Tunnel - Precast Gallery Fabrication	244	22-Jan-15	21-Nov-15	42%												
Construction																
Sub-sea TBM Tunnel - NB ID12.2m - S881																
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6522 to 6500 - 22m)	5	01-Apr-16	06-Apr-16	100%												
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6500 to 6430 - 70m)	15	06-Apr-16	21-Apr-16	100%												
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6430 to 6350 - 80m)	17	21-Apr-16	08-May-16	100%												
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6350 to 6300 - 50m)	10	08-May-16	19-May-16	100%												
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6300 to 6260 - 40m)	5	19-May-16	24-May-16	100%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6260 to 6240 - 20m)	2	24-May-16	26-May-16	100%												
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6240 to 6175 - 65m)	11	26-May-16	06-Jun-16	100%												
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6175 to 6135 - 40m)	5	06-Jun-16	11-Jun-16	100%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6135 to 6100 - 35m)	3	11-Jun-16	14-Jun-16	100%												
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6100 to 6050 - 50m)	9	14-Jun-16	24-Jun-16	100%												
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6050 to 6010 - 40m)	5	24-Jun-16	29-Jun-16	100%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6010 to 5830 - 180m)	14	29-Jun-16	13-Jul-16	0%												
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5830 to 5810 - 20m)	2	13-Jul-16	16-Jul-16	0%												
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch5810 to 5740 - 70m)	12	16-Jul-16	28-Jul-16	0%												
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5740 to 5550 - 190m)	22	28-Jul-16	20-Aug-16	0%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5550 to 5330 - 220m)	18	20-Aug-16	07-Sep-16	0%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5330 to 4950 - 380m)	30	07-Sep-16	07-Oct-16	0%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch4950 to 4870 - 80m)	6	07-Oct-16	13-Oct-16	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4870 to 4750 - 120m)	8	13-Oct-16	21-Oct-16	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4750 to 4600 - 150m)	10	21-Oct-16	31-Oct-16	0%												
Sub-sea TBM Tunnel - SB ID12.2m - S882																
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6451 to 6371 - 80m)	17	30-Jan-16	19-Feb-16	100%												
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6321 to 6281 - 40m)	5	29-Feb-16	05-Mar-16	100%												
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6121 to 6071 - 50m)	9	25-Apr-16	04-May-16	100%												
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6071 to 6031 - 40m)	5	04-May-16	09-May-16	100%												
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6031 to 5851 - 180m)	14	09-May-16	24-May-16	100%												
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5851 to 5831 - 20m)	2	24-May-16	26-May-16	100%												
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch5831 to 5761 - 70m)	12	26-May-16	07-Jun-16	100%												
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5761 to 5571 - 190m)	22	07-Jun-16	30-Jun-16	100%												
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5571 to 5351 - 220m)	18	30-Jun-16	19-Jul-16	100%												
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5351 to 4971 - 380m)	30	19-Jul-16	19-Aug-16	43%												
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch4971 to 4891 - 80m)	6	19-Aug-16	25-Aug-16	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4891 to 4771 - 120)	8	25-Aug-16	02-Sep-16	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4771 to 4621 - 150m)	10	02-Sep-16	12-Sep-16	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4621 to 4421 - 200m)	13	12-Sep-16	25-Sep-16	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4421 to 4321 - 100m)	6	25-Sep-16	01-Oct-16	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4321 to 4221 - 100m)	6	01-Oct-16	07-Oct-16	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4221 to 3851 - 370m)	26	07-Oct-16	02-Nov-16	0%												
Sub-sea TBM Tunnel - NB - Precast Invert Gallery																
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP48	16	26-May-16	11-Jun-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP47	12	11-Jun-16	24-Jun-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP46	9	24-Jun-16	03-Jul-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP45	10	03-Jul-16	13-Jul-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP44	14	13-Jul-16	28-Jul-16	21%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP43	11	28-Jul-16	08-Aug-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP42	11	08-Aug-16	20-Aug-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP41	9	20-Aug-16	29-Aug-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP40	9	29-Aug-16	07-Sep-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP39	3	07-Sep-16	10-Sep-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP38	8	12-Sep-16	20-Sep-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP37	8	20-Sep-16	28-Sep-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP36	8	28-Sep-16	06-Oct-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP35	7	06-Oct-16	13-Oct-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP34	8	13-Oct-16	21-Oct-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP33	4	21-Oct-16	25-Oct-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP32	6	25-Oct-16	31-Oct-16	0%												
Sub-sea TBM Tunnel - SB - Precast Invert Gallery																
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP47	11	18-Apr-16	29-Apr-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP46	11	29-Apr-16	10-May-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP45	8	10-May-16	19-May-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP44	8	19-May-16	27-May-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP43	15	27-May-16	11-Jun-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP42	13	11-Jun-16	25-Jun-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP41	10	25-Jun-16	05-Jul-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP40	8	05-Jul-16	13-Jul-16	100%												

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. F)
 Three Months Rolling Programme
 Progress as of 31-Aug-16



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev. C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev. F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP39	9	13-Jul-16	23-Jul-16	89%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP38	7	23-Jul-16	30-Jul-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP37	8	30-Jul-16	07-Aug-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP36	8	07-Aug-16	16-Aug-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP35	7	16-Aug-16	23-Aug-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP34	7	23-Aug-16	30-Aug-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP33	16	30-Aug-16	15-Sep-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP32	6	15-Sep-16	21-Sep-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP31	10	21-Sep-16	01-Oct-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP30	7	01-Oct-16	08-Oct-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP29	6	08-Oct-16	14-Oct-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP28	11	14-Oct-16	25-Oct-16	0%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP27	6	25-Oct-16	31-Oct-16	0%												

Sub-sea Tunnel Cross Passage & Internal Structure

Design Submission

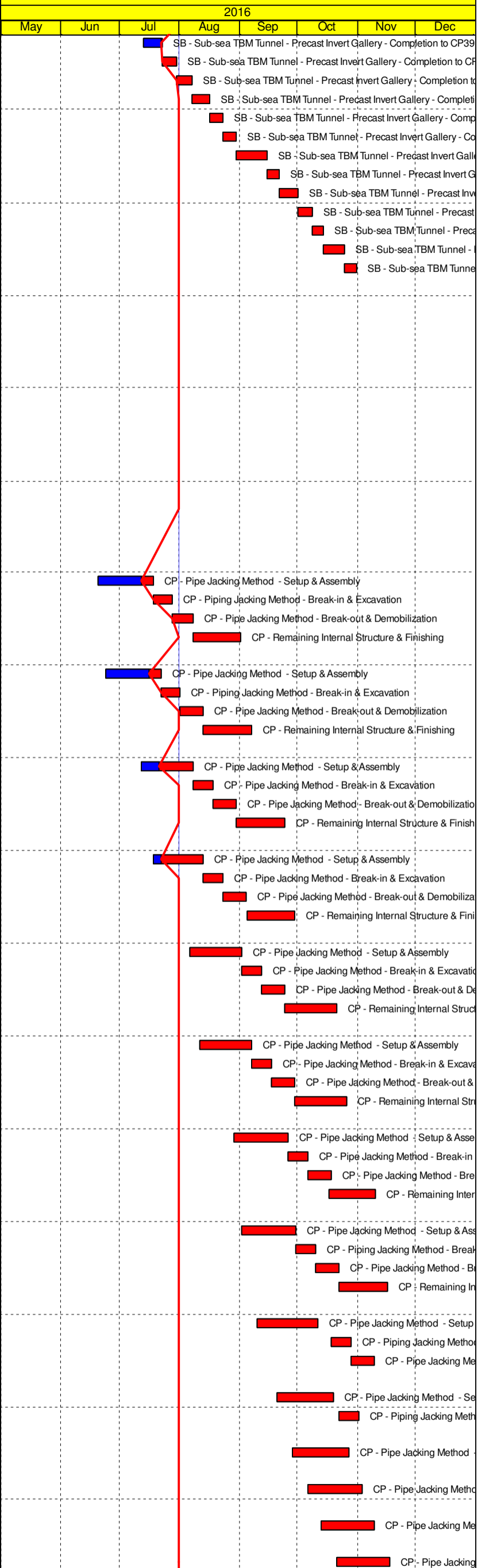
(G4) DDA for Cross Passage - Permanent works - incl. Geotechnical Assessment - Sub-sea tunnel

IPs/SO's Advance Comments/ICE Comments	28	21-Dec-14	17-Jan-15	100%
Comments Received	0		17-Jan-15	100%
Designer to Reply RfC + Update Submission	21	19-Jan-15	11-Feb-15	100%
Submit Updated DDA to SO/ICE/IPs	0	12-Feb-15		100%
ICE Approval & Issue Check Cert	12	12-Feb-15	04-Mar-15	100%
Submit ICE Check Cert to SO	6	05-Mar-15	11-Mar-15	100%
IPs Review	28	12-Feb-15	11-Mar-15	100%
IP's No Objection Received	0		11-Mar-15	100%
SO's Review	35	12-Feb-15	18-Mar-15	100%
SO Approval with Condition Received	0		18-Mar-15	100%

Construction

Sub-sea Tunnel Cross Passage

CP48 - ML03 - Ch6489				
CP - Pipe Jacking Method - Setup & Assembly	23	20-Jun-16	18-Jul-16	43%
CP - Piping Jacking Method - Break-in & Excavation	10	18-Jul-16	28-Jul-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	11	28-Jul-16	08-Aug-16	0%
CP - Remaining Internal Structure & Finishing	21	08-Aug-16	01-Sep-16	0%
CP47 - ML03 - Ch6390				
CP - Pipe Jacking Method - Setup & Assembly	23	24-Jun-16	22-Jul-16	43%
CP - Piping Jacking Method - Break-in & Excavation	10	22-Jul-16	01-Aug-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	01-Aug-16	13-Aug-16	0%
CP - Remaining Internal Structure & Finishing	21	13-Aug-16	07-Sep-16	0%
CP46 - ML03 - Ch6292				
CP - Pipe Jacking Method - Setup & Assembly	23	12-Jul-16	08-Aug-16	35%
CP - Pipe Jacking Method - Break-in & Excavation	10	08-Aug-16	18-Aug-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	18-Aug-16	30-Aug-16	0%
CP - Remaining Internal Structure & Finishing	21	30-Aug-16	24-Sep-16	0%
CP45 - ML03 - Ch6193				
CP - Pipe Jacking Method - Setup & Assembly	23	18-Jul-16	13-Aug-16	17%
CP - Pipe Jacking Method - Break-in & Excavation	10	13-Aug-16	23-Aug-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	23-Aug-16	04-Sep-16	0%
CP - Remaining Internal Structure & Finishing	21	05-Sep-16	29-Sep-16	0%
CP44 - ML03 - Ch6095				
CP - Pipe Jacking Method - Setup & Assembly	23	06-Aug-16	02-Sep-16	0%
CP - Pipe Jacking Method - Break-in & Excavation	10	02-Sep-16	12-Sep-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	12-Sep-16	24-Sep-16	0%
CP - Remaining Internal Structure & Finishing	21	24-Sep-16	21-Oct-16	0%
CP43 - ML03 - Ch5996				
CP - Pipe Jacking Method - Setup & Assembly	23	11-Aug-16	07-Sep-16	0%
CP - Pipe Jacking Method - Break-in & Excavation	10	07-Sep-16	17-Sep-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	17-Sep-16	29-Sep-16	0%
CP - Remaining Internal Structure & Finishing	21	29-Sep-16	26-Oct-16	0%
CP42 - ML03 - Ch5898				
CP - Pipe Jacking Method - Setup & Assembly	23	29-Aug-16	26-Sep-16	0%
CP - Pipe Jacking Method - Break-in & Excavation	10	26-Sep-16	06-Oct-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	06-Oct-16	18-Oct-16	0%
CP - Remaining Internal Structure & Finishing	21	17-Oct-16	10-Nov-16	0%
CP41 - ML03 - Ch5800				
CP - Pipe Jacking Method - Setup & Assembly	23	02-Sep-16	30-Sep-16	0%
CP - Piping Jacking Method - Break-in & Excavation	10	30-Sep-16	10-Oct-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	10-Oct-16	22-Oct-16	0%
CP - Remaining Internal Structure & Finishing	21	22-Oct-16	16-Nov-16	0%
CP40 - ML03 - Ch5703				
CP - Pipe Jacking Method - Setup & Assembly	23	10-Sep-16	11-Oct-16	0%
CP - Piping Jacking Method - Break-in & Excavation	10	18-Oct-16	28-Oct-16	0%
CP - Pipe Jacking Method - Break-out & Demobilization	12	28-Oct-16	09-Nov-16	0%
CP39 - ML03 - Ch5607				
CP - Pipe Jacking Method - Setup & Assembly	23	20-Sep-16	19-Oct-16	0%
CP - Piping Jacking Method - Break-in & Excavation	10	22-Oct-16	01-Nov-16	0%
CP38 - ML03 - Ch5510				
CP - Pipe Jacking Method - Setup & Assembly	23	28-Sep-16	27-Oct-16	0%
CP37 - ML03 - Ch5413				
CP - Pipe Jacking Method - Setup & Assembly	23	06-Oct-16	03-Nov-16	0%
CP36 - ML03 - Ch5315				
CP - Pipe Jacking Method - Setup & Assembly	23	13-Oct-16	09-Nov-16	0%
CP35 - ML03 - Ch5217				
CP - Pipe Jacking Method - Setup & Assembly	23	21-Oct-16	17-Nov-16	0%



- Planned Bar
- Planned Bar - Critical
- Progress bar
- ◆ Planned Milestone
- ◆ Progress Milestone



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev. C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev. F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016											
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
C&C Tunnel - 5th 85m - Tunnel Structure	83	19-Oct-16	26-Jan-17	0%												
C&C Tunnel - 6th 85m - Excavation by ramp	27	22-Aug-16	22-Sep-16	0%												
C&C Tunnel - 6th 85m - Excavation by vertical mean	52	23-Sep-16	24-Nov-16	0%												
South Retrieval Shaft																
Design Submission																
(F4) Gantry Crane Support/Foundations in Southern Landfall																
Preparation of IFA Gantry Crane / Foundation	18	27-Jul-15	15-Aug-15	0%												
Review & Comment by JV	18	17-Aug-15	05-Sep-15	0%												
Designer prepare IFA	10	07-Sep-15	17-Sep-15	0%												
Formal Submission of IFA to ICE/ IPs	0		17-Sep-15	0%												
Advanced Submission to SO	0		17-Sep-15	0%												
IPs/ SO's Advance Comments/ ICE Comments	28	18-Sep-15	15-Oct-15	0%												
Method Statement Submission																
Method Statement of Construction Methodology of Retrieval Shaft																
Preparation Method Statement for Retrieval Shaft	25	24-Aug-15	21-Sep-15	0%												
Submit Method Statement to SO	0		21-Sep-15	0%												
SO Reviews & Comments	28	22-Sep-15	19-Oct-15	0%												
Re-submission	18	20-Oct-15	10-Nov-15	0%												
Construction																
South Landfall GI Works/DW Setting Up	48	06-Aug-15	02-Oct-15	13%												
South Retrieval Shaft - Diaphragm Wall	98	03-Oct-15	29-Jan-16	3%												
Retrieval Shaft - Excavation - Soft (other than Fill)	140	15-Apr-16	30-Sep-16	0%												
Retrieval Shaft - Temp. Slab/Prepare for TBM Breakthrough	48	03-Oct-16	28-Nov-16	0%												
South Approach Ramp																
Construction																
Approach Ramp (CH1580-1850) - Pipe Pile/Sheet Piles Wall	126	03-Oct-15	09-Mar-16	0%												
Approach Ramp (CH1580-1850) - Tension Piles	103	03-Oct-15	04-Feb-16	0%												
South Ventilation Building																
Design Submission																
(I1) DDA for South Vent.Bldg. GBP & Arch.Submission																
IPs Review	28	22-Dec-14	18-Jan-15	88%												
IP's No Objection Received	0		18-Jan-15	0%												
SO's Review	35	22-Dec-14	25-Jan-15	91%												
SO Approval with Condition Received	0		26-Jan-15	0%												
(I2) DDA for South Vent.Bldg. Foundation Design																
Review & Comment by JV	18	27-Apr-15	18-May-15	88%												
Designer prepare DDA	10	19-May-15	30-May-15	0%												
Formal Submission of DDA to ICE/ IPs	0		30-May-15	0%												
Advanced Submission to SO	0		30-May-15	0%												
IPs/ SO's Advance Comments/ ICE Comments	28	31-May-15	27-Jun-15	0%												
Comments Received	0		27-Jun-15	0%												
Designer to Reply RtC + Update Submission	21	29-Jun-15	23-Jul-15	0%												
Submit Updated DDA to SO/ ICE/ IPs	0	24-Jul-15		0%												
ICE Approval & Issue Check Cert	18	24-Jul-15	13-Aug-15	0%												
IPs Review	28	24-Jul-15	20-Aug-15	0%												
SO's Review	35	24-Jul-15	27-Aug-15	0%												
(I2) DDA for South Vent.Bldg.Structural Design incl.Vent.Connections																
Review & Comment by JV	18	18-Feb-15	17-Mar-15	76%												
Designer prepare DDA	10	18-Mar-15	28-Mar-15	0%												
Formal Submission of DDA to ICE/ IPs	0		28-Mar-15	0%												
Advanced Submission to SO	0		28-Mar-15	0%												
IPs/ SO's Advance Comments/ ICE Comments	28	29-Mar-15	25-Apr-15	0%												
Comments Received	0		25-Apr-15	0%												
Designer to Reply RtC + Update Submission	21	27-Apr-15	21-May-15	0%												
Submit Updated DDA to SO/ ICE/ IPs	0	22-May-15		0%												
ICE Approval & Issue Check Cert	18	22-May-15	12-Jun-15	0%												
IPs Review	28	22-May-15	18-Jun-15	0%												
SO's Review	35	22-May-15	25-Jun-15	0%												
(J1) DDA Temp.works for Construction of Sth.Vent.Bldg.																
Designer to Reply RtC + Update Submission	21	24-Aug-15	16-Sep-15	90%												
Submit Updated DDA to SO/ ICE/ IPs	0	17-Sep-15		0%												
ICE Approval & Issue Check Cert	12	17-Sep-15	02-Oct-15	0%												
Submit ICE Check Cert to SO	6	03-Oct-15	09-Oct-15	0%												
IPs Review	28	17-Sep-15	14-Oct-15	0%												
IP's No Objection Received	0		14-Oct-15	0%												
SO's Review	35	17-Sep-15	21-Oct-15	0%												
SO Approval with Condition Received	0		22-Oct-15	0%												
Construction																
Mobilization & Setting Up Piling Rigs	64	06-Aug-15	22-Oct-15	0%												
S - Pile Test	24	09-Apr-16	07-May-16	0%												
S - Sheet Piling	48	23-Oct-15	17-Dec-15	0%												
S- Excavation	100	09-May-16	05-Sep-16	0%												
Substructure	95	06-Sep-16	30-Dec-16	0%												
South Surface Roadworks, Utility & Drainage works																
Design Submission																
(E1) AIP - Southern Landfall Seawall Modification																
SO Review (35 Days)	35	03-Mar-17	06-Apr-17	100%												
SO Approval with Condition Received	0		06-Apr-17	100%												
(E1) DDA - Southern Landfall Seawall Modification																
Preparation of DDA Modification of Seawall at Sth Landfall	18	07-Apr-17	02-May-17	100%												
Review & Comment by JV	18	04-May-17	24-May-17	100%												
Designer prepare DDA	10	25-May-17	06-Jun-17	100%												
Formal Submission of DDA to ICE/ IPs	0		06-Jun-17	100%												

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
Detailed Works Programme (Rev. F)
Three Months Rolling Programme
Progress as of 31-Aug-16



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG08507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG08507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG08507 Rev. C	CLA	WYu
30-Oct-15	TMCLKDBJGEN-PRG08507 Rev. F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016							
					May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Advanced Submission to SO	0		06-Jun-17	100%								
IPs/ SO's Advance Comments/ ICE Comments	28	07-Jun-17	04-Jul-17	83%								
Comments Received	0		04-Jul-17	0%								
Designer to Reply RiC + Update Submission	21	05-Jul-17	28-Jul-17	0%								
Submit Updated DDA to SO/ ICE/ IPs	0	29-Jul-17		0%								
ICE Approval & Issue Check Cert	12	29-Jul-17	11-Aug-17	0%								
Submit ICE Check Cert to SO	6	12-Aug-17	18-Aug-17	0%								
IPs Review	28	29-Jul-17	25-Aug-17	0%								
IP's No Objection Received	0		25-Aug-17	0%								
SO's Review	35	29-Jul-17	01-Sep-17	0%								
SO Approval with Condition Received	0		01-Sep-17	0%								
(E3) DDA for Sewerage, Drainage, Waterworks & Utility works for South Landfall												
ICE Approval & Issue Check Cert	12	05-Mar-15	18-Mar-15	100%								
Submit ICE Check Cert to SO	6	19-Mar-15	25-Mar-15	100%								
IPs Review	28	05-Mar-15	01-Apr-15	88%								
IP's No Objection Received	0		01-Apr-15	0%								
SO's Review	35	05-Mar-15	08-Apr-15	91%								
SO Approval with Condition Received	0		08-Apr-15	0%								
Method Statement Submission												
Method Statement of Ground Treatment for TBMs Passing under Southern Landfall Seawall												
Preparation Method Statement for Ground Improvement in South Landfall	9	20-Jul-15	29-Jul-15	0%								
Submit Method Statement to SO	0		29-Jul-15	0%								
SO Reviews & Comments	28	30-Jul-15	26-Aug-15	0%								
Re-submission	6	27-Aug-15	02-Sep-15	0%								
SO's Review	28	03-Sep-15	30-Sep-15	0%								
SO's Approval	0		30-Sep-15	0%								
Construction												
Temporary Platform for Ground Treatment for TBM passing under Southern Seawall	48	06-Aug-15	02-Oct-15	0%								
Grouting Treatment for TBM passing under Southern Seawall	339	03-Oct-15	25-Nov-16	0%								Grouting Treat
Testing & Commissioning/Inspection & Handover												
Final Inspection & Handover												
Design Submission												
(A12) Maintenance Matrix												
Prepare Re-submission	18	12-Mar-16	06-Apr-16	88%	Re-submission							
2nd Submission	0		06-Apr-16	0%	Submission							
SO's Condition Approval	35	07-Apr-16	11-May-16	0%	SO's Condition Approval							
(A13) Operation & Maintenance Manual												
Preparation of Operation and Maintenance Manual	48	24-Dec-15	27-Feb-16	0%	and Maintenance Manual							
1st Submission	0		27-Feb-16	0%								
SO's Comments for 1st Submission	35	28-Feb-16	02-Apr-16	0%	Comments for 1st Submission							
Prepare Re-submission	24	05-Apr-16	03-May-16	0%	Prepare Re-submission							
2nd Submission	0		03-May-16	0%	2nd Submission							
SO's Condition Approval	35	04-May-16	07-Jun-16	0%	SO's Condition Approval							
(A14) As-built & As-fabricated Drawings												
Preparation of As-built and As-fabricated Drawings	48	24-Dec-15	27-Feb-16	0%	As-fabricated Drawings							
1st Submission	0		27-Feb-16	0%								
SO's Comments for 1st Submission	35	28-Feb-16	02-Apr-16	0%	Comments for 1st Submission							
Prepare Re-submission	24	05-Apr-16	03-May-16	0%	Prepare Re-submission							
2nd Submission	0		03-May-16	0%	2nd Submission							
SO's Condition Approval	35	04-May-16	07-Jun-16	0%	SO's Condition Approval							
(A15) Health & Safety File incl. As-built Dwgs & Records, Maintenance Schedules, O&M Manual												
Preparation of Health and Safety File including as-built drawings and records, maintenance schedules, op	48	24-Dec-15	27-Feb-16	0%	Safety File including as-built drawings and records, maintenance schedules, operation and mai							
1st Submission	0		27-Feb-16	0%								
SO's Comments for 1st Submission	35	28-Feb-16	02-Apr-16	0%	Comments for 1st Submission							
Prepare Re-submission	24	05-Apr-16	03-May-16	0%	Prepare Re-submission							
2nd Submission	0		03-May-16	0%	2nd Submission							
SO's Condition Approval	35	04-May-16	07-Jun-16	0%	SO's Condition Approval							

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SPo
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev. B	SPa	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev. C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev. F	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		✓

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						D	C	O	
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit.	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓

WATER QUALITY

Marine Works (Sequence A)

6.1	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		✓

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						D	C	O	
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		✓
6.1	Annex A Figure 6.2b Appendix D6b	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;	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓

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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	
		- Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and - Reclamation dredging and filling for Portion 1 of HKLR;							
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		✓
<i>General Marine Works</i>									
6.1	-	Use of TMB for the construction of the submarine tunnel.	Tunnel works / Construction phase	Contractor	TM-EIAO		Y		N/A
6.1	-	Export dredged spoils from NWWCZ.	All areas as much as possible / dredging activities	Contractor	DASO Permit conditions		Y		✓
6.1	-	Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25%	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Where sand fill is proposed for filling below +2.5mPD, the fine content in the sand fill will be controlled to 5%.	All areas/ backfilling works	Contractor	TM-EIAO		Y		N.A
6.1	-	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit		Y		✓

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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	
					conditions.				
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		Y		N/A

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Environmental Mitigation and Enhancement Measure Implementation Schedule*

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						D	C	O	
					conditions.				
6.1	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		<>
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
<i>Land Works</i>									
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		✓

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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	-	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	-	✓	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		✓
6.1	-	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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						D	C	O	
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		✓
<i>Water Quality Monitoring</i>									
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.	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	Contractor	EM&A Manual		Y	Y	✓

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						D	C	O	
		One year operation phase water quality monitoring at designated stations.	monitoring for a year.						
ECOLOGY									

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						D	C	O	
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		✓
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		✓

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						D	C	O	
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓

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						D	C	O	
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									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓

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

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

*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	
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		<>

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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*

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

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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	
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: <i>f</i> suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; <i>f</i> Having a capacity of <450L unless the specifications have been approved by the EPD; and <i>f</i> Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. <i>f</i> Clearly labelled and used solely for the storage of chemical wastes; <i>f</i> Enclosed with at least 3 sides; <i>f</i> 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; <i>f</i> Adequate ventilation;	All areas / throughout construction period	Contractor	TMEIA		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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		f Sufficiently covered to prevent rainfall							

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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	
		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

*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	
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 $\mu\text{g}/\text{m}^3$	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337	500

Table D2 *Action and Limit Levels for Water Quality*

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

Notes:

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

- (a) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (b) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths
- (c) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (d) All figures given in the table are used for reference only, and EPD may amend the figures whenever it is considered as necessary
- (e) The 1%-ile of baseline data for surface and middle DO is 4.2 mg/L, whilst for bottom DO is 3.6 mg/L.

Table D3 *Action and Limit Levels for Impact Dolphin Monitoring*

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 70% of baseline & ANI < 70% of baseline	STG < 70% of baseline & ANI < 70% of baseline
Limit Level	[STG < 40% of baseline & ANI < 40% of baseline] and STG < 40% of baseline & ANI < 40% of baseline	

Notes:

1. STG means quarterly encounter rate of number of dolphin sightings, which is **6.00 in NEL** and **9.85 in NWL** during the baseline monitoring period
2. ANI means quarterly encounter rate of total number of dolphins, which is **22.19 in NEL** and **44.66 in NWL** during the baseline monitoring period
3. For North Lantau Social Cluster, AL will be trigger if NEL or NWL fall below the criteria; LL will be triggered if both NEL and NWL fall below the criteria.

Table D4 *Derived Value of Action Level (AL) and Limit Level (LL)*

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

Appendix E

EM&A Monitoring Schedules

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - December 2016**

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1-Dec	2-Dec	3-Dec
				1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
4-Dec	5-Dec	6-Dec	7-Dec	8-Dec	9-Dec	10-Dec
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
11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec	17-Dec
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
18-Dec	19-Dec	20-Dec	21-Dec	22-Dec	23-Dec	24-Dec
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
25-Dec	26-Dec	27-Dec	28-Dec	29-Dec	30-Dec	31-Dec
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	public holiday	public holiday				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 - January 2017**

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

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

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - February 2017**

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-Feb	2-Feb	3-Feb	4-Feb
				1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
5-Feb	6-Feb	7-Feb	8-Feb	9-Feb	10-Feb	11-Feb
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-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb
		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-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb
	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-Feb	27-Feb	28-Feb				
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
Impact Marine Water Quality Monitoring (WQM) Schedule (27 December 2016 to 31 January 2017)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
25-Dec	26-Dec	27-Dec	28-Dec	29-Dec	30-Dec	31-Dec
		WQM Mid-Ebb 11:58 (10:13 - 13:43) Mid-Flood 17:14 (15:29 - 18:59)		WQM Mid-Flood 7:58 (06:13 - 09:43) Mid-Ebb 13:11 (11:26 - 14:56)		WQM Mid-Flood 9:04 (07:19 - 10:49) Mid-Ebb 14:23 (12:38 - 16:08)
01-Jan	02-Jan	03-Jan	04-Jan	05-Jan	06-Jan	07-Jan
		WQM Mid-Flood 10:55 (09:10 - 12:40) Mid-Ebb 16:31 (14:46 - 18:16)		WQM Mid-Flood 12:27 (10:42 - 14:12) Mid-Ebb 18:38 (16:53 - 20:23)		WQM Mid-Ebb 7:22 (05:37 - 09:07) Mid-Flood 14:09 (12:24 - 15:54)
08-Jan	09-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan
		WQM Mid-Ebb 11:07 (09:22 - 12:52) Mid-Flood 16:38 (14:53 - 18:23)		WQM Mid-Ebb 12:54 (11:09 - 14:39) Mid-Flood 18:12 (16:27 - 19:57)		WQM Mid-Flood 9:03 (07:18 - 10:48) Mid-Ebb 14:22 (12:37 - 16:07)
15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan	21-Jan
		WQM Mid-Flood 10:56 (09:11 - 12:41) Mid-Ebb 16:27 (14:42 - 18:12)		WQM Mid-Flood 12:09 (10:24 - 13:54) Mid-Ebb 18:15 (16:30 - 20:00)		WQM Mid-Ebb 6:43 (04:58 - 08:28) Mid-Flood 13:33 (11:48 - 15:18)
22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan
		WQM Mid-Ebb 10:51 (09:15 - 12:30) Mid-Flood 15:56 (14:11 - 17:41)		WQM Mid-Ebb 12:16 (10:31 - 14:01) Mid-Flood 17:26 (15:41 - 19:11)		
29-Jan	30-Jan	31-Jan	01-Feb	02-Feb	03-Feb	04-Feb
		WQM Mid-Flood 9:32 (07:47 - 11:17) Mid-Ebb 15:15 (13:30 - 17:00)		WQM Mid-Flood 10:42 (08:57 - 12:27) Mid-Ebb 16:46 (15:01 - 18:31)		WQM Mid-Flood 12:15 (10:30 - 14:00) Mid-Ebb 19:08 (17:23 - 20:53)

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-sea Tunnel Section
Impact Marine Water Quality Monitoring (WQM) Schedule (February 2017)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29-Jan	30-Jan	31-Jan	01-Feb	02-Feb	03-Feb	04-Feb
				WQM Mid-Flood 10:42 (08:57 - 12:27) Mid-Ebb 16:46 (15:01 - 18:31)		WQM Mid-Flood 12:15 (10:30 - 14:00) Mid-Ebb 19:08 (17:23 - 20:53)
05-Feb	06-Feb	07-Feb	08-Feb	09-Feb	10-Feb	11-Feb
		WQM Mid-Ebb 10:00 (08:15 - 11:45) Mid-Flood 15:21 (13:36 - 17:06)		WQM Mid-Ebb 12:00 (10:15 - 13:45) Mid-Flood 17:19 (15:34 - 19:04)		WQM Mid-Flood 7:58 (06:13 - 09:43) Mid-Ebb 13:25 (11:40 - 15:10)
12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb
		WQM Mid-Flood 9:27 (07:42 - 11:12) Mid-Ebb 15:05 (13:20 - 16:50)		WQM Mid-Flood 10:17 (08:32 - 12:02) Mid-Ebb 16:17 (14:32 - 18:02)		WQM Mid-Flood 11:21 (09:36 - 13:06) Mid-Ebb 18:04 (16:19 - 19:49)
19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb
		WQM Mid-Ebb 9:37 (08:50 - 10:20) Mid-Flood 14:02 (12:17 - 15:47)		WQM Mid-Ebb 11:19 (09:34 - 13:04) Mid-Flood 16:21 (14:36 - 18:06)		WQM Mid-Ebb 12:34 (10:49 - 14:19) Mid-Flood 17:57 (16:12 - 19:42)
26-Feb	27-Feb	28-Feb	29-Feb	01-Mar	02-Mar	03-Mar
		WQM Mid-Flood 8:22 (06:37 - 10:07) Mid-Ebb 14:13 (12:28 - 15:58)		WQM Mid-Flood 9:22 (07:37 - 11:07) Mid-Ebb 15:31 (13:46 - 17:16)		WQM Mid-Flood 10:33 (08:48 - 12:18) Mid-Ebb 17:16 (15:31 - 19:01)

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - January 2017**

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

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - February 2017**

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

Appendix F

Impact Air Quality Monitoring Results

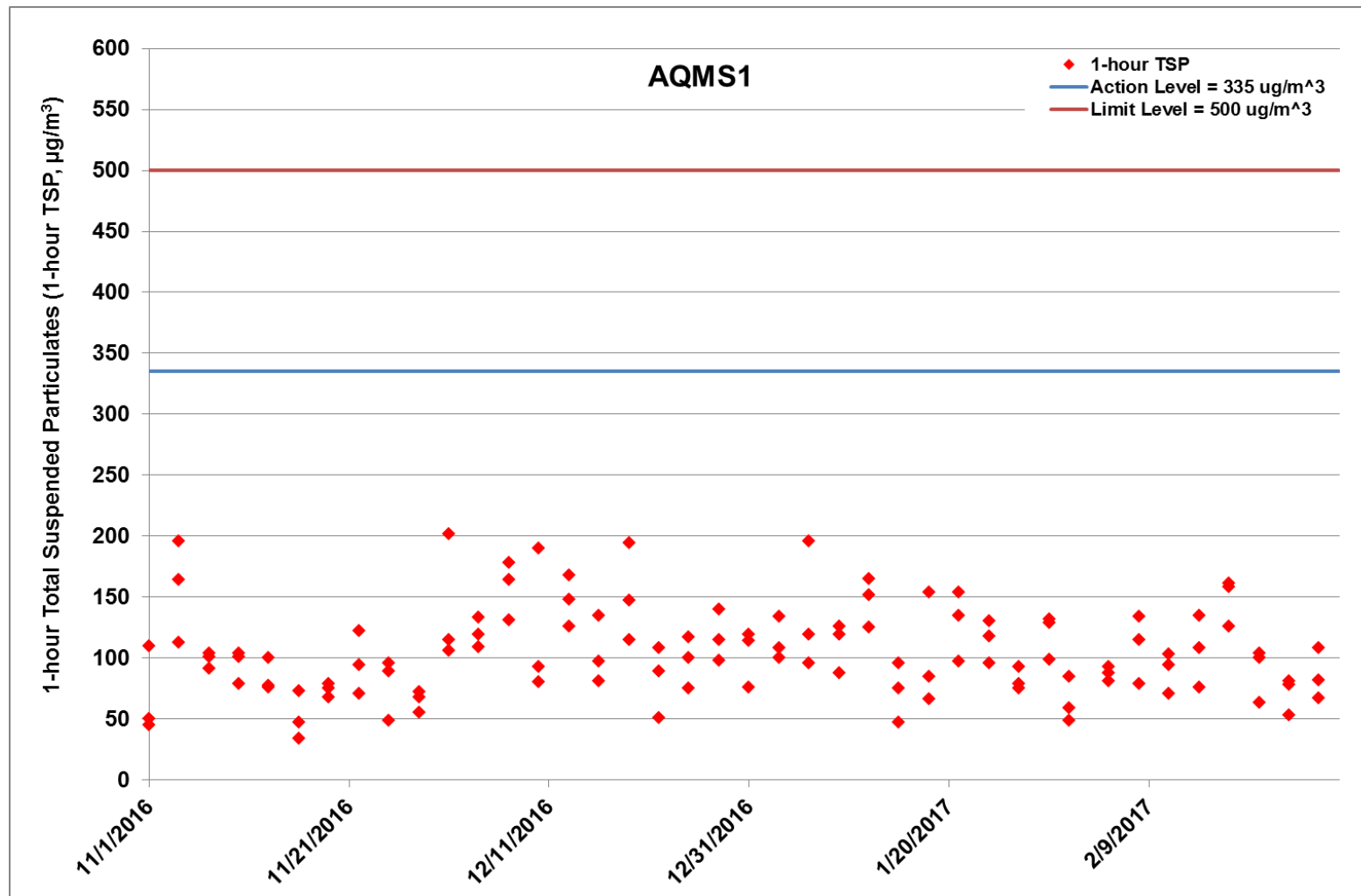


Figure G.1 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_ February 2017_REV a.xlsx



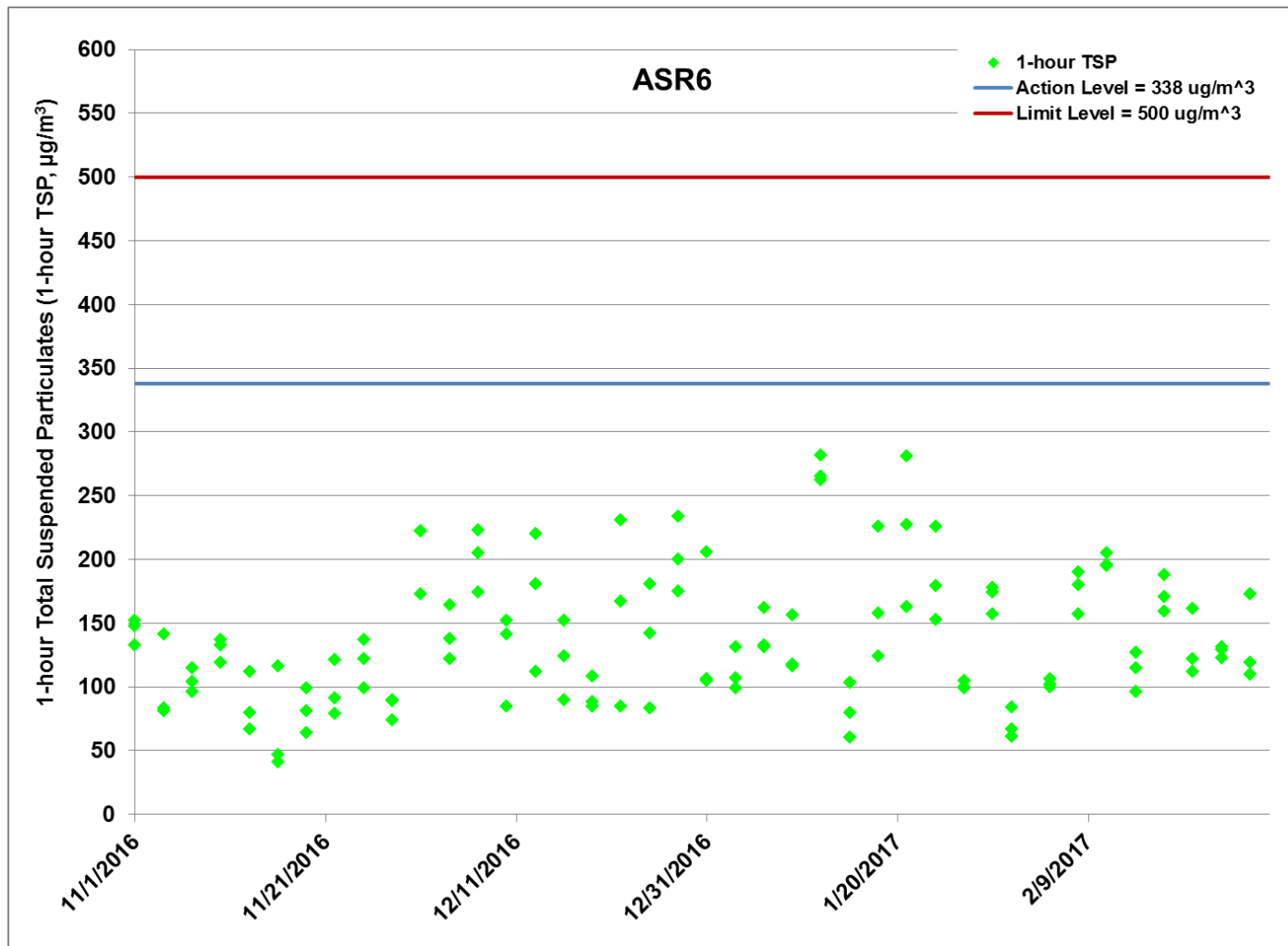


Figure G.2 Impact Monitoring – 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 – 28/2/2017) and Box Culvert Extension (1/11/2016 – 28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



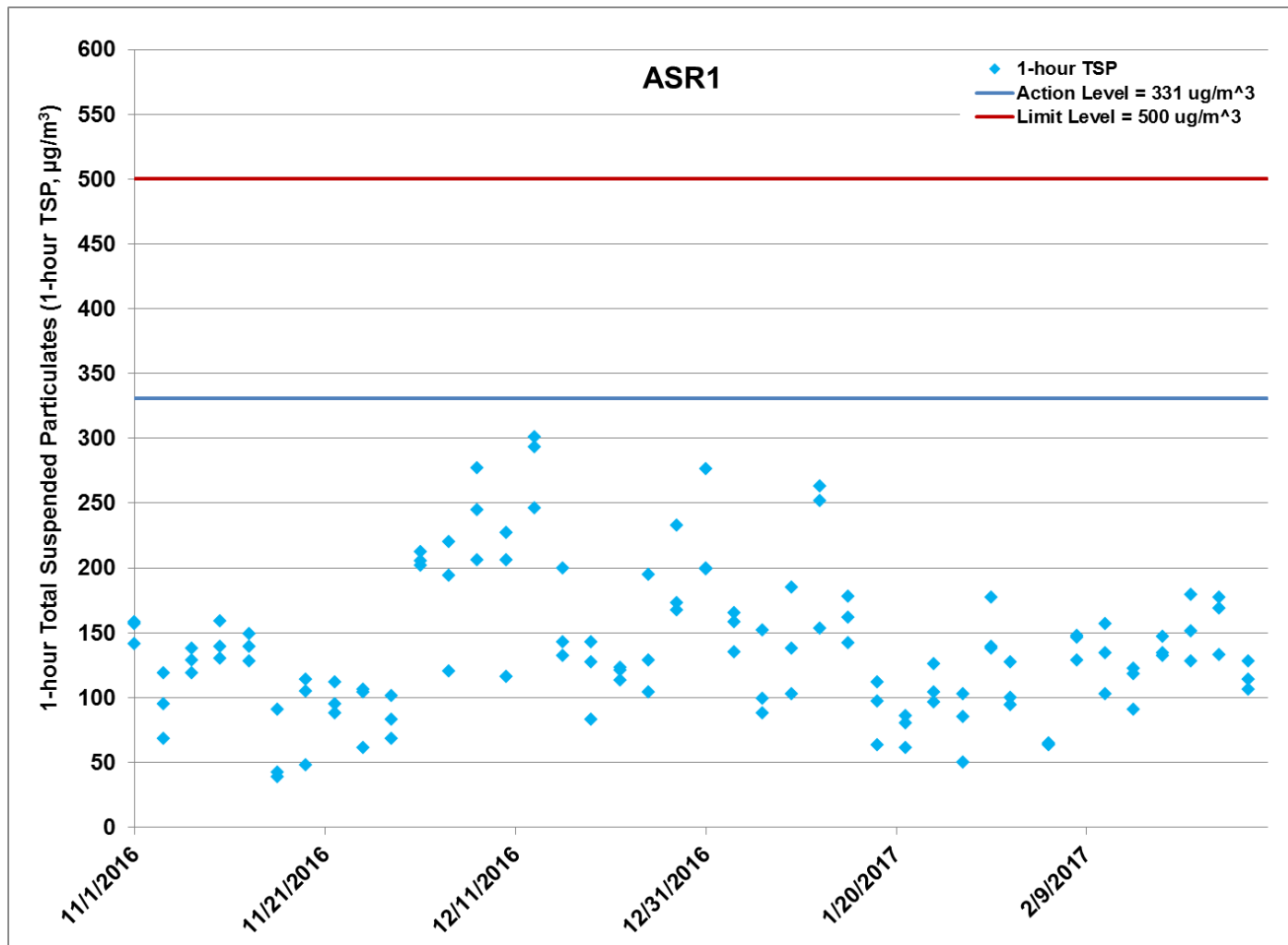


Figure G.3 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 - 28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



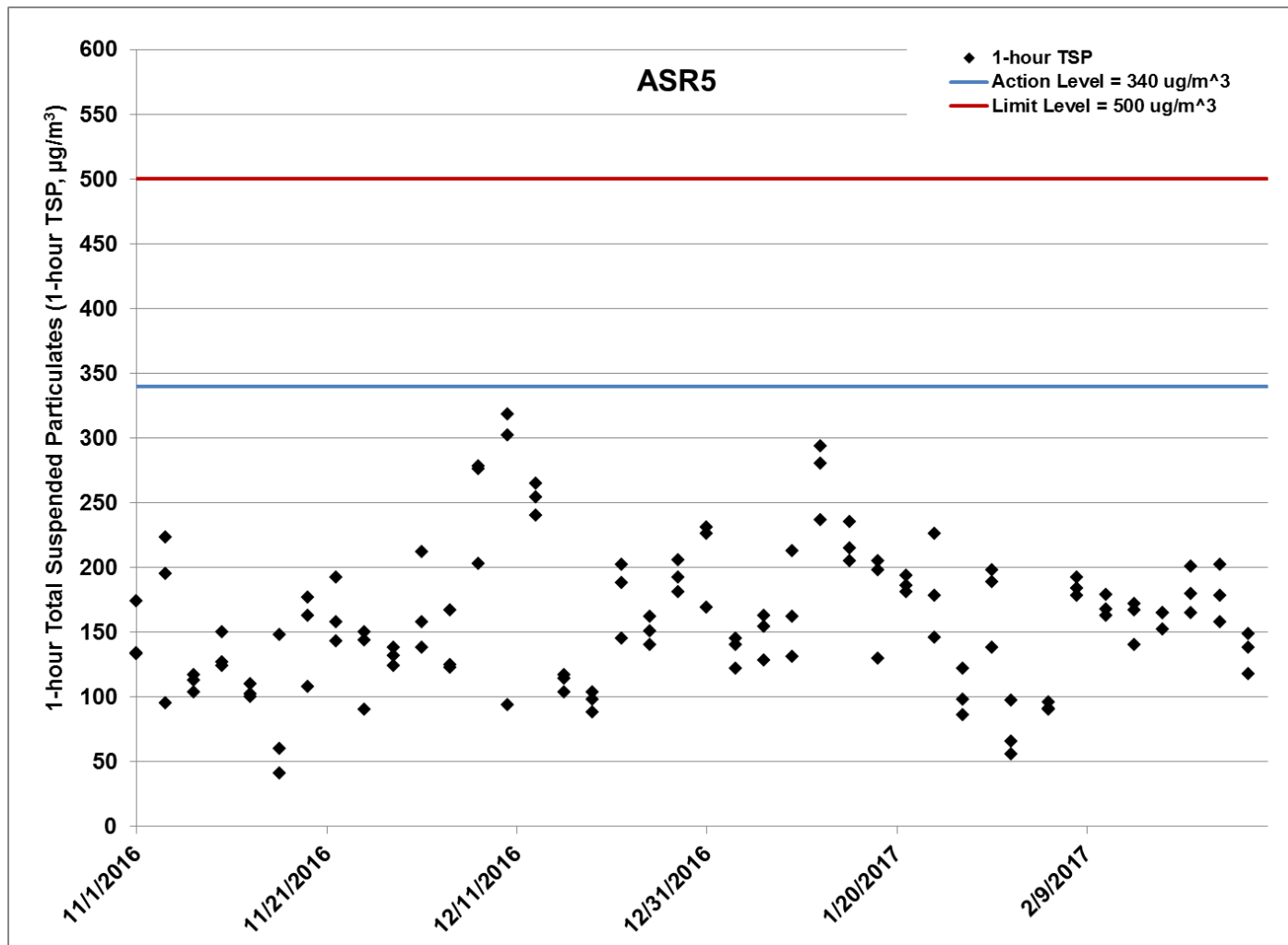


Figure G.4 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



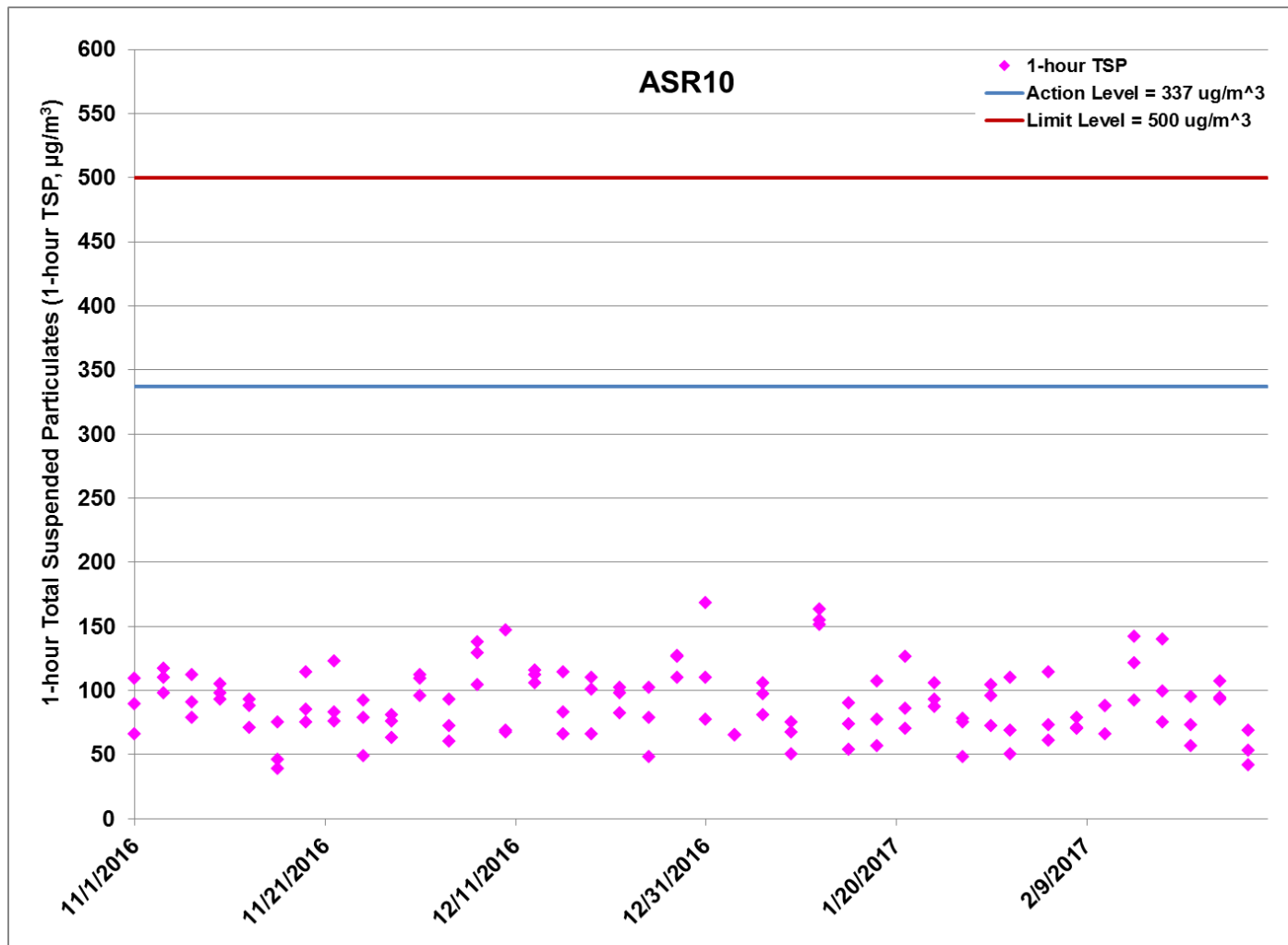


Figure G.5 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 - 28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



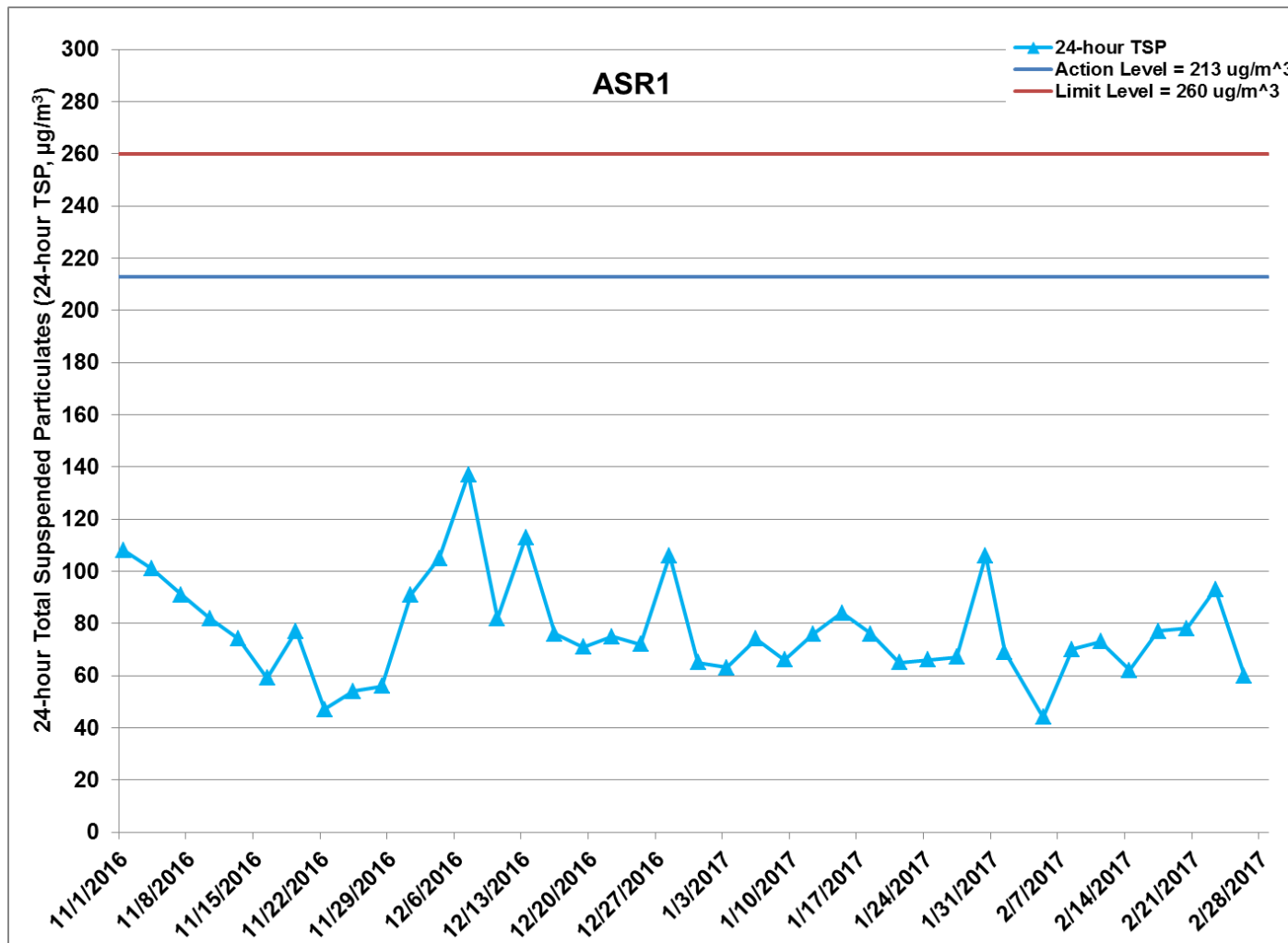


Figure G.6 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



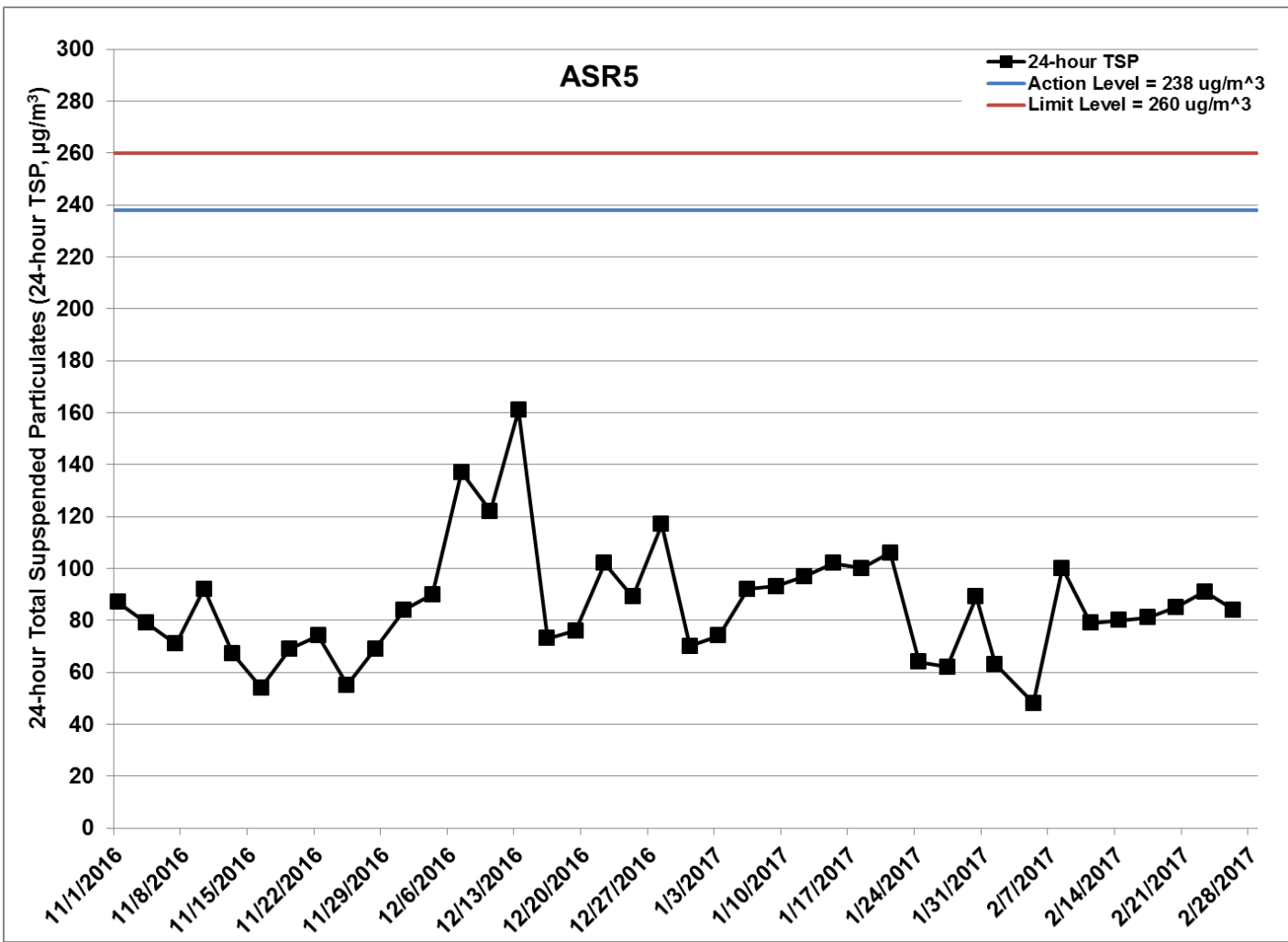


Figure G.7 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



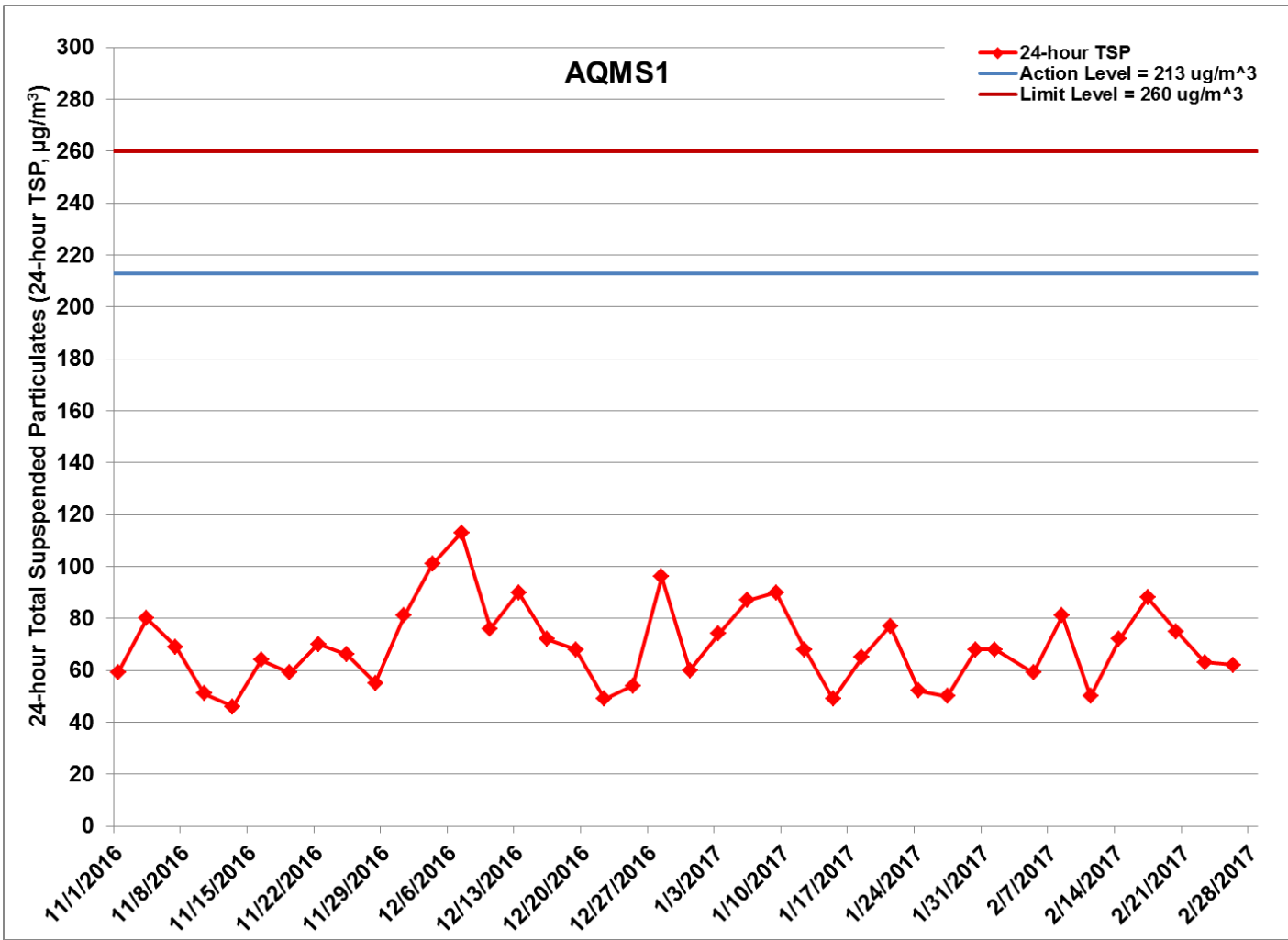


Figure G.8 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



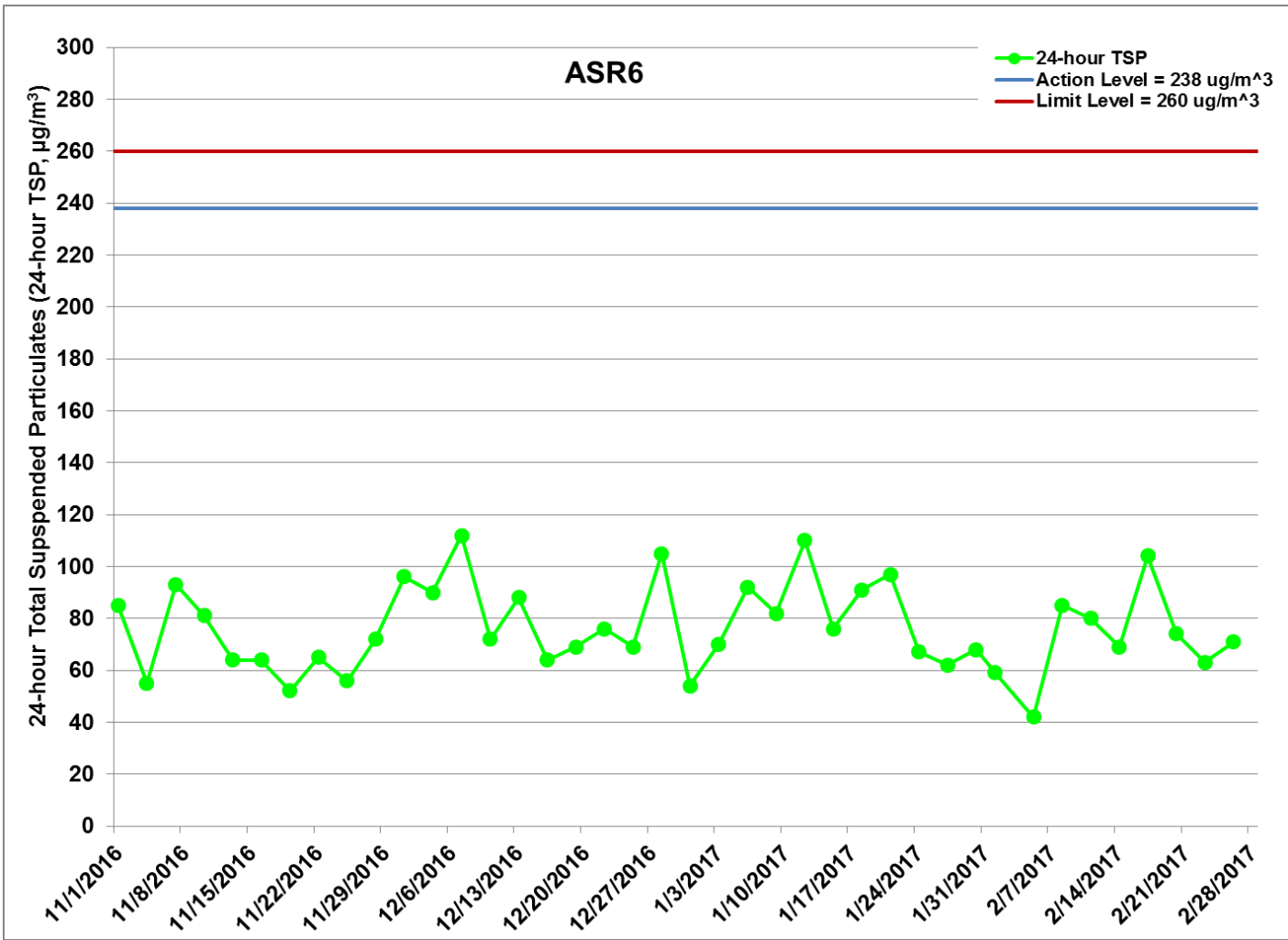


Figure G.9 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



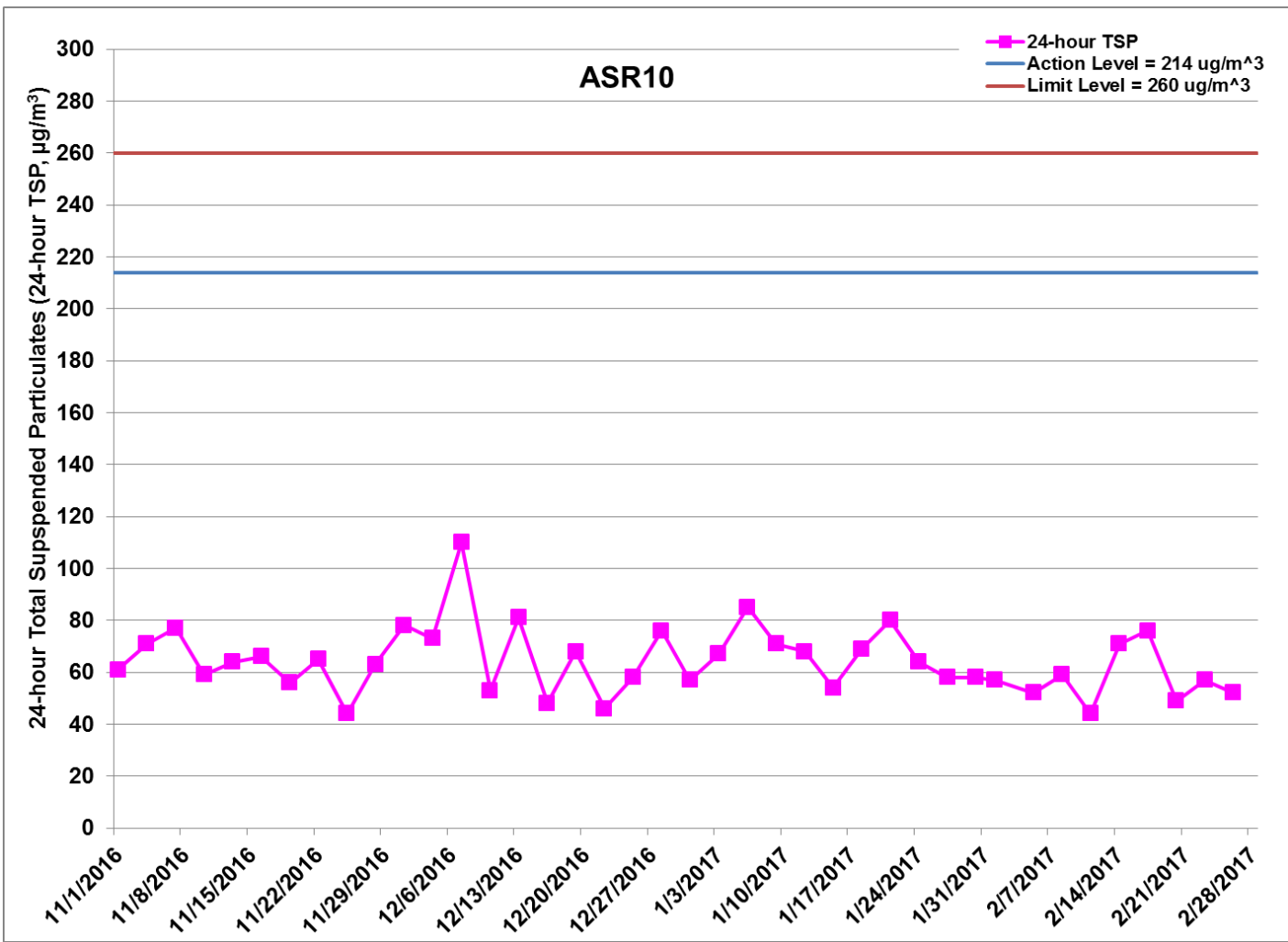


Figure G.10 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 November 2016 and 28 February 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction (1/11/2016 - 28/2/2017) and Box Culvert Extension (1/11/2016 -28/2/2017). Ref: 0212330_Impact AQM graphs_February 2017_REV a.xlsx



Appendix G

Impact Water Quality Monitoring Results

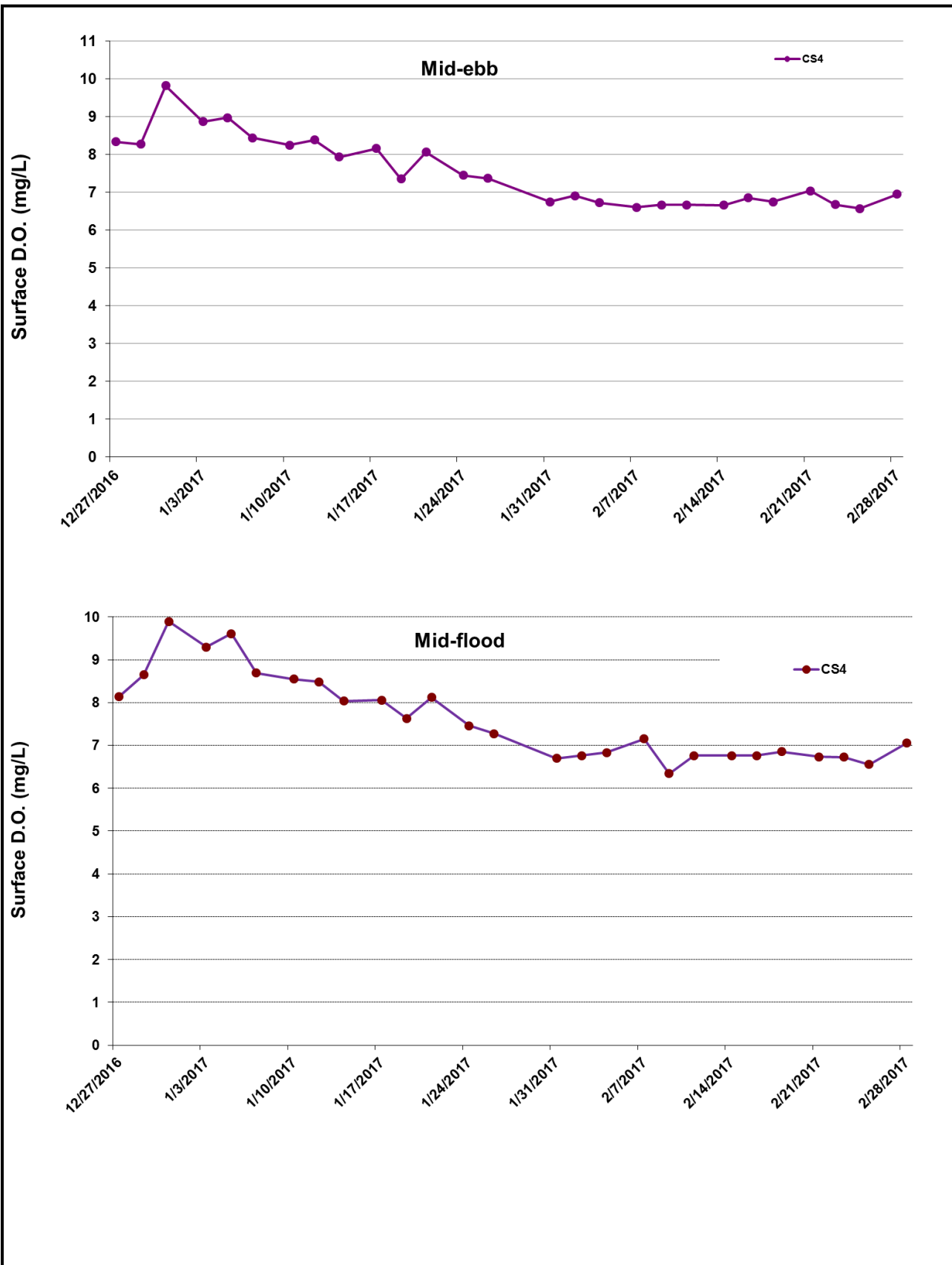


Figure I1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

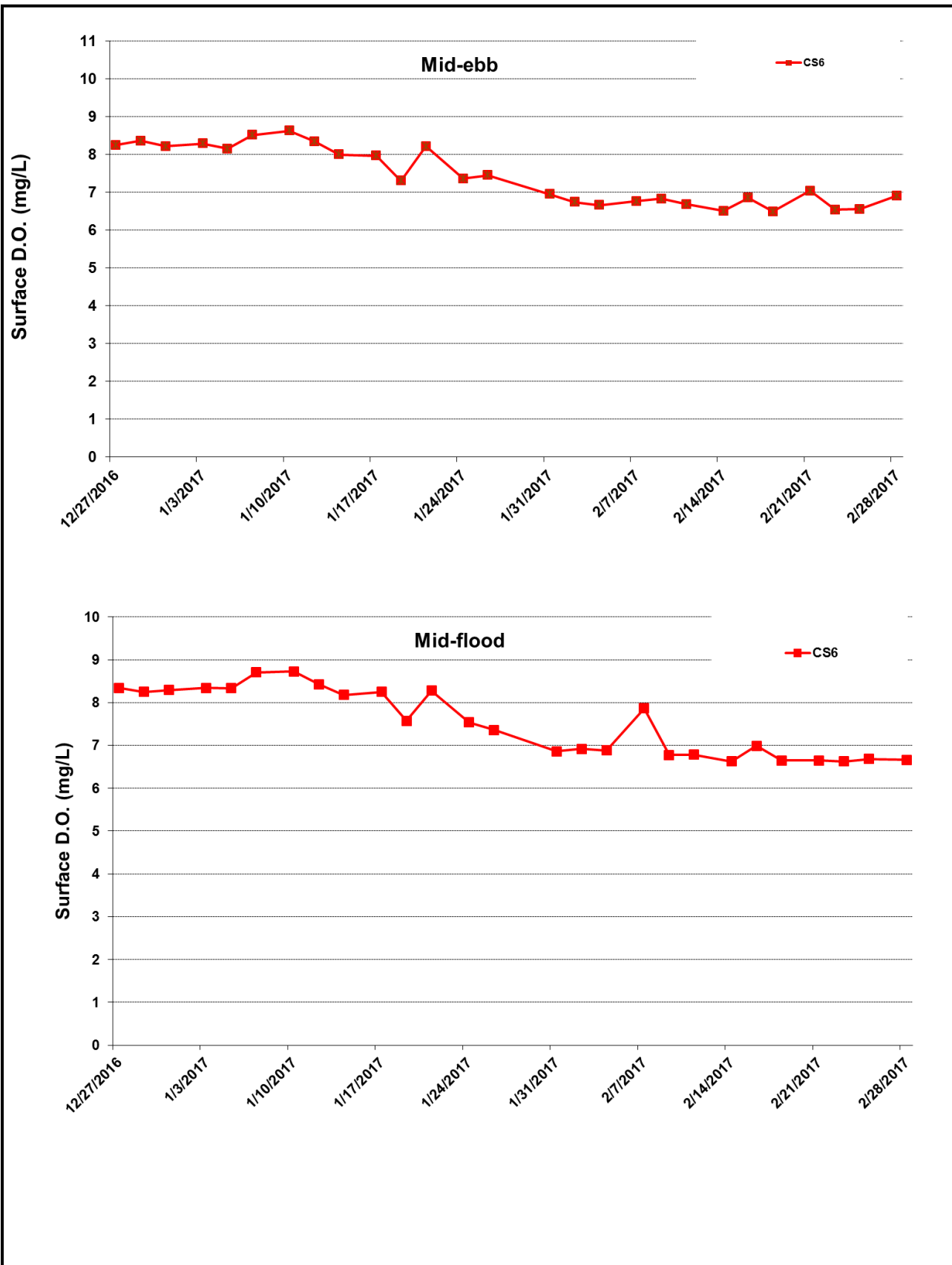


Figure I2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

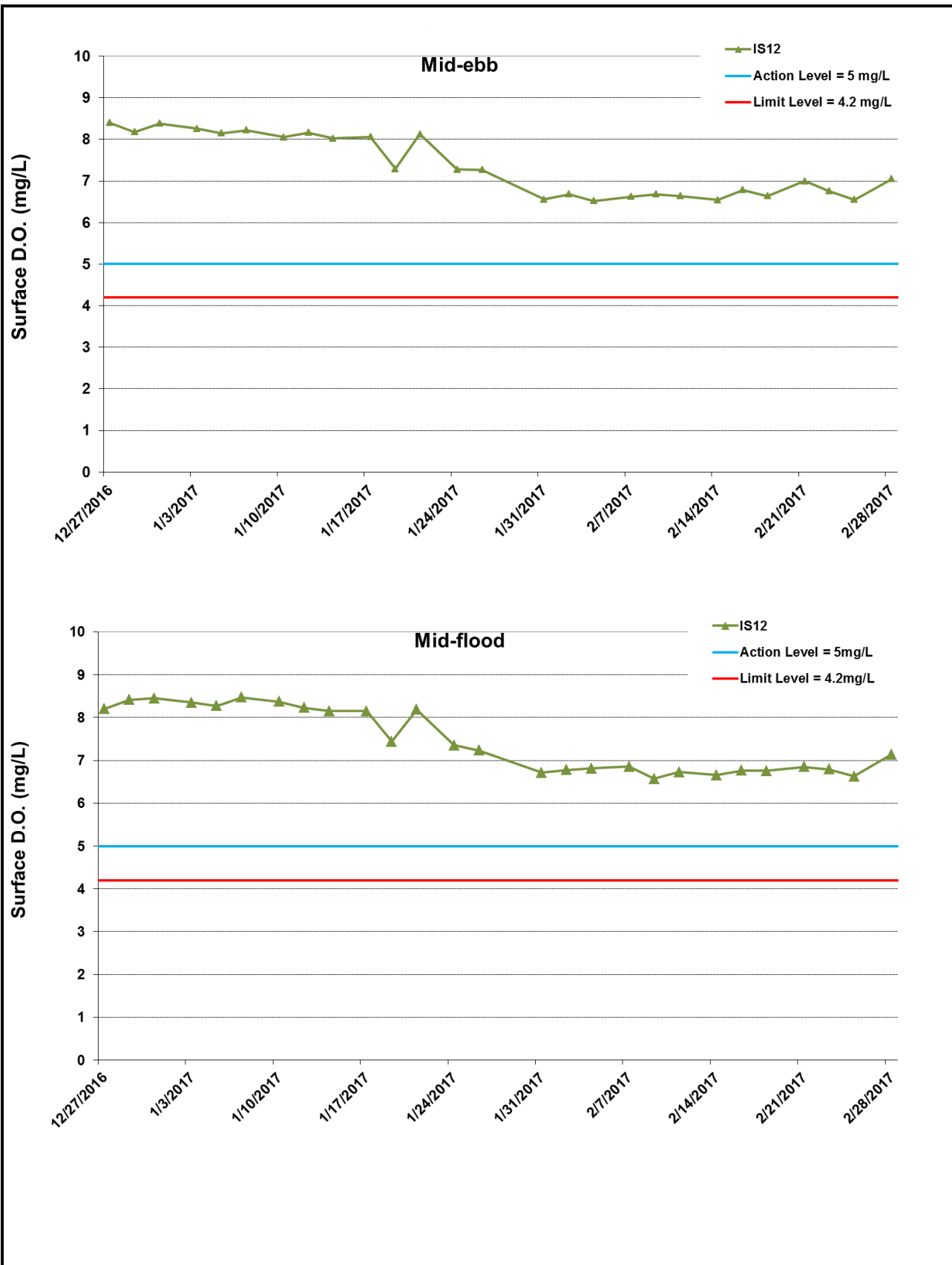


Figure I3 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

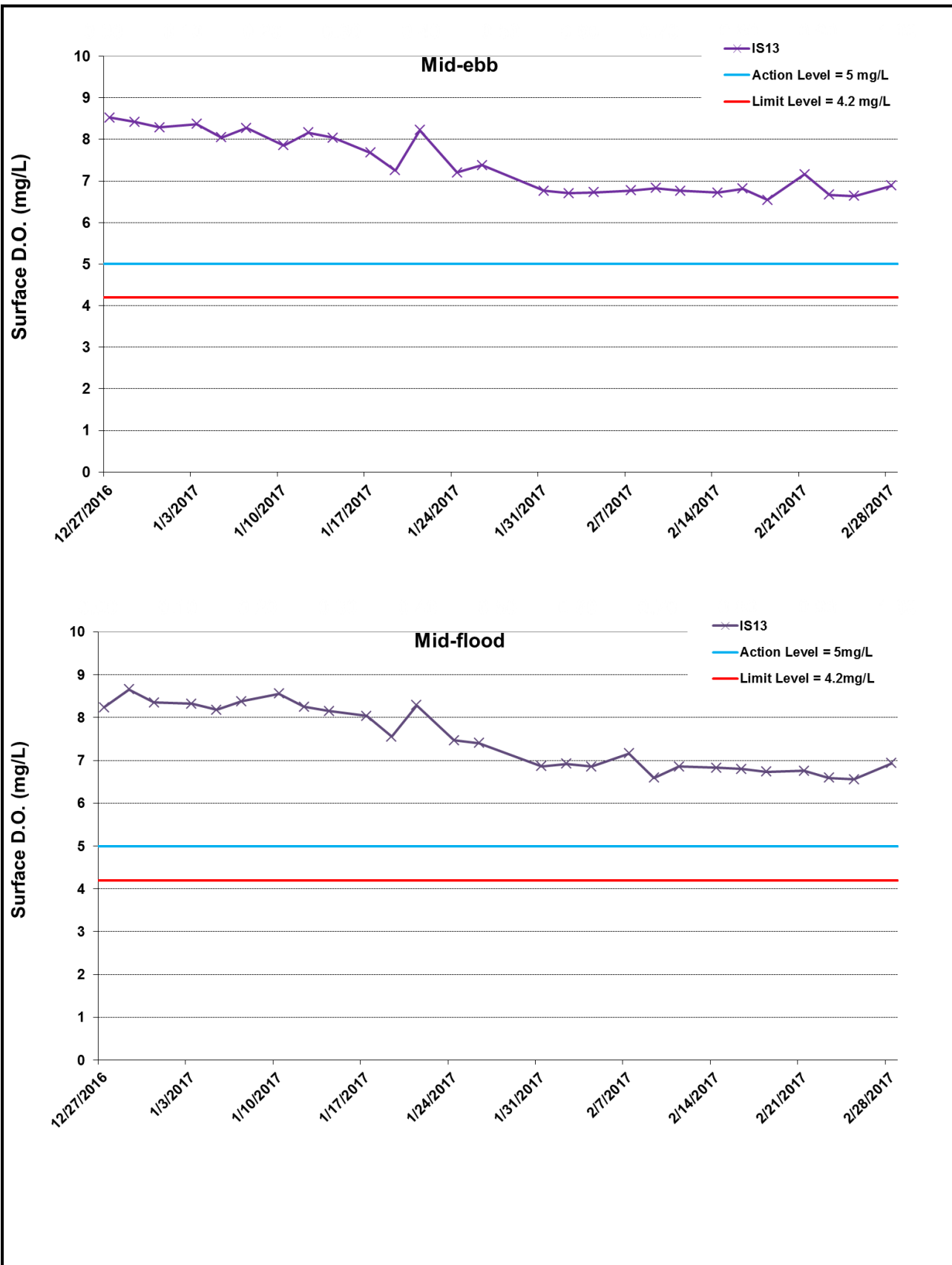


Figure I4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



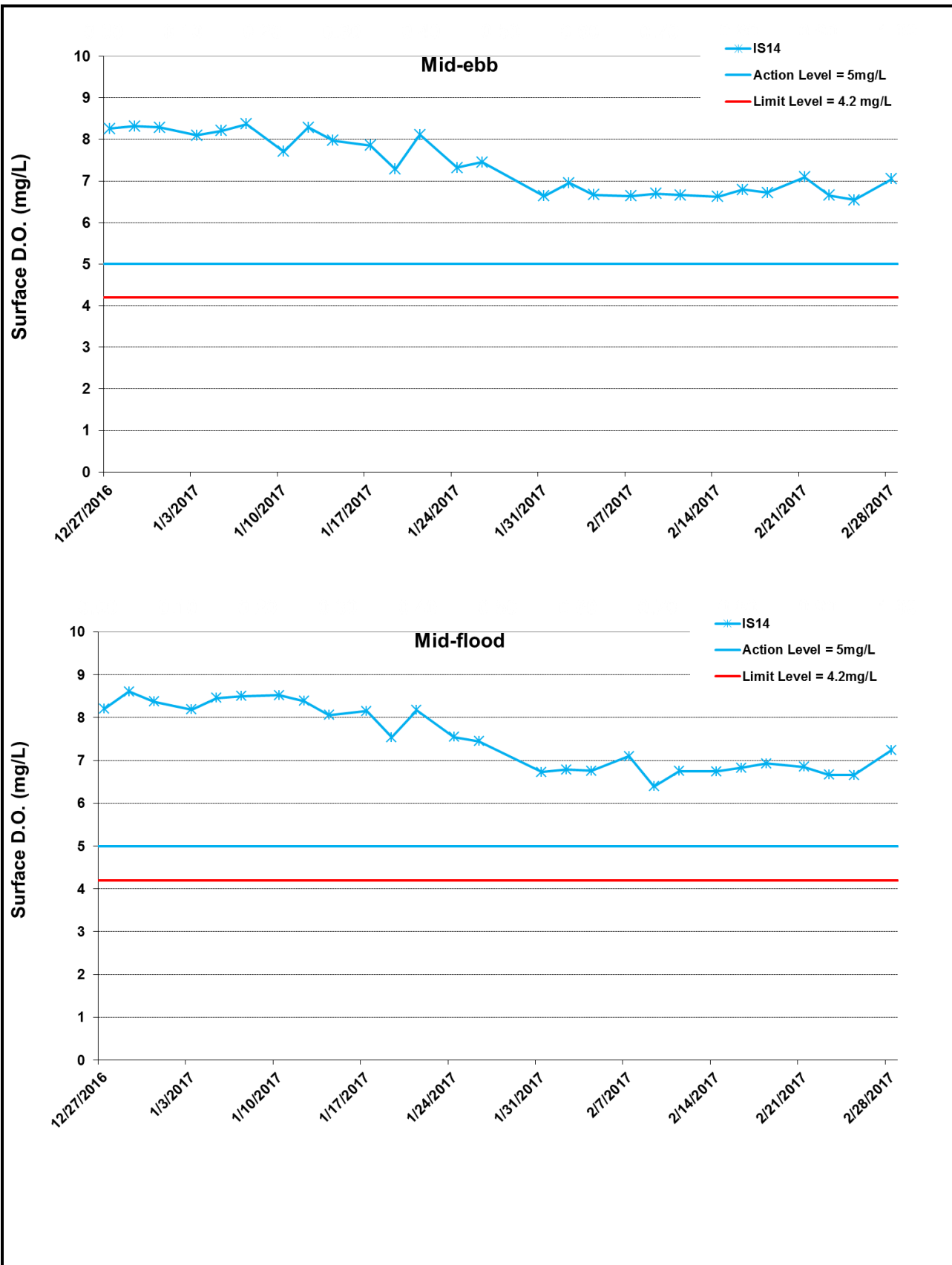


Figure I5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

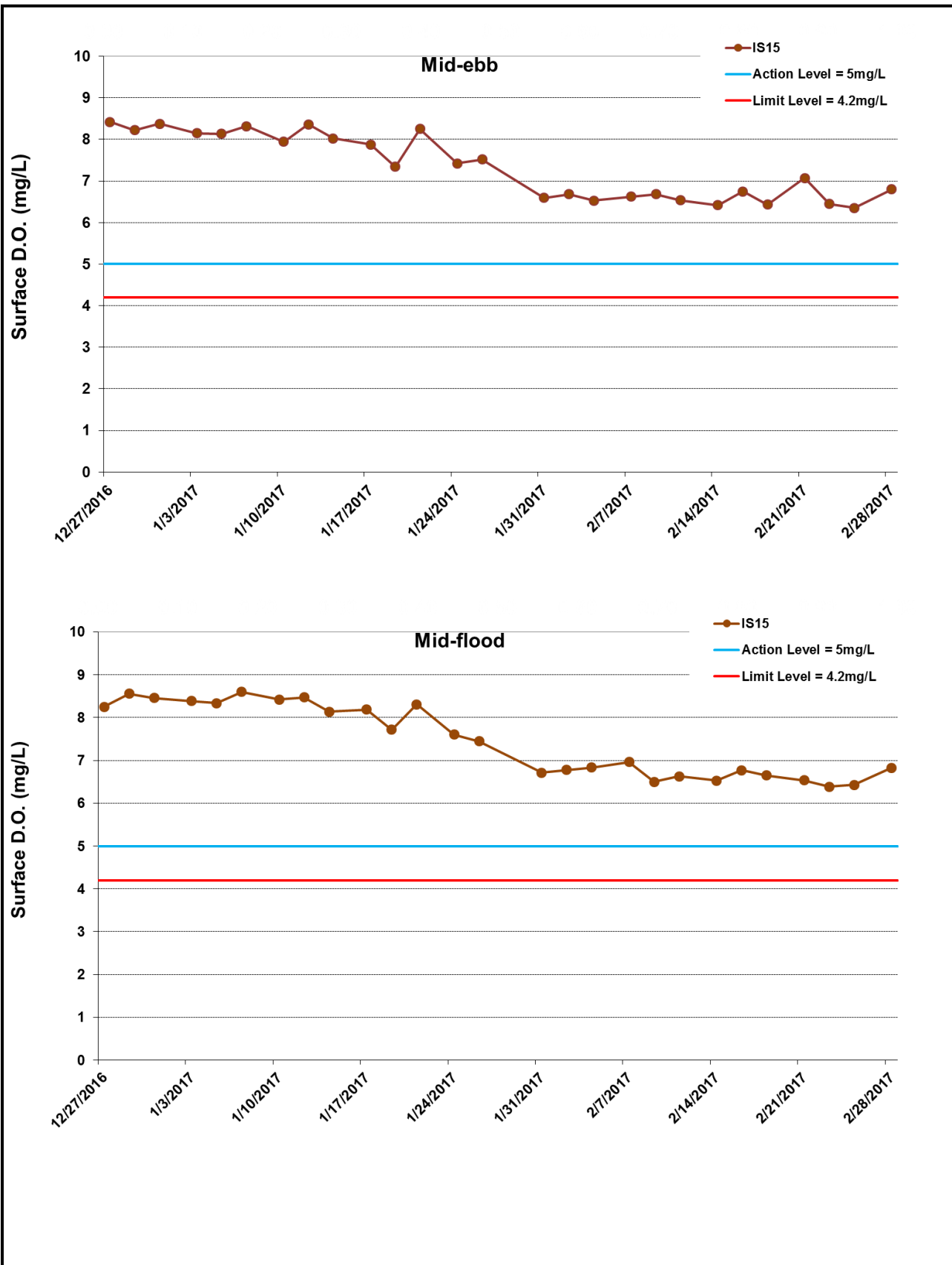


Figure I6 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

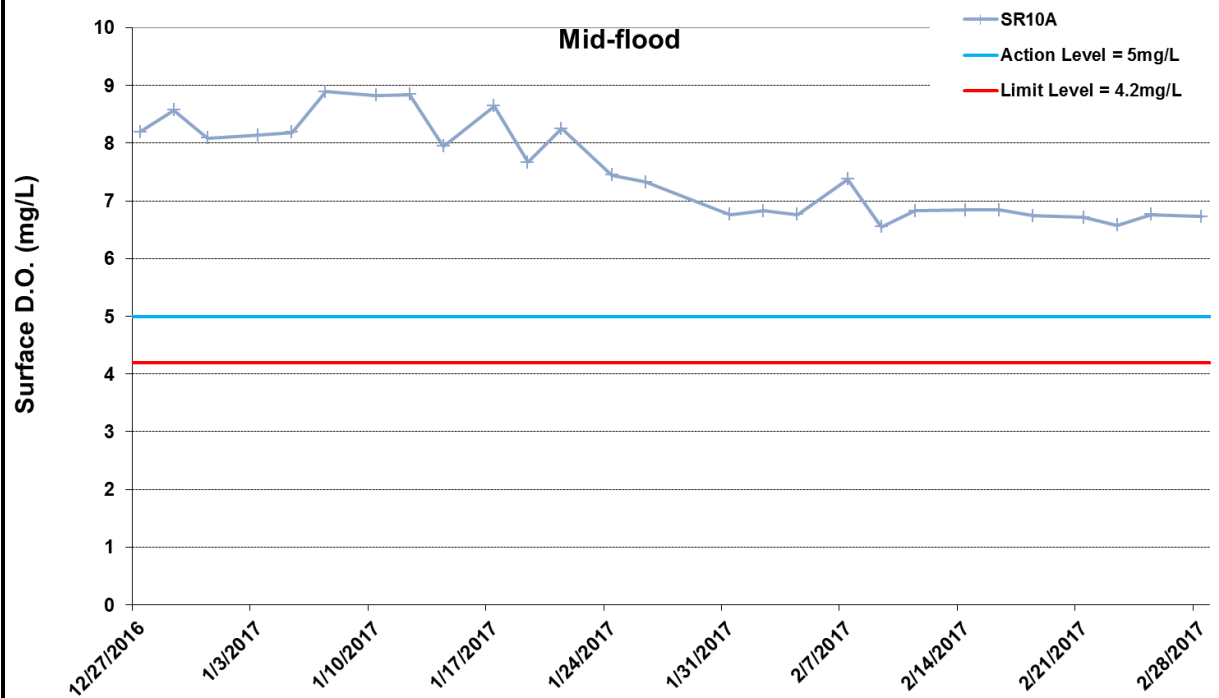
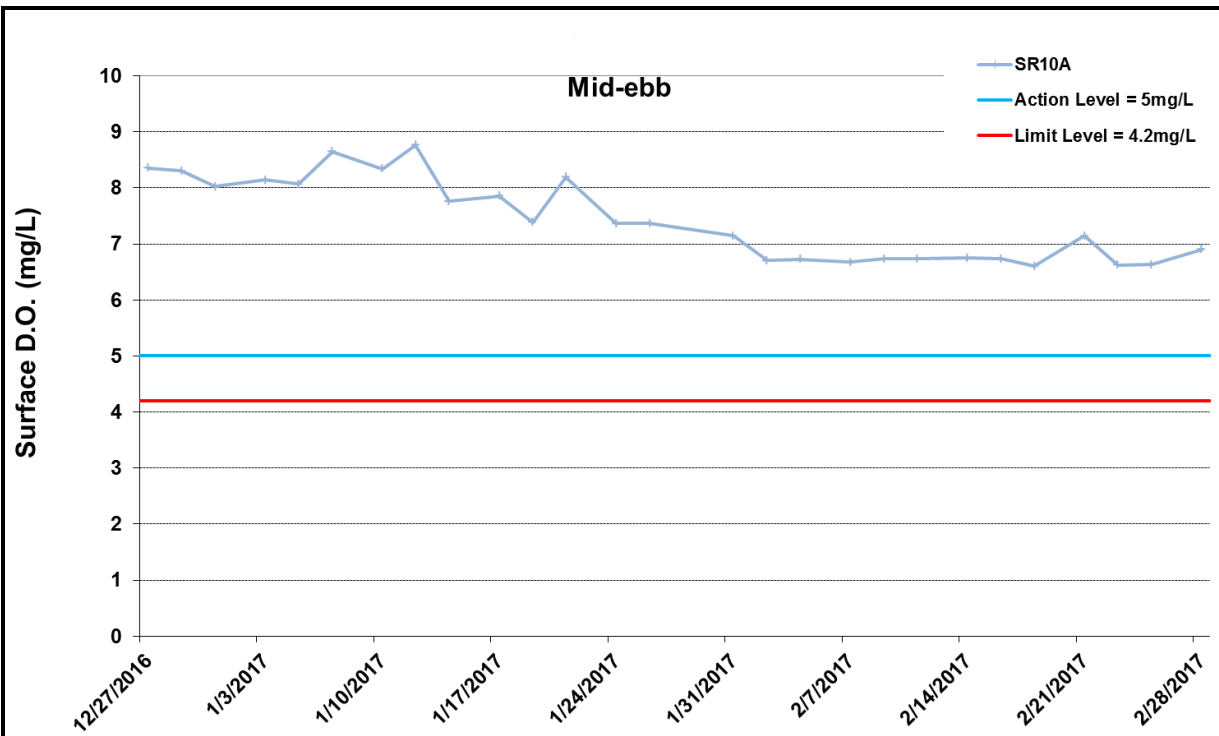


Figure I7 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

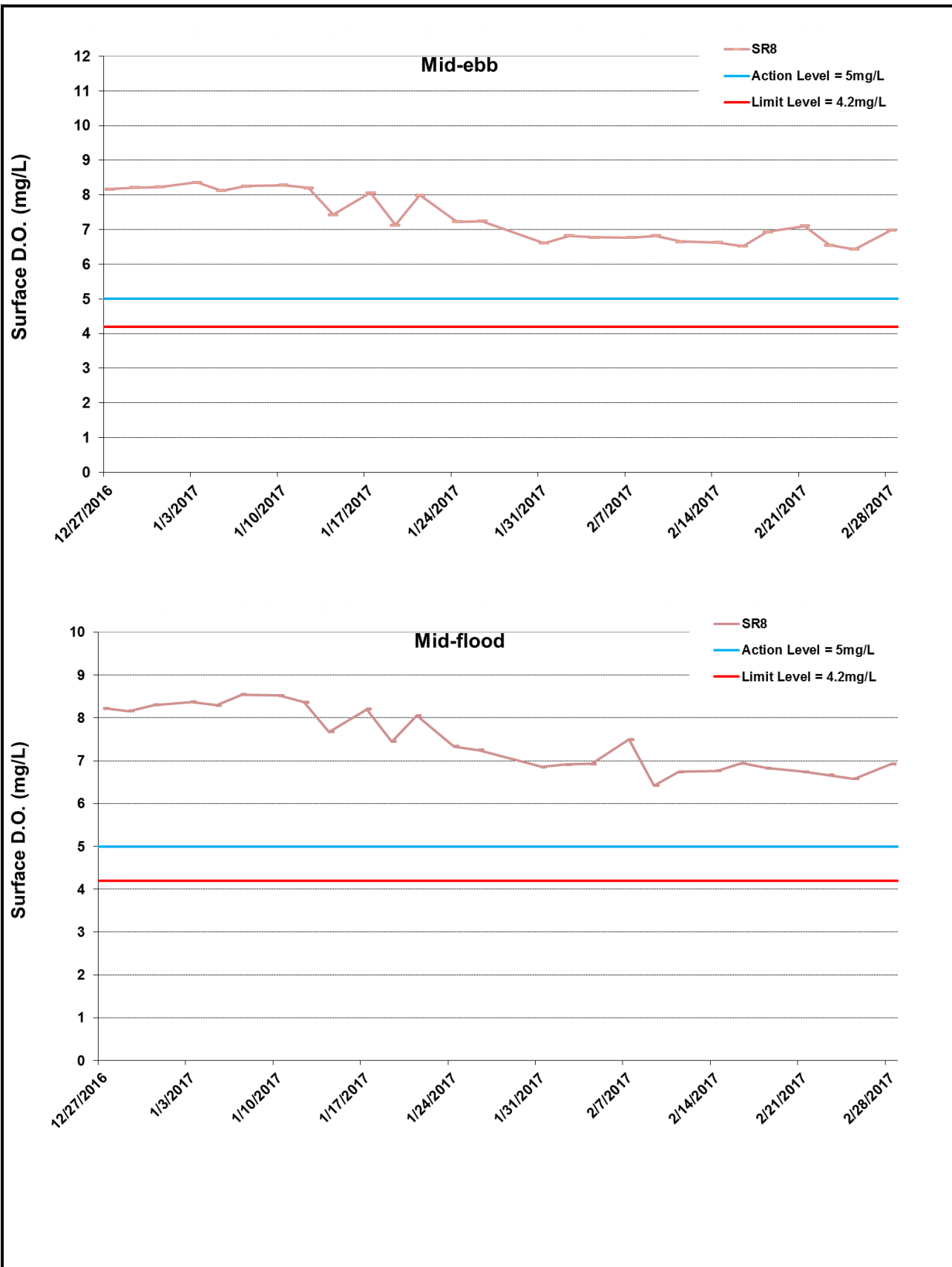


Figure I8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

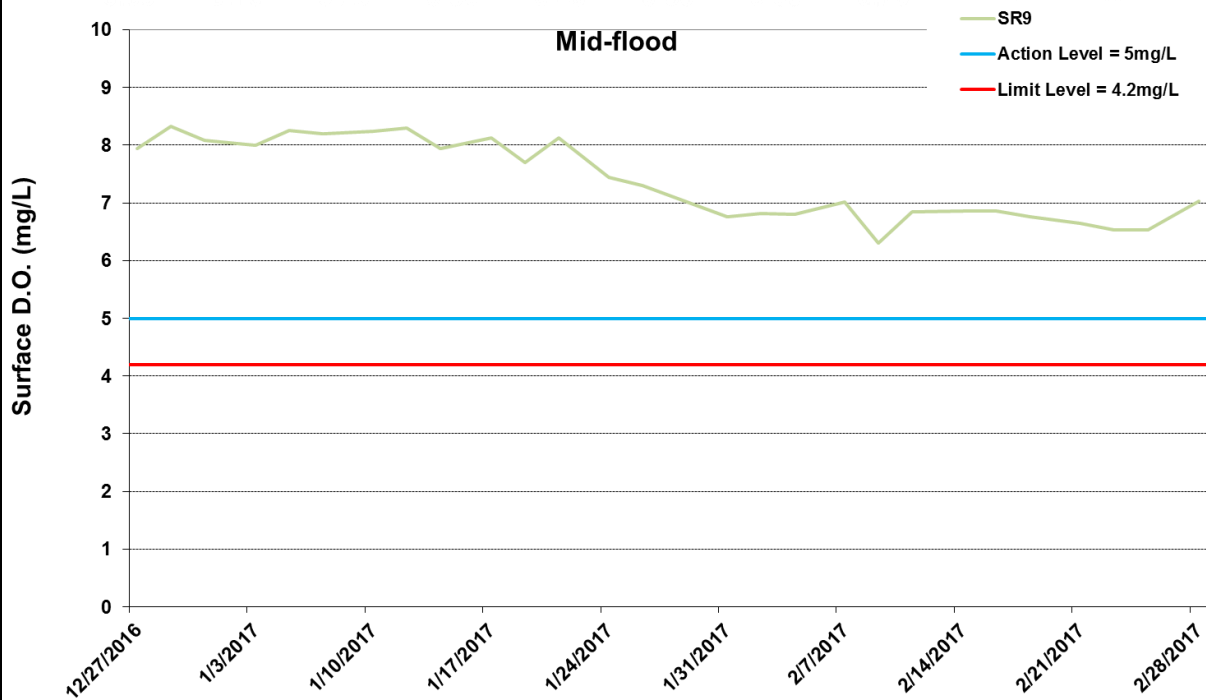
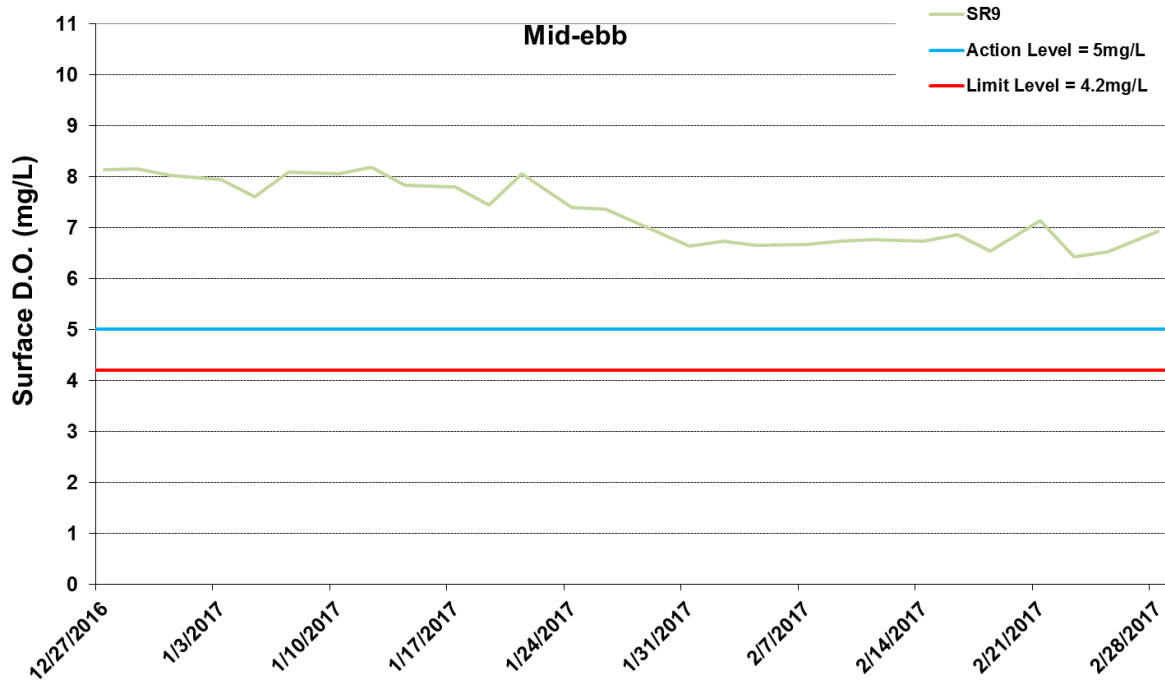
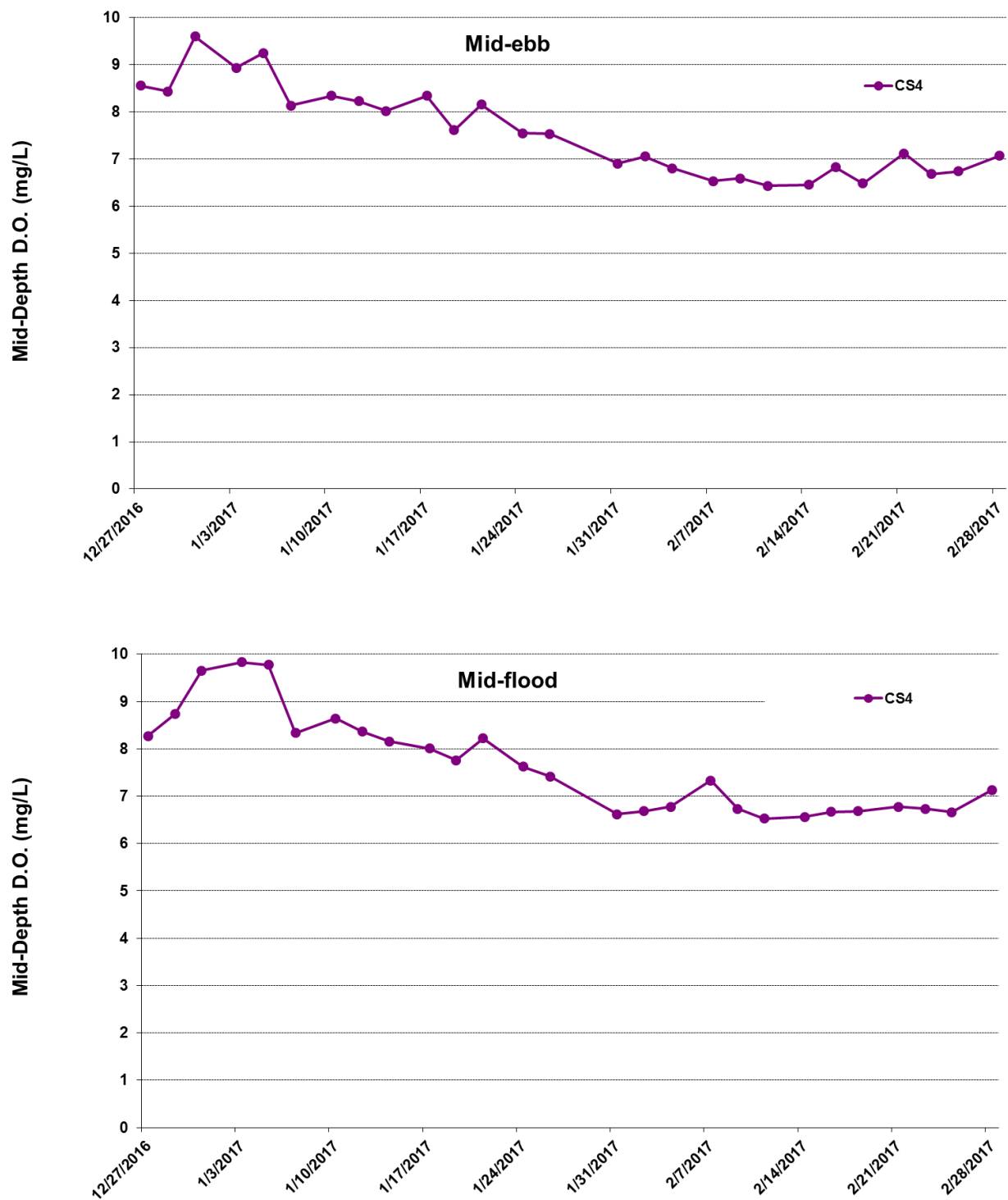


Figure I9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 27 December 2016 and 28 February 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.

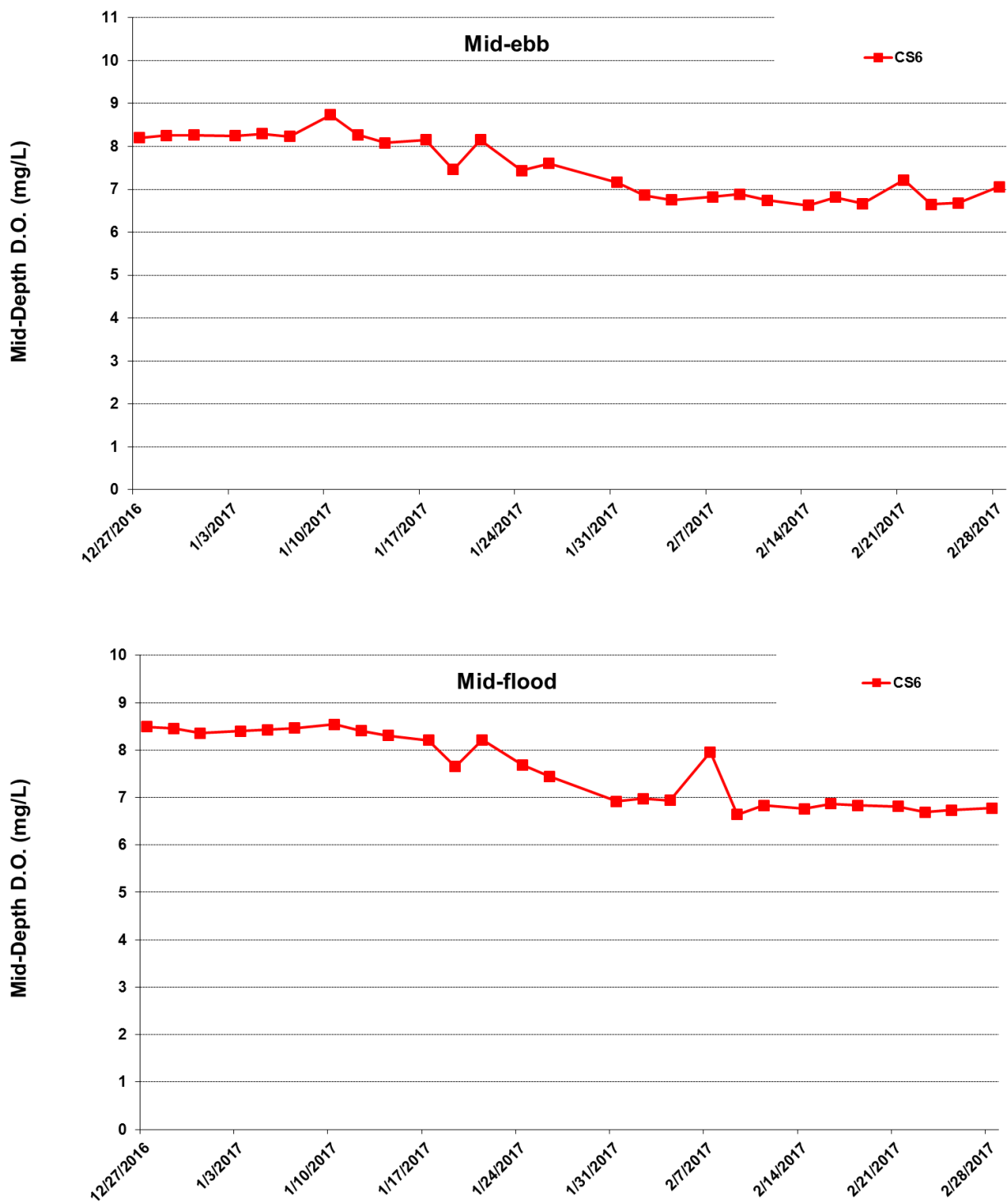




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I10 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.

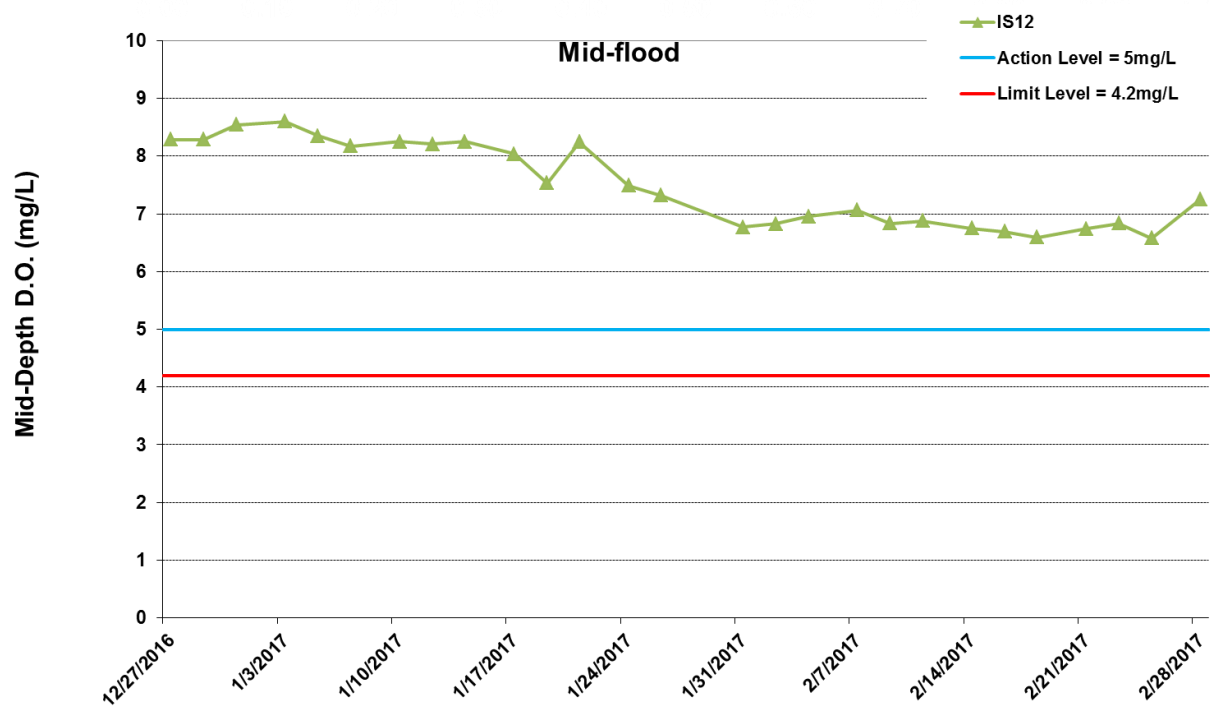
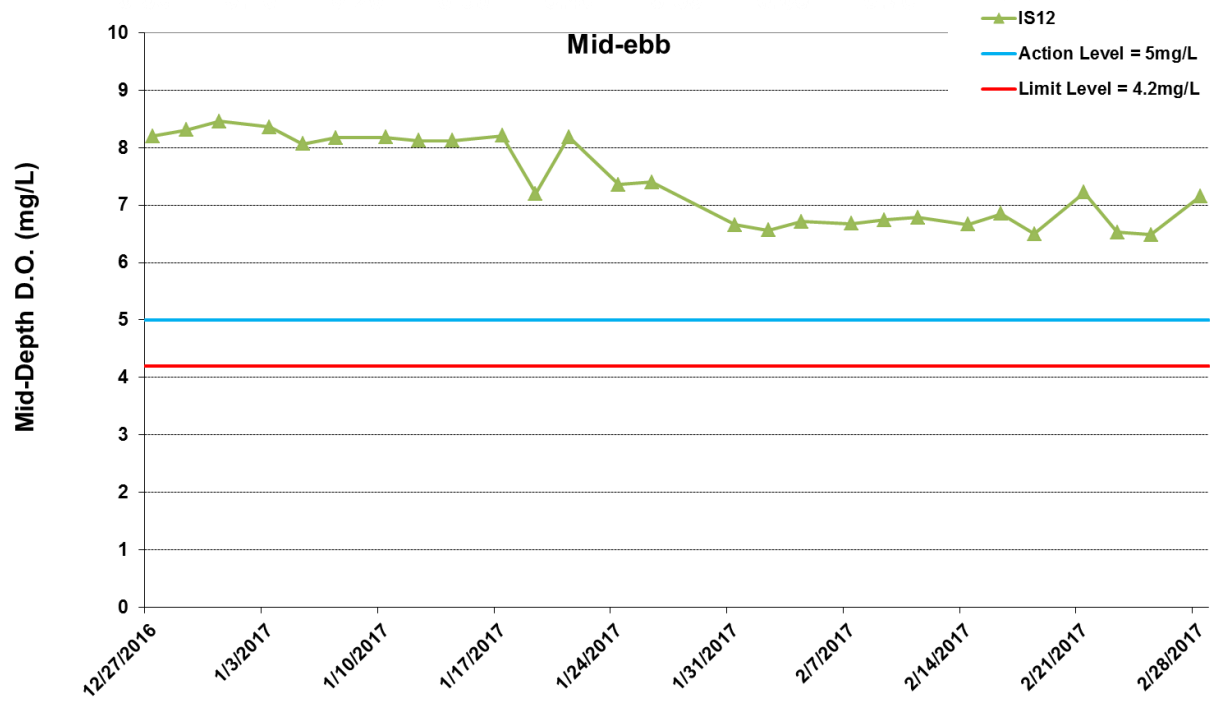




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

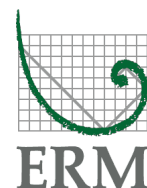
Figure I11 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.

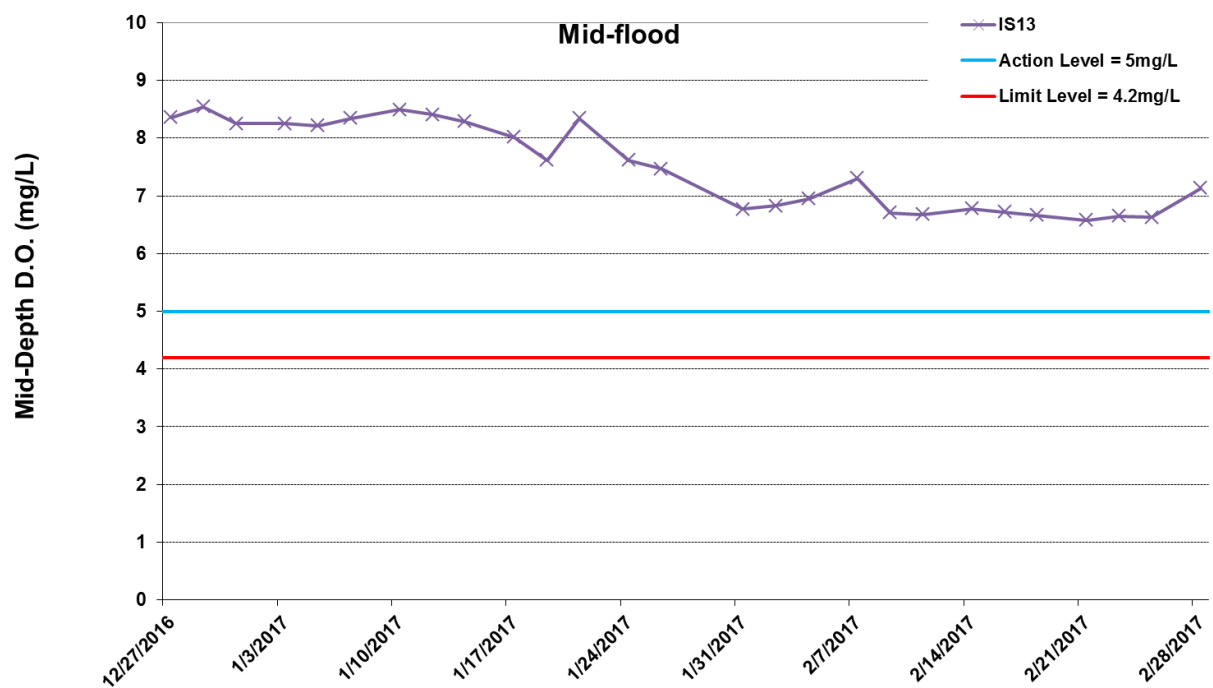
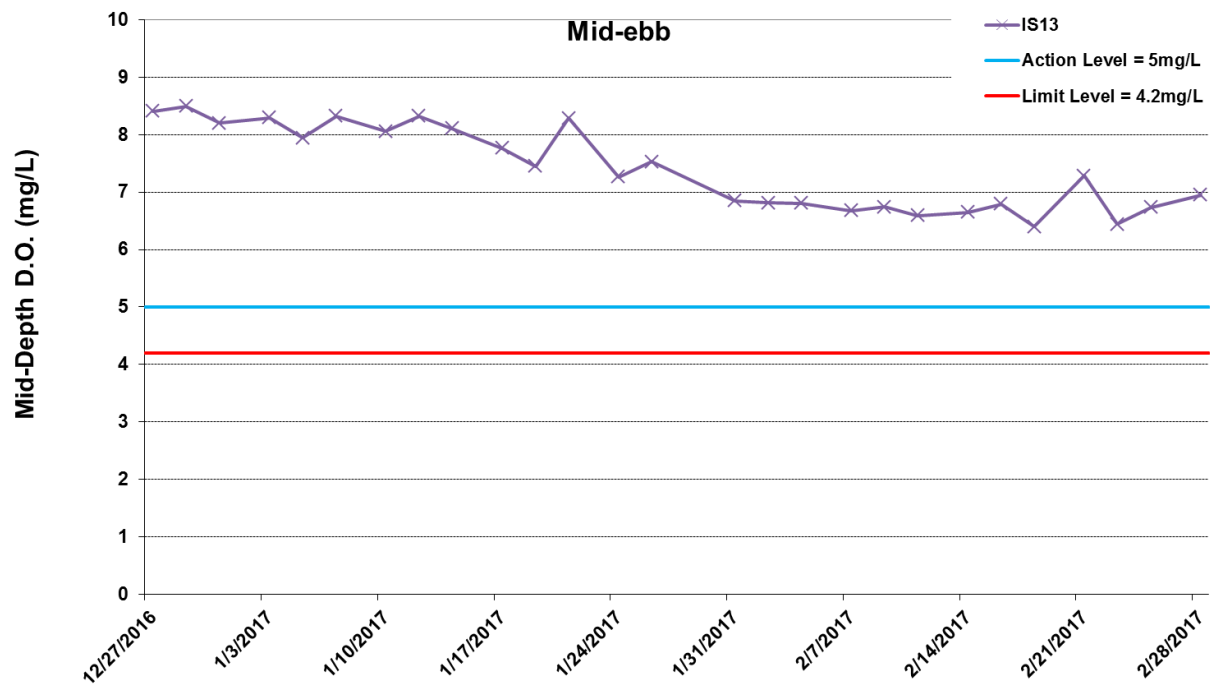




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.

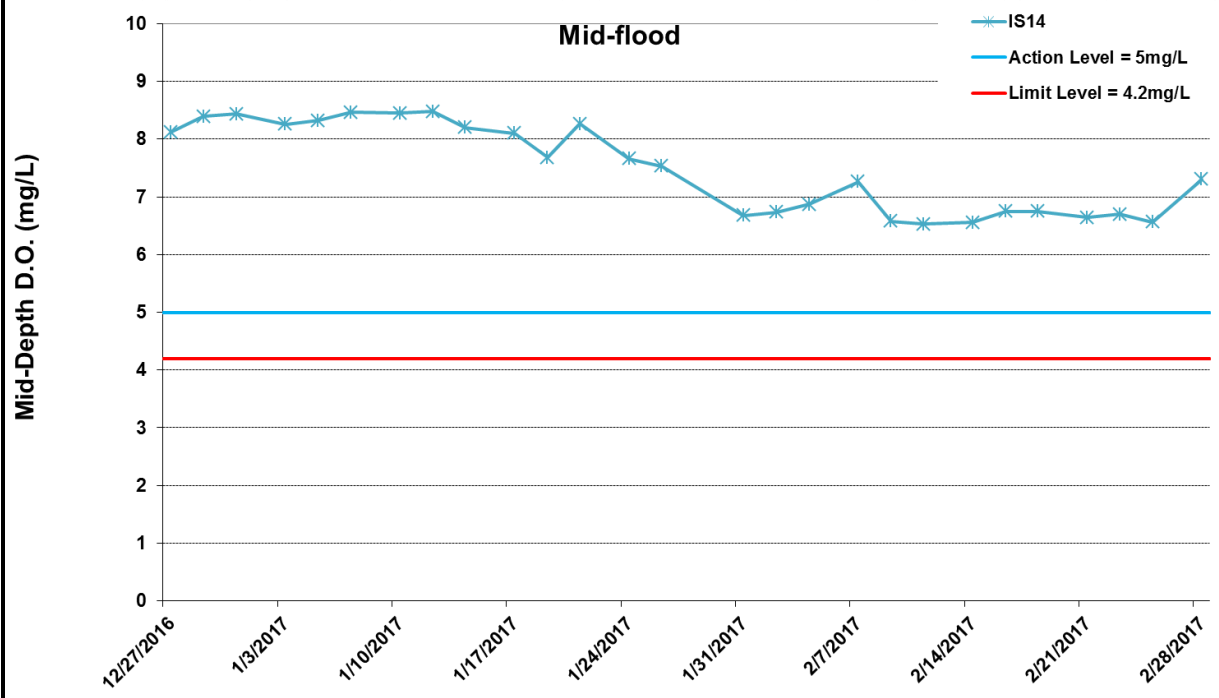
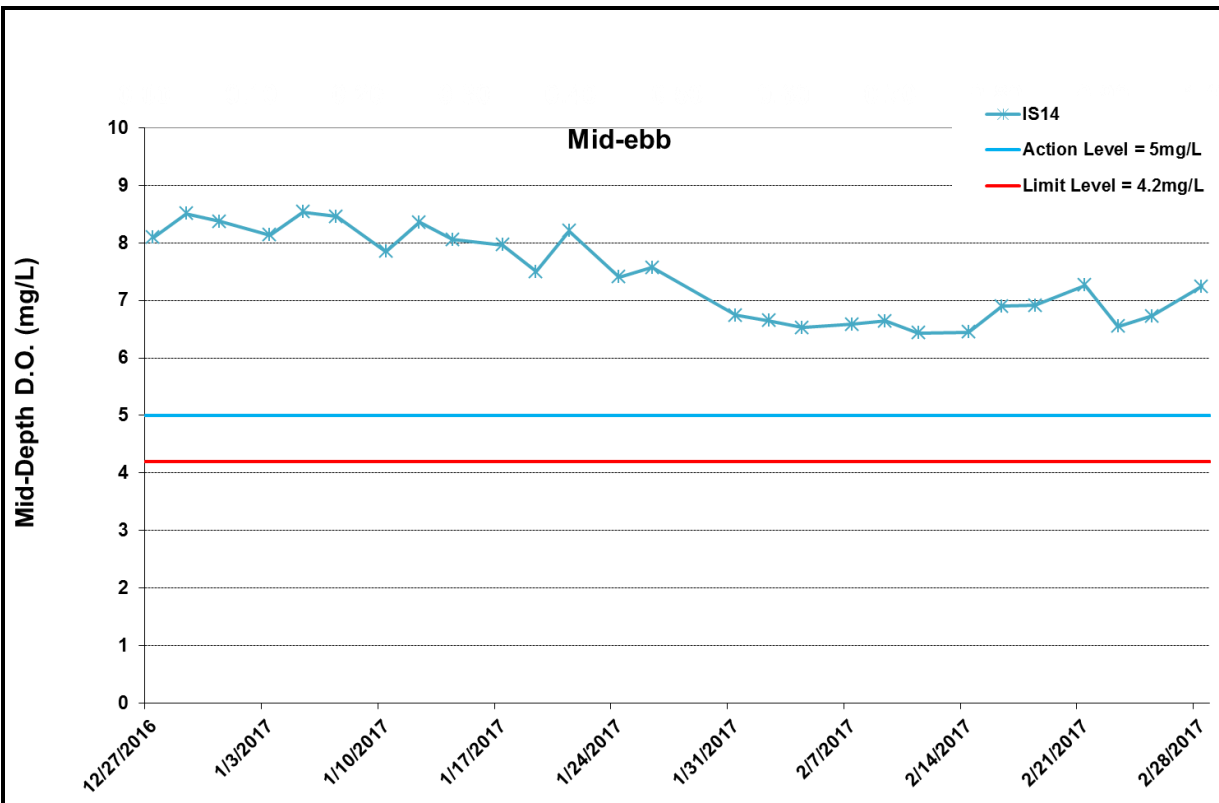




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



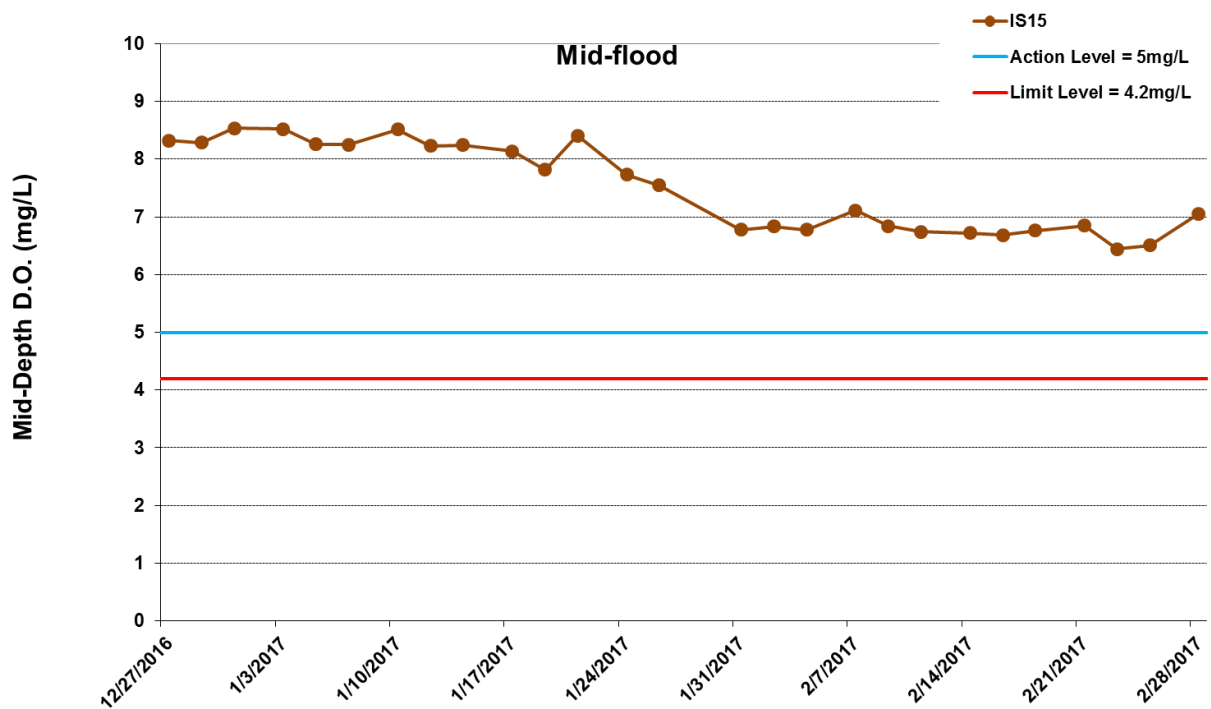
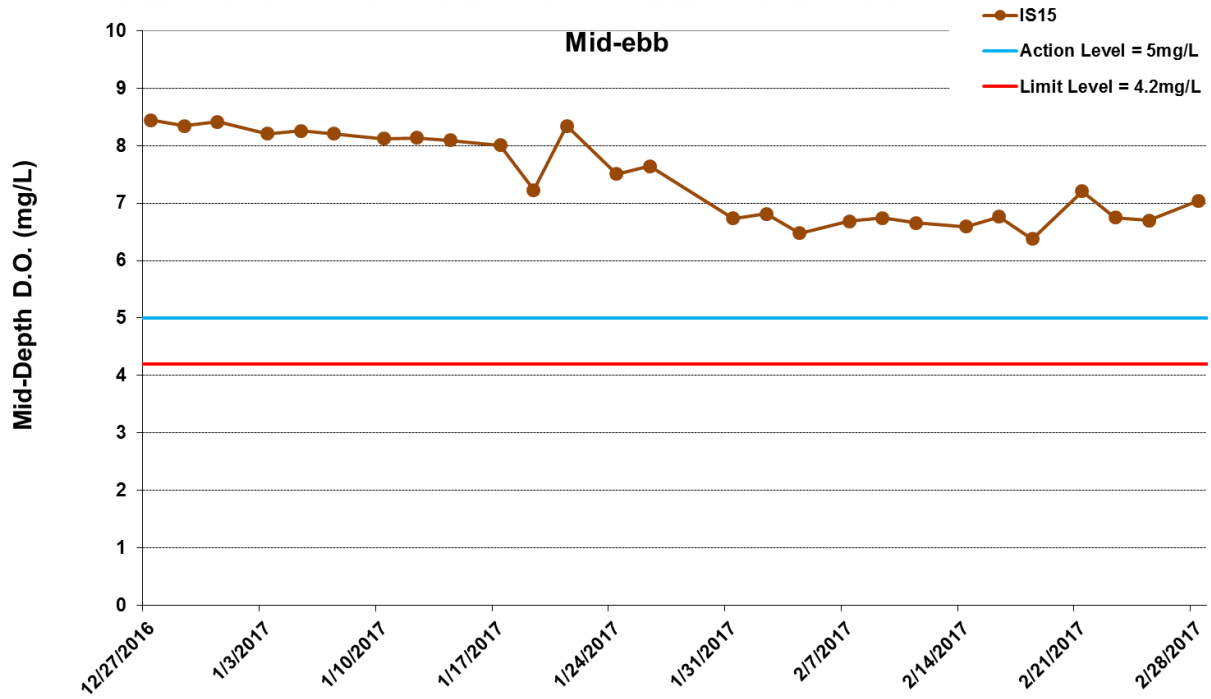


*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



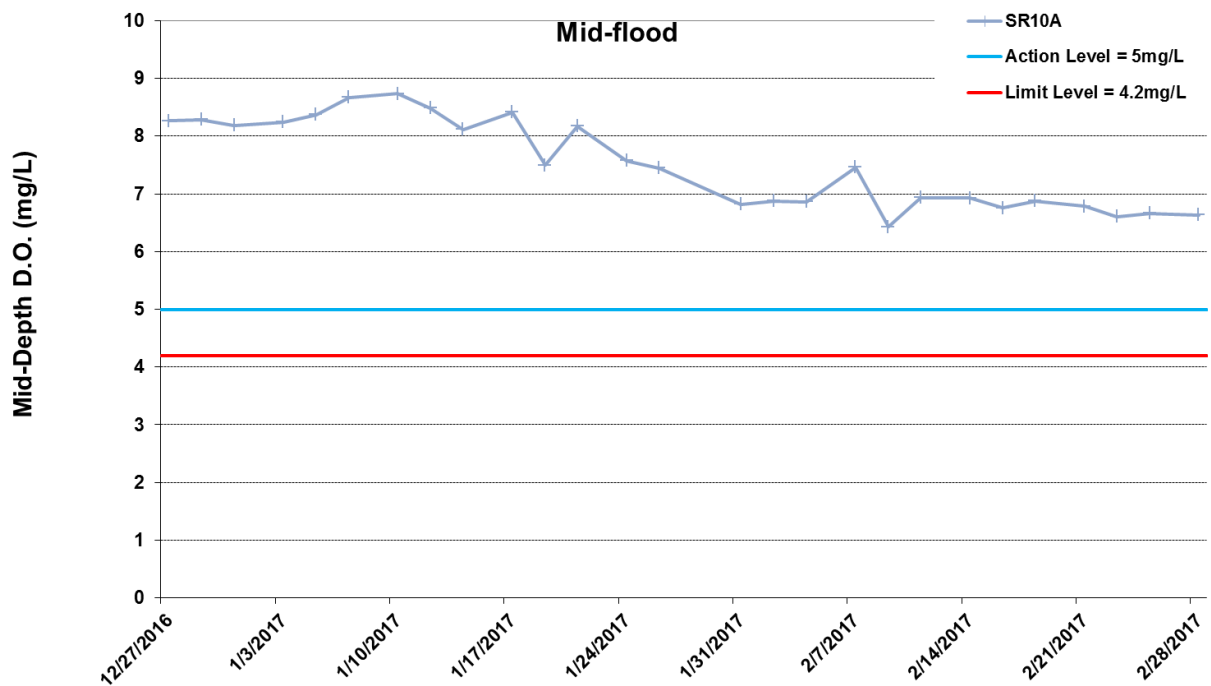
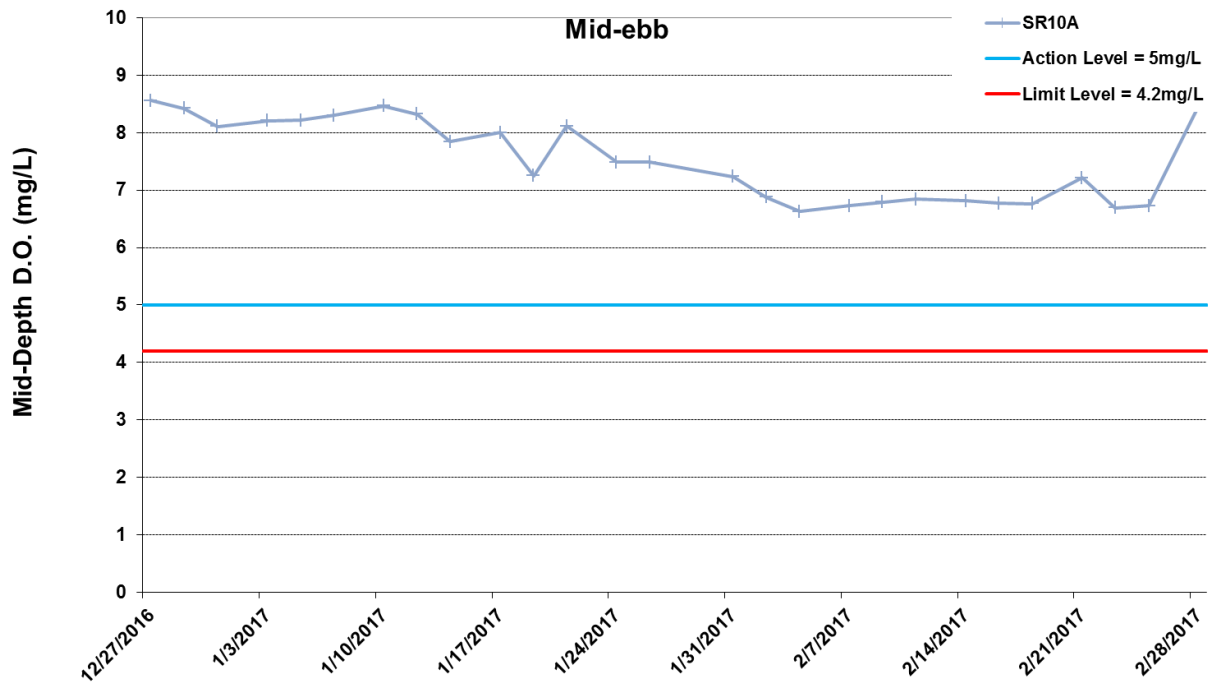
Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls



*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.





*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I16 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 27 December 2016 and 28 February 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



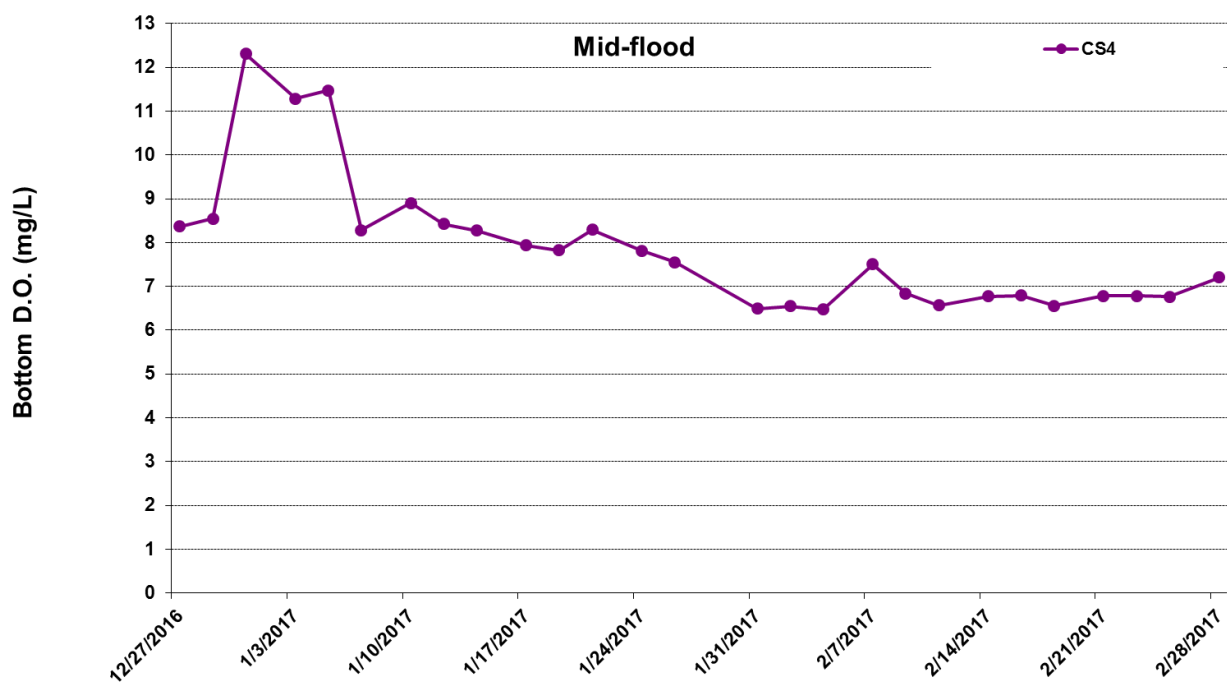
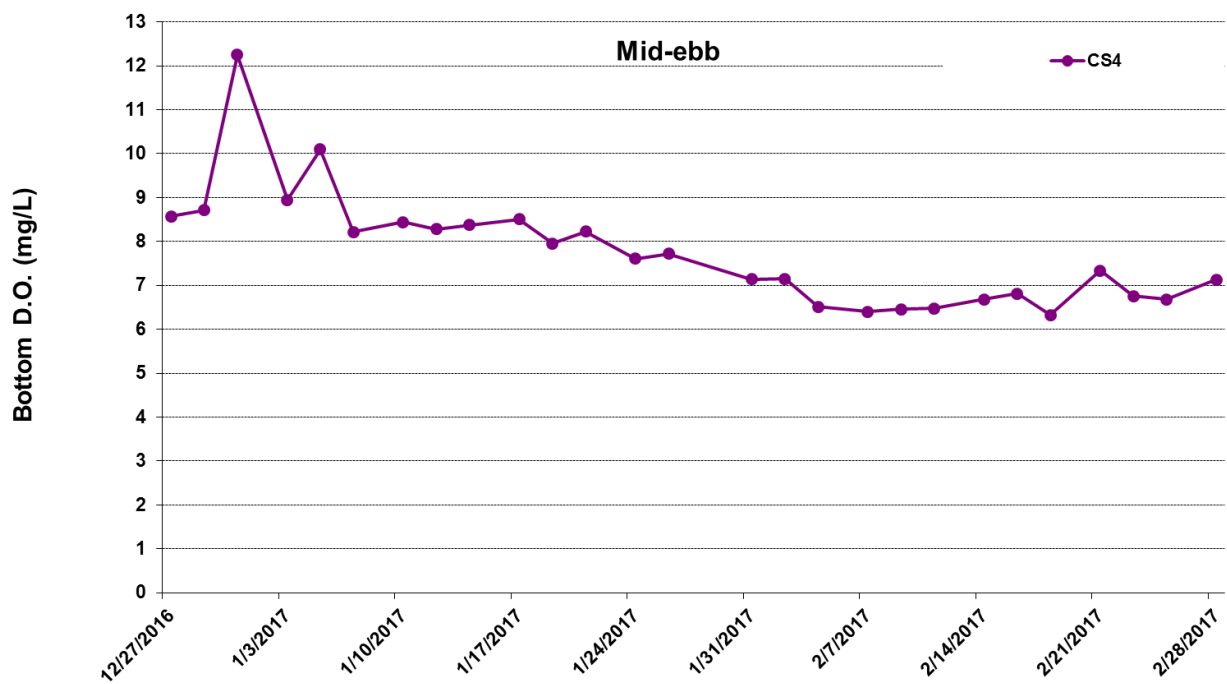


Figure I17 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

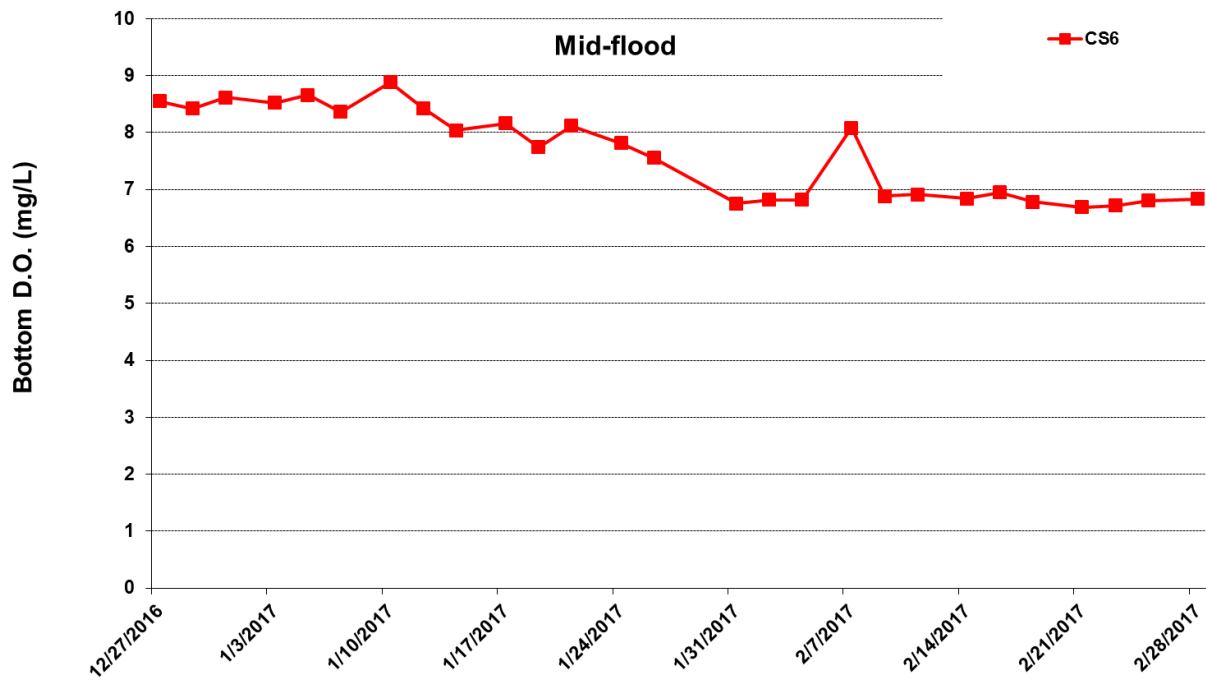
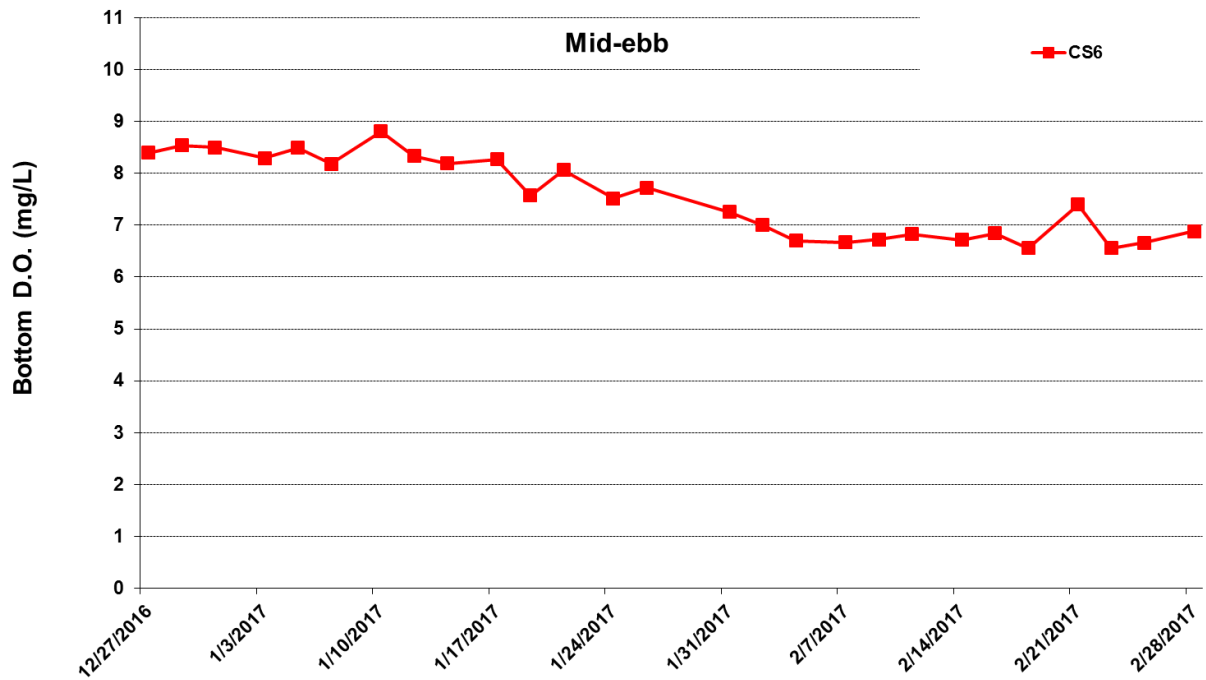


Figure I18 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



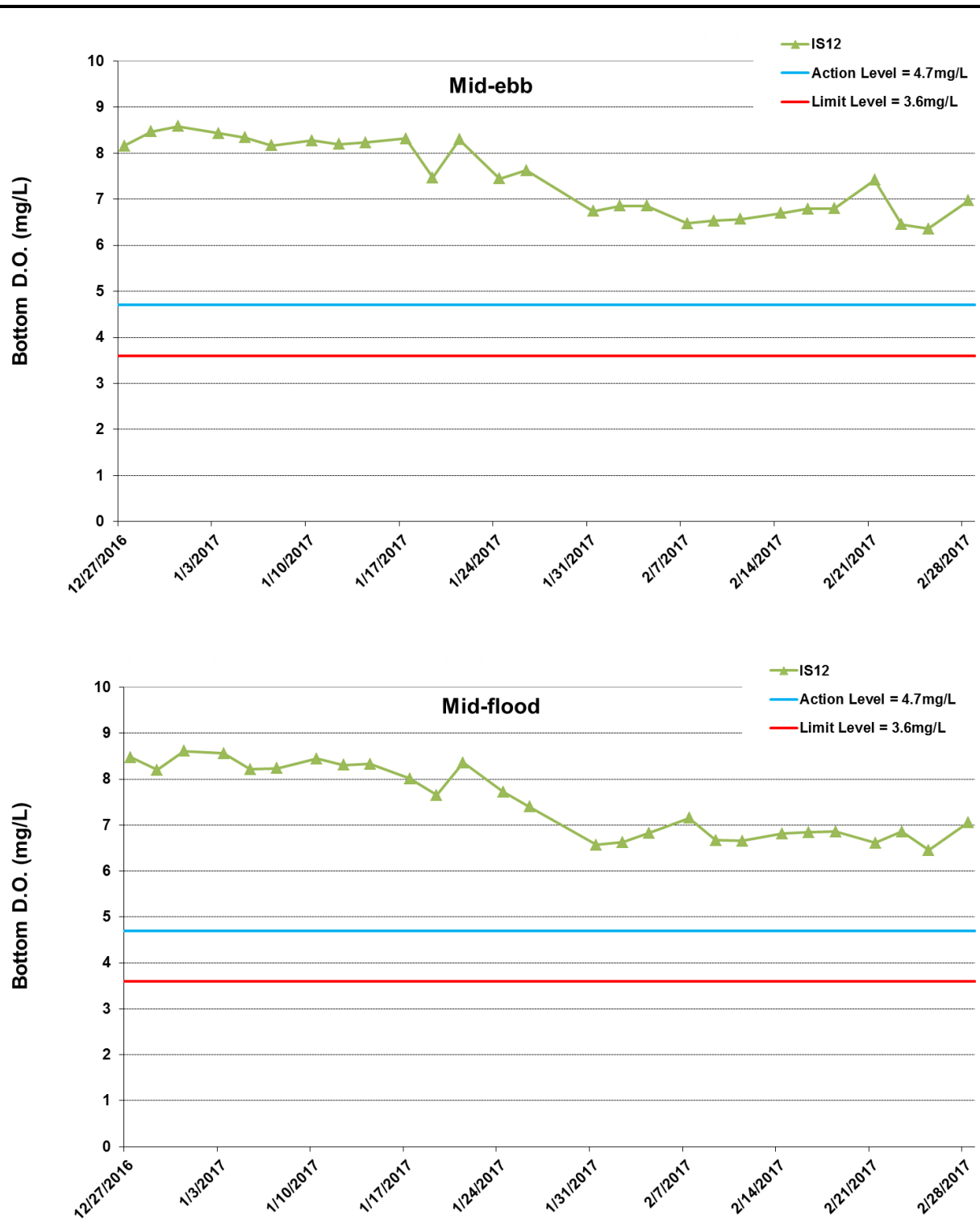


Figure I19 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

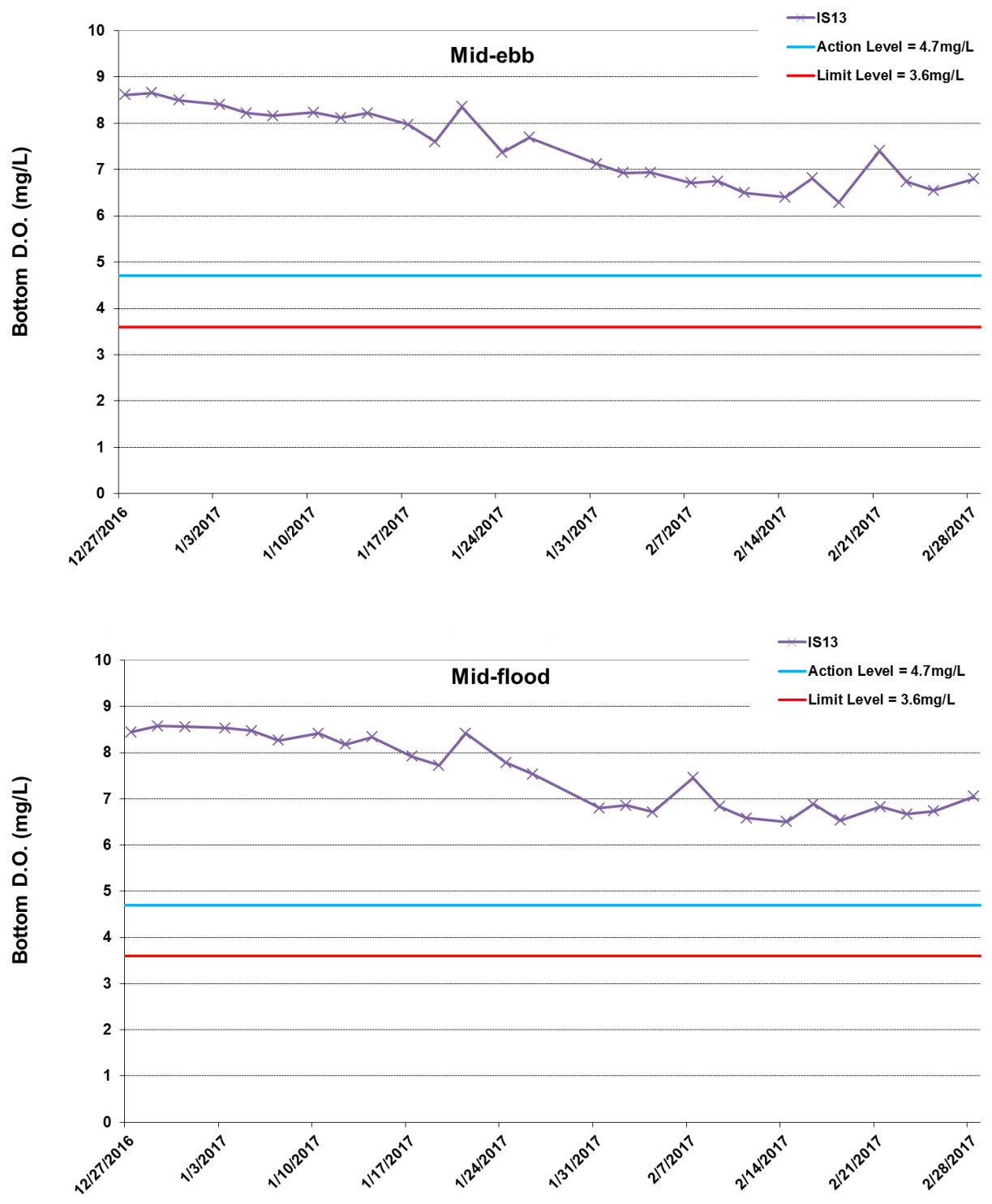


Figure I20 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

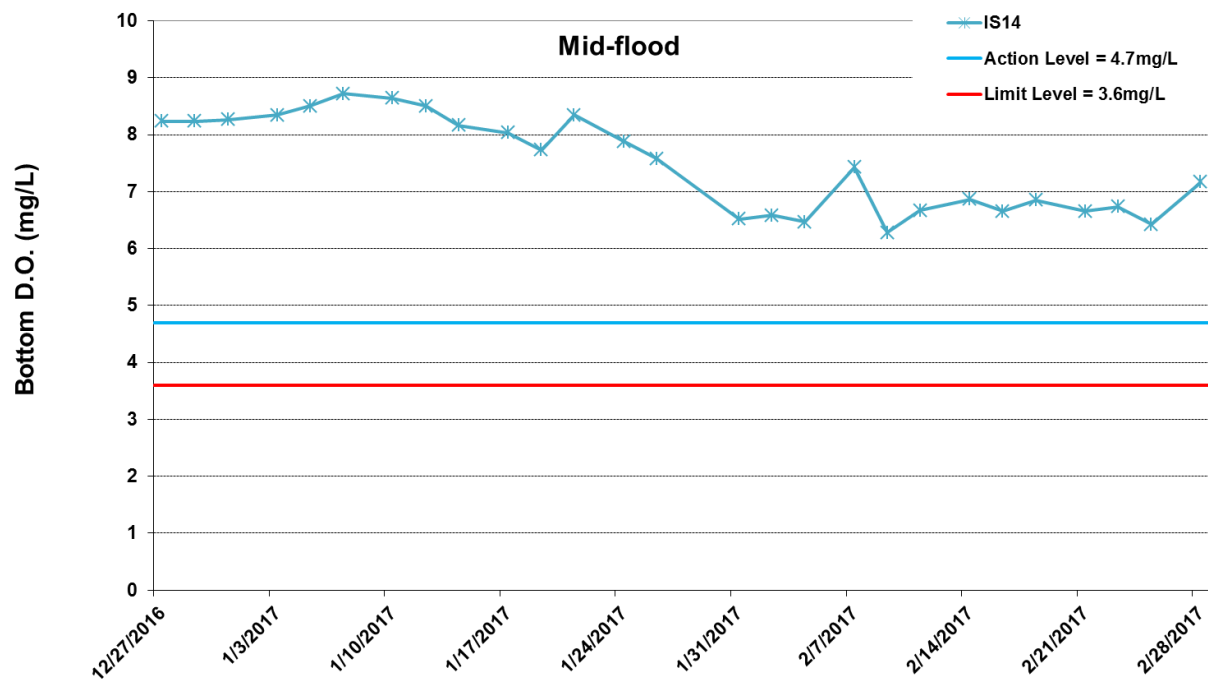
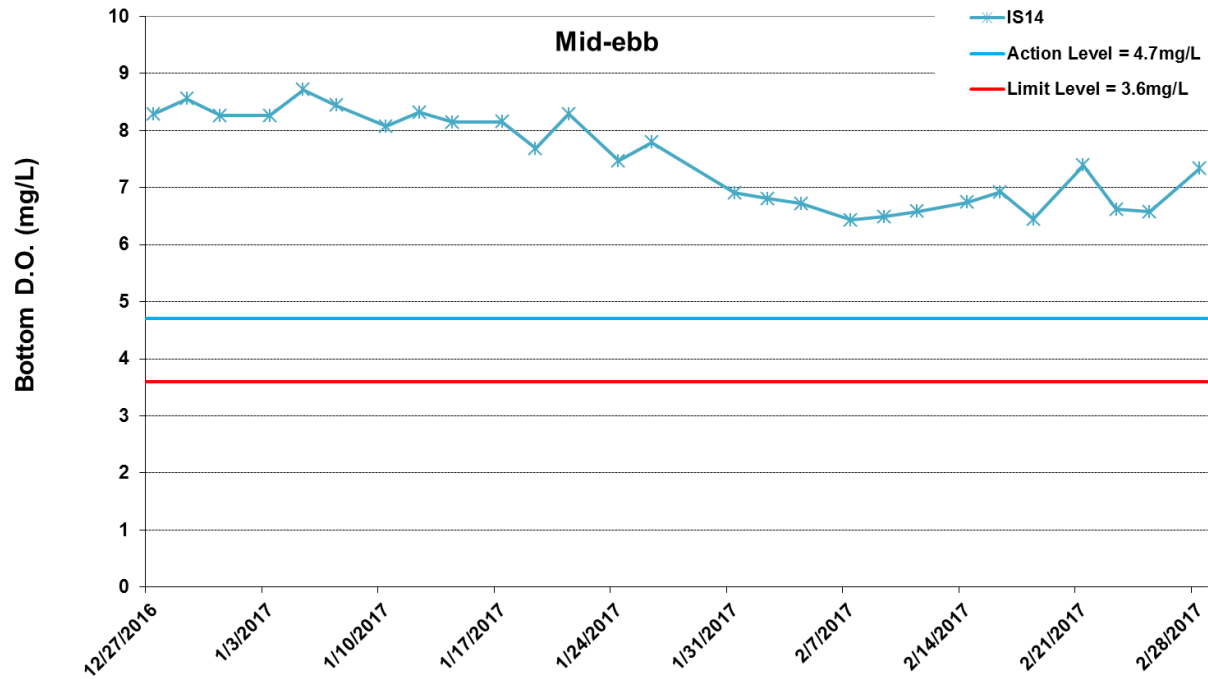


Figure I21 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



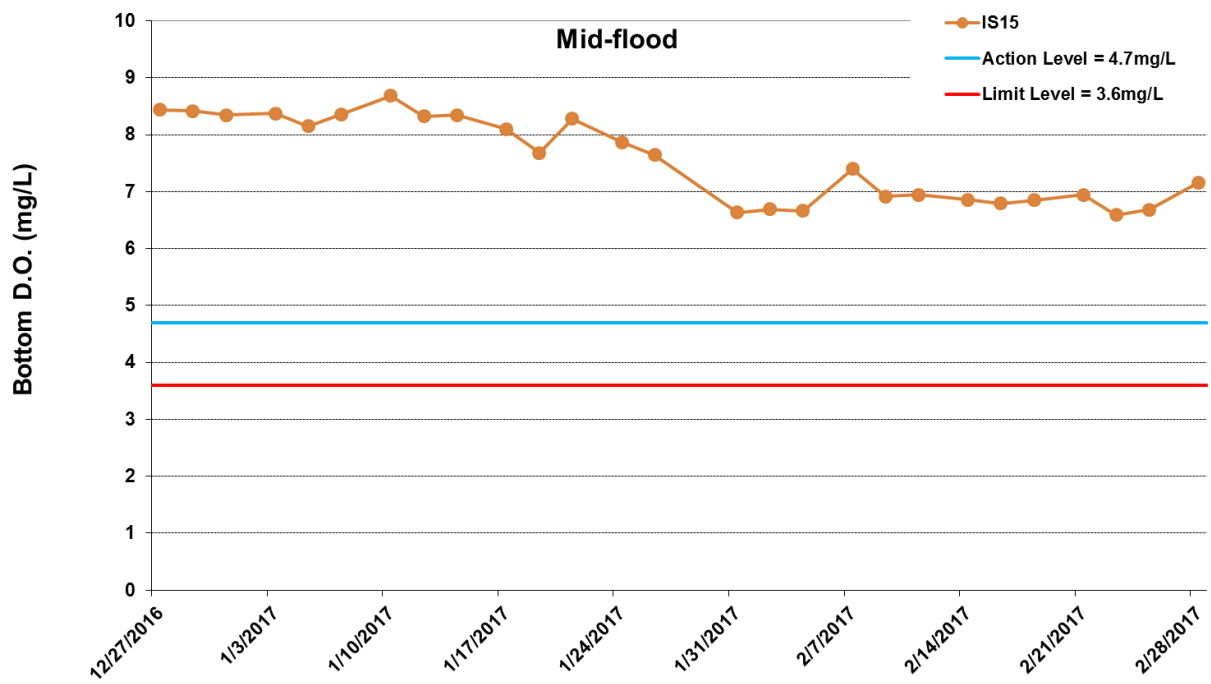
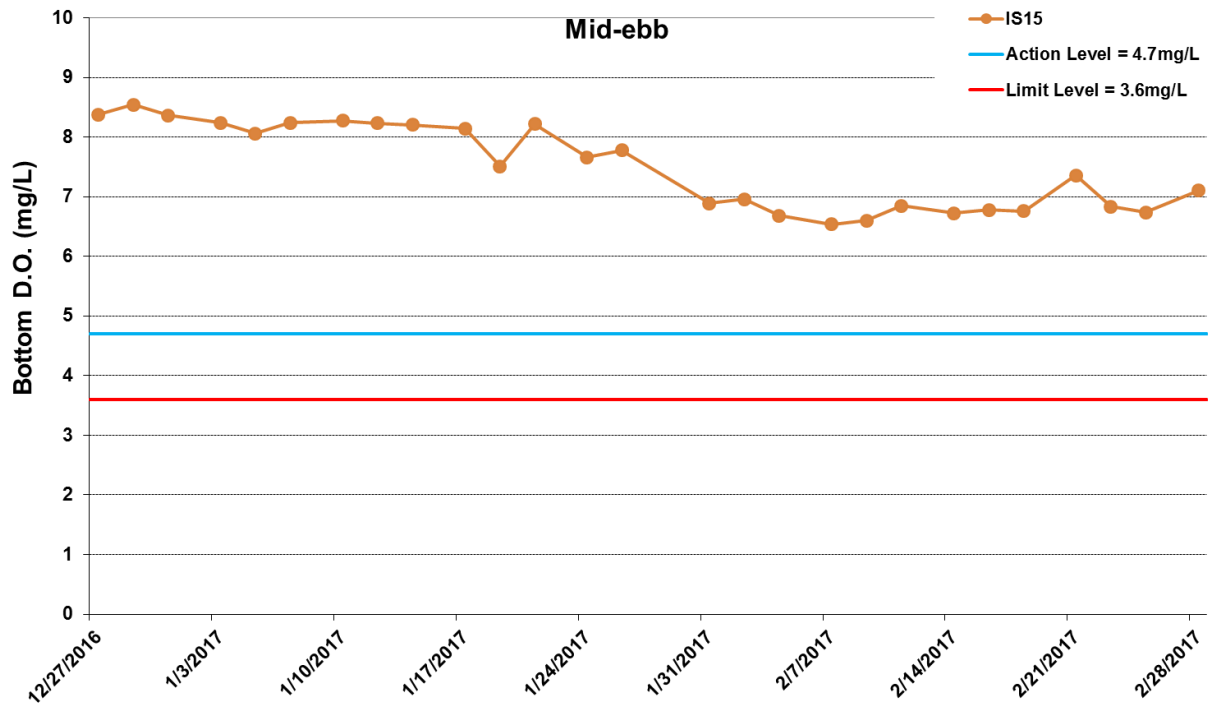


Figure I22 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



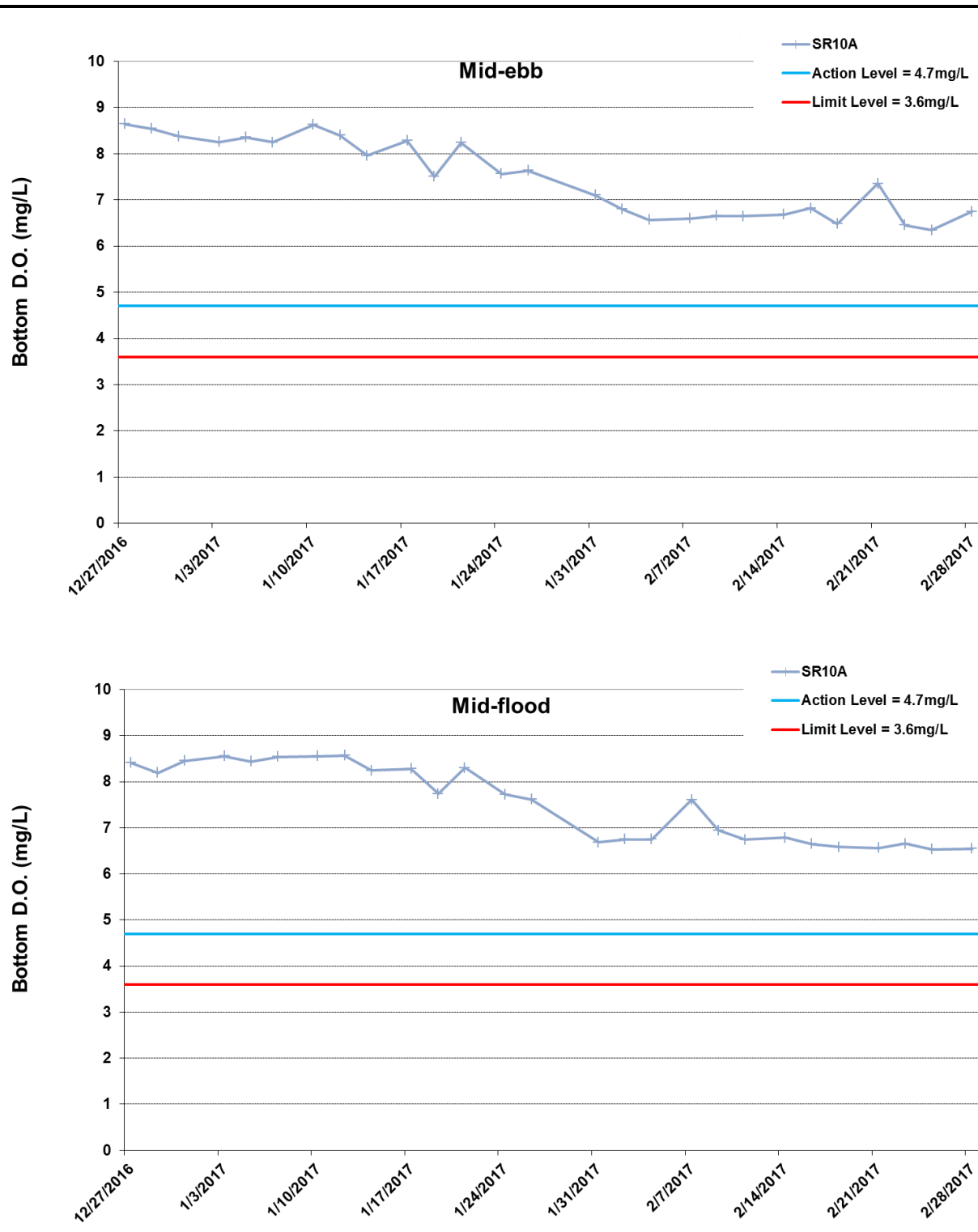


Figure I23 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

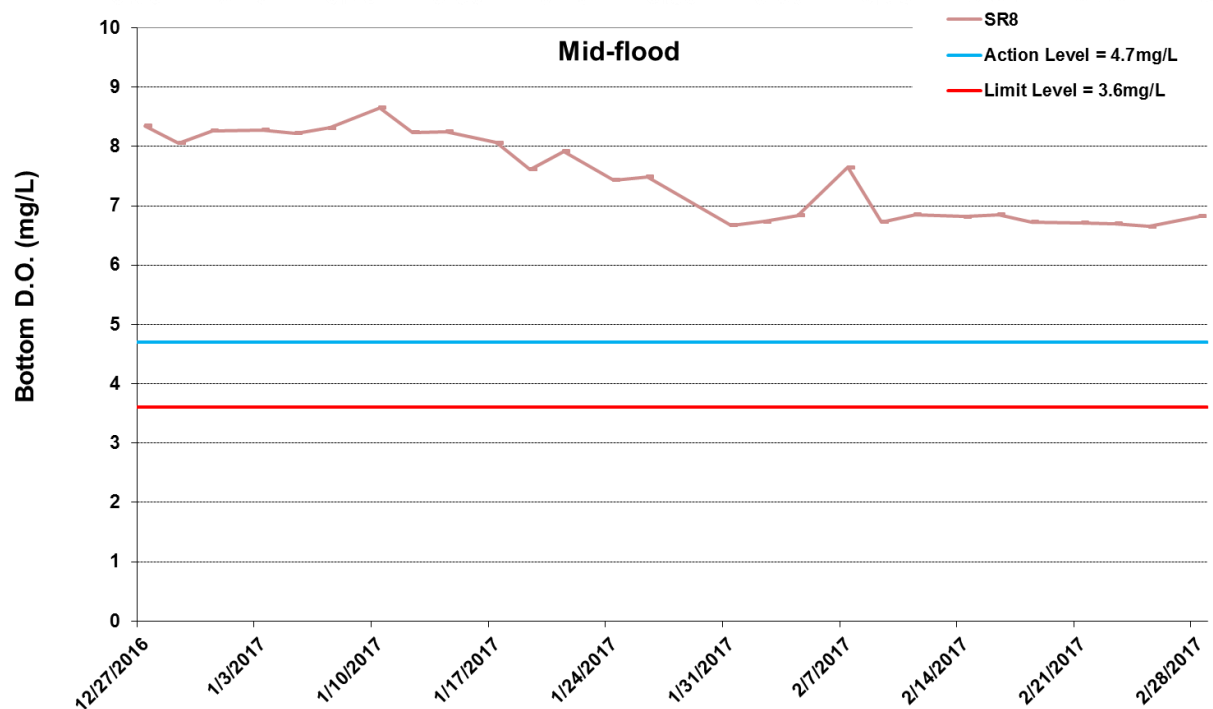
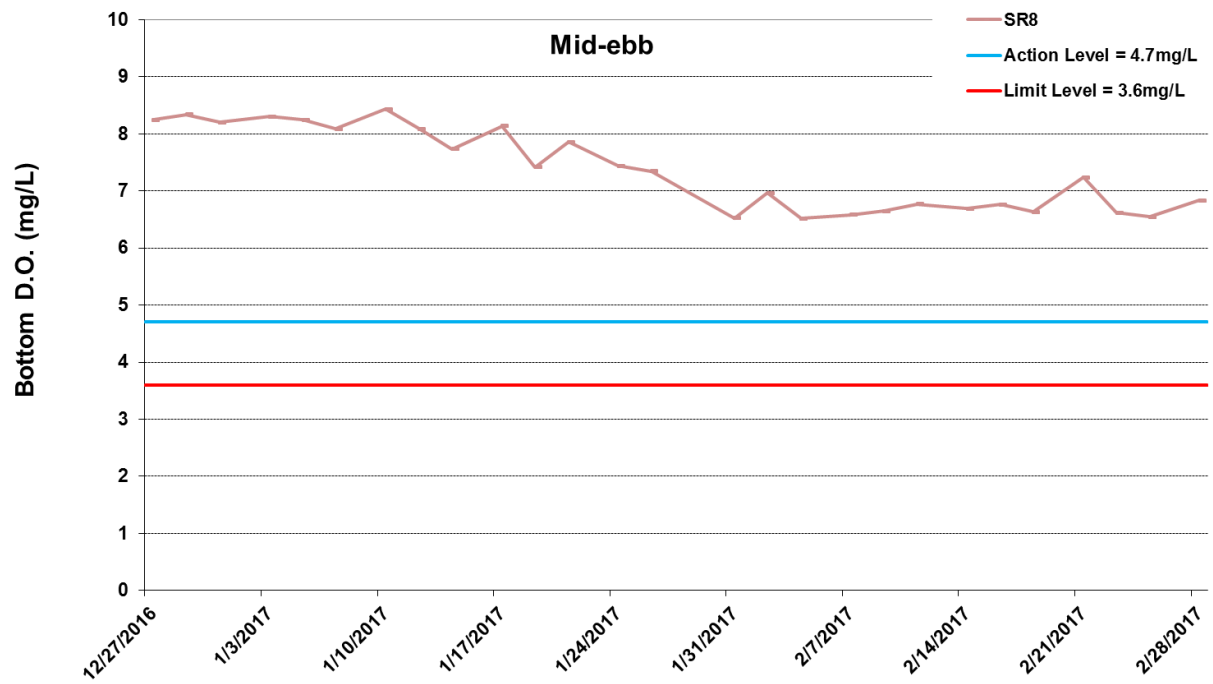


Figure I24 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



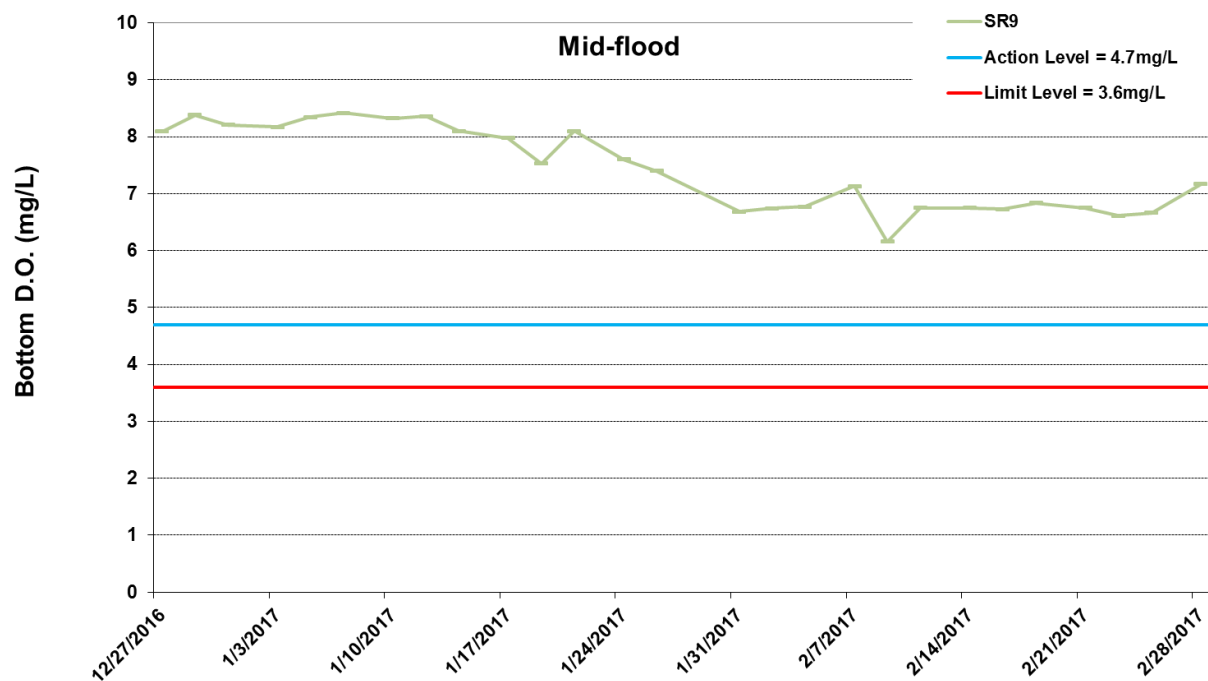
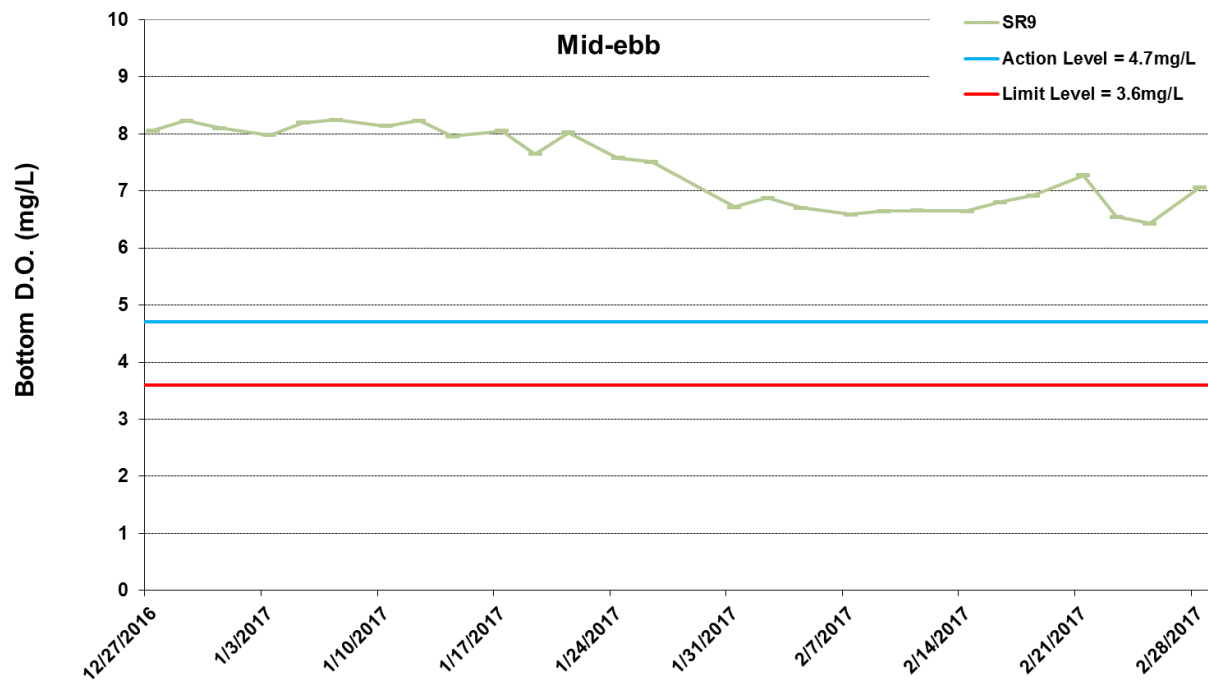


Figure I25 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 27 December 2016 and 28 February 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



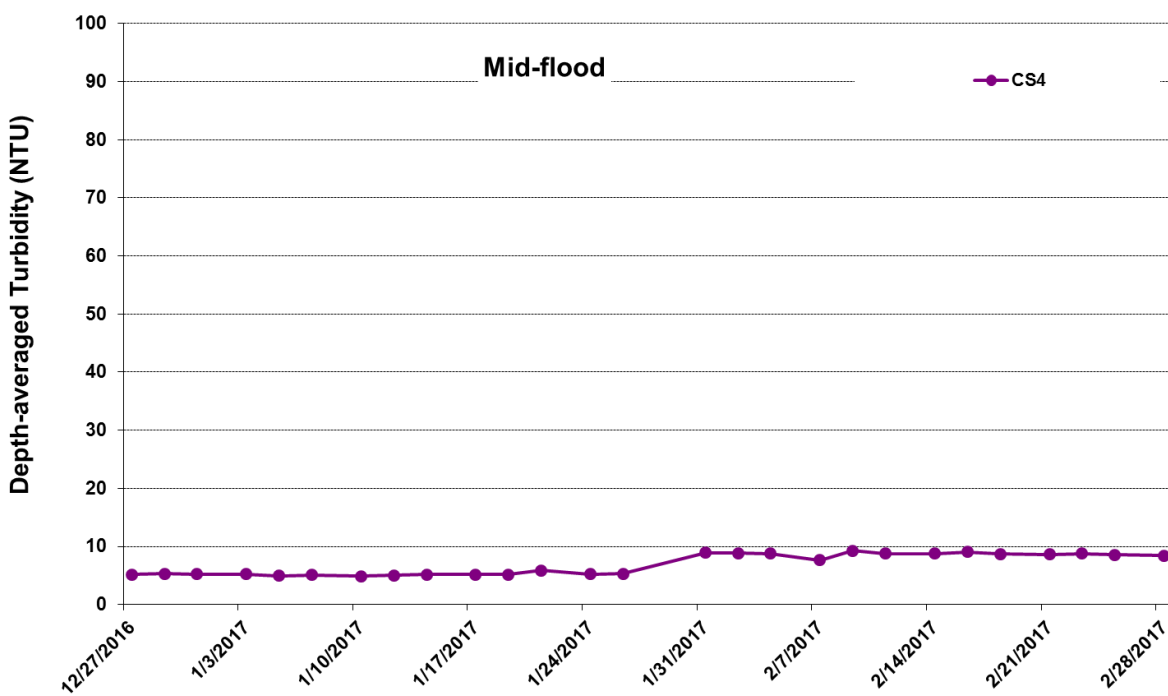
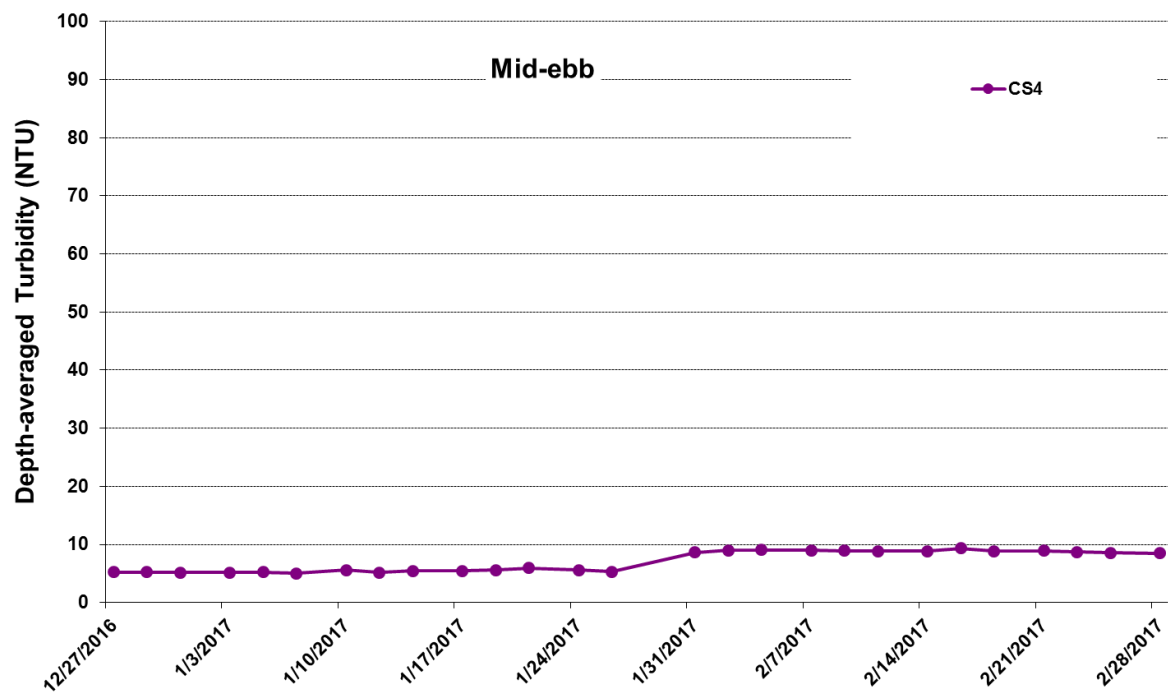


Figure I26 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



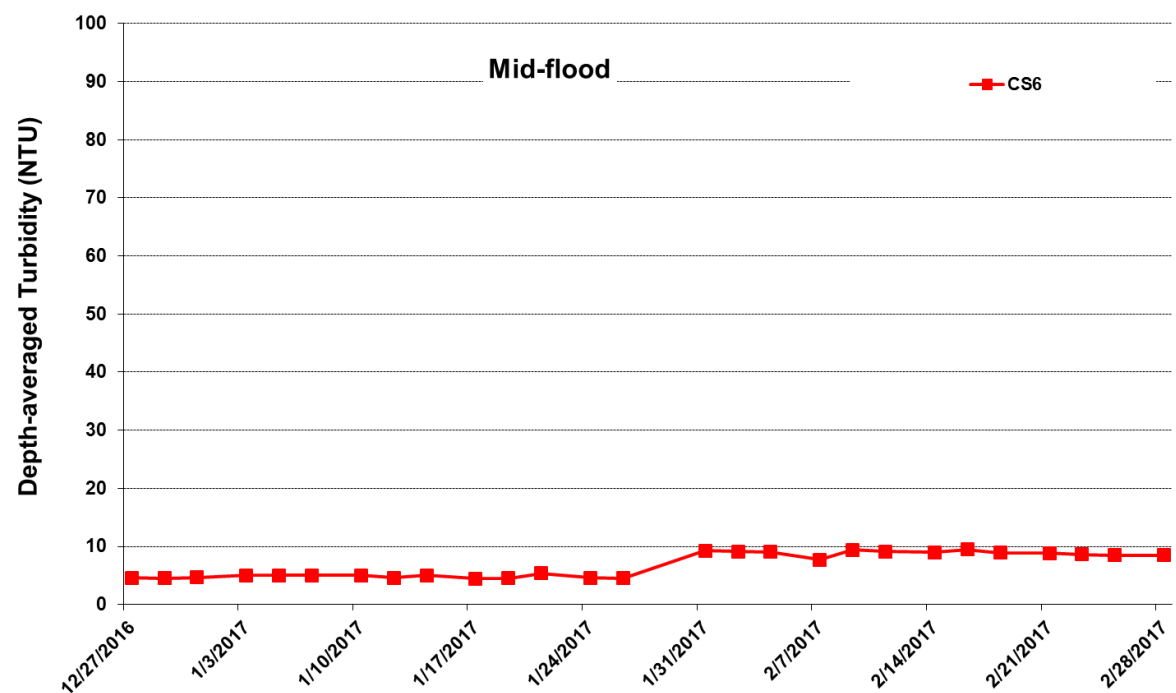
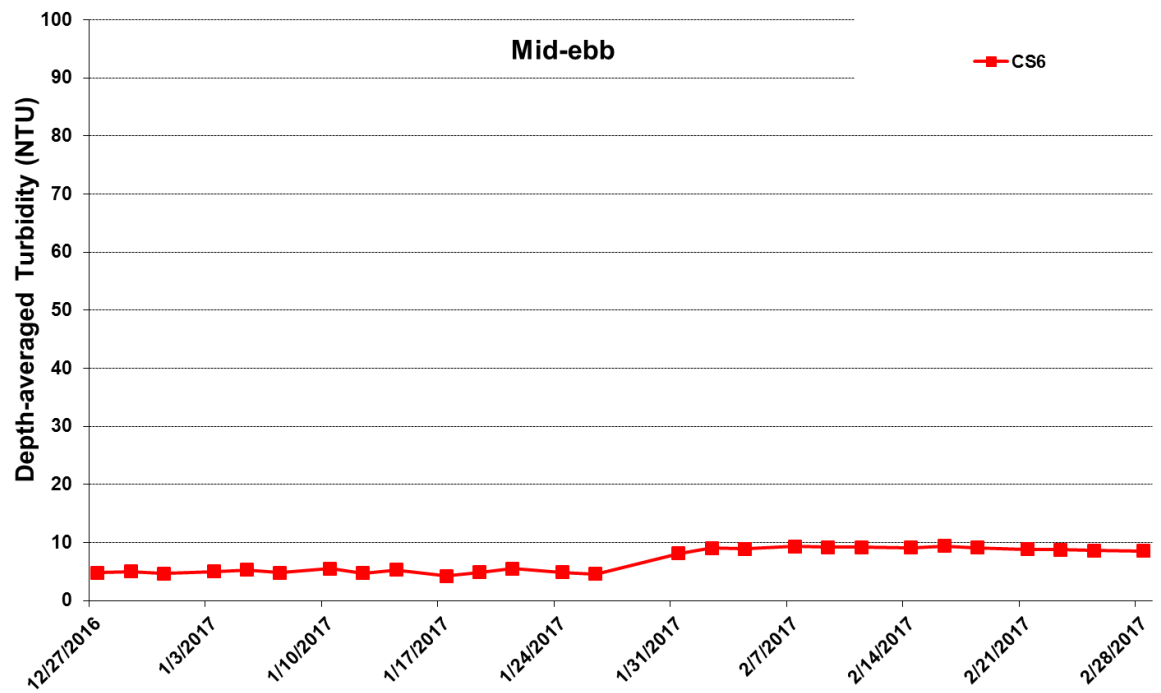


Figure I27 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



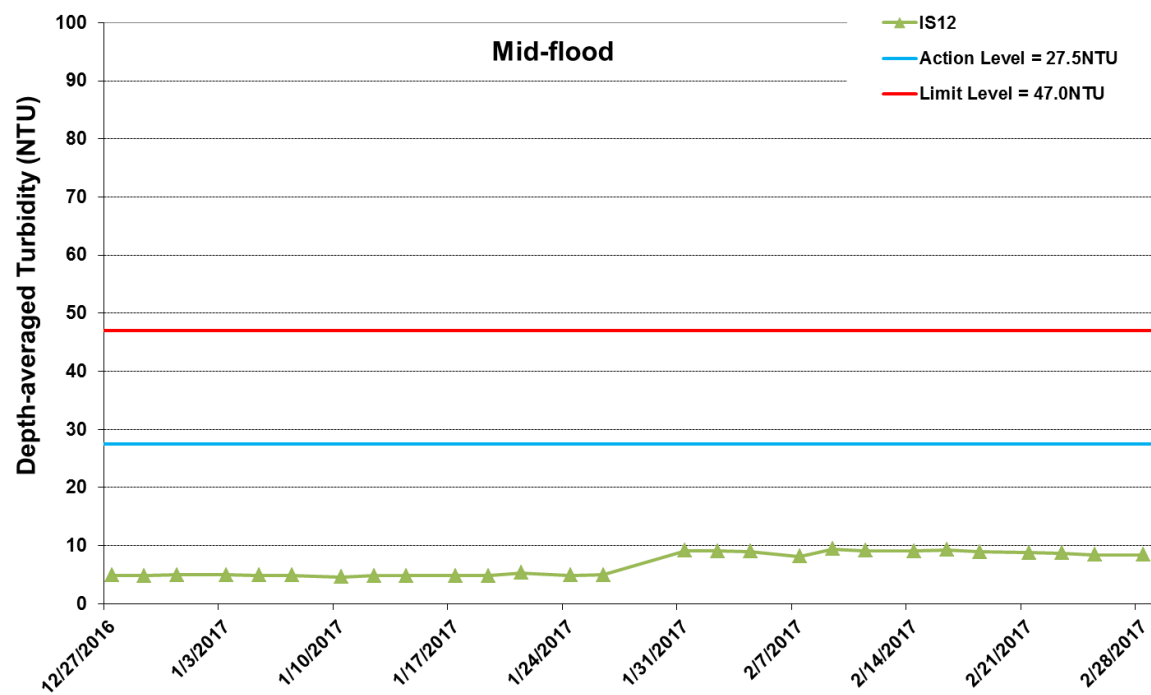
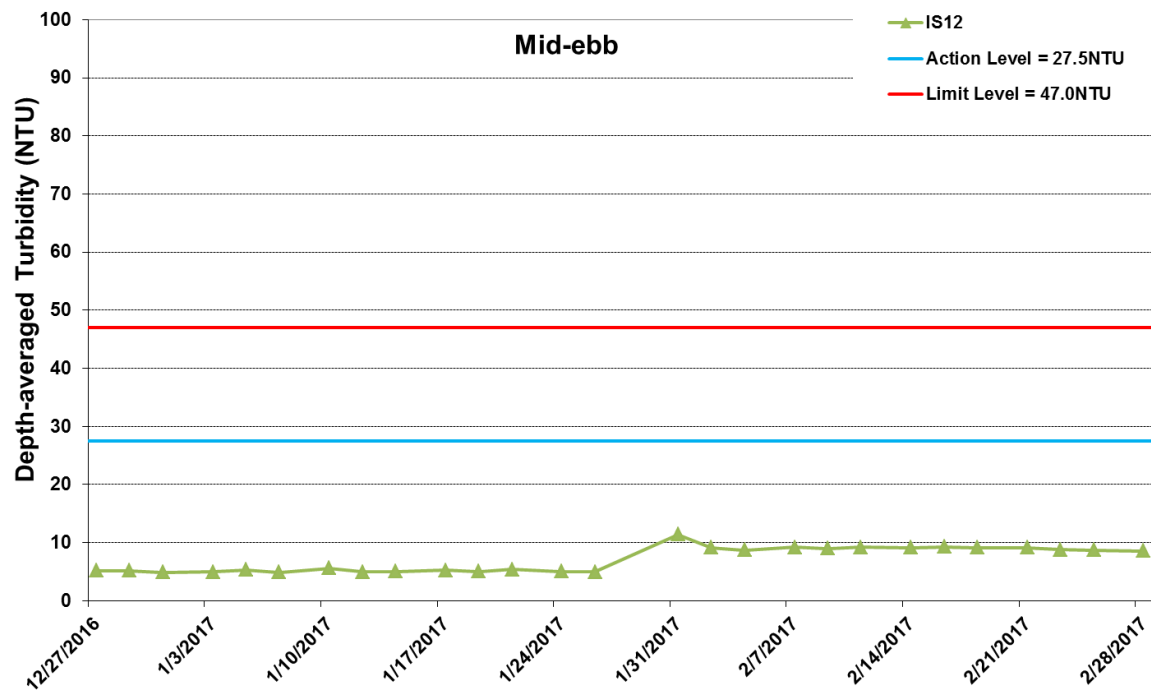


Figure I28 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



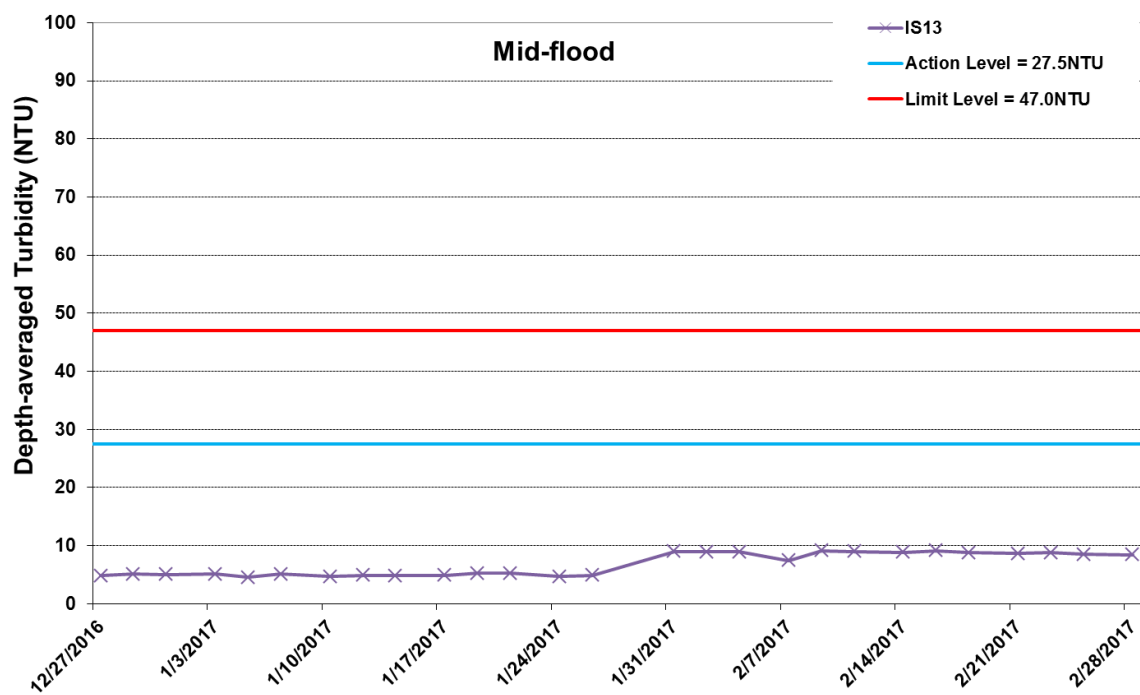
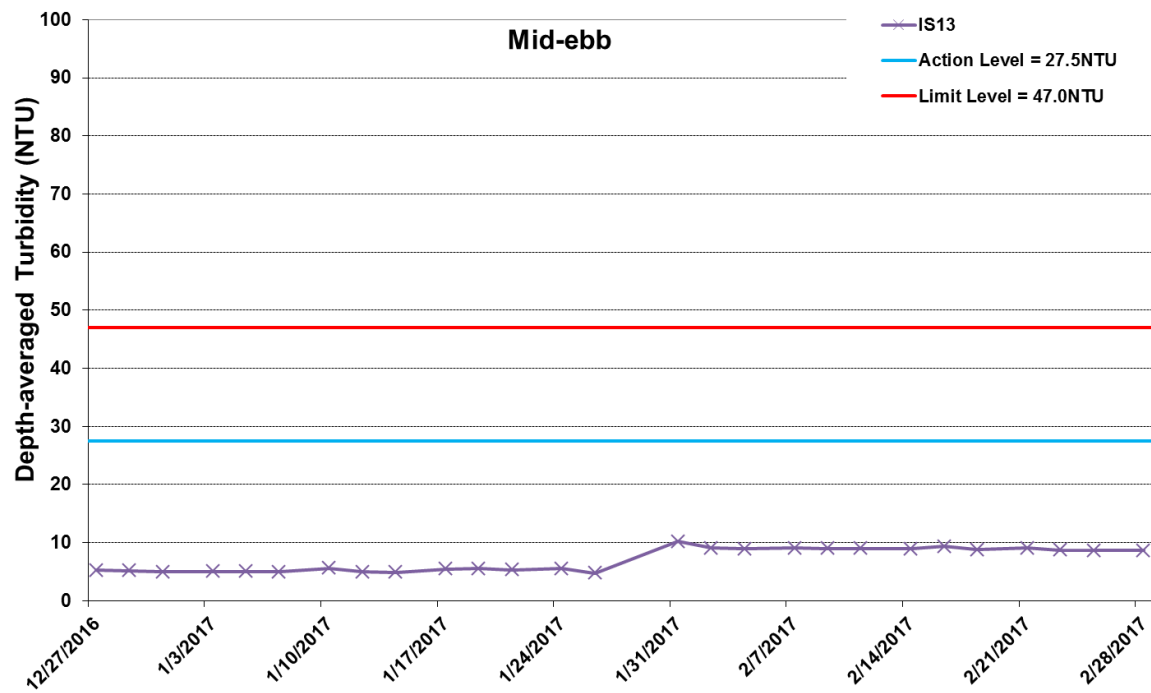


Figure I29 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



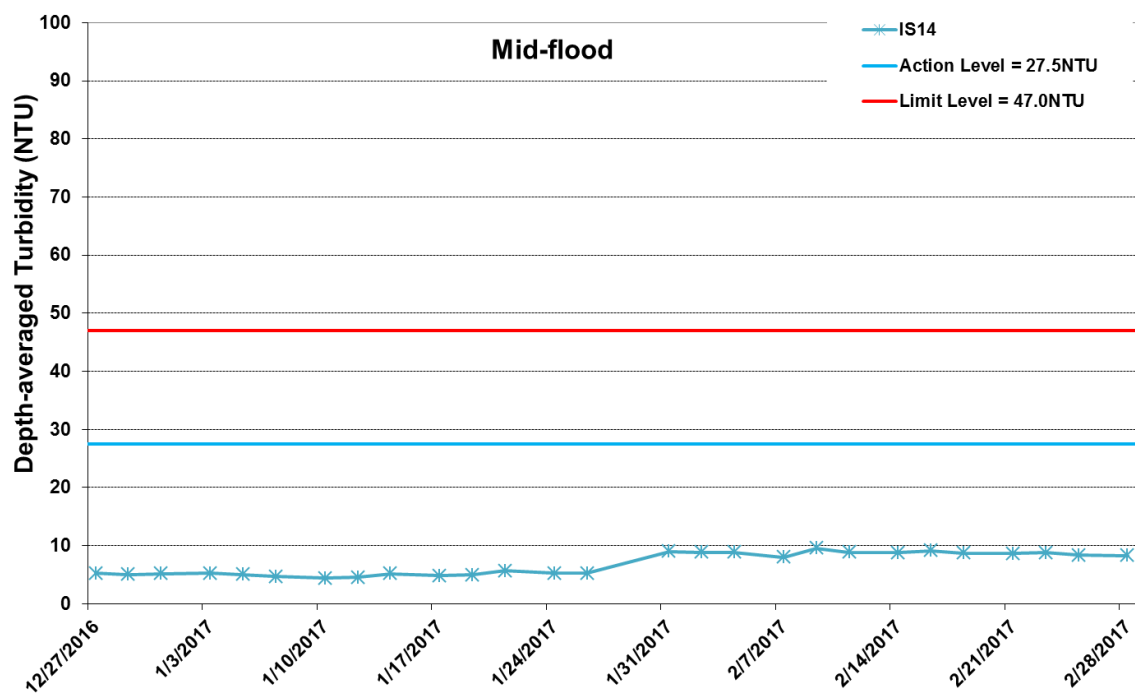
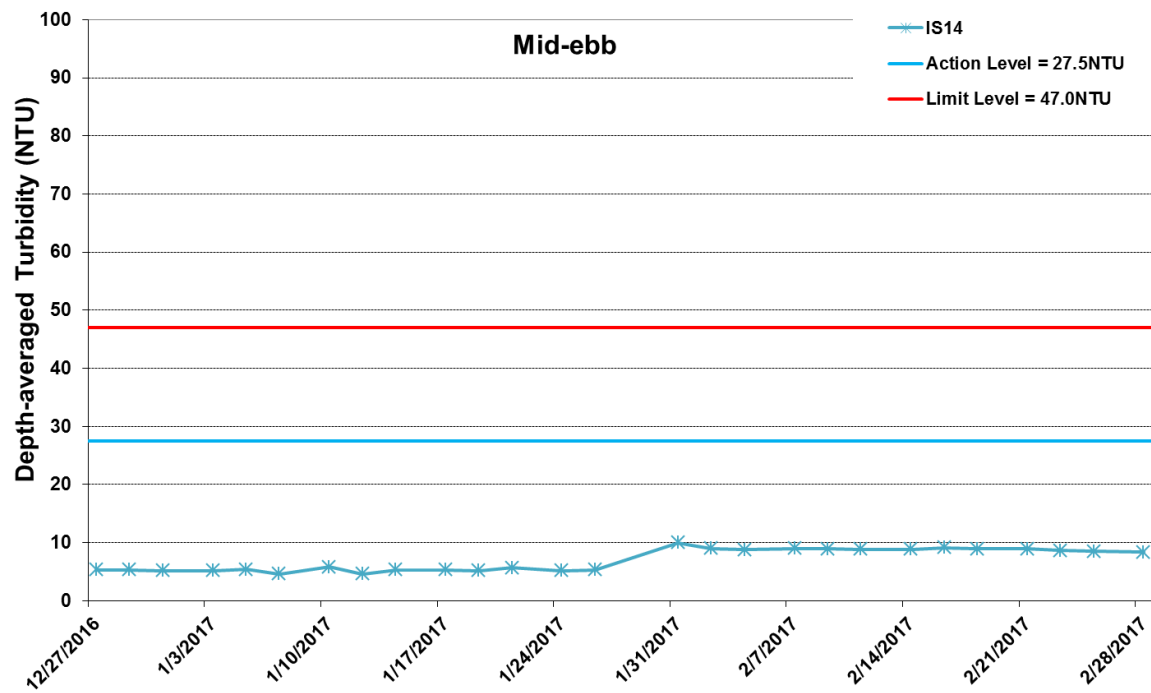


Figure I30 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



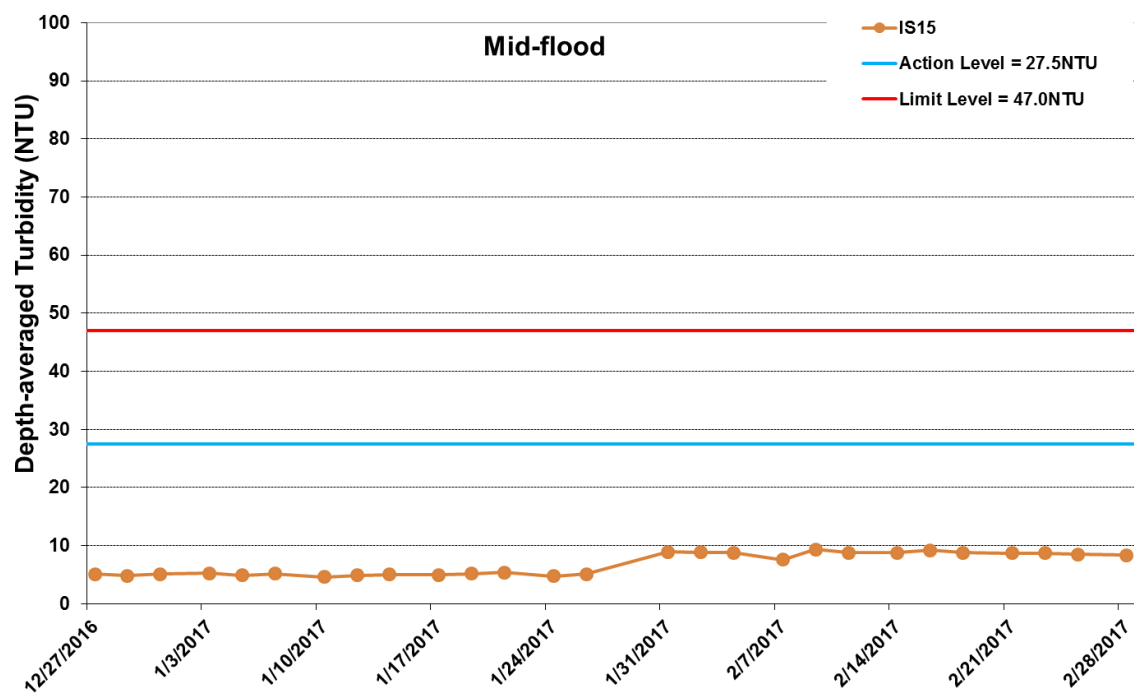
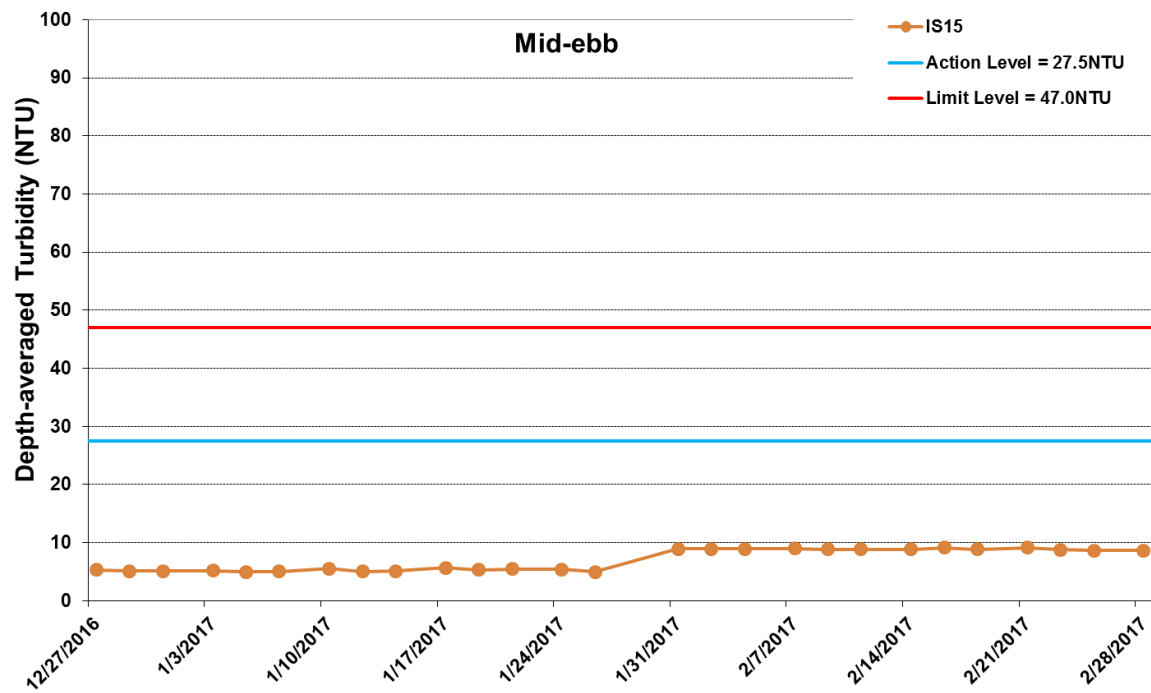


Figure I31 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



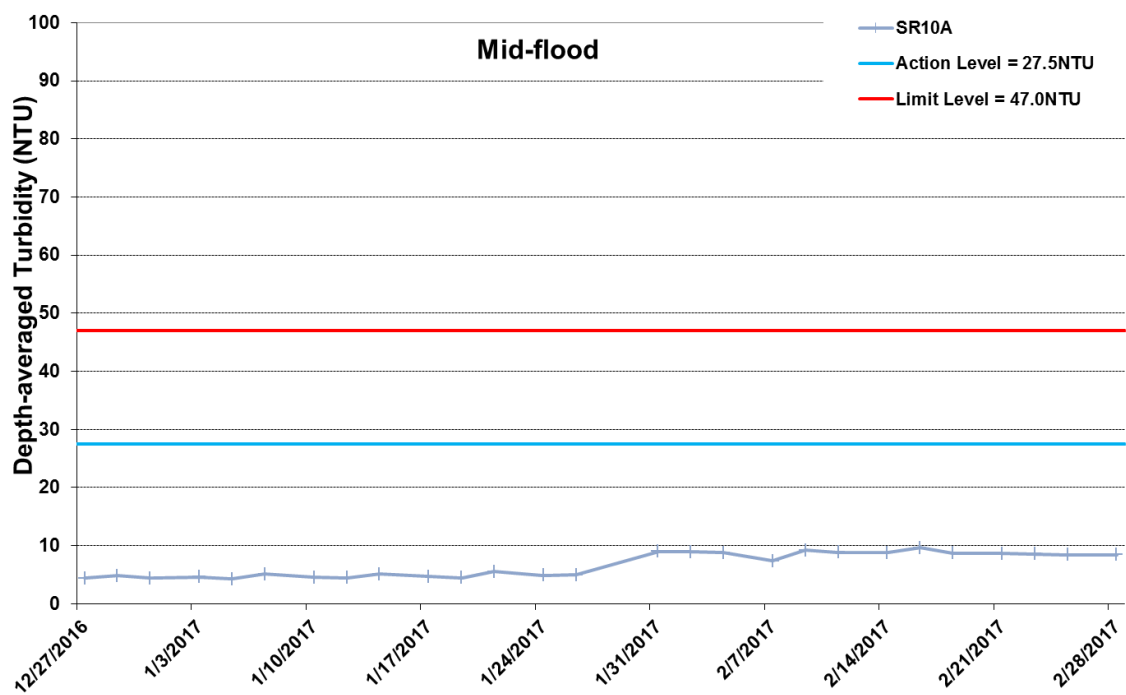
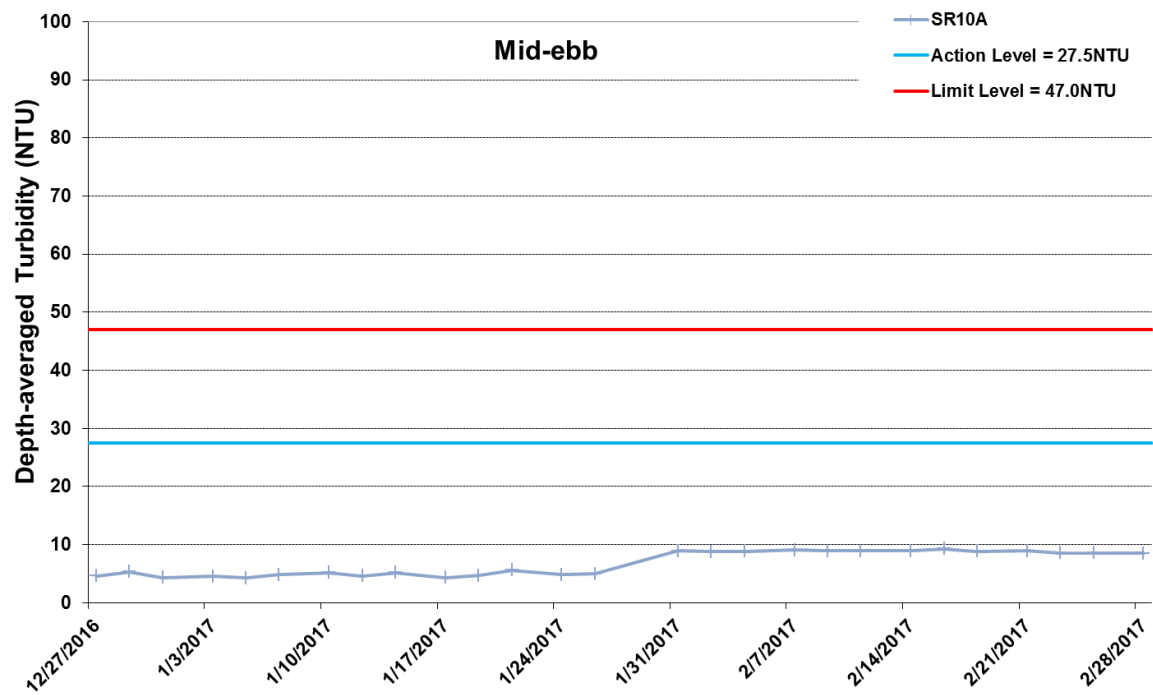


Figure I32 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



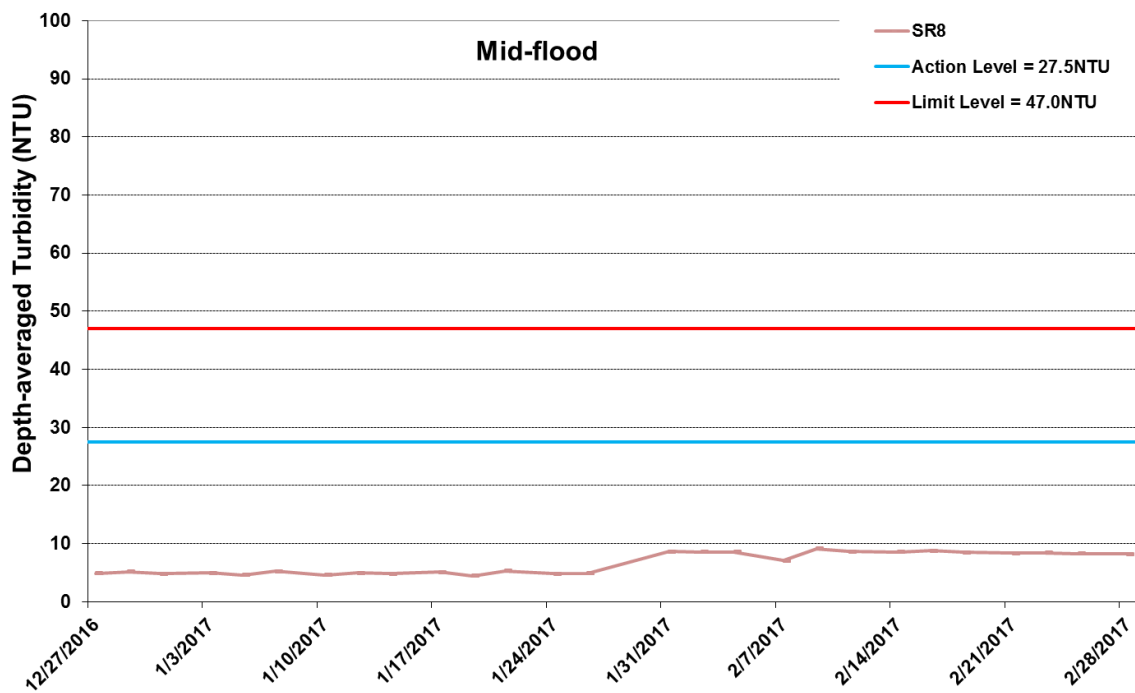
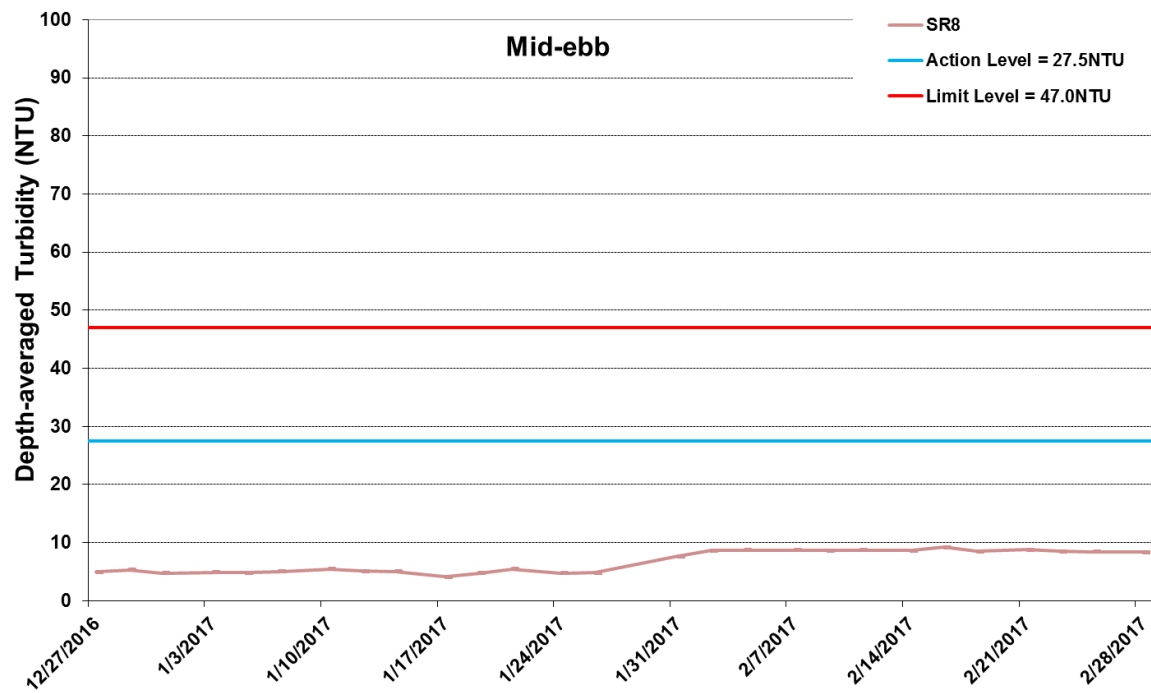


Figure I33 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



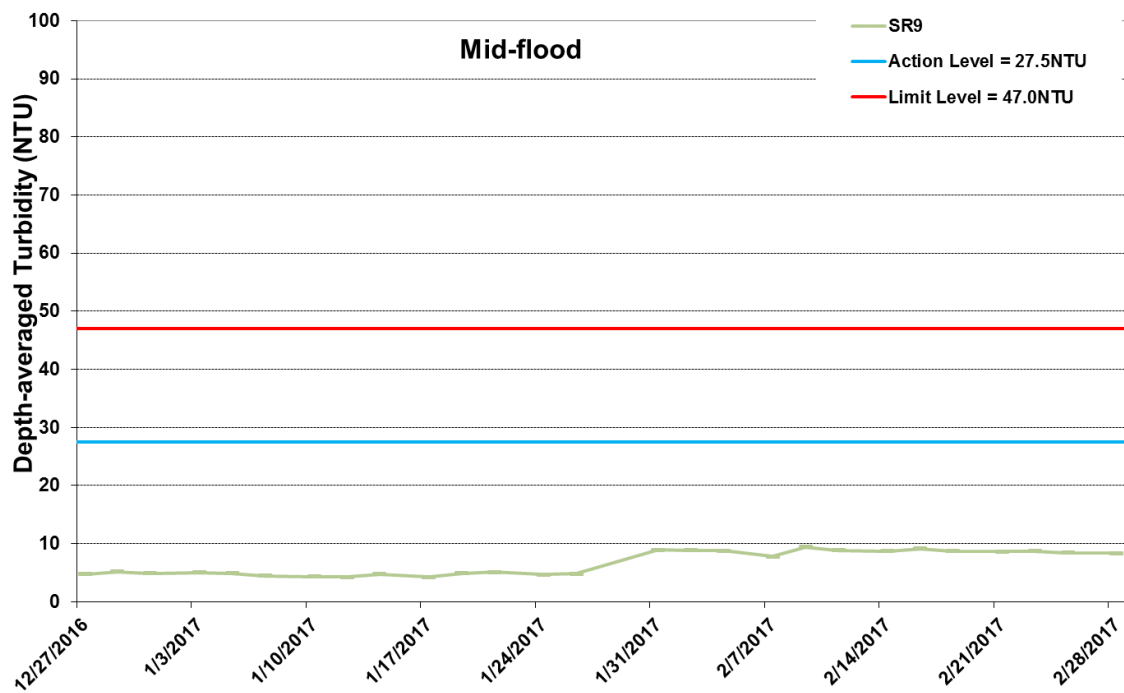
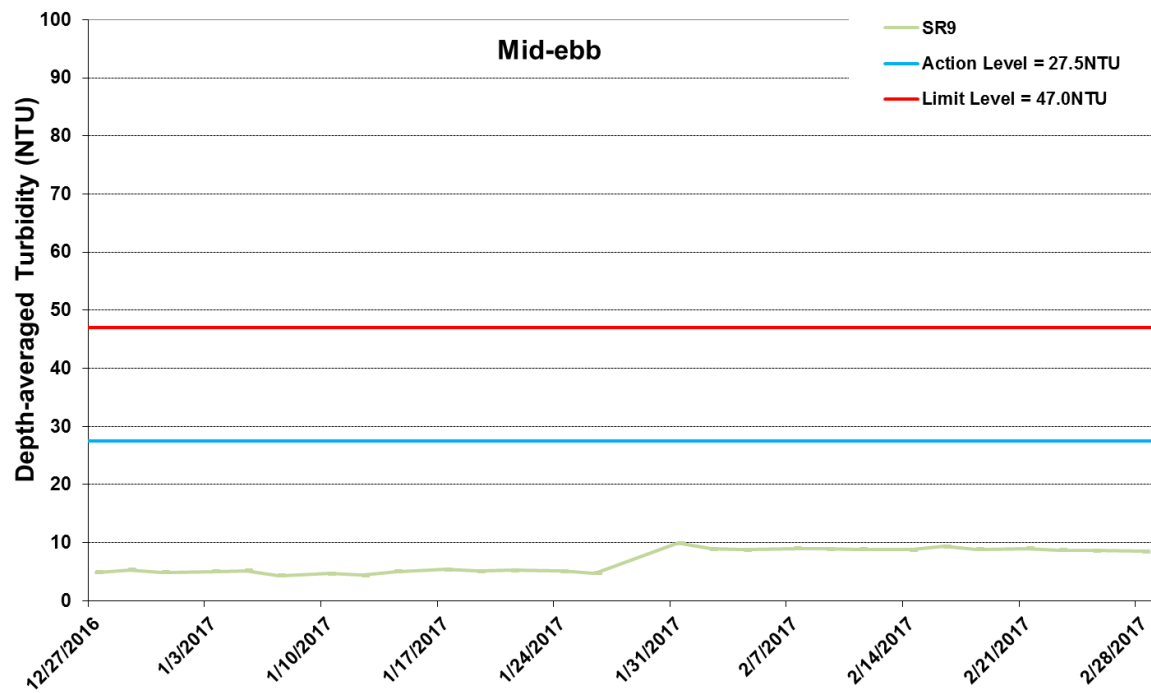


Figure I34 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 27 December 2016 and 28 February 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



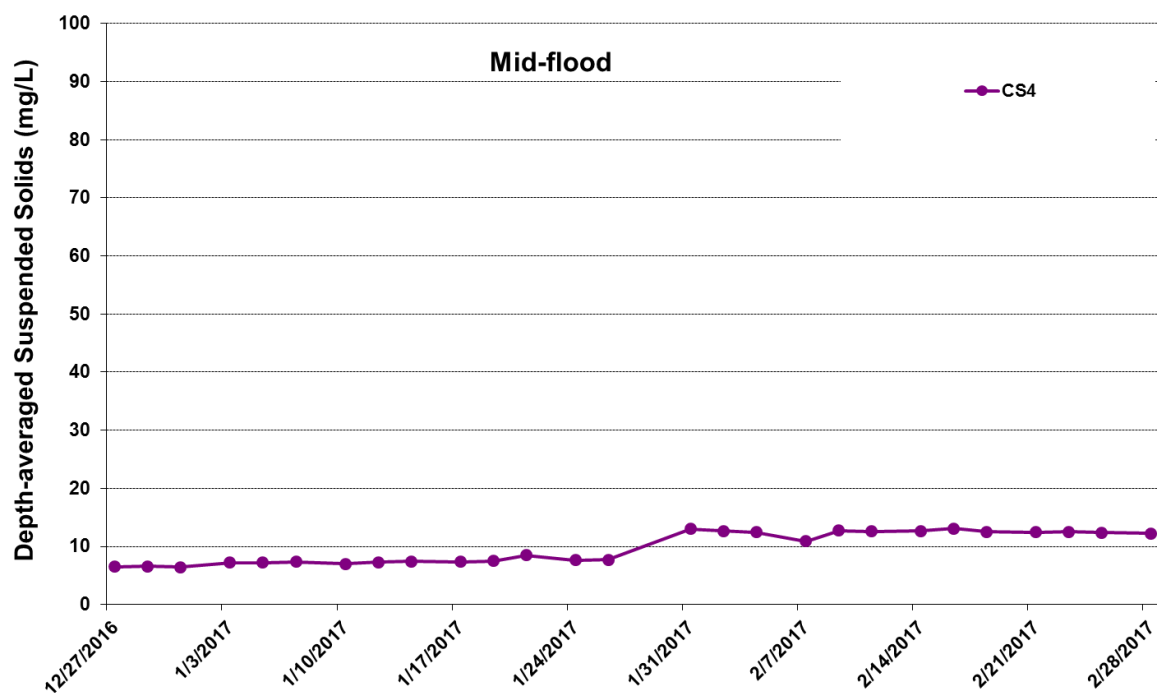
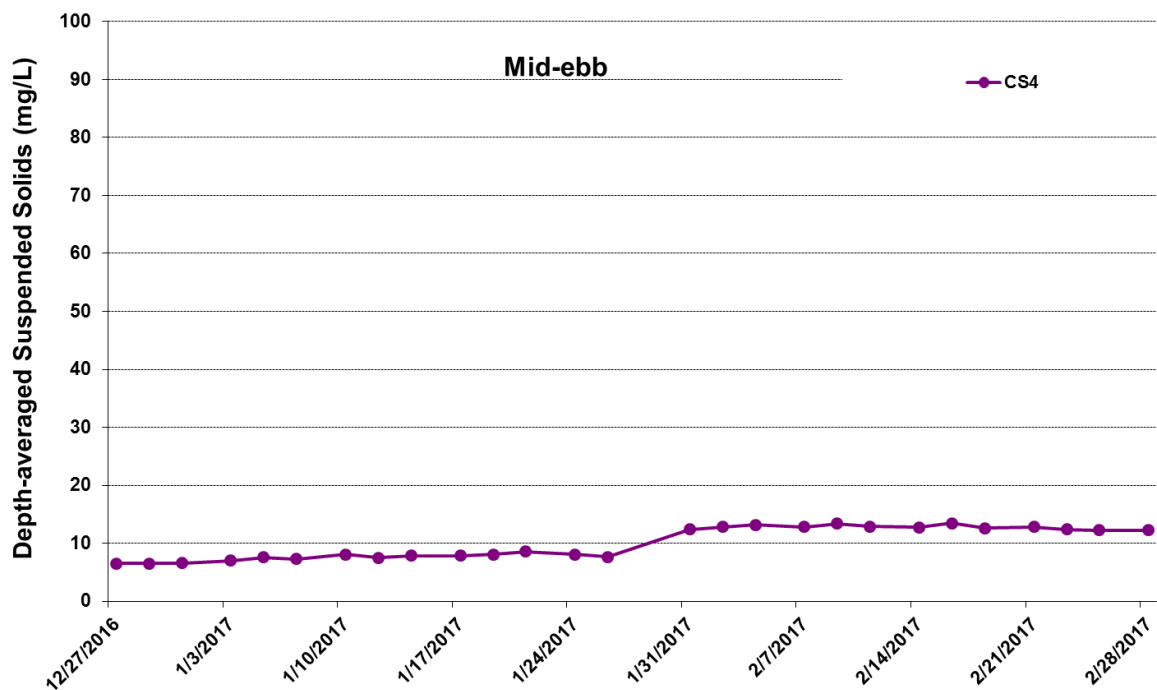


Figure I35 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



Ref: 0212330_Impact-WQM_February2017_graphs_Rev a.xls

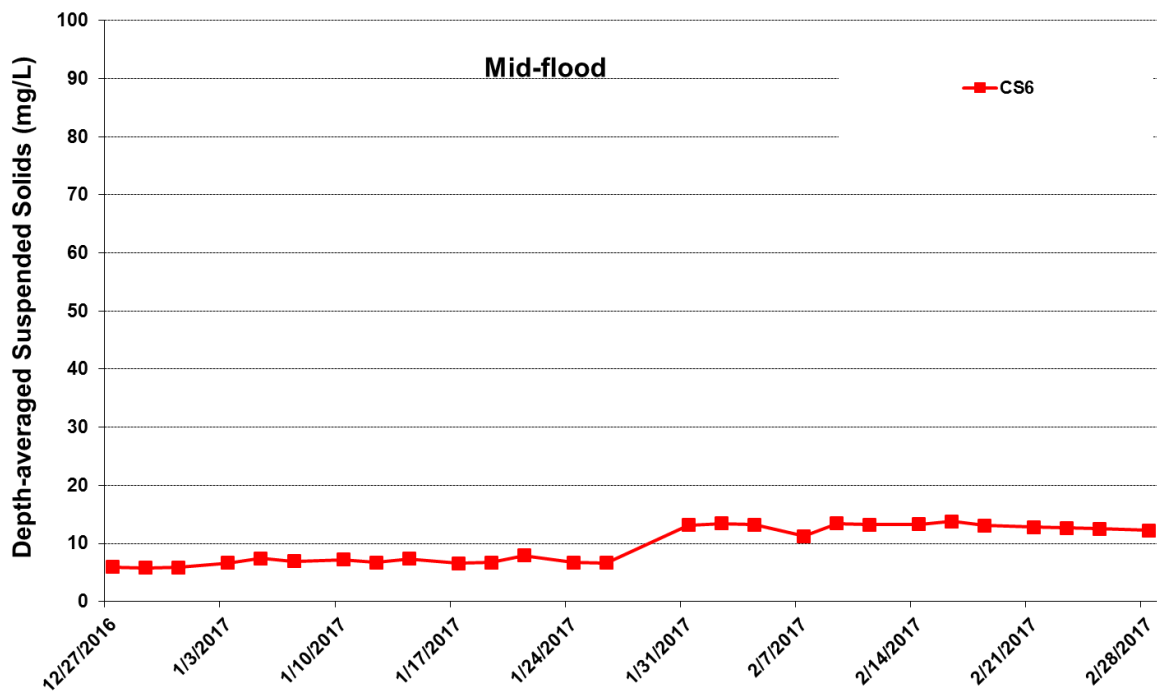
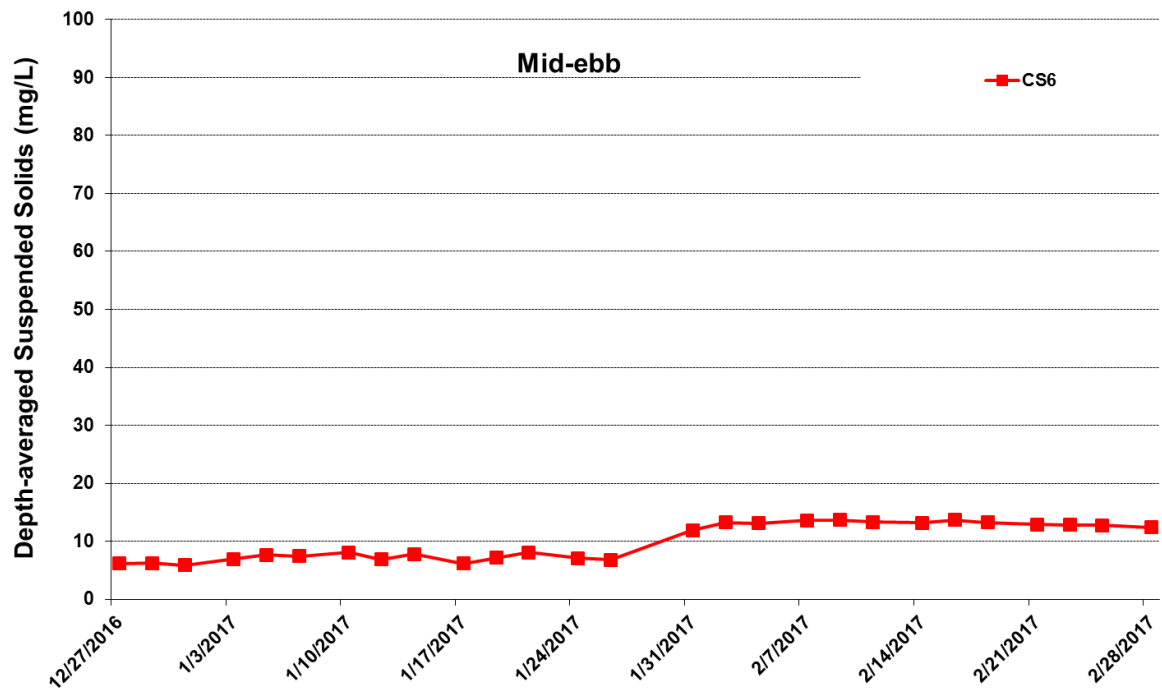


Figure I36 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



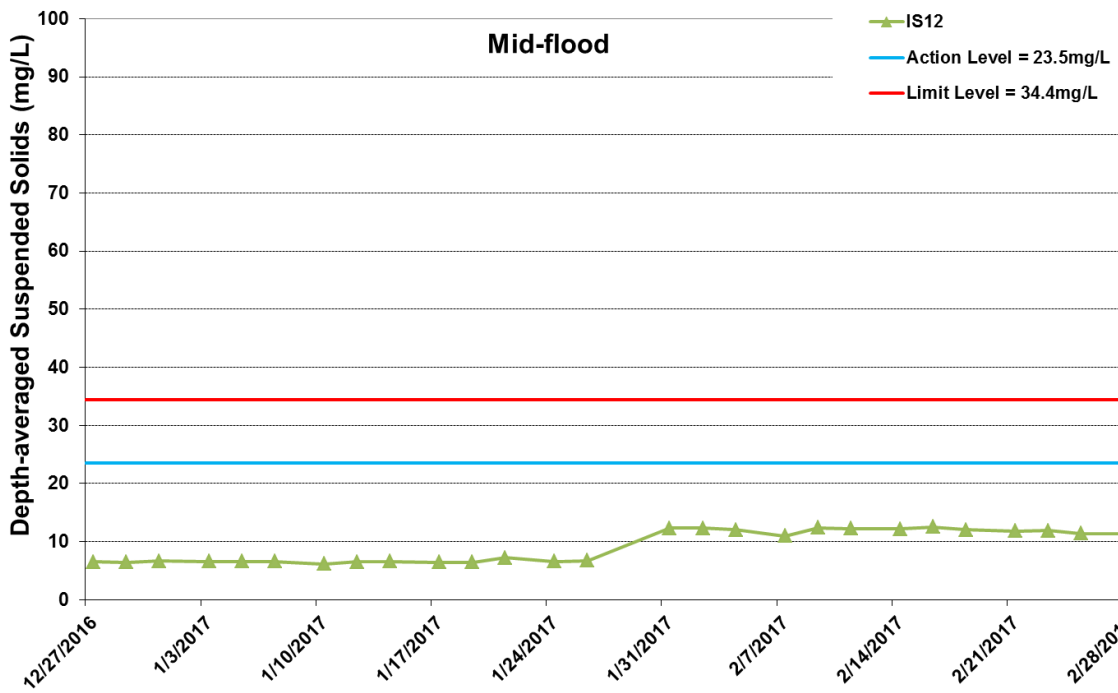
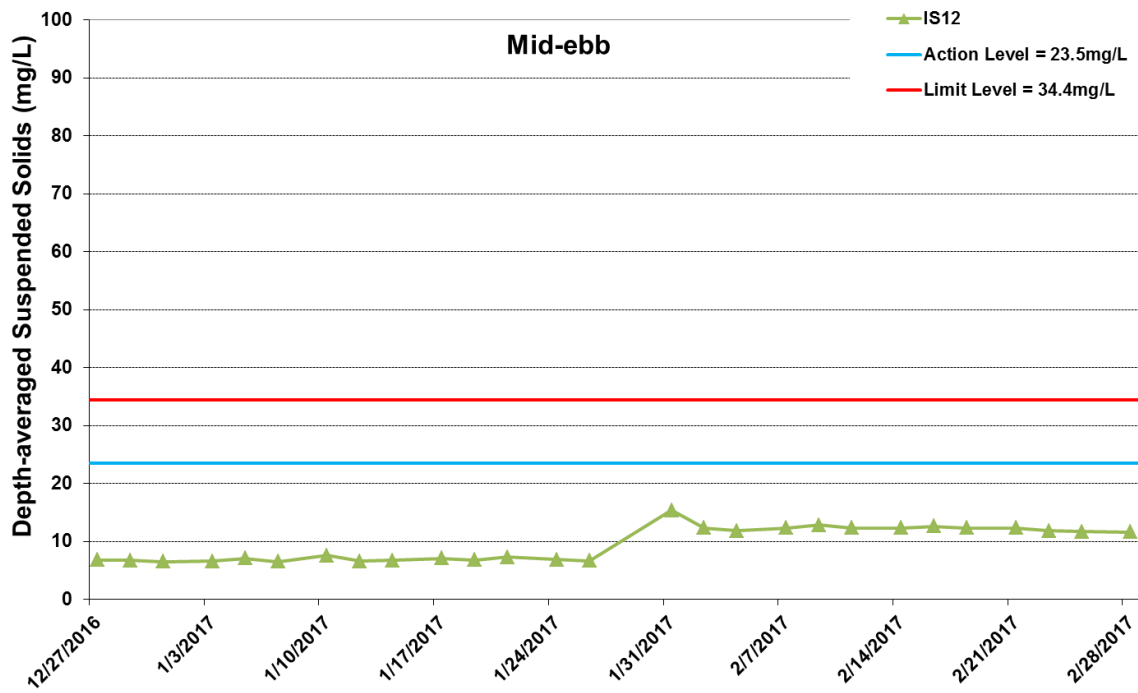


Figure I37 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



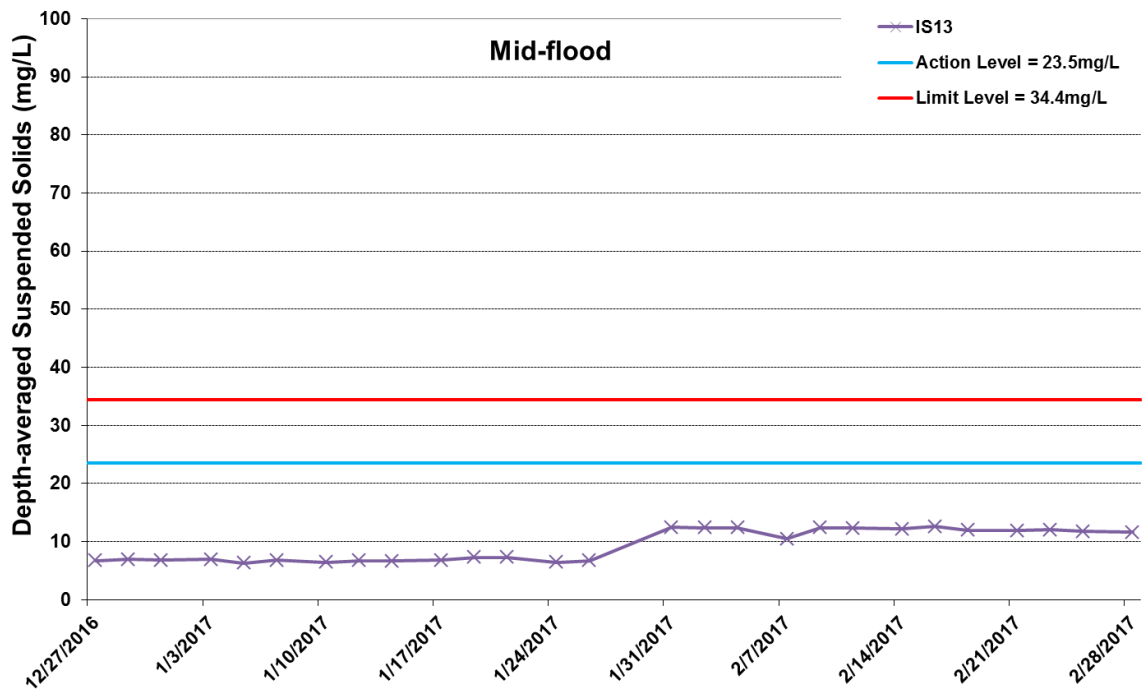
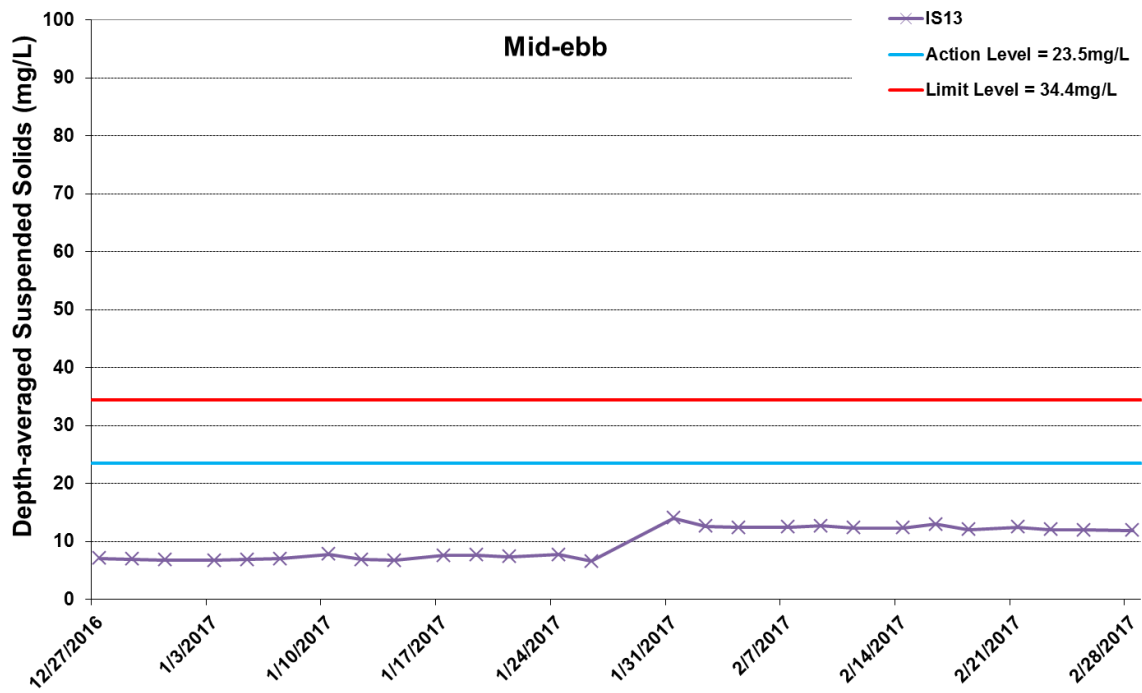


Figure I38 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



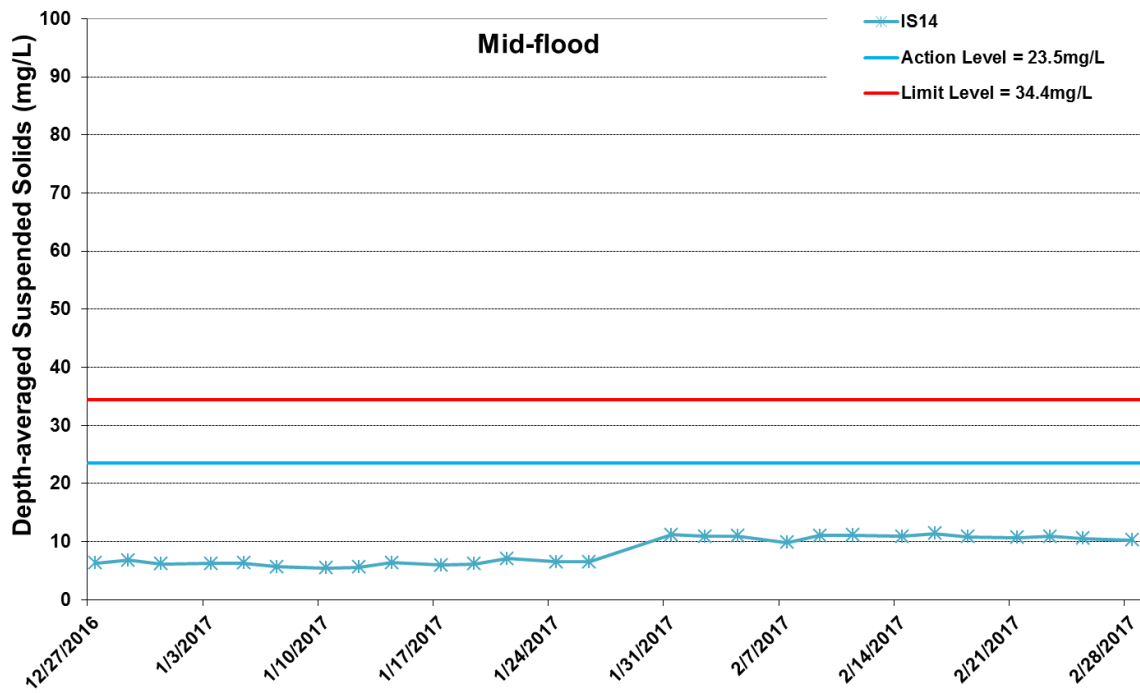
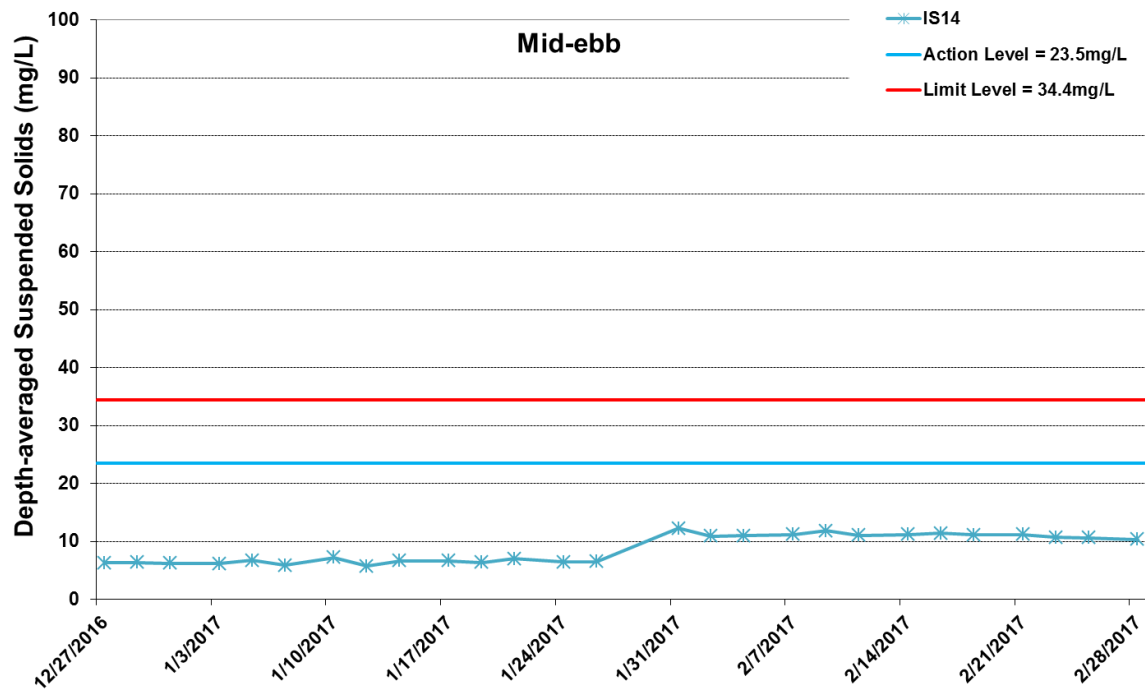


Figure I39 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



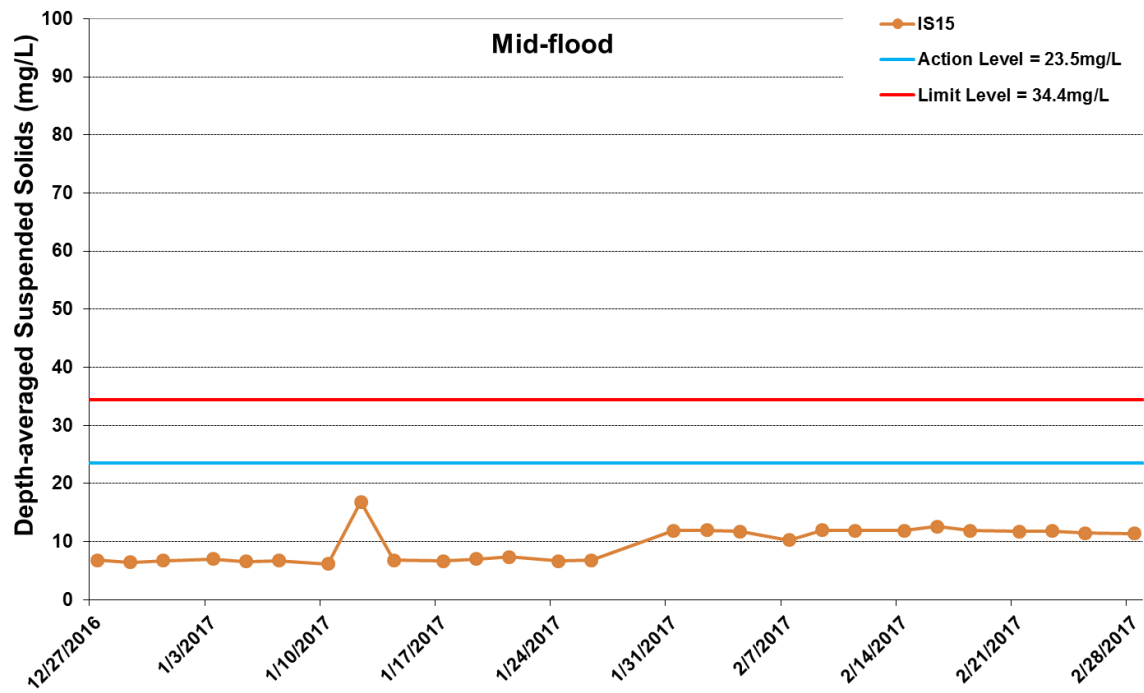
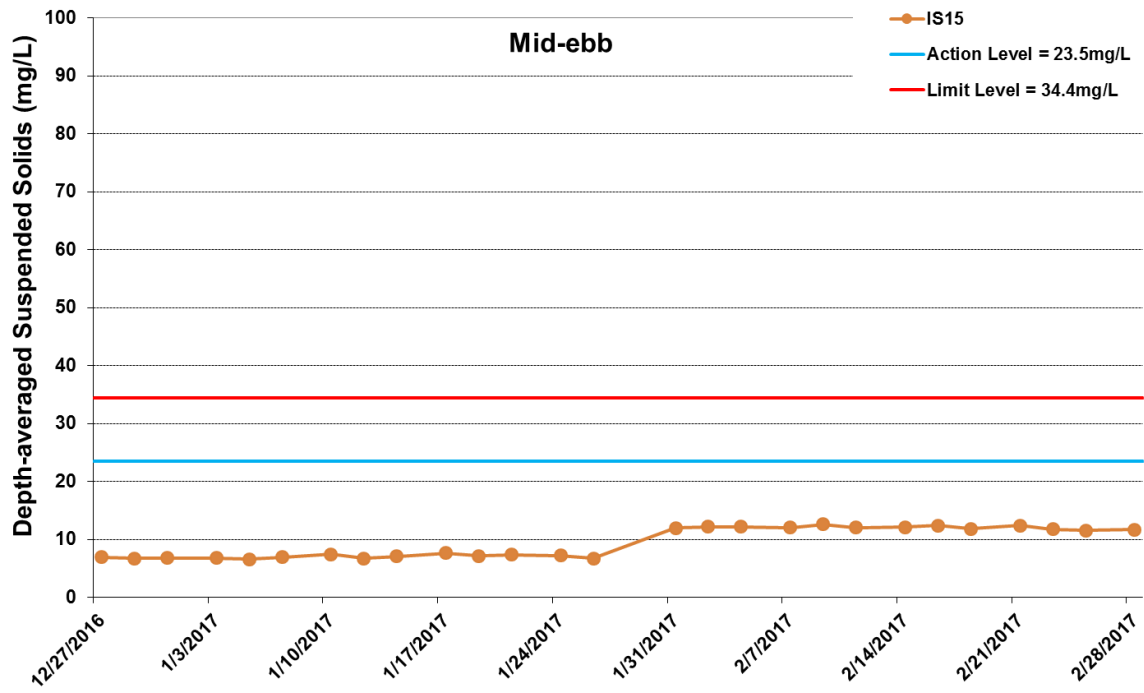


Figure I40 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



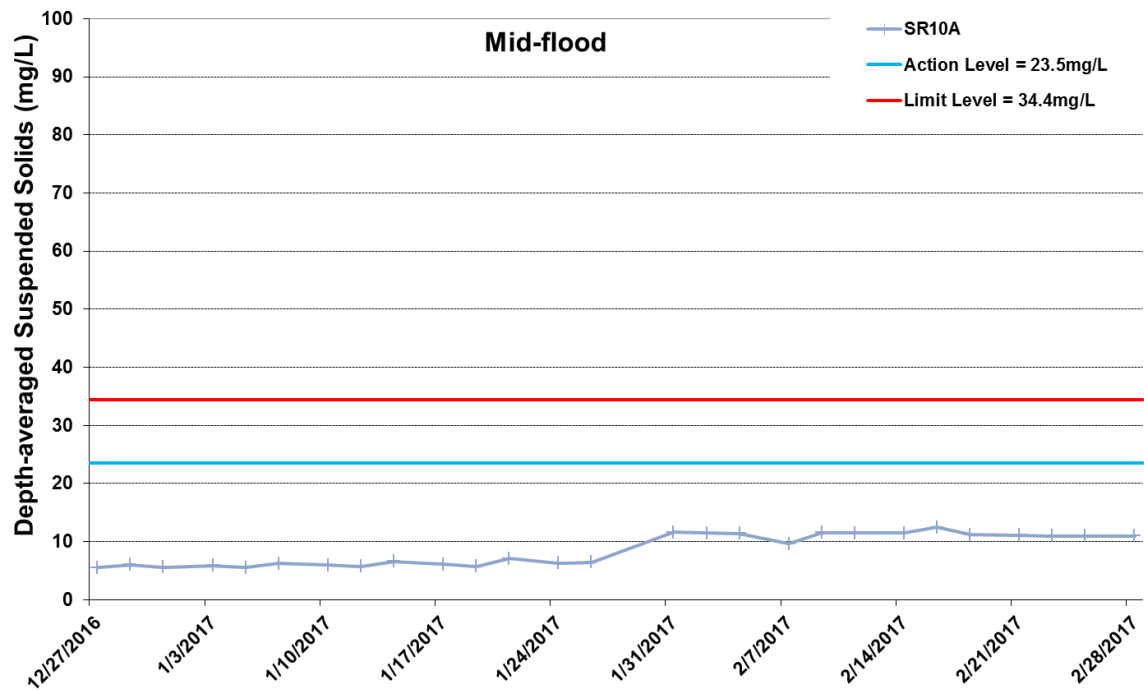
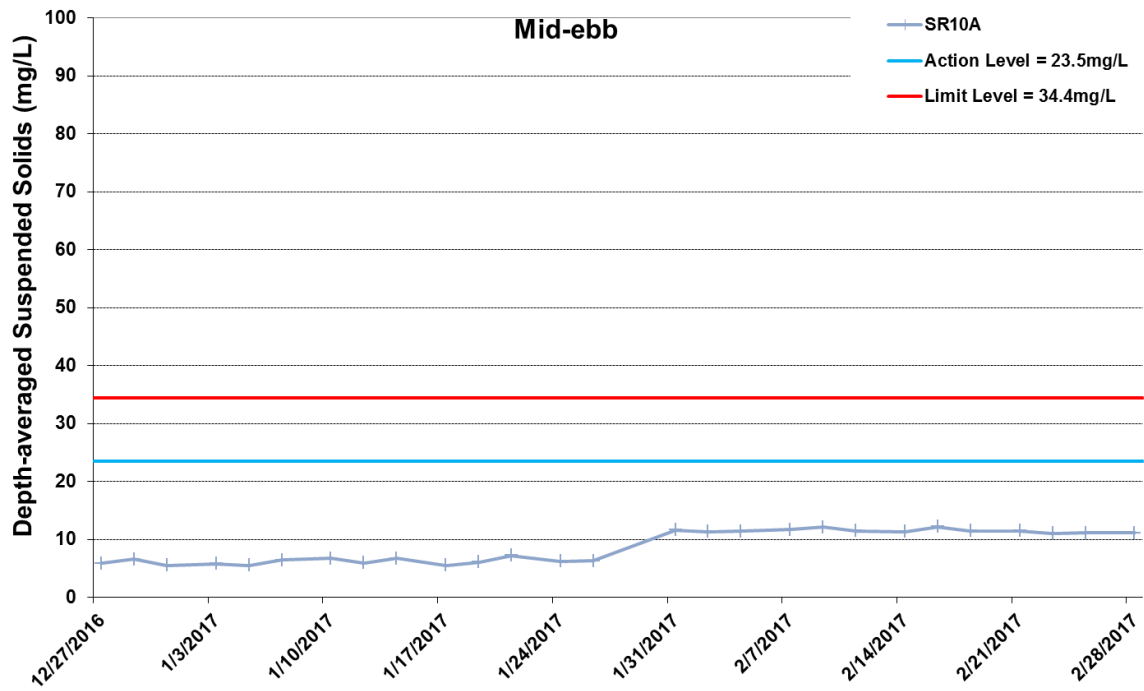


Figure I41 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



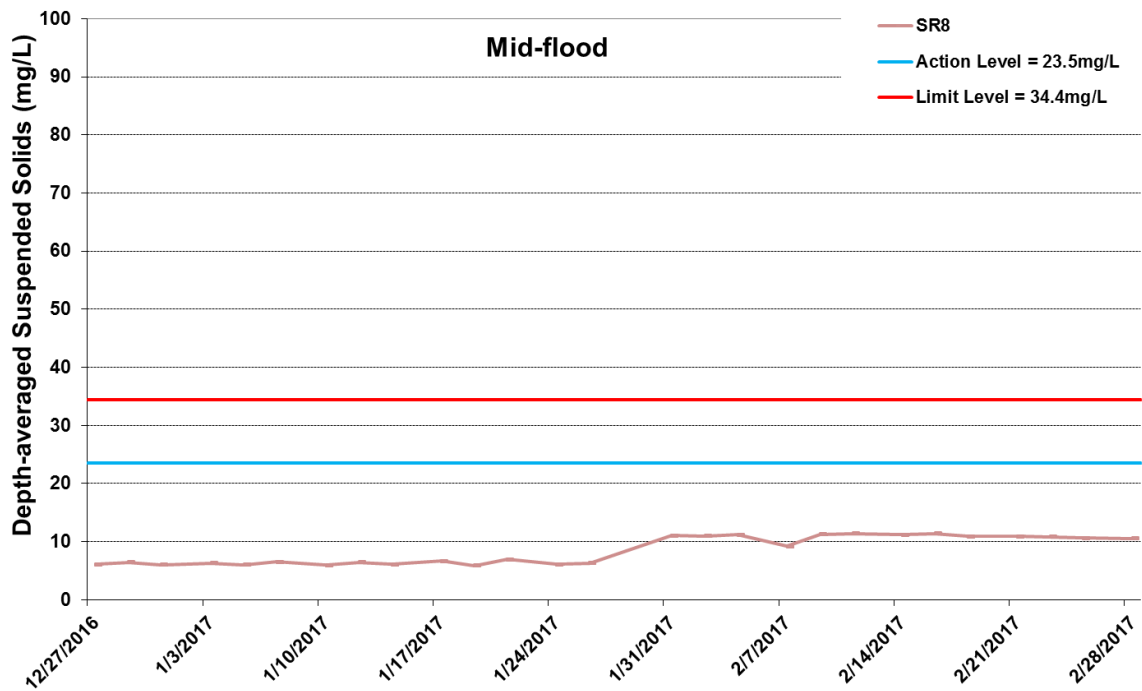
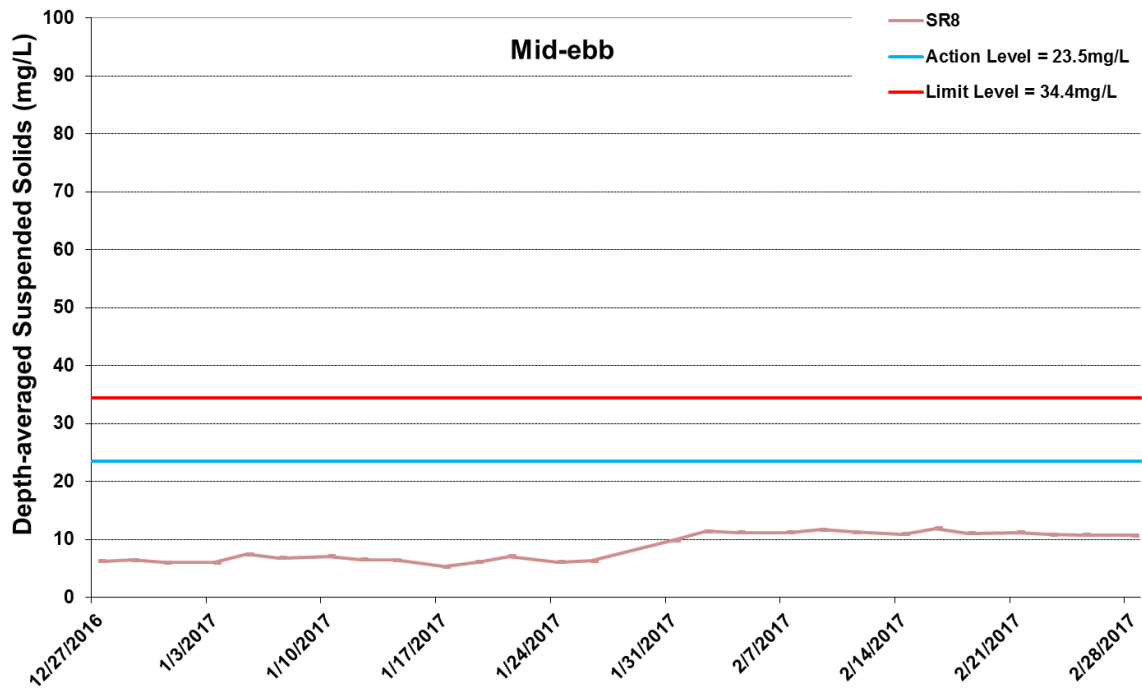


Figure I42 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



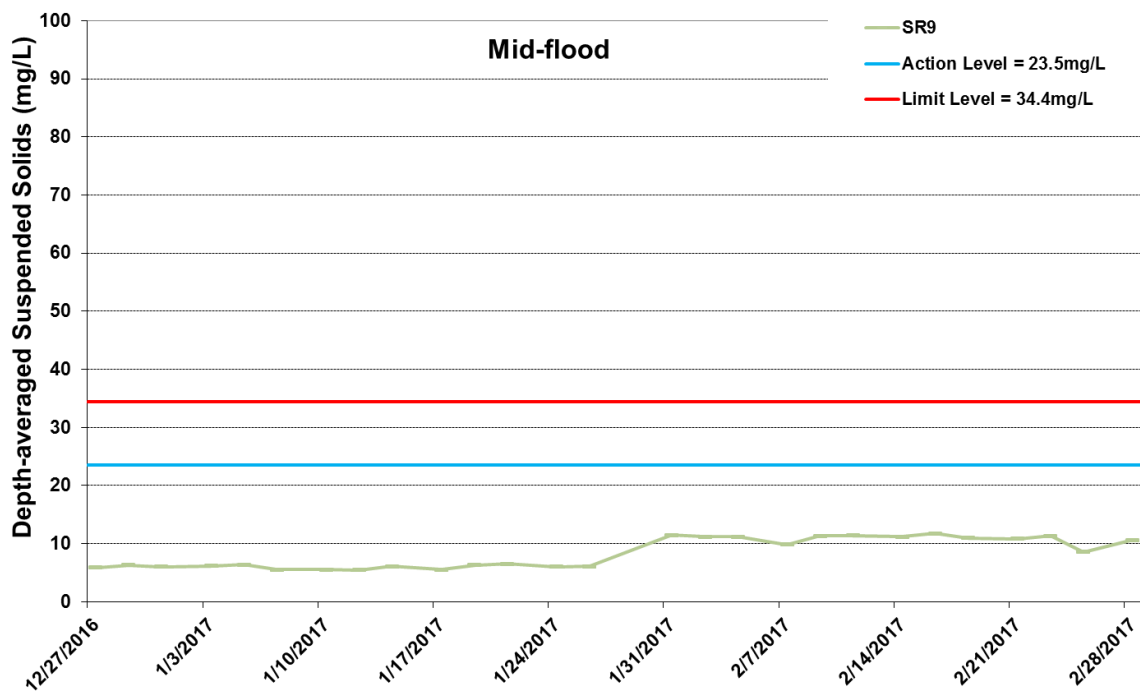
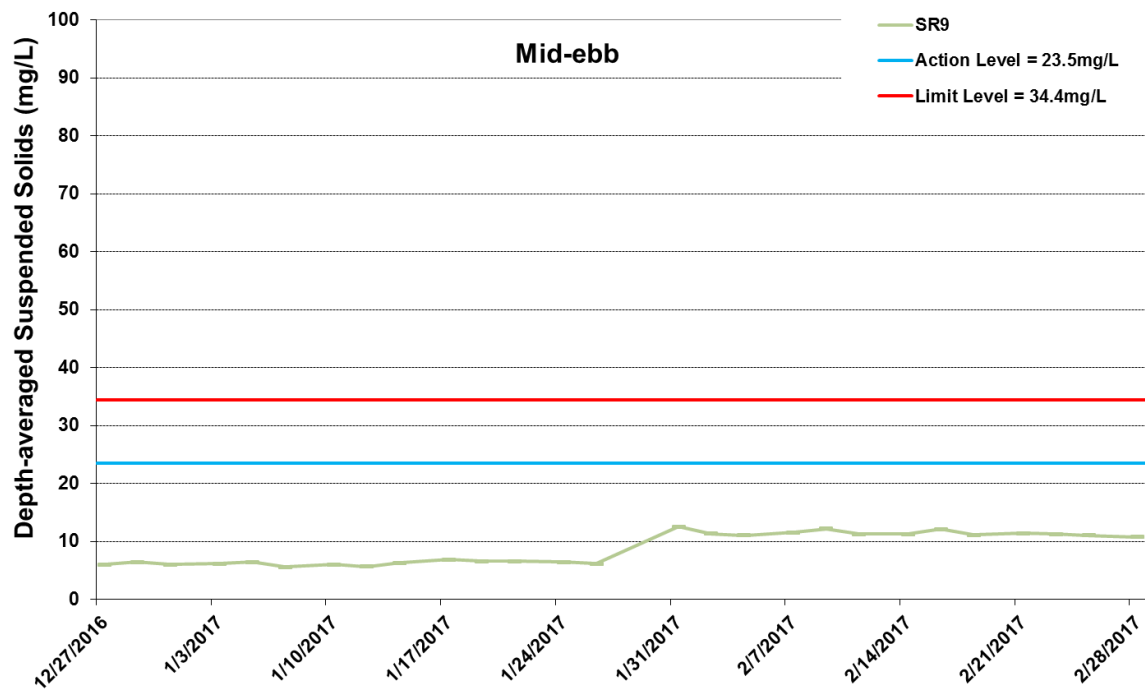


Figure I43 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 27 December 2016 and 28 February 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Dredging and filling works at Portion N-A (27/12/2016 - 28/2/2017). WQM was resumed on 27/12/2016.



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**

*13th Quarterly Progress Report (December 2016-February 2017)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

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

4 June 2017

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 will end upon the completion of the dolphin monitoring carried out by HKLR03 contract.
- 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 TM-CLKL Northern Connection Sub-sea Tunnel Section EM&A project. He is responsible for the dolphin monitoring study, including the data collection on Chinese White Dolphins during the construction phase (i.e. impact period) of the TM-CLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas.

- 1.4. During the construction period of HKLR, the dolphin specialist would be in charge of reviewing and collating information collected by HKLR03 dolphin monitoring programme to examine any potential impacts of TM-CLKL construction works on the dolphins.
- 1.5. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional mitigation measures will be recommended as necessary.
- 1.6. This report is the 13th quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, summarizing the results of the surveys findings during the period of December 2016 to February 2017, utilizing the survey data collected by HKLR03 impact phase monitoring project.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

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

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

Line No.		Easting	Northing		Line No.		Easting	Northing
1	Start Point	804671	815456		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805475	815913		14	Start Point	817537	820220
2	End Point	805477	826654		14	End Point	817537	824613
3	Start Point	806464	819435		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	819771		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	820220		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	820466		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	820880		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	820872		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					
12	End Point	815542	824882					

- 2.1.2. The HKLR03 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 19 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2015, 2016). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines was labeled as “secondary” survey effort. According to HKCRP long-term dolphin monitoring data, encounter rates of Chinese white dolphins deduced from effort and sighting data collected along primary and secondary lines were similar in NEL and NWL survey areas. Therefore, both primary and secondary survey effort were presented as on-effort survey effort in this report.

2.2. Photo-identification Work

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

2.3. Data Analysis

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

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

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

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

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

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

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

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

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 December 2016 to February 2017, six sets of systematic line-transect vessel surveys were conducted under the HKLR03 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.1.1. From these HKLR03 surveys, a total of 878.35 km of survey effort was collected, with 86.5% 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, 340.00 km and 538.35 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.1.1.2. The total survey effort conducted on primary lines was 632.39 km, while the effort on secondary lines was 245.96 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. A summary table of the survey effort is shown in Appendix I.
- 3.1.1.3. During the six sets of HKLR03 monitoring surveys from December 2016 to February 2017, a total of 17 groups of 62 Chinese White Dolphins were sighted. Fourteen of the 17 dolphin sightings were made during on-effort during this quarter, while all except one

on-effort dolphin sightings were made on primary lines. A summary table of dolphin sightings is shown in Appendix II. In this quarterly period, all dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during HKLR03 monitoring surveys.

3.2. *Distribution*

- 3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from December 2016 to February 2017 is shown in Figure 1. Dolphin sightings made in the present quarter were mainly located to the north of Lung Kwu Chau and at the northwestern end of NWL survey area (Figure 1). A few sightings were also made to the west of airport platform adjacent to the western territorial boundary (Figure 1). On the other hand, the dolphins were completely absent from the central and western portions of North Lantau waters as in previous quarters (Figure 1).
- 3.2.2. Notably, all dolphin sightings were located far away from the alignment of TM-CLKL as well as the HKBCF and HKLR03 reclamation sites (Figure 1). On the contrary, two dolphin groups were sighted adjacent to the HKLR09 alignment near Sham Wat (Figure 1).
- 3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (December 2016 to February 2017) was drastically different from the one during the baseline monitoring period (September to November 2011) (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 16 quarters of HKLR03 monitoring, which has resulted in zero to extremely low dolphin encounter rates in this area.
- 3.2.4. In NWL survey area, dolphin occurrence was also significantly different between the baseline and impact phase periods. During the present impact monitoring period, much fewer dolphins occurred in this survey area (mostly to the north of Lung Kwu Chau at the northwestern corner of the survey area) than during the baseline period, when many dolphin groups were frequently sighted between Lung Kwu Chau and Black Point, around Sha Chau, near Pillar Point and to the west of the Chek Lap Kok Airport (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the five quarterly periods of winter months in 2012-17 (Figure 2). Among the five winter periods, dolphins were regularly sighted in NWL waters in 2012-13 and 2013-14, but their usage there has gradually diminished in the three subsequent winter periods, with the only occurrences mostly concentrated within and around the Sha Chau and Lung Kwu Chau Marine Park (Figure 2).

3.3. *Encounter rate*

- 3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines

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

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during December 2016 – February 2017

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 (1 & 6 Dec 2016)	0.00	0.00
	Set 2 (16 & 19 Dec 2016)	0.00	0.00
	Set 3 (10 & 12 Jan 2017)	0.00	0.00
	Set 4 (16 & 20 Jan 2017)	0.00	0.00
	Set 5 (7 & 9 Feb 2017)	0.00	0.00
	Set 6 (16 & 21 Feb 2017)	0.00	0.00
Northwest Lantau	Set 1 (1 & 6 Dec 2016)	1.58	1.58
	Set 2 (16 & 19 Dec 2016)	5.99	22.45
	Set 3 (10 & 12 Jan 2017)	0.00	0.00
	Set 4 (16 & 20 Jan 2017)	6.27	20.38
	Set 5 (7 & 9 Feb 2017)	0.00	0.00
	Set 6 (16 & 21 Feb 2017)	8.99	42.71

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (December 2016 – February 2017) and baseline monitoring period (September – November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	December 2016 – February 2017	September – November 2011	December 2016 – February 2017	September – November 2011
Northeast Lantau	0.0	6.00 \pm 5.05	0.0	22.19 \pm 26.81
Northwest Lantau	3.80 \pm 3.79	9.85 \pm 5.85	14.52 \pm 17.21	44.66 \pm 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 2.91 sightings and 10.73 dolphins per 100 km of survey effort respectively, while the

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

- 3.3.3. In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were both zero with no on-effort sighting being made, and such extremely low occurrence of dolphins in NEL have been consistently recorded in the past 16 quarters of HKLR03 monitoring (Table 4). This is a serious concern as the dolphin occurrence in NEL in the past few years (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) have remained exceptionally low when compared to the baseline period (Table 4). Dolphins have been virtually absent from NEL waters since January 2014, with only three groups of six dolphins sighted there since then despite consistent and intensive survey effort being conducted in this survey area.

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from all quarters of HKLR03 impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; the encounter rates in **winter** months were highlighted in **blue**; ± 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
December 2012-February 2013 (Impact)	3.14 ± 3.21	6.33 ± 8.64
March-May 2013 (Impact)	0.42 ± 1.03	0.42 ± 1.03
June-August 2013 (Impact)	0.88 ± 1.36	3.91 ± 8.36
September-November 2013 (Impact)	1.01 ± 1.59	3.77 ± 6.49
December 2013-February 2014 (Impact)	0.45 ± 1.10	1.34 ± 3.29
March-May 2014 (Impact)	0.00	0.00
June-August 2014 (Impact)	0.42 ± 1.04	1.69 ± 4.15
September-November 2014 (Impact)	0.00	0.00
December 2014-February 2015 (Impact)	0.00	0.00
March-May 2015 (Impact)	0.00	0.00
June-August 2015 (Impact)	0.44 ± 1.08	0.44 ± 1.08
September-November 2015 (Impact)	0.00	0.00
December 2015-February 2016 (Impact)	0.00	0.00
March-May 2016 (Impact)	0.00	0.00
June-August 2016 (Impact)	0.00	0.00
September-November 2016 (Impact)	0.00	0.00
December 2016-February 2017 (Impact)	0.00	0.00

3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period (reductions of 61.4% and 67.5% respectively) were only small fractions of the ones recorded during the three-month baseline period, indicating a dramatic decline in dolphin usage of this survey area as well during the present impact phase period (Table 5).

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

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	9.85 \pm 5.85	44.66 \pm 29.85
December 2012-February 2013 (Impact)	8.36 \pm 5.03	35.90 \pm 23.10
March-May 2013 (Impact)	7.75 \pm 3.96	24.23 \pm 18.05
June-August 2013 (Impact)	6.56 \pm 3.68	27.00 \pm 18.71
September-November 2013 (Impact)	8.04 \pm 1.10	32.48 \pm 26.51
December 2013-February 2014 (Impact)	8.21 \pm 2.21	32.58 \pm 11.21
March-May 2014 (Impact)	6.51 \pm 3.34	19.14 \pm 7.19
June-August 2014 (Impact)	4.74 \pm 3.84	17.52 \pm 15.12
September-November 2014 (Impact)	5.10 \pm 4.40	20.52 \pm 15.10
December 2014-February 2015 (Impact)	2.91 \pm 2.69	11.27 \pm 15.19
March-May 2015 (Impact)	0.47 \pm 0.73	2.36 \pm 4.07
June-August 2015 (Impact)	2.53 \pm 3.20	9.21 \pm 11.57
September-November 2015 (Impact)	3.94 \pm 1.57	21.05 \pm 17.19
December 2015-February 2016 (Impact)	2.64 \pm 1.52	10.98 \pm 3.81
March-May 2016 (Impact)	0.98 \pm 1.10	4.78 \pm 6.85
June-August 2016 (Impact)	1.72 \pm 2.17	7.48 \pm 10.98
September-November 2016 (Impact)	2.86 \pm 1.98	10.89 \pm 10.98
December 2016-February 2017 (Impact)	3.80 \pm 3.79	14.52 \pm 17.21

3.3.5. During the same winter quarters, dolphin encounter rates in NWL during 2016-17 was slightly higher than the previous two winter periods, but was still much lower than the ones in the winter periods of 2012-13 and 2013-14 (Table 5). Such temporal trend should be closely monitored in the upcoming monitoring quarters whether the dolphin occurrence would continue to increase as the construction activities of HZMB works have

been mostly completed in coming months.

- 3.3.6. As recently discussed in Hung (2016), the dramatic decline in dolphin usage of NEL waters in the past few years (including the declines in abundance, encounter rate and habitat use in NEL, as well as shifts of individual core areas and ranges away from NEL waters) was possibly related to the HZMB construction works that were commenced since 2012. It appeared that such noticeable decline has already extended to NWL waters progressively in the past few years, and with no sign of recovery even the HZMB-related construction activities has well past the peak.
- 3.3.7. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.3.8. For the comparison between the baseline period and the present quarter (17th quarter of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0110 and 0.0440 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarters in both the average dolphin encounter rates of STG and ANI.
- 3.3.9. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. the first 17 quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.000003 and 0.000001 respectively. 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).
- 3.3.10. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented in previous quarters. This raises serious concern, as the timing of the decline in dolphin usage in North Lantau waters coincided well with the construction schedule of the HZMB-related projects (Hung 2016).
- 3.3.11. To ensure the continuous usage of North Lantau waters by the dolphins, every possible measure should be implemented by the contractors and relevant authorities of HZMB-related works to minimize all disturbances to the dolphins.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from one to eight individuals per group in North Lantau region during December 2016 to February 2017. 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 (December 2016 – February 2017) and baseline monitoring period (September – November 2011) (Note: \pm denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	December 2016 – February 2017	September – November 2011
Overall	3.65 \pm 2.37 (n = 17)	3.72 \pm 3.13 (n = 66)
Northeast Lantau	---	3.18 \pm 2.16 (n = 17)
Northwest Lantau	3.65 \pm 2.37 (n = 17)	3.92 \pm 3.40 (n = 49)

- 3.4.2. The average dolphin group size in NWL waters during December 2016 to February 2017 was slightly lower than the one recorded during the three-month baseline period (Table 6). Most of these dolphin groups were composed of 1-4 individuals only, while there were five medium-sized groups of 5-8 individuals.
- 3.4.3. Distribution of the larger dolphin groups (i.e. five individuals or more per group) during the present quarter is shown in Figure 3, with comparison to the one in baseline period. During the winter months of 2016-17, the five medium-sized groups were sighted to the north of Lung Kwu Chau, near Sha Chau, and to the west of the airport platform (Figure 3). Such distribution pattern was very different from the baseline period, when the larger dolphin groups were more frequently sighted and more evenly distributed in NWL waters, with a few more sighted in NEL waters (Figure 3).
- 3.5. *Habitat use*
- 3.5.1. From December 2016 to February 2017, the more important habitats utilized by Chinese White Dolphins were mostly concentrated around Lung Kwu Chau and to the north of the island (Figures 4a and 4b). Two grids located to the west of the airport platform and adjacent to HKLR09 alignment also recorded moderate to high densities of dolphins. On the contrary, all grids near TMCLKL alignment as well as HKLR03/HKBCF reclamation sites did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b).
- 3.5.2. However, it should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern should be examined when more survey effort for each grid will be collected throughout the impact phase monitoring programme.
- 3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present impact monitoring period (Figure 5). 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 5).

- 3.5.4. The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with higher 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, the only areas with moderate to high dolphin densities were restricted to the waters near Lung Kwu Chau during the present impact phase period (Figure 5).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the present quarterly period, three unspotted juveniles were sighted with their mothers in the North Lantau region. These sightings of young calves were located near Sha Chau and to the west of the airport platform (Figure 6).
- 3.6.2. The infrequent occurrence of young calves in the present quarter was very different from their regular occurrence in North Lantau waters during the baseline period (Figure 6). This should be of a serious concern, and the occurrence of young calves in North Lantau waters should be closely monitored in the upcoming quarters.
- 3.7. *Activities and associations with fishing boats*
- 3.7.1. Four of the 17 dolphin groups were engaged in feeding activities, while none of them was engaged in socializing, traveling or milling/resting activity during the three-month study period. The percentage of sightings associated with feeding activities (23.5%) was much higher than the one recorded during the baseline period (11.6%). However, it should be noted the sample size on total numbers of dolphin sightings during the present quarter (17 dolphin groups) was much lower than the baseline period (66 dolphin groups).
- 3.7.2. Distribution of dolphins engaged in various activities during the present impact phase period and the baseline period is shown in Figure 6. The four dolphin groups engaged in feeding activities were sighted around Lung Kwu Chau, Sha Chau as well as to the west of Shum Wat adjacent to the HKLR09 alignment during the present quarterly period, which was very different from the baseline period when various dolphin activities occurred throughout the North Lantau region (Figure 6).
- 3.7.3. Notably, none of the 17 dolphin groups was found to be associated with any operating fishing vessel during the present impact phase period.
- 3.8. *Summary of photo-identification works*
- 3.8.1. From December 2016 to February 2017, over 2,100 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, 26 individuals sighted 43 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these re-sightings were made in NWL. Nine individuals (NL46, NL98, NL104, NL136, NL182, NL210, NL321 WL145 and WL275) were re-sighted twice, while two individuals (NL202 and NL286) were both re-sighted five times during the three-month period (Appendix III).

- 3.8.3. Notably, six of these 26 individuals (CH105, NL98, NL120, NL123, NL182 and NL226) were also sighted in West Lantau waters during the HKLR09 monitoring surveys from December 2016 to February 2017, showing their extensive individual movements across different survey areas.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the 26 individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.
- 3.9.2. All identified dolphins sighted in the present quarter were utilizing NWL waters only, but have completely avoided NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as the baseline period.
- 3.9.3. On the other hand, several individuals (NL98, NL120, NL123, NL182 and NL226) consistently utilized North Lantau waters in the past have extended their range use to WL during the present quarter. In the upcoming quarters, individual range use and movements should be continuously monitored to examine whether there has been any consistent shifts of individual home ranges from North Lantau to West or Southwest Lantau, as such shift could possibly be related to the HZMB-related construction works (see Hung 2015, 2016).

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 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, 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.

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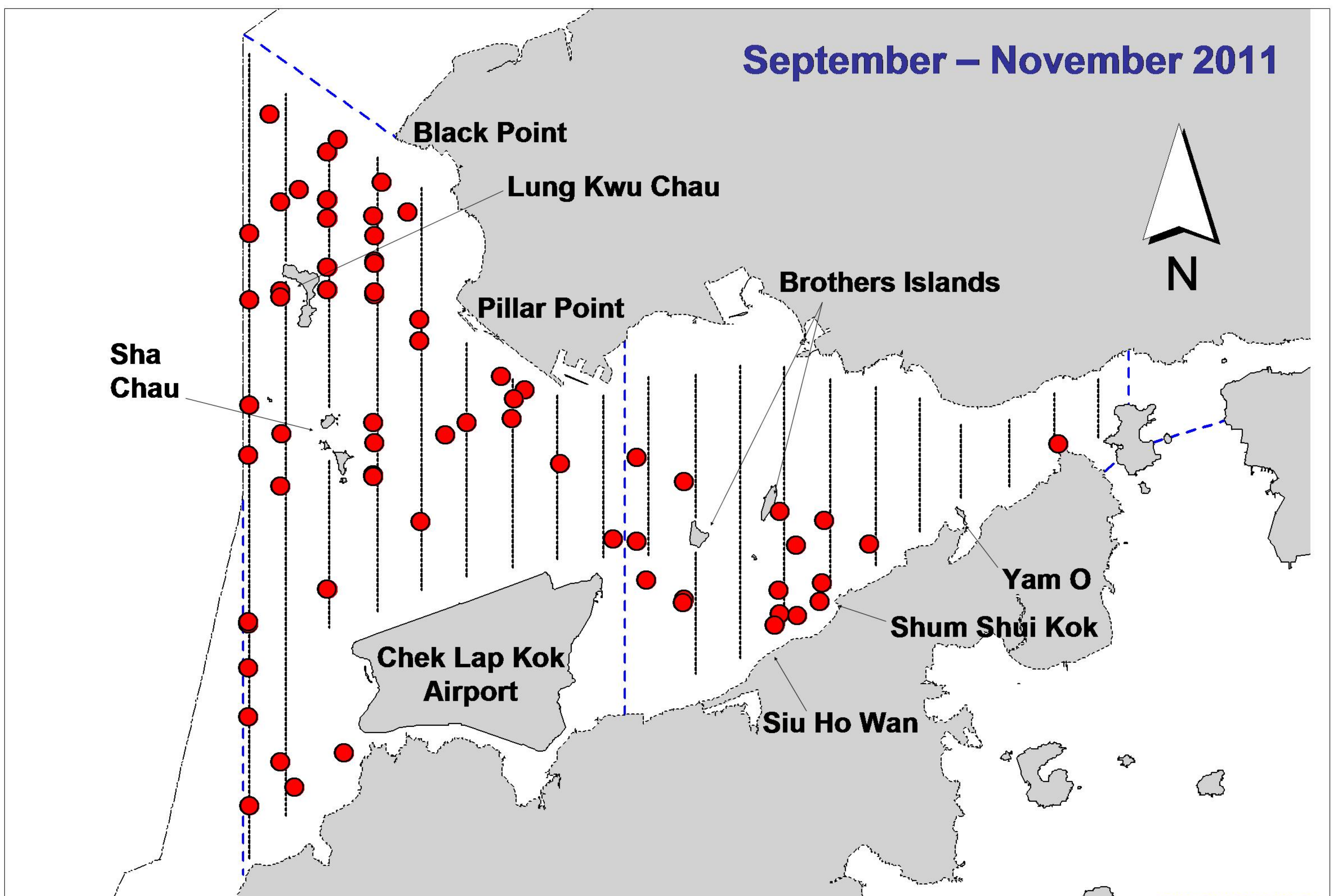
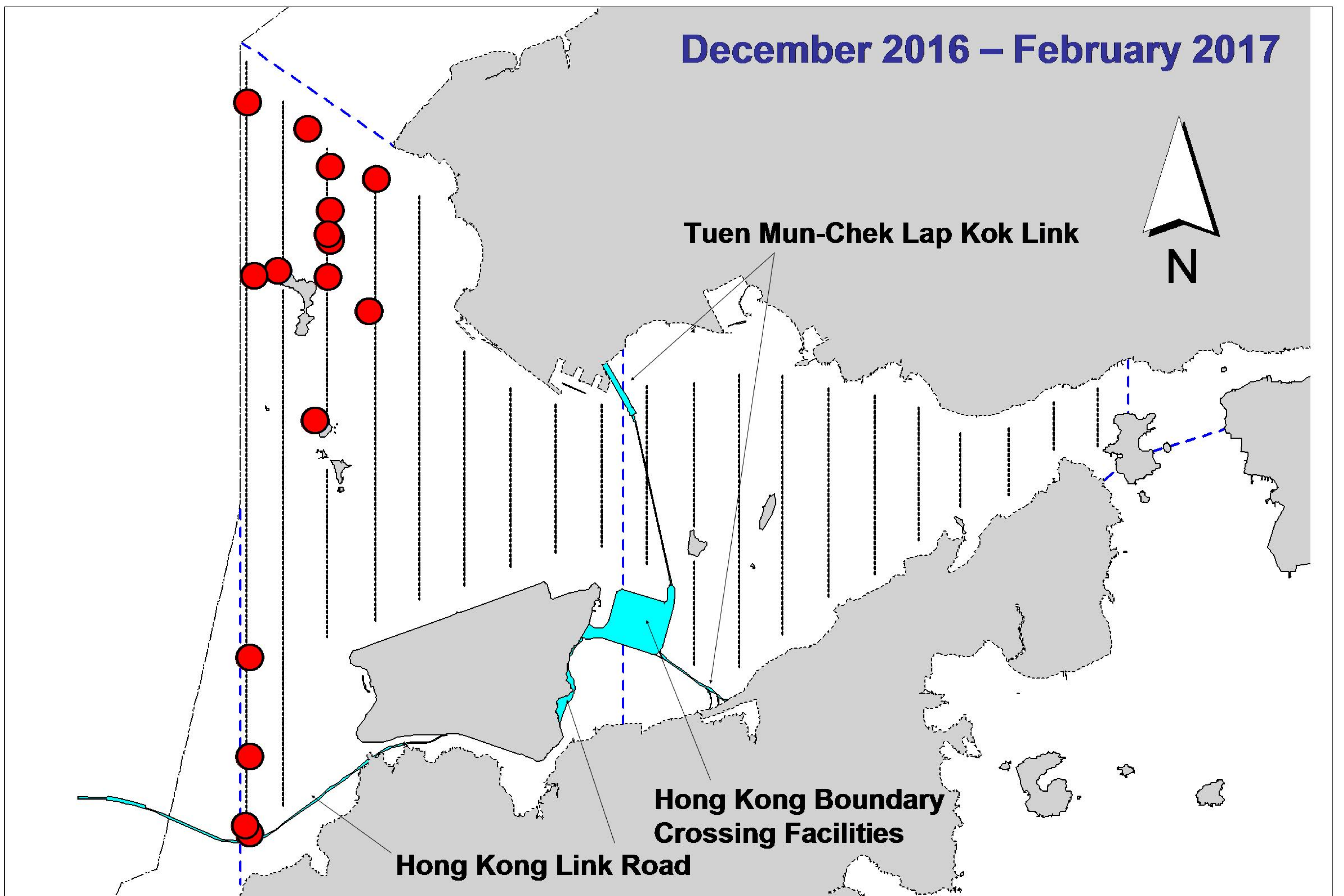


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

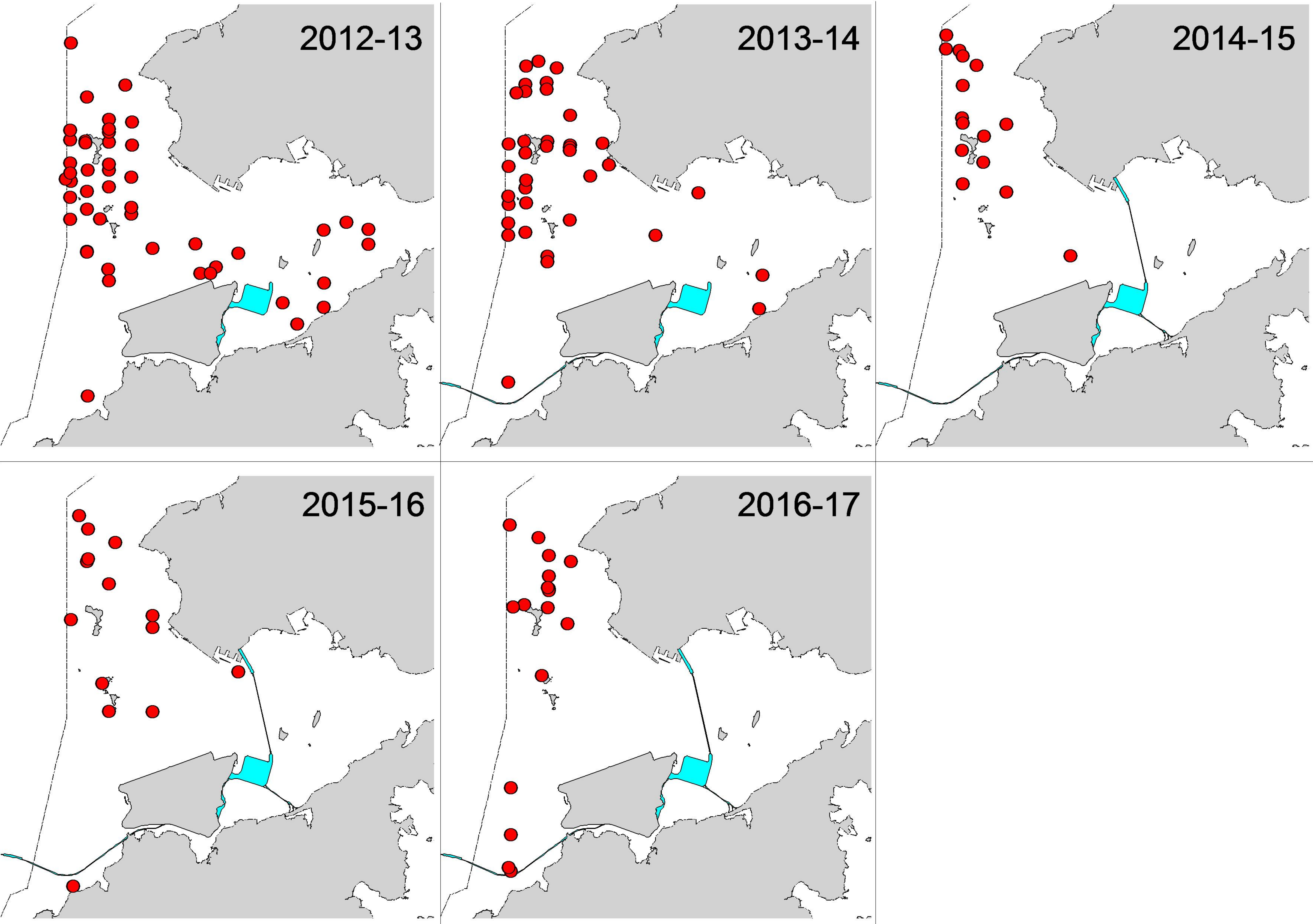


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past five winter quarters (December-February) of HKLR03 impact phase in 2012-17

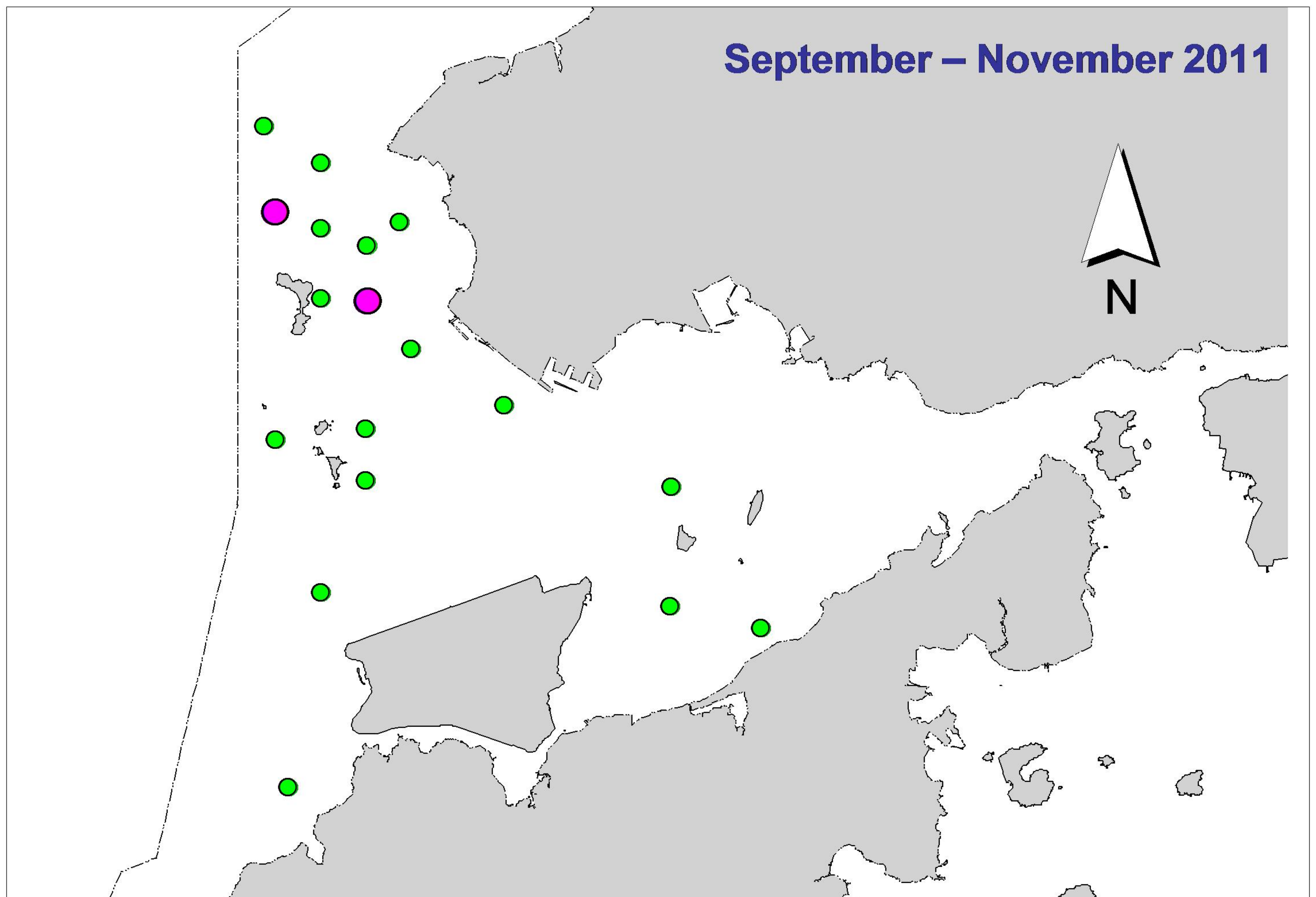
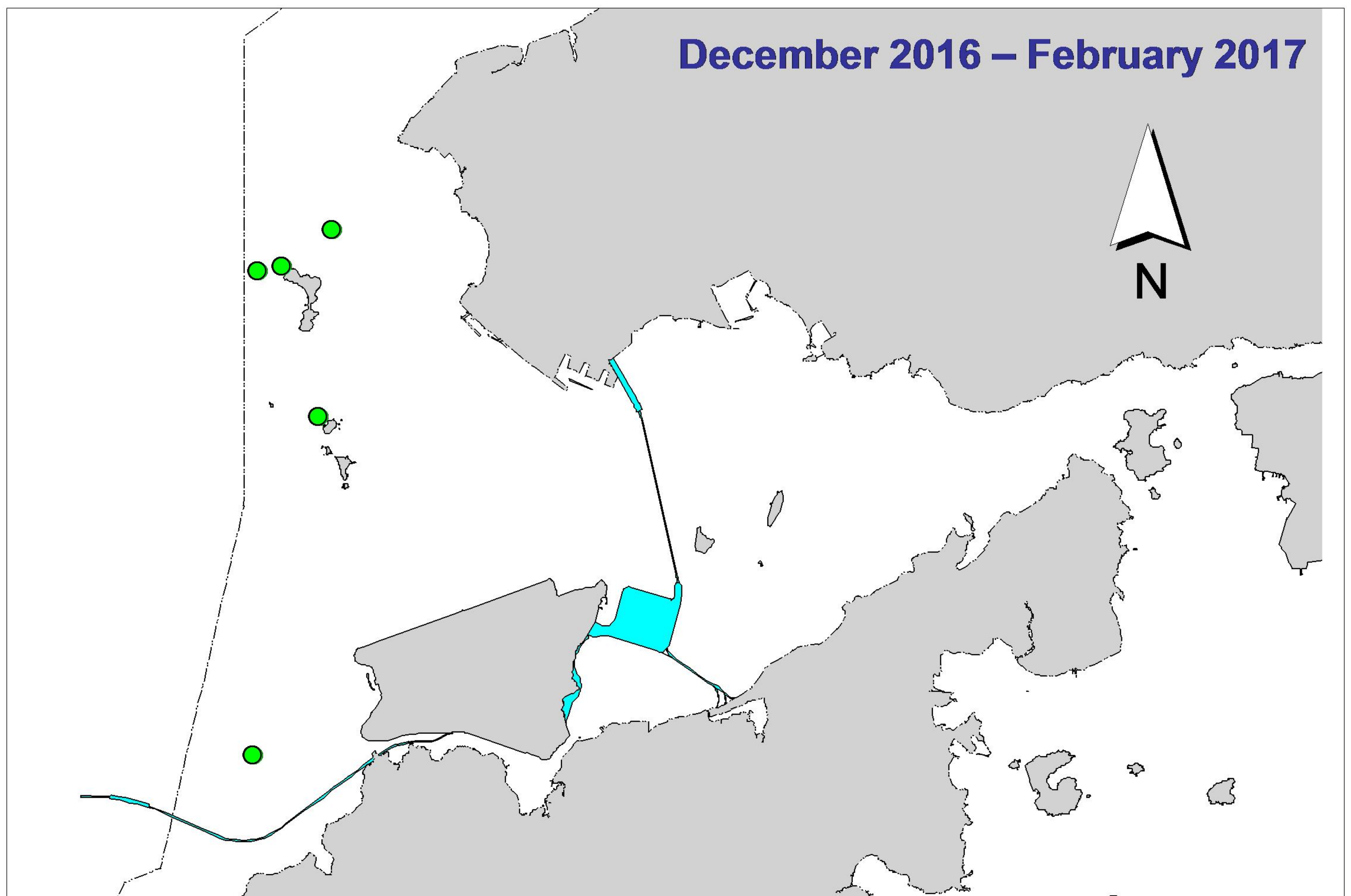


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

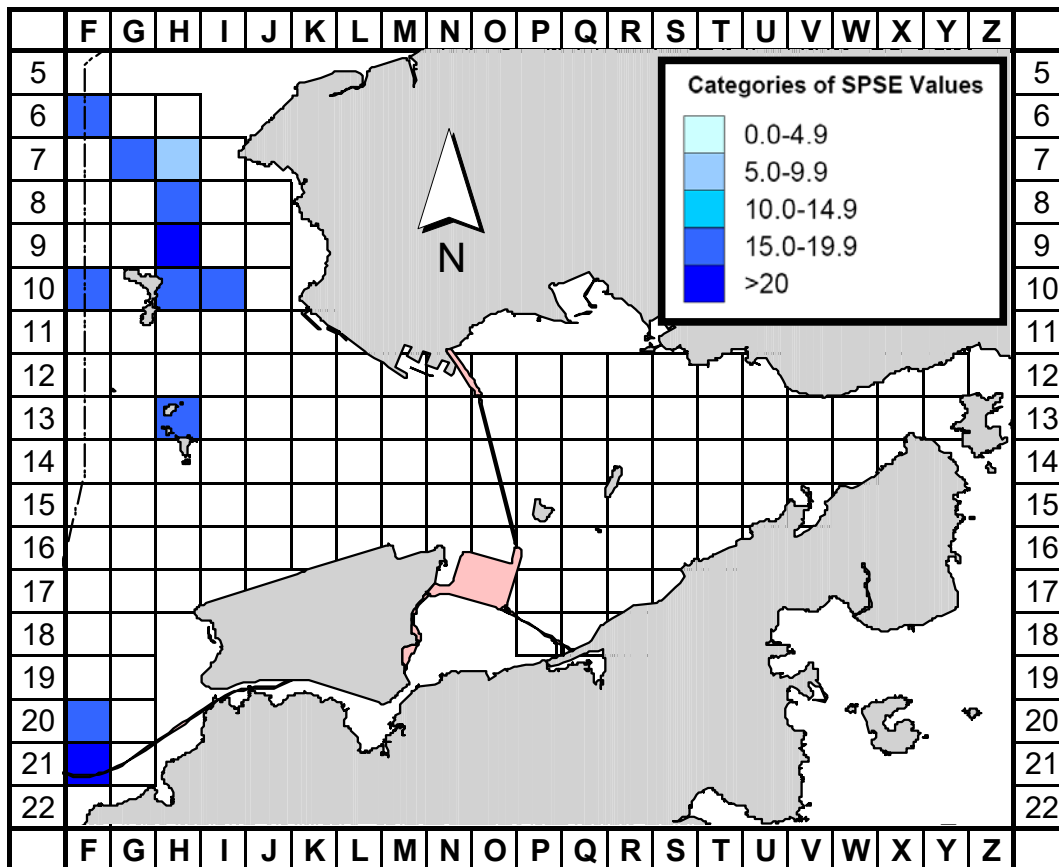


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Dec16-Feb17) (SPSE = no. of on-effort sightings per 100 units of survey effort)

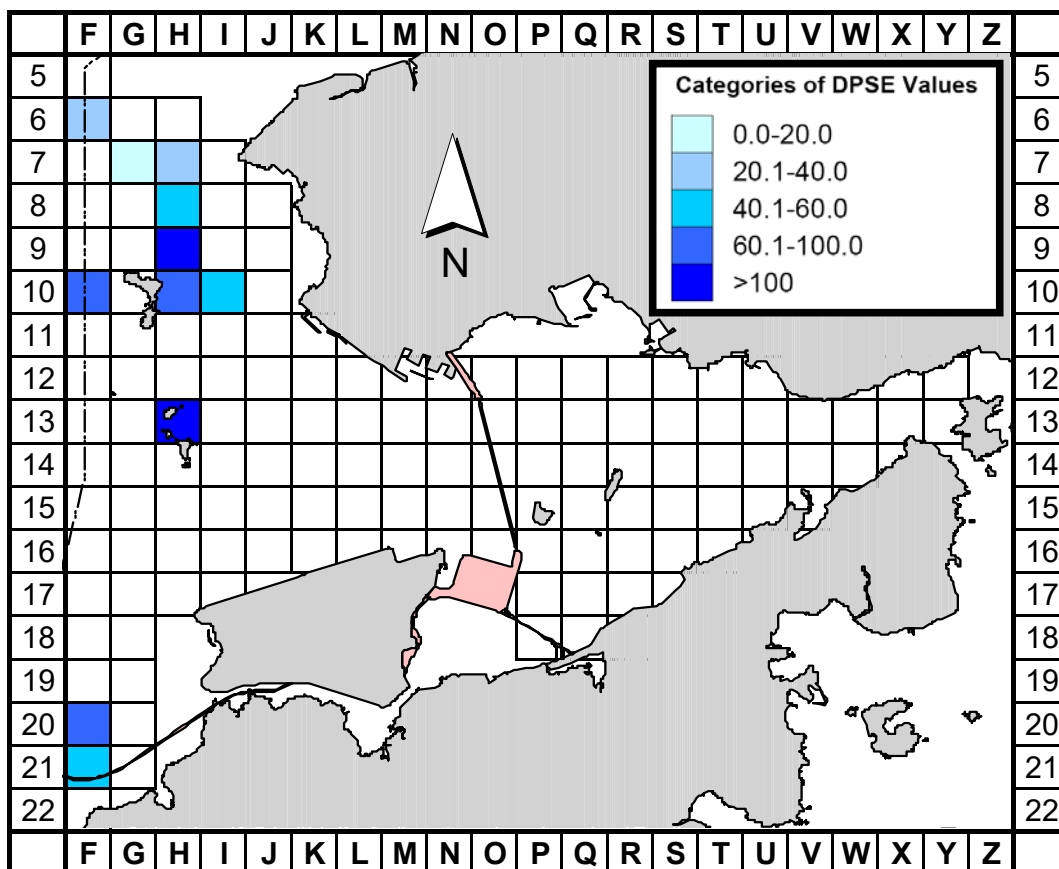


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Dec16-Feb17) (DPSE = no. of dolphins per 100 units of survey effort)

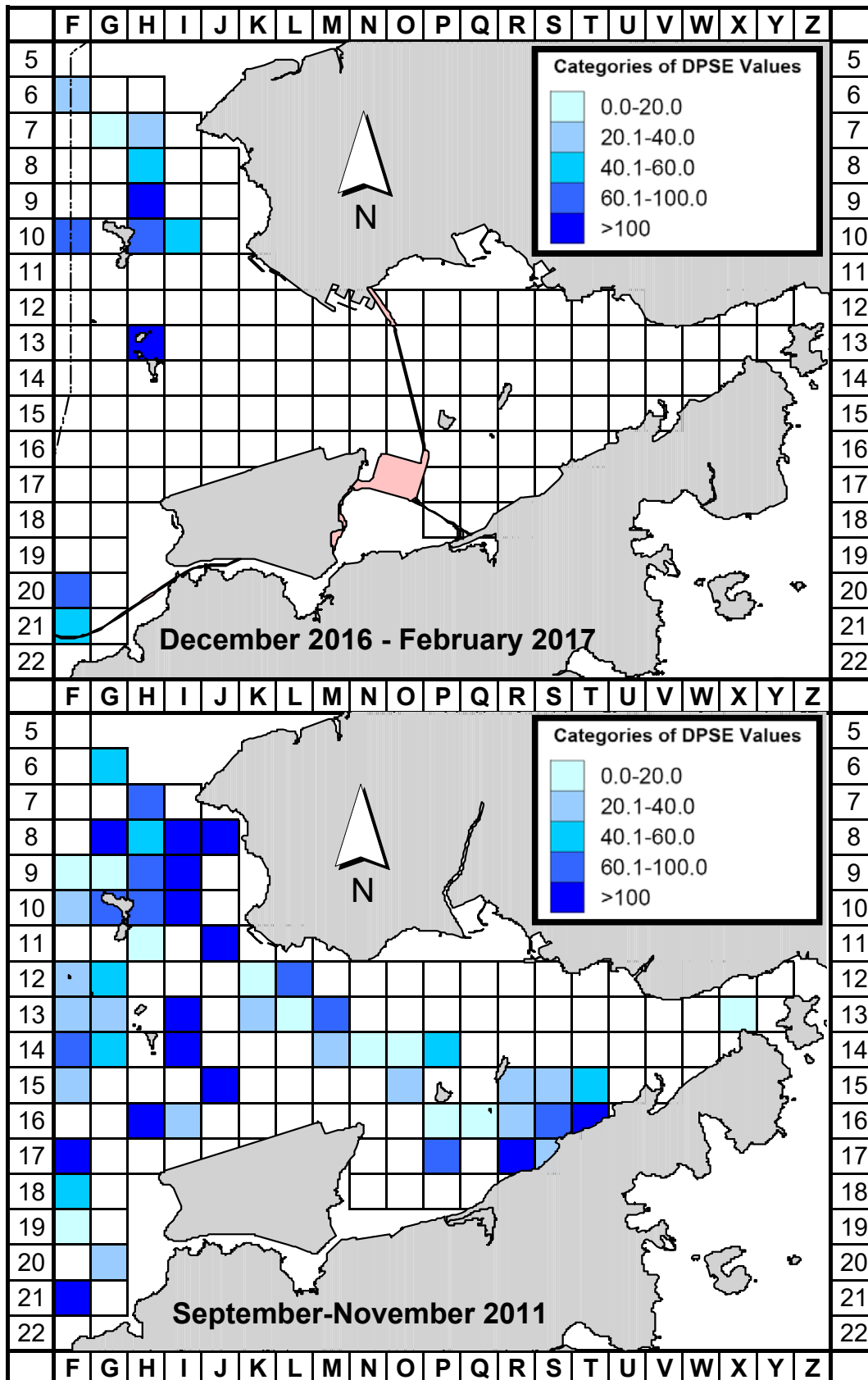


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (December 2016 - February 2017) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

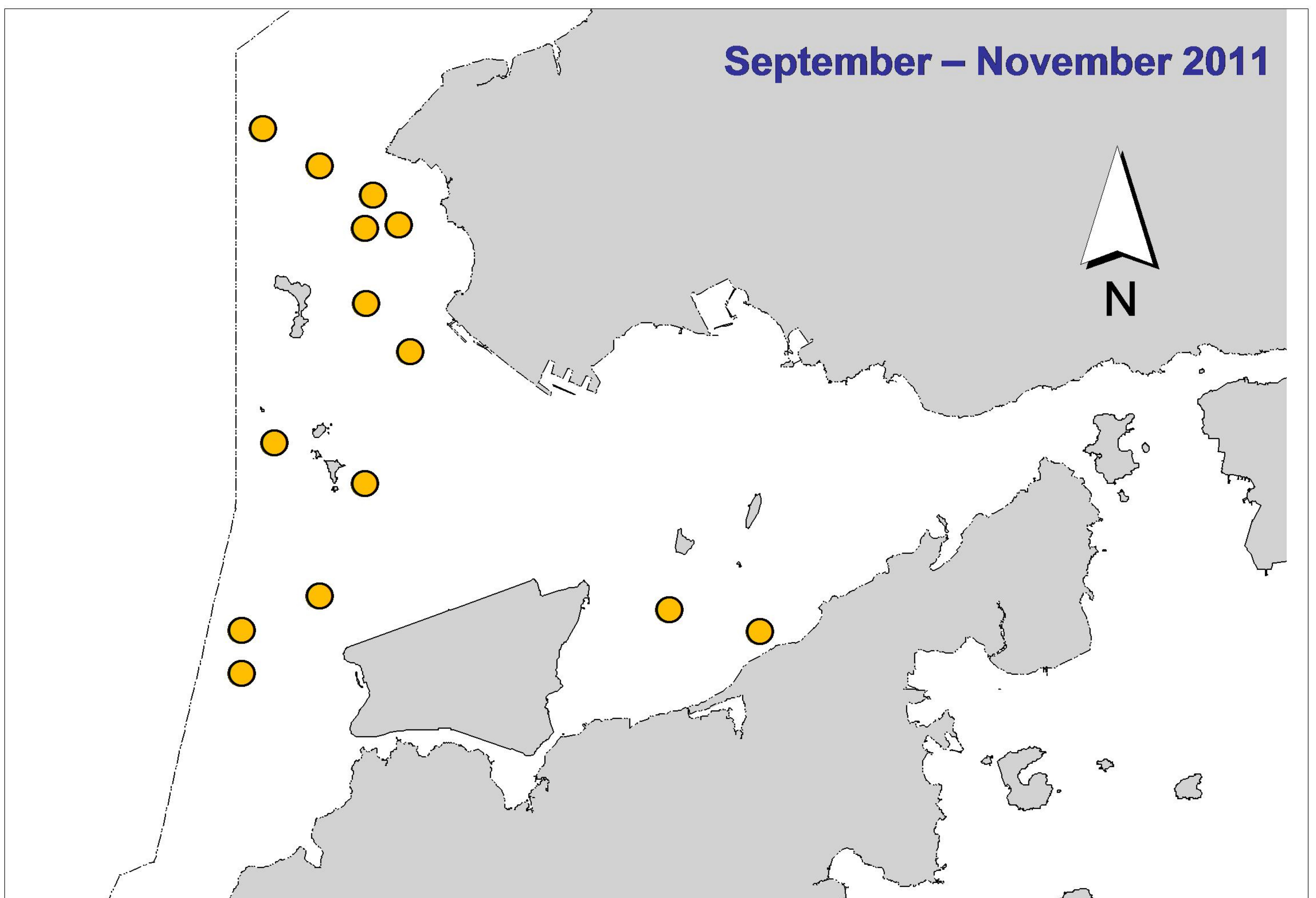
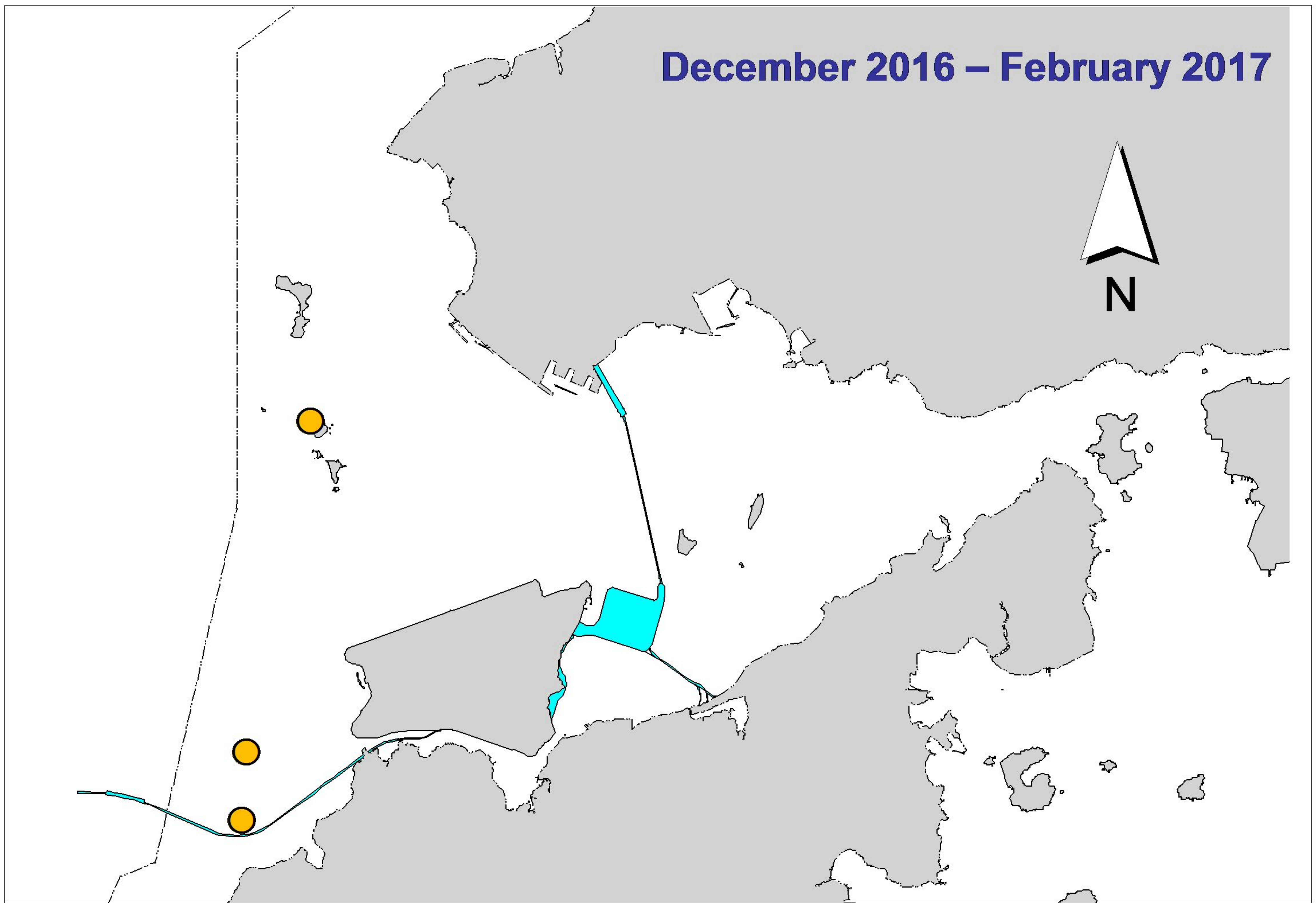


Figure 6. Distribution of young calves of Chinese white dolphins during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

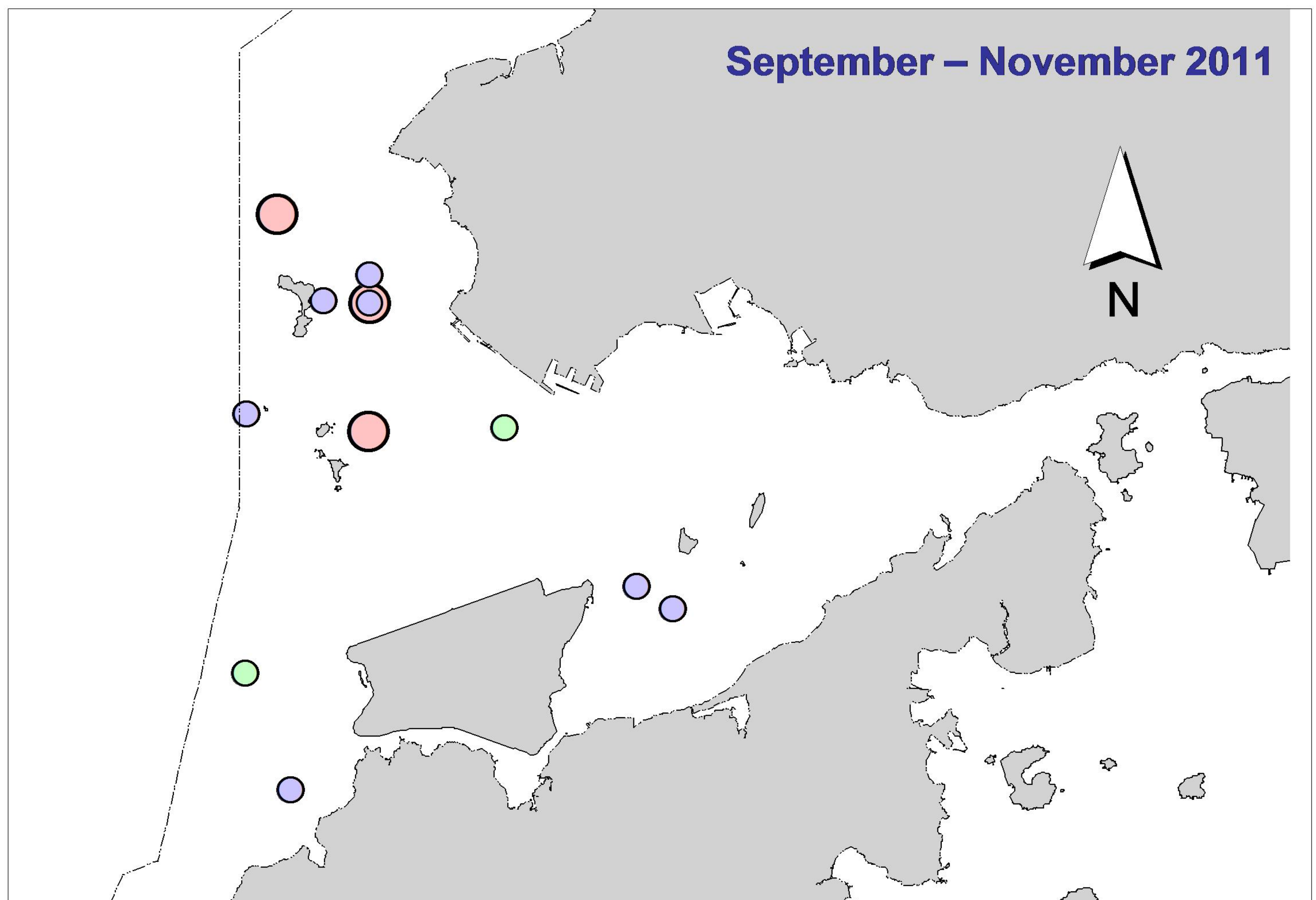
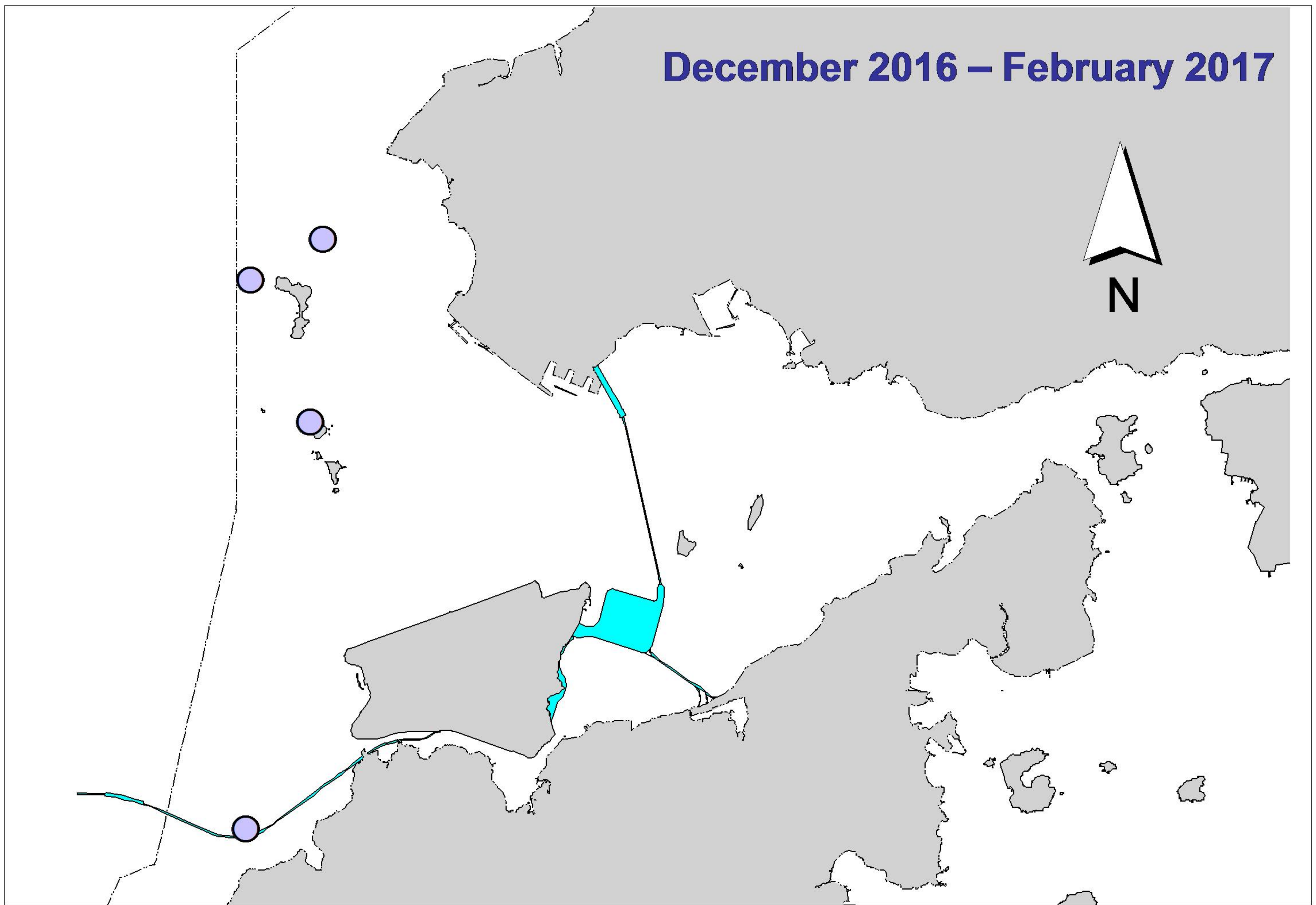


Figure 7. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (Dec 2016 - Feb 2017)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
1-Dec-16	NE LANTAU	1	1.10	WINTER	STANDARD36826	HKLR	P
1-Dec-16	NE LANTAU	2	14.04	WINTER	STANDARD36826	HKLR	P
1-Dec-16	NE LANTAU	3	2.70	WINTER	STANDARD36826	HKLR	P
1-Dec-16	NE LANTAU	2	6.99	WINTER	STANDARD36826	HKLR	S
1-Dec-16	NE LANTAU	3	2.87	WINTER	STANDARD36826	HKLR	S
1-Dec-16	NW LANTAU	2	7.78	WINTER	STANDARD36826	HKLR	P
1-Dec-16	NW LANTAU	3	30.29	WINTER	STANDARD36826	HKLR	P
1-Dec-16	NW LANTAU	4	2.10	WINTER	STANDARD36826	HKLR	P
1-Dec-16	NW LANTAU	2	0.10	WINTER	STANDARD36826	HKLR	S
1-Dec-16	NW LANTAU	3	12.43	WINTER	STANDARD36826	HKLR	S
6-Dec-16	NE LANTAU	2	8.24	WINTER	STANDARD36826	HKLR	P
6-Dec-16	NE LANTAU	3	12.45	WINTER	STANDARD36826	HKLR	P
6-Dec-16	NE LANTAU	2	5.56	WINTER	STANDARD36826	HKLR	S
6-Dec-16	NE LANTAU	3	5.85	WINTER	STANDARD36826	HKLR	S
6-Dec-16	NW LANTAU	2	3.30	WINTER	STANDARD36826	HKLR	P
6-Dec-16	NW LANTAU	3	21.96	WINTER	STANDARD36826	HKLR	P
6-Dec-16	NW LANTAU	4	6.80	WINTER	STANDARD36826	HKLR	P
6-Dec-16	NW LANTAU	2	2.34	WINTER	STANDARD36826	HKLR	S
6-Dec-16	NW LANTAU	3	5.60	WINTER	STANDARD36826	HKLR	S
16-Dec-16	NE LANTAU	2	1.84	WINTER	STANDARD36826	HKLR	P
16-Dec-16	NE LANTAU	3	15.94	WINTER	STANDARD36826	HKLR	P
16-Dec-16	NE LANTAU	4	2.10	WINTER	STANDARD36826	HKLR	P
16-Dec-16	NE LANTAU	2	2.56	WINTER	STANDARD36826	HKLR	S
16-Dec-16	NE LANTAU	3	8.66	WINTER	STANDARD36826	HKLR	S
16-Dec-16	NW LANTAU	2	8.49	WINTER	STANDARD36826	HKLR	P
16-Dec-16	NW LANTAU	3	22.63	WINTER	STANDARD36826	HKLR	P
16-Dec-16	NW LANTAU	2	3.41	WINTER	STANDARD36826	HKLR	S
16-Dec-16	NW LANTAU	3	4.41	WINTER	STANDARD36826	HKLR	S
19-Dec-16	NW LANTAU	2	25.43	WINTER	STANDARD36826	HKLR	P
19-Dec-16	NW LANTAU	3	10.26	WINTER	STANDARD36826	HKLR	P
19-Dec-16	NW LANTAU	2	6.14	WINTER	STANDARD36826	HKLR	S
19-Dec-16	NW LANTAU	3	5.93	WINTER	STANDARD36826	HKLR	S
19-Dec-16	NE LANTAU	2	2.66	WINTER	STANDARD36826	HKLR	P
19-Dec-16	NE LANTAU	3	12.82	WINTER	STANDARD36826	HKLR	P
19-Dec-16	NE LANTAU	2	4.15	WINTER	STANDARD36826	HKLR	S
19-Dec-16	NE LANTAU	3	5.57	WINTER	STANDARD36826	HKLR	S
10-Jan-17	NE LANTAU	2	4.00	WINTER	STANDARD36826	HKLR	P
10-Jan-17	NE LANTAU	3	14.60	WINTER	STANDARD36826	HKLR	P
10-Jan-17	NE LANTAU	2	8.90	WINTER	STANDARD36826	HKLR	S
10-Jan-17	NE LANTAU	3	2.10	WINTER	STANDARD36826	HKLR	S
10-Jan-17	NW LANTAU	2	0.70	WINTER	STANDARD36826	HKLR	P
10-Jan-17	NW LANTAU	3	28.52	WINTER	STANDARD36826	HKLR	P
10-Jan-17	NW LANTAU	4	2.10	WINTER	STANDARD36826	HKLR	P
10-Jan-17	NW LANTAU	2	2.10	WINTER	STANDARD36826	HKLR	S
10-Jan-17	NW LANTAU	3	5.88	WINTER	STANDARD36826	HKLR	S
12-Jan-17	NW LANTAU	2	11.90	WINTER	STANDARD31516	HKLR	P
12-Jan-17	NW LANTAU	3	28.60	WINTER	STANDARD31516	HKLR	P
12-Jan-17	NW LANTAU	2	11.00	WINTER	STANDARD31516	HKLR	S
12-Jan-17	NW LANTAU	3	2.30	WINTER	STANDARD31516	HKLR	S
12-Jan-17	NE LANTAU	2	16.82	WINTER	STANDARD31516	HKLR	P
12-Jan-17	NE LANTAU	2	8.97	WINTER	STANDARD31516	HKLR	S
12-Jan-17	NE LANTAU	3	1.00	WINTER	STANDARD31516	HKLR	S

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
16-Jan-17	NW LANTAU	2	17.83	WINTER	STANDARD36826	HKLR	P
16-Jan-17	NW LANTAU	3	19.51	WINTER	STANDARD36826	HKLR	P
16-Jan-17	NW LANTAU	2	10.47	WINTER	STANDARD36826	HKLR	S
16-Jan-17	NW LANTAU	3	2.70	WINTER	STANDARD36826	HKLR	S
16-Jan-17	NE LANTAU	2	10.30	WINTER	STANDARD36826	HKLR	P
16-Jan-17	NE LANTAU	3	6.40	WINTER	STANDARD36826	HKLR	P
16-Jan-17	NE LANTAU	2	9.60	WINTER	STANDARD36826	HKLR	S
20-Jan-17	NW LANTAU	2	0.70	WINTER	STANDARD31516	HKLR	P
20-Jan-17	NW LANTAU	3	25.76	WINTER	STANDARD31516	HKLR	P
20-Jan-17	NW LANTAU	4	4.64	WINTER	STANDARD31516	HKLR	P
20-Jan-17	NW LANTAU	2	1.20	WINTER	STANDARD31516	HKLR	S
20-Jan-17	NW LANTAU	3	6.20	WINTER	STANDARD31516	HKLR	S
20-Jan-17	NE LANTAU	2	13.65	WINTER	STANDARD31516	HKLR	P
20-Jan-17	NE LANTAU	3	5.69	WINTER	STANDARD31516	HKLR	P
20-Jan-17	NE LANTAU	2	10.46	WINTER	STANDARD31516	HKLR	S
7-Feb-17	NE LANTAU	2	0.61	WINTER	STANDARD36826	HKLR	P
7-Feb-17	NE LANTAU	3	8.22	WINTER	STANDARD36826	HKLR	P
7-Feb-17	NE LANTAU	4	10.00	WINTER	STANDARD36826	HKLR	P
7-Feb-17	NE LANTAU	2	0.96	WINTER	STANDARD36826	HKLR	S
7-Feb-17	NE LANTAU	3	5.61	WINTER	STANDARD36826	HKLR	S
7-Feb-17	NE LANTAU	4	4.60	WINTER	STANDARD36826	HKLR	S
7-Feb-17	NW LANTAU	2	1.58	WINTER	STANDARD36826	HKLR	P
7-Feb-17	NW LANTAU	3	16.98	WINTER	STANDARD36826	HKLR	P
7-Feb-17	NW LANTAU	4	12.66	WINTER	STANDARD36826	HKLR	P
7-Feb-17	NW LANTAU	3	5.78	WINTER	STANDARD36826	HKLR	S
7-Feb-17	NW LANTAU	4	1.80	WINTER	STANDARD36826	HKLR	S
9-Feb-17	NE LANTAU	2	4.59	WINTER	STANDARD31516	HKLR	P
9-Feb-17	NE LANTAU	3	12.25	WINTER	STANDARD31516	HKLR	P
9-Feb-17	NE LANTAU	2	5.54	WINTER	STANDARD31516	HKLR	S
9-Feb-17	NE LANTAU	3	4.53	WINTER	STANDARD31516	HKLR	S
9-Feb-17	NW LANTAU	2	2.18	WINTER	STANDARD31516	HKLR	P
9-Feb-17	NW LANTAU	3	8.68	WINTER	STANDARD31516	HKLR	P
9-Feb-17	NW LANTAU	4	28.37	WINTER	STANDARD31516	HKLR	P
9-Feb-17	NW LANTAU	3	7.37	WINTER	STANDARD31516	HKLR	S
9-Feb-17	NW LANTAU	4	6.00	WINTER	STANDARD31516	HKLR	S
16-Feb-17	NW LANTAU	2	36.29	WINTER	STANDARD36826	HKLR	P
16-Feb-17	NW LANTAU	2	10.85	WINTER	STANDARD36826	HKLR	S
16-Feb-17	NE LANTAU	1	0.70	WINTER	STANDARD36826	HKLR	P
16-Feb-17	NE LANTAU	2	14.21	WINTER	STANDARD36826	HKLR	P
16-Feb-17	NE LANTAU	2	7.08	WINTER	STANDARD36826	HKLR	S
16-Feb-17	NE LANTAU	3	1.81	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NW LANTAU	3	8.20	WINTER	STANDARD36826	HKLR	P
21-Feb-17	NW LANTAU	4	18.51	WINTER	STANDARD36826	HKLR	P
21-Feb-17	NW LANTAU	5	3.99	WINTER	STANDARD36826	HKLR	P
21-Feb-17	NW LANTAU	2	1.00	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NW LANTAU	3	2.40	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NW LANTAU	4	1.40	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NW LANTAU	5	2.80	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NE LANTAU	2	1.20	WINTER	STANDARD36826	HKLR	P
21-Feb-17	NE LANTAU	3	13.40	WINTER	STANDARD36826	HKLR	P
21-Feb-17	NE LANTAU	4	5.12	WINTER	STANDARD36826	HKLR	P
21-Feb-17	NE LANTAU	2	0.70	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NE LANTAU	3	4.70	WINTER	STANDARD36826	HKLR	S
21-Feb-17	NE LANTAU	4	5.58	WINTER	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (December 2016 - February 2017)

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

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
1-Dec-16	1	1337	1	NW LANTAU	3	233	ON	HKLR	827758	806489	WINTER	NONE	P
16-Dec-16	1	1308	3	NW LANTAU	3	74	ON	HKLR	826206	807351	WINTER	NONE	P
16-Dec-16	2	1359	8	NW LANTAU	3	ND	OFF	HKLR	827051	805334	WINTER	NONE	
19-Dec-16	1	1105	6	NW LANTAU	2	17	ON	HKLR	826942	804829	WINTER	NONE	P
19-Dec-16	2	1204	4	NW LANTAU	2	272	ON	HKLR	829219	806502	WINTER	NONE	P
19-Dec-16	3	1222	2	NW LANTAU	2	26	ON	HKLR	827680	806489	WINTER	NONE	P
16-Jan-17	1	1027	1	NW LANTAU	2	84	ON	HKLR	815336	804713	WINTER	NONE	P
16-Jan-17	2	1041	5	NW LANTAU	3	22	ON	HKLR	816920	804716	WINTER	NONE	P
16-Jan-17	3	1211	3	NW LANTAU	3	121	ON	HKLR	828289	806500	WINTER	NONE	P
16-Jan-17	4	1226	4	NW LANTAU	2	200	ON	HKLR	826916	806446	WINTER	NONE	P
7-Feb-17	1	1259	3	NW LANTAU	3	ND	OFF	HKLR	828941	807511	WINTER	NONE	
9-Feb-17	1	1510	1	NW LANTAU	4	515	ON	HKLR	829996	805999	WINTER	NONE	S
16-Feb-17	1	1006	2	NW LANTAU	2	325	ON	HKLR	815481	804610	WINTER	NONE	P
16-Feb-17	2	1027	2	NW LANTAU	2	ND	OFF	HKLR	818991	804710	WINTER	NONE	
16-Feb-17	3	1115	2	NW LANTAU	2	1311	ON	HKLR	830541	804672	WINTER	NONE	P
16-Feb-17	4	1139	7	NW LANTAU	2	98	ON	HKLR	827813	806448	WINTER	NONE	P
16-Feb-17	5	1210	8	NW LANTAU	2	4	ON	HKLR	823927	806152	WINTER	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in December 2016 - February 2017

ID#	DATE	STG#	AREA
CH34	19/12/16	1	NW LANTAU
CH105	16/02/17	5	NW LANTAU
NL46	16/12/16	2	NW LANTAU
	16/01/17	3	NW LANTAU
NL98	16/12/16	2	NW LANTAU
	16/02/17	5	NW LANTAU
NL104	19/12/16	1	NW LANTAU
	16/02/17	4	NW LANTAU
NL120	16/12/16	1	NW LANTAU
NL123	16/02/17	5	NW LANTAU
NL136	16/12/16	2	NW LANTAU
	16/01/17	3	NW LANTAU
NL182	01/12/16	1	NW LANTAU
	16/12/16	2	NW LANTAU
NL202	16/12/16	2	NW LANTAU
	19/12/16	1	NW LANTAU
	19/12/16	3	NW LANTAU
	16/01/17	4	NW LANTAU
	16/02/17	4	NW LANTAU
NL203	19/12/16	2	NW LANTAU
NL210	16/01/17	4	NW LANTAU
	09/02/17	1	NW LANTAU
NL226	16/12/16	1	NW LANTAU
NL260	16/02/17	5	NW LANTAU
NL269	16/01/17	2	NW LANTAU
NL286	16/12/16	2	NW LANTAU
	19/12/16	1	NW LANTAU
	19/12/16	3	NW LANTAU
	16/01/17	4	NW LANTAU
	16/02/17	4	NW LANTAU
NL296	16/12/16	1	NW LANTAU
NL320	16/02/17	4	NW LANTAU
NL321	19/12/16	1	NW LANTAU
	16/02/17	4	NW LANTAU

ID#	DATE	STG#	AREA
WL17	19/12/16	2	NW LANTAU
WL28	16/01/17	2	NW LANTAU
WL145	16/01/17	2	NW LANTAU
	16/02/17	1	NW LANTAU
WL179	16/02/17	5	NW LANTAU
WL234	16/01/17	3	NW LANTAU
WL261	16/02/17	5	NW LANTAU
WL275	07/02/17	1	NW LANTAU
	16/02/17	4	NW LANTAU

Appendix IV. Twenty-six individual dolphins that were identified during December 2016 to February 2017 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)

NL104



NL120



NL123



NL136



Appendix IV. (cont'd)

NL182



NL202



NL203



NL210



Appendix IV. (cont'd)

NL226



NL260



NL269



NL286



Appendix IV. (cont'd)

NL296



NL320



NL321



WL17



Appendix IV. (cont'd)

WL28



WL145



WL179



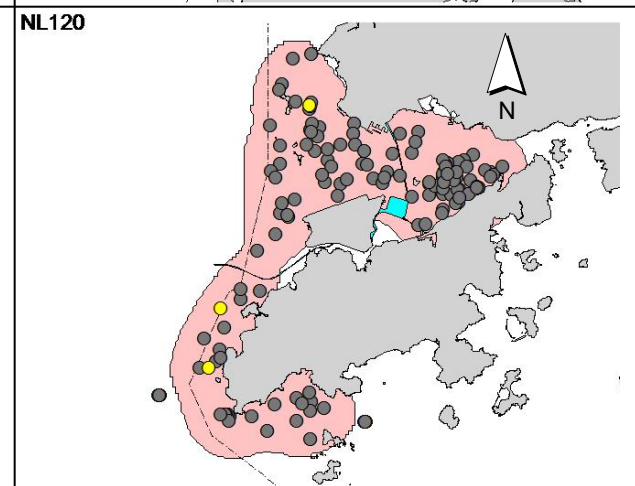
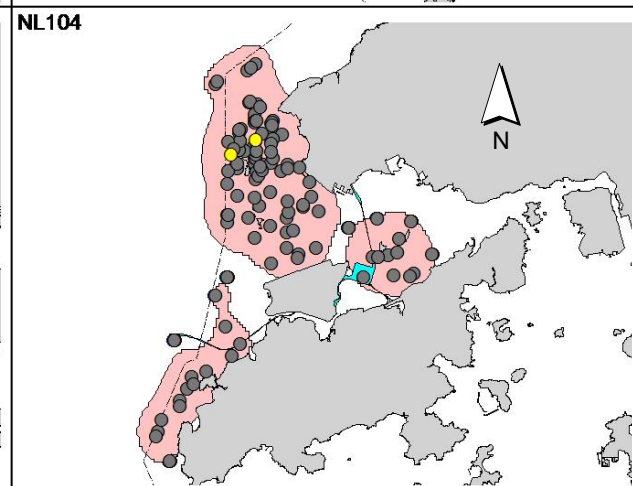
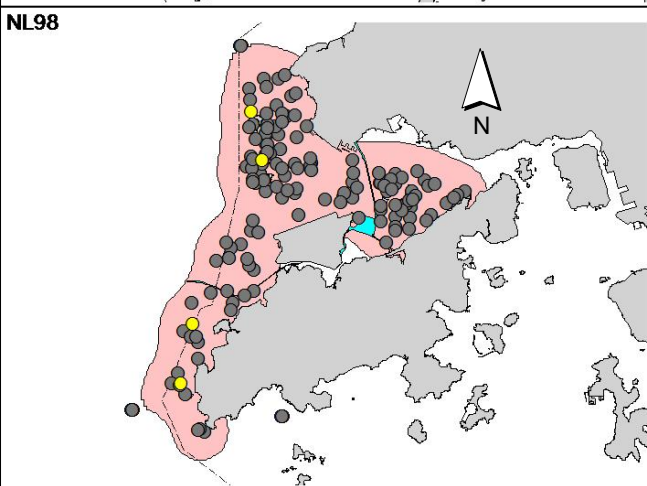
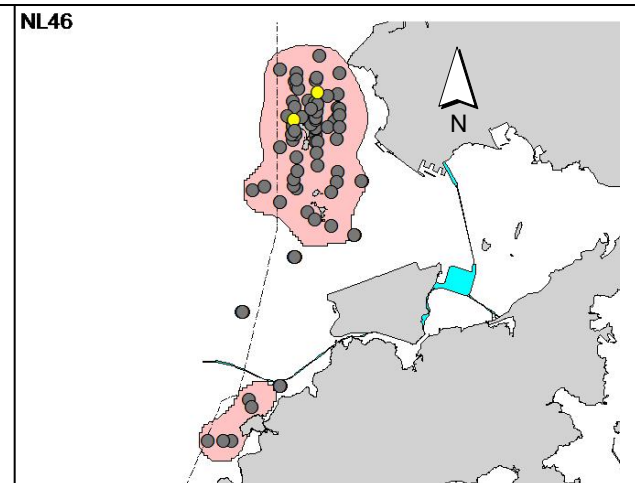
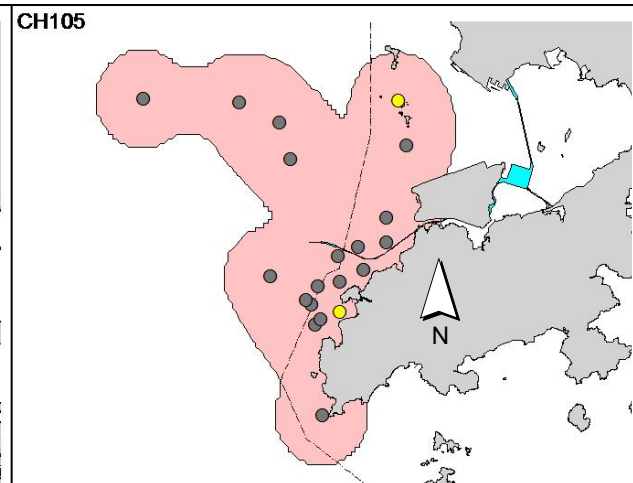
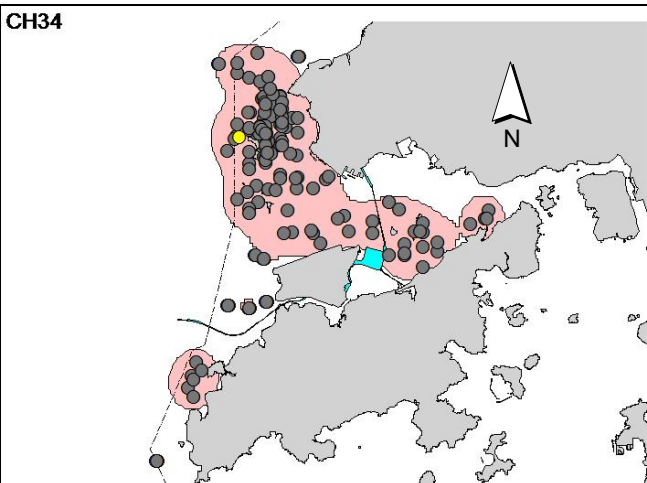
WL234



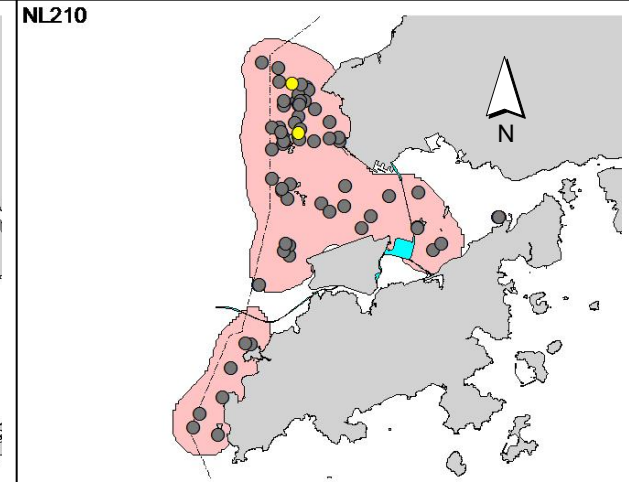
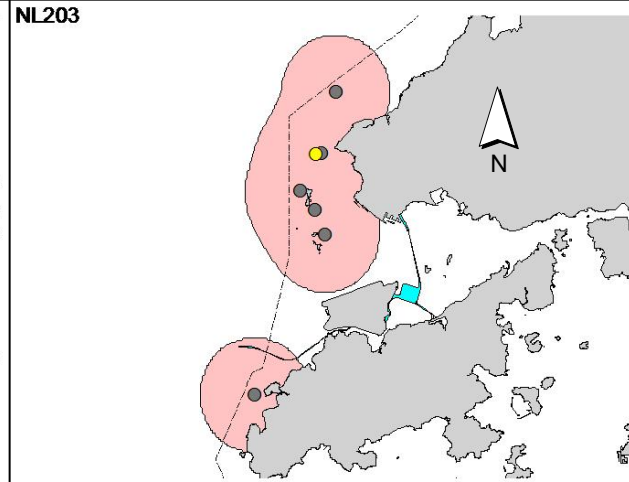
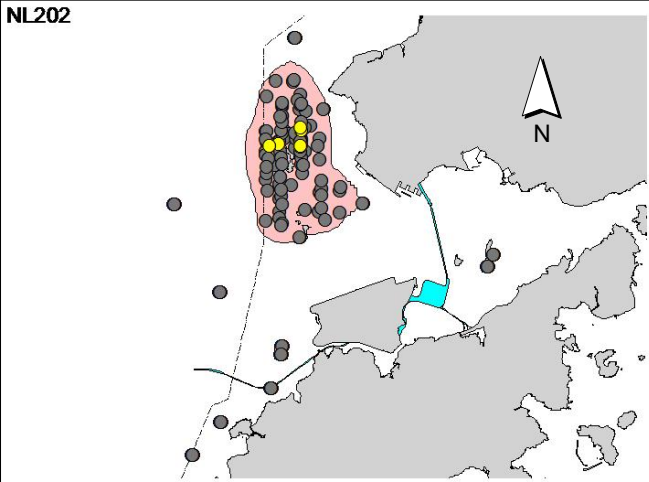
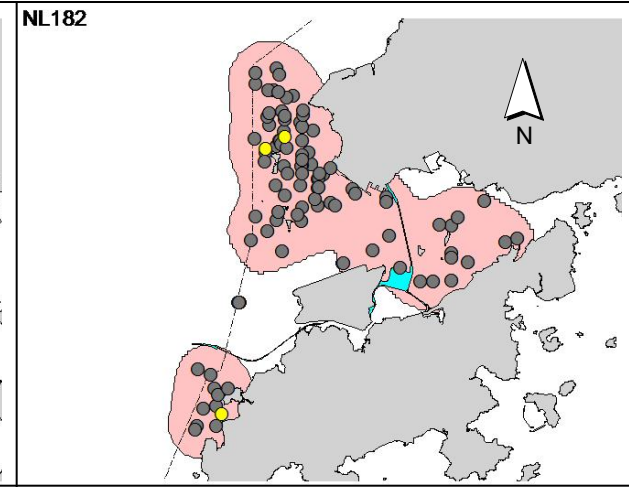
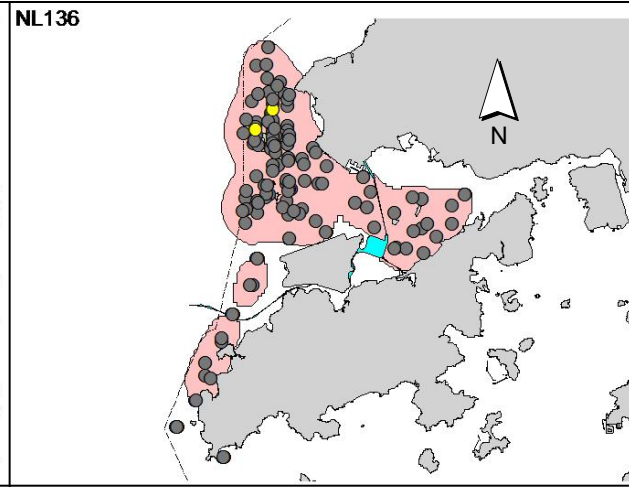
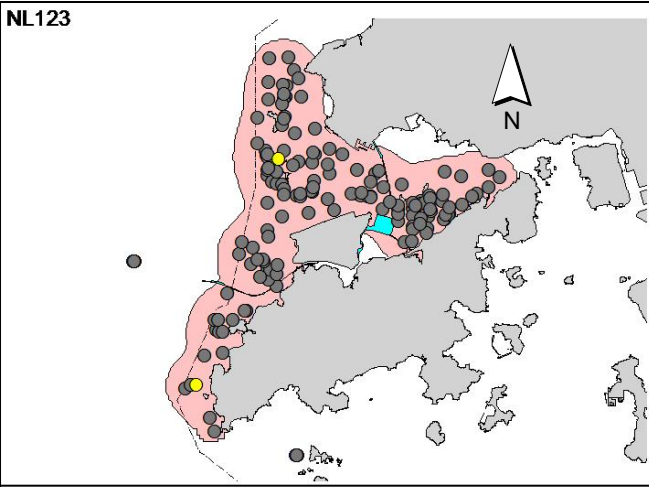
Appendix IV. (cont'd)



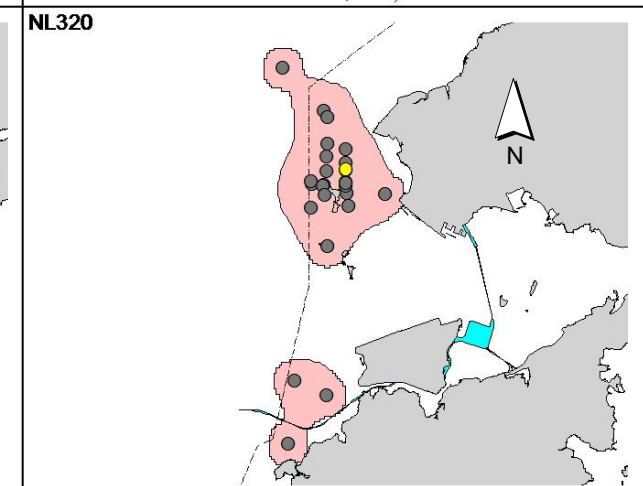
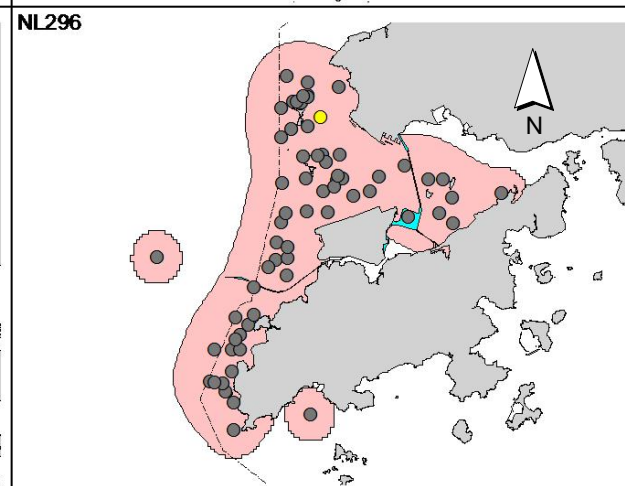
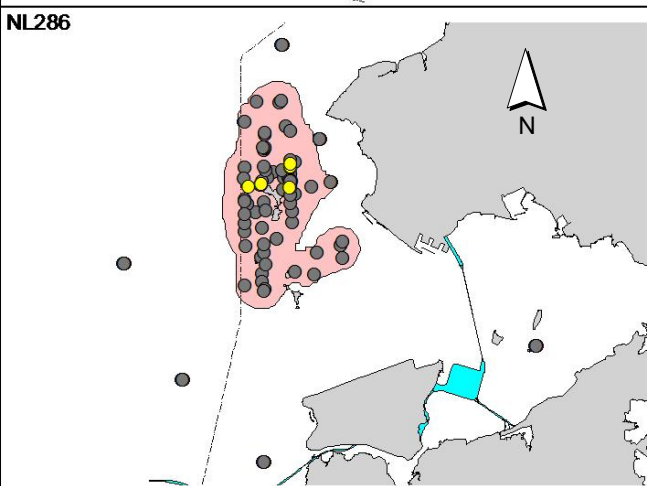
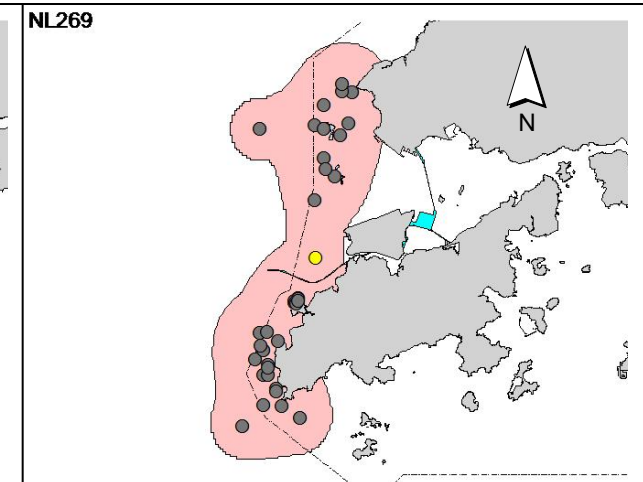
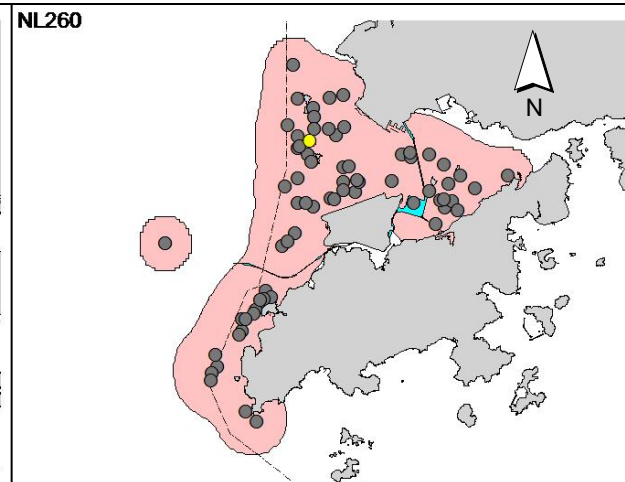
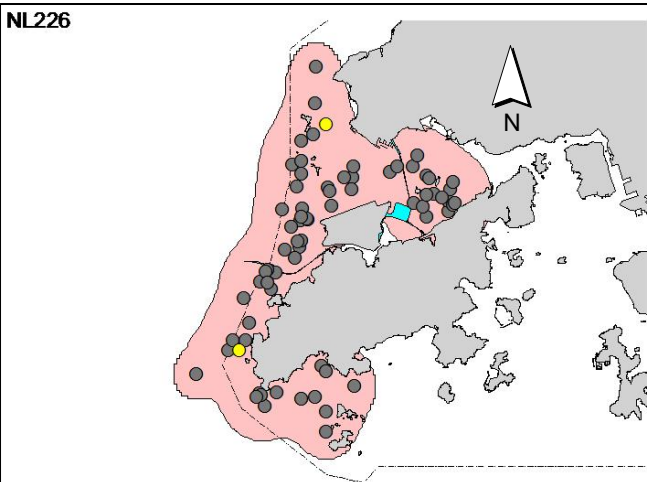
Appendix V. Ranging patterns (95% kernel ranges) of 26 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicates sightings made in December 2016 – February 2017 during HZMB-related monitoring surveys)



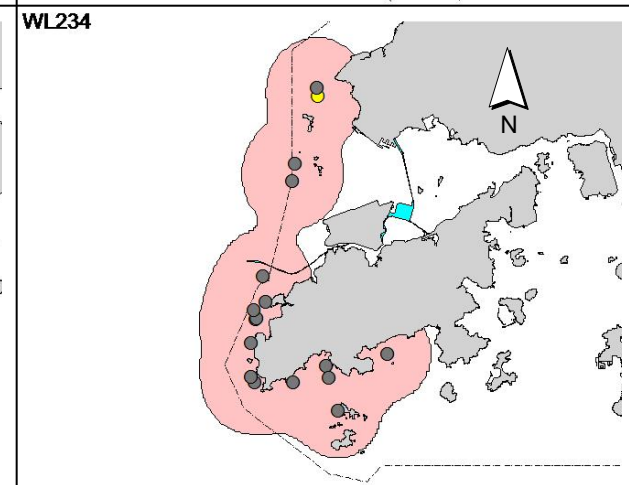
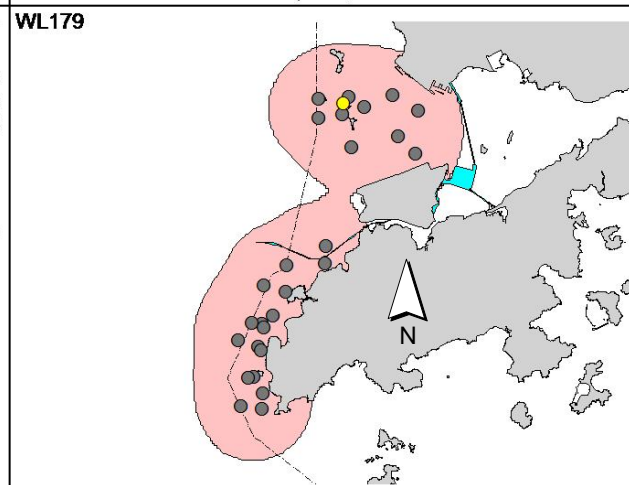
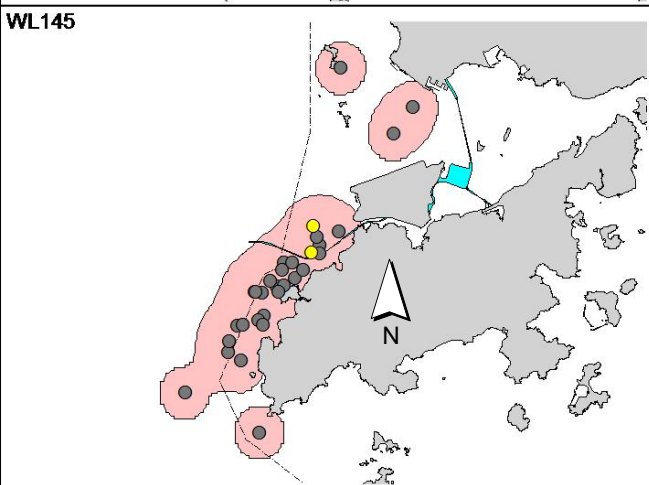
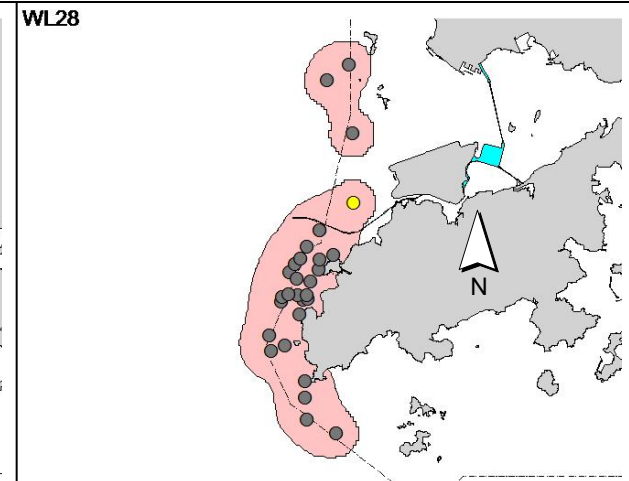
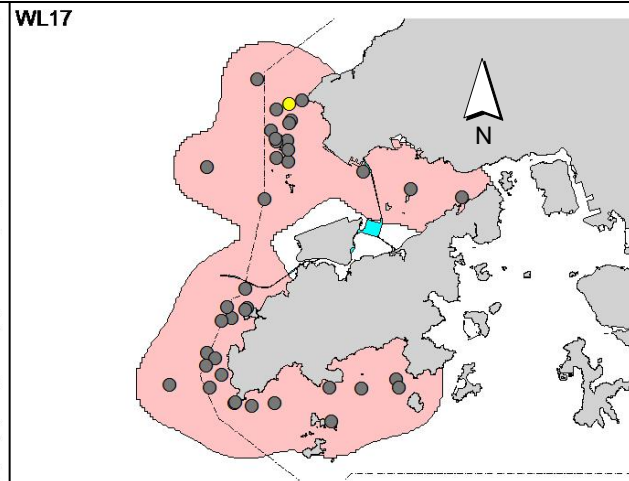
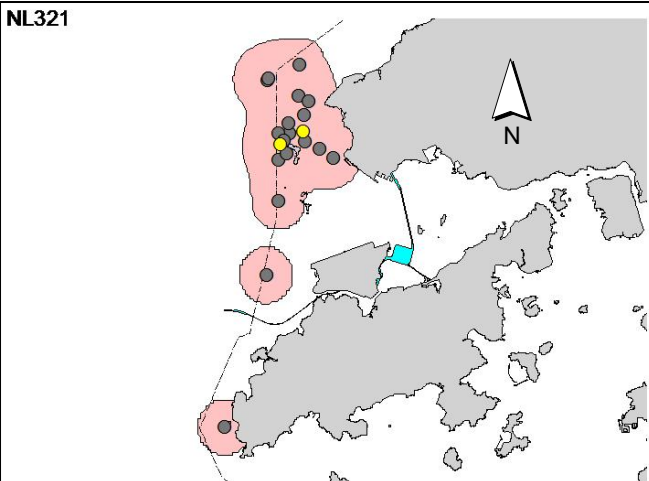
Appendix V. (cont'd)



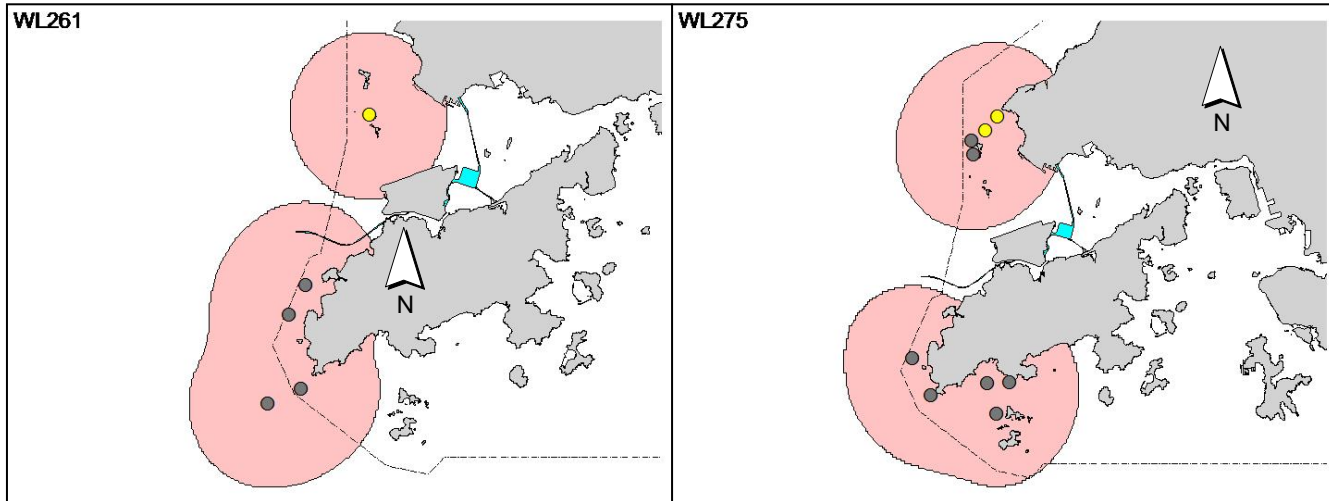
Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix V. (cont'd)



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				
	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. 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				
	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. If the exceedance is confirmed to be Project related after investigation, submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

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

Event & Action Plan for Impact Water Quality Monitoring

Event	ET Leader	IEC	SOR	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in situ</i> measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and SOR; 4. Check monitoring data, all plant, equipment and Contractor's working methods. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working methods. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of non-compliance in writing; 2. Notify Contractor. 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IEC on the proposed mitigation measures; 2. Ensure mitigation measures are properly implemented; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the Supervising Officer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of additional mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 5. Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the

Event	ET Leader	IEC	SOR	Contractor
	<ol style="list-style-type: none"> 2. Identify source(s) of impact; 3. Inform IEC, Contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 	<ol style="list-style-type: none"> 1. Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly. 	<ol style="list-style-type: none"> 1. writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to review the working methods. 	<ol style="list-style-type: none"> 1. non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR.
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 5. As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

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

Event / Action Plan for Impact Dolphin Monitoring

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

EVENT	ACTION			
	ET	IEC	SOR	Contractor
	<ol style="list-style-type: none"> 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. 	<p>Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.</p> <ol style="list-style-type: none"> 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. 	<p>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.</p> <ol style="list-style-type: none"> 3. Supervise the implementation of additional monitoring and/or any other mitigation measures. 	<p>potential mitigation measures.</p> <ol style="list-style-type: none"> 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 project commencement
1-Hr TSP	Action	0	30
	Limit	0	2
24-Hr TSP	Action	0	5
	Limit	0	1
Water Quality	Action	0	6
	Limit	0	1
Impact Dolphin Monitoring	Action	0	9
	Limit	1	8

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 (December 2016 to February 2017)	4	0	0
Total No. received since project commencement	13	0	0

ENVIRONMENTAL COMPLAINT INVESTIGATION REPORT

Our Reference: 0212330_Complaint LOG_20161213_09

Basic Information of Complaints

Reference Number:	Not disclosed
Date of Complaints Received	13 December 2016
Location of Complaints	Seaview Crescent
Nature of Complaints	Noise emissions at mid-night
Complaints Received by	EPD
Via	Not disclosed
Complainants	Not disclosed

Details of Complaints

On 13 December 2016, a complaint case was received by EPD regarding noise emissions from hammering works at mid-night in November and December. The Contractor and the Environmental Team (ET) received the complaint notification from IEC on 14 December 2016.

Investigation Report

Upon receiving the case notification from IEC on 14 December 2016, the Contractor had promptly checked the construction programme and the site log of November and December 2016.

According to the site log and construction programme provided by the Contractor, there is no hammering works scheduled at Seaview Crescent in November and December 2016. Major construction works in Southern Landfall in December were jet grouting, CSM ground treatment and diaphragm wall construction. Construction programme is provided in Annex A. In addition, the distance between the location of complainant and the project site is about 3.5km. The impact of noise generated from the construction works in the project site should be insignificant to the complainant. Therefore, the complaint is not related to this Contract's work. A location map is provided in Annex B.

Based on the above, the complaint case is considered to be not related to this Contract.

Mitigation Measures and Follow-Up Actions Recommended to/Undertaken by Contractor

The Contractor has been reminded to adhere strictly to implement all relevant mitigation measures of noise impact recommended or specified in the EP (EP-354/2009/D), the approved EIA and the Updated EM&A Manual of this Project to avoid causing noise pollution. No other additional action is required. The Contractor shall also fully comply with the conditions in the approved CNP to carry out construction works under the Contract.

Date of File Closed : 13 January 2017

Approved and Filed by:



(Jovy Tam, ET Leader)
Date: 13 January 2017

Annex A

Construction programme

Activity Name	2016					2017		
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
TMCLK - Northern Connection Sub-Sea Tunnel Section								
Contract Dates								
Commencement and Completion Dates								
KD01 - Achievement of Stage 1 - Nth TBM & C&C for E&MS/TCSS								◆ KD01 - Achievement of Stage 1 - Nth TBM & C&C
Site Possession Date								
Portions: X1,(N10,11,13 & 14) - Sth Landfall								
Portions: N1 to N4 & N12								◆ Portions: N1 to N4 & N12
Handover Date								
Portions: N8A, N8B(above +3), N8C								
General Submissions								
Environmental								
Environmental Permit Submissions								
Supplementary WMP of C&C Tunnel at Sth.Landfall								
Supplementary WMP of C&C Tunnel at Sth.Landfall								
Sediment Quality Report/Dumping Permit								
Southern Landfall								
Southern landfall - Commencement of Shaft & C&C Tunnel Dwall								
Sediment Sampling & Testing Plan (SSTP) - if required								
Complete SSTP and Obtain EPD's approval								
Sediment Quality Report (SQR) - if required								
Advance Ground Investigation works for Sediment sampling								
Sediment Sample Testing & Report preparation								
Dumping Permit for Load Dumping (Loading Permit) - if required								
Finalize the application document and submit to EPD - for Dwall								
Notify the results and issue Loading Permit for Local & Cross Boundary Crossing - for Dwall								
General Design Submissions								
(G6) IFA for Tunnel GBP								
SO's Review								
SO Approval with Condition Received								
PAYMENT MILESTONE								
Design and Design Checking of the Works								
MS 2.32 Approve DDA for Approach Ramp Structures to Cut-and-cover Tunnels by the Supervising Officer								
MS 2.44 Approve DDA for South Ventilation Building by the Supervising Officer								
MS 2.48 Approve DDA for North Ventilation Building by the Supervising Officer								
MS 2.51 Submit DDA for Facilities Provision for TCSS								
MS 2.52 Approve DDA for Facilities Provision for TCSS by the Supervising Officer								
MS 2.56 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Southern Landfall by the Supervising Officer								
MS 2.60 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Northern Landfall by the Supervising Officer								
MS 2.69 Submit draft Operation and Maintenance Manual for all Tunnels and Cross Passgaes								
MS 2.70 Accept Operation and Maintenance Manual for all Tunnels and Cross Passgaes by the Supervising Officer								
MS 2.71 Submit draft Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes								
MS 2.72 Accept Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes by the Supervising Officer								
TBM Tunnel								
MS 3.3.5 Complete excavation to formation level for retrieval shaft and complete casting of base slab								◆ MS 3.3.5 Complete excavation to formation level for retrieval shaft and complete
MS 3.3.6 Complete all necessary works of retrieval shaft to facilitate retrieval of TBM								◆ MS 3.3.6 Complete all necessary works of retrieval shaft to facilitate retrieval of TBM
MS 3.3.19 Completion of excavation, support and permanent lining for 13% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.20 Completion of excavation, support and permanent lining for 14% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.21 Completion of excavation, support and permanent lining for 15% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.22 Completion of excavation, support and permanent lining for 16% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.23 Completion of excavation, support and permanent lining for 17% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.24 Completion of excavation, support and permanent lining for 18% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.25 Completion of excavation, support and permanent lining for 19% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.26 Completion of excavation, support and permanent lining for 20% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.27 Completion of excavation, support and permanent lining for 21% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.28 Completion of excavation, support and permanent lining for 22% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.29 Completion of excavation, support and permanent lining for 23% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.30 Completion of excavation, support and permanent lining for 24% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.31 Completion of excavation, support and permanent lining for 25% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.32 Completion of excavation, support and permanent lining for 27.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.33 Completion of excavation, support and permanent lining for 30% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.34 Completion of excavation, support and permanent lining for 32.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.35 Completion of excavation, support and permanent lining for 35% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.36 Completion of excavation, support and permanent lining for 37.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.37 Completion of excavation, support and permanent lining for 40% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.38 Completion of excavation, support and permanent lining for 42.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.39 Completion of excavation, support and permanent lining for 45% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.40 Completion of excavation, support and permanent lining for 47.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								
MS 3.3.41 Completion of excavation, support and permanent lining for 50% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.41 Completion of excavation, support and permanent lining for 50% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.42 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.42 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.43 Completion of excavation, support and permanent lining for 55% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.43 Completion of excavation, support and permanent lining for 55% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.44 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.44 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.45 Completion of excavation, support and permanent lining for 60% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.45 Completion of excavation, support and permanent lining for 60% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.46 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.46 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.47 Completion of excavation, support and permanent lining for 65% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.47 Completion of excavation, support and permanent lining for 65% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.48 Completion of excavation, support and permanent lining for 67.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.48 Completion of excavation, support and permanent lining for 67.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.49 Completion of excavation, support and permanent lining for 70% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.49 Completion of excavation, support and permanent lining for 70% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.50 Completion of excavation, support and permanent lining for 72.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.50 Completion of excavation, support and permanent lining for 72.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.51 Completion of excavation, support and permanent lining for 75% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.51 Completion of excavation, support and permanent lining for 75% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.52 Completion of excavation, support and permanent lining for 77.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.52 Completion of excavation, support and permanent lining for 77.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.53 Completion of excavation, support and permanent lining for 80% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.53 Completion of excavation, support and permanent lining for 80% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.54 Completion of excavation, support and permanent lining for 82.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.54 Completion of excavation, support and permanent lining for 82.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.55 Completion of excavation, support and permanent lining for 85% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.55 Completion of excavation, support and permanent lining for 85% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.56 Completion of excavation, support and permanent lining for 87.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.56 Completion of excavation, support and permanent lining for 87.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.57 Completion of excavation, support and permanent lining for 90% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.57 Completion of excavation, support and permanent lining for 90% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.58 Completion of excavation, support and permanent lining for 92.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.58 Completion of excavation, support and permanent lining for 92.5% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel
MS 3.3.59 Completion of excavation, support and permanent lining for 95% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel								◆ MS 3.3.59 Completion of excavation, support and permanent lining for 95% of the total length (measured on plan) of the Northern Connection Sub-Sea Tunnel

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone



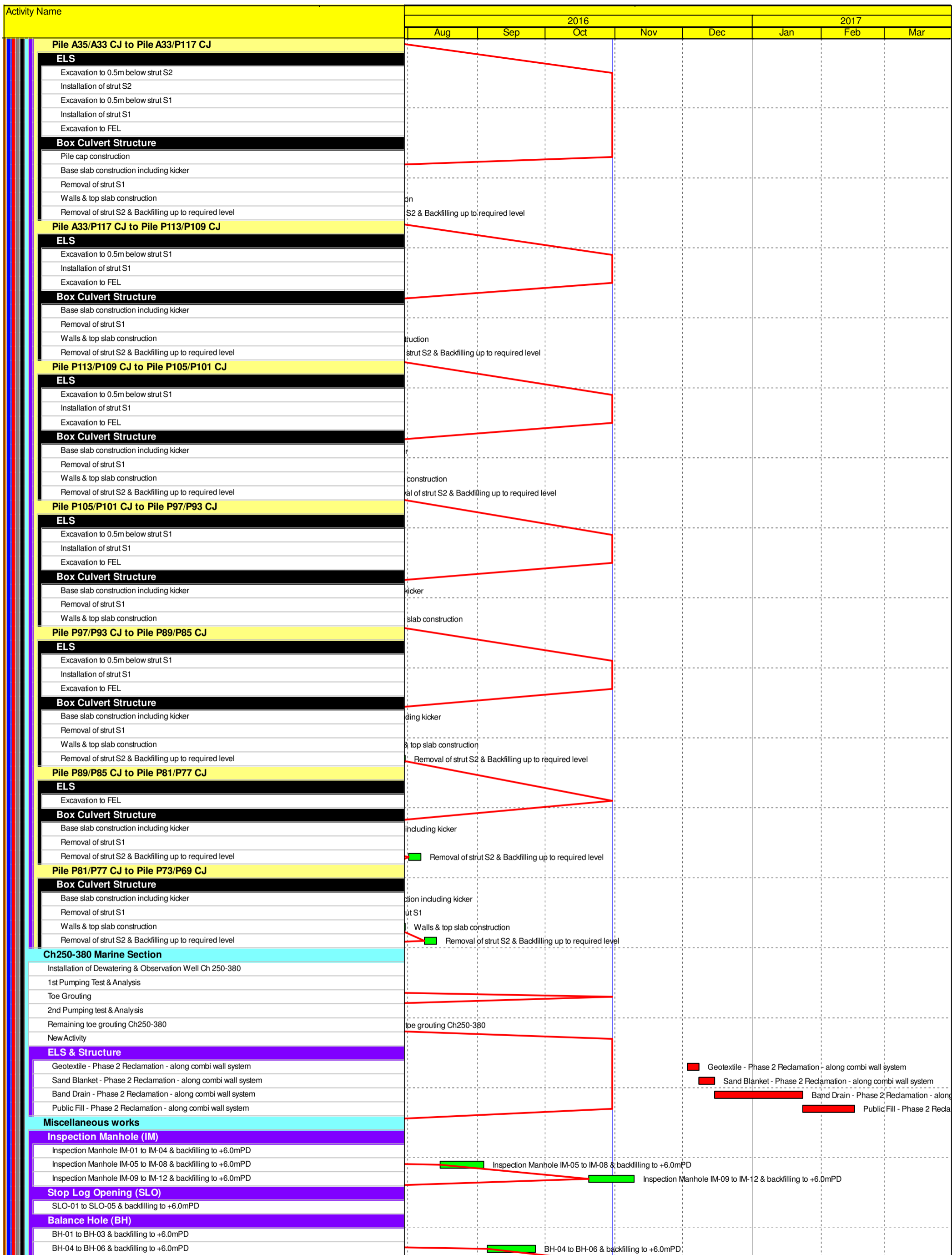
Date	Revision	Checked	Approved
12-Feb-14	TMCLKBJGEN-PRG98507	WYu	SPr
08-Apr-14	TMCLKBJGEN-PRG98507 Rev.B	SPr	WYu
28-Aug-14	TMCLKBJGEN-PRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKBJGEN-PRG98507 Rev.F	WYu	

Activity Name	2016					2017		
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
MS 5.1.13 Complete retaining wall foundation for 80% of the total length (measured on plan) of approach ramp structure								
MS 5.1.14 Complete retaining wall foundation for 90% of the total length (measured on plan) of approach ramp structure								
MS 5.1.15 Complete retaining wall foundation for 100% of the total length (measured on plan) of approach ramp structure								
South Ventilation Buildings								
MS 7.1.1 Complete 100% of cofferdam for excavation			◆ MS 7.1.1 Complete 100% of cofferdam for excavation					
MS 7.1.2 Complete 100% of excavation to the formation level			◆ MS 7.1.2 Complete 100% of excavation to the formation level					
MS 7.1.3 Complete 100% of foundation for the ventilation building								
MS 7.1.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building				◆ MS 7.1.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building				
MS 7.1.5 Complete concreting works of 50% area of the total construction floor area for the ventilation building						◆ MS 7.1.5 Complete concreting works of 50% area of the total construction floor area for the ventilation building		
North Ventilation Buildings								
MS 7.2.1 Complete 100% of cofferdam for excavation								
MS 7.2.2 Complete 100% of excavation to the formation level								
MS 7.2.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building				◆ MS 7.2.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building				
MS 7.2.5 Complete concreting works of 50% area of the total construction floor area for the ventilation building						◆ MS 7.2.5 Complete concreting works of 50% area of the total construction floor area for the ventilation building		
MS 7.2.6 Complete concreting works of 75% area of the total construction floor area for the ventilation building							◆ MS 7.2.6 Complete concreting works of 75% area of the total construction floor area for the ventilation building	
Facilities Provision for E&M Works for TBM Tunnel, Cut & Cover Tunnels and C								
MS 9.1.1 Complete 25% of bonding terminal, opening and accessories, etc.				◆ MS 9.1.1 Complete 25% of bonding terminal, opening and accessories, etc.				
MS 9.1.2 Complete 25% of plinth, hoisting facilities and accessories, etc.				◆ MS 9.1.2 Complete 25% of plinth, hoisting facilities and accessories, etc.				
Construction								
Northern Landfall								
North Reclamation (Phase 1)								
Construction								
Zone B								
Reclamation								
Surcharge Removal - Zone B - (CH598 to 698) stage 1								
Surcharge Period - Zone B - (CH648 to 698) stage 2								
Box Culvert Extension								
Construction								
Ch000-010 Culvert Outfall								
Removal of temporary seawall block								
Concreting in-situ Top Slab and stich joint								
Removal of temporary bulk head								
CH000-150 Land Section								
ELS & Structure								
Pile A43/A41 CJ to Pile A41/A39 CJ								
Box Culvert Structure								
Removal of strut S2 & Backfilling up to required level								
Pile A45/A43 CJ to Pile A43/A41 CJ								
Box Culvert Structure								
Removal of strut S2 & Backfilling up to required level								
Pile A52/A49 CJ to Pile A49/A47 CJ								
Box Culvert Structure								
Preparation for Temp Access Road for N8 handvoer								
Ch150-250 Marine Section								
ELS & Structure								
Toe grouting Ch100-250								
2nd Pumping test Ch100-250								
Pile A41/A39 CJ to Pile A39/A37 CJ								
ELS								
Excavation to 0.5m below strut S2								
Installation of strut S2								
Excavation to 0.5m below strut S1								
Installation of strut S1								
Excavation to FEL								
Box Culvert Structure								
Pile cap construction								
Base slab construction including kicker								
Removal of strut S1								
Sliding formworks 1st assembly								
Walls & top slab construction								
Removal of strut S2 & Backfilling up to required level								
Pile A39/A37 CJ to Pile A37/A35 CJ								
ELS								
Excavation to 0.5m below strut S2								
Installation of strut S2								
Excavation to 0.5m below strut S1								
Installation of strut S1								
Excavation to FEL								
Box Culvert Structure								
Pile cap construction								
Base slab construction including kicker								
Removal of strut S1								
Walls & top slab construction								
Removal of strut S2 & Backfilling up to required level								
Pile A37/A35 CJ to Pile A35/A33 CJ								
ELS								
Excavation to 0.5m below strut S2								
Installation of strut S2								
Excavation to 0.5m below strut S1								
Installation of strut S1								
Excavation to FEL								
Box Culvert Structure								
Pile cap construction								
Base slab construction including kicker								
Removal of strut S1								
Walls & top slab construction								
Removal of strut S2 & Backfilling up to required level								

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SFu
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SFu	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	

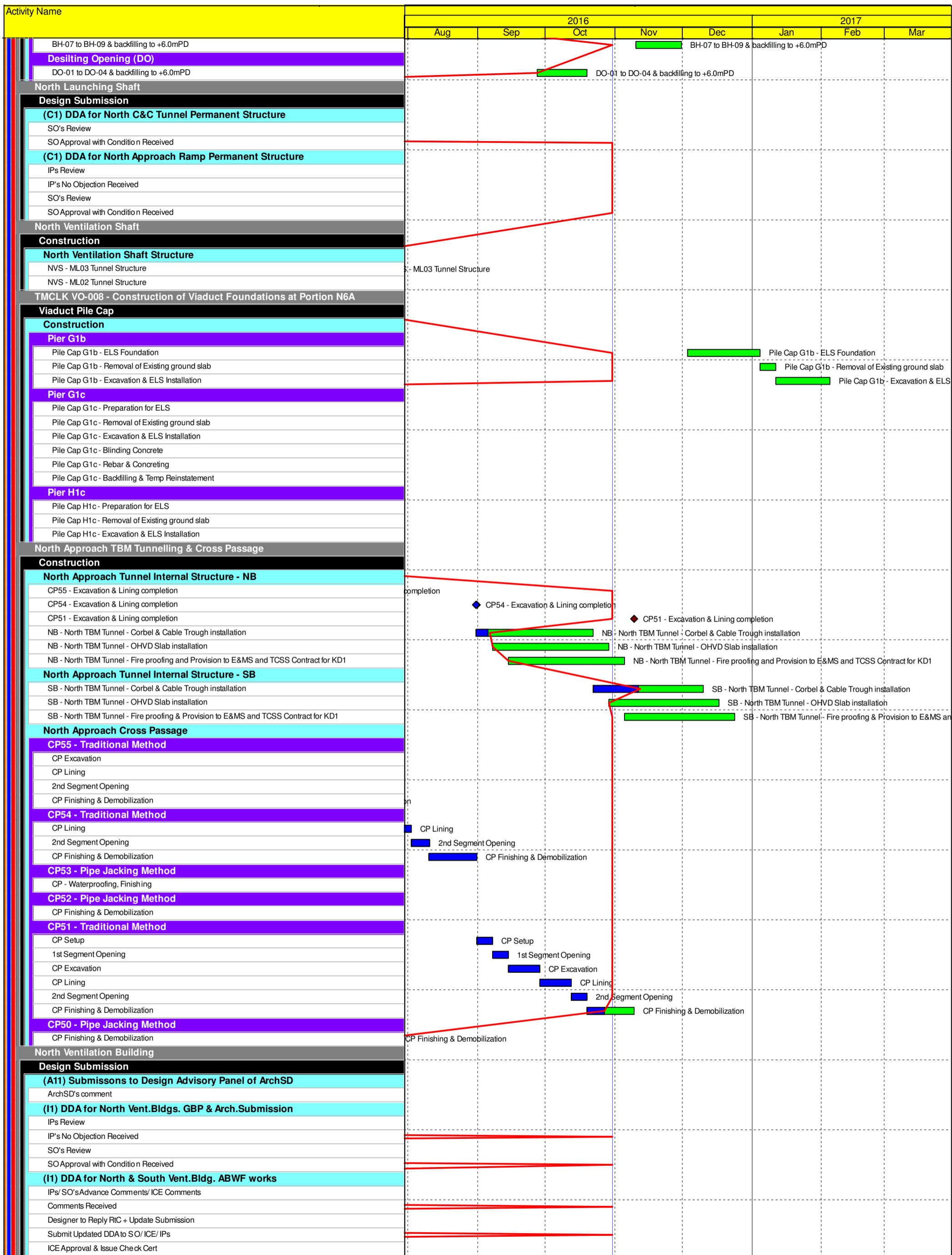


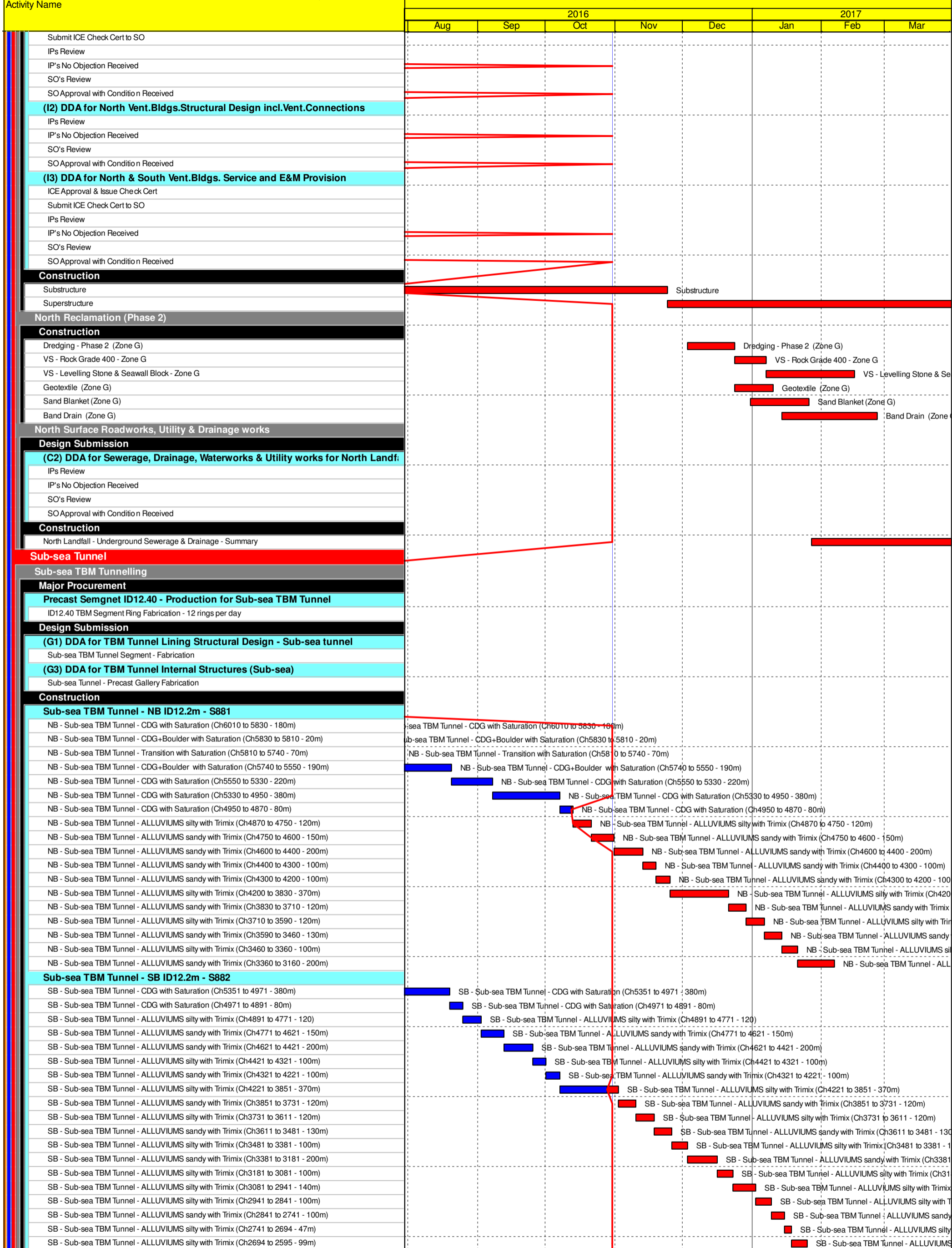
■ Geotextile - Phase 2 Reclamation - along combi wall system
■ Sand Blanket - Phase 2 Reclamation - along combi wall system
■ Band Drain - Phase 2 Reclamation - along combi wall system
■ Public Fill - Phase 2 Reclamation - along combi wall system

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SFe
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SPH	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLH	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	

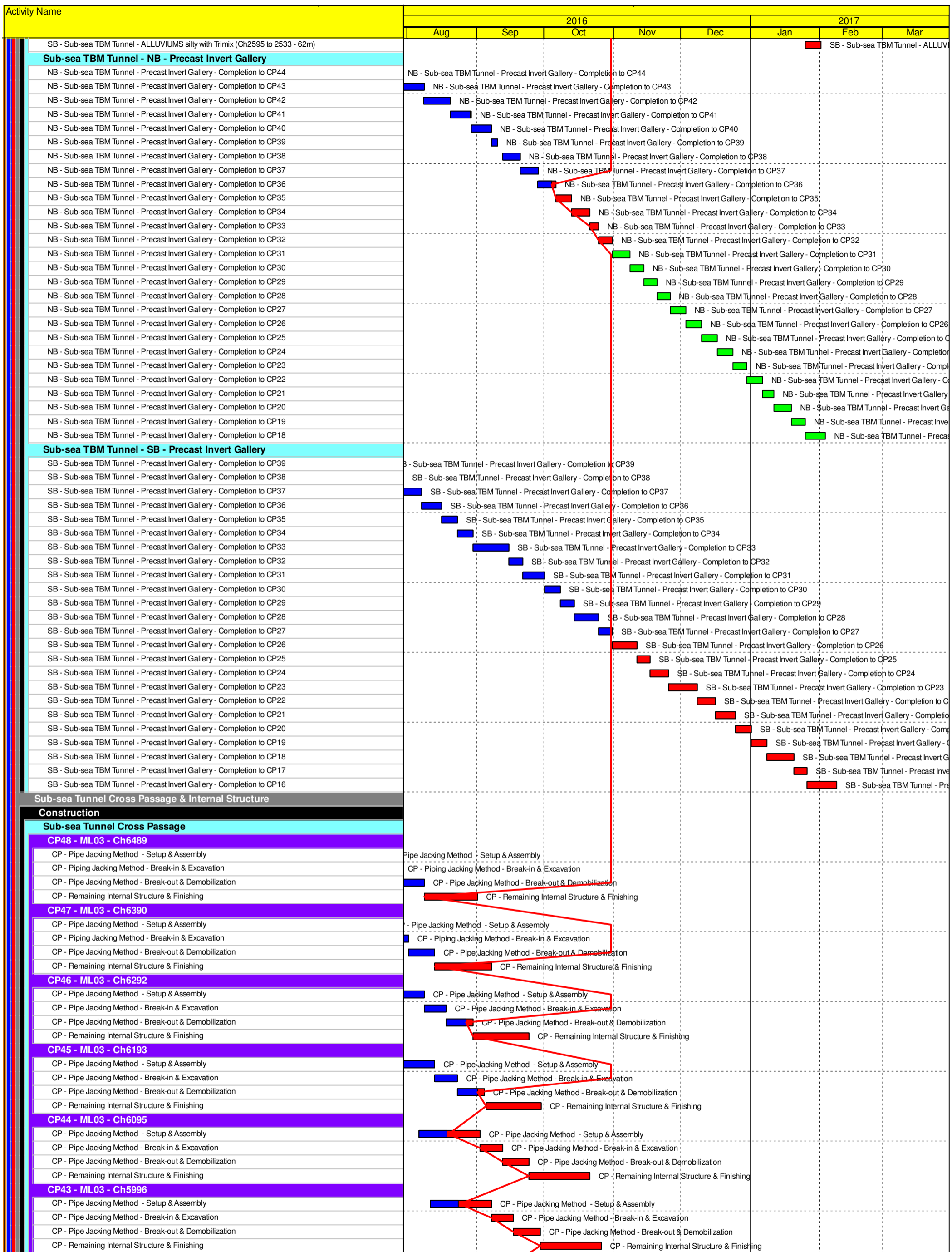




- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone



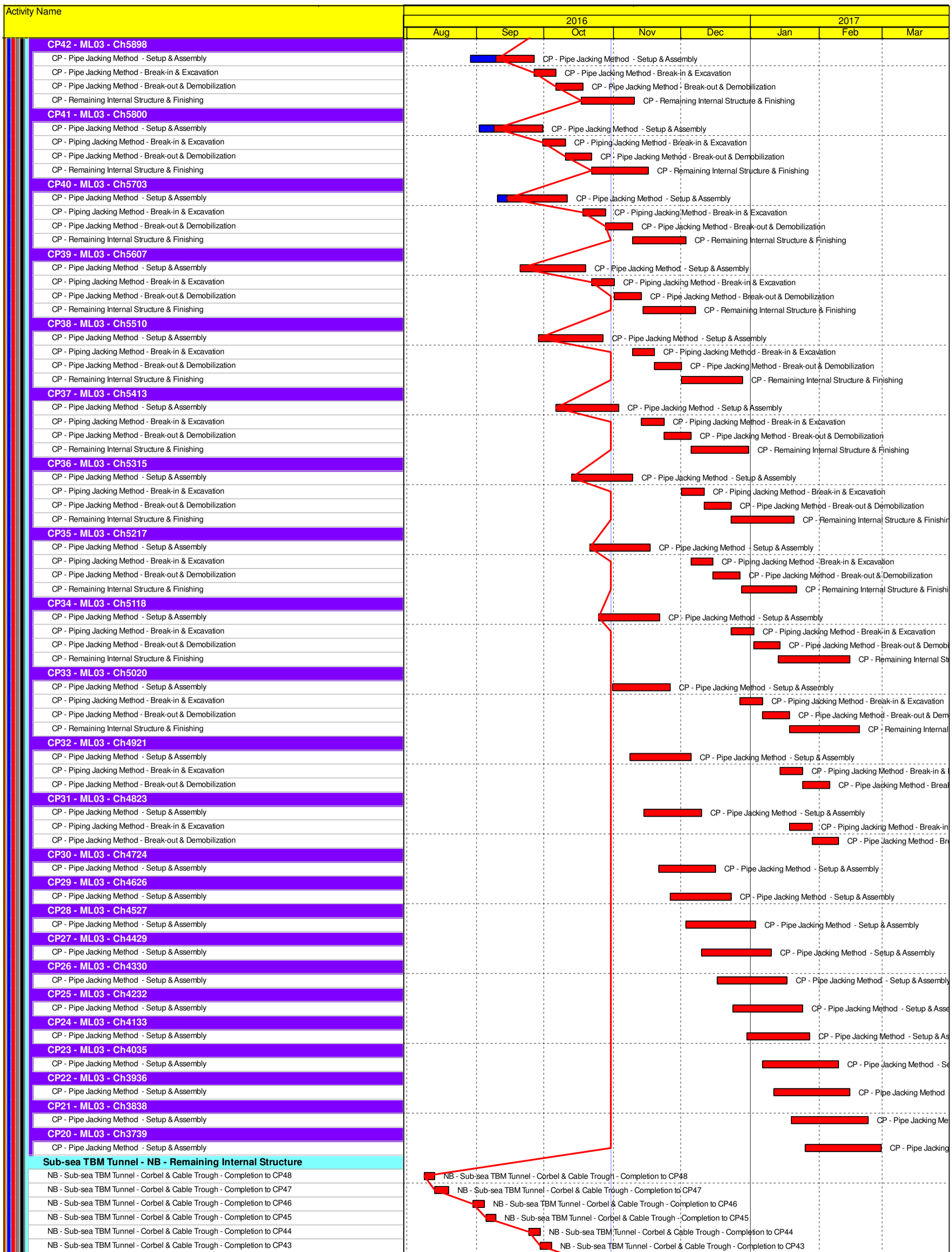
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12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SFu
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SFu	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLi	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	



	Planned Bar
	Planned Bar - Critical
	Planned Milestone
	Progress bar
	Progress Milestone



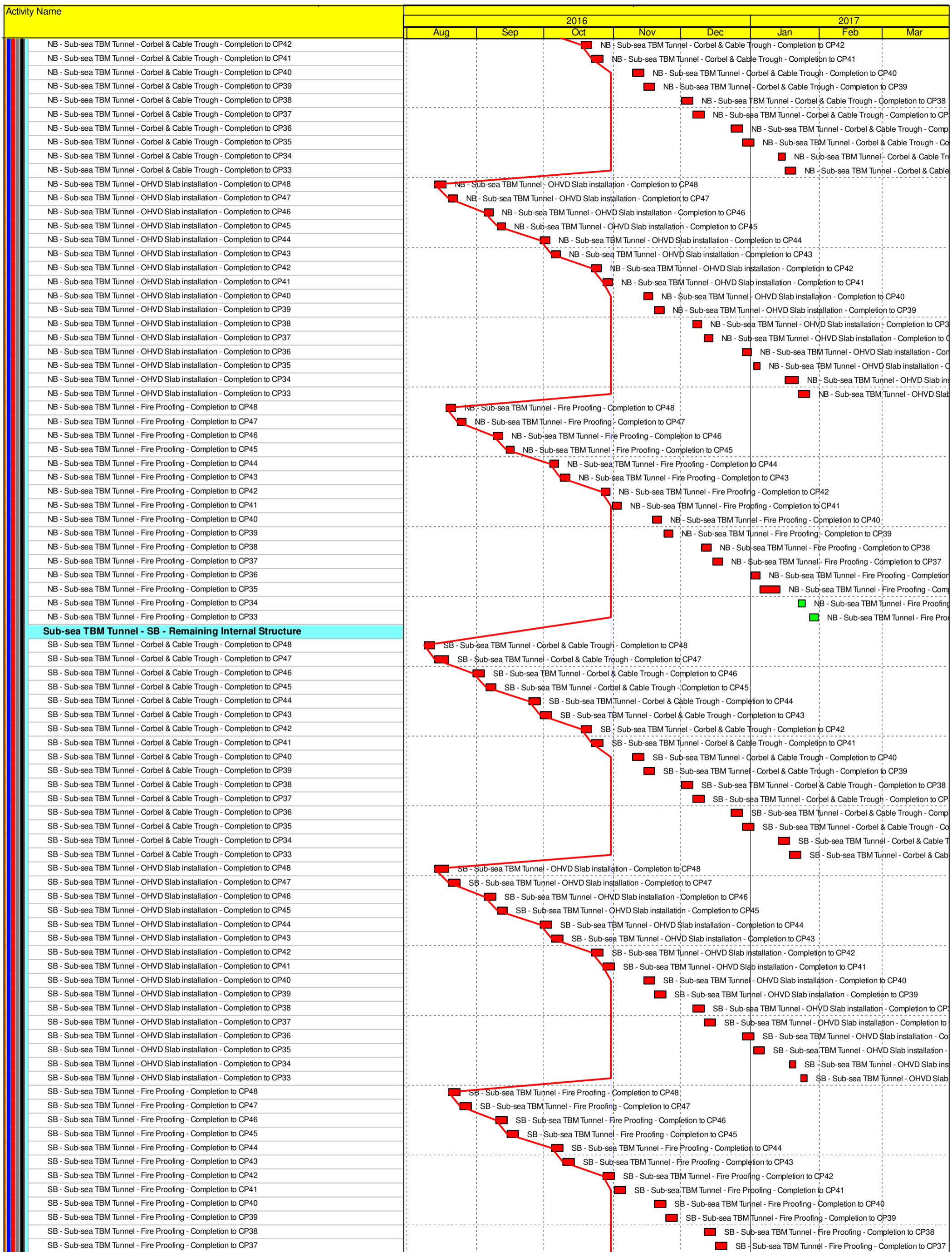
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08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SFe	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	



- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone



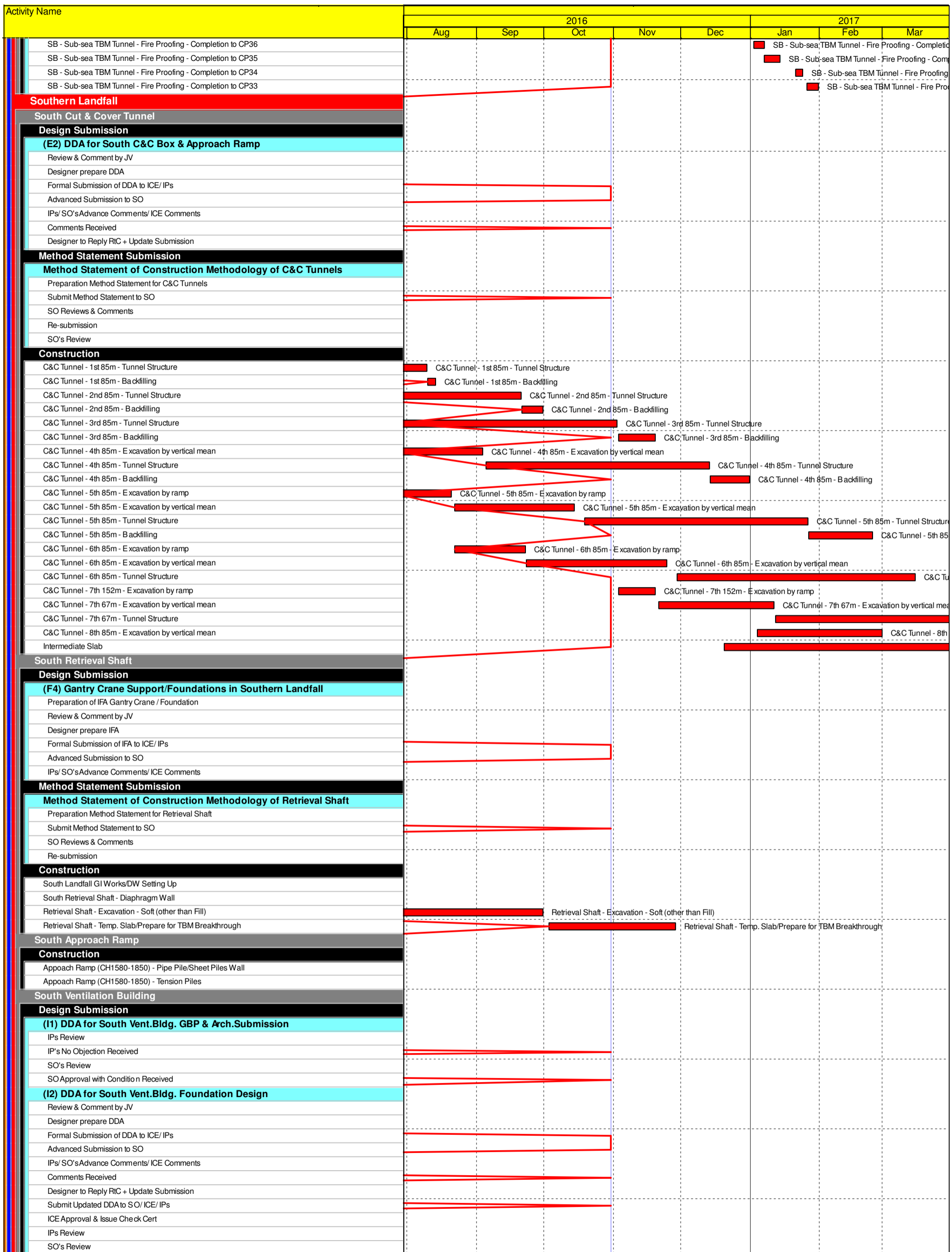
Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SFe
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SFe	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	



■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone



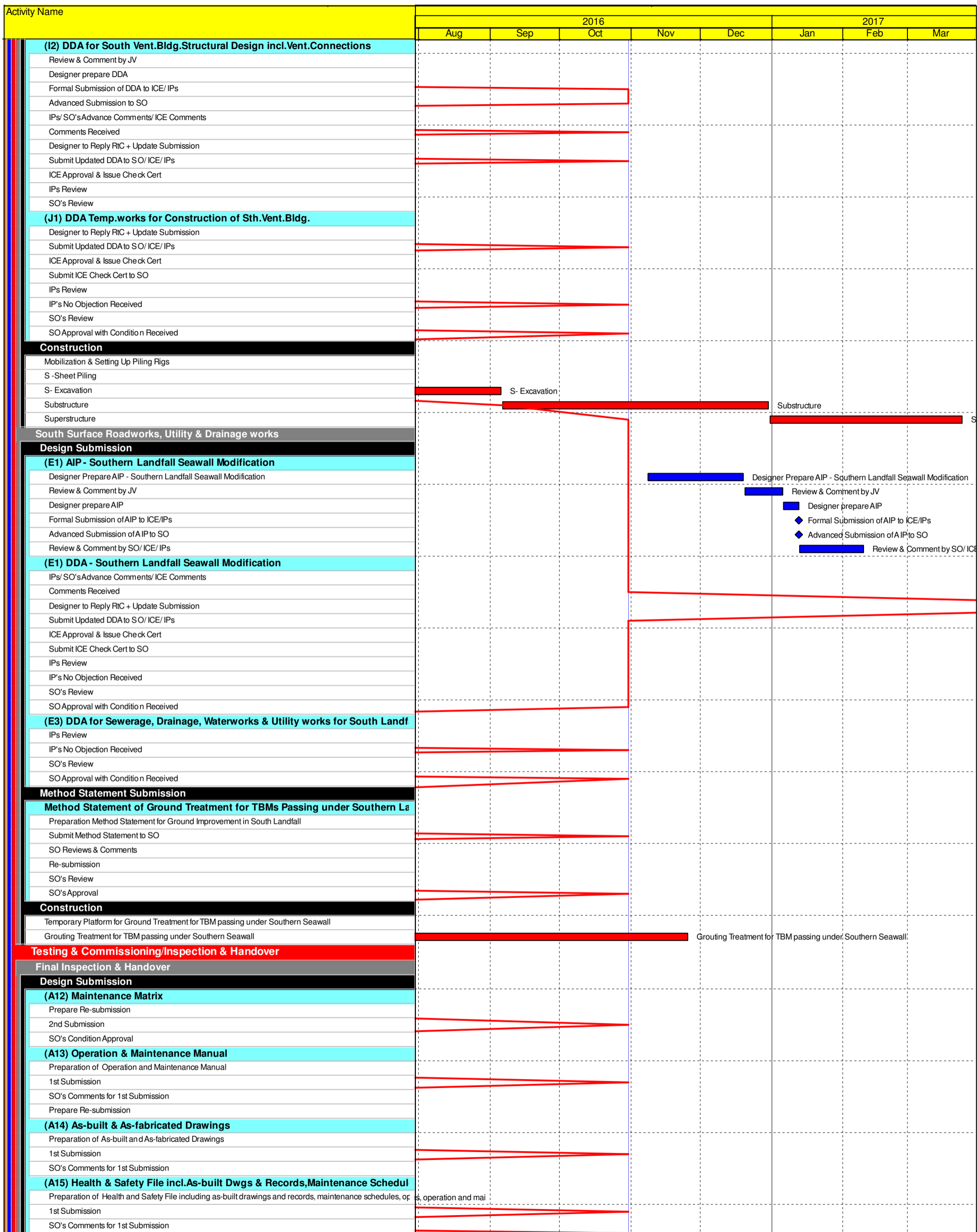
Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SFu
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SFu	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLi	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	



	Planned Bar
	Planned Bar - Critical
	Planned Milestone
	Progress bar
	Progress Milestone



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SPr
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SPr	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG98507	WYu	SFe
08-Apr-14	TMCLKDBJGEN-PRG98507 Rev.B	SFe	WYu
28-Aug-14	TMCLKDBJGEN-PRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJGEN-PRG98507 Rev.F	WYu	

Annex B

Location map



Location map

ENVIRONMENTAL COMPLAINT INVESTIGATION REPORT

Our Reference: 0212330_Complaint LOG_20170116_10

Basic Information of Complaints

Reference Number:	EP3/N09/RS/00001641-17
Date of Complaints Received	Not disclosed
Location of Complaints	East of artificial island of the Hong Kong - Zhuhai-Macao Bridge
Nature of Complaints	Sewage discharge
Complaints Received by	EPD
Via	Not disclosed
Complainants	Not disclosed

Details of Complaints

On 16 January 2017, the Contractor and the Environmental Team (ET) received the complaint notification from EPD forwarded by IEC regarding sewage discharge during night-time at DBJV's construction site at the east of the artificial island of the Hong Kong - Zhuhai-Macao Bridge.

Investigation Report

Upon receiving the case notification from IEC on 16 January 2017, the Contractor had promptly checked the site inspection record in January 2017.

According to the site inspection record provided by the Contractor, no improper discharge was recorded up to 17 January 2017. Wastewater was treated in the Wetsep before discharge. Photos of the Wetsep and the discharge point which are provided by the Contractor are presented in Annex A. Regular inspection and maintenance of the Wetsep were also carried out to ensure that the wastewater was treated properly before discharge. Wetsep inspection record is provided in Annex B.

In addition, according to ET's weekly joint site inspection with SOR and the Contractor on 18 January 2017 morning, no improper discharge was observed at the site area at the east of artificial island. Wetsep was also functioning properly and wastewater was treated before discharge. Site drainage management plan showing the Wetsep and the discharge point is provided in Annex C. Site foreman was responsible for the operation of the Wetsep and water pipes. Photos showing the discharge point and Wetsep which were taken on 18 January 2017 are provided in Annex A. Moreover, major works during the incident period included jet grouting, CSM ground treatment and diaphragm wall construction. Construction programme is provided in Annex D.

Apart from the site investigation, ET has conducted an interview with the night-shift foreman on 24 January 2017. He was responsible for the site management and wastewater discharge arrangement during the incident period. It was reported that there was no improper discharge on site during the concerned time period. Wastewater was properly treated at the Wetsep before discharge.

Based on the above, there is no evidence to prove that the complaint case is related to this Contract.

Mitigation Measures and Follow-Up Actions Recommended to/Undertaken by Contractor

There is no evidence to prove that the complaint case is related to this Contract.

The Contractor was reminded to review and enhance the current mitigation measures to avoid similar situation.

The Contractor has been reminded to adhere strictly to implement all relevant mitigation measures of water quality impact recommended or specified in the EP (EP-354/2009/D), the approved EIA and the Updated EM&A Manual of this Project to avoid causing water pollution. The Contractor shall also fully comply with the conditions in the approved water discharge license to carry out construction works under the Contract.

- 1) Pursuant to ER Part 8 Appendix 8F Cl.8F.4(d), the dosing of coagulant and flocculant at the treatment plant shall be automatic and by means of a mixer. In addition, an automatic alkali and acid dosing device controlled by a feedback loop from an automatic pH sensor shall be provided for controlling the pH value of the effluent.
- 2) A discharge point sign should be prominently displayed on site to indicate the location of discharge point.
- 3) Good housekeeping should be maintained on site for easy identification of water pipe arrangement.
- 4) The wastewater treatment facilities should be operated by designated personnel to ensure proper functioning.

Date of File Closed : 21 March 2017

Approved and Filed by:



(Jovy Tam, ET Leader)

Date: 21 March 2017

Annex A

Photo record



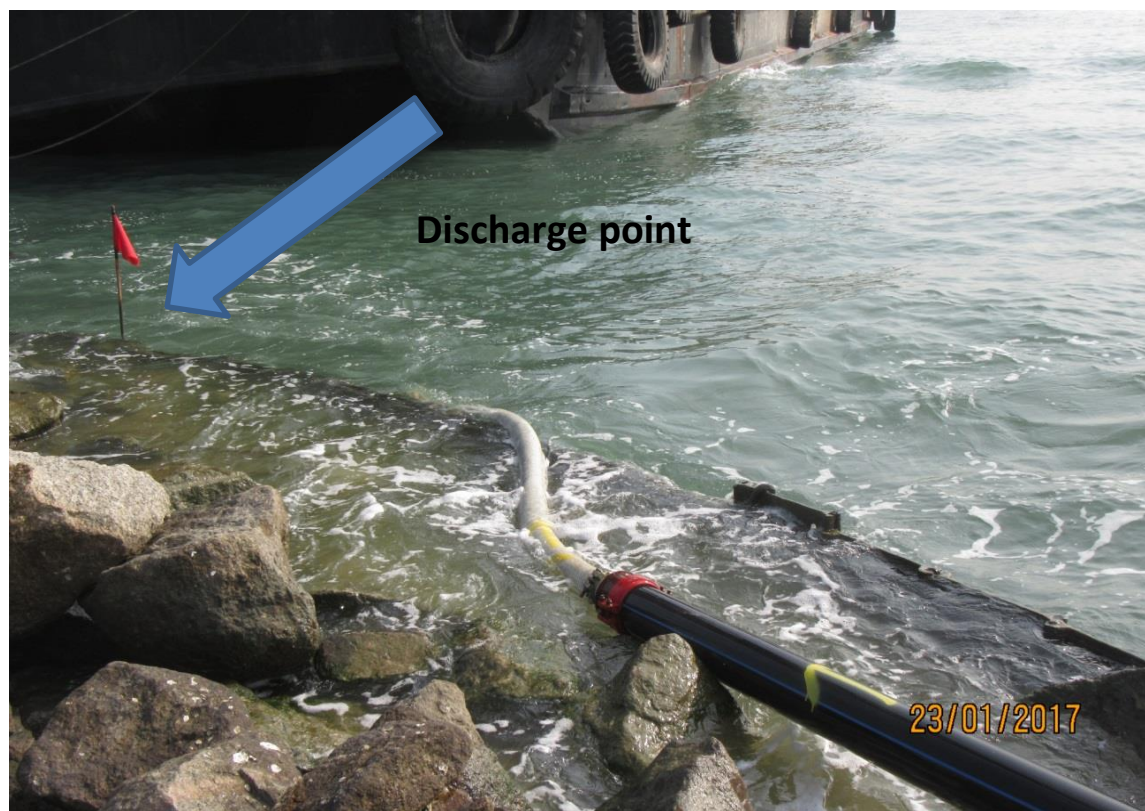
Annex A Photo Records taken by the Contractor

*Note: Photos taken on 11/1/2017



Wastewater was treated in the Wetsep before discharge.

*Note: Photos taken on 23/1/2017



Condition near the point of discharge which did not reveal any observable evidence of improper discharge



Annex A Photo Records taken by the Contractor

*Note: Photos taken on 13/1/2017



Condition of the site area at the east of HKBCF artificial island which did not reveal any observable evidence of improper discharge

*Note: Photos taken on 16/1/2017



Condition of the site area at the east of HKBCF artificial island which did not reveal any observable evidence of improper discharge



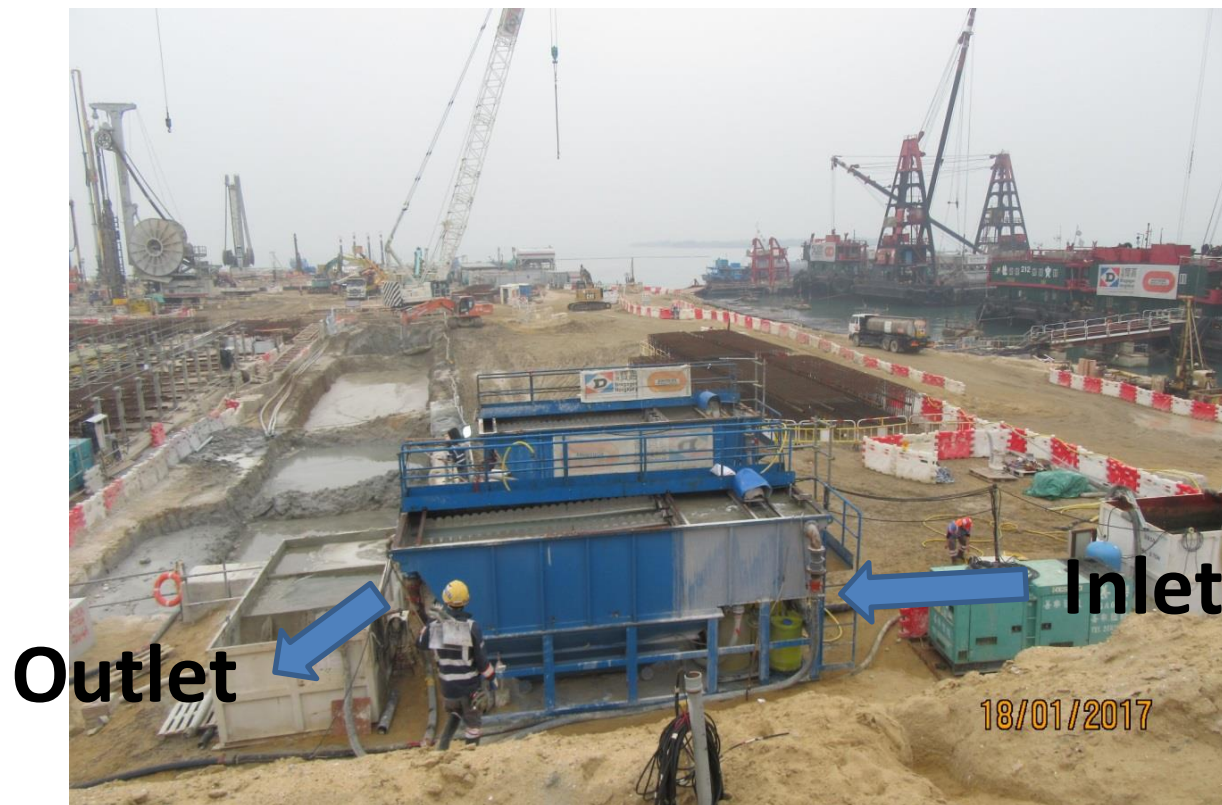
Annex A Photo Records taken during Site Investigation

*Note: Photos taken on 18/1/2017



Condition near the point of discharge which did not reveal any observable evidence of improper discharge

*Note: Photos taken on 18/1/2017



Wastewater was treated in the Wetsep before discharge.

Annex B

Inspection record of Wetsep

WETSEP Location 污水處理機位置: 2号
 Date 日期: 9-1-2017 to 至 15-1-2017

	Monday 星期二	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. WETSEP In Normal Operation? 處理機是否正常運作?	✓	✓	✓	✓	✓	✓	
2. pH Value 酸鹼度 (6.0 - 9.0)	8	8.2	8.3	8.2	8.1	8.2	
3. Electrical Supply OK? 電力供應正常?	✓	✓	✓	✓	✓	✓	
4. Outlet Abnormal? (Any Sludge? Any Colour Change? Flowrate?) 出水口有否異常? (污泥有否積聚? 顏色有否改變? 流量有否異常?)	有異常	有異常	有異常	有異常	有異常	有異常	
5. Potion Enough? 藥水是否足夠?	✓	✓	✓	✓	✓	✓	
6. Clean the Sedimentation Tank? 有否清理隔沙缸?	有 9:30	有 9:30	有 9:30	有 9:30	有 9:30	有 9:30	
7. Clean the De-silt Basin? 有否清理蓄泥池?	有 10:00	有 10:00	有 10:00	有 10:00	有 10:00	有 10:00	
8. Are the Cleansing Records of Sedimentation Tank/ De-silt Basin Stored Properly? 清理蓄泥池記錄是否妥善儲存?	✓	✓	✓	✓	✓	✓	
9. Others 其他情況	一切正常	一切正常	一切正常	一切正常	一切正常	一切正常	
Verified by Site Foreman/Supervisor 地盤管工/監督簽署確認							

*Please - tick (✓) in the box if the condition is normal. *若情況正常, 請於方格內加上剔號(✓).
 cross (X) in the box if the condition is abnormal, and write down the non-conformance.
 *若情況不尋常, 請於方格內加上交叉(X), 並寫下不尋常狀況。

17/01/2017

WETSEP Location 污水處理機位置: 2號

Date 日期: 16-1-2017 to 至 22-1-2017

	Monday 星期二	Tuesday 星期三	Wednesday 星期四	Thursday 星期五	Friday 星期六	Saturday 星期日	Sunday 星期一
1. WETSEP In Normal Operation? 處理機是否正常運作?	✓	✓					
2. pH Value 酸鹼度 (6.0 - 9.0)	8.1	8.7					
3. Electrical Supply OK? 電力供應正常?	✓	✓					
4. Outlet Abnormal? (Any Sludge? Any Colour Change? Flowrate?) 出水口有否異常? (污泥有否積聚? 顏色有否改變? 流量有否異常?)	有異常	有異常					
5. Potion Enough? 藥水是否足夠?	✓	✓					
6. Clean the Sedimentation Tank? 有否清理隔沙缸?	有 09:30	有 10:30					
7. Clean the De-silt Basin? 有否清理蓄泥池?	有 10:00	有 11:00					
8. Are the Cleansing Records of Sedimentation Tank/ De-silt Basin Stored Properly? 清理蓄泥池記錄是否妥善儲存?	✓	✓					
9. Others 其他情況	一切正常	一切正常					
Verified by Site Foreman/Supervisor 地盤管工/監督簽署確認							

*Please - tick (✓) in the box if the condition is normal. *若情況正常, 請於方格內加上剔號(✓)。
cross (X) in the box if the condition is abnormal, and write down the non-conformance. *若情況不尋常, 請於方格內加上交叉(X), 並寫下不尋常狀況。

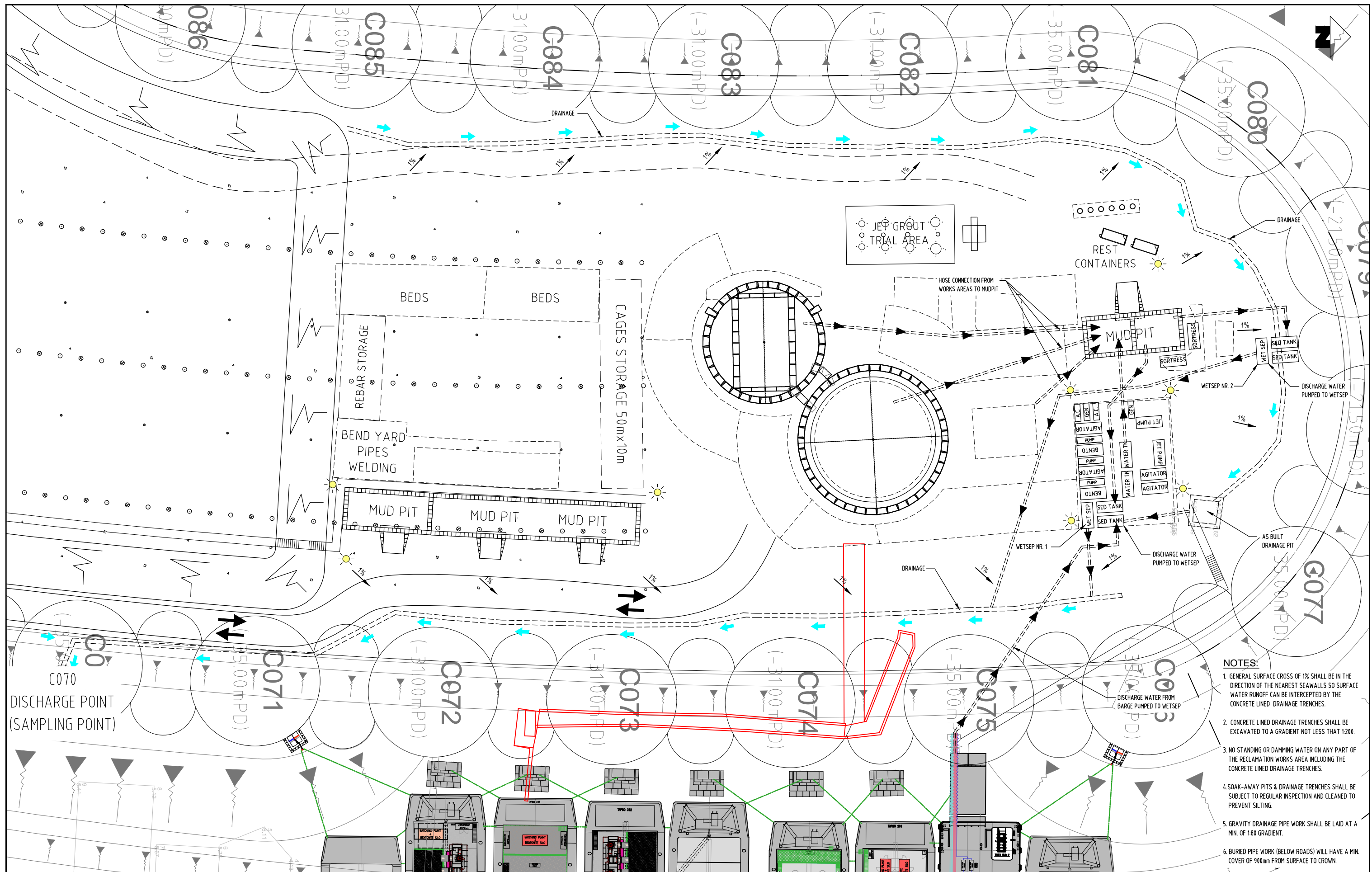
Remarks:

(1) Please keep the record and...

17/01/2017

Annex C

Site Drainage Management Plan



- NOTES:**
1. GENERAL SURFACE CROSS OF 1% SHALL BE IN THE DIRECTION OF THE NEAREST SEAWALLS SO SURFACE WATER RUNOFF CAN BE INTERCEPTED BY THE CONCRETE LINED DRAINAGE TRENCHES.
 2. CONCRETE LINED DRAINAGE TRENCHES SHALL BE EXCAVATED TO A GRADIENT NOT LESS THAN 1:200.
 3. NO STANDING OR DAMMING WATER ON ANY PART OF THE RECLAMATION WORKS AREA INCLUDING THE CONCRETE LINED DRAINAGE TRENCHES.
 4. SOAK-AWAY PITS & DRAINAGE TRENCHES SHALL BE SUBJECT TO REGULAR INSPECTION AND CLEANED TO PREVENT SILTING.
 5. GRAVITY DRAINAGE PIPE WORK SHALL BE LAID AT A MIN. OF 1:80 GRADIENT.
 6. BURIED PIPE WORK (BELOW ROADS) WILL HAVE A MIN. COVER OF 900mm FROM SURFACE TO CROWN.

Rev.	Date	Drawn	Designed	Verified	Description	Approved
D	27JUL16	AGM	pkv	Ble	UPDATE	SPo
C	15JUN16	pkv	pkv	ACh	WESTSEP NR. 3 REMOVED	SPo
B	14JUN16	pkv	pkv	ACh	DISCHARGE FROM BARGE ADDED	SPo
A	07JUN16	pkv	pkv	BLe	FIRST ISSUE	SPo

Main Contractor

Dragages - Bouygues Joint Venture 宜嘉 - 中鐵建聯營

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

SOUTHERN LANDFALL
PORTION E1 SURFACE WATER DRAINAGE & DISCHARGE
ARRANGEMENT - GENERAL LAYOUT

Drawing no.

TMCLKL8-DBJ-SAA-MSI-10026

Scale

NTS

CADD Ref.

SAA-MSI-10026

Issue Status

DFT (DRAFT)

Revision

D

Annex D

Construction programme

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016		2017					
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					TMCLK - Northern Connection Sub-Sea Tunnel Section							
Contract Dates												
Commencement and Completion Dates												
KD01 - Achievement of Stage 1 - Nth TBM & C&C for E&MS/TCSS	0		09-Jan-17	0%							◆ KD01 - Achievement of Stage 1 - Nth TBM & C&C for E&MS/TCSS	
Site Possession Date												
Portions: X1,(N10,11,13 & 14) - Sth Landfall	0	06-Aug-15		0%								
Portions: N1 to N4 & N12	0		03-Dec-16	0%							◆ Portions: N1 to N4 & N12	
General Submissions												
Environmental												
Environmental Permit Submissions												
Supplementary WMP of C&C Tunnel at Sth.Landfall												
Supplementary WMP of C&C Tunnel at Sth.Landfall	0		28-Jun-14	0%								
Sediment Quality Report/Dumping Permit												
Southern Landfall												
Southern landfall - Commencement of Shaft & C&C Tunnel Dwall	0	03-Oct-15		0%								
Sediment Sampling & Testing Plan (SSTP) - if required												
Complete SSTP and Obtain EPD's approval	24	17-Feb-15	19-Mar-15	50%								
Sediment Quality Report (SQR) - if required												
Advance Ground Investigation works for Sediment sampling	24	20-Mar-15	21-Apr-15	90%								
Sediment Sample Testing & Report preparation	120	22-Apr-15	12-Sep-15	0%								
Dumping Permit for Load Dumping (Loading Permit) - if required												
Finalize the application document and submit to EPD - for Dwall	24	20-Jan-15	16-Feb-15	0%								
Notify the results and issue Loading Permit for Local & Cross Boundary Crossing - for Dwall	24	17-Feb-15	19-Mar-15	0%								
General Design Submissions												
(G6) IFA for Tunnel GBP												
SO's Review	35	29-Apr-14	02-Jun-14	100%								
SO Approval with Condition Received	0		03-Jun-14	100%								
PAYMENT MILESTONE												
Design and Design Checking of the Works												
MS 2.5 Submit AIP for seawall modification works at Southern Landfall	0		31-Jan-17	100%							◆ MS 2.5 Submit AIP for seawall modification works at S	
MS 2.32 Approve DDA for Approach Ramp Structures to Cut-and-cover Tunnels by the Supervising Officer	0		30-Apr-15	100%								
MS 2.44 Approve DDA for South Ventilation Building by the Supervising Officer	0		30-Jun-15	0%								
MS 2.48 Approve DDA for North Ventilation Building by the Supervising Officer	0		31-Jan-15	100%								
MS 2.52 Approve DDA for Facilities Provision for TCSS by the Supervising Officer	0		28-Feb-15	0%								
MS 2.56 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Southern Landfall by the Supervi	0		30-Apr-15	100%								
MS 2.60 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Northern Landfall by the Supervi	0		31-Dec-14	0%								
MS 2.69 Submit draft Operation and Maintenance Manual for all Tunnels and Cross Passgaes	0		29-Feb-16	0%								
MS 2.70 Accept Operation and Maintenance Manual for all Tunnels and Cross Passgaes by the Supervising	0		30-Jun-16	0%							◆ MS 2.70 Accept Operation and Maintenance Manual for all Tunnels and Cross Passgaes by the Supervising Officer	
MS 2.71 Submit draft Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes	0		29-Feb-16	0%								
MS 2.72 Accept Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes by the	0		30-Jun-16	0%							◆ MS 2.72 Accept Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes by the Supervising Offic	
Tunnel Boring Machine (TBM) and Back-up Equipment for TBM Tunnel												
MS 3.1.6 Removal of TBM for Southbound Tunnel from Site after the completion of TBM Tunnel	0		31-Jan-17	0%							◆ MS 3.1.6 Removal of TBM for Southbound Tunnel from	
MS 3.1.12 Removal of TBM for Northbound Tunnel from Site after the completion of TBM Tunnel	0		28-Feb-17	0%							◆ MS 3.1.12 Removal of TBM for Northbound	
MS 3.1.25 Demolition of Slurry Treatment Plant on completion	0		28-Feb-17	0%							◆ MS 3.1.25 Demolition of Slurry Treatment	
MS 3.1.26 Complete the whole of the activities under this Cost Centre Part to the satisfaction of the Supervisin	0		31-Dec-15	0%								
TBM Tunnel												
MS 3.3.4 Complete walls of retrieval shaft	0		30-Jan-16	0%								
MS 3.3.5 Complete excavation to formation level for retrieval shaft and complete casting of base slab	0		30-Nov-16	0%							◆ MS 3.3.5 Complete excavation to formation level for retrieval shaft and complete cas	
MS 3.3.6 Complete all necessary works of retrieval shaft to facilitate retrieval of TBM	0		30-Nov-16	0%							◆ MS 3.3.6 Complete all necessary works of retrieval shaft to facilitate retrieval of TBM	
MS 3.3.33 Completion of excavation, support and permanent lining for 30% of the total length (measured on p	0		31-May-16	100%							◆ MS 3.3.33 Completion of excavation, support and permanent lining for 30% of the total length (measured on p	
MS 3.3.34 Completion of excavation, support and permanent lining for 32.5% of the total length (measured on p	0		30-Jun-16	100%							◆ MS 3.3.34 Completion of excavation, support and permanent lining for 32.5% of the total length (measured on p	
MS 3.3.35 Completion of excavation, support and permanent lining for 35% of the total length (measured on p	0		30-Jun-16	100%							◆ MS 3.3.35 Completion of excavation, support and permanent lining for 35% of the total length (measured on p	
MS 3.3.36 Completion of excavation, support and permanent lining for 37.5% of the total length (measured on p	0		30-Jun-16	100%							◆ MS 3.3.36 Completion of excavation, support and permanent lining for 37.5% of the total length (measured on p	
MS 3.3.37 Completion of excavation, support and permanent lining for 40% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.37 Completion of excavation, support and permanent lining for 40% of the total length (measured on p	
MS 3.3.38 Completion of excavation, support and permanent lining for 42.5% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.38 Completion of excavation, support and permanent lining for 42.5% of the total length (measured on p	
MS 3.3.39 Completion of excavation, support and permanent lining for 45% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.39 Completion of excavation, support and permanent lining for 45% of the total length (measured on p	
MS 3.3.40 Completion of excavation, support and permanent lining for 47.5% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.40 Completion of excavation, support and permanent lining for 47.5% of the total length (measured on p	
MS 3.3.41 Completion of excavation, support and permanent lining for 50% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.41 Completion of excavation, support and permanent lining for 50% of the total length (measured on p	
MS 3.3.42 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.42 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on p	
MS 3.3.43 Completion of excavation, support and permanent lining for 55% of the total length (measured on p	0		31-Aug-16	0%							◆ MS 3.3.43 Completion of excavation, support and permanent lining for 55% of the total length (measured on p	
MS 3.3.44 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on p	0		31-Aug-16	0%							◆ MS 3.3.44 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on p	
MS 3.3.45 Completion of excavation, support and permanent lining for 60% of the total length (measured on p	0		31-Aug-16	0%							◆ MS 3.3.45 Completion of excavation, support and permanent lining for 60% of the total length (measured on p	
MS 3.3.46 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on p	0		30-Sep-16	0%							◆ MS 3.3.46 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on p	
MS 3.3.47 Completion of excavation, support and permanent lining for 65% of the total length (measured on p	0		30-Sep-16	0%							◆ MS 3.3.47 Completion of excavation, support and permanent lining for 65% of the total length (measured on p	
MS 3.3.48 Completion of excavation, support and permanent lining for 67.5% of the total length (measured on p	0		30-Sep-16	0%							◆ MS 3.3.48 Completion of excavation, support and permanent lining for 67.5% of the total length (measured on p	
MS 3.3.49 Completion of excavation, support and permanent lining for 70% of the total length (measured on p	0		30-Sep-16	0%							◆ MS 3.3.49 Completion of excavation, support and permanent lining for 70% of the total length (measured on p	
MS 3.3.50 Completion of excavation, support and permanent lining for 72.5% of the total length (measured on p	0		31-Oct-16	0%							◆ MS 3.3.50 Completion of excavation, support and permanent lining for 72.5% of the total length (r	
MS 3.3.51 Completion of excavation, support and permanent lining for 75% of the total length (measured on p	0		31-Oct-16	0%							◆ MS 3.3.51 Completion of excavation, support and permanent lining for 75% of the total length (me	
MS 3.3.52 Completion of excavation, support and permanent lining for 77.5% of the total length (measured on p	0		31-Oct-16	0%							◆ MS 3.3.52 Completion of excavation, support and permanent lining for 77.5% of the total length (r	
MS 3.3.53 Completion of excavation, support and permanent lining for 80% of the total length (measured on p	0		31-Oct-16	0%							◆ MS 3.3.53 Completion of excavation, support and permanent lining for 80% of the total length (me	
MS 3.3.54 Completion of excavation, support and permanent lining for 82.5% of the total length (measured on p	0		30-Nov-16	0%							◆ MS 3.3.54 Completion of excavation, support and permanent lining for 82.5% of the	
MS 3.3.55 Completion of excavation, support and permanent lining for 85% of the total length (measured on p	0		30-Nov-16	0%							◆ MS 3.3.55 Completion of excavation, support and permanent lining for 85% of the to	
MS 3.3.56 Completion of excavation, support and permanent lining for 87.5% of the total length (measured on p	0		30-Nov-16	0%							◆ MS 3.3.56 Completion of excavation, support and permanent lining for 87.5% of the	
MS 3.3.57 Completion of excavation, support and permanent lining for 90% of the total length (measured on p	0		30-Nov-16	0%							◆ MS 3.3.57 Completion of excavation, support and permanent lining for 90% of the to	
MS 3.3.58 Completion of excavation, support and permanent lining for 92.5% of the total length (measured on p	0		30-Nov-16	0%							◆ MS 3.3.58 Completion of excavation, support and permanent lining for 92.5% of the	
MS 3.3.59 Completion of excavation, support and permanent lining for 95% of the total length (measured on p	0		31-Dec-16	0%							◆ MS 3.3.59 Completion of excavation, support and permanent lining for	
MS 3.3.60 Completion of excavation, support and permanent lining for 97.5% of the total length (measured on p	0		31-Dec-16	0%							◆ MS 3.3.60 Completion of excavation, support and permanent lining for	
MS 3.3.61 Completion of excavation, support and permanent lining for 100% of the total length (measured on p	0		31-Dec-16	0%							◆ MS 3.3.61 Completion of excavation, support and permanent lining for	
MS 3.3.96 Completion of excavation, support and permanent lining for 50% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.96 Completion of excavation, support and permanent lining for 50% of the total length (measured on plan) of the S	
MS 3.3.97 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.97 Completion of excavation, support and permanent lining for 52.5% of the total length (measured on plan) of the	
MS 3.3.98 Completion of excavation, support and permanent lining for 55% of the total length (measured on p	0		30-Jul-16	100%							◆ MS 3.3.98 Completion of excavation, support and permanent lining for 55% of the total length (measured on plan) of the S	
MS 3.3.99 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.99 Completion of excavation, support and permanent lining for 57.5% of the total length (measured on plan) of the	
MS 3.3.100 Completion of excavation, support and permanent lining for 60% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.100 Completion of excavation, support and permanent lining for 60% of the total length (measured on plan) of the	
MS 3.3.101 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.101 Completion of excavation, support and permanent lining for 62.5% of the total length (measured on plan) of th	
MS 3.3.102 Completion of excavation, support and permanent lining for 65% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.102 Completion of excavation, support and permanent lining for 65% of the total length (measured on plan) of the	
MS 3.3.103 Completion of excavation, support and permanent lining for 67.5% of the total length (measured on p	0		31-Aug-16	100%							◆ MS 3.3.103 Completion of excavation, support and permanent lining for 67.5% of the total length (measured on plan) of th	

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
Detailed Works Programme (Rev. F)
Three Months Rolling Programme
Progress as of 01-Jan-17



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJENPRG98507	WYu	SPs
08-Apr-14	TMCLKDBJENPRG98507 Rev.B	SPs	WYu
28-Aug-14	TMCLKDBJENPRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJENPRG98507 Rev.F	WYu	

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016					2017										
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May								
MS 3.3.104 Completion of excavation, support and permanent lining for 70% of the total length (measured on plan) of the Northbound	0		30-Sep-16	0%																
MS 3.3.105 Completion of excavation, support and permanent lining for 72.5% of the total length (measured on plan) of the Northbound	0		30-Sep-16	0%																
MS 3.3.106 Completion of excavation, support and permanent lining for 75% of the total length (measured on plan) of the Northbound	0		30-Sep-16	0%																
MS 3.3.107 Completion of excavation, support and permanent lining for 77.5% of the total length (measured on plan) of the Northbound	0		30-Sep-16	0%																
MS 3.3.108 Completion of excavation, support and permanent lining for 80% of the total length (measured on plan) of the Northbound	0		31-Oct-16	0%																
MS 3.3.109 Completion of excavation, support and permanent lining for 82.5% of the total length (measured on plan) of the Northbound	0		31-Oct-16	0%																
MS 3.3.110 Completion of excavation, support and permanent lining for 85% of the total length (measured on plan) of the Northbound	0		31-Oct-16	0%																
MS 3.3.111 Completion of excavation, support and permanent lining for 87.5% of the total length (measured on plan) of the Northbound	0		31-Oct-16	0%																
MS 3.3.112 Completion of excavation, support and permanent lining for 90% of the total length (measured on plan) of the Northbound	0		30-Nov-16	0%																
MS 3.3.113 Completion of excavation, support and permanent lining for 92.5% of the total length (measured on plan) of the Northbound	0		30-Nov-16	0%																
MS 3.3.114 Completion of excavation, support and permanent lining for 95% of the total length (measured on plan) of the Northbound	0		30-Nov-16	0%																
MS 3.3.115 Completion of excavation, support and permanent lining for 97.5% of the total length (measured on plan) of the Northbound	0		30-Nov-16	0%																
MS 3.3.116 Completion of excavation, support and permanent lining for 100% of the total length (measured on plan) of the Northbound	0		30-Nov-16	0%																
MS 3.3.117 Complete tunnel internal structures for 25% of total length (measured on plan) of the Northbound	0		31-Oct-16	0%																
MS 3.3.118 Complete tunnel internal structures for 50% of total length (measured on plan) of the Northbound	0		31-Jan-17	0%																
MS 3.3.121 Complete tunnel internal structures for 25% of total length (measured on plan) of the Southbound	0		31-Oct-16	0%																
MS 3.3.122 Complete tunnel internal structures for 50% of total length (measured on plan) of the Southbound	0		31-Jan-17	0%																
Cross Passages for TBM Tunnel																				
MS 3.3.1 Complete 50% of ground treatment for excavation of all Type 1 Cross Passages(Percentage to be certified for completion)	0		30-Nov-16	0%																
MS 3.3.3 Complete 50% of ground treatment for excavation of all Type 2 Cross Passages(Percentage to be certified for completion)	0		30-Nov-16	0%																
MS 3.3.5 Complete 50% of excavation and support for all Type 1 Cross Passages(Percentage to be certified for completion)	0		31-Dec-16	0%																
MS 3.3.7 Complete 50% of excavation and support for all Type 2 Cross Passages(Percentage to be certified for completion)	0		31-Dec-16	0%																
MS 3.3.9 Complete 50% of permanent lining and internal structures for all Type 1 Cross Passages(Percentage to be certified for completion)	0		31-Jan-17	0%																
MS 3.3.11 Complete 50% of permanent lining and internal structures for all Type 2 Cross Passages(Percentage to be certified for completion)	0		28-Feb-17	0%																
Cut-and-cover Tunnels at Southern Landfalls																				
MS 4.1.1 Complete 10% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		31-Oct-15	0%																
MS 4.1.2 Complete 20% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		31-Oct-15	0%																
MS 4.1.3 Complete 30% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		30-Nov-15	0%																
MS 4.1.4 Complete 40% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		30-Nov-15	0%																
MS 4.1.5 Complete 50% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		31-Dec-15	0%																
MS 4.1.6 Complete 60% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		31-Dec-15	0%																
MS 4.1.7 Complete 70% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		30-Jan-16	0%																
MS 4.1.8 Complete 80% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		30-Jan-16	0%																
MS 4.1.9 Complete 90% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		29-Feb-16	0%																
MS 4.1.10 Complete 100% of total length (measured on plan) of temporary retaining walls for excavation of Cut-and-cover tunnel	0		31-Mar-16	0%																
MS 4.1.11 Complete 40% of excavation for Cut-and-cover tunnel	0		30-Jun-16	0%																
MS 4.1.12 Complete 60% of excavation for Cut-and-cover tunnel	0		31-Aug-16	0%																
MS 4.1.13 Complete 80% of excavation for Cut-and-cover tunnel	0		31-Oct-16	0%																
MS 4.1.14 Complete 100% of excavation for Cut-and-cover tunnel	0		31-Dec-16	0%																
MS 4.1.15 Complete 100% of excavation for Cut-and-cover tunnel	0		28-Feb-17	0%																
MS 4.1.16 Complete permanent tunnel structure for 10% of the total length (measured on plan) of Cut-and-cover Tunnel	0		30-Jul-16	0%																
MS 4.1.17 Complete permanent tunnel structure for 20% of the total length (measured on plan) of Cut-and-cover Tunnel	0		31-Aug-16	0%																
MS 4.1.18 Complete permanent tunnel structure for 30% of the total length (measured on plan) of Cut-and-cover Tunnel	0		30-Sep-16	0%																
MS 4.1.19 Complete permanent tunnel structure for 40% of the total length (measured on plan) of Cut-and-cover Tunnel	0		30-Sep-16	0%																
MS 4.1.20 Complete permanent tunnel structure for 50% of the total length (measured on plan) of Cut-and-cover Tunnel	0		31-Oct-16	0%																
MS 4.1.21 Complete permanent tunnel structure for 60% of the total length (measured on plan) of Cut-and-cover Tunnel	0		31-Jan-17	0%																
MS 4.1.22 Complete permanent tunnel structure for 70% of the total length (measured on plan) of Cut-and-cover Tunnel	0		28-Feb-17	0%																
MS 4.1.23 Complete permanent tunnel structure for 80% of the total length (measured on plan) of Cut-and-cover Tunnel	0		28-Feb-17	0%																
MS 4.1.26 Complete excavation for 50% of total length (measured on plan) of all Cross Passages	0		31-Dec-15	0%																
MS 4.1.27 Complete excavation for 100% of total length (measured on plan) of all Cross Passages	0		31-Mar-16	0%																
MS 4.1.29 Complete pavement for 50% of the total length (measured on plan) of Cut-and-cover Tunnel	0		31-Dec-16	0%																
Cut-and-cover Tunnel at Northern Landfall																				
MS 4.2.22 Complete tunnel internal structure for 50% of NB Northern Landfall TBM Tunnel	0		31-Aug-16	0%																
MS 4.2.23 Complete tunnel internal structure for 100% of NB Northern Landfall TBM Tunnel	0		30-Sep-16	0%																
MS 4.2.24 Complete tunnel internal structure for 50% of SB Northern Landfall TBM Tunnel	0		31-Oct-16	0%																
MS 4.2.25 Complete tunnel internal structure for 100% of SB Northern Landfall TBM Tunnel	0		30-Nov-16	0%																
MS 4.2.28 Complete 75% of permanent lining and internal structures for all Northern Landfall Cross Passages	0		30-Sep-16	100%																
MS 4.2.29 Complete 100% of permanent lining and internal structures for all Northern Landfall Cross Passages	0		31-Oct-16	0%																
MS 4.2.30 Complete Permanent tunnel structure for 25% of Cut and Cover Tunnel	0		31-Aug-16	0%																
MS 4.2.31 Complete Permanent tunnel structure for 50% of Cut and Cover Tunnel	0		30-Sep-16	0%																
MS 4.2.32 Complete Permanent tunnel structure for 75% of Cut and Cover Tunnel	0		30-Nov-16	0%																
MS 4.2.34 Complete Permanent junction structure at interface between Cut-and-cover and TBM Tunnel	0		30-Jul-16	0%																
Approach Ramp Structures to Cut-and-cover Tunnel at Southern Landfall																				
MS 5.1.2 Complete 40% of excavation for approach ramp structures	0		31-Mar-16	0%																
MS 5.1.3 Complete 60% of excavation for approach ramp structures	0		31-Mar-16	0%																
MS 5.1.4 Complete 80% of excavation for approach ramp structures	0		30-Apr-16	0%																
MS 5.1.5 Complete 100% of excavation for approach ramp structures	0		30-Apr-16	0%																
MS 5.1.6 Complete retaining wall foundation for 10% of the total length (measured on plan) of approach ramp structure	0		31-Oct-15	0%																
MS 5.1.7 Complete retaining wall foundation for 20% of the total length (measured on plan) of approach ramp structure	0		30-Nov-15	0%																
MS 5.1.8 Complete retaining wall foundation for 30% of the total length (measured on plan) of approach ramp structure	0		30-Nov-15	0%																
MS 5.1.9 Complete retaining wall foundation for 40% of the total length (measured on plan) of approach ramp structure	0		31-Dec-15	0%																
MS 5.1.10 Complete retaining wall foundation for 50% of the total length (measured on plan) of approach ramp structure	0		31-Dec-15	0%																
MS 5.1.11 Complete retaining wall foundation for 60% of the total length (measured on plan) of approach ramp structure	0		30-Jan-16	0%																
MS 5.1.12 Complete retaining wall foundation for 70% of the total length (measured on plan) of approach ramp structure	0		30-Jan-16	0%																
MS 5.1.13 Complete retaining wall foundation for 80% of the total length (measured on plan) of approach ramp structure	0		29-Feb-16	0%																
MS 5.1.14 Complete retaining wall foundation for 90% of the total length (measured on plan) of approach ramp structure	0		29-Feb-16	0%																
MS 5.1.15 Complete retaining wall foundation for 100% of the total length (measured on plan) of approach ramp structure	0		31-Mar-16	0%																
South Ventilation Buildings																				
MS 7.1.1 Complete 100% of cofferdam for excavation	0		30-Sep-16	0%																
MS 7.1.2 Complete 100% of excavation to the formation level	0		30-Sep-16	0%																
MS 7.1.3 Complete 100% of foundation for the ventilation building	0		30-Apr-16	0%		</														

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016			2017				
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
					MS 7.2.6 Complete concreting works of 75% area of the total construction floor area for the ventilation building	0		31-Dec-16	0%			
Facilities Provision for E&M Works for TBM Tunnel, Cut & Cover Tunnels and Cross Passages												
MS 9.1.1 Complete 25% of bonding terminal, opening and accessories, etc.	0		30-Sep-16	0%				◆ MS 9.1.1 Complete 25% of bonding terminal, opening and accessories, etc.				
MS 9.1.2 Complete 25% of plinth, hoisting facilities and accessories, etc.	0		30-Sep-16	0%				◆ MS 9.1.2 Complete 25% of plinth, hoisting facilities and accessories, etc.				
MS 9.1.3 Complete 50% of bonding terminal, opening and accessories, etc.	0		31-Jan-17	0%				◆ MS 9.1.3 Complete 50% of bonding terminal, opening and accessories, etc.				
MS 9.1.4 Complete 50% of plinth, hoisting facilities and accessories, etc.	0		31-Jan-17	0%				◆ MS 9.1.4 Complete 50% of plinth, hoisting facilities and accessories, etc.				
Construction												
Northern Landfall												
North Reclamation (Phase 1)												
Box Culvert Extension												
Construction												
Ch000-010 Culvert Outfall												
Removal of temporary bulk head	18	25-Nov-15	15-Dec-15	0%								
Ch150-250 Marine Section												
ELS & Structure												
Pile A41/A39 CJ to Pile A39/A37 CJ												
ELS												
Excavation to 0.5m below strut S2	4	05-Feb-16	16-Feb-16	100%								
Installation of strut S2	6	17-Feb-16	23-Feb-16	100%								
Excavation to 0.5m below strut S1	5	24-Feb-16	29-Feb-16	100%								
Installation of strut S1	5	01-Mar-16	05-Mar-16	100%								
Excavation to FEL	5	07-Mar-16	11-Mar-16	100%								
Box Culvert Structure												
Pile cap construction	10	18-Mar-16	01-Apr-16	100%								
Base slab construction including kicker	6	15-Apr-16	21-Apr-16	0%								
Removal of strut S1	4	22-Apr-16	26-Apr-16	0%								
Sliding formworks 1st assembly	18	27-Apr-16	19-May-16	0%								
Walls & top slab construction	6	20-May-16	26-May-16	0%								
Removal of strut S2 & Backfilling up to required level	6	03-Jun-16	10-Jun-16	0%								
Pile A39/A37 CJ to Pile A37/A35 CJ												
ELS												
Excavation to 0.5m below strut S2	4	17-Feb-16	20-Feb-16	100%								
Installation of strut S2	6	22-Feb-16	27-Feb-16	100%								
Excavation to 0.5m below strut S1	5	01-Mar-16	05-Mar-16	100%								
Installation of strut S1	5	07-Mar-16	11-Mar-16	100%								
Excavation to FEL	5	12-Mar-16	17-Mar-16	100%								
Box Culvert Structure												
Pile cap construction	10	02-Apr-16	14-Apr-16	100%								
Base slab construction including kicker	6	22-Apr-16	28-Apr-16	0%								
Removal of strut S1	4	29-Apr-16	04-May-16	0%								
Walls & top slab construction	6	27-May-16	02-Jun-16	0%								
Removal of strut S2 & Backfilling up to required level	6	11-Jun-16	17-Jun-16	0%								
Pile A37/A35 CJ to Pile A35/A33 CJ												
ELS												
Excavation to 0.5m below strut S2	4	22-Feb-16	25-Feb-16	100%								
Installation of strut S2	6	26-Feb-16	03-Mar-16	100%								
Excavation to 0.5m below strut S1	5	07-Mar-16	11-Mar-16	100%								
Installation of strut S1	5	12-Mar-16	17-Mar-16	100%								
Excavation to FEL	5	18-Mar-16	23-Mar-16	100%								
Box Culvert Structure												
Pile cap construction	10	15-Apr-16	26-Apr-16	100%								
Base slab construction including kicker	6	29-Apr-16	06-May-16	0%								
Removal of strut S1	4	07-May-16	11-May-16	0%								
Walls & top slab construction	6	03-Jun-16	10-Jun-16	0%								
Removal of strut S2 & Backfilling up to required level	6	18-Jun-16	24-Jun-16	0%								
Pile A35/A33 CJ to Pile A33/P117 CJ												
ELS												
Excavation to 0.5m below strut S2	4	26-Feb-16	01-Mar-16	100%								
Installation of strut S2	6	02-Mar-16	08-Mar-16	100%								
Excavation to 0.5m below strut S1	5	12-Mar-16	17-Mar-16	100%								
Installation of strut S1	5	18-Mar-16	23-Mar-16	100%								
Excavation to FEL	5	24-Mar-16	01-Apr-16	100%								
Box Culvert Structure												
Pile cap construction	10	27-Apr-16	09-May-16	100%								
Base slab construction including kicker	6	10-May-16	17-May-16	0%								
Removal of strut S1	4	18-May-16	21-May-16	0%								
Walls & top slab construction	6	11-Jun-16	17-Jun-16	0%								
Pile A33/P117 CJ to Pile P113/P109 CJ												
Box Culvert Structure												
Base slab construction including kicker	6	18-May-16	24-May-16	0%								
Removal of strut S1	4	25-May-16	28-May-16	0%								
Walls & top slab construction	6	18-Jun-16	24-Jun-16	0%								
Pile P113/P109 CJ to Pile P105/P101 CJ												
Box Culvert Structure												
Base slab construction including kicker	6	25-May-16	31-May-16	50%								
Removal of strut S1	4	01-Jun-16	04-Jun-16	0%								
Pile P105/P101 CJ to Pile P97/P93 CJ												
Box Culvert Structure												
Base slab construction including kicker	6	01-Jun-16	07-Jun-16	0%								
Removal of strut S1	4	08-Jun-16	13-Jun-16	0%								
Pile P97/P93 CJ to Pile P89/P85 CJ												
Box Culvert Structure												
Base slab construction including kicker	6	08-Jun-16	15-Jun-16	50%								
Removal of strut S1	4	16-Jun-16	20-Jun-16	0%								
Pile P89/P85 CJ to Pile P81/P77 CJ												
Box Culvert Structure												
Base slab construction including kicker	6	16-Jun-16	22-Jun-16	0%								

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

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Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016		2017				
					Oct	Nov	Jan	Feb	Mar	Apr	May
Removal of strut S1	4	23-Jun-16	27-Jun-16	0%							
Pile P81/P77 CJ to Pile P73/P69 CJ											
Box Culvert Structure											
Base slab construction including kicker	6	23-Jun-16	29-Jun-16	100%							
Ch250-380 Marine Section											
Installation of Dewatering & Observation Well Ch 250-380	23	04-Nov-15	30-Nov-15	100%							
1st Pumping Test & Analysis	17	01-Dec-15	19-Dec-15	100%							
Toe Grouting	106	21-Dec-15	07-May-16	100%							
2nd Pumping test & Analysis	25	08-Apr-16	07-May-16	100%							
Remaining toe grouting Ch250-380	51	09-May-16	09-Jul-16	100%							
NewActivity	0			0%							
ELS & Structure											
Geotextile - Phase 2 Reclamation - along combi wall system	4	03-Dec-16	08-Dec-16	0%							
Sand Blanket - Phase 2 Reclamation - along combi wall system	6	08-Dec-16	15-Dec-16	0%							
Band Drain - Phase 2 Reclamation - along combi wall system	30	15-Dec-16	23-Jan-17	0%							
Public Fill - Phase 2 Reclamation - along combi wall system	14	23-Jan-17	15-Feb-17	0%							
Pile P73/P69 CJ to Pile P65/P61 CJ											
ELS											
Excavation to 0.5m below strut S1	9	15-Feb-17	25-Feb-17	0%							
Installation of strut S1	5	25-Feb-17	03-Mar-17	0%							
Excavation to FEL	5	03-Mar-17	09-Mar-17	0%							
Box Culvert Structure											
Base slab construction including kicker	6	16-Mar-17	23-Mar-17	0%							
Pile P65/P61 CJ to Pile P57/P53 CJ											
ELS											
Excavation to 0.5m below strut S1	9	22-Feb-17	04-Mar-17	0%							
Installation of strut S1	5	04-Mar-17	10-Mar-17	0%							
Excavation to FEL	5	10-Mar-17	16-Mar-17	0%							
Pile P57/P53 CJ to Pile P49/P45 CJ											
ELS											
Excavation to 0.5m below strut S1	9	01-Mar-17	11-Mar-17	0%							
Installation of strut S1	5	11-Mar-17	17-Mar-17	0%							
Excavation to FEL	5	17-Mar-17	23-Mar-17	0%							
Pile P49/P45 CJ to Pile P41/P37 CJ											
ELS											
Excavation to 0.5m below strut S1	9	08-Mar-17	18-Mar-17	0%							
Pile P41/P37 CJ to Pile P33/P29 CJ											
ELS											
Excavation to 0.5m below strut S1	9	15-Mar-17	25-Mar-17	0%							
Miscellaneous works											
Inspection Manhole (IM)											
Inspection Manhole IM-01 to IM-04 & backfilling to +6.0mPD	12	24-Sep-15	09-Oct-15	0%							
Inspection Manhole IM-09 to IM-12 & backfilling to +6.0mPD	18	20-Oct-16	09-Nov-16	0%							
Stop Log Opening (SLO)											
SLO-01 to SLO-05 & backfilling to +6.0mPD	24	10-Oct-15	07-Nov-15	0%							
Balance Hole (BH)											
BH-01 to BH-03 & backfilling to +6.0mPD	18	03-Sep-15	23-Sep-15	0%							
BH-04 to BH-06 & backfilling to +6.0mPD	18	05-Sep-16	26-Sep-16	0%							
BH-07 to BH-09 & backfilling to +6.0mPD	18	10-Nov-16	30-Nov-16	0%							
Desilting Opening (DO)											
DO-01 to DO-04 & backfilling to +6.0mPD	18	27-Sep-16	19-Oct-16	0%							
North Launching Shaft											
Design Submission											
(C1) DDA for North C&C Tunnel Permanent Structure											
SO's Review	35	24-May-14	27-Jun-14	90%							
SO Approval with Condition Received	0		27-Jun-14	0%							
North Ventilation Shaft											
Construction											
North Ventilation Shaft Structure											
NVS - ML03 Tunnel Structure	47	19-May-16	15-Jul-16	30%							
NVS - ML02 Tunnel Structure	44	05-Apr-16	27-May-16	46%							
TMCLK VO-008 - Construction of Viaduct Foundations at Portion N6A											
Viaduct Pile Cap											
Construction											
Pier G1b											
Pile Cap G1b - ELS Foundation	24	03-Dec-16	04-Jan-17	0%							
Pile Cap G1b - Removal of Existing ground slab	6	04-Jan-17	11-Jan-17	0%							
Pile Cap G1b - Excavation & ELS Installation	15	11-Jan-17	04-Feb-17	0%							
Pile Cap G1b - Blinding Concrete	3	04-Feb-17	08-Feb-17	0%							
Pile Cap G1b - Rebar & Concreting	18	08-Feb-17	01-Mar-17	0%							
Pile Cap G1b - Backfilling & Temp Reinstatement	6	01-Mar-17	08-Mar-17	0%							
Pier H1b											
Pile Cap H1b - ELS Foundation	24	08-Mar-17	06-Apr-17	0%							
Pier G1c											
Pile Cap G1c - Preparation for ELS	6	24-Oct-14	30-Oct-14	0%							
Pile Cap G1c - Removal of Existing ground slab	6	31-Oct-14	06-Nov-14	0%							
Pile Cap G1c - Excavation & ELS Installation	12	07-Nov-14	20-Nov-14	0%							
Pile Cap G1c - Blinding Concrete	3	21-Nov-14	24-Nov-14	0%							
Pile Cap G1c - Rebar & Concreting	18	25-Nov-14	15-Dec-14	0%							
Pile Cap G1c - Backfilling & Temp Reinstatement	6	16-Dec-14	22-Dec-14	0%							
Pier H1c											
Pile Cap H1c - Preparation for ELS	6	02-Nov-15	07-Nov-15	0%							
Pile Cap H1c - Removal of Existing ground slab	6	09-Nov-15	14-Nov-15	0%							
North Approach TBM Tunnelling & Cross Passage											
Construction											
Northern Landfall Surface Setup for TBM operation											
Gantry Removal at North TBM Launching Shaft	24	17-Mar-17	19-Apr-17	0%							

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

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Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJENPRG98507	WYu	SPu
08-Apr-14	TMCLKDBJENPRG98507 Rev.B	SPu	WYu
28-Aug-14	TMCLKDBJENPRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJENPRG98507 Rev.F	WYu	

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016			2017						
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May		
Slurry Treatment Plant De commissioning & Removal	48	17-Mar-17	19-May-17	0%										
North Approach Tunnel Internal Structure - NB														
CP51 - Excavation & Lining completion	0		09-Nov-16	0%										
NB - North TBM Tunnel - Corbel & Cable Trough installation	42	31-Aug-16	22-Oct-16	91%										
NB - North TBM Tunnel - OHVD Slab installation	42	07-Sep-16	29-Oct-16	0%										
NB - North TBM Tunnel - Fire proofing and Provision to E&MS and TCSS Contract for KD1	42	14-Sep-16	05-Nov-16	0%										
North Approach Tunnel Internal Structure - SB														
SB - North TBM Tunnel - Corbel & Cable Trough installation	42	22-Oct-16	10-Dec-16	91%										
SB - North TBM Tunnel - OHVD Slab installation	42	29-Oct-16	17-Dec-16	3%										
SB - North TBM Tunnel - Fire proofing & Provision to E&MS and TCSS Contract for KD1	42	05-Nov-16	24-Dec-16	0%										
North Approach Cross Passage														
CP55 - Traditional Method														
CP Finishing & Demobilization	18	23-May-16	14-Jun-16	100%										
CP52 - Pipe Jacking Method														
CP Finishing & Demobilization	21	24-Mar-16	22-Apr-16	100%										
CP51 - Traditional Method														
CP Excavation	14	14-Sep-16	28-Sep-16	100%										
CP Lining	14	28-Sep-16	12-Oct-16	100%										
2nd Segment Opening	7	12-Oct-16	19-Oct-16	100%										
CP Finishing & Demobilization	18	19-Oct-16	09-Nov-16	100%										
CP50 - Pipe Jacking Method														
CP Finishing & Demobilization	21	27-Jun-16	21-Jul-16	100%										
North Ventilation Building														
Design Submission														
(A11) Submissions to Design Advisory Panel of ArchSD														
ArchSD's comment	30	10-Jun-14	09-Jul-14	93%										
(I1) DDA for North Vent.Bldgs. GBP & Arch.Submission														
IPs Review	28	21-Aug-14	17-Sep-14	92%										
IP's No Objection Received	0		17-Sep-14	0%										
SO's Review	35	21-Aug-14	24-Sep-14	94%										
SO Approval with Condition Received	0		24-Sep-14	0%										
(I1) DDA for North & South Vent.Bldg. ABWF works														
IPs/ SO's Advance Comments/ ICE Comments	28	03-Dec-14	30-Dec-14	88%										
Comments Received	0		30-Dec-14	0%										
Designer to Reply PtC + Update Submission	21	31-Dec-14	24-Jan-15	0%										
Submit Updated DDA to SO/ ICE/ IPs	0	26-Jan-15		0%										
ICE Approval & Issue Check Cert	18	26-Jan-15	14-Feb-15	0%										
Submit ICE Check Cert to SO	6	16-Feb-15	25-Feb-15	0%										
IPs Review	28	26-Jan-15	22-Feb-15	0%										
IP's No Objection Received	0		22-Feb-15	0%										
SO's Review	35	26-Jan-15	01-Mar-15	0%										
SO Approval with Condition Received	0		02-Mar-15	0%										
(I2) DDA for North Vent.Bldgs.Structural Design incl.Vent.Connections														
IPs Review	28	24-Dec-14	20-Jan-15	92%										
IP's No Objection Received	0		20-Jan-15	0%										
SO's Review	35	24-Dec-14	27-Jan-15	92%										
SO Approval with Condition Received	0		27-Jan-15	0%										
(I3) DDA for North & South Vent.Bldgs. Service and E&M Provision														
ICE Approval & Issue Check Cert	12	15-Jan-15	28-Jan-15	100%										
Submit ICE Check Cert to SO	6	29-Jan-15	04-Feb-15	100%										
IPs Review	28	15-Jan-15	11-Feb-15	92%										
IP's No Objection Received	0		11-Feb-15	0%										
SO's Review	35	15-Jan-15	18-Feb-15	91%										
SO Approval with Condition Received	0		18-Feb-15	0%										
Construction														
Substructure	120	28-Jun-16	19-Nov-16	0%										
Superstructure	120	19-Nov-16	24-Apr-17	0%										
North Reclamation (Phase 2)														
Construction														
Dredging - Phase 2 (Zone G)	18	03-Dec-16	24-Dec-16	10%										
VS - Rock Grade 400 - Zone G	9	24-Dec-16	07-Jan-17	0%										
VS - Levelling Stone & Seawall Block - Zone G	27	07-Jan-17	15-Feb-17	0%										
VS - Rock Type A - Zone G	10	15-Feb-17	27-Feb-17	0%										
Vertical Seawall - Bermstone - (Zone G)	18	27-Feb-17	20-Mar-17	0%										
Vertical Seawall - Seawall Copping - (Zone G)	78	27-Feb-17	06-Jun-17	0%										
Geotextile (Zone G)	11	24-Dec-16	10-Jan-17	0%										
Sand Blanket (Zone G)	21	31-Dec-16	26-Jan-17	0%										
Band Drain (Zone G)	30	14-Jan-17	25-Feb-17	0%										
Reclamation - Phase 2	24	11-Feb-17	11-Mar-17	0%										
Backfilling to +10mPD - Phase 2	48	25-Feb-17	27-Apr-17	0%										
North Surface Roadworks, Utility & Drainage works														
Construction														
North Landfall - Underground Sewerage & Drainage - Summary	408	27-Jan-17	26-Jun-18	0%										
North Landfall - Underground Sewerage & Drainage - Portion N5	139	11-Mar-17	30-Aug-17	0%										
Sub-sea Tunnel														
Sub-sea TBM Tunnelling														
Major Procurement														
Precast Segment ID12.40 - Production for Sub-sea TBM Tunnel														
ID12.40 TBM Segment Ring Fabrication - 12 rings per day	300	22-Nov-14	19-Dec-15	89%										
Design Submission														
(G1) DDA for TBM Tunnel Lining Structural Design - Sub-sea tunnel														
Sub-sea TBM Tunnel Segment - Fabrication	265	06-Oct-14	26-Aug-15	89%										
(G3) DDA for TBM Tunnel Internal Structures (Sub-sea)														
Sub-sea Tunnel - Precast Gallery Fabrication	244	22-Jan-15	18-Nov-15	84%										
Construction														
Sub-sea TBM Tunnel - NB ID12.2m - S881														
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5550 to 5330 - 220m)	18	14-Aug-16	02-Sep-16	100%										

■ Planned Bar
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12-Feb-14	TMCLKDBJEN.PRG.98507	WYu	SPs
08-Apr-14	TMCLKDBJEN.PRG.98507 Rev.B	SPs	WYu
28-Aug-14	TMCLKDBJEN.PRG.98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJEN.PRG.98507 Rev.F	WYu	

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016						2017					
					2016		2017		2017		2017		2017			
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May				
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5330 to 4950 - 380m)	30	02-Sep-16	02-Oct-16	100%												
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch4950 to 4870 - 80m)	6	02-Oct-16	08-Oct-16	100%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4870 to 4750 - 120m)	8	08-Oct-16	16-Oct-16	100%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4750 to 4600 - 150m)	10	16-Oct-16	26-Oct-16	100%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4600 to 4400 - 200m)	13	26-Oct-16	08-Nov-16	100%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4400 to 4300 - 100m)	6	08-Nov-16	14-Nov-16	100%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4300 to 4200 - 100m)	6	14-Nov-16	20-Nov-16	76%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4200 to 3830 - 370m)	26	20-Nov-16	16-Dec-16	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch3830 to 3710 - 120m)	8	16-Dec-16	24-Dec-16	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3710 to 3590 - 120m)	8	24-Dec-16	01-Jan-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch3590 to 3460 - 130m)	8	01-Jan-17	09-Jan-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3460 to 3360 - 100m)	7	09-Jan-17	16-Jan-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch3360 to 3160 - 200m)	13	16-Jan-17	01-Feb-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3160 to 3060 - 100m)	7	01-Feb-17	08-Feb-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3060 to 2920 - 140m)	10	08-Feb-17	18-Feb-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2920 to 2820 - 100m)	7	18-Feb-17	25-Feb-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch2820 to 2720 - 100m)	6	25-Feb-17	03-Mar-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2720 to 2673 - 47m)	3	03-Mar-17	06-Mar-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2673 to 2574 - 99m)	7	06-Mar-17	13-Mar-17	0%												
NB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2574 to 2512 - 62m)	4	13-Mar-17	17-Mar-17	0%												
Sub-sea TBM Tunnel - SB ID12.2m - S882																
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4621 to 4421 - 200m)	13	12-Sep-16	25-Sep-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4421 to 4321 - 100m)	6	25-Sep-16	01-Oct-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch4321 to 4221 - 100m)	6	01-Oct-16	07-Oct-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4221 to 3851 - 370m)	26	07-Oct-16	02-Nov-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch3851 to 3731 - 120m)	8	02-Nov-16	10-Nov-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3731 to 3611 - 120m)	8	10-Nov-16	18-Nov-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch3611 to 3481 - 130m)	8	18-Nov-16	26-Nov-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3481 to 3381 - 100m)	7	26-Nov-16	03-Dec-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch3381 to 3181 - 200m)	13	03-Dec-16	16-Dec-16	100%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3181 to 3081 - 100m)	7	16-Dec-16	23-Dec-16	80%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch3081 to 2941 - 140m)	10	23-Dec-16	02-Jan-17	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2941 to 2841 - 100m)	7	02-Jan-17	09-Jan-17	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS sandy with Trimix (Ch2841 to 2741 - 100m)	6	09-Jan-17	15-Jan-17	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2741 to 2694 - 47m)	3	15-Jan-17	18-Jan-17	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2694 to 2595 - 99m)	7	18-Jan-17	25-Jan-17	0%												
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch2595 to 2533 - 62m)	4	25-Jan-17	01-Feb-17	0%												
SB - TBM Removal at Southern Landfall	60	01-Feb-17	02-Apr-17	0%												
Sub-sea TBM Tunnel - NB - Precast Invert Gallery																
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP39	3	02-Sep-16	05-Sep-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP38	8	07-Sep-16	15-Sep-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP37	8	15-Sep-16	23-Sep-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP36	8	23-Sep-16	01-Oct-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP35	7	01-Oct-16	08-Oct-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP34	8	08-Oct-16	16-Oct-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP33	4	16-Oct-16	20-Oct-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP32	6	20-Oct-16	26-Oct-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP31	8	26-Oct-16	03-Nov-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP30	6	03-Nov-16	09-Nov-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP29	6	09-Nov-16	15-Nov-16	100%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP28	6	15-Nov-16	21-Nov-16	50%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP27	7	21-Nov-16	28-Nov-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP26	7	28-Nov-16	05-Dec-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP25	7	05-Dec-16	12-Dec-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP24	7	12-Dec-16	19-Dec-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP23	6	19-Dec-16	25-Dec-16	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP22	7	25-Dec-16	01-Jan-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP21	5	01-Jan-17	06-Jan-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP20	8	06-Jan-17	14-Jan-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP19	6	14-Jan-17	20-Jan-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP18	6	20-Jan-17	26-Jan-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP17	7	26-Jan-17	05-Feb-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP16	7	05-Feb-17	12-Feb-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP15	7	12-Feb-17	19-Feb-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP14	7	19-Feb-17	26-Feb-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP13	6	26-Feb-17	04-Mar-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP12	7	04-Mar-17	11-Mar-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP11	6	11-Mar-17	17-Mar-17	0%												
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP10	6	17-Mar-17	23-Mar-17	0%												
Sub-sea TBM Tunnel - SB - Precast Invert Gallery																
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP32	6	15-Sep-16	21-Sep-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP31	10	21-Sep-16	01-Oct-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP30	7	01-Oct-16	08-Oct-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP29	6	08-Oct-16	14-Oct-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP28	11	14-Oct-16	25-Oct-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP27	6	25-Oct-16	31-Oct-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP26	11	31-Oct-16	11-Nov-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP25	6	11-Nov-16	17-Nov-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP24	8	17-Nov-16	25-Nov-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP23	13	25-Nov-16	08-Dec-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP22	8	08-Dec-16	16-Dec-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP21	9	16-Dec-16	25-Dec-16	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP20	7	25-Dec-16	01-Jan-17	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP19	7	01-Jan-17	08-Jan-17	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP18	12	08-Jan-17	20-Jan-17	100%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP17	6	20-Jan-17	26-Jan-17	17%												
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP16	10	26-Jan-17	08-Feb-17	0%												

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016			2017						
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May		
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP15	7	08-Feb-17	15-Feb-17	0%										
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP14	7	15-Feb-17	22-Feb-17	0%										
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP13	13	22-Feb-17	07-Mar-17	0%										
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP12	8	07-Mar-17	15-Mar-17	0%										
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP11	11	15-Mar-17	26-Mar-17	0%										
Sub-sea Tunnel Cross Passage & Internal Structure														
Construction														
Sub-sea Tunnel Cross Passage														
CP48 - ML03 - Ch6489														
CP - Pipe Jacking Method - Break-out & Demobilization	11	22-Jul-16	02-Aug-16	100%										
CP - Remaining Internal Structure & Finishing	21	02-Aug-16	26-Aug-16	100%										
CP47 - ML03 - Ch6390														
CP - Remaining Internal Structure & Finishing	21	08-Aug-16	31-Aug-16	90%										
CP46 - ML03 - Ch6292														
CP - Pipe Jacking Method - Setup & Assembly	23	07-Jul-16	03-Aug-16	100%										
CP - Pipe Jacking Method - Break-in & Excavation	10	03-Aug-16	13-Aug-16	100%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	13-Aug-16	25-Aug-16	100%										
CP - Remaining Internal Structure & Finishing	21	25-Aug-16	20-Sep-16	0%										
CP45 - ML03 - Ch6193														
CP - Pipe Jacking Method - Setup & Assembly	23	12-Jul-16	08-Aug-16	100%										
CP - Pipe Jacking Method - Break-in & Excavation	10	08-Aug-16	18-Aug-16	100%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	18-Aug-16	30-Aug-16	100%										
CP - Remaining Internal Structure & Finishing	21	30-Aug-16	24-Sep-16	85%										
CP44 - ML03 - Ch6095														
CP - Pipe Jacking Method - Setup & Assembly	23	01-Aug-16	27-Aug-16	100%										
CP - Pipe Jacking Method - Break-in & Excavation	10	27-Aug-16	06-Sep-16	100%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	06-Sep-16	18-Sep-16	100%										
CP - Remaining Internal Structure & Finishing	21	19-Sep-16	14-Oct-16	85%										
CP43 - ML03 - Ch5996														
CP - Pipe Jacking Method - Setup & Assembly	23	06-Aug-16	02-Sep-16	100%										
CP - Pipe Jacking Method - Break-in & Excavation	10	02-Sep-16	12-Sep-16	100%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	12-Sep-16	24-Sep-16	100%										
CP - Remaining Internal Structure & Finishing	21	24-Sep-16	21-Oct-16	60%										
CP42 - ML03 - Ch5898														
CP - Pipe Jacking Method - Setup & Assembly	23	24-Aug-16	21-Sep-16	100%										
CP - Pipe Jacking Method - Break-in & Excavation	10	21-Sep-16	01-Oct-16	100%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	01-Oct-16	13-Oct-16	100%										
CP - Remaining Internal Structure & Finishing	21	12-Oct-16	05-Nov-16	0%										
CP41 - ML03 - Ch5800														
CP - Pipe Jacking Method - Setup & Assembly	23	29-Aug-16	24-Sep-16	100%										
CP - Piping Jacking Method - Break-in & Excavation	10	25-Sep-16	04-Oct-16	100%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	05-Oct-16	16-Oct-16	100%										
CP - Remaining Internal Structure & Finishing	21	17-Oct-16	09-Nov-16	0%										
CP40 - ML03 - Ch5703														
CP - Pipe Jacking Method - Setup & Assembly	23	05-Sep-16	04-Oct-16	100%										
CP - Piping Jacking Method - Break-in & Excavation	10	13-Oct-16	23-Oct-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	23-Oct-16	04-Nov-16	0%										
CP - Remaining Internal Structure & Finishing	21	04-Nov-16	29-Nov-16	0%										
CP39 - ML03 - Ch5607														
CP - Pipe Jacking Method - Setup & Assembly	23	15-Sep-16	15-Oct-16	100%										
CP - Piping Jacking Method - Break-in & Excavation	10	17-Oct-16	26-Oct-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	27-Oct-16	07-Nov-16	0%										
CP - Remaining Internal Structure & Finishing	21	08-Nov-16	01-Dec-16	0%										
CP38 - ML03 - Ch5510														
CP - Pipe Jacking Method - Setup & Assembly	23	23-Sep-16	22-Oct-16	80%										
CP - Piping Jacking Method - Break-in & Excavation	10	04-Nov-16	14-Nov-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	14-Nov-16	26-Nov-16	0%										
CP - Remaining Internal Structure & Finishing	21	26-Nov-16	21-Dec-16	0%										
CP37 - ML03 - Ch5413														
CP - Pipe Jacking Method - Setup & Assembly	23	03-Oct-16	29-Oct-16	10%										
CP - Piping Jacking Method - Break-in & Excavation	10	08-Nov-16	17-Nov-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	18-Nov-16	29-Nov-16	0%										
CP - Remaining Internal Structure & Finishing	21	30-Nov-16	23-Dec-16	0%										
CP36 - ML03 - Ch5315														
CP - Pipe Jacking Method - Setup & Assembly	23	08-Oct-16	05-Nov-16	10%										
CP - Piping Jacking Method - Break-in & Excavation	10	26-Nov-16	06-Dec-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	06-Dec-16	18-Dec-16	0%										
CP - Remaining Internal Structure & Finishing	21	19-Dec-16	14-Jan-17	0%										
CP35 - ML03 - Ch5217														
CP - Pipe Jacking Method - Setup & Assembly	23	17-Oct-16	11-Nov-16	10%										
CP - Piping Jacking Method - Break-in & Excavation	10	30-Nov-16	09-Dec-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	10-Dec-16	21-Dec-16	0%										
CP - Remaining Internal Structure & Finishing	21	22-Dec-16	18-Jan-17	0%										
CP34 - ML03 - Ch5118														
CP - Pipe Jacking Method - Setup & Assembly	23	20-Oct-16	16-Nov-16	0%										
CP - Piping Jacking Method - Break-in & Excavation	10	18-Dec-16	28-Dec-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	28-Dec-16	09-Jan-17	0%										
CP - Remaining Internal Structure & Finishing	21	09-Jan-17	08-Feb-17	0%										
CP33 - ML03 - Ch5020														
CP - Pipe Jacking Method - Setup & Assembly	23	26-Oct-16	22-Nov-16	0%										
CP - Piping Jacking Method - Break-in & Excavation	10	22-Dec-16	31-Dec-16	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	01-Jan-17	12-Jan-17	0%										
CP - Remaining Internal Structure & Finishing	21	13-Jan-17	13-Feb-17	0%										
CP32 - ML03 - Ch4921														
CP - Pipe Jacking Method - Setup & Assembly	23	03-Nov-16	30-Nov-16	0%										
CP - Piping Jacking Method - Break-in & Excavation	10	09-Jan-17	19-Jan-17	0%										
CP - Pipe Jacking Method - Break-out & Demobilization	12	19-Jan-17	31-Jan-17	0%										

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section

Detailed Works Programme (Rev. F)

Three Months Rolling Programme

Progress as of 01-Jan-17



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJENPRG98507	WYu	SPs
08-Apr-14	TMCLKDBJENPRG98507 Rev.B	SPs	WYu
28-Aug-14	TMCLKDBJENPRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJENPRG98507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016						2017						
					2016			2017			2017		2017				
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug		
CP - Remaining Internal Structure & Finishing	21	04-Feb-17	28-Feb-17	0%													
CP31 - ML03 - Ch4823																	
CP - Pipe Jacking Method - Setup & Assembly	23	09-Nov-16	06-Dec-16	0%													
CP - Piping Jacking Method - Break-in & Excavation	10	13-Jan-17	22-Jan-17	0%													
CP - Pipe Jacking Method - Break-out & Demobilization	12	23-Jan-17	03-Feb-17	0%													
CP - Remaining Internal Structure & Finishing	21	04-Feb-17	28-Feb-17	0%													
CP30 - ML03 - Ch4724																	
CP - Pipe Jacking Method - Setup & Assembly	23	15-Nov-16	12-Dec-16	0%													
CP - Piping Jacking Method - Break-in & Excavation	10	31-Jan-17	10-Feb-17	0%													
CP - Pipe Jacking Method - Break-out & Demobilization	12	10-Feb-17	22-Feb-17	0%													
CP - Remaining Internal Structure & Finishing	21	22-Feb-17	18-Mar-17	0%													
CP29 - ML03 - Ch4626																	
CP - Pipe Jacking Method - Setup & Assembly	23	21-Nov-16	17-Dec-16	0%													
CP - Piping Jacking Method - Break-in & Excavation	10	04-Feb-17	13-Feb-17	0%													
CP - Pipe Jacking Method - Break-out & Demobilization	12	14-Feb-17	25-Feb-17	0%													
CP - Remaining Internal Structure & Finishing	21	27-Feb-17	22-Mar-17	0%													
CP28 - ML03 - Ch4527																	
CP - Pipe Jacking Method - Setup & Assembly	23	28-Nov-16	24-Dec-16	0%													
CP - Piping Jacking Method - Break-in & Excavation	10	22-Feb-17	04-Mar-17	0%													
CP - Pipe Jacking Method - Break-out & Demobilization	12	04-Mar-17	16-Mar-17	0%													
CP - Remaining Internal Structure & Finishing	21	16-Mar-17	11-Apr-17	0%													
CP27 - ML03 - Ch4429																	
CP - Pipe Jacking Method - Setup & Assembly	23	05-Dec-16	04-Jan-17	0%													
CP - Piping Jacking Method - Break-in & Excavation	10	26-Feb-17	07-Mar-17	0%													
CP - Pipe Jacking Method - Break-out & Demobilization	12	08-Mar-17	19-Mar-17	0%													
CP26 - ML03 - Ch4330																	
CP - Pipe Jacking Method - Setup & Assembly	23	12-Dec-16	11-Jan-17	0%													
CP - Piping Jacking Method - Break-in & Excavation	10	16-Mar-17	26-Mar-17	0%													
CP25 - ML03 - Ch4232																	
CP - Pipe Jacking Method - Setup & Assembly	23	19-Dec-16	18-Jan-17	0%													
CP24 - ML03 - Ch4133																	
CP - Pipe Jacking Method - Setup & Assembly	23	28-Dec-16	24-Jan-17	0%													
CP23 - ML03 - Ch4035																	
CP - Pipe Jacking Method - Setup & Assembly	23	03-Jan-17	04-Feb-17	0%													
CP22 - ML03 - Ch3936																	
CP - Pipe Jacking Method - Setup & Assembly	23	06-Jan-17	09-Feb-17	0%													
CP21 - ML03 - Ch3838																	
CP - Pipe Jacking Method - Setup & Assembly	23	14-Jan-17	17-Feb-17	0%													
CP20 - ML03 - Ch3739																	
CP - Pipe Jacking Method - Setup & Assembly	23	20-Jan-17	23-Feb-17	0%													
CP19 - ML03 - Ch3641																	
CP - Pipe Jacking Method - Setup & Assembly	23	26-Jan-17	01-Mar-17	0%													
CP18 - ML03 - Ch3542																	
CP - Pipe Jacking Method - Setup & Assembly	23	06-Feb-17	03-Mar-17	0%													
CP17 - ML03 - Ch3444																	
CP - Pipe Jacking Method - Setup & Assembly	23	13-Feb-17	10-Mar-17	0%													
CP16 - ML03 - Ch3345																	
CP - Pipe Jacking Method - Setup & Assembly	23	20-Feb-17	17-Mar-17	0%													
CP15 - ML03 - Ch3247																	
CP - Pipe Jacking Method - Setup & Assembly	23	27-Feb-17	24-Mar-17	0%													
CP14 - ML03 - Ch3148																	
CP - Pipe Jacking Method - Setup & Assembly	23	04-Mar-17	31-Mar-17	0%													
CP13 - ML03 - Ch3050																	
CP - Pipe Jacking Method - Setup & Assembly	23	11-Mar-17	08-Apr-17	0%													
CP12 - ML03 - Ch2951																	
CP - Pipe Jacking Method - Setup & Assembly	23	17-Mar-17	18-Apr-17	0%													
Sub-sea TBM Tunnel - NB - Remaining Internal Structure																	
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP44	5	19-Sep-16	23-Sep-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP43	5	24-Sep-16	29-Sep-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP42	5	12-Oct-16	17-Oct-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP41	5	17-Oct-16	22-Oct-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP40	5	04-Nov-16	09-Nov-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP39	5	09-Nov-16	14-Nov-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP38	5	26-Nov-16	01-Dec-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP37	5	01-Dec-16	06-Dec-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP36	5	19-Dec-16	23-Dec-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP35	5	24-Dec-16	28-Dec-16	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP34	3	09-Jan-17	11-Jan-17	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP33	5	12-Jan-17	16-Jan-17	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP32	5	04-Feb-17	08-Feb-17	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP31	5	09-Feb-17	13-Feb-17	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP30	5	22-Feb-17	27-Feb-17	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP29	5	27-Feb-17	04-Mar-17	0%													
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP28	5	16-Mar-17	21-Mar-17	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP44	4	24-Sep-16	27-Sep-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP43	4	29-Sep-16	03-Oct-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP42	4	17-Oct-16	21-Oct-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP41	4	22-Oct-16	26-Oct-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP40	4	09-Nov-16	13-Nov-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP39	4	14-Nov-16	18-Nov-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP38	4	01-Dec-16	05-Dec-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP37	4	06-Dec-16	10-Dec-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP36	4	24-Dec-16	27-Dec-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP35	3	29-Dec-16	31-Dec-16	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP34	6	12-Jan-17	17-Jan-17	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP33	5	18-Jan-17	22-Jan-17	0%													
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP32	4	09-Feb-17	12-Feb-17	0%													

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08-Apr-14	TMCLKDJENPRG98507 Rev.B	SPs	WYu
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30-Oct-15	TMCLKDJENPRG98507 Rev.F	WYu	

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016			2017													
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May									
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP31	4	14-Feb-17	17-Feb-17	0%																	
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP30	4	27-Feb-17	03-Mar-17	0%																	
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP29	4	04-Mar-17	08-Mar-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP44	4	28-Sep-16	01-Oct-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP43	4	03-Oct-16	07-Oct-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP42	4	21-Oct-16	25-Oct-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP41	4	26-Oct-16	30-Oct-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP40	4	13-Nov-16	17-Nov-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP39	4	18-Nov-16	22-Nov-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP38	4	05-Dec-16	09-Dec-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP37	4	10-Dec-16	14-Dec-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP36	4	28-Dec-16	31-Dec-16	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP35	9	01-Jan-17	09-Jan-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP34	3	18-Jan-17	20-Jan-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP33	1	23-Jan-17	23-Jan-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP32	3	13-Feb-17	15-Feb-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP31	3	18-Feb-17	20-Feb-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP30	3	03-Mar-17	06-Mar-17	0%																	
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP29	3	08-Mar-17	11-Mar-17	0%																	
NB - Sub-sea TBM Tunnel - Road Level Fire Proofing	334	17-Mar-17	10-May-18	0%																	

Sub-sea TBM Tunnel - SB - Remaining Internal Structure				
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP44	5	19-Sep-16	23-Sep-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP43	5	24-Sep-16	29-Sep-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP42	5	12-Oct-16	17-Oct-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP41	5	17-Oct-16	22-Oct-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP40	5	04-Nov-16	09-Nov-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP39	5	09-Nov-16	14-Nov-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP38	5	26-Nov-16	01-Dec-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP37	5	01-Dec-16	06-Dec-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP36	5	19-Dec-16	23-Dec-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP35	5	24-Dec-16	28-Dec-16	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP34	5	09-Jan-17	13-Jan-17	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP33	5	14-Jan-17	18-Jan-17	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP32	5	04-Feb-17	08-Feb-17	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP31	5	09-Feb-17	13-Feb-17	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP30	5	22-Feb-17	27-Feb-17	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP29	5	27-Feb-17	04-Mar-17	0%
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP28	5	16-Mar-17	21-Mar-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP44	5	24-Sep-16	28-Sep-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP43	5	29-Sep-16	04-Oct-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP42	5	17-Oct-16	22-Oct-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP41	5	22-Oct-16	27-Oct-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP40	5	09-Nov-16	14-Nov-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP39	5	14-Nov-16	19-Nov-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP38	5	01-Dec-16	06-Dec-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP37	5	06-Dec-16	11-Dec-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP36	5	24-Dec-16	28-Dec-16	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP35	5	29-Dec-16	02-Jan-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP34	3	14-Jan-17	16-Jan-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP33	3	19-Jan-17	21-Jan-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP32	5	09-Feb-17	13-Feb-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP31	5	14-Feb-17	18-Feb-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP30	5	27-Feb-17	04-Mar-17	0%
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP29	5	04-Mar-17	09-Mar-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP44	5	29-Sep-16	03-Oct-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP43	5	04-Oct-16	09-Oct-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP42	5	22-Oct-16	27-Oct-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP41	5	27-Oct-16	01-Nov-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP40	5	14-Nov-16	19-Nov-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP39	5	19-Nov-16	24-Nov-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP38	5	06-Dec-16	11-Dec-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP37	5	11-Dec-16	16-Dec-16	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP36	5	29-Dec-16	02-Jan-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP35	7	03-Jan-17	09-Jan-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP34	3	17-Jan-17	19-Jan-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP33	2	22-Jan-17	23-Jan-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP32	3	14-Feb-17	16-Feb-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP31	4	19-Feb-17	22-Feb-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP30	4	04-Mar-17	08-Mar-17	0%
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP29	4	09-Mar-17	13-Mar-17	0%
SB - Remaining Fire Proofing in Tunnel	334	04-Feb-17	23-Mar-18	0%

Southern Landfall				
South Cut & Cover Tunnel				
Design Submission				
(E2) DDA for South C&C Box & Approach Ramp				
Review & Comment by JV	18	09-Dec-14	31-Dec-14	88%
Designer prepare DDA	10	02-Jan-15	13-Jan-15	0%
Formal Submission of DDA to ICE/ IPs	0		13-Jan-15	0%
Advanced Submission to SO	0		13-Jan-15	0%
IPs/ SO's Advance Comments/ ICE Comments	28	14-Jan-15	10-Feb-15	0%
Comments Received	0		10-Feb-15	0%
Designer to Reply RfC + Update Submission	21	11-Feb-15	10-Mar-15	0%
Method Statement Submission				
Method Statement of Construction Methodology of C&C Tunnels				
Preparation Method Statement for C&C Tunnels	25	28-Mar-15	30-Apr-15	0%
Submit Method Statement to SO	0		30-Apr-15	0%
SO Reviews & Comments	28	01-May-15	28-May-15	0%

Page 9 of 11	<ul style="list-style-type: none"> ■ Planned Bar ■ Planned Bar - Critical ◆ Planned Milestone ■ Progress bar ◆ Progress Milestone 	TMCLK - Northern Connection Sub-Sea Tunnel Section Detailed Works Programme (Rev. F) Three Months Rolling Programme Progress as of 01-Jan-17		<table border="1"> <thead> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> </thead> <tbody> <tr><td>12-Feb-14</td><td>TMCLKDBJENPRG98507</td><td>WYu</td><td>SPs</td></tr> <tr><td>08-Apr-14</td><td>TMCLKDBJENPRG98507 Rev.B</td><td>SPs</td><td>WYu</td></tr> <tr><td>28-Aug-14</td><td>TMCLKDBJENPRG98507 Rev.C</td><td>CLa</td><td>WYu</td></tr> <tr><td>30-Oct-15</td><td>TMCLKDBJENPRG98507 Rev.F</td><td>WYu</td><td></td></tr> </tbody> </table>	Date	Revision	Checked	Approved	12-Feb-14	TMCLKDBJENPRG98507	WYu	SPs	08-Apr-14	TMCLKDBJENPRG98507 Rev.B	SPs	WYu	28-Aug-14	TMCLKDBJENPRG98507 Rev.C	CLa	WYu	30-Oct-15	TMCLKDBJENPRG98507 Rev.F	WYu	
Date	Revision	Checked	Approved																					
12-Feb-14	TMCLKDBJENPRG98507	WYu	SPs																					
08-Apr-14	TMCLKDBJENPRG98507 Rev.B	SPs	WYu																					
28-Aug-14	TMCLKDBJENPRG98507 Rev.C	CLa	WYu																					
30-Oct-15	TMCLKDBJENPRG98507 Rev.F	WYu																						

Activity Name	Orig Dur	DWP Start	DWP Finish	% Comp	2016			2017				
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Re-submission	18	29-May-15	18-Jun-15	0%								
Construction												
C&C Tunnel - 2nd 85m - Tunnel Structure	83	14-Jun-16	20-Sep-16	0%	C&C Tunnel - 2nd 85m - Tunnel Structure							
C&C Tunnel - 2nd 85m - Backfilling	9	21-Sep-16	30-Sep-16	0%	C&C Tunnel - 2nd 85m - Backfilling							
C&C Tunnel - 3rd 85m - Tunnel Structure	83	26-Jul-16	02-Nov-16	0%	C&C Tunnel - 3rd 85m - Tunnel Structure							
C&C Tunnel - 3rd 85m - Backfilling	15	03-Nov-16	19-Nov-16	0%	C&C Tunnel - 3rd 85m - Backfilling							
C&C Tunnel - 4th 85m - Tunnel Structure	83	05-Sep-16	13-Dec-16	0%	C&C Tunnel - 4th 85m - Tunnel Structure							
C&C Tunnel - 4th 85m - Backfilling	14	14-Dec-16	31-Dec-16	0%	C&C Tunnel - 4th 85m - Backfilling							
C&C Tunnel - 5th 85m - Excavation by vertical mean	44	22-Aug-16	14-Oct-16	0%	C&C Tunnel - 5th 85m - Excavation by vertical mean							
C&C Tunnel - 5th 85m - Tunnel Structure	83	19-Oct-16	26-Jan-17	0%	C&C Tunnel - 5th 85m - Tunnel Structure							
C&C Tunnel - 5th 85m - Backfilling	19	27-Jan-17	24-Feb-17	0%	C&C Tunnel - 5th 85m - Backfilling							
C&C Tunnel - 6th 85m - Excavation by ramp	27	22-Aug-16	22-Sep-16	0%	C&C Tunnel - 6th 85m - Excavation by ramp							
C&C Tunnel - 6th 85m - Excavation by vertical mean	52	23-Sep-16	24-Nov-16	0%	C&C Tunnel - 6th 85m - Excavation by vertical mean							
C&C Tunnel - 6th 85m - Tunnel Structure	83	29-Nov-16	15-Mar-17	0%	C&C Tunnel - 6th 85m - Tunnel Structure							
C&C Tunnel - 6th 85m - Backfilling	20	16-Mar-17	08-Apr-17	0%	C&C Tunnel - 6th 85m - Backfilling							
C&C Tunnel - 7th 152m - Excavation by ramp	15	03-Nov-16	19-Nov-16	0%	C&C Tunnel - 7th 152m - Excavation by ramp							
C&C Tunnel - 7th 67m - Excavation by vertical mean	42	21-Nov-16	11-Jan-17	0%	C&C Tunnel - 7th 67m - Excavation by vertical mean							
C&C Tunnel - 7th 67m - Tunnel Structure	78	12-Jan-17	24-Apr-17	0%	C&C Tunnel - 7th 67m - Tunnel Structure							
C&C Tunnel - 8th 85m - Excavation by vertical mean	42	04-Jan-17	28-Feb-17	0%	C&C Tunnel - 8th 85m - Excavation by vertical mean							
C&C Tunnel - 8th 85m - Tunnel Structure	88	01-Mar-17	19-Jun-17	0%	C&C Tunnel - 8th 85m - Tunnel Structure							
Intermediate Slab	164	20-Dec-16	18-Jul-17	0%	Intermediate Slab							
South Retrieval Shaft												
Design Submission												
(F4) Gantry Crane Support/Foundations in Southern Landfall												
Preparation of IFA Gantry Crane / Foundation	18	27-Jul-15	15-Aug-15	100%								
Review & Comment by JV	18	17-Aug-15	05-Sep-15	100%								
Designer prepare IFA	10	07-Sep-15	17-Sep-15	100%								
Formal Submission of IFA to ICE/ IPs	0		17-Sep-15	100%								
Advanced Submission to SO	0		17-Sep-15	100%								
IPs/ SO's Advance Comments/ ICE Comments	28	18-Sep-15	15-Oct-15	88%								
Comments Received	0		15-Oct-15	0%								
Designer to Reply RtC + Update Submission	21	16-Oct-15	10-Nov-15	0%								
Submit Updated IFA to SO/ ICE/ IPs	0	11-Nov-15		0%								
ICE Approval & Issue Check Cert	12	11-Nov-15	24-Nov-15	0%								
IPs Review	28	11-Nov-15	08-Dec-15	0%								
SO's Review	35	11-Nov-15	15-Dec-15	0%								
Method Statement Submission												
Method Statement of Construction Methodology of Retrieval Shaft												
Preparation Method Statement for Retrieval Shaft	25	24-Aug-15	21-Sep-15	0%								
Submit Method Statement to SO	0		21-Sep-15	0%								
SO Reviews & Comments	28	22-Sep-15	19-Oct-15	0%								
Construction												
South Landfall GI Works/DW Setting Up	48	06-Aug-15	02-Oct-15	0%								
South Retrieval Shaft - Diaphragm Wall	98	03-Oct-15	29-Jan-16	80%								
Retrieval Shaft - Excavation - Soft (other than Fill)	140	15-Apr-16	30-Sep-16	0%	Retrieval Shaft - Excavation - Soft (other than Fill)							
Retrieval Shaft - Temp. Slab/Prepare for TBM Breakthrough	48	03-Oct-16	28-Nov-16	0%	Retrieval Shaft - Temp. Slab/Prepare for TBM Breakthrough							
South Approach Ramp												
Construction												
Approach Ramp (CH1580-1850) - Pipe Pile/Sheet Piles Wall	126	03-Oct-15	09-Mar-16	0%								
Approach Ramp (CH1580-1850) - Tension Piles	103	03-Oct-15	04-Feb-16	0%								
Approach Ramp (CH1580-1800) - Excavation,	22	16-Mar-17	11-Apr-17	0%								
South Ventilation Building												
Design Submission												
(I1) DDA for South Vent.Bldg. GBP & Arch.Submission												
IPs Review	28	22-Dec-14	18-Jan-15	88%								
IP's No Objection Received	0		18-Jan-15	0%								
SO's Review	35	22-Dec-14	25-Jan-15	91%								
SO Approval with Condition Received	0		26-Jan-15	0%								
(I2) DDA for South Vent.Bldg. Foundation Design												
Review & Comment by JV	18	27-Apr-15	18-May-15	88%								
Designer prepare DDA	10	19-May-15	30-May-15	0%								
Formal Submission of DDA to ICE/ IPs	0		30-May-15	0%								
Advanced Submission to SO	0		30-May-15	0%								
IPs/ SO's Advance Comments/ ICE Comments	28	31-May-15	27-Jun-15	0%								
Comments Received	0		27-Jun-15	0%								
Designer to Reply RtC + Update Submission	21	29-Jun-15	23-Jul-15	0%								
Submit Updated DDA to SO/ ICE/ IPs	0	24-Jul-15		0%								
ICE Approval & Issue Check Cert	18	24-Jul-15	13-Aug-15	0%								
IPs Review	28	24-Jul-15	20-Aug-15	0%								
SO's Review	35	24-Jul-15	27-Aug-15	0%								
(I2) DDA for South Vent.Bldg.Structural Design incl.Vent.Connections												
Review & Comment by JV	18	18-Feb-15	13-Mar-15	76%								
Designer prepare DDA	10	14-Mar-15	25-Mar-15	0%								
Formal Submission of DDA to ICE/ IPs	0		25-Mar-15	0%								
Advanced Submission to SO	0		25-Mar-15	0%								
IPs/ SO's Advance Comments/ ICE Comments	28	26-Mar-15	22-Apr-15	0%								
Comments Received	0		22-Apr-15	0%								
Designer to Reply RtC + Update Submission	21	23-Apr-15	18-May-15	0%								
(J1) DDA Temp.works for Construction of Sth.Vent.Bldg.												
Designer to Reply RtC + Update Submission	21	24-Aug-15	16-Sep-15	90%								
Submit Updated DDA to SO/ ICE/ IPs	0	17-Sep-15		0%								
ICE Approval & Issue Check Cert	12	17-Sep-15	02-Oct-15	0%								
Submit ICE Check Cert to SO	6	03-Oct-15	09-Oct-15	0%								
IPs Review	28	17-Sep-15	14-Oct-15	0%								
IP's No Objection Received	0		14-Oct-15	0%								
SO's Review	35	17-Sep-15	21-Oct-15	0%								
SO Approval with Condition Received	0		22-Oct-15	0%								

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
Detailed Works Programme (Rev. F)
Three Months Rolling Programme
 Progress as of 01-Jan-17



Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJENPRG98507	WYu	SPs
08-Apr-14	TMCLKDBJENPRG98507 Rev.B	SPs	WYu
28-Aug-14	TMCLKDBJENPRG98507 Rev.C	CLa	WYu
30-Oct-15	TMCLKDBJENPRG98507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	% Comp	2016					2017					
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May			
					Construction										
Mobilization & Setting Up Piling Rigs	64	06-Aug-15	22-Oct-15	0%											
Substructure	95	06-Sep-16	30-Dec-16	0%											
Superstructure	65	31-Dec-16	24-Mar-17	0%											
South Surface Roadworks, Utility & Drainage works															
Design Submission															
(E1) AIP - Southern Landfall Seawall Modification															
Designer Prepare AIP - Southern Landfall Seawall Modification	36	08-Nov-16	19-Dec-16	100%											
Review & Comment by JV	12	20-Dec-16	05-Jan-17	100%											
Designer prepare AIP	6	06-Jan-17	12-Jan-17	100%											
Formal Submission of AIP to ICE/IPs	0		12-Jan-17	100%											
Advanced Submission of AIP to SO	0		12-Jan-17	100%											
Review & Comment by SO/ ICE/ IPs	28	13-Jan-17	09-Feb-17	100%											
Advance Comments from SO/ Comments from ICE/ IPs Received	0		09-Feb-17	100%											
Designer to Prepare RTC & Updated AIP	18	10-Feb-17	02-Mar-17	100%											
Submission of AIP to SO/ ICE together with Reply To Comment (RTC)	0		02-Mar-17	100%											
Reply to IPs Comments in RTC	0		02-Mar-17	100%											
ICE Approval & Issue of Design Check Cert.	18	03-Mar-17	23-Mar-17	100%											
SO Review (35 Days)	35	03-Mar-17	06-Apr-17	100%											
(E1) DDA - Southern Landfall Seawall Modification															
Designer to Reply RTC + Update Submission	21	05-Jul-17	28-Jul-17	83.33%											
Submit Updated DDA to SO/ ICE/ IPs	0	29-Jul-17		0%											
ICE Approval & Issue Check Cert	12	29-Jul-17	11-Aug-17	0%											
Submit ICE Check Cert to SO	6	12-Aug-17	18-Aug-17	0%											
IPs Review	28	29-Jul-17	25-Aug-17	0%											
IP's No Objection Received	0		25-Aug-17	0%											
SO's Review	35	29-Jul-17	01-Sep-17	0%											
SO Approval with Condition Received	0		01-Sep-17	0%											
(E3) DDA for Sewerage, Drainage, Waterworks & Utility works for South Landfall															
IPs Review	28	02-Mar-15	29-Mar-15	100%											
IP's No Objection Received	0		29-Mar-15	100%											
SO's Review	35	02-Mar-15	05-Apr-15	100%											
SO Approval with Condition Received	0		08-Apr-15	100%											
Method Statement Submission															
Method Statement of Ground Treatment for TBMs Passing under Southern Landfall Seawall															
Preparation Method Statement for Ground Improvement in South Landfall	9	20-Jul-15	29-Jul-15	0%											
Submit Method Statement to SO	0		29-Jul-15	0%											
SO Reviews & Comments	28	30-Jul-15	26-Aug-15	0%											
Re-submission	6	27-Aug-15	02-Sep-15	0%											
SO's Review	28	03-Sep-15	30-Sep-15	0%											
SO's Approval	0		30-Sep-15	0%											
Construction															
Temporary Platform for Ground Treatment for TBM passing under Southern Seawall	48	06-Aug-15	02-Oct-15	0%											
Grouting Treatment for TBM passing under Southern Seawall	339	03-Oct-15	25-Nov-16	0%											
Testing & Commissioning/Inspection & Handover															
Final Inspection & Handover															
Design Submission															
(A12) Maintenance Matrix															
Preparation of Maintenance Matrix	35	24-Dec-15	05-Feb-16	100%											
Prepare Re-submission	18	12-Mar-16	06-Apr-16	88%											
2nd Submission	0		06-Apr-16	0%											
SO's Condition Approval	35	07-Apr-16	11-May-16	0%											
(A13) Operation & Maintenance Manual															
Preparation of Operation and Maintenance Manual	48	24-Dec-15	27-Feb-16	0%											
1st Submission	0		27-Feb-16	0%											
SO's Comments for 1st Submission	35	28-Feb-16	02-Apr-16	0%											
Prepare Re-submission	24	05-Apr-16	03-May-16	0%											
(A14) As-built & As-fabricated Drawings															
Preparation of As-built and As-fabricated Drawings	48	24-Dec-15	27-Feb-16	0%											
1st Submission	0		27-Feb-16	0%											
SO's Comments for 1st Submission	35	28-Feb-16	02-Apr-16	0%											
(A15) Health & Safety File incl. As-built Dwgs & Records, Maintenance Schedules, O&M Manual															
Preparation of Health and Safety File including as-built drawings and records, maintenance schedules, op	48	24-Dec-15	27-Feb-16	0%											
1st Submission	0		27-Feb-16	0%											
SO's Comments for 1st Submission	35	28-Feb-16	02-Apr-16	0%											

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

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30-Oct-15	TMCLKDBJGENPRG98507 Rev.F	WYu	



ENVIRONMENTAL COMPLAINT/ENQUIRY INVESTIGATION REPORT

Our Reference: 0212330_Complaint LOG_20170214_12

Basic Information of Complaint/Enquiry

Reference Number:	EP/RW/0000358212
Date of Complaint/Enquiry Received	6 February 2017
Location of Complaint/Enquiry	Site area near Ho Yeung Street
Nature of Complaint/Enquiry	Muddy water discharge
Complaint/Enquiry Received by	EPD
Via	Fax
Complainant/Enquirer	Not disclosed

Details of Complaint/Enquiry

On 6 February 2017, a complaint case was received by EPD regarding muddy water discharge from the site near Ho Yeung Street from 12:00am on 31 January 2017 to 4:00am on 1 February 2017. The IEC, the Environmental Team (ET) and the Project Proponent received the complaint notification from EPD on 14 February 2017. The ET was informed that the case is categorized as complaint in nature upon the investigation, discussion and agreement between relevant parties (i.e. the Contractor (DBJV), SOR and IEC).

Investigation Report

Upon receiving the case notification from EPD on 14 February 2017, the Contractor had promptly checked the construction programme of January and February 2017.

According to the construction programme provided by the Contractor, no construction works were carried out at the site near Ho Yeung Street during January and February 2017. No improper discharge was recorded. Two wetseps were set up at the site near Ho Yeung Street to treat the wastewater directed from the Slurry Treatment Plant during the incident period. Treated wastewater was discharged to the designated discharge point specified in the Water Discharge License. Site drainage plan of N6 is provided in Annex A.

Moreover, according to the inspection record of DBJV at midnight on 31 January and 1 February, the wastewater was properly treated by the wetsep before discharge. No improper discharge was observed during inspection. Photos taken by DBJV during the incident period were provided in Annex B.

ET has conducted an interview with the site foreman who was responsible for the wastewater treatment and management of wetsep of N6 during the incident period. It was confirmed that there was no improper discharge at N6 site area during the incident period. Maintenance record of the N6 wetsep during the incident period is provided in Annex C.

In addition, ET has conducted a joint site inspection with IEC, SOR and DBJV on 21 February 2017. No improper discharge was observed at the site near Ho Yeung Street. Two wetseps were operating to treat the wastewater from STP. No leakage of water pipes or malfunction of the wetseps was observed during the inspection. No water pipes were found on the seaside. Photos showing the site conditions are provided in Annex B.

Based on the above, there is no evidence to prove that the complaint case is related to this Contract.

Mitigation Measures and Follow-Up Actions Recommended to/Undertaken by Contractor

There is no evidence to prove that the complaint case is related to this Contract.

The Contractor was reminded to review and enhance the current mitigation measures to avoid similar situation.

The Contractor has been reminded to adhere strictly to implement all relevant mitigation measures of water quality impact recommended or specified in the EP (EP-354/2009/D), the approved EIA, Updated EM&A Manual and the Water Discharge License of this Project to avoid causing water pollution. The Contractor shall also fully comply with the conditions in the approved water discharge license to carry out construction works under the Contract.

Date of File Closed : 21 March 2017

Approved and Filed by:

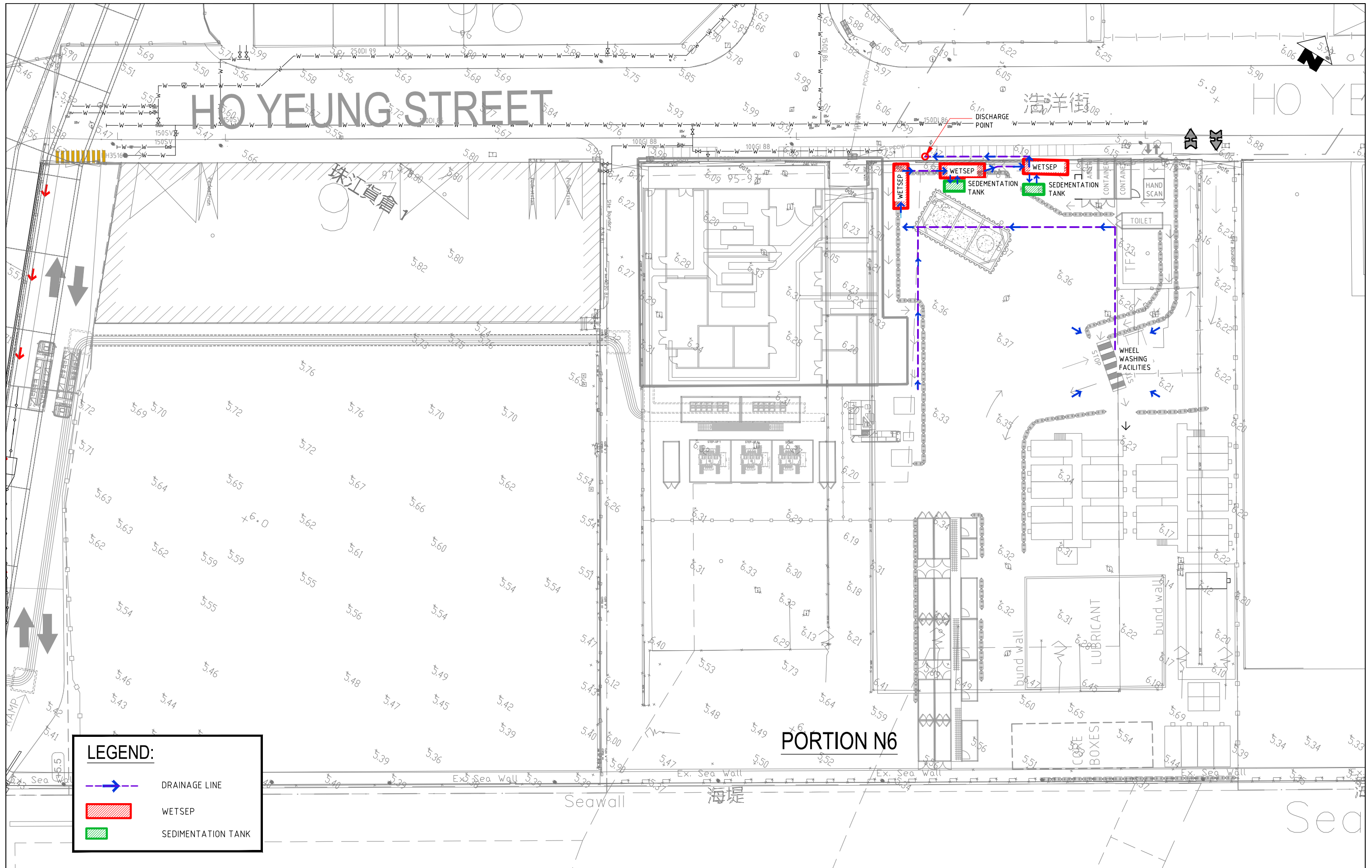


(Jovy Tam, ET Leader)

Date: 21 March 2017

Annex A

Site Drainage Management Plan



Rev.	Date	Drawn	Designed	Verified	Description	Approved
C	10FEB17	ASP	ACM	ECa	DRAINAGE LAYOUT REVISED	ASc
B	07DEC16	KBa	PKV	PKV	DISCHARGE POINT RELOCATED	ASc
A	01SEP16	KBa	ECa	ECa	FIRST ISSUE	SPo

Main Contractor

Dragages - Bouygues Joint Venture 宜基 - 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

GENERAL
PORTION N6
DRAINAGE LAYOUT

Drawing no.

TMCLKL8-DBJ-NAA-MSI-11513

Scale

1:500 @ A3

CADD Ref.

NAA-MSI011513-C-DFT

Issue Status

DFT (DRAFT)

Revision

C

Annex B

Photo Record



Annex B Photo Records taken during Site Investigation

*Note: Photos taken on 21/2/2017



Wastewater was treated in the Wetsep before discharge.

*Note: Photos taken on 21/2/2017



No improper discharge was observed on the seaside.



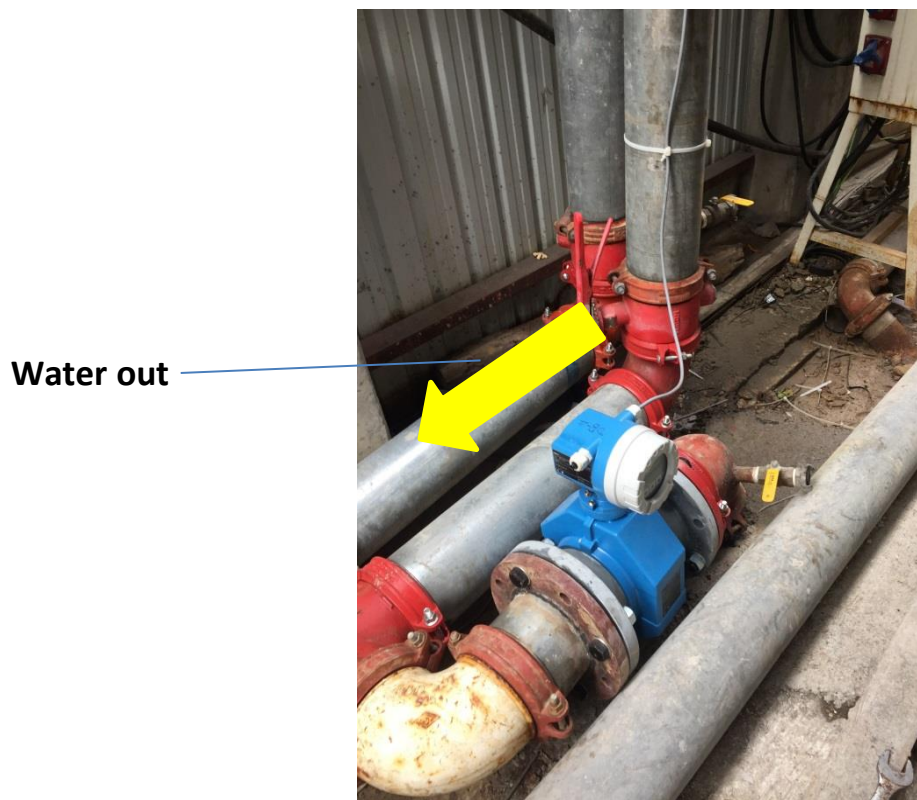
Annex B Photo Records taken during Site Investigation

*Note: Photos taken on 21/2/2017



No improper discharge was observed on the seaside.

*Note: Photos taken on 21/2/2017



Treated wastewater was directed to the designated discharge point.



Annex B Photo Records taken by DBJV

*Note: Photos taken on 1/2/2017



Wastewater was functioning properly.

*Note: Photos taken on 1/2/2017



Water sample was taken for checking.

Annex C

Maintenance Record of Wetsep

WETSEP Location 污水處理機位置: 116

Date

日期:

30-1-17 to 至 5-2-17

		<u>Monday</u> 星期一	<u>Tuesday</u> 星期二	<u>Wednesday</u> 星期三	<u>Thursday</u> 星期四	<u>Friday</u> 星期五	<u>Saturday</u> 星期六	<u>Sunday</u> 星期日
1.	WETSEP In Normal Operation? 處理機是否正常運作?	✓	✓	✓	✓	✓	✓	✓
2.	pH Value 酸鹼度 (6.0 - 9.0)	7.4	6.1	6.7	6.0	7.3	6.8	7.5
3.	Electrical Supply OK? 電力供應正常?	✓	✓	✓	✓	✓	✓	✓
4.	Outlet Abnormal? 出水口有否異常?	X	X	X	X	X	X	X
5.	Potion Enough? 藥水是否足夠?	✓	✓	✓	✓	✓	✓	✓
6.	Clean the Sedimentation Tank? 有否清理隔沙缸?	✓	✓	✓	✓	✓	✓	✓
7.	Clean the De-silt Basin? 有否清理蓄泥池?	✓	✓	✓	✓	✓	✓	✓
8.	Are the Cleansing Records of Sedimentation Tank/ De-silt Basin Stored Properly? 清理蓄泥池記錄是否妥善儲存?	✓	✓	✓	✓	✓	✓	✓
9.	Refill of Flocculants? pH Neutralization agent? 補充凝絮劑/酸鹼調節劑?	✓	✓	✓	✓	✓	✓	✓
10.	Flow rate of the discharge 排放流量	正常	正常	正常	正常	正常	正常	正常
11.	Nature and Composition of the discharge 廢水排放的性質及成份	无色	无色	无色	无色	无色	无色	无色
12.	Proper Desludging operation and disposal 正確清除及處理淤泥	✓	✓	✓	✓	✓	✓	✓
13.	Others 其他情況							
	Verified by Site Foreman/Supervisor 地盤管工/監督簽署確認	Lik	Lik	Lik	Lik	Lik	Lik	Lik

*Please - tick (✓) in the box if the condition is normal. *若情況正常, 請於方格內加上剔號(✓).
cross (X) in the box if the condition is abnormal, and write down the non-conformance.
*若情況不尋常, 請於方格內加上交叉(X), 並寫下不尋常狀況。

Remarks:

(1) Please keep the record and send to environmental department in monthly basis.

備註:

(1) 請將記錄妥善保存, 並每月將記錄交回環保部。

Email
message

Environmental
Resources
Management

To Ramboll Environ - Hong Kong, Limited (ENPO)

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

From ERM- Hong Kong, Limited

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

Subject Notification of Exceedance for Impact Dolphin
Monitoring



ERM

Date 13 June 2017

Dear Sir or Madam,

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

0212330_Dec2016/Feb2017_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact
dolphin monitoring data between December 2016 and February 2017.

Regards,

A handwritten signature in black ink, appearing to be 'Jovy Tam', written in a cursive style.

Mr Jovy Tam
Environmental Team Leader

CONFIDENTIALITY NOTICE

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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_ Dec2016/Feb2017_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedances = 1 Limit Level Exceedance]	
Date	December 2016 to February 2017 (monitored) 05 June 2017 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0.0 & ANI = 0.0
	NWL	STG = 3.8 & ANI = 14.52
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between December 2016 and February 2017. The exceedance was reported in the approved <i>Fortieth Monthly EM&A Report</i> dated 13 March 2017.	
Statistical Analyses	<p>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:</p> <ul style="list-style-type: none"> A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present quarter, December 2016 to February 2017) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and present impact monitoring quarter. By setting $\alpha = 0.05$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0110$) and ANI ($p = 0.0440$) 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 February 2017) 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 quarters. By setting $\alpha = 0.00005$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000003$) and in ANI ($p = 0.000001$) between Cumulative Period and Location were detected. <p>*Note: The commencement date under <i>Contract No. HY/2012/08</i> is 1 November 2013.</p>	
Works Undertaken (in the monitoring quarter)	<p>In the quarter between December 2016 and February 2017, the major marine works under <i>Contract No. HY/2012/08</i> included:</p> <ul style="list-style-type: none"> Installation of silt curtain; Dredging; Construction of Vertical Seawall; Band drain installation; and Filling works. 	

<p>Possible Reason for Action or Limit Level Exceedance(s)</p>	<p>The potential factors that may have contributed to the observed exceedance are reviewed below:</p> <ul style="list-style-type: none"> • Blocking of CWD travelling corridor: The <i>Monitoring of Marine Mammals in Hong Kong Waters (2015 – 16)</i> ⁽¹⁾ reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to this Contract), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau. • Marine works of the Contract: As per the findings from the EIA report (<i>Section 8.11.9</i>), the major influences on the Chinese White Dolphin (CWD) <i>Sousa chinensis</i> under this Contract are marine traffics, reclamation and dredging works. The Contractor implemented the marine traffic control in the reporting period as per the requirements in the <i>EP-354/2009/D</i> and the updated <i>EM&A Manual</i>. Most of the vessels of this Contract also worked within the site boundary, in which the area is seldom used by CWD. Disturbance from vessels of this Contract is considered minor. The reclamation and dredging works of this Contract (Phase 2) commenced on 27th December 2016. Dredging works were undertaken within the working rate described in the EP and the approved EIA Report by a closed grab dredger with silt curtains being deployed throughout the dredging period. Filling works were undertaken within 200m leading seawall throughout the filling period and the working rate described in the EP and the approved EIA Report were strictly followed. After reviewing of the daily dredging and filling records, all daily dredging and filling work rates in this quarter are under the maximum work rate described in the EP. During this quarter of dolphin monitoring, no adverse impact on CWD due to the activities under this Contract was observed. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between December 2016 and February 2017, there was no exceedance on WQM. Impact mean levels of depth-averaged SS at all sampling stations during both mid-ebb and mid-flood tides were well below the corresponding ambient levels. The WQM results imply that no unacceptable impact on water quality was associated with the marine works under this Contract, and thus no indirect impacts on marine habitat quality due to change in water quality is observed in this Contract. <p>In view of the above, marine ecological mitigation measures were considered properly implemented, and thus no unacceptable impact on CWD or its habitat was associated with this Contract in this quarter from December 2016 and February 2017.</p>
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(1) Hung SKY (2016). Prepared for AFCD. Available at: https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2015_16.pdf

<p>Actions Taken/ To Be Taken</p>	<p>With reference to the site inspection records in this quarter, the respective marine ecological mitigation measures have been implemented properly by the Contractor throughout the marine works period, including:</p> <ol style="list-style-type: none"> 1. 250m dolphin exclusion zone; 2. Acoustic decoupling plan; 3. Training to workers; 4. Offsite vessel routing control in accordance with Regular Marine Travel Routes Plan, including routing control within existing and proposed marine park boundaries; 5. Vessels speed limited at 5 knots and 10 knots within existing and proposed marine park boundaries and site boundary respectively; 6. Idling and mooring of working vessels within site boundary; <p>The existing mitigation measures are recommended to be continuously implemented. Furthermore, it is also recommended to reduce the vessels for marine works as much as possible. The ET will monitor for future trends in exceedance(s).</p> <p>A joint team meeting was held on 29 May 2017 for discussion on CWD trend, with attendance of ENPO, HyD, Representatives of Resident Site Staff (RSS), Representatives of Environmental Team (ET) for Contract No. HY/2010/02, HY2011/03, HY/2012/07 and HY/2012/08. The discussion/recommendation as recorded in the minutes of the meeting, which might be relevant to this Contract are summarized below. It was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified or separate from the other stress factors. ENPO presented the interim CWD survey results in mainland waters obtained from Hong Kong-Zhuhai-Macao Bridge Authority that some CWDs that were previously more often sighted in Hong Kong waters have expanded their ranges into mainland waters, and some with reduced usage in Hong Kong waters, while they are partially accounted for the local decline. It was reminded that the ETs shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractor to ensure the relevant measures are fully implemented. The ETs were also reminded to update the BMP boundary in the Regular Marine Travel Route Plan. The participants were requested by ENPO to collect and report the marine traffic statistics. It was recommended that the marine works of HZMB projects should be completed as soon as possible so as to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible. It was also suggested that the protection measures (e.g., speed limit control) for the proposed Brothers Marine Park (BMP) shall be brought forward as soon as possible before its establishment so as to provide a better habitat for dolphin recovery. It was also recommended that the marine works footprint and vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible. It is noted that even though marine vessels may moor within the mooring site of BMP, commercial activities including loading / unloading / transshipment are not allowed except a permit is obtained. The HZMB works vessels were recommended to avoid the BMP.</p> <p>It was reminded that starting from January 2016, high-speed ferry (HSF) from the SkyPier would be re-routed north to the northern edge of the Sha Chau and Lung Kwu Chau Marine Park that had the highest density of CWD in the NWL. While the HSF would reduce speed to 15 knots, the associated disturbance might still affect CWD in the area. It implied that the CWDs in the area should be closely followed.</p>
<p>Remarks</p>	<p>The results of impact dolphin monitoring, the status of implemented marine ecological mitigation measures are documented in the approved <i>Thirty-Eighth to Fortieth Monthly EM&A Reports</i>.</p>

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 December 2016 [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 <u>Inert</u> 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	930.268	0.000	0.000	0.000	930.268
Jan-2016	24.068	0.000	0.000	0.000	24.068
Feb-2016	9.229	0.000	0.000	0.000	9.229
Mar-2016	3.501	0.000	0.000	0.000	3.501
Apr-2016	9.175	0.000	0.000	0.000	9.175
May-2016	2.392	0.000	0.000	0.000	2.392
Jun-2016	5.597	0.000	0.000	0.000	5.597
Half Year Sub-total	53.962	0.000	0.000	0.000	53.962
Jul-2016	10.063	0.000	0.000	0.000	10.063
Aug-2016	31.621	0.000	0.000	0.000	31.621
Sep-2016	9.450	0.000	0.000	0.000	9.450
Oct-2016	23.118	0.000	0.000	0.000	23.118
Nov-2016	13.293	0.000	0.000	0.000	13.293
Dec-2016	25.662	0.000	0.000	0.000	25.662
Project Total Quantities	1097.437	0.000	0.000	0.000	1097.437

Month	Actual Quantities of <u>Non-inert</u> 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	0.000	0.000	2.150	2.150	6.870	6.870	1.710	1.710	2.217
Jan-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.113
Feb-2016	1.850	1.850	0.000	0.000	0.000	0.000	4.740	4.740	0.102
Mar-2016	0.000	0.000	0.200	0.200	0.000	0.000	3.000	3.000	0.111
Apr-2016	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.198
May-2016	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.202
Jun-2016	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.214
Half Year Sub-total	1.850	1.850	0.800	0.800	0.000	0.000	7.740	7.740	0.940
Jul-2016	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.292
Aug-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.323
Sep-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.335
Oct-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.235
Nov-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.305
Dec-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.288
Project Total Quantities	1.850	1.850	3.150	3.150	6.870	6.870	9.450	9.450	4.935

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)
20.000	0.000	0.000	0.000	20.000

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)
0.000	0.000	0.000	0.000	0.100

- 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 m³. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).

Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No. / Works Order No.: HY/2012/08

Monthly Summary Waste Flow Table for **February 2017** [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 <u>Inert</u> 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	1097.465	0.000	0.000	0.000	1097.465
Jan-2017	60.781	0.000	0.000	0.000	60.781
Feb-2017	17.367	0.000	0.000	0.000	17.367
Mar-2017					
Apr-2017					
May-2017					
Jun-2017					
Half Year Sub-total					
Jul-2017					
Aug-2017					
Sep-2017					
Oct-2017					
Nov-2017					
Dec-2017					
Project Total Quantities	1175.613	0.000	0.000	0.000	1175.613

Month	Actual Quantities of <u>Non-inert</u> 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	1.850	1.850	3.150	3.150	6.870	6.870	9.450	9.450	4.935
Jan-2017	0.000	0.000	0.000	0.000	0.000	0.000	3.400	3.400	0.257
Feb-2017	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.340
Mar-2017									
Apr-2017									
May-2017									
Jun-2017									
Half Year Sub-total									
Jul-2017									
Aug-2017									
Sep-2017									
Oct-2017									
Nov-2017									
Dec-2017									
Project Total Quantities	1.850	1.850	3.350	3.350	6.870	6.870	12.850	12.850	5.532

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)
20.000	0.000	0.000	0.000	20.000

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)
0.000	0.000	0.000	0.000	0.100

- 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 m³. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).