

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

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

29 June 2018

Environmental Resources Management

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

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	16 th Quarterly EM&A Report	VAR	JT	CAR	29/06/18
Revision	Description	By	Checked	Approved	Date
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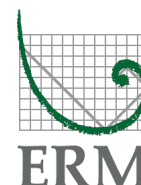


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EXECUTIVE SUMMARY

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 Sixteenth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 September 2017 to 30 November 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;
- 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;
- Phase 2 Surcharge Removal – Portion N-A;
- Bulk Excavation – Portion S-A;
- CSM treatment, Jet Grouting works and D-wall Construction; and
- Ground Freezing Works – Portion S-A

Marine-based Works

- Seawall Construction and Filling works – Portion N-A; and
- Seawall Enhancement works – Portion N-C

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

24-hour TSP Monitoring	29 sessions
1-hour TSP Monitoring	29 sessions
Water Quality Monitoring	13 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	13 sessions

Implementation of Marine Mammal Exclusion Zone

Daily marine mammal exclusion zone was in effect during the period of dredging, reclamation or marine sheet piling works in open waters under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded in November 2017 during the exclusion zone monitoring.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

Fourteen (14) Action Level exceedances and two (2) Limit Level exceedance of 1-hour TSP were recorded in the air quality monitoring of this reporting period. One (1) Action Level exceedances of 24-hour TSP was recorded. Investigation report is provided in Appendix J.

Breaches of Action and Limit Levels for Water Quality

Ten (10) Action Level exceedances of Suspended Solids (SS) were recorded in the water quality monitoring of this reporting period. Investigation reports are provided in Appendix J.

Dolphin Monitoring

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between September and November 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 light pollution at Tuen Mun Pier was referred by IEC on 25 October 2017.

No environmental summons was received in this 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:

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;
- Phase 2 Surcharge Removal - Portion N-A;
- Bulk Excavation - Portion S-A;
- CSM treatment, Jet Grouting works and D-wall Construction; and
- Ground Freezing Works - Portion S-A

Marine-based Works

- Seawall Enhancement works - Portion N-C

Future Key Issues

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

1.1

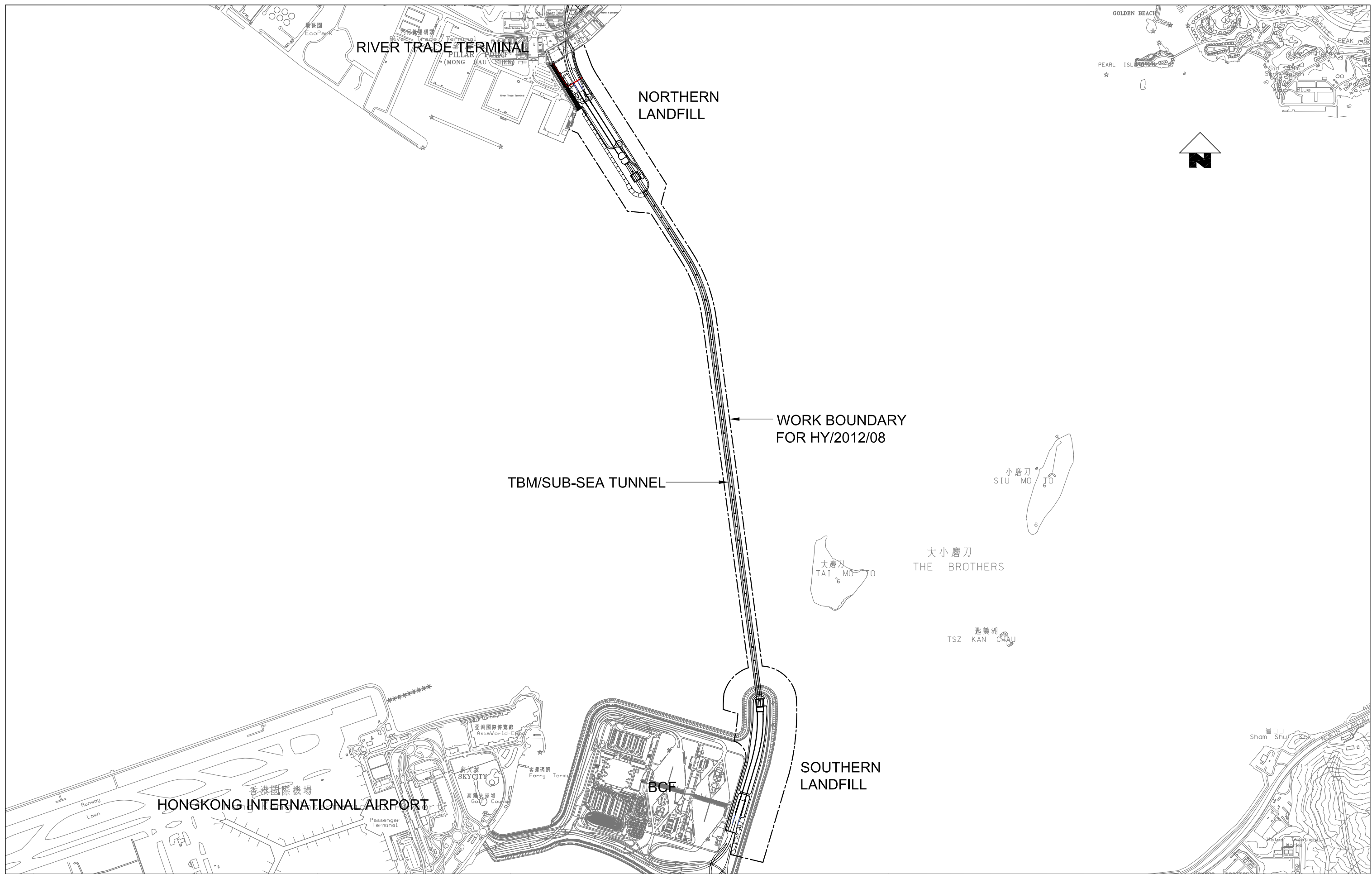
BACKGROUND

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

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

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of TM-CLKL while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with Environmental Permit No. EP-354/2009/A. Ramboll 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	Date	11SEP13
Drawn By	DAI	Checked	PKV
Approved By	SPo	Date	11SEP2013
Rev.	Description	Date	Checked
A	FIRST ISSUE	11SEP13	PKV

Main Contractor

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

HIGHWAYS DEPARTMENT

Contractor's Designer

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 Sixteenth Quarterly EM&A Report under the *Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section*. This report presents a summary of the environmental monitoring and audit works from 1 September 2017 to 30 November 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 Officer	Bryan Lee	2293 7323	2293 7499
		24-hour complaint hotline	Rachel Lam	2293 7330
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

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

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

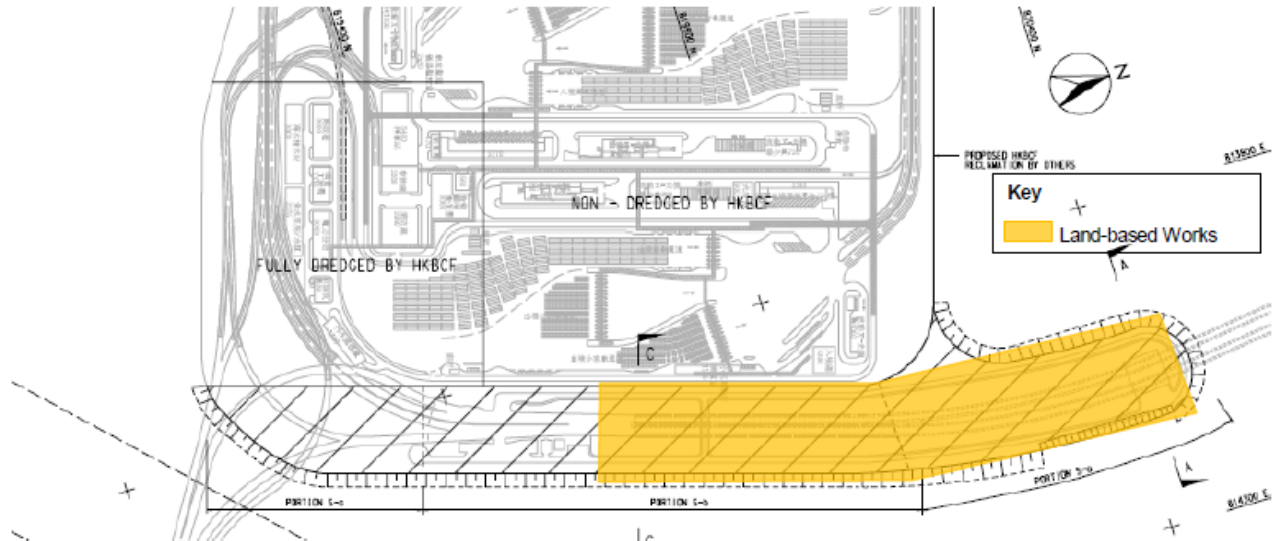
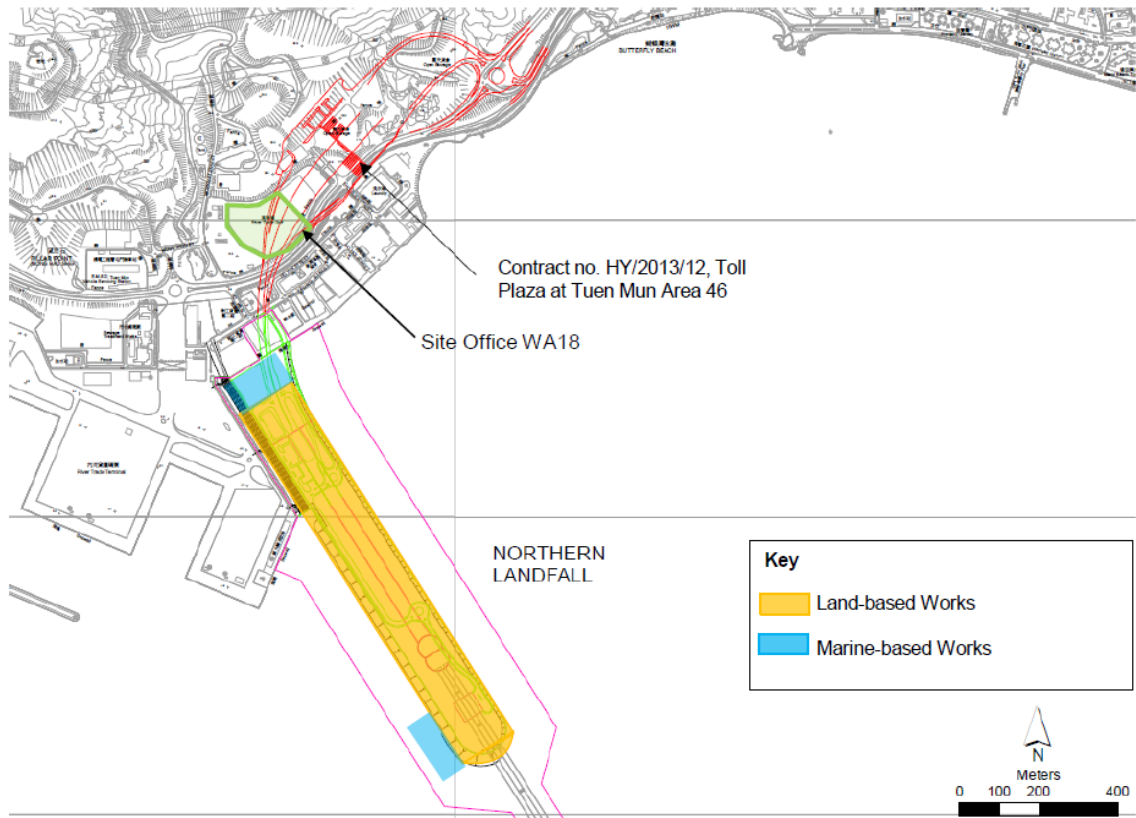
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

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;• 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;• Phase 2 Surcharge Removal – Portion N-A;• Bulk Excavation – Portion S-A;• CSM treatment, Jet Grouting works and D-wall Construction; and• Ground Freezing Works – Portion S-A
<i>Marine-based Works</i>
<ul style="list-style-type: none">• Seawall Construction and Filling works – Portion N-A; and• Seawall Enhancement works – Portion N-C

Figure 1.2 Locations of Construction Activities – September 2017 to November 2017



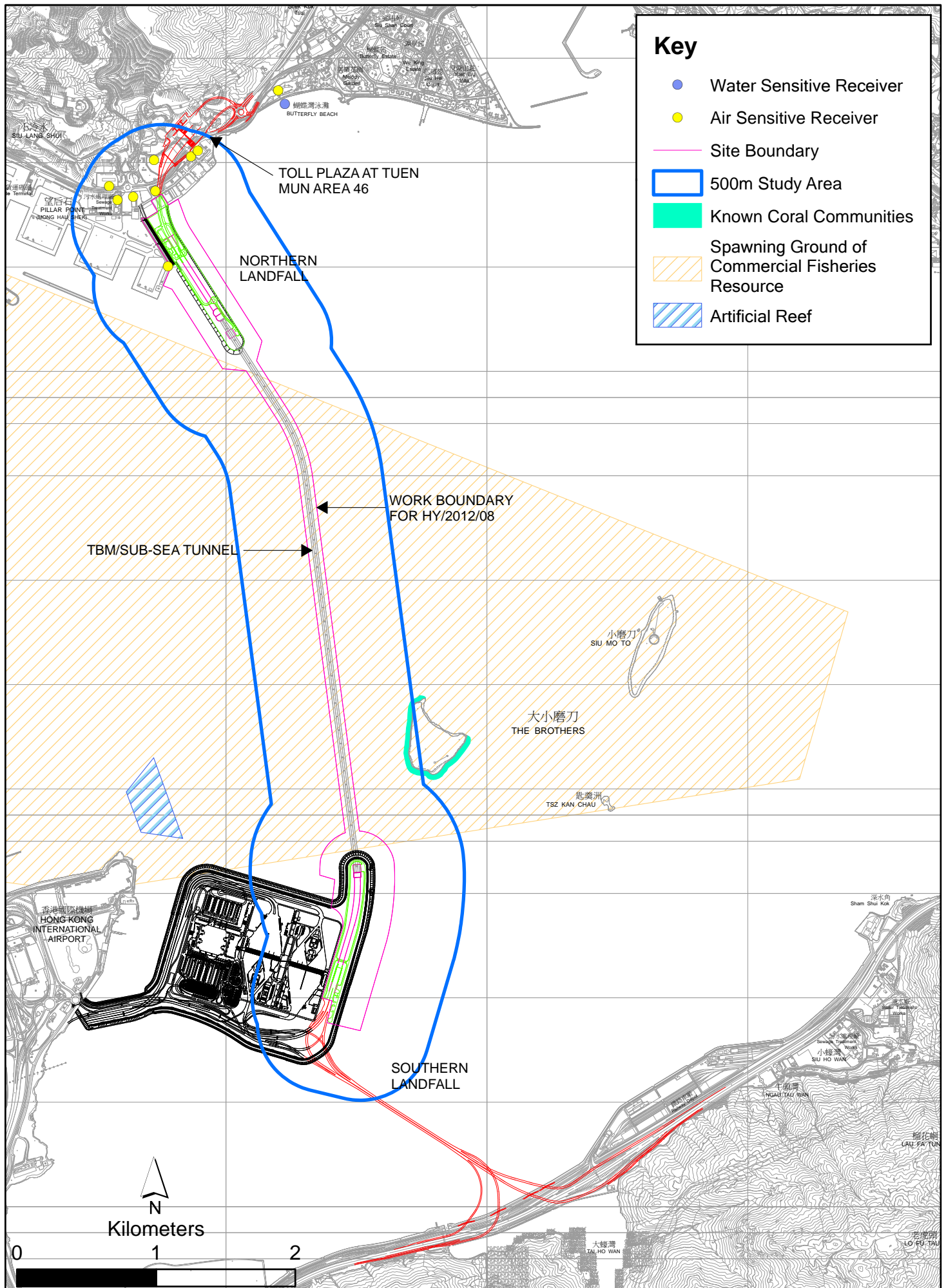


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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

2.1 AIR QUALITY

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

2.1.1 Monitoring Requirements and Equipment

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

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

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

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR1	3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 September 2017	Tuen Mun Fireboat Station	Office	TSP monitoring
ASR5	3, 6, 9, 12, 18, 21, 24, 27 and 30 October 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, 26 and 29 November 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.

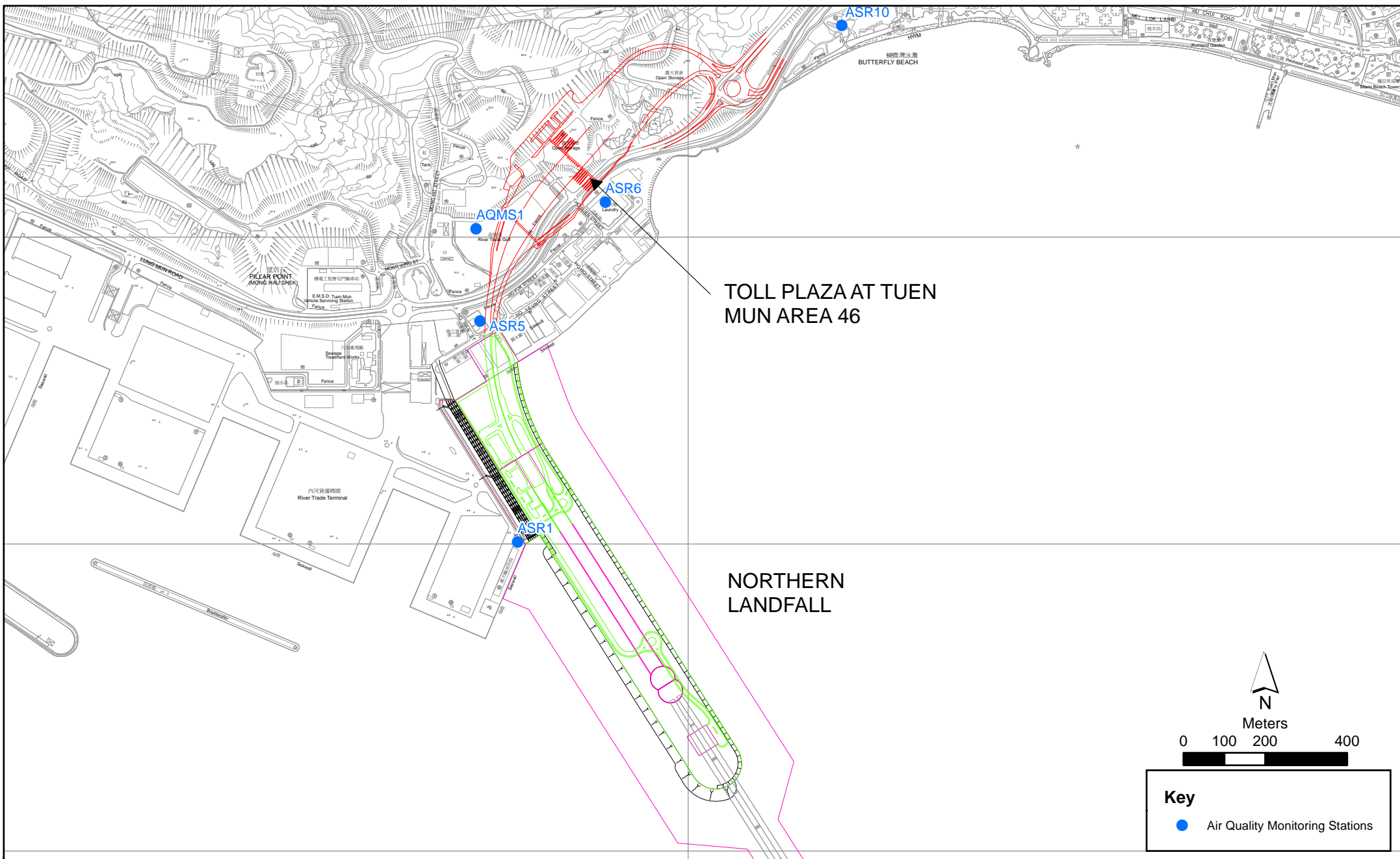


Figure 2.1

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 <ul style="list-style-type: none"> 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*. Impact AQM on 15/10/2017 was cancelled due to adverse weather.

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 *Forty-seventh to Forty-ninth 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 ($\mu\text{g}/\text{m}^3$)
September	ASR 1	179	52 - 545	331	500
2017 to	ASR 5	185	59 - 456	340	500
November	AQMS1	118	32 - 473	335	500
2017	ASR6	149	50 - 388	338	500
	ASR10	113	18 - 816	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 ($\mu\text{g}/\text{m}^3$)
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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 ($\mu\text{g}/\text{m}^3$)
September 2017 to	ASR 1	120	35 - 220	213	260
	ASR 5	100	30 - 222	238	260
November 2017	AQMS1	69	28 - 207	213	260
	ASR6	79	32 - 150	238	260
	ASR10	79	26 - 205	214	260

Fourteen (14) Action Level exceedances and two (2) Limit Level exceedance of 1-hour TSP were recorded in the air quality monitoring of this reporting period. One (1) Action Level exceedance of 24-hour TSP was 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	
CS6	Control / Far Field Station	817028	823992		less than 3m, mid-depth sampling	
SR8	Sensitive receiver (Gazettal beaches in Tuen Mun)	816306	825715		only. If water depth less than 6m, mid-depth may be omitted.	
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.

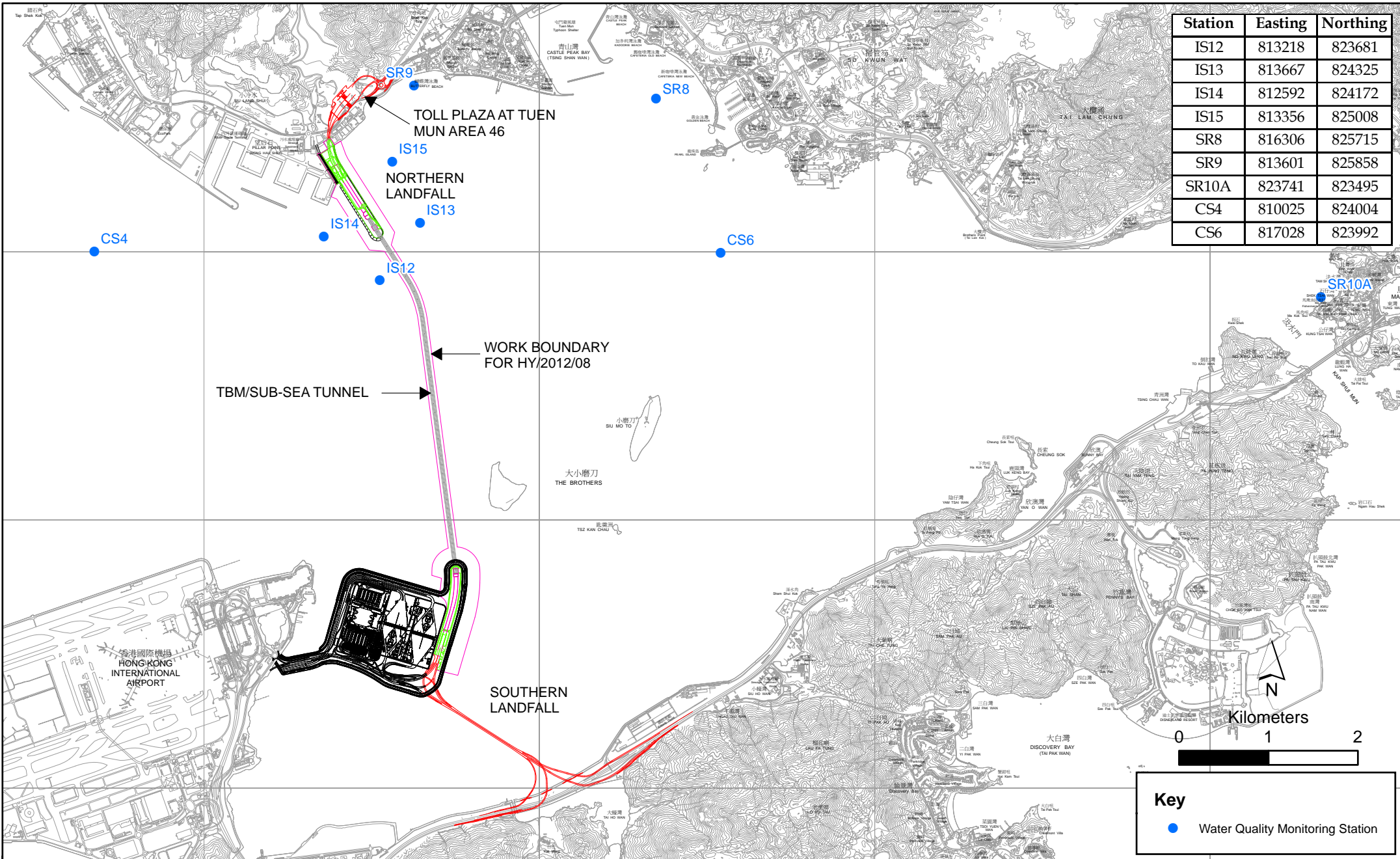


Figure 2.2

Water Quality Monitoring Station

Table 2.6 Water Quality Monitoring Equipment

Equipment	Model
Multi-Parameters	YSI ProDss 16J101715
Multi-Parameters	YSI ProDss 17E102520
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4

2.2.2 Action & Limit Levels

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

2.2.3 Monitoring Schedule for the Reporting Period

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

2.2.4 Results and Observations

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

Since seawall block installation for Phase II reclamation commenced on 1 November 2017, impact water quality monitoring resumed on 1 November 2017. In this reporting period, a total of thirteen (13) monitoring events were undertaken in which Ten (10) Action Level exceedances of Suspended Solids (SS) for impact water quality monitoring were 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
------------------	--------------

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

2.3.3 *Monitoring Parameter, Frequencies & Duration*

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

2.3.4 *Monitoring Location*

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

Table 2.8 *Impact Dolphin Monitoring Line Transect Co-ordinates*

Line No.	Easting	Northing	Line No.	Easting	Northing		
1	Start Point	804671	815456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805476	820800*	14	Start Point	817537	820220
2	End Point	805476	826654	14	End Point	817537	824613
3	Start Point	806464	821150*	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	821500*	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	821850*	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	822150*	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	822000*	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	821123	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613

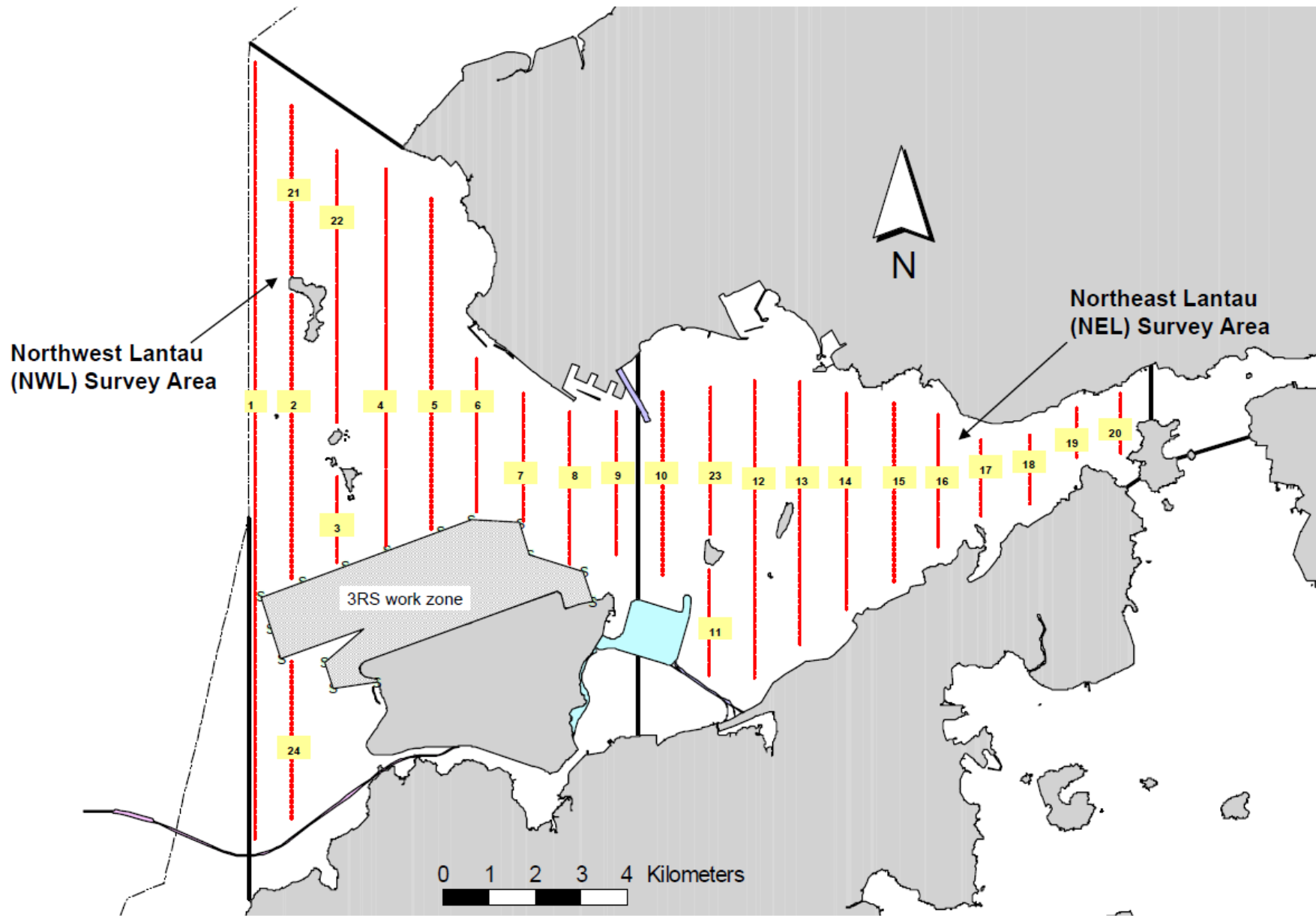


Figure 2.3

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

Line No.		Easting	Northing	Line No.		Easting	Northing
9	Start Point	812516	821303	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	821176	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807	24*	Start Point	805476*	815900*
12	End Point	815542	824882	24*	End Point	805476*	819100*

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

2.3.5 *Action & Limit Levels*

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

2.3.6 *Monitoring Schedule for the Reporting Period*

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

2.3.7 *Results & Observations*

A total of 802.12 km of survey effort was conducted, with 96.0% 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, 297.00 km and 505.12 km of survey effort were conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 578.16 km and 223.96 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 13 groups of 50 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All thirteen dolphin sightings were made during on-effort search, and twelve of the thirteen 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: Sep 15 th /18 th	0.00	0.00
	Set 2: Sep 22 th /29 th	0.00	0.00
	Set 3: Oct 4 th /9 th	0.00	0.00
	Set 4: Oct 18 th /26 th	0.00	0.00
	Set 5: Nov 1 st /8 th	0.00	0.00
	Set 6: Nov 17 th /24 th	0.00	0.00
NWL	Set 1: Sep 15 th /18 th	0.00	0.00
	Set 2: Sep 22 th /29 th	3.63	16.34
	Set 3: Oct 4 th /9 th	1.86	9.30
	Set 4: Oct 18 th /26 th	4.89	4.89
	Set 5: Nov 1 st /8 th	4.99	26.60
	Set 6: Nov 17 th /24 th	3.33	5.00

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

Table 2.10 *Quarterly Average Encounter Rates*

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	September - November 2017	September - November 2011	September - November 2017	September - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	3.12 ± 1.91	9.85 ± 5.85	10.35 ± 9.66	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 - 12 individuals per group in North Lantau region during September 2017 to November 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	
	September - November 2017	September - November 2011
Overall	3.85 ± 3.39 (n = 13)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	3.85 ± 3.39 (n = 13)	3.92 ± 3.40 (n = 49)

Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between September 2017 and November 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. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded in November 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 6, 13, 20 and 27 September 2017; 4, 11, 18 and 25 October 2017; 1, 8, 15, 22 and 29 November 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
6 September 2017	Works Area - Portion N-C <ul style="list-style-type: none"> Drip tray should be provided to the oil drum. Reminder from SOR Works Area - Portion N-B <ul style="list-style-type: none"> Stagnant water should be removed. Works Area - Portion S-B <ul style="list-style-type: none"> Stagnant water on the concrete block should be removed. Label should be displayed on the discharge point and pipe. 	Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray to the oil drum. Reminder from SOR Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water. Works Area - Portion S-B <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water on the concrete block. The Contractor was reminded to display label on the discharge point and pipe.
13 September 2017	Works Area - TBM tunnel <ul style="list-style-type: none"> Cements bags should be covered by impervious sheeting. Drip tray should be provided for the chemical container. Works Area - Portion S-B <ul style="list-style-type: none"> Adequate drip tray should be provided for chemical storage. Repaired drip tray should be provided for the machine. 	Works Area - TBM tunnel <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bags with impervious sheeting. The Contractor was reminded to provide drip tray for the chemical container. Works Area - Portion S-B <ul style="list-style-type: none"> The Contractor was reminded to provide adequate drip tray for chemical storage. The Contractor was reminded to provide repaired drip tray for the machine.

Inspection Date	Environmental Observations	Recommendations/ Remarks
20 September 2017	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical container. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> Cement bags should be covered with tarpaulin sheeting. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical container. Drip tray should be provided for the chemical container. <p>Reminder from SOR:</p> <ul style="list-style-type: none"> Proper label should be displayed on the water pipe. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical container. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bags with tarpaulin sheeting. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical container. The Contractor was reminded to provide drip tray for the chemical container. <p>Reminder from SOR:</p> <ul style="list-style-type: none"> The Contractor was reminded to put proper label on the water pipe.
27 September 2017	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Accumulated rubbish should be removed from the waste container. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Drip tray should be provided for the oil drum. The surface of slope should be covered with tarpaulin sheeting. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Cement bags should be covered with tarpaulin sheeting. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove accumulated rubbish from the waste container. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the oil drum. The Contractor was reminded to cover the surface of slope with tarpaulin sheeting. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bags with tarpaulin sheeting.
4 October 2017	<p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Accumulated rubbish should be removed from the waste container.. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Stagnant water should be removed and chemical labels should be provided for the chemical drums. Accumulated rubbish should be removed from the waste container. <p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical containers. Drip tray should be provided for the chemical containers. 	<p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to remove accumulated rubbish from the waste container. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water and provide chemical labels for the chemical drums. The Contractor was reminded to remove accumulated rubbish from the waste container. <p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers. The Contractor was reminded to provide drip tray for the chemical containers.

Inspection Date	Environmental Observations	Recommendations/ Remarks
11 October 2017	<p>Works Area -Portion N-C</p> <ul style="list-style-type: none"> Water spraying should be applied more frequently during dry conditions. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Water spraying should be applied more frequently during dry conditions. <p>Reminder from SOR:</p> <p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Stagnant water should be removed and larvacide should be sprayed regularly. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Stagnant water should be removed. 	<p>Works Area -Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying more frequently during dry conditions. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying more frequently during dry conditions. <p>Reminder from SOR:</p> <p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water and spray larvacide regularly. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water.
18 October 2017	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical containers. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical containers. 	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers.
25 October 2017	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical containers. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> "Stop work" label should be put on the unused grouting machine. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Slurry paddles should be tidied up. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to put the "Stop work" label on the unused grouting machine. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to tidy up the slurry paddles.
1 November 2017	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Accumulated waste in the skip should be removed. Drip tray should be provided for the chemical containers. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical containers. Accumulated waste in the skip should be removed. 	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the accumulated waste in the skip. The Contractor was reminded to provide drip tray for the chemical containers. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers. The Contractor was reminded to remove the accumulated waste in the skip.

Inspection Date	Environmental Observations	Recommendations/ Remarks
8 November 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 N-A</p> <ul style="list-style-type: none"> Standard NRMM label should be displayed on the generator. <p>Works Area -Portion S-B</p> <ul style="list-style-type: none"> Proper label should be provided to identify the waste sorting area. Cement bags should be covered with tarpaulin sheets. Proper label showing the direction of flow should be displayed on the water pipe. 	<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 N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to displayed standard NRMM label on the generator. <p>Works Area -Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide proper label to identify the waste sorting area. The Contractor was reminded to cover the cement bags with tarpaulin sheets. The Contractor was reminded to display proper label showing the direction of flow on the water pipe.
15 November 2017	<p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Proper NRMM label should be displayed on the generator. Drip tray should be provided for the oil drums. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> Proper chemical label should be displayed on the chemical containers. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> Proper chemical label should be displayed on the oil drums. Proper chemical label should be displayed on the oil drums. 	<p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to display proper NRMM label on the generator. The Contractor was reminded to provide drip tray for the oil drums. <p>Works Area - Portion S-C</p> <ul style="list-style-type: none"> The Contractor was reminded to display proper chemical labels on the chemical containers. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The Contractor was reminded to display proper chemical labels on the oil drums. The Contractor was reminded to display proper chemical labels on the oil drums.
22 November 2017	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Drip tray and proper chemical label should be provided to the chemical containers. Accumulated general refuse should be removed. Cement bags should be covered with tarpaulin sheeting. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Cement bags should be covered with tarpaulin sheeting. Drip tray and proper chemical label should be provided to the chemical containers. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray and proper chemical label to the chemical containers. The Contractor was reminded to remove accumulated general refuse. The Contractor was reminded to cover cement bags with tarpaulin sheeting. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to cover cement bags with tarpaulin sheeting. The Contractor was reminded to provide drip tray and proper chemical label to the chemical containers.
29 November 2017	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Drip tray and proper chemical label should be provided to the chemical containers. Drip tray and proper chemical label should be provided to the chemical containers. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> General refuse should be disposed of to the waste containers. <p>Accumulated water on the ground should be removed.</p>	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray and proper chemical label to the chemical containers. The Contractor was reminded to provide drip tray and proper chemical label to the chemical containers. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to dispose of the general refuse to the waste containers. <p>The Contractor was reminded to remove the accumulated water on the ground.</p>

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 chemical wastes. 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
September 2017	886	0	300	200	0	0	0
October 2017	706	0	244	132,270	0	0	2,312
November 2017	3259	0	345	343,470	3,800	0	5,836
Total	4,851	0	889	475,940	3,800	0	8,148

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-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Waste Water Discharge License	WT00017707-2013	18 November 2013	30 November 2018	DBJV	For site WA18
Waste Water Discharge License	WT00018433-2014	6 March 2014	31 March 2019	DBJV	N6 Site
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/18-036	21 October 2017	20 November 2017	DBJV	Type 1 (Dedicated site) and Type 2 (Confined Marine Disposal)
Marine Dumping Permit	EP/MD/18-087	21 November 2017	20 December 2017	DBJV	Type 1 (Dedicated site) and Type 2 (Confined Marine Disposal)
Construction Noise Permit	GW-RW0247-17	19 May 2017	9 November 2017	DBJV	For Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0279-17	13 June 2017	12 December 2017	DBJV	WA23 @ Tsing Yi
Construction Noise Permit	GW-RS0713-17	1 September 2017	28 February 2018	DBJV	Southern Landfall
Construction Noise Permit	GW-RS0878-17	11 October 2017	2 April 2018	DBJV	Southern Landfall
Construction Noise Permit	GW-RW0538-17	16 October 2017	15 April 2018	DBJV	For Urmston Road in front of Pillar Point
Construction Noise Permit	PP-RS0019-17	31 August 2017	30 November 2017	DBJV	Southern Landfall (Percussive Piling)

Notes:

HyD = Highways Department

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
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 twenty-nine monitoring events for both 1-hour TSP and 24-hour TSP were undertaken in which fourteen (14) Action Level exceedances and two (2) Limit Level exceedance of 1-hour TSP were recorded in the air quality monitoring of this reporting period. One (1) Action Level exceedance of 24-hour TSP was recorded. (*Table 2.15*).

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

Station	Exceedance Level	Date of Exceedances		Number of Exceedances	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
AQMS1	Action Level	2017-09-18	-	1	0
	Limit Level	-	-	0	0
ASR1	Action Level	2017-09-12	-	2	0
		2017-10-21	-	2	1
ASR5	Limit Level	2017-09-12	-	1	0
	Action Level	2017-09-12	-	1	0
		2017-09-27	-	2	0
		2017-10-27	-	1	0
		2017-11-02	-	1	0
		2017-11-11	-	1	0
ASR6	Limit Level	-	-	0	0
	Action Level	2017-10-27	-	1	0
	Limit Level	-	-	0	0
ASR10	Action Level	2017-11-02	-	1	0
		2017-11-29	-	1	0
	Limit Level	2017-11-02	-	1	0
Total number of Action level Exceedances:				14	1
Total number of Limit level Exceedances:				2	0

For marine water quality impact monitoring, a total of thirteen monitoring events were undertaken in which Ten (10) Action Level exceedances of Suspended Solids (SS) were recorded in the water quality monitoring of this reporting period. (*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 most monitoring stations are well below the ambient mean values (*Table 2.16*). Quarterly mean values of depth-averaged SS at IS14 and IS15 are higher than the ambient mean values.

As the quarterly mean is not significantly higher than the 1.3 ambient mean value, 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 (November 2017)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS4	10.2	9.0	13.3	11.7	7.69	9.83
CS6	10.9	11.7	14.1	15.2	7.29	9.49
IS12	9.2	9.5	12.0	12.3	10.01	10.68
IS13	10.0	10.5	13.0	13.7	9.90	13.07
IS14	10.4	9.7	13.5	12.6	8.80	15.38
IS15	9.6	11.0	12.5	14.2	7.14	14.71
SR10A	10.3	10.2	13.3	13.3	7.74	9.64
SR8	10.1	11.3	13.1	14.7	8.41	11.97
SR9	8.8	9.9	11.4	12.8	8.38	11.24
Grand Total	10.0	10.3	13.0	13.4	8.37	11.78

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	-	-	-	-	-	-	2017-11-06	2017-11-06
	LL	-	-	-	-	-	-	-	-
IS13	AL	-	-	-	-	-	-	2017-11-06	2017-11-06
	LL	-	-	-	-	-	-	-	-
IS14	AL	-	-	-	-	-	-	-	2017-11-08
	LL	-	-	-	-	-	-	-	-
IS15	AL	-	-	-	-	-	-	-	2017-11-22
	LL	-	-	-	-	-	-	-	-
SR8	AL	-	-	-	-	-	-	-	2017-11-06 2017-11-08
	LL	-	-	-	-	-	-	-	-
SR9	AL	-	-	-	-	-	-	-	2017-11-08
	LL	-	-	-	-	-	-	-	-
SR10A	AL	-	-	-	-	-	-	-	2017-11-06
	LL	-	-	-	-	-	-	-	-
Total AL Exceedances:		0	0	0	0	0	0	2	8
Total LL Exceedances:		0	0	0	0	0	0	0	0

Notes:

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

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between September and November 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 light pollution at Tuen Mun Pier was referred by IEC on 25 October 2017.

No environmental summons was received in this reporting period.

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

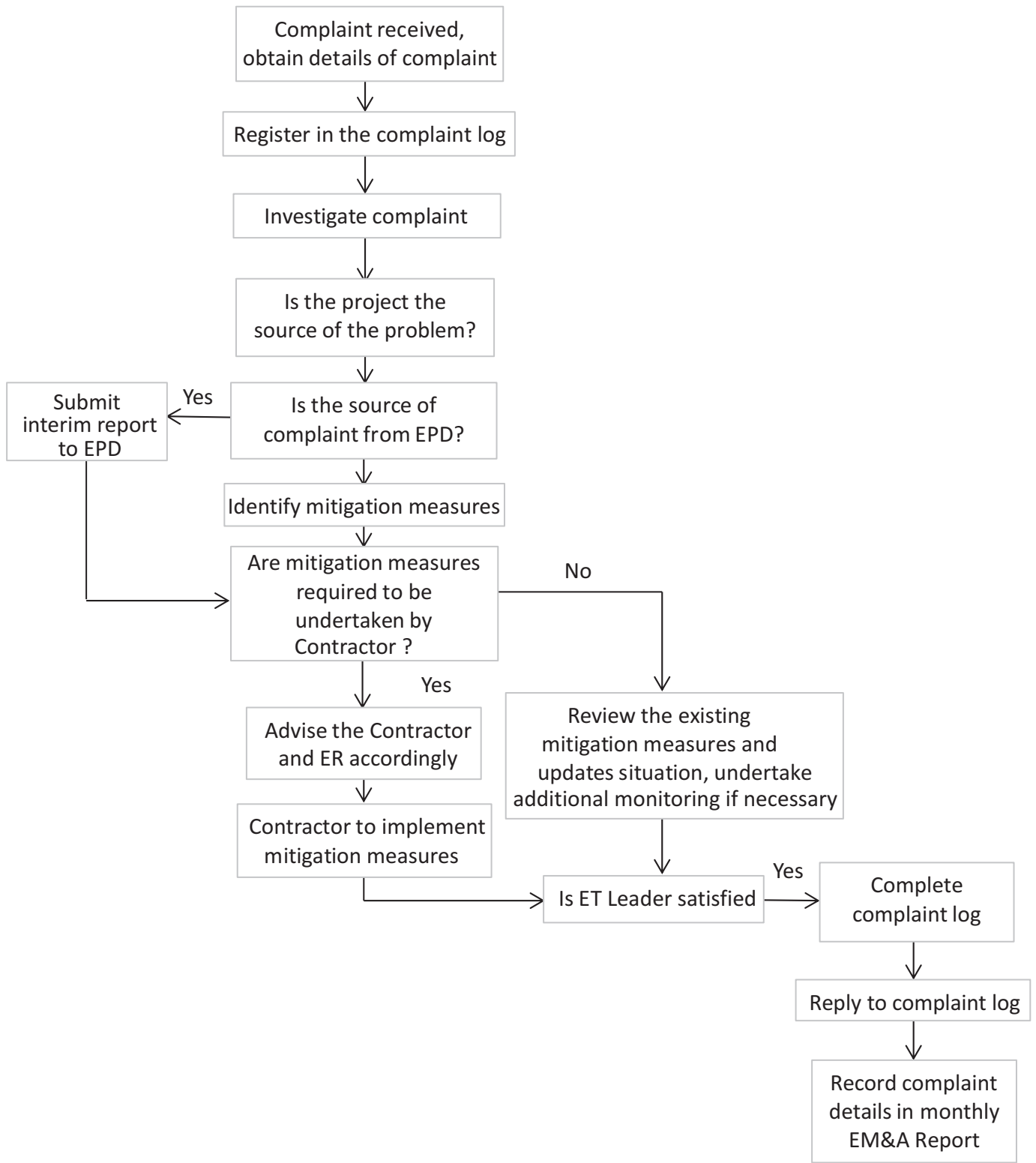


Figure 2.4

Environmental Complaint Handling Procedure

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>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;• Phase 2 Surcharge Removal – Portion N-A;• Bulk Excavation – Portion S-A;• CSM treatment, Jet Grouting works and D-wall Construction; and• Ground Freezing Works – Portion S-A
<i>Marine-based Works</i>
<ul style="list-style-type: none">• Seawall Enhancement works – Portion N-C

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 water quality, marine ecology and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality and marine ecology (include dolphin monitoring) are scheduled to continue for the next reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not considered to be necessary at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period.

CONCLUSIONS

This Sixteenth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 September 2017 to 30 November 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) , water quality monitoring and dolphin monitoring were carried out in the reporting period. Fourteen (14) Action Level exceedances and two (2) Limit Level exceedance of 1-hour TSP were recorded in the air quality monitoring of this reporting period. One (1) Action Level exceedances of 24-hour TSP was recorded.

Ten (10) Action Level exceedances of Suspended Solids (SS) were recorded in the water quality monitoring of this reporting period.

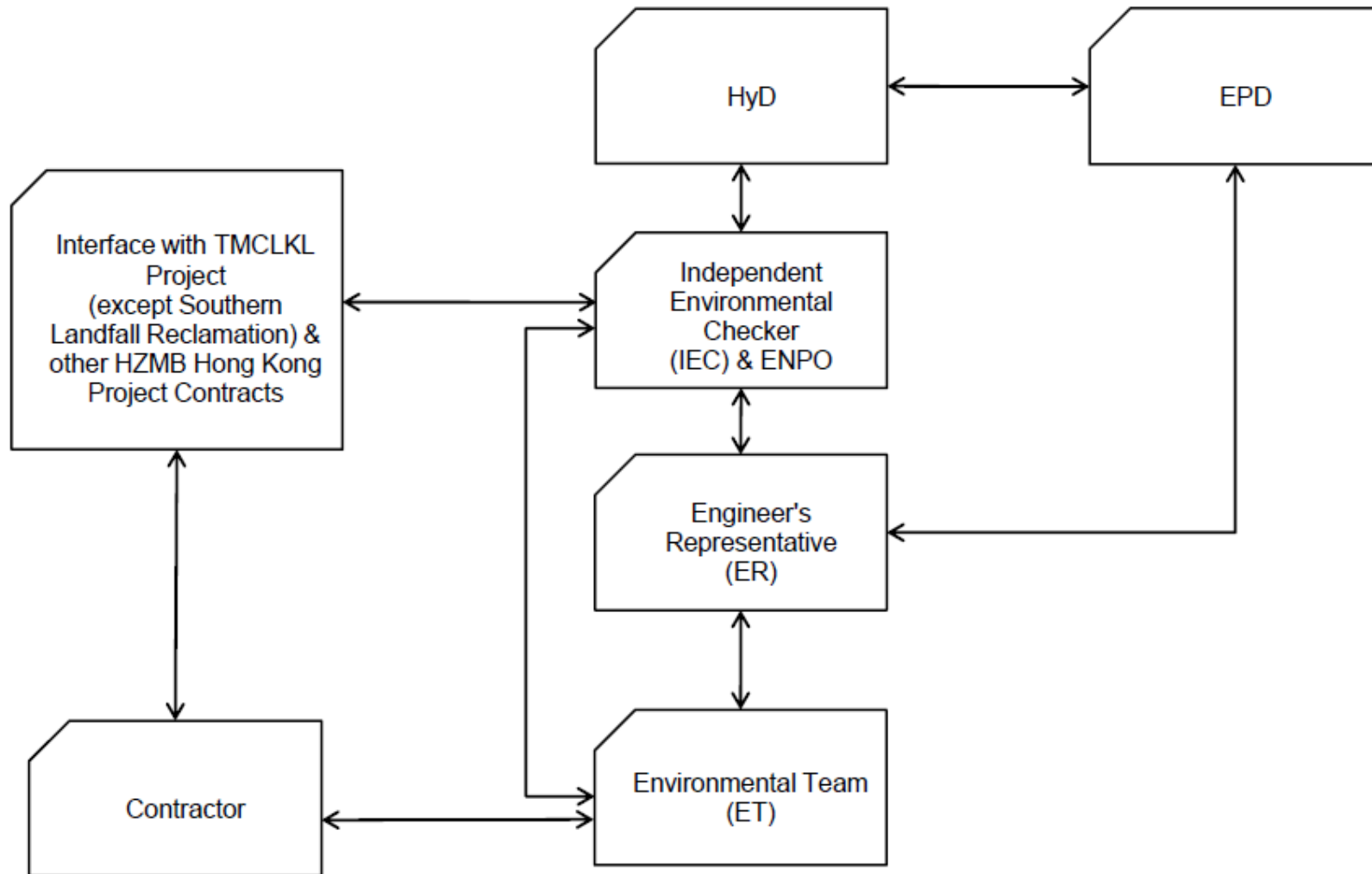
A total of 13 groups of 50 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All thirteen dolphin sightings were made during on-effort search, and twelve of the thirteen on-effort dolphin sightings were made on primary lines. Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between September and November 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.

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

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

Appendix A

Project Organization for Environmental Works

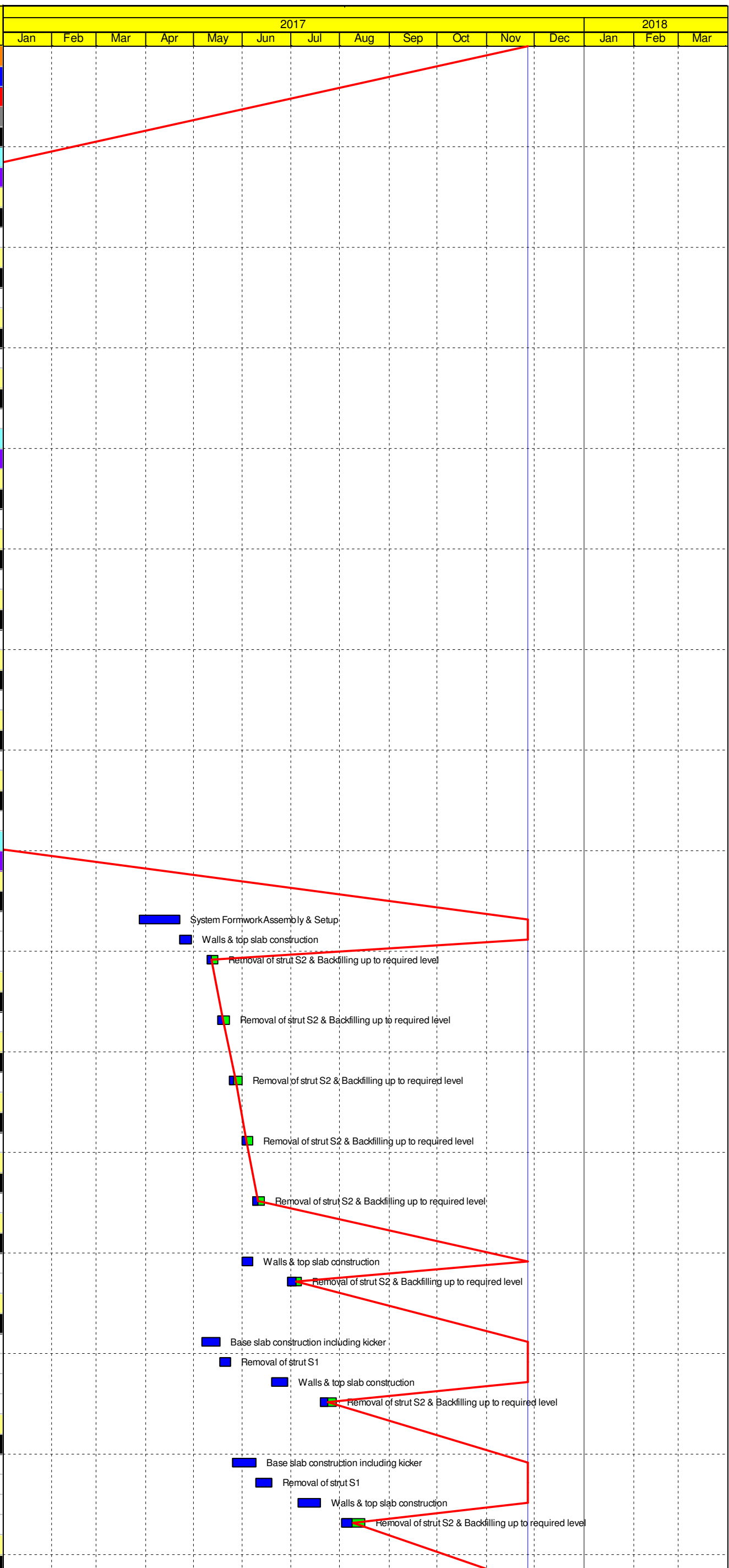


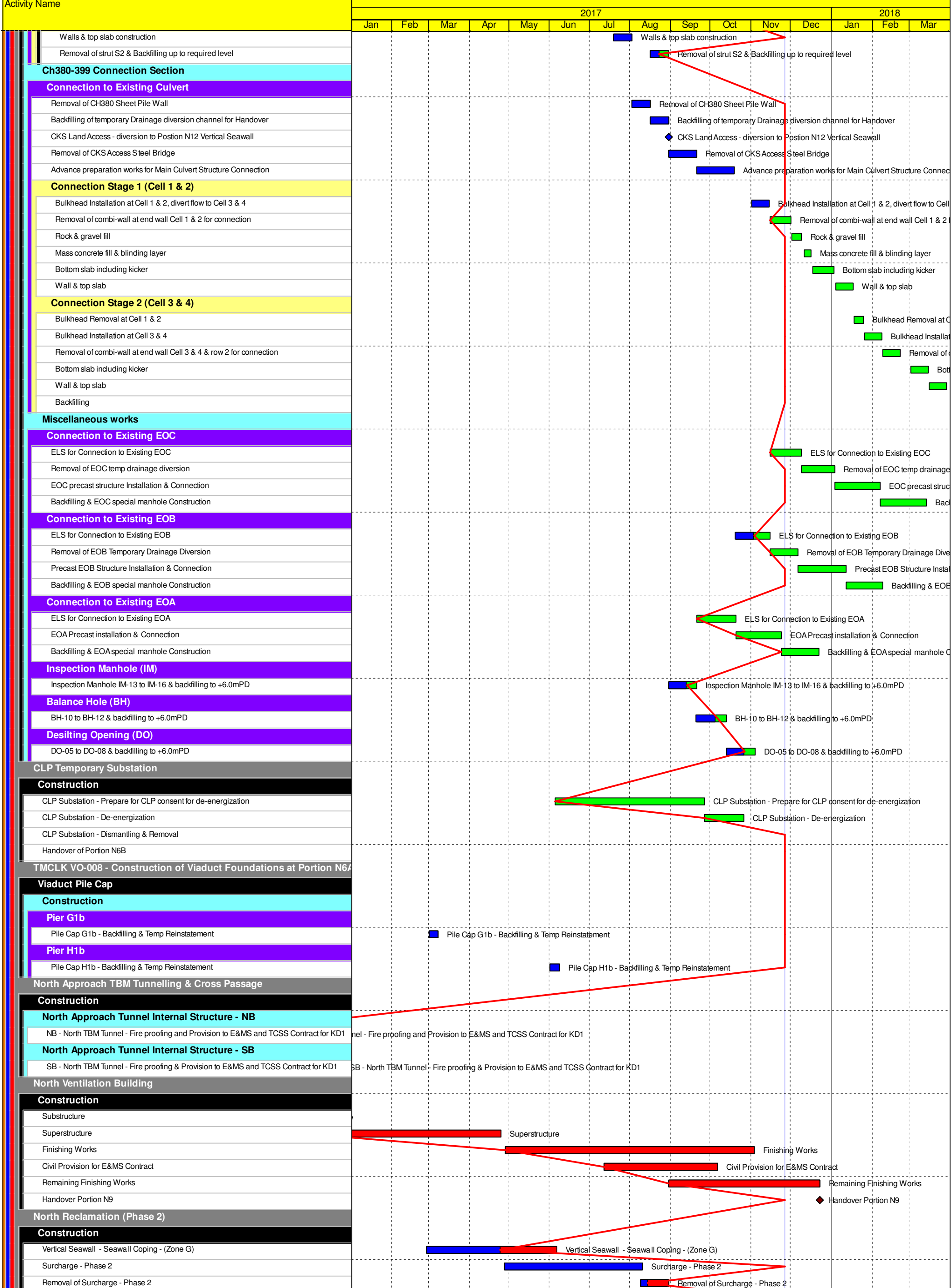
↔ Line of Communication

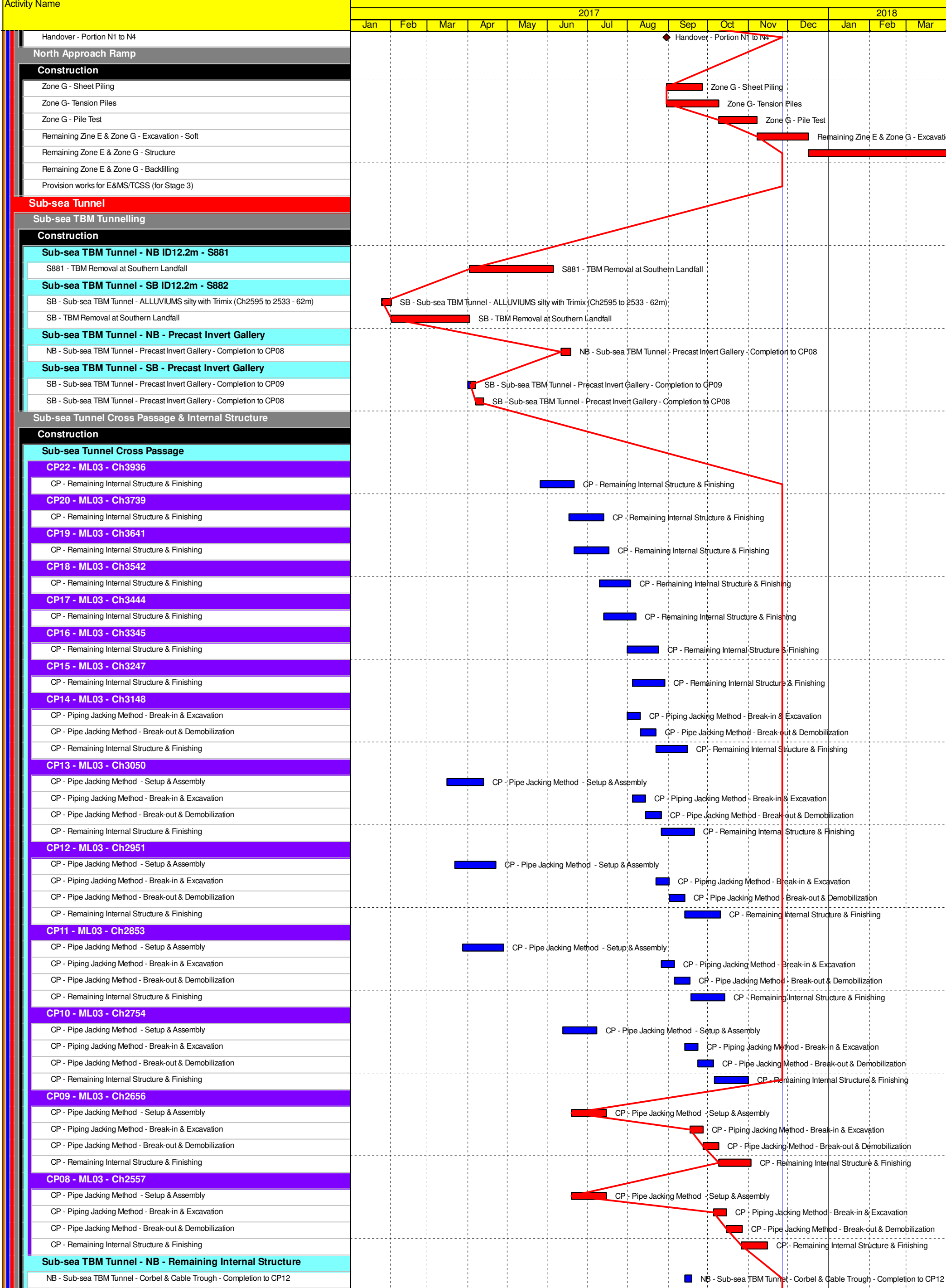
Appendix B

Construction Programme

Activity Name	
TMCLK - Northern Connection Sub-Sea Tunnel Section	
Construction	
Northern Landfall	
Box Culvert Extension	
Construction	
CH100-150 Land Section	
ELS & Structure	
Pile A41/A39 CJ to Pile A39/A37 CJ (Bay 7)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile A39/A37 CJ to Pile A37/A35 CJ (Bay 8)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile A37/A35 CJ to Pile A35/A33 CJ (Bay 9)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile A35/A33 CJ to Pile A33/P117 CJ (Bay 10)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Ch150-250 Marine Section	
ELS & Structure	
Pile A33/P117 CJ to Pile P113/P109 CJ (Bay 11)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P113/P109 CJ to Pile P105/P101 CJ (Bay 12)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P105/P101 CJ to Pile P97/P93 CJ (Bay 13)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P97/P93 CJ to Pile P89/P85 CJ (Bay 14)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P89/P85 CJ to Pile P81/P77 CJ (Bay 15)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P81/P77 CJ to Pile P73/P69 CJ (Bay 16)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Ch250-380 Marine Section	
ELS & Structure	
Pile P73/P69 CJ to Pile P65/P61 CJ (Bay 17)	
Box Culvert Structure	
System Formwork Assembly & Setup	
Walls & top slab construction	
Removal of strut S2 & Backfilling up to required level	
Pile P65/P61 CJ to Pile P57/P53 CJ (Bay 18)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P57/P53 CJ to Pile P49/P45 CJ (Bay 19)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P49/P45 CJ to Pile P41/P37 CJ (Bay 20)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P41/P37 CJ to Pile P33/P29 CJ (Bay 21)	
Box Culvert Structure	
Removal of strut S2 & Backfilling up to required level	
Pile P33/P29 CJ to Pile P25/P21 CJ (Bay 22)	
Box Culvert Structure	
Walls & top slab construction	
Removal of strut S2 & Backfilling up to required level	
Pile P25/P21 CJ to Pile P17/P13 CJ (Bay 23)	
Box Culvert Structure	
Base slab construction including kicker	
Removal of strut S1	
Walls & top slab construction	
Removal of strut S2 & Backfilling up to required level	
Pile P17/P13 CJ to Pile P09/P05 CJ (Bay 24)	
Box Culvert Structure	
Base slab construction including kicker	
Removal of strut S1	
Walls & top slab construction	
Removal of strut S2 & Backfilling up to required level	
Pile P09/P05 CJ to End Wall CJ (Bay 25)	
Box Culvert Structure	

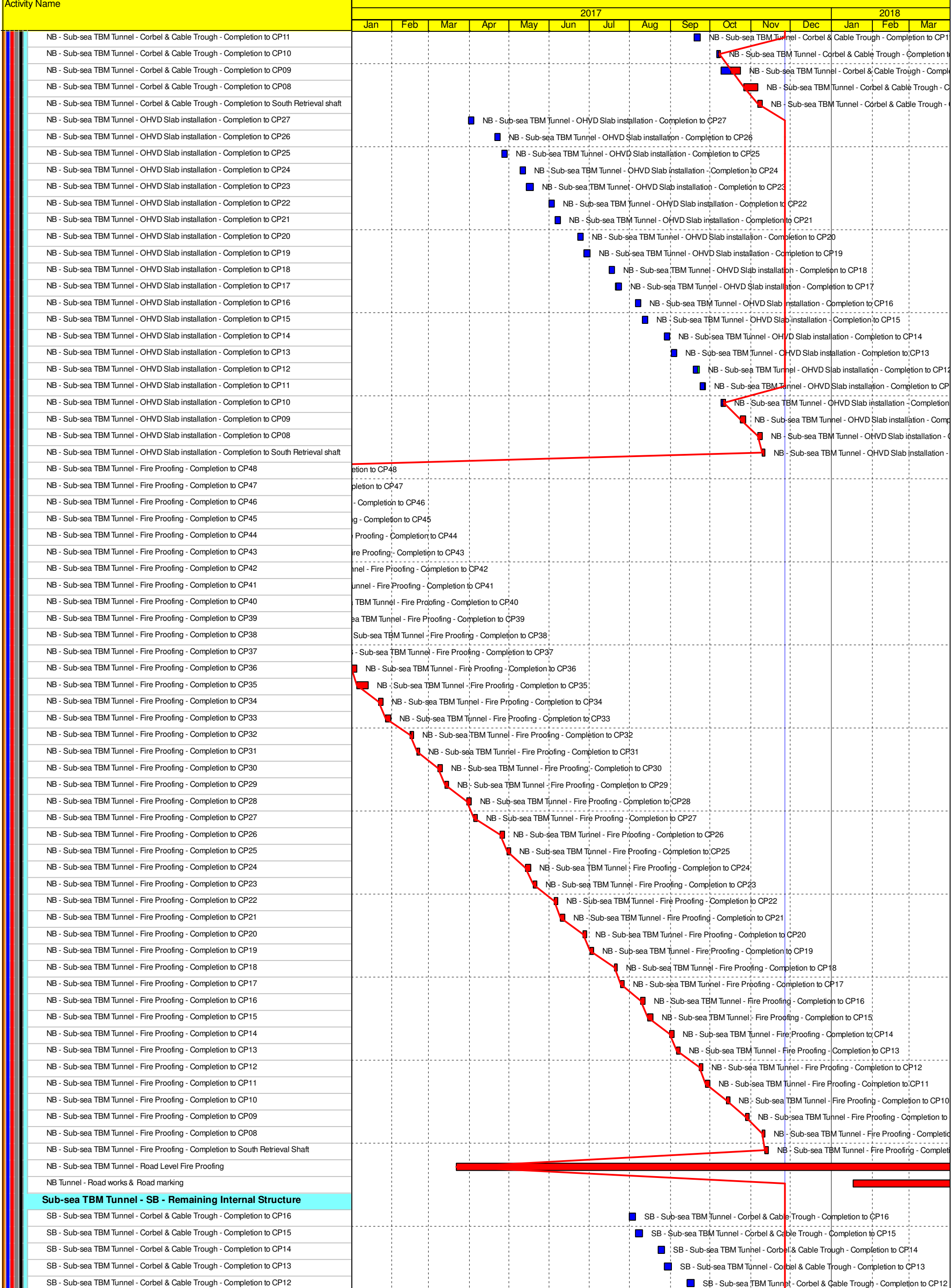


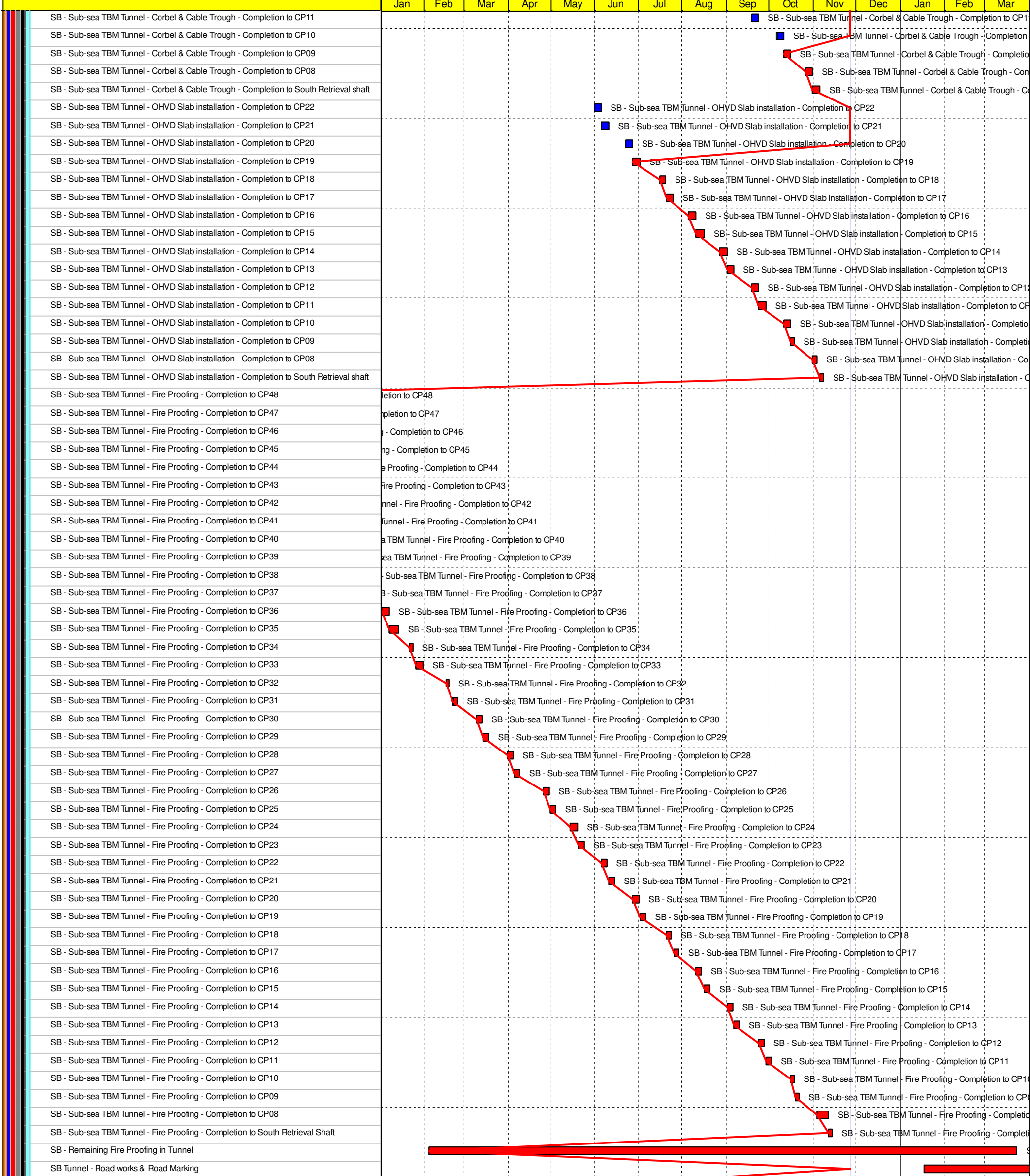




- Planned Bar
- Planned Bar - Critical
- Progress bar
- ◆ Planned Milestone
- ◆ Progress Milestone

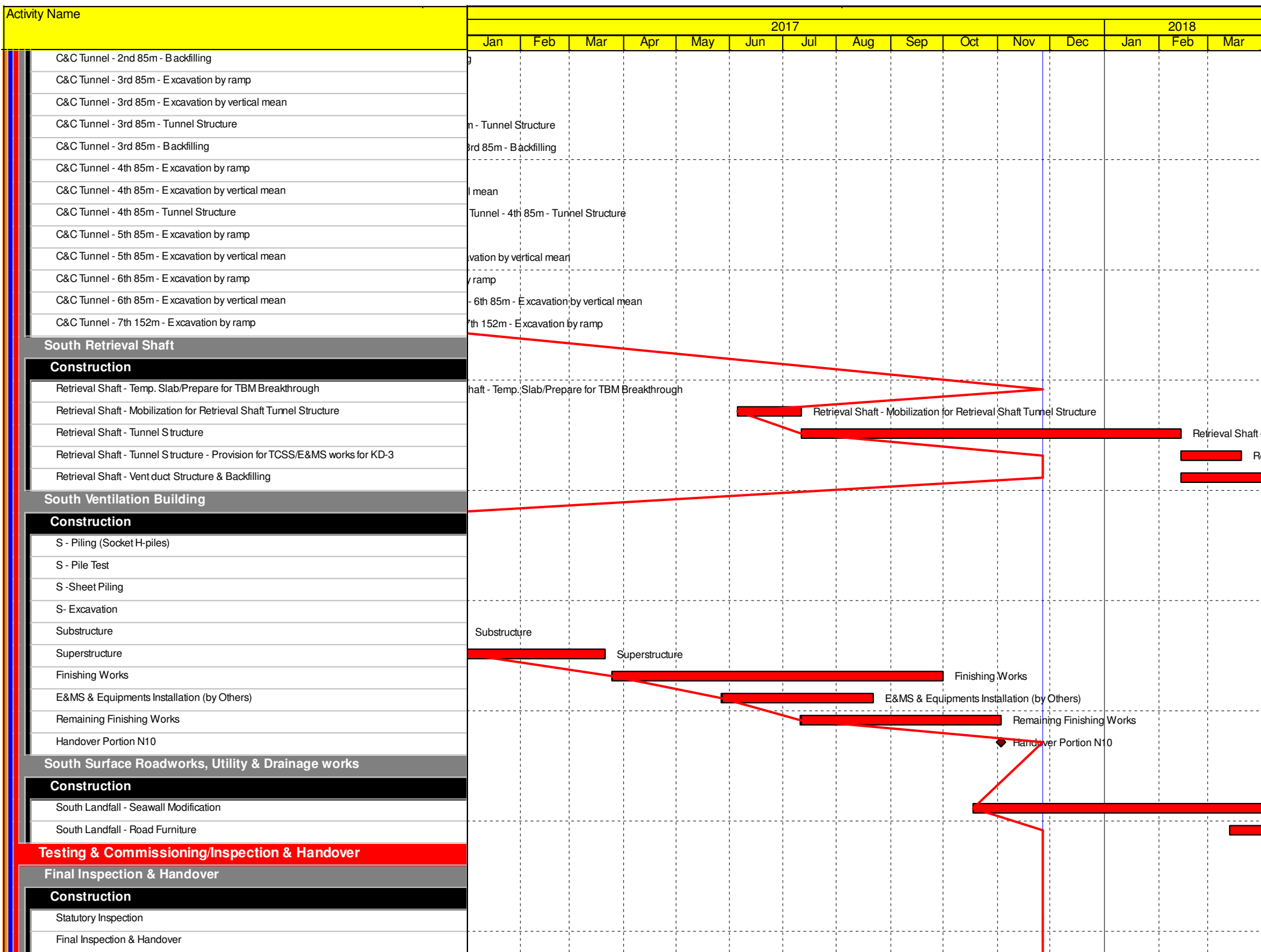
Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGENPRG98507	WYu	SPs
08-Apr-14	TMCLKDBJGENPRG98507	SPs	WYu
28-Aug-14	TMCLKDBJGENPRG98507	CLs	WYu
30-Oct-15	TMCLKDBJGENPRG98507	WYu	





Southern Landfall	
South Cut & Cover Tunnel	
Construction	
South C&C Tunnel - Diaphragm Wall	
C&C Tunnel - 1st 85m - Excavation by ramp	
C&C Tunnel - 1st 85m - Excavation by vertical mean	
C&C Tunnel - 1st 85m - Tunnel Structure	
C&C Tunnel - 1st 85m - Backfilling	
C&C Tunnel - 2nd 85m - Excavation by ramp	
C&C Tunnel - 2nd 85m - Excavation by vertical mean	
C&C Tunnel - 2nd 85m - Tunnel Structure	

Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGENPRG98507	WYu	SPe
08-Apr-14	TMCLKDBJGENPRG98507	SPe	WYu
28-Aug-14	TMCLKDBJGENPRG98507	CLa	WYu
30-Oct-15	TMCLKDBJGENPRG98507	WYu	



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

Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGENPRG.98507	WYu	SPa
08-Apr-14	TMCLKDBJGENPRG.98507	SPa	WYu
28-Aug-14	TMCLKDBJGENPRG.98507	CLa	WYu
30-Oct-15	TMCLKDBJGENPRG.98507	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		✓

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	
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		✓

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

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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	
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		✓

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	
		- 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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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	
					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

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	
					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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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	
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	5.8	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
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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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	
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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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	
		One year operation phase water quality monitoring at designated stations.	monitoring for a year.						
ECOLOGY									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/ during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m2 in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/towards end of construction period	TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	N/A. To be implemented by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/ during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for dredging and reclamation works	All areas/ Detailed Design/ during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
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		✓

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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	
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
10.9	7.6	The colour and shape of the toll control buildings, ventilation building and administration building shall adopt a design which could blend it into the vicinity elements, and the details will be developed in detailed design stage (DM2)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (OM6)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
WASTE									

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

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

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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	
12.6	8.1	The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: f Suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; f Having a capacity of <450L unless the specifications have been approved by the EPD; and f Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. f Clearly labelled and used solely for the storage of chemical wastes; f Enclosed with at least 3 sides; f Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest; f Adequate ventilation;	All areas / throughout construction period	Contractor	TMEIA		Y		<>

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						D	C	O	
		f Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and f Incompatible materials are adequately separated.							
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		N/A
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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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	
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		N/A

*** Remarks:**

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

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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 Impact Dolphin Monitoring*

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

Notes:

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

Table D3 *Derived Value of Action Level (AL) and Limit Level (LL)*

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

Appendix E

EM&A Monitoring Schedules

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

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

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

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

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Oct	Public holiday 2-Oct	3-Oct	4-Oct	Public holiday 5-Oct	6-Oct	7-Oct
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
8-Oct	9-Oct	10-Oct	11-Oct	12-Oct	13-Oct	14-Oct
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
15-Oct	16-Oct	17-Oct	18-Oct	19-Oct	20-Oct	21-Oct
Impact AQM cancelled due to T8.			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-Oct	23-Oct	24-Oct	25-Oct	26-Oct	27-Oct	Public holiday 28-Oct
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
29-Oct	30-Oct	31-Oct				
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM					

Impact AQM on 15/10/2017 was cancelled due to adverse weather.

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

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

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

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

Sundav	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1/Nov ebb tide 8:50 - 12:20 flood tide 15:31 - 19:01	2/Nov	3/Nov ebb tide 10:19 - 13:49 flood tide 4:21 - 7:51	4/Nov
5/Nov	6/Nov	7/Nov	8/Nov	9/Nov	10/Nov	11/Nov
	ebb tide 12:36 - 16:06 flood tide 6:55 - 10:25		ebb tide 14:18 - 17:48 flood tide 8:54 - 12:24		ebb tide 16:45 - 19:47 flood tide 11:17 - 14:47	
12/Nov	13/Nov	14/Nov	15/Nov	16/Nov	17/Nov	18/Nov
	ebb tide 7:21 - 10:51 flood tide 14:26 - 17:56		ebb tide 9:13 - 12:43 flood tide 15:27 - 18:57		ebb tide 10:38 - 14:08 flood tide 4:51 - 8:21	
19/Nov	20/Nov	21/Nov	22/Nov	23/Nov	24/Nov	25/Nov
	ebb tide 12:26 - 15:56 flood tide 6:56 - 10:26		ebb tide 13:35 - 17:05 flood tide 8:15 - 11:45		ebb tide 15:16 - 17:59 flood tide 9:52 - 13:22	
26/Nov	27/Nov	28/Nov	29/Nov	30/Nov		
	ebb tide 4:33 - 8:03 flood tide 12:58 - 16:28		ebb tide 7:03 - 10:33 flood tide 14:07 - 17:37			

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

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

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

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

Appendix F

Impact Air Quality Monitoring Results

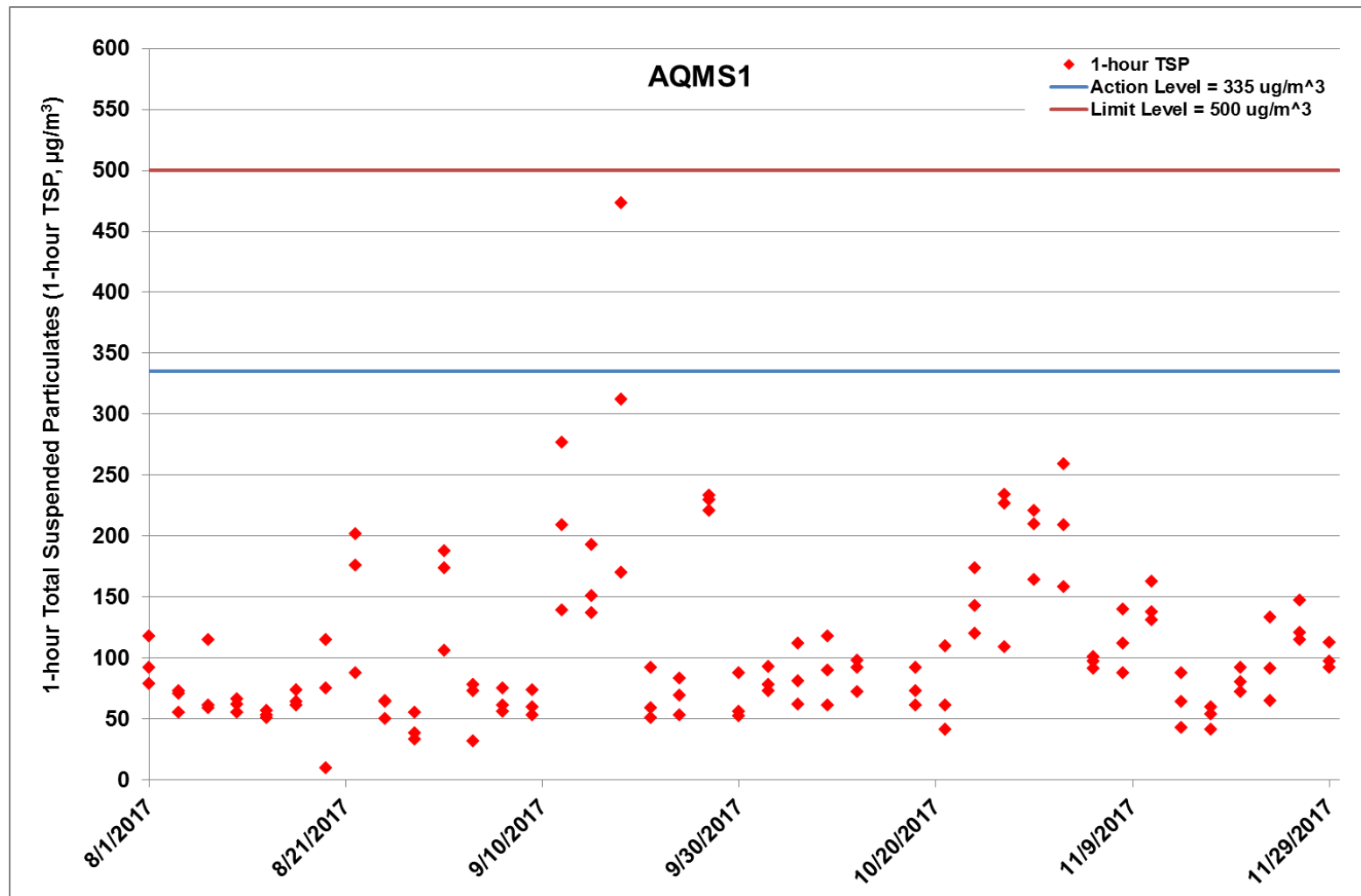


Figure F.1 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



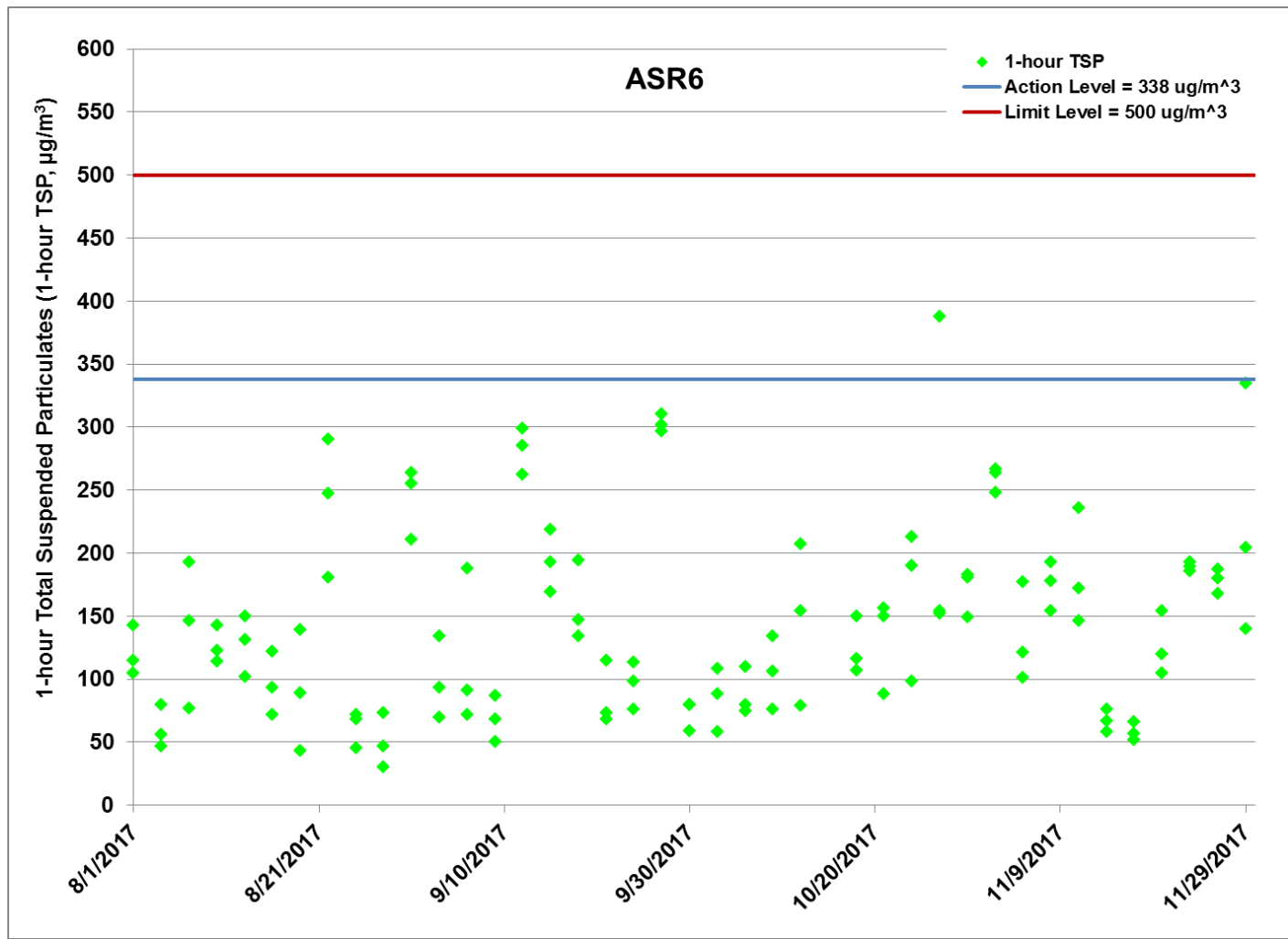


Figure F.2 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



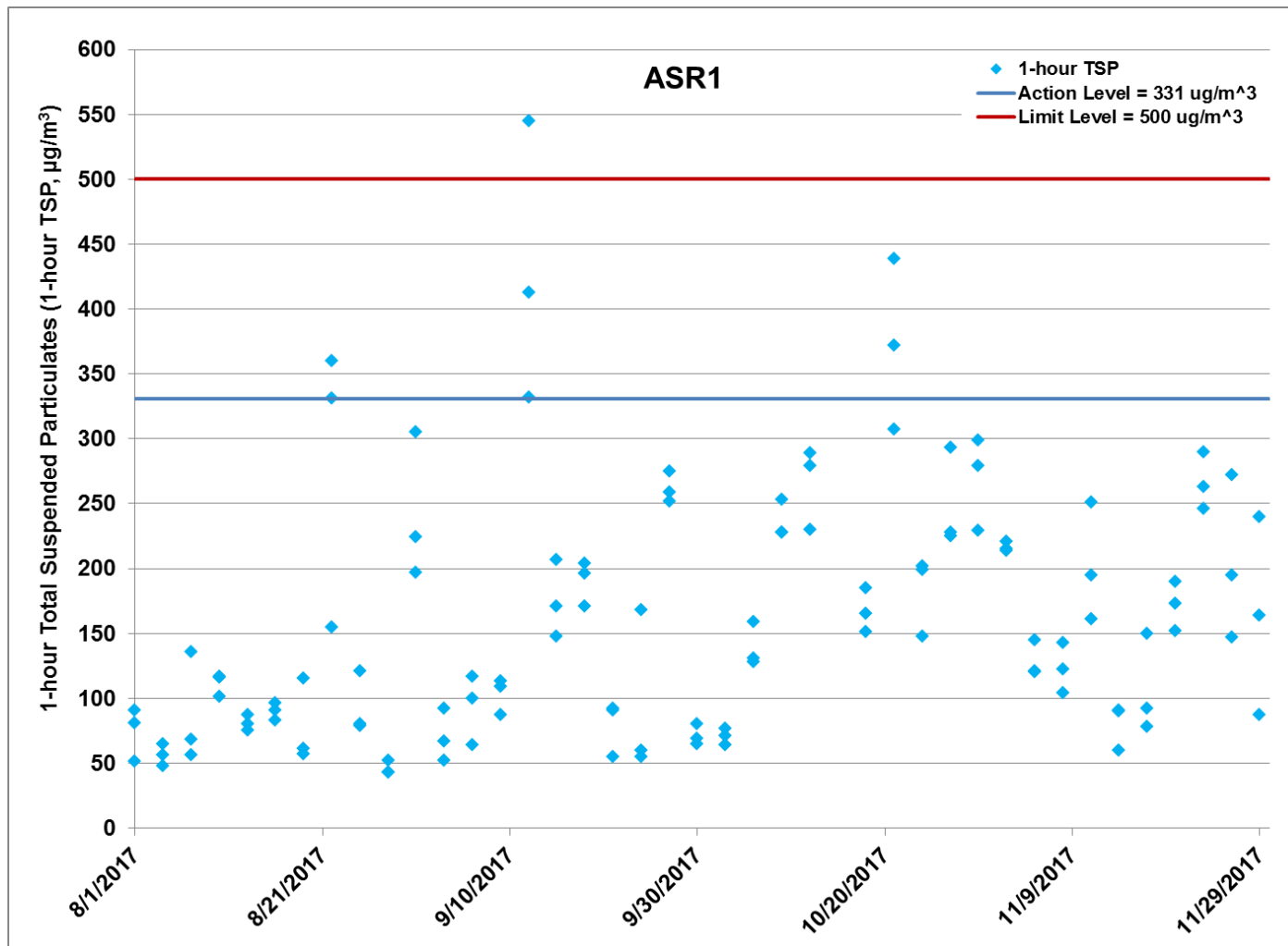


Figure F.3 Impact Monitoring - 1-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



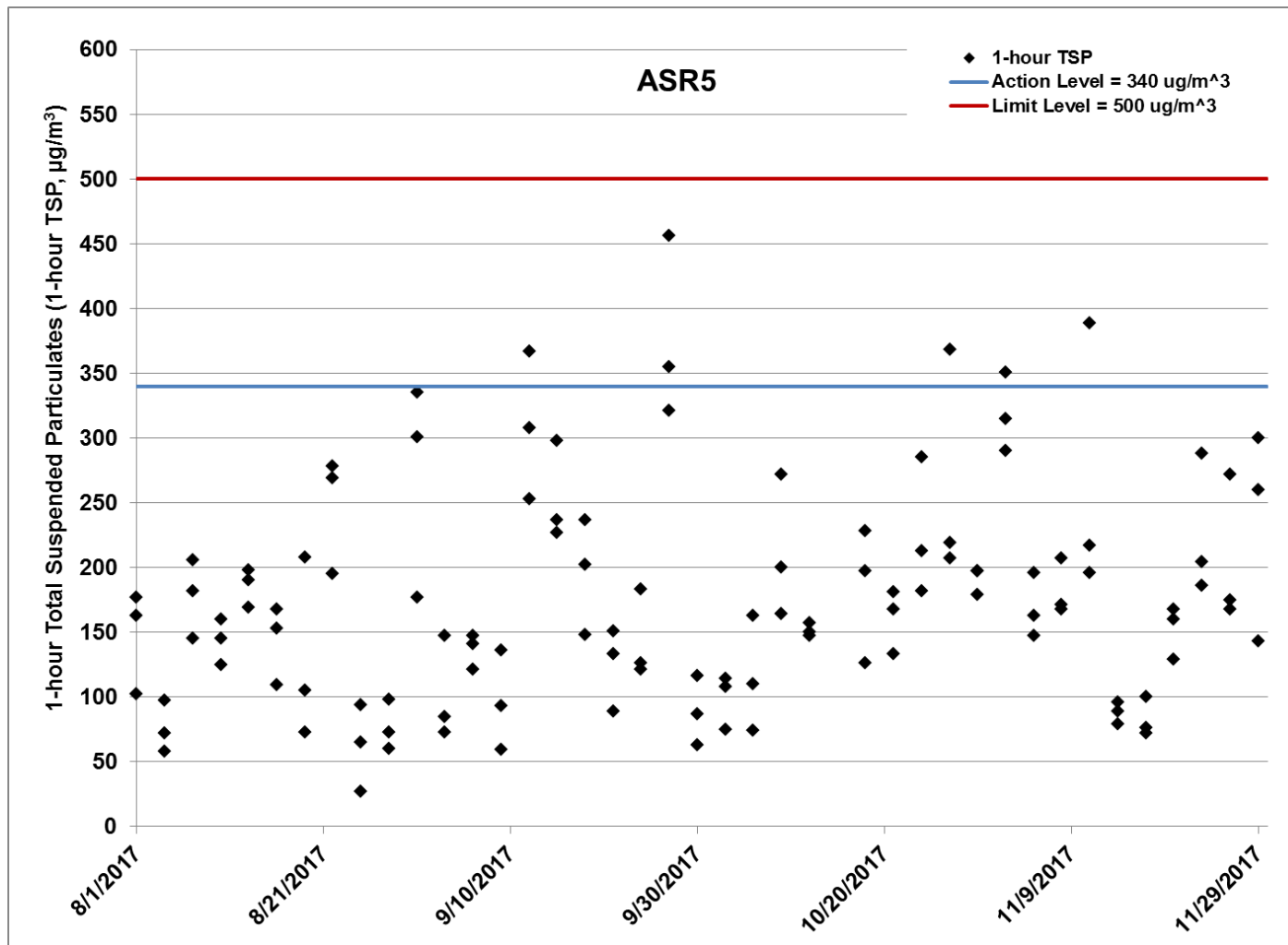


Figure F.4 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



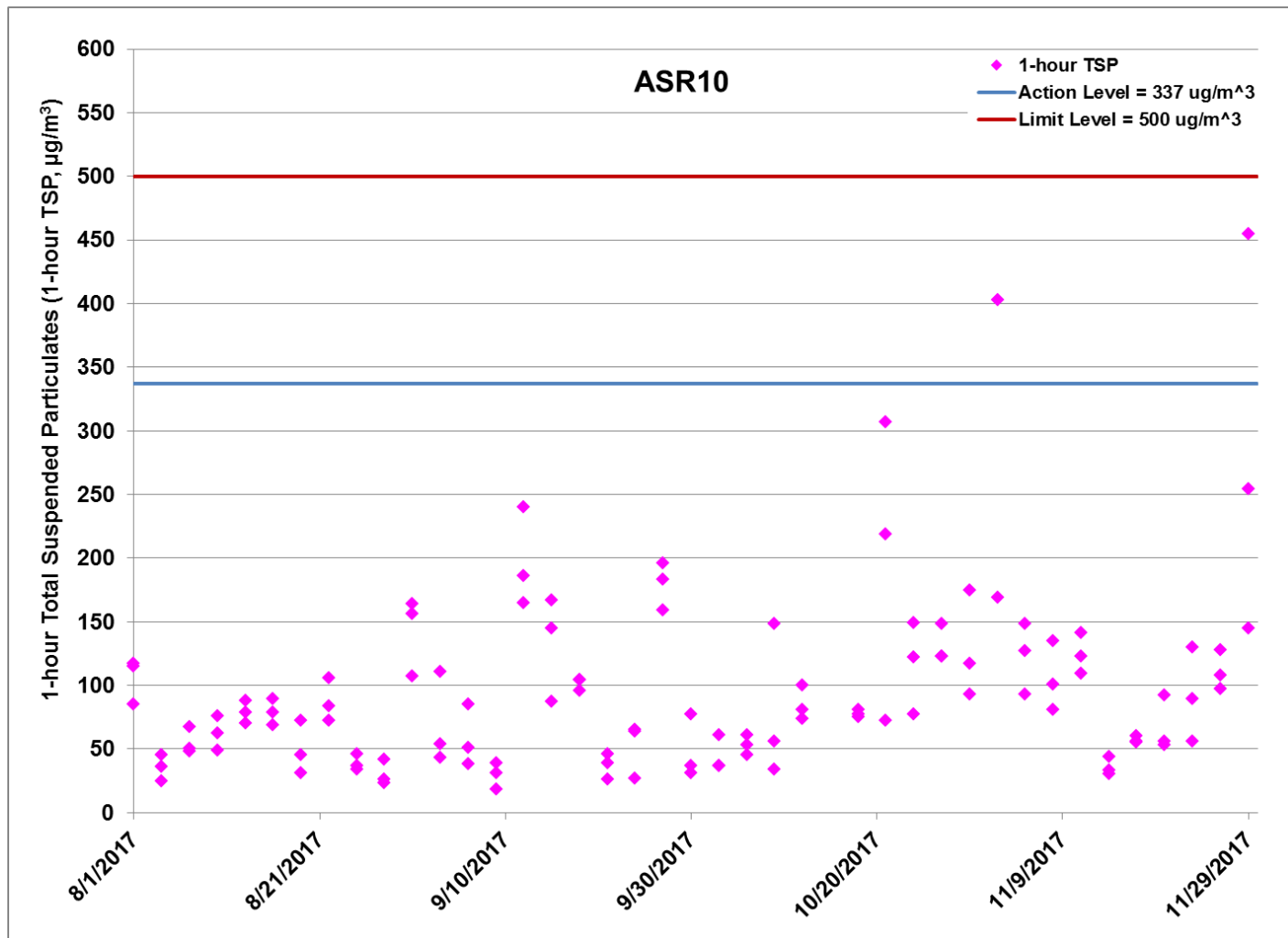


Figure F.5 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



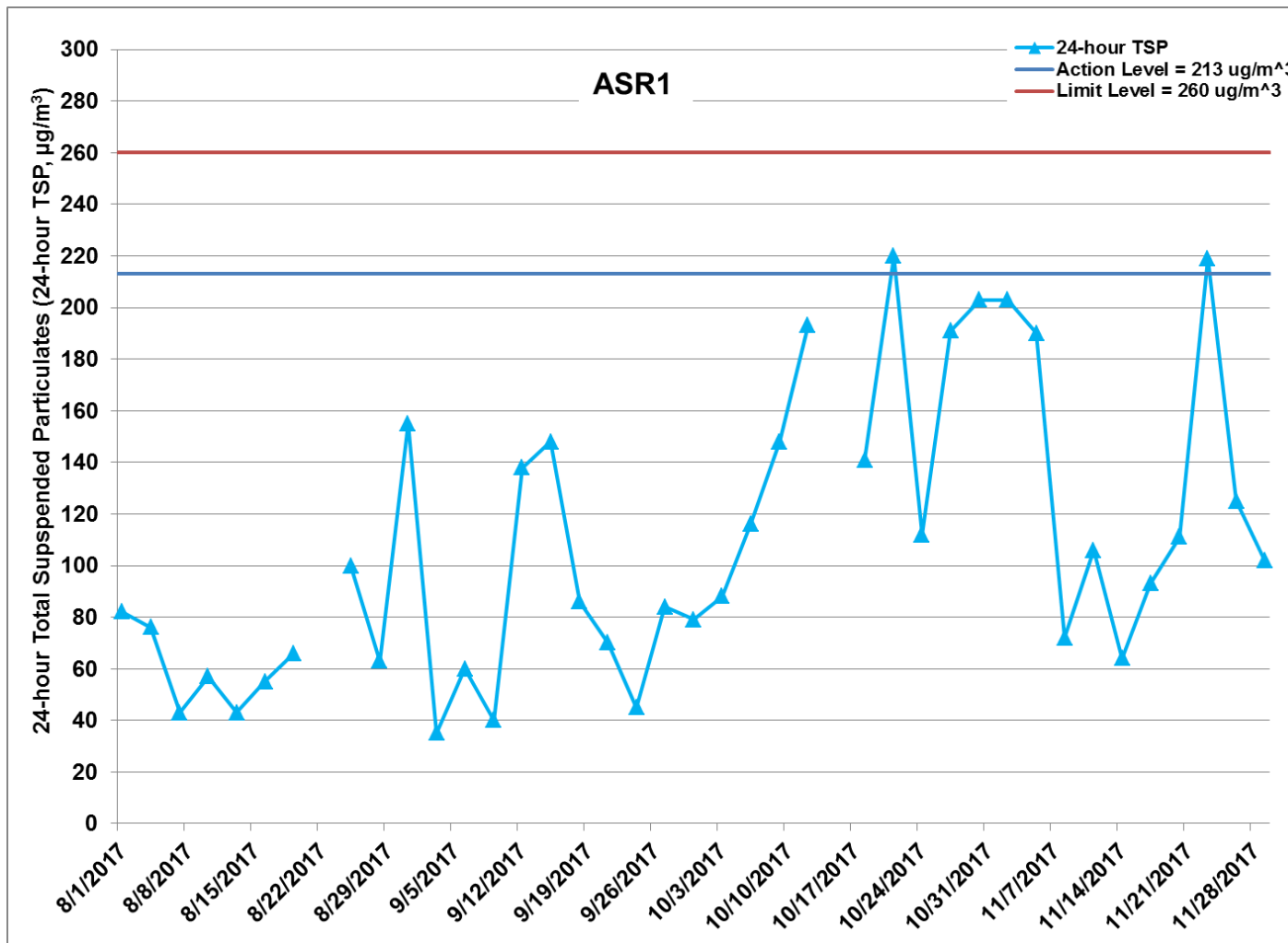


Figure F.6 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



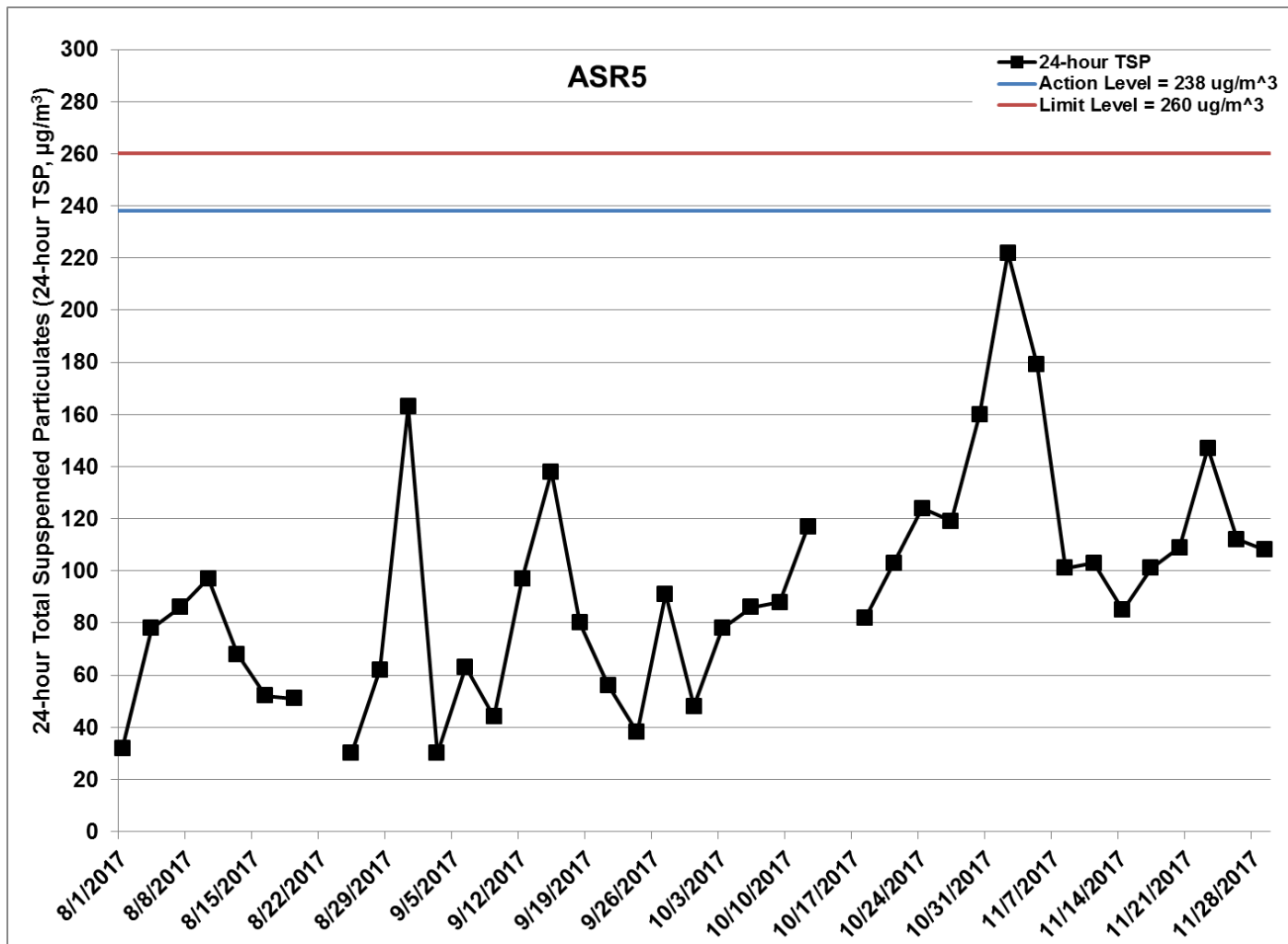


Figure F.7 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



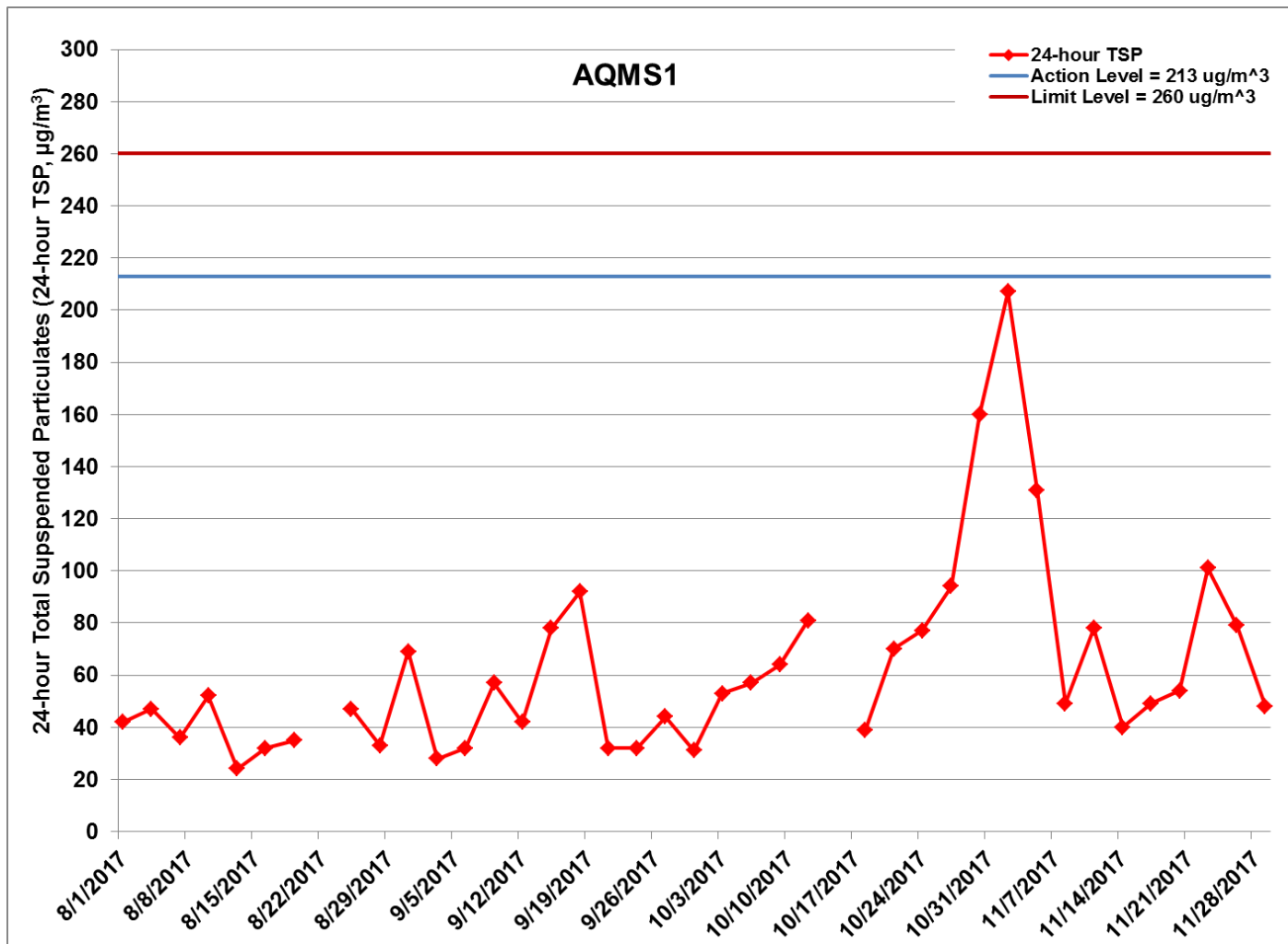


Figure F.8 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



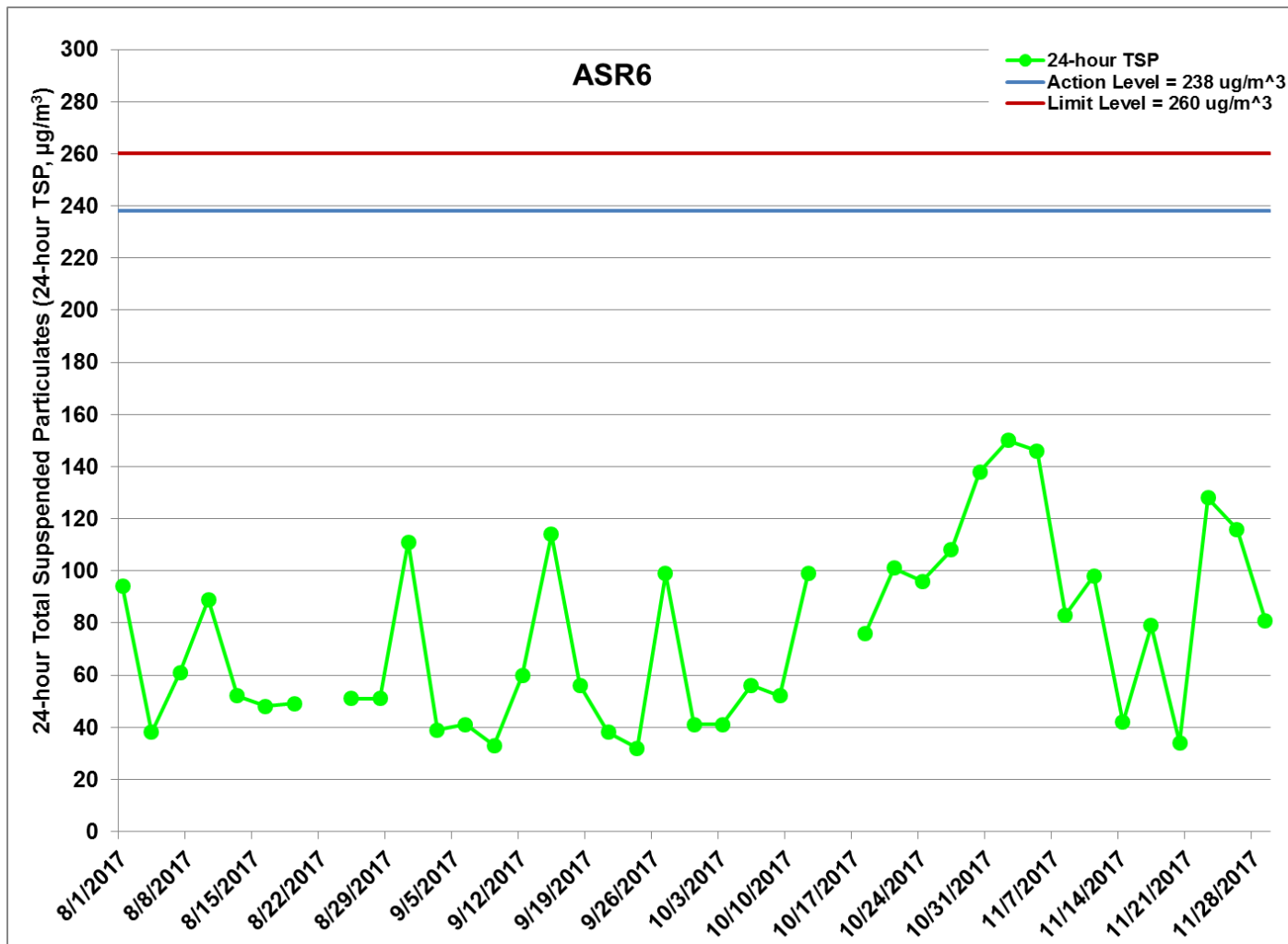


Figure F.9 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



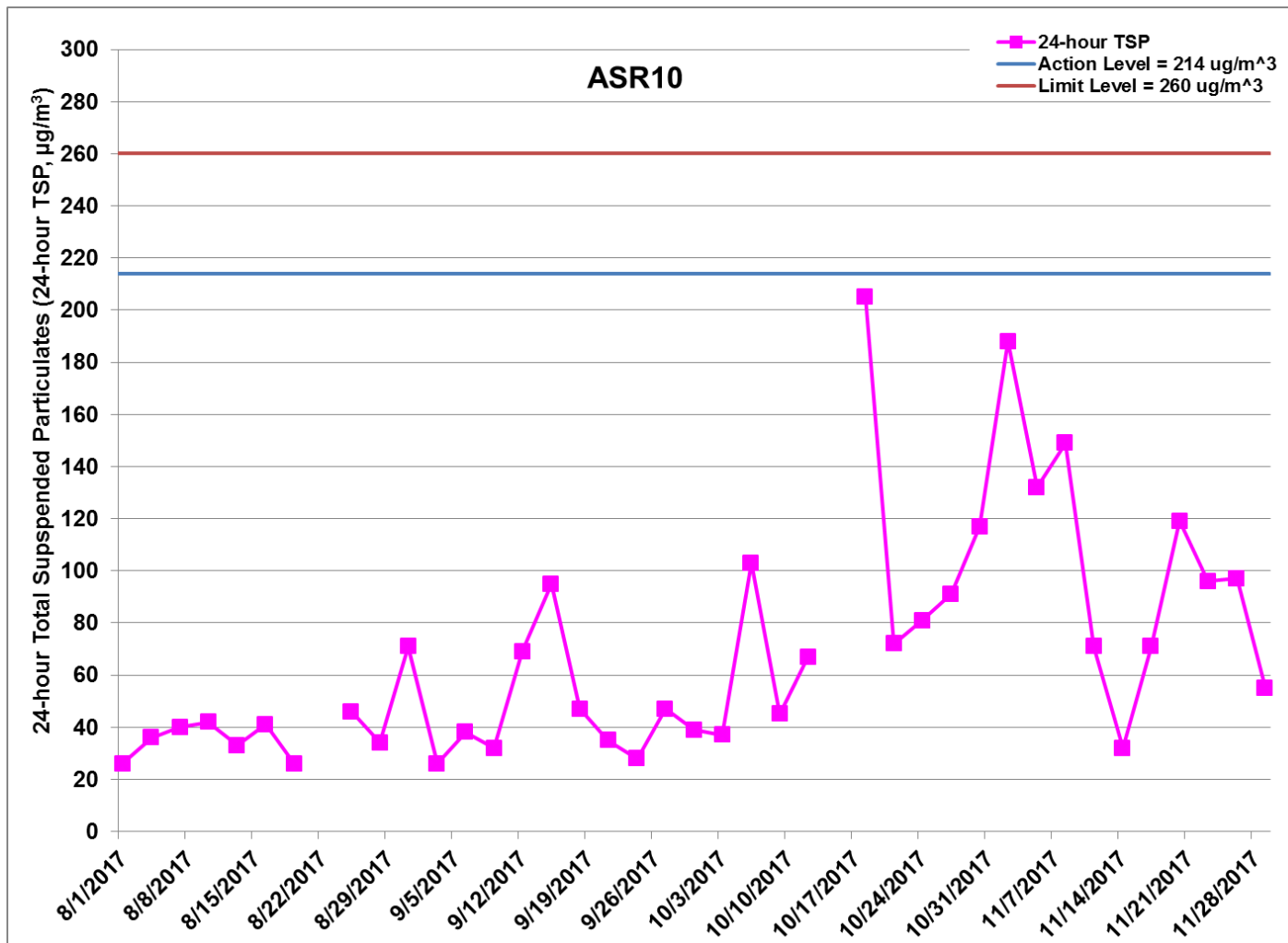


Figure F.10 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 August 2017 and 30 November 2017 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building, Bulk Excavation and Phase 2 Surcharge Removal (1/8/2017 - 30/11/2017) Ref: 0212330_Impact AQM graphs_November 2017_REV a.xlsx



Appendix G

Impact Water Quality Monitoring Results

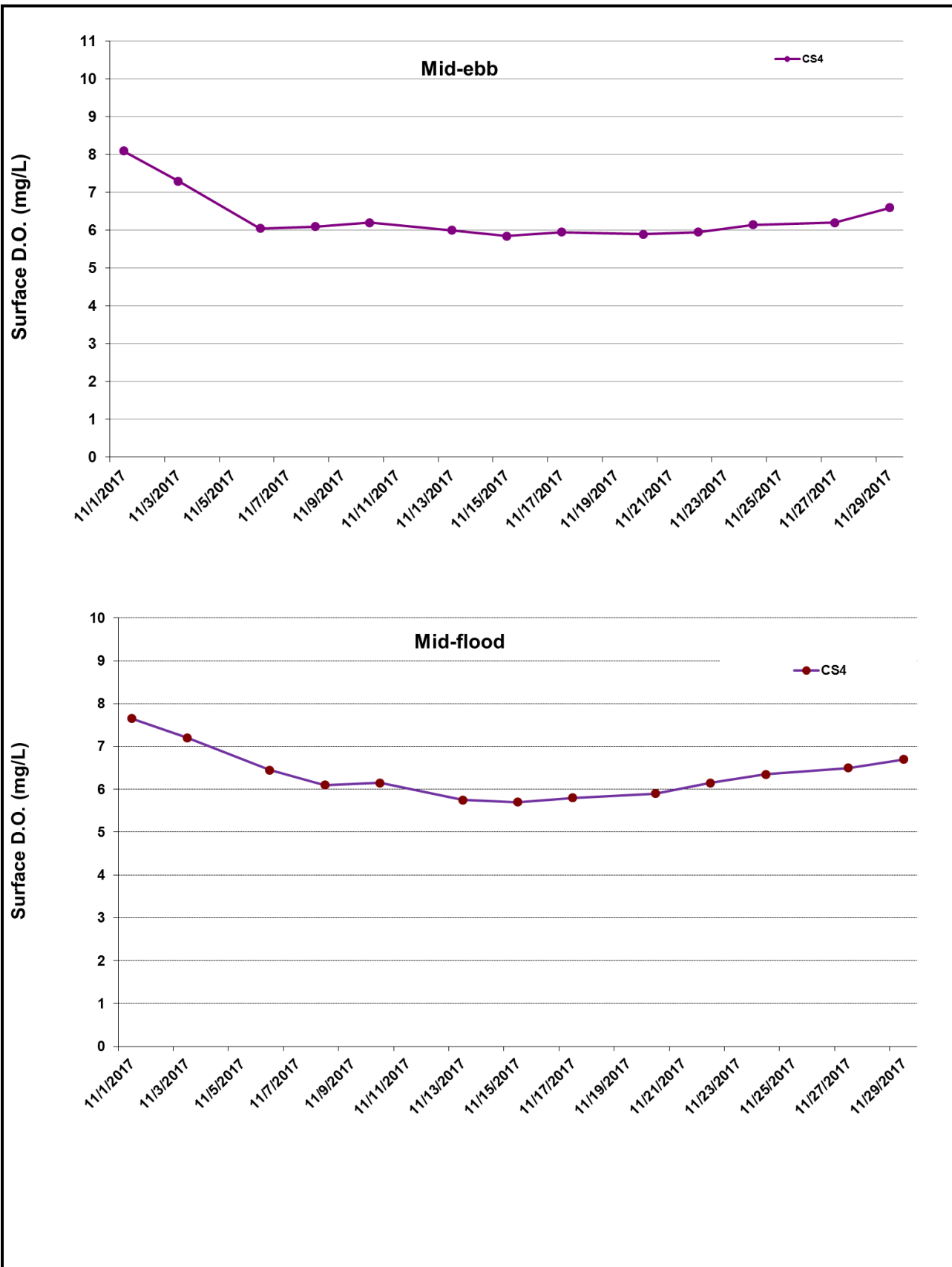


Figure I1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

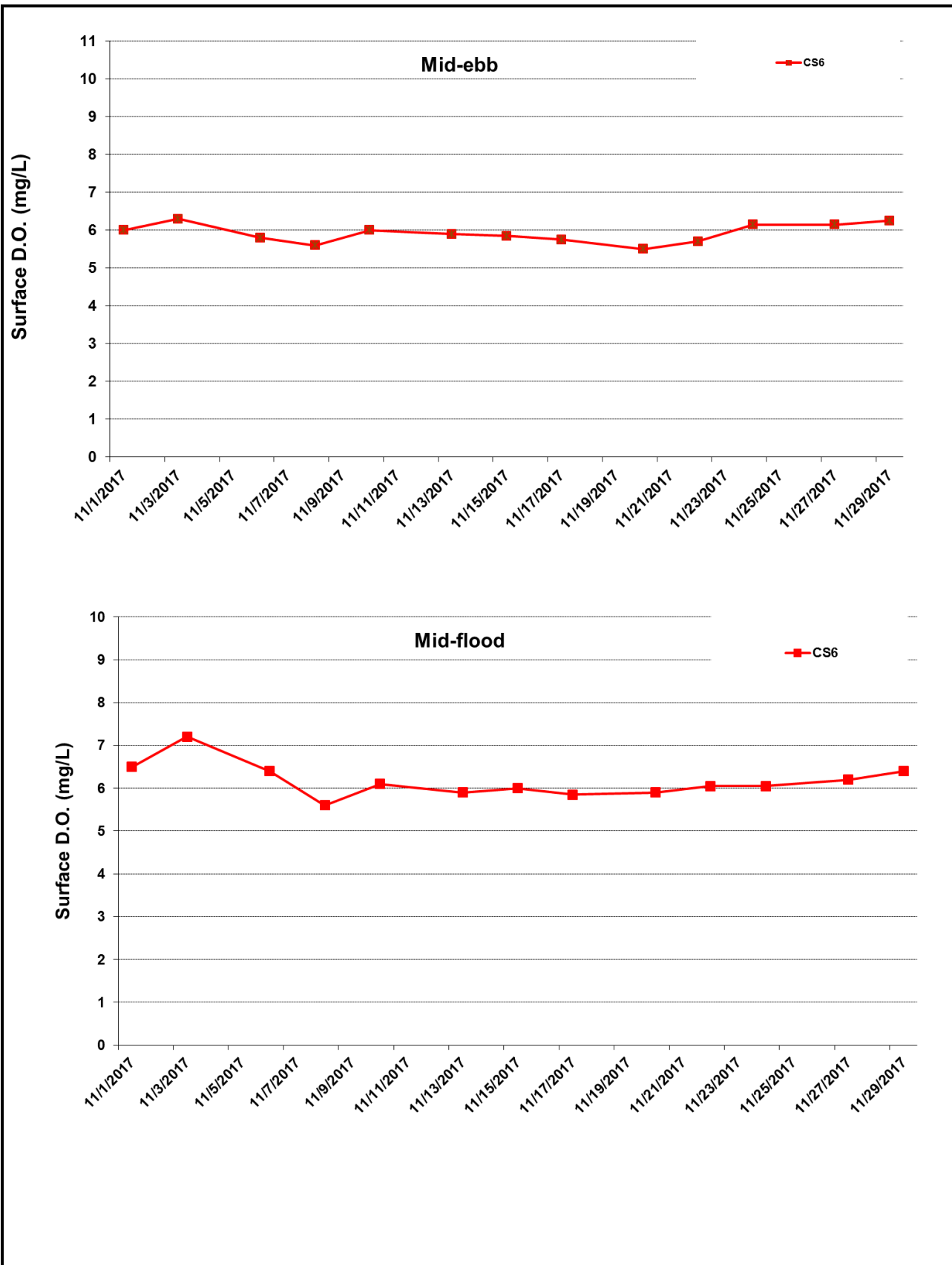


Figure I2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

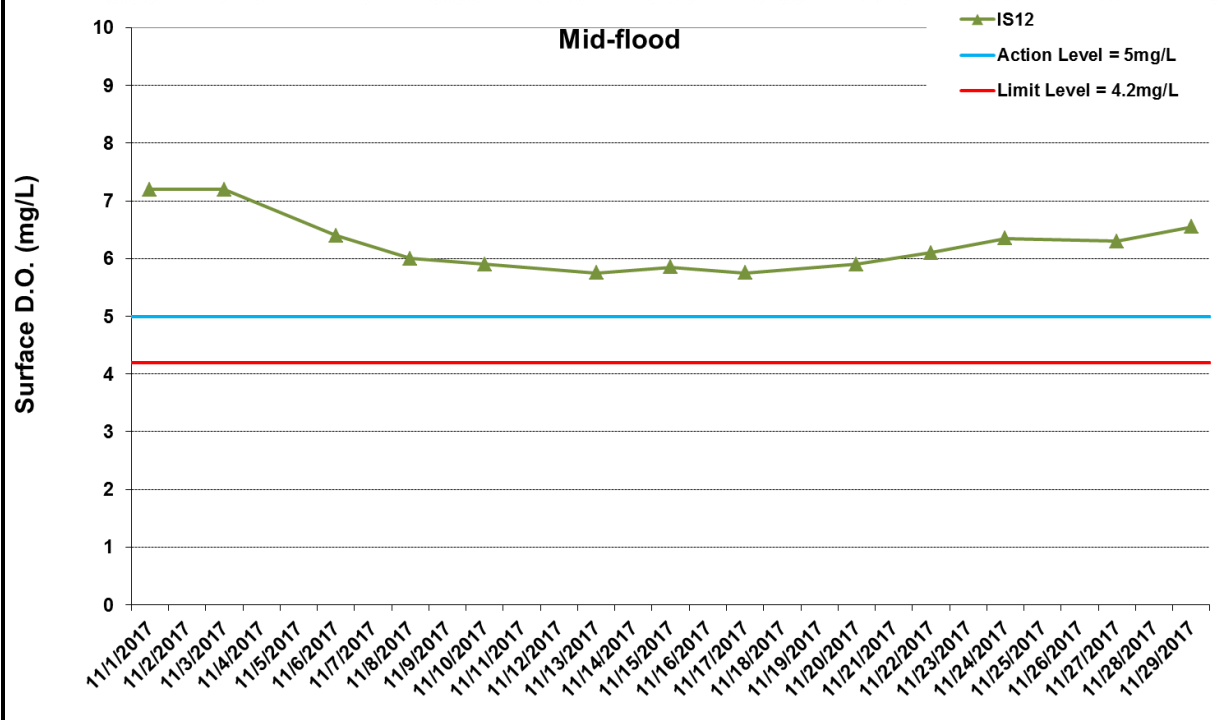
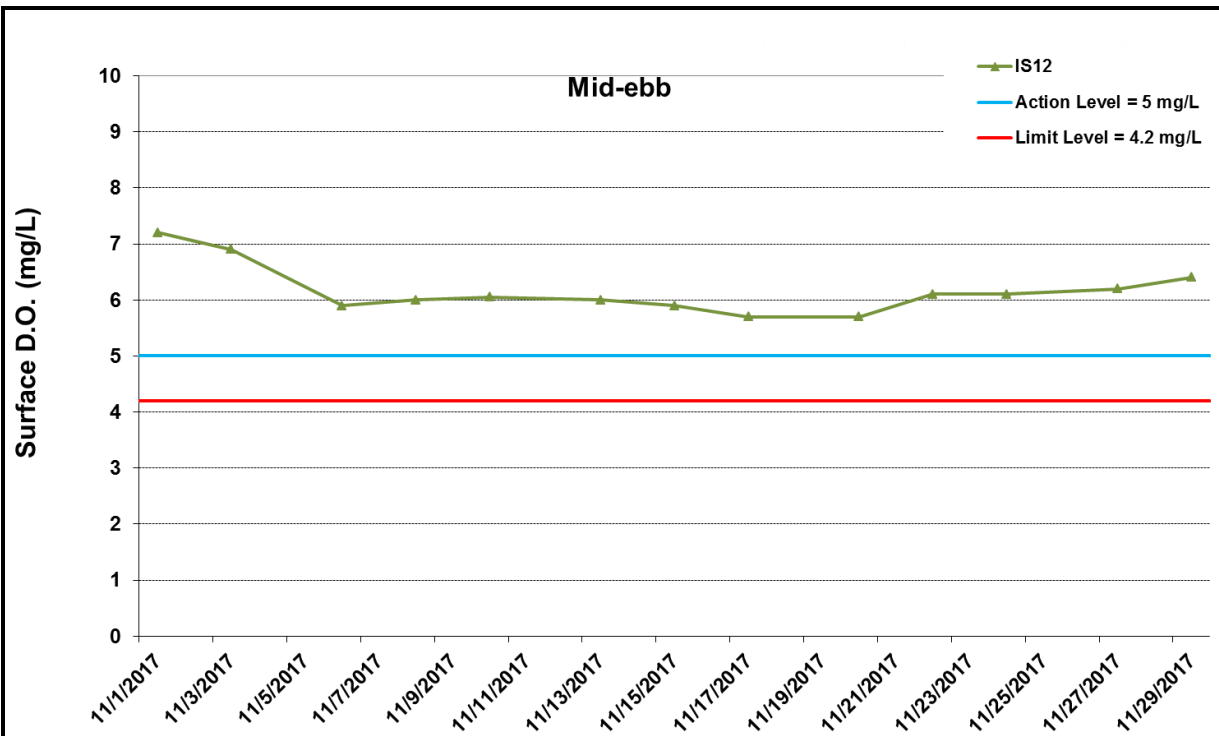


Figure I3 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

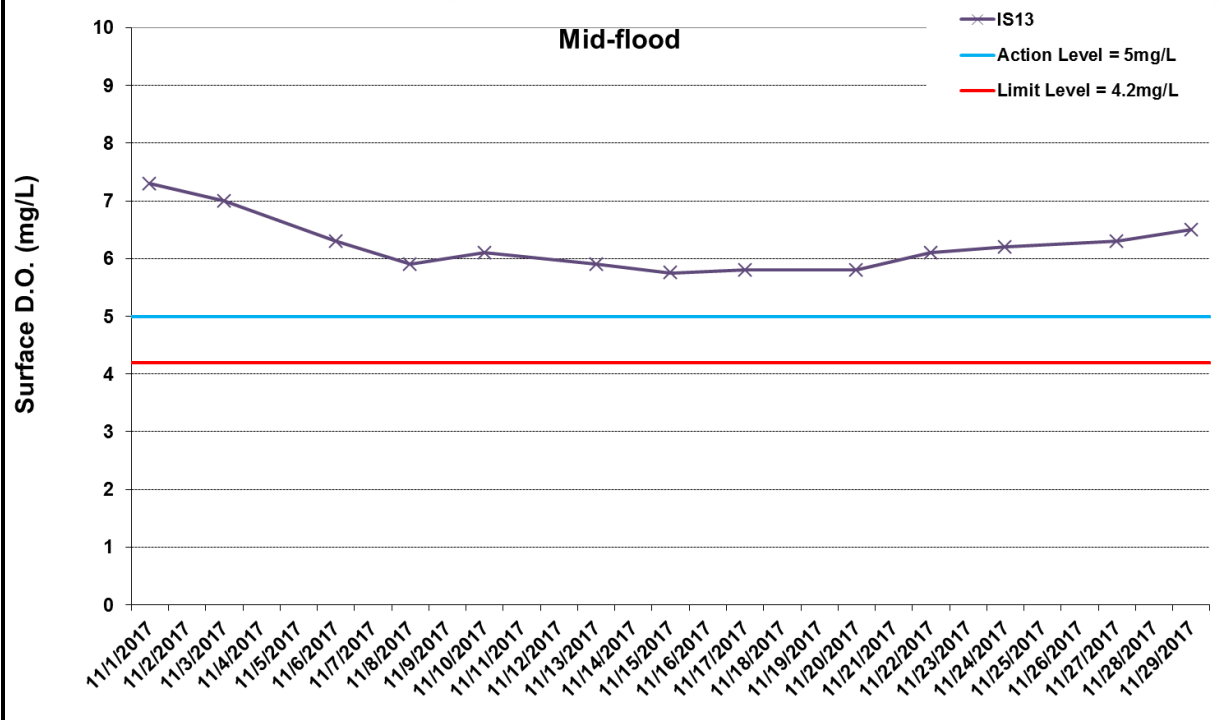
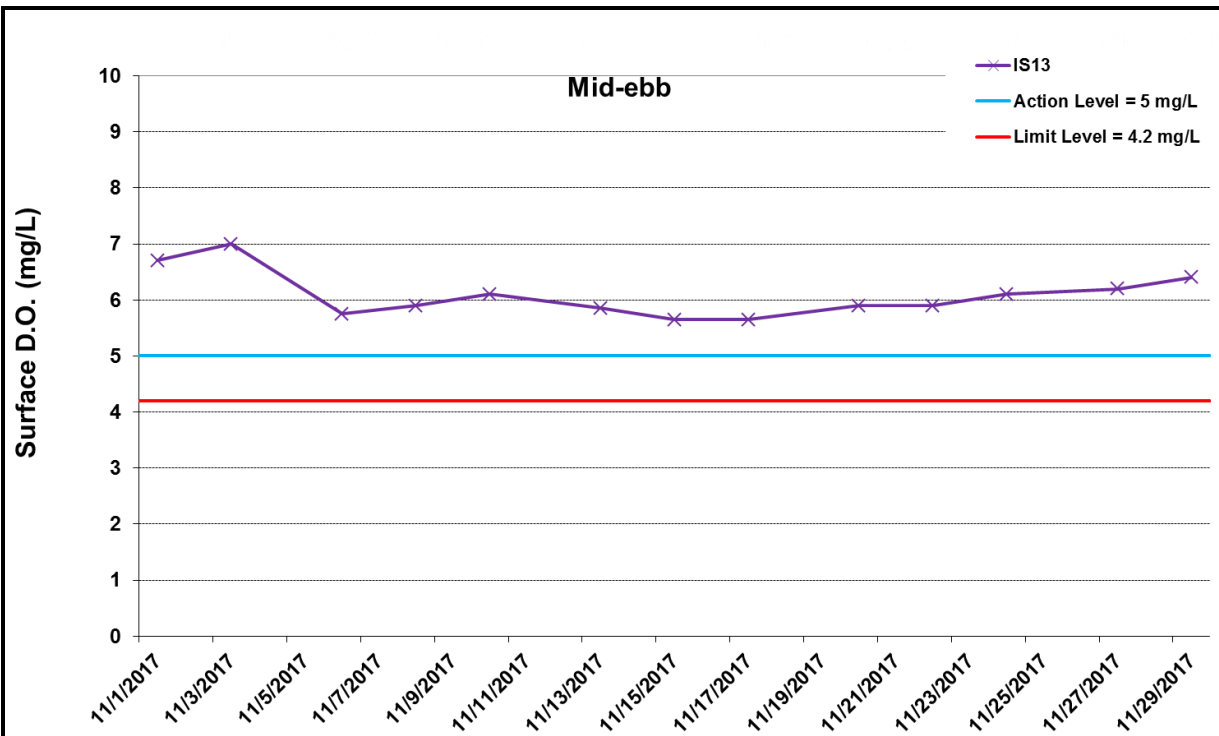


Figure I4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

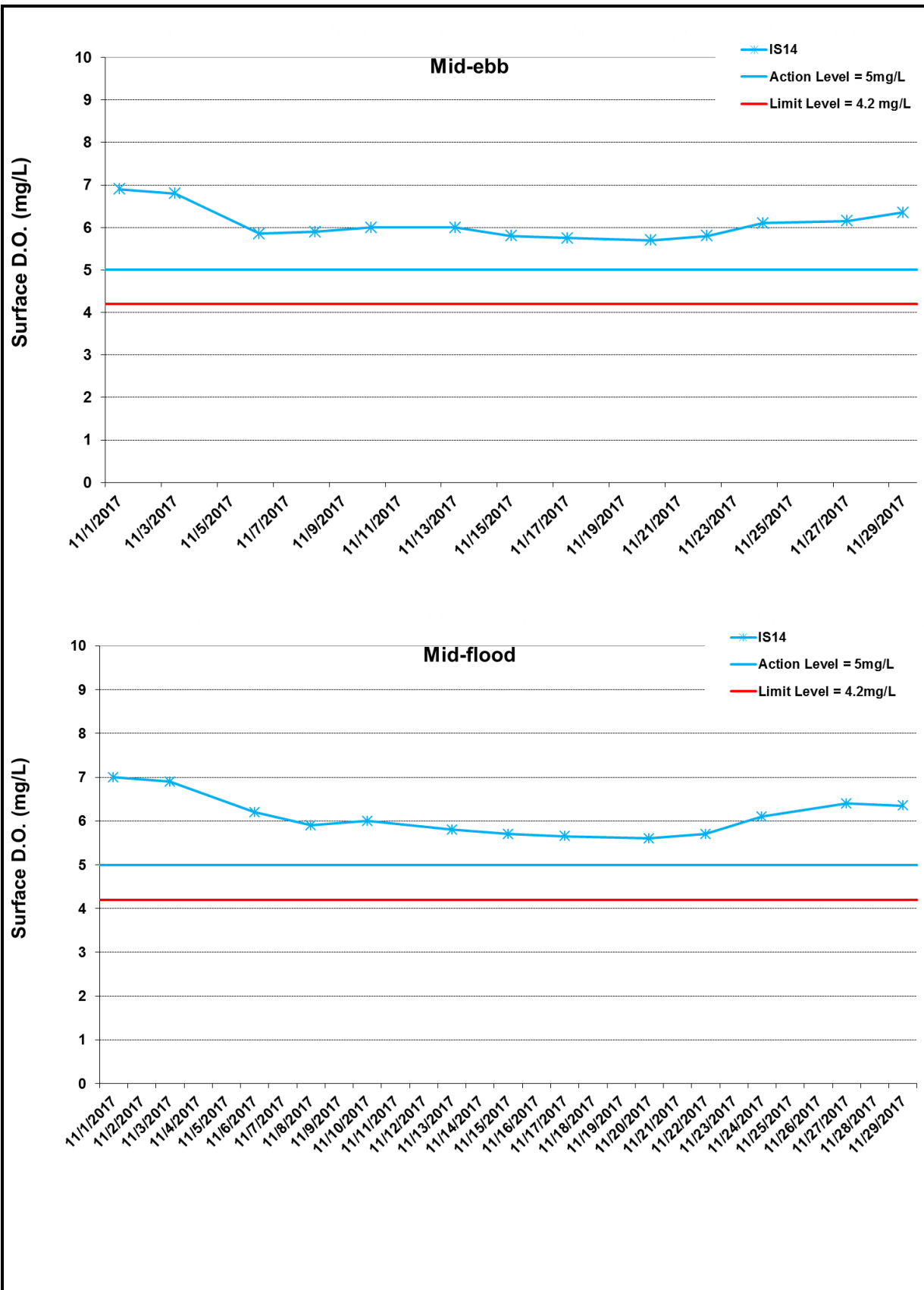


Figure I5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

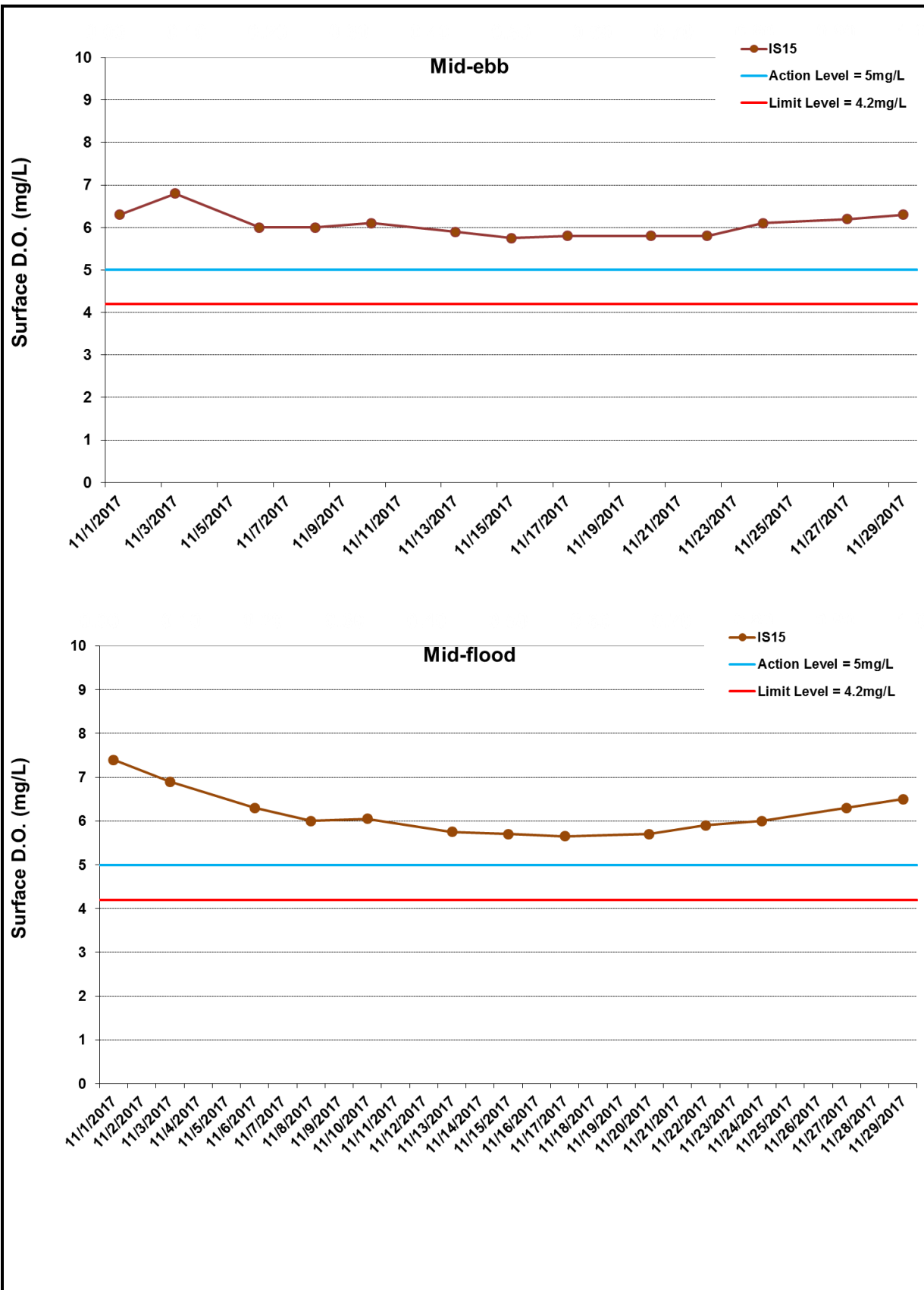


Figure I6 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

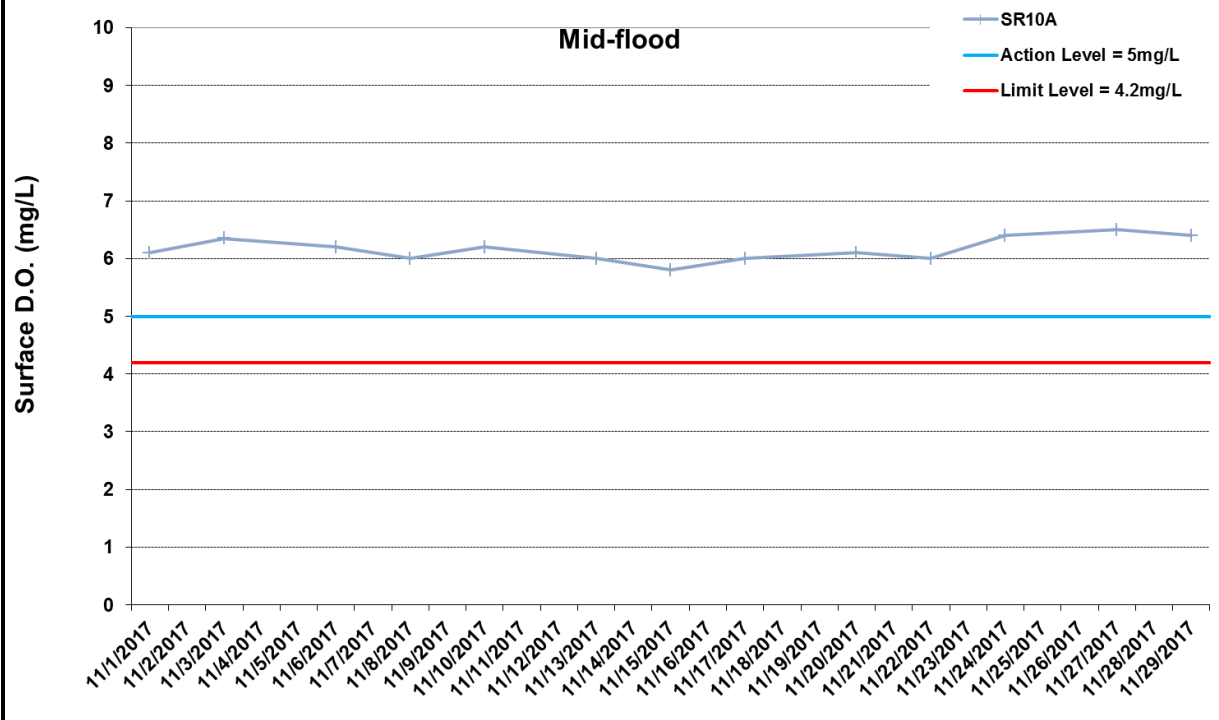
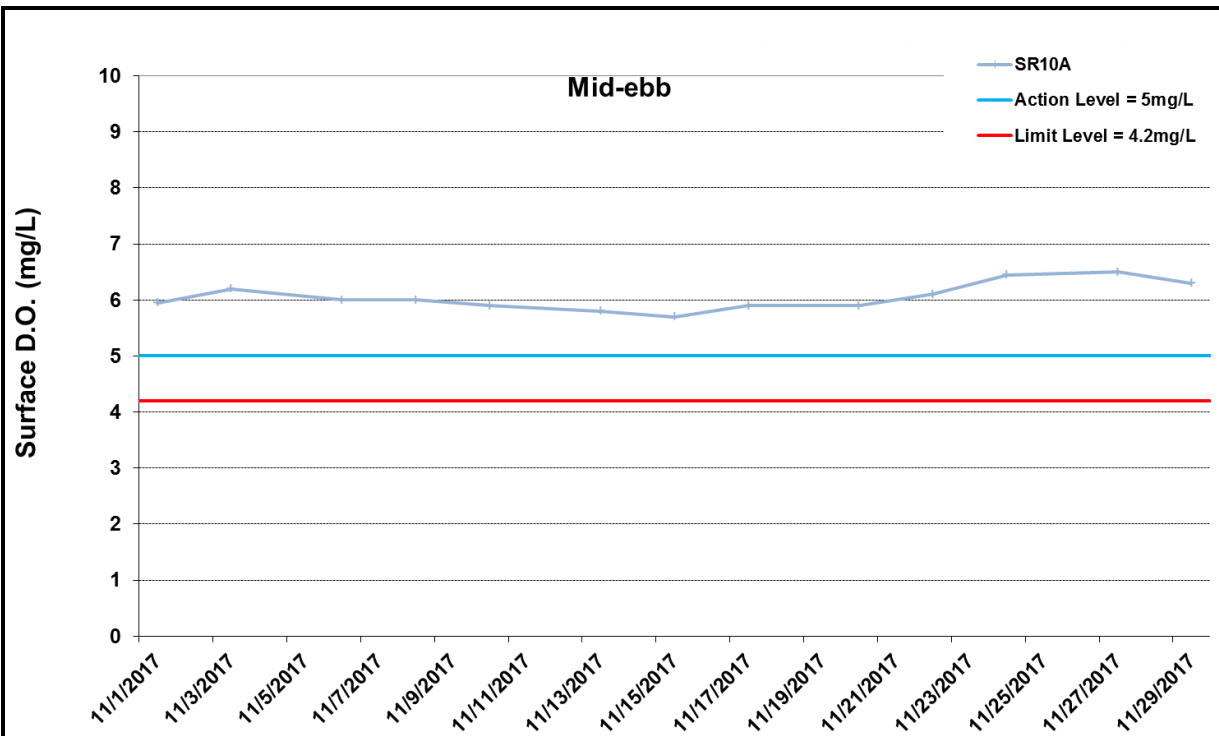


Figure I7 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

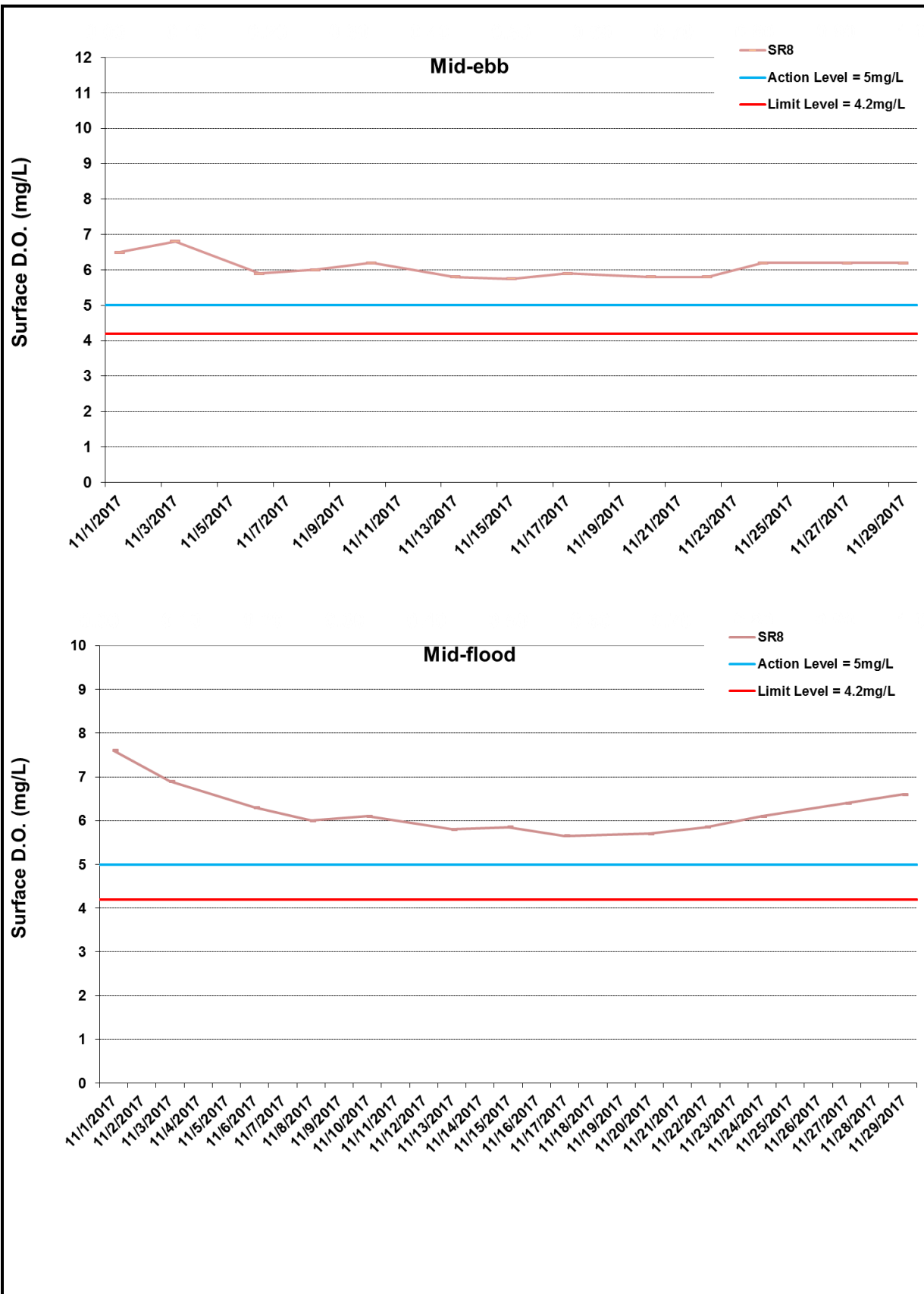


Figure I8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

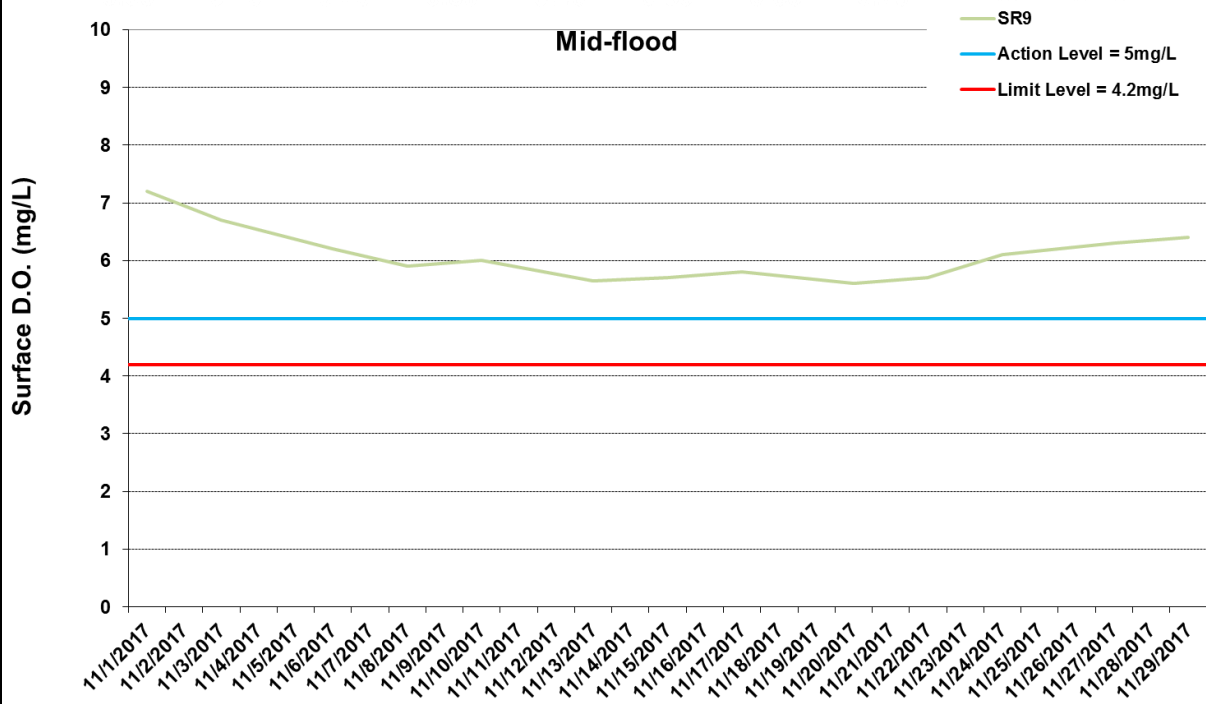
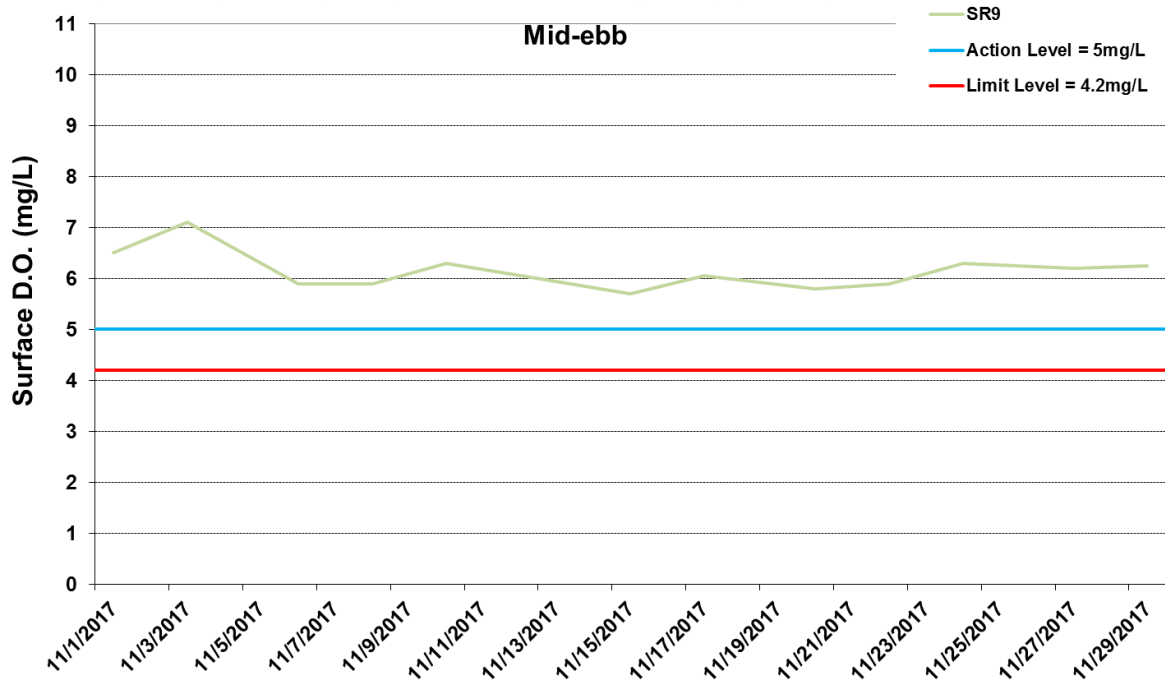
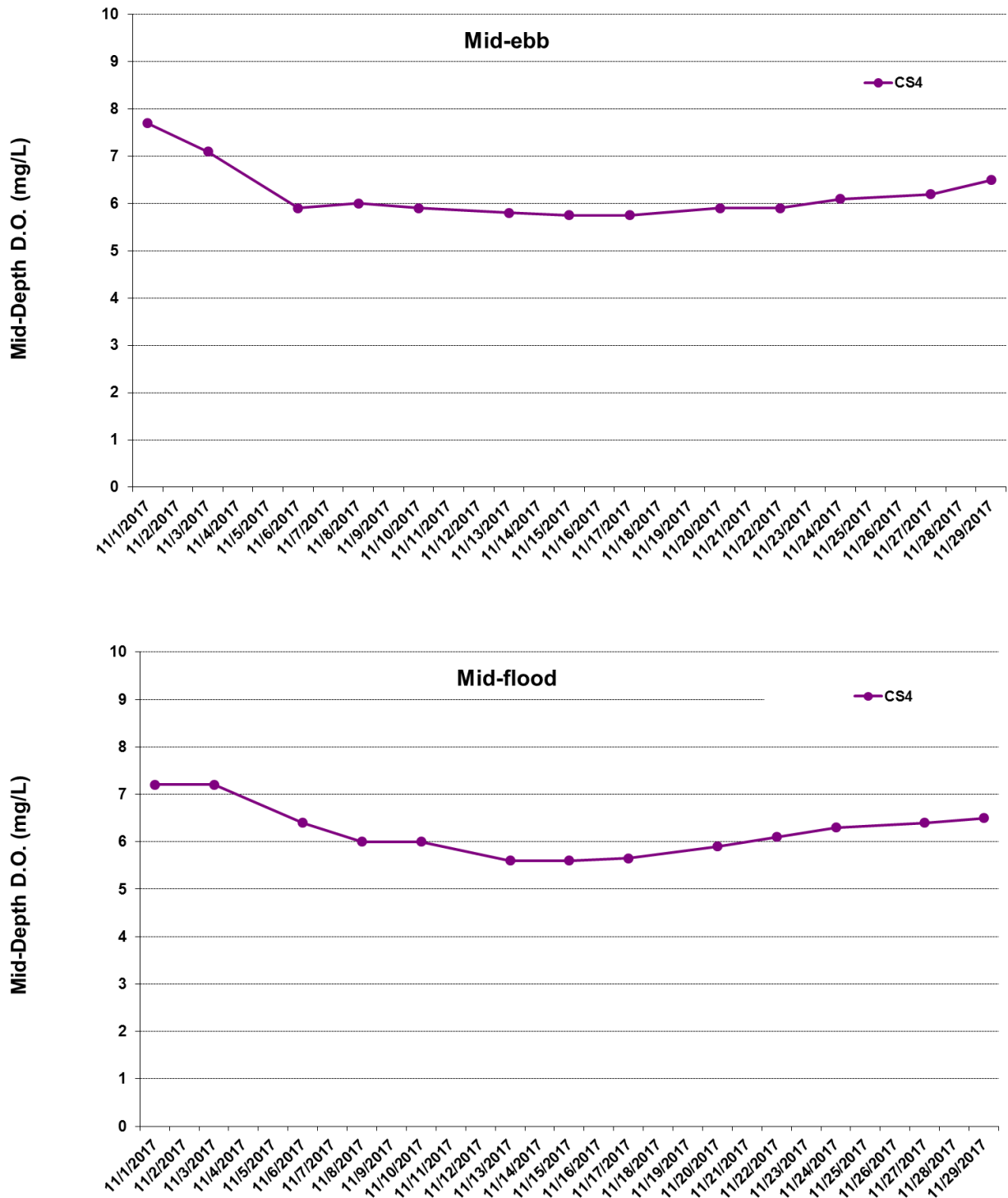


Figure I9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2017 and 30 November 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).

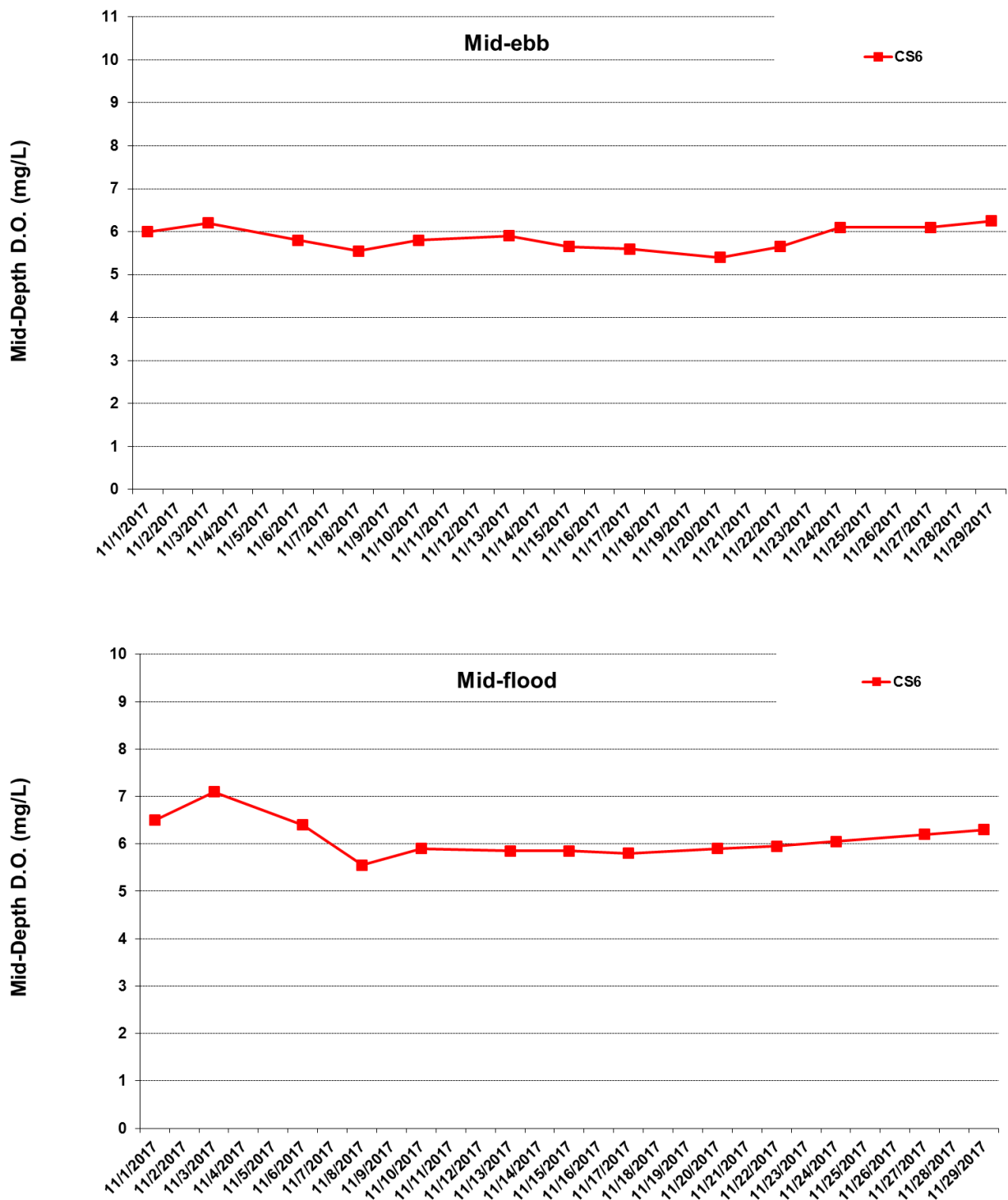




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I10 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2017 and 30 November 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).

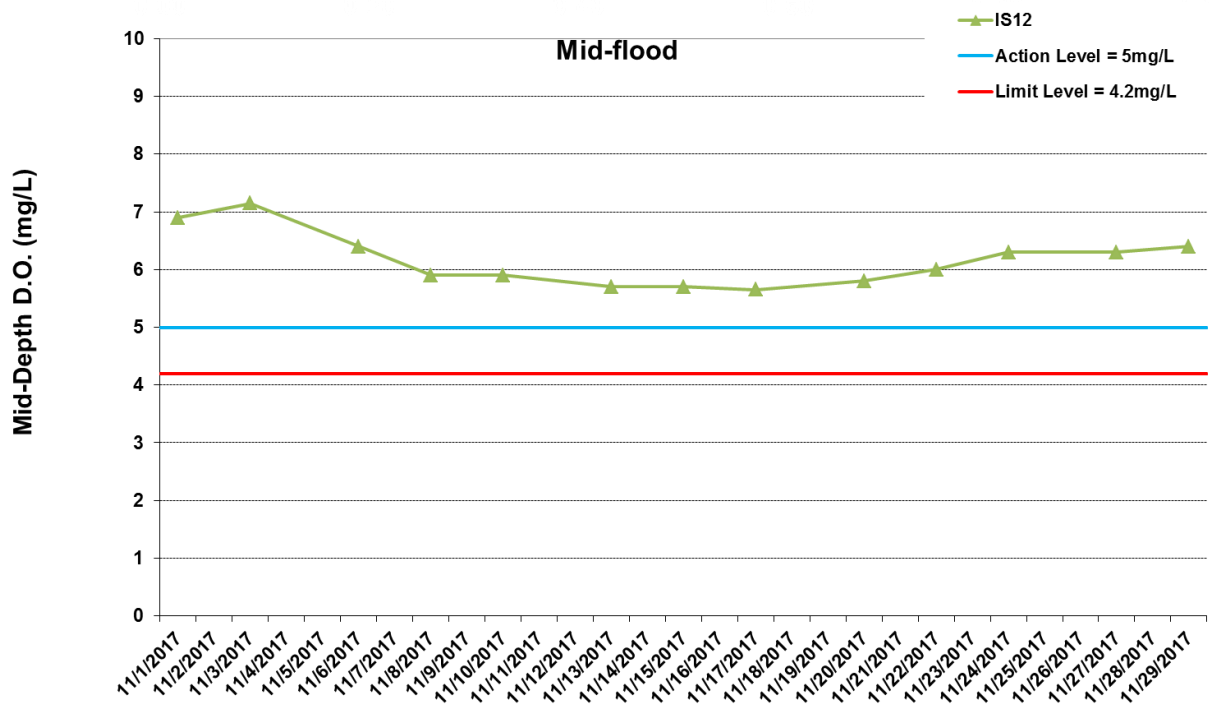
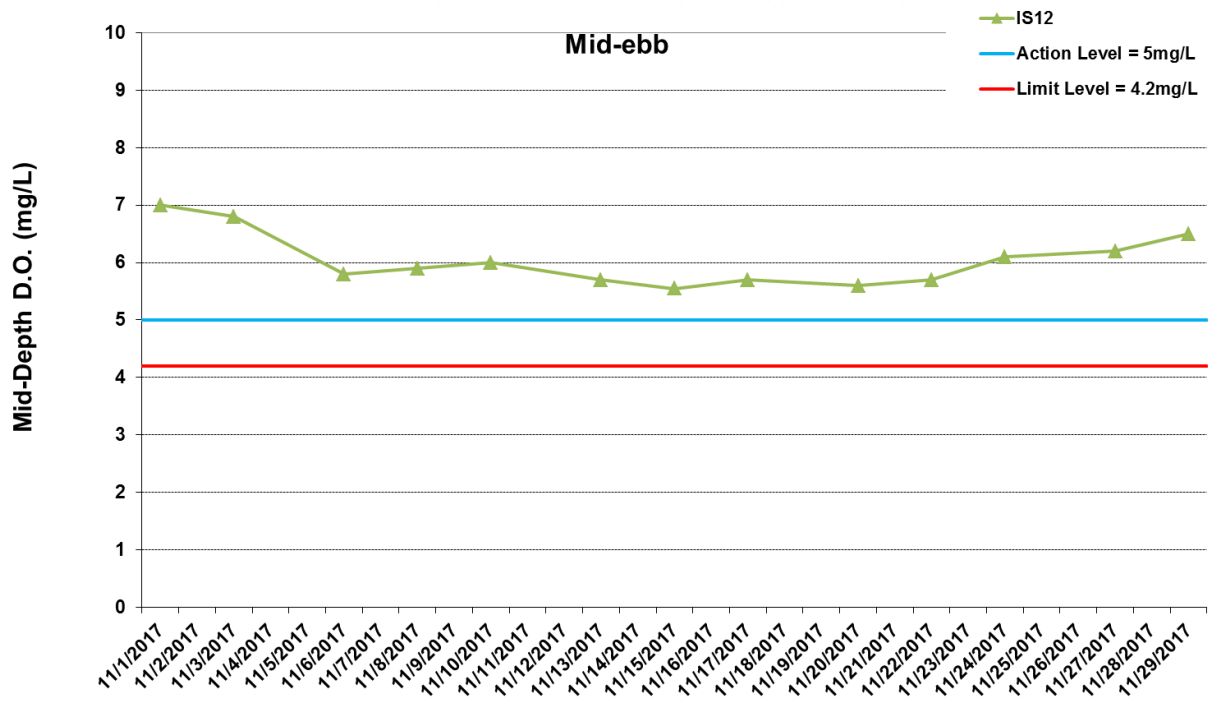




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I11 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2017 and 30 November 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).

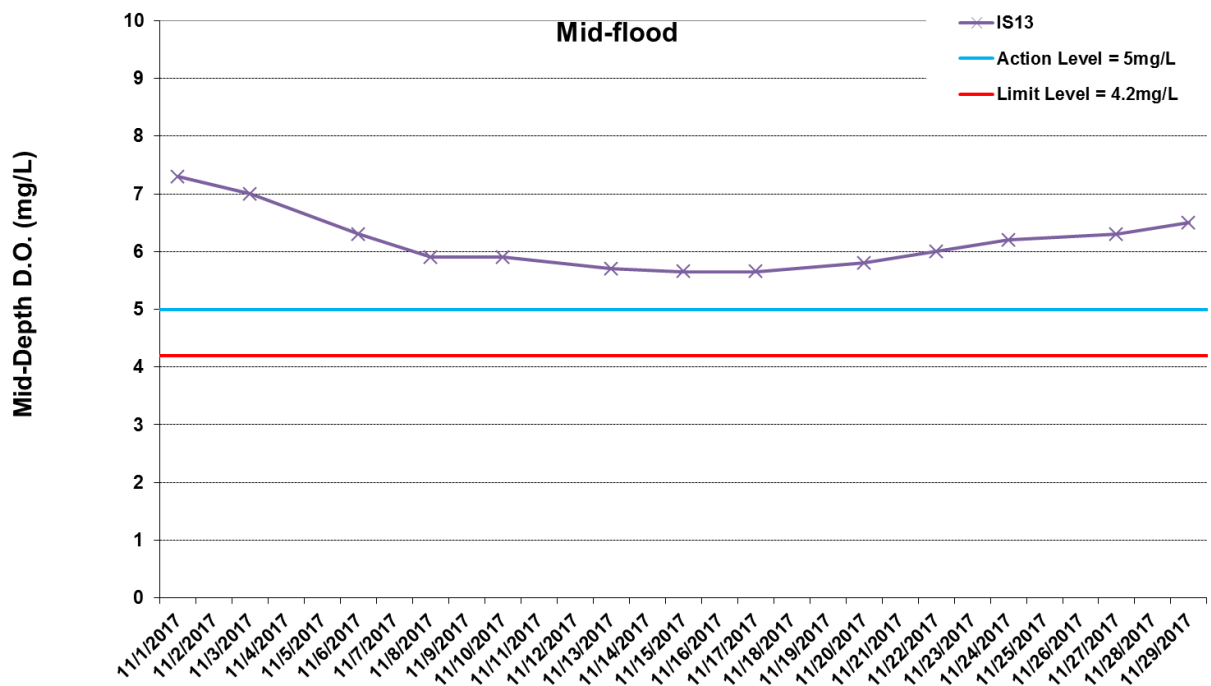
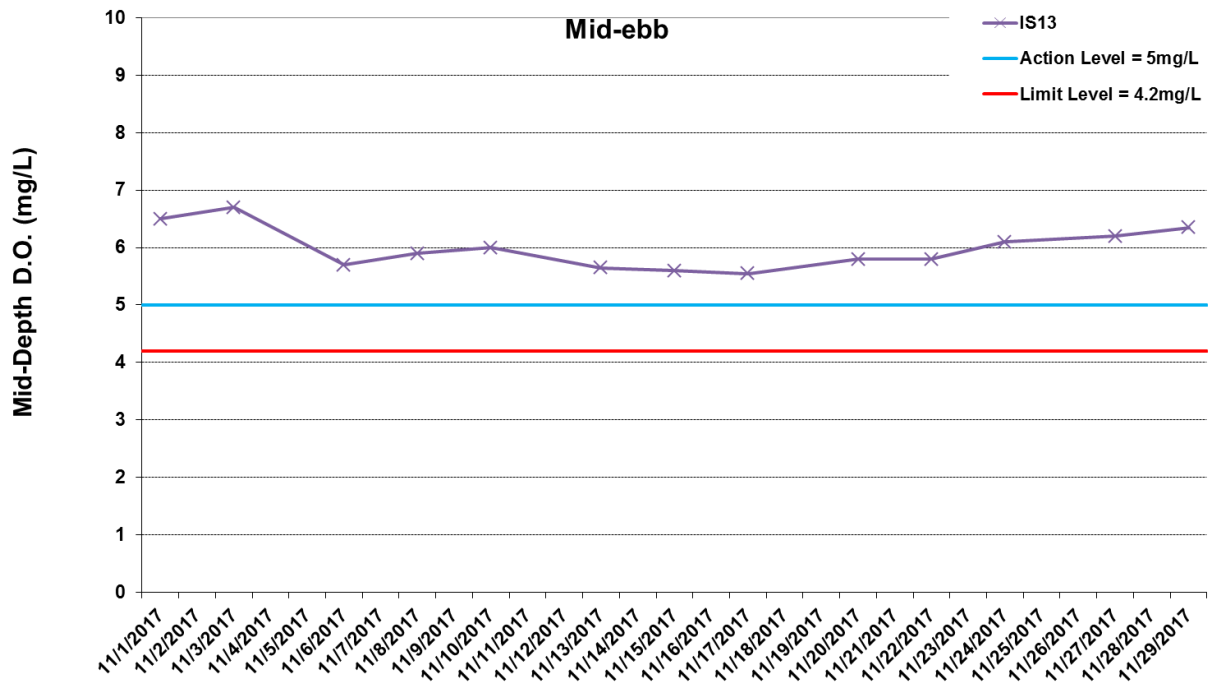




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2017 and 30 November 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).

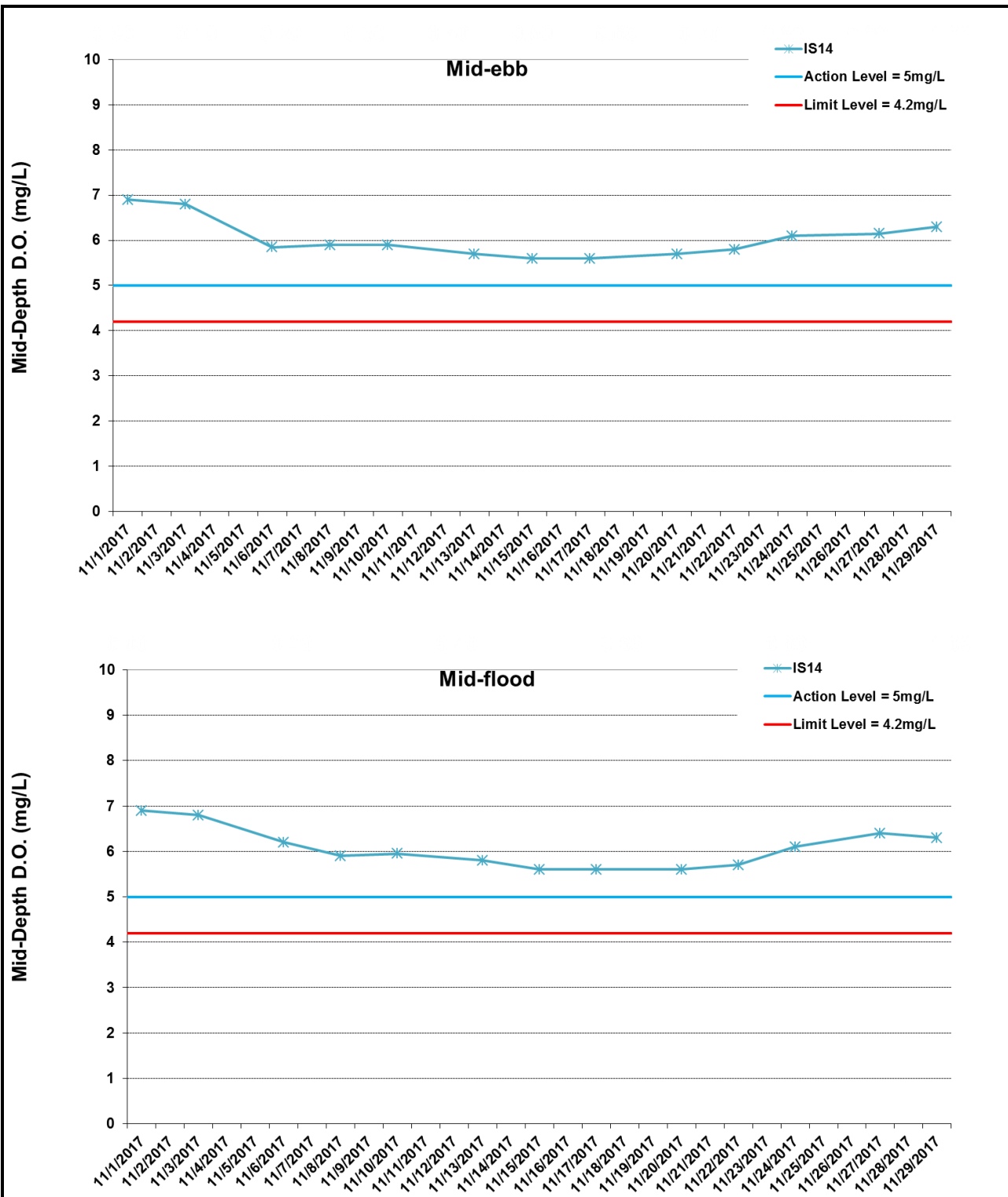




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2017 and 30 November 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).

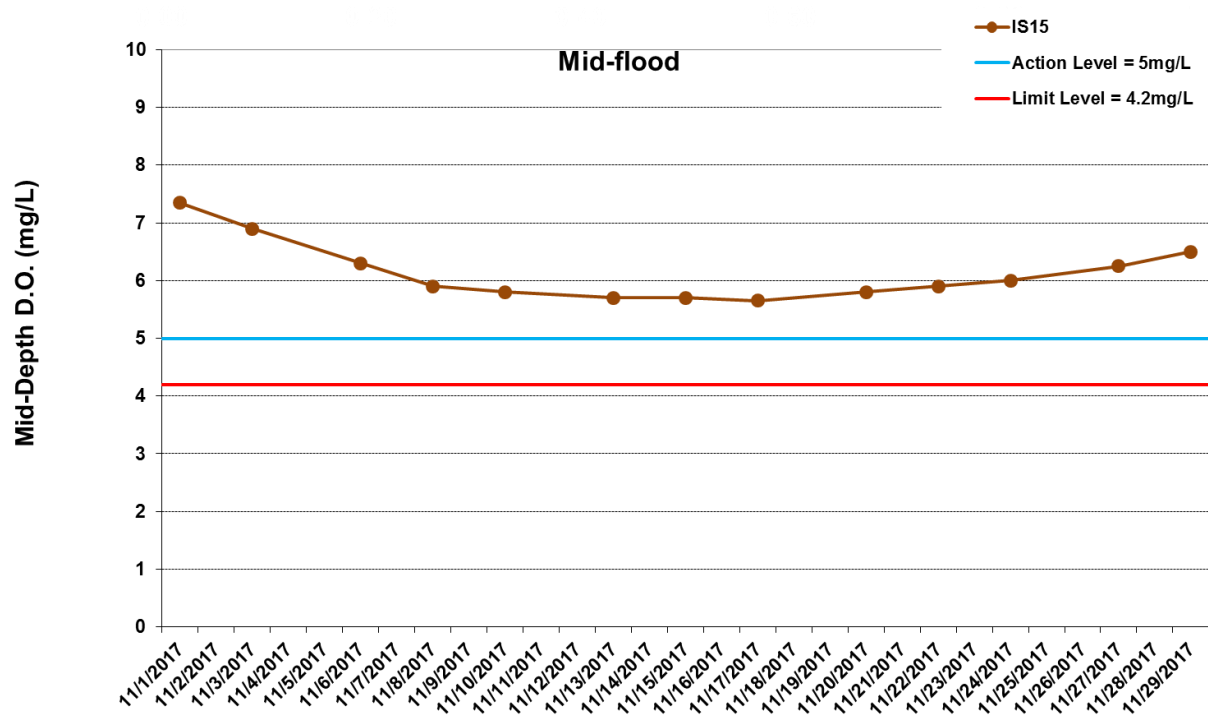
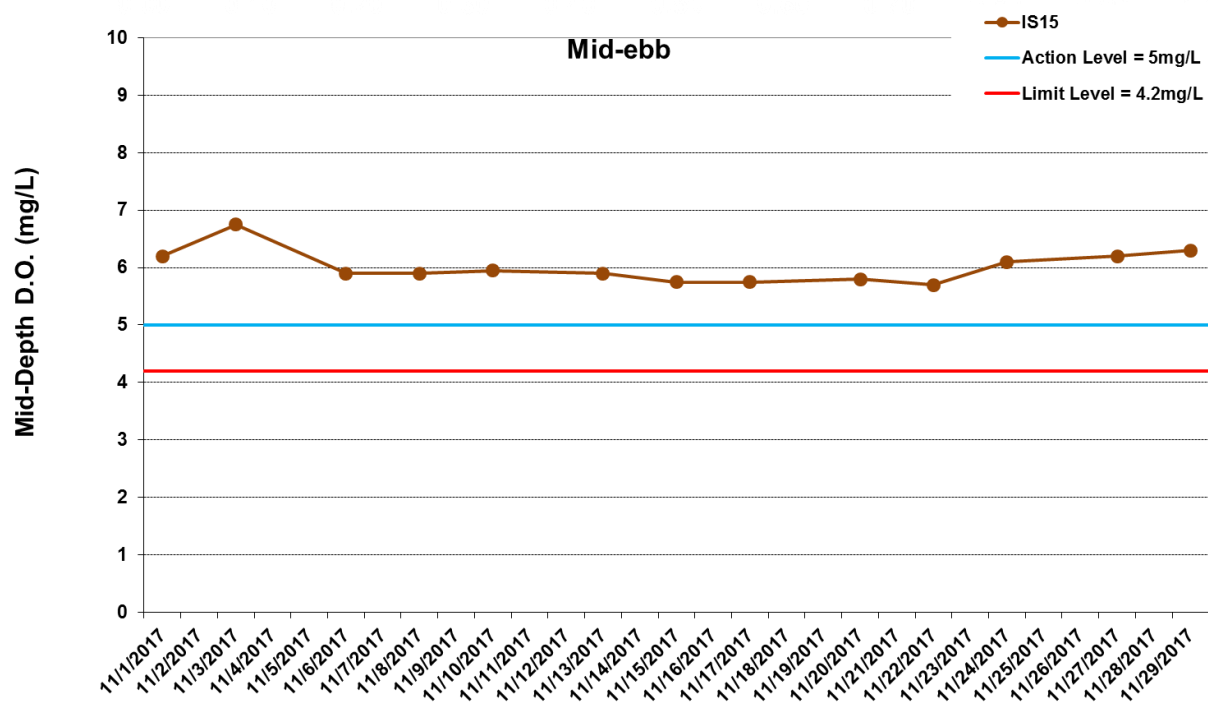




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2017 and 30 November 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).

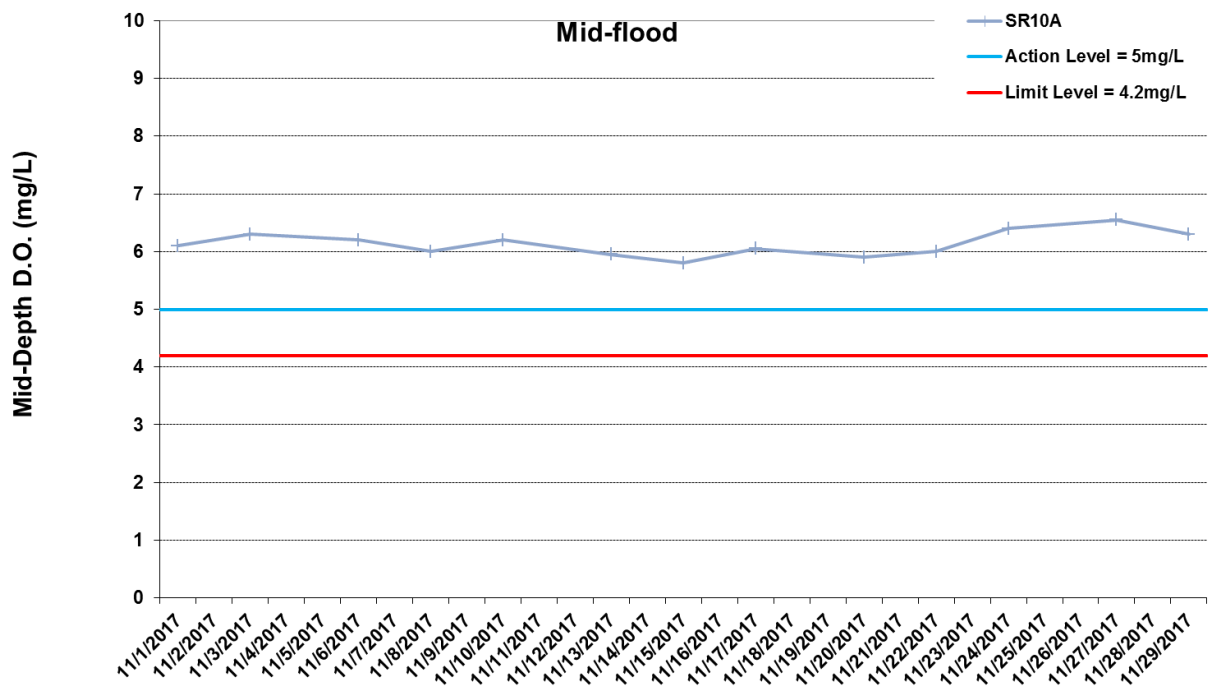
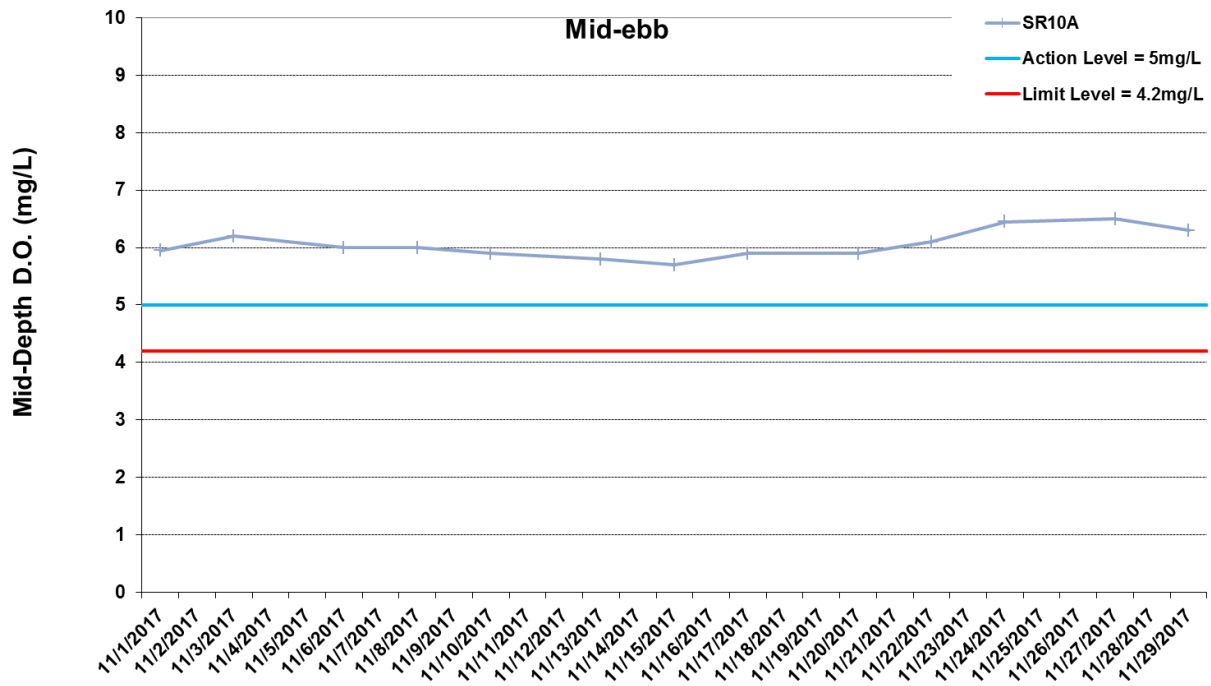




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure I15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2017 and 30 November 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).





*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 1 November 2017 and 30 November 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



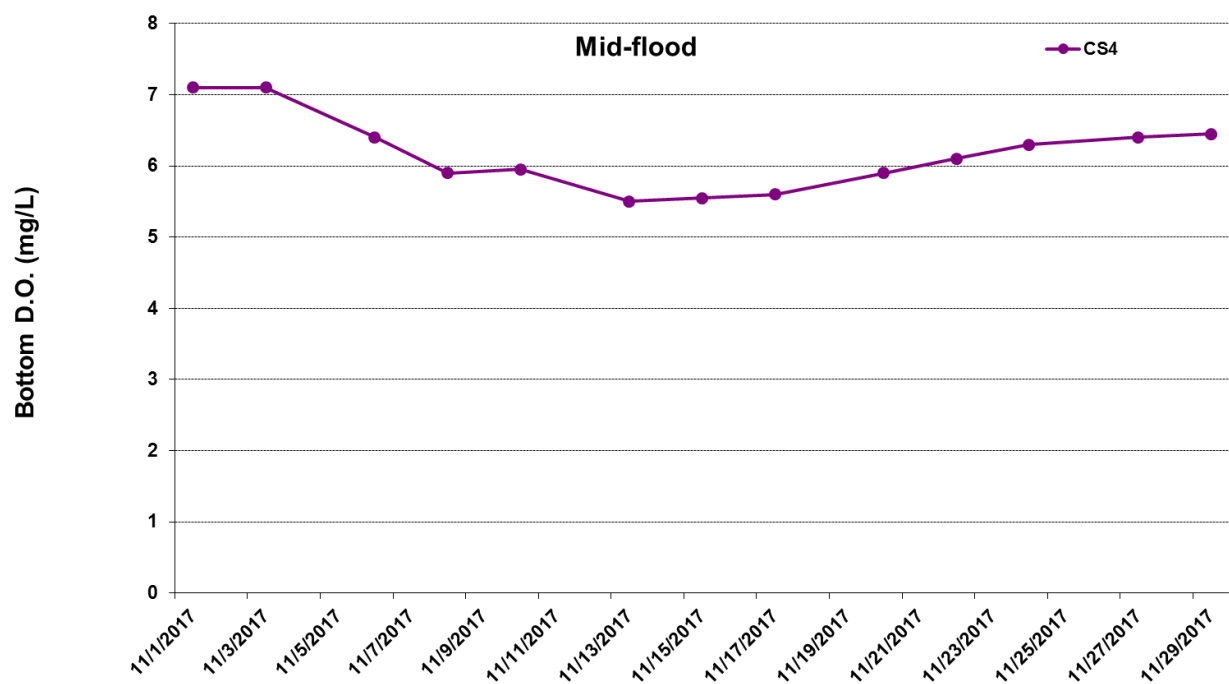
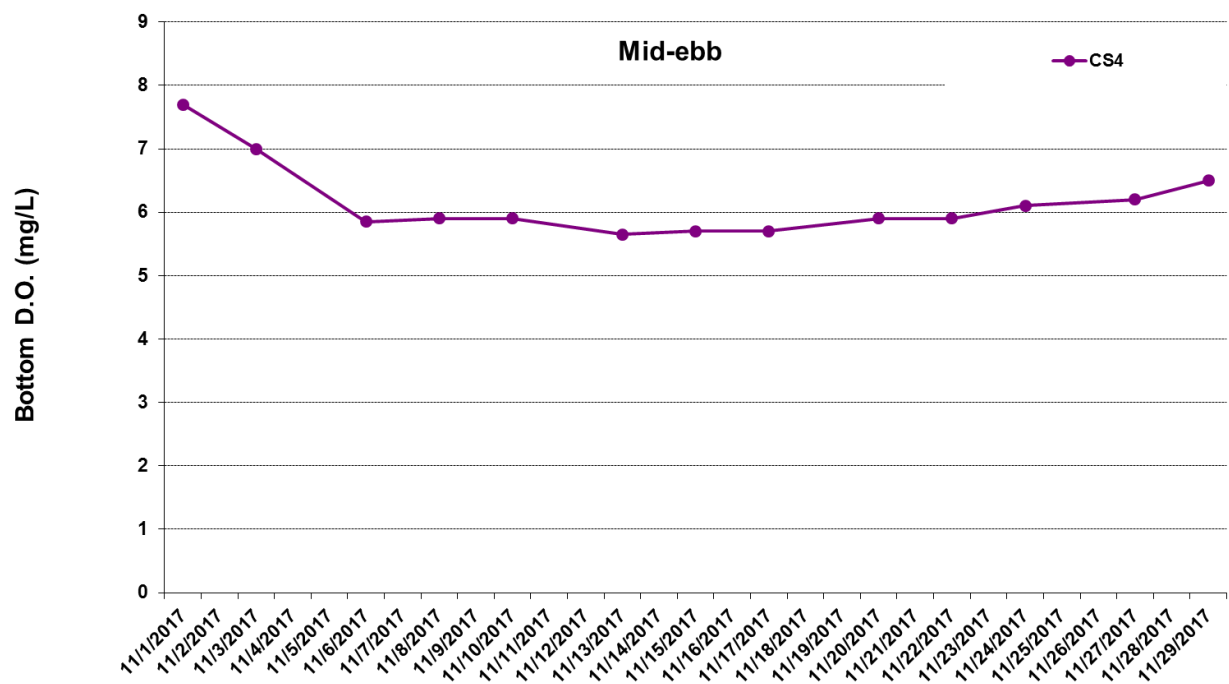


Figure I17 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



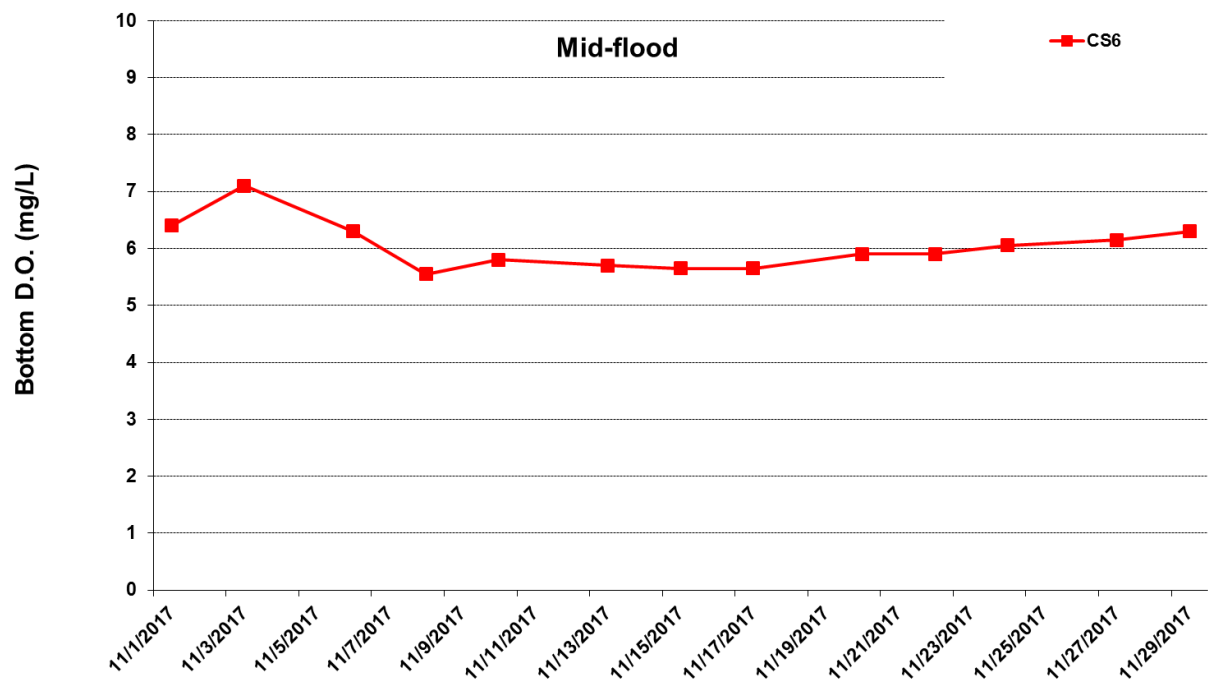
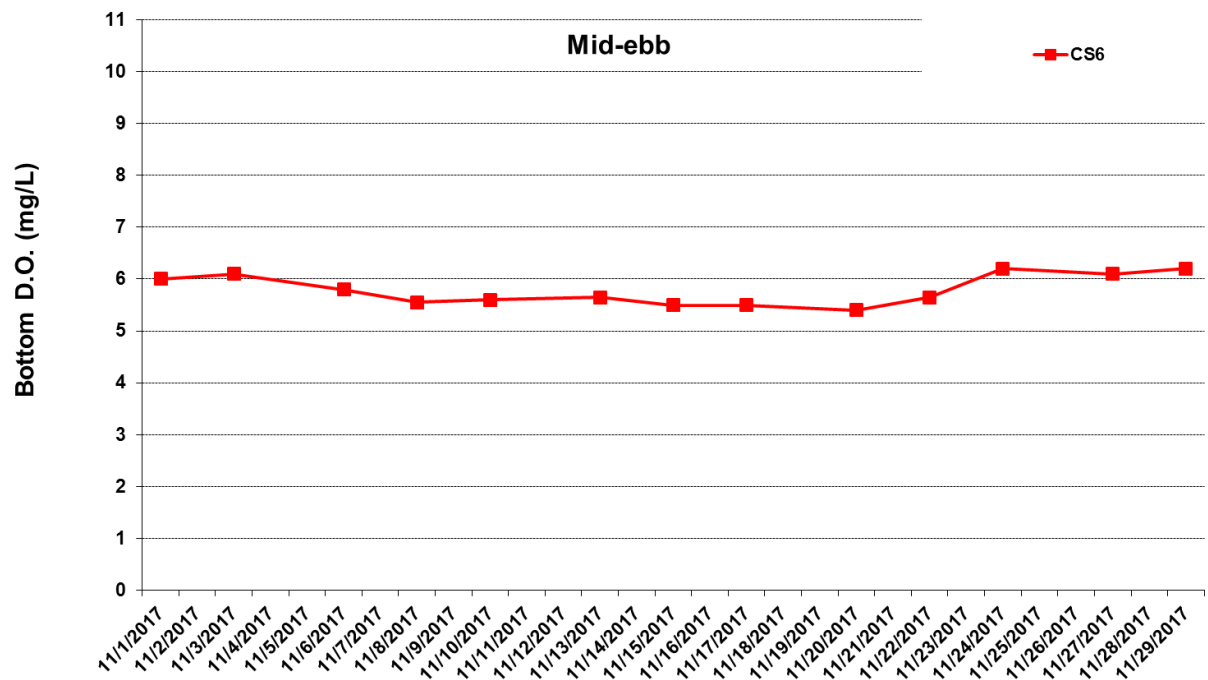


Figure I18 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



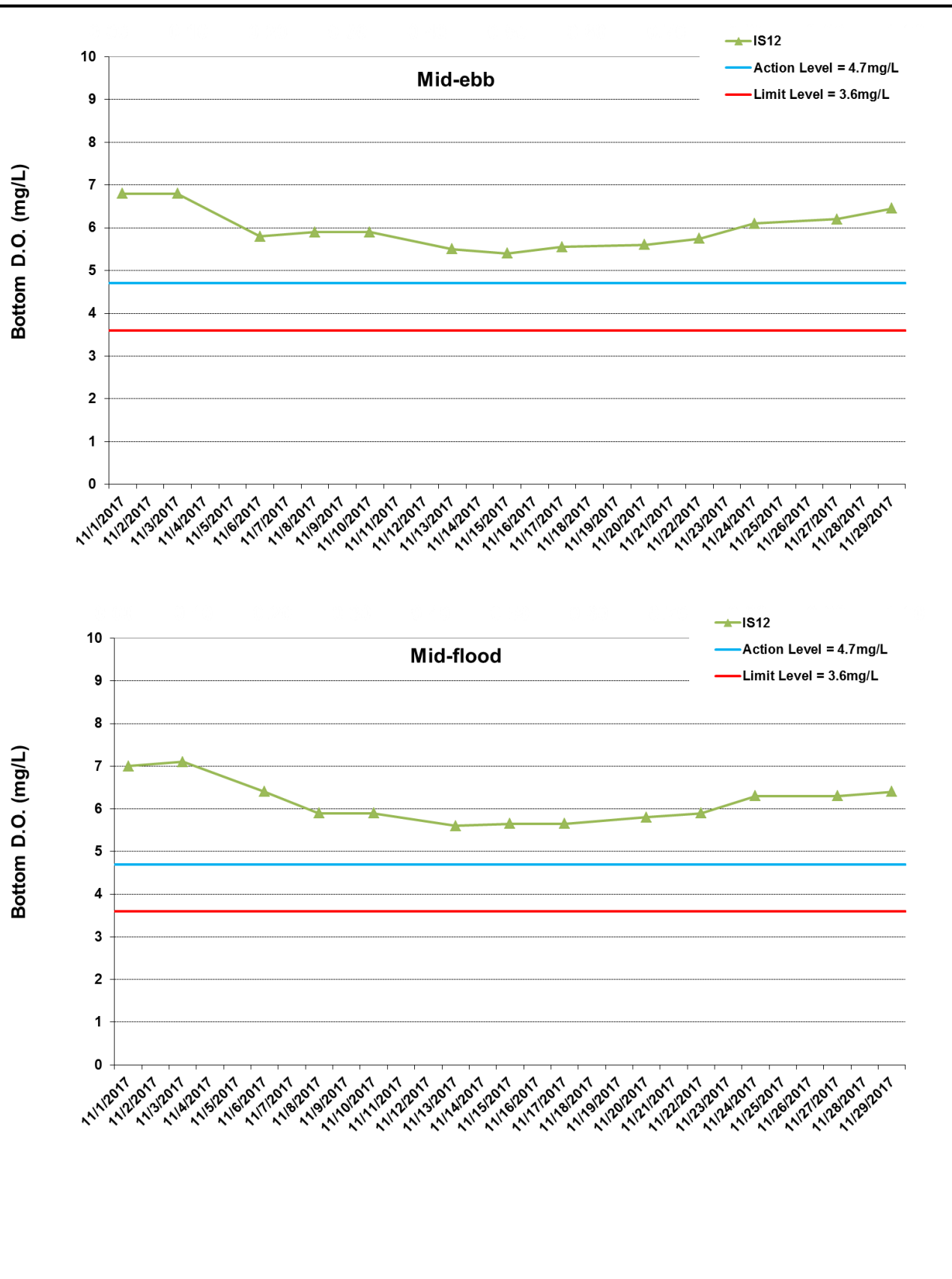


Figure I19 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



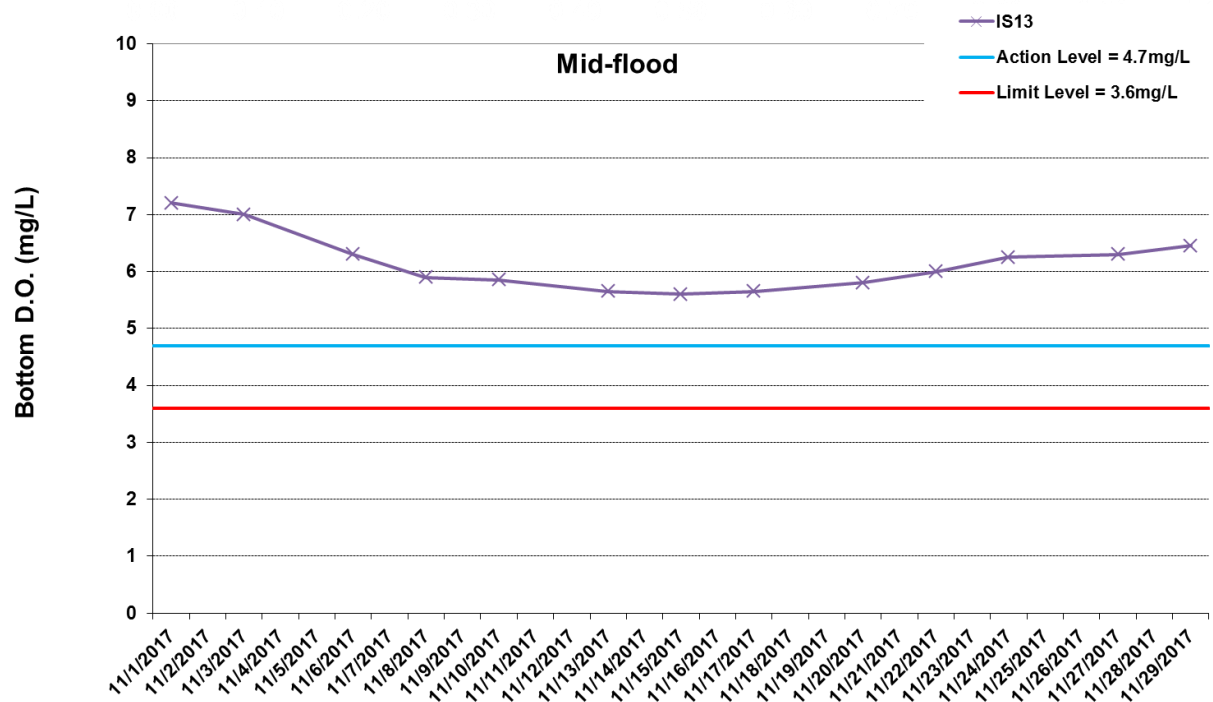
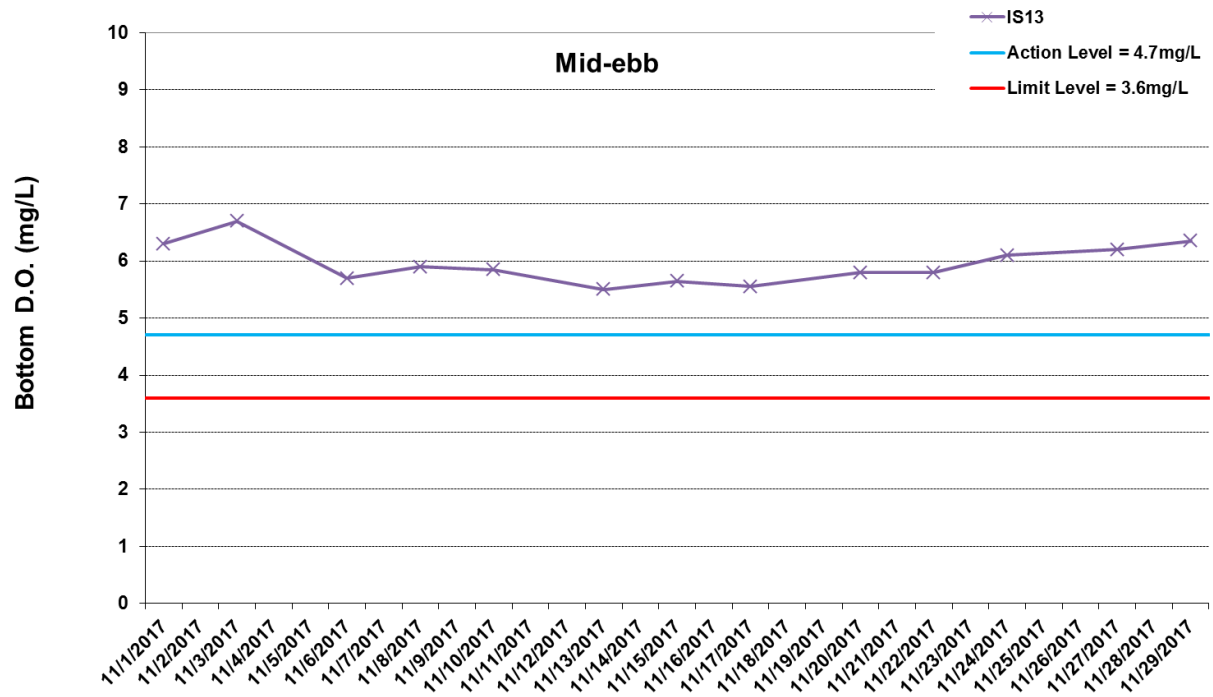


Figure I20 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



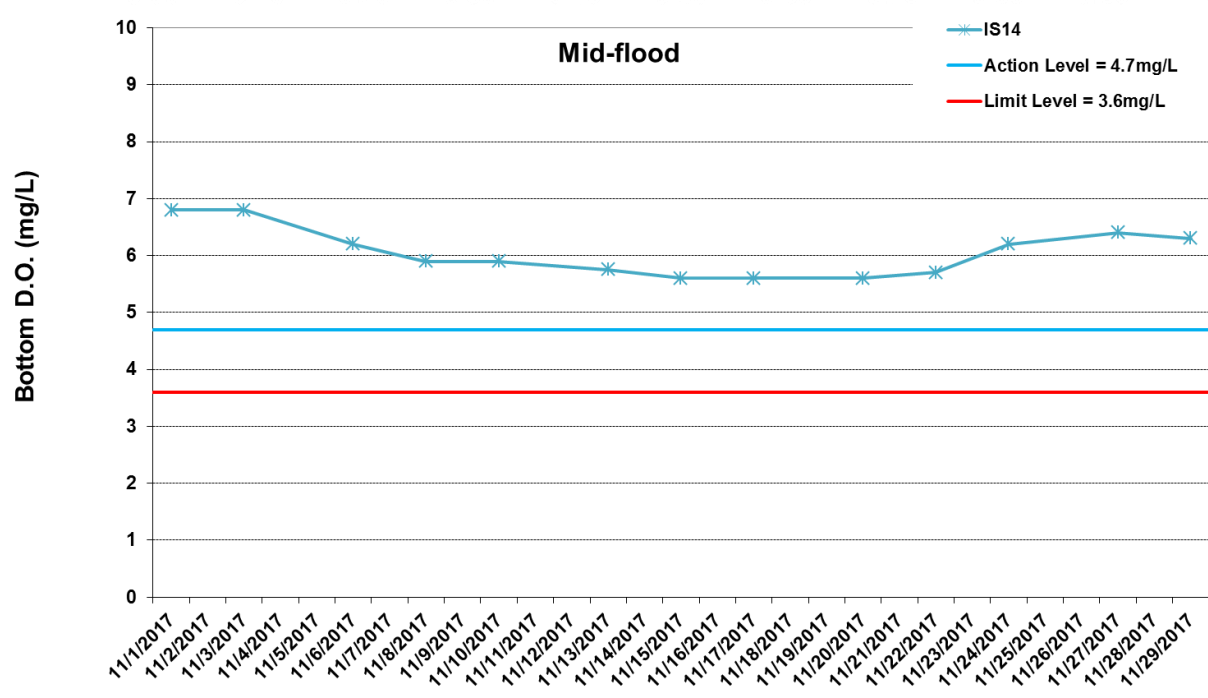
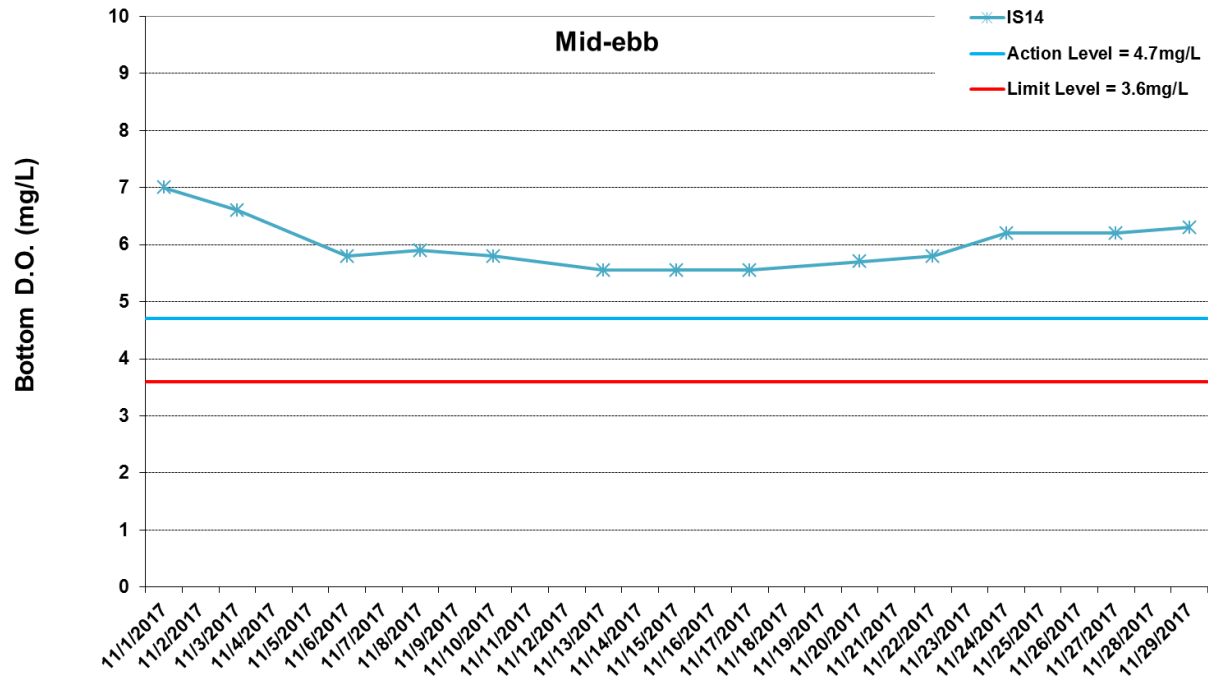


Figure I21 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



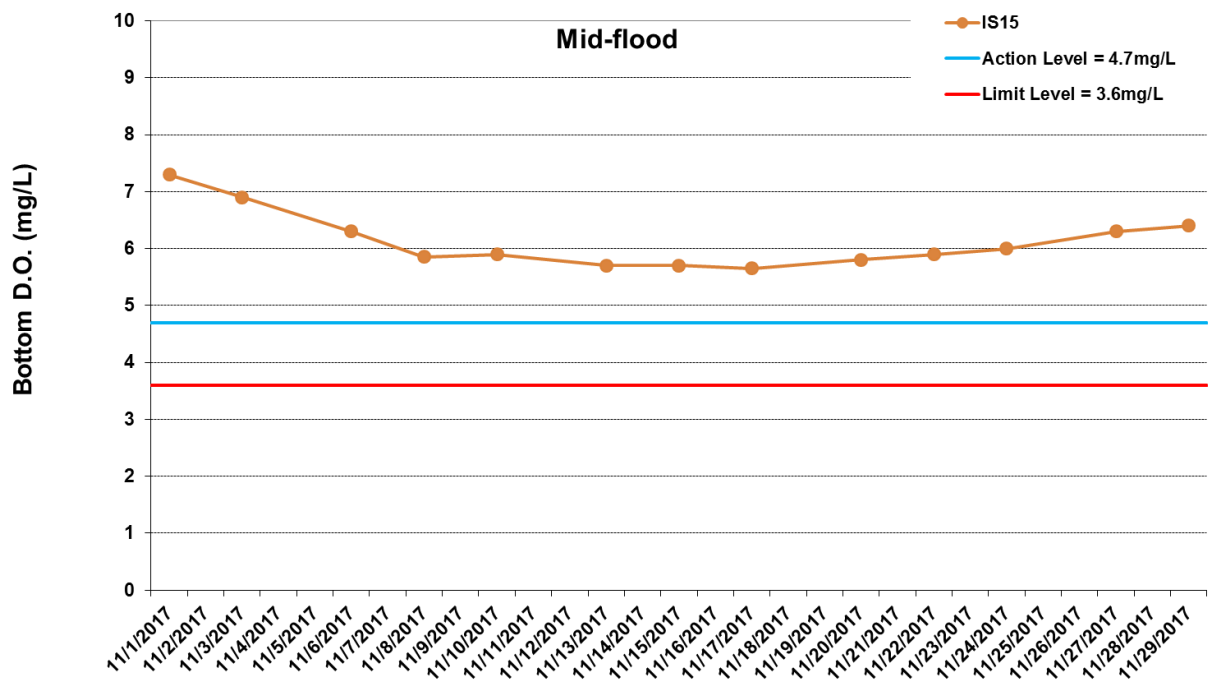
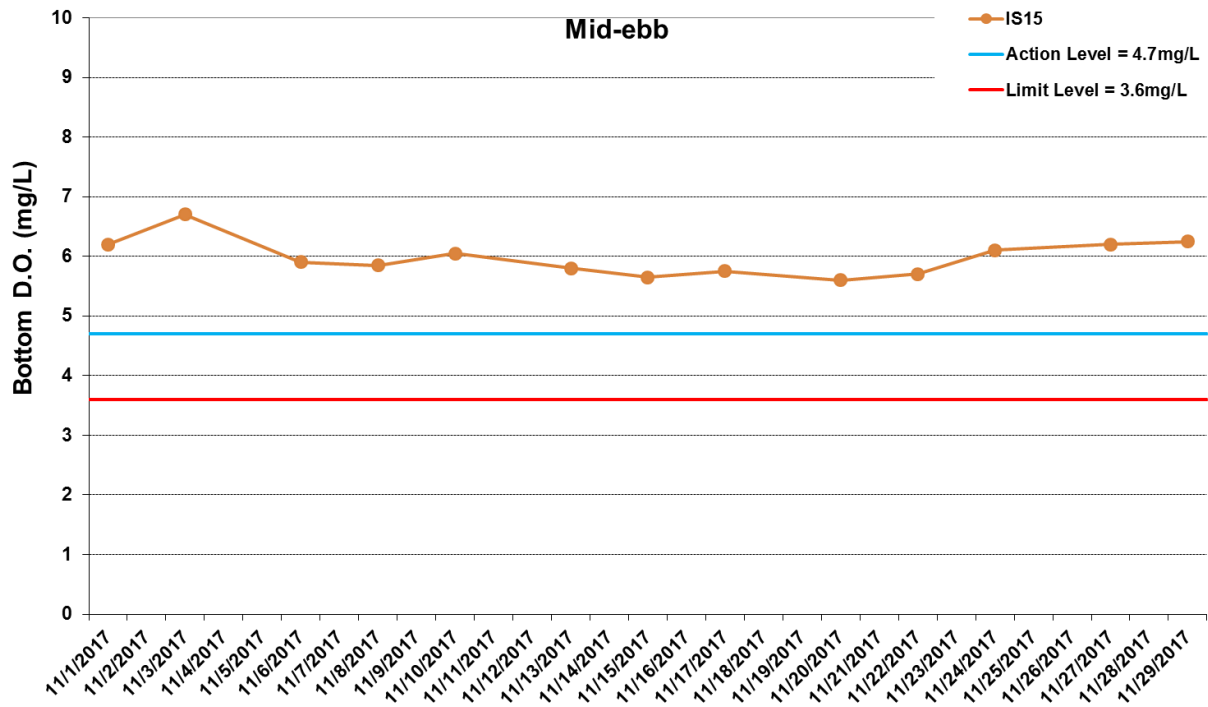


Figure I22 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



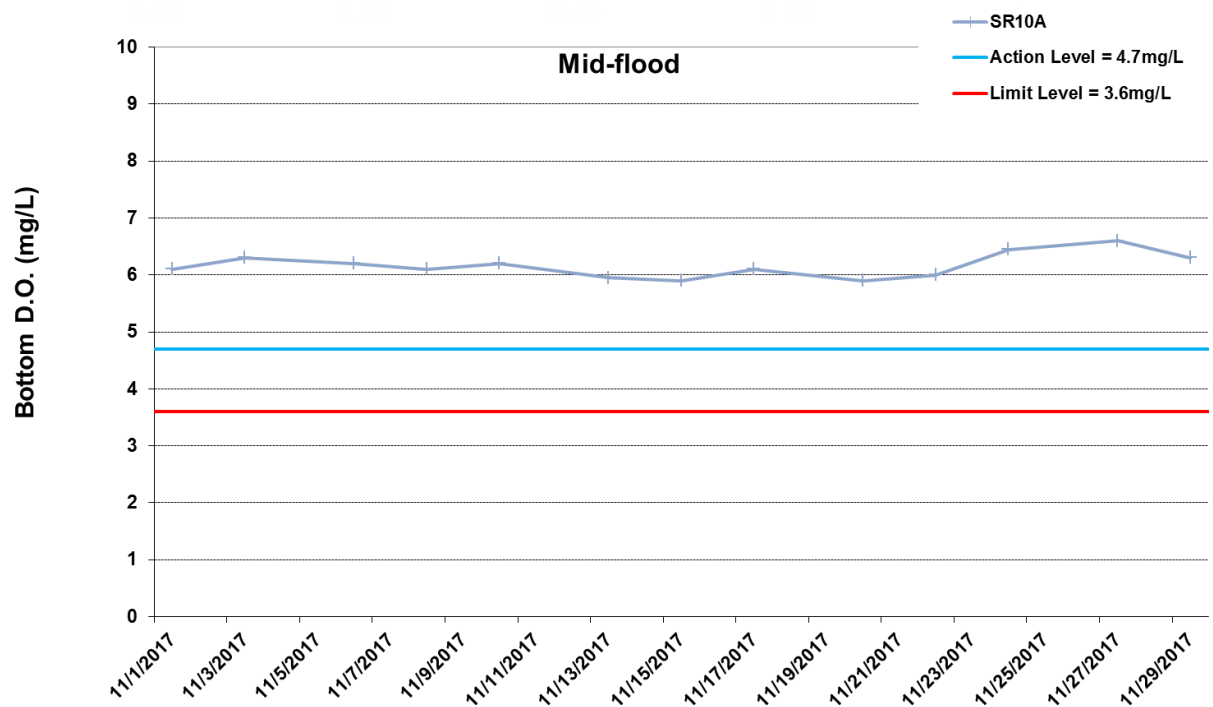
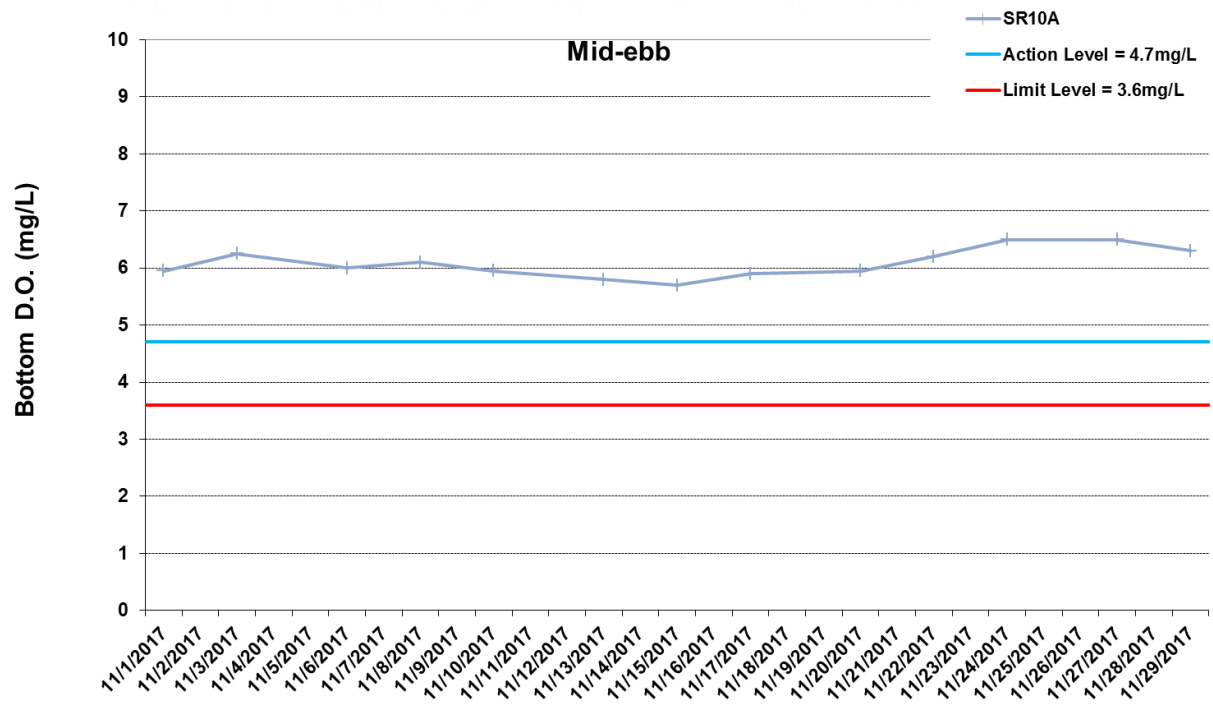


Figure I23 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



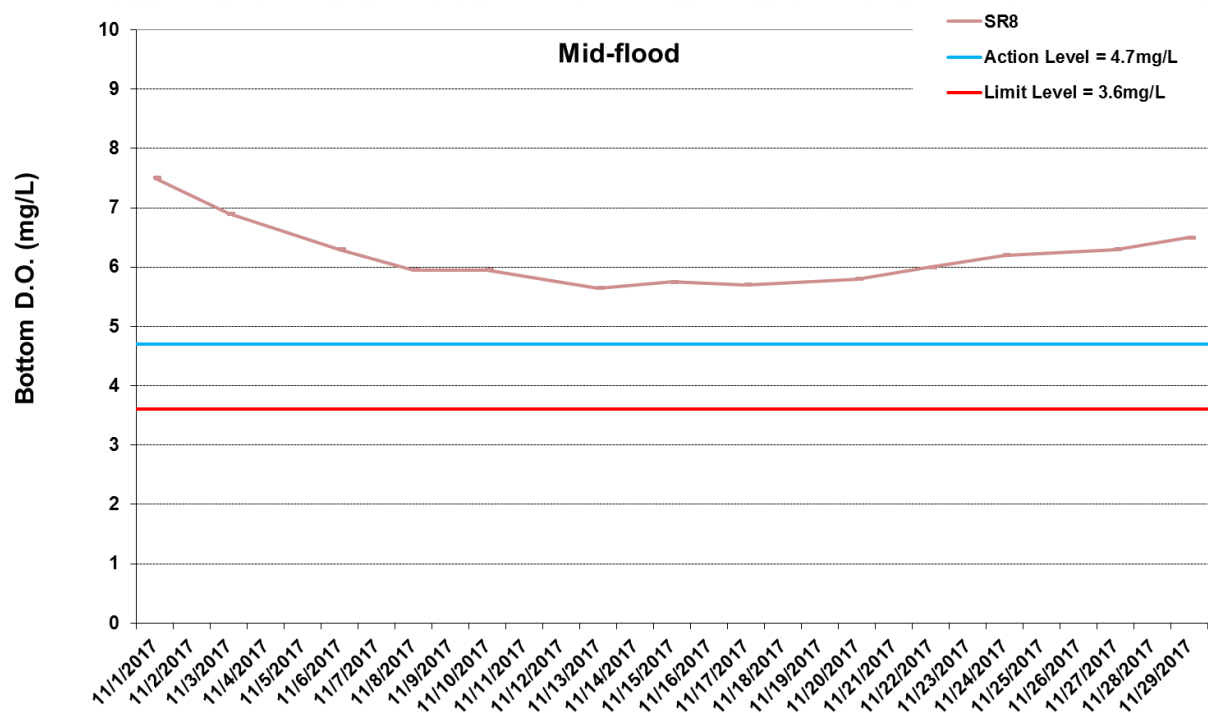
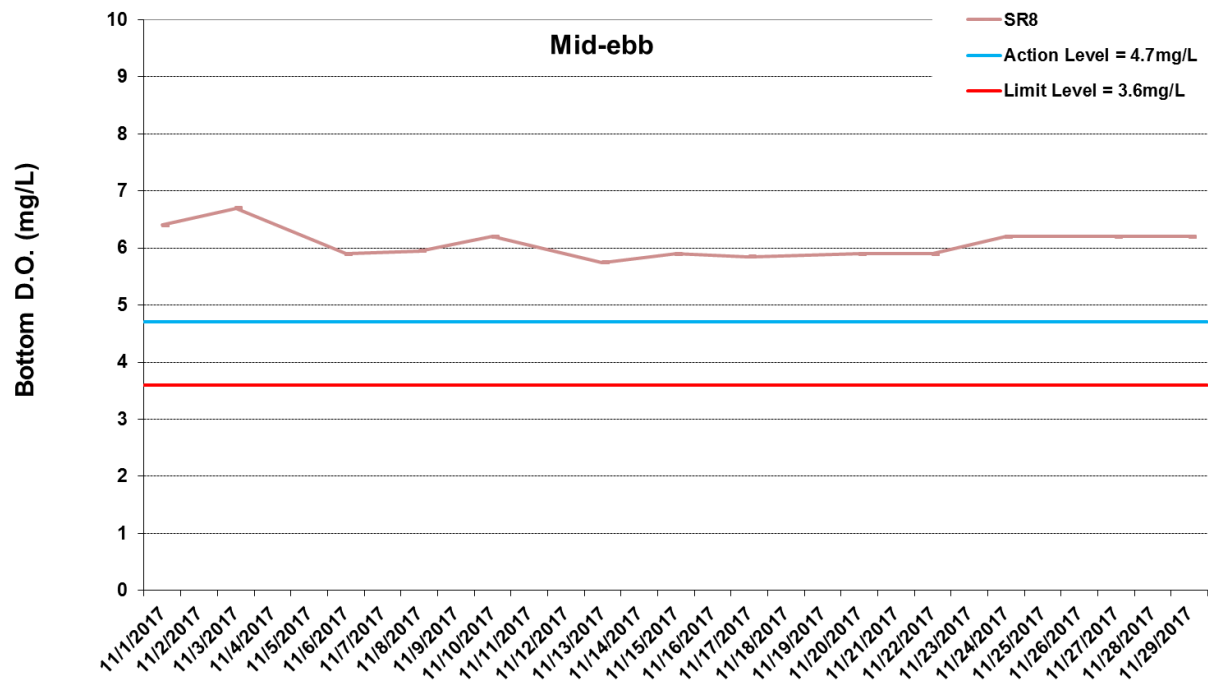


Figure I24 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



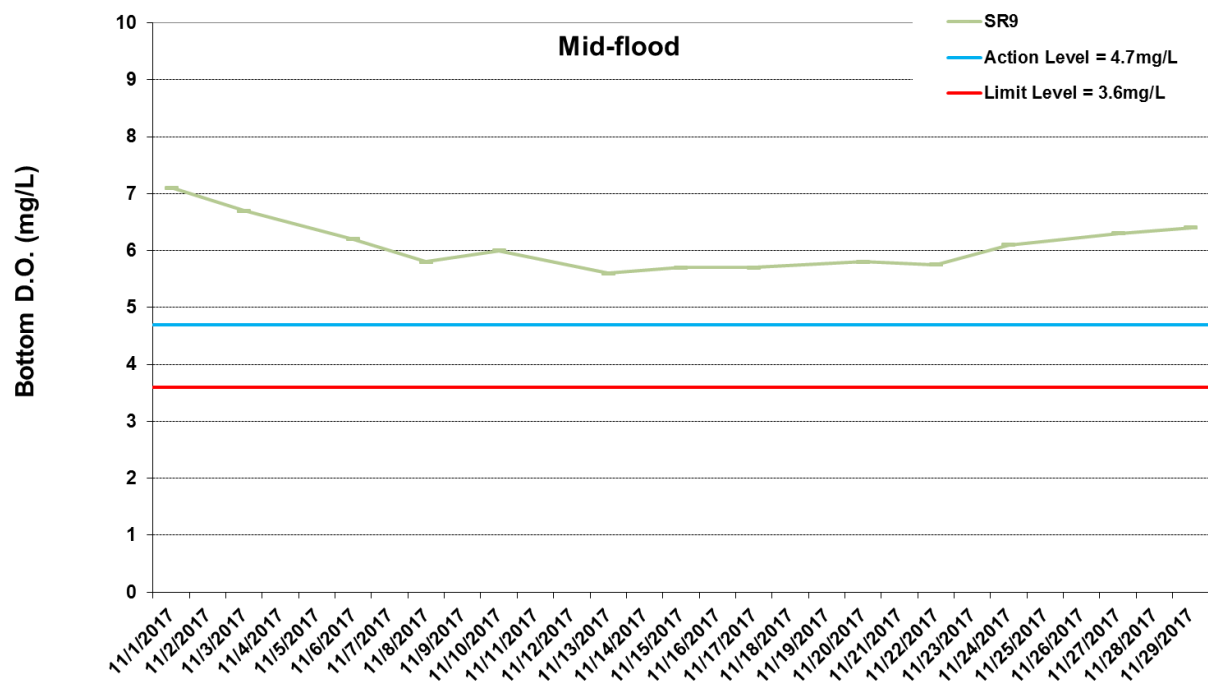
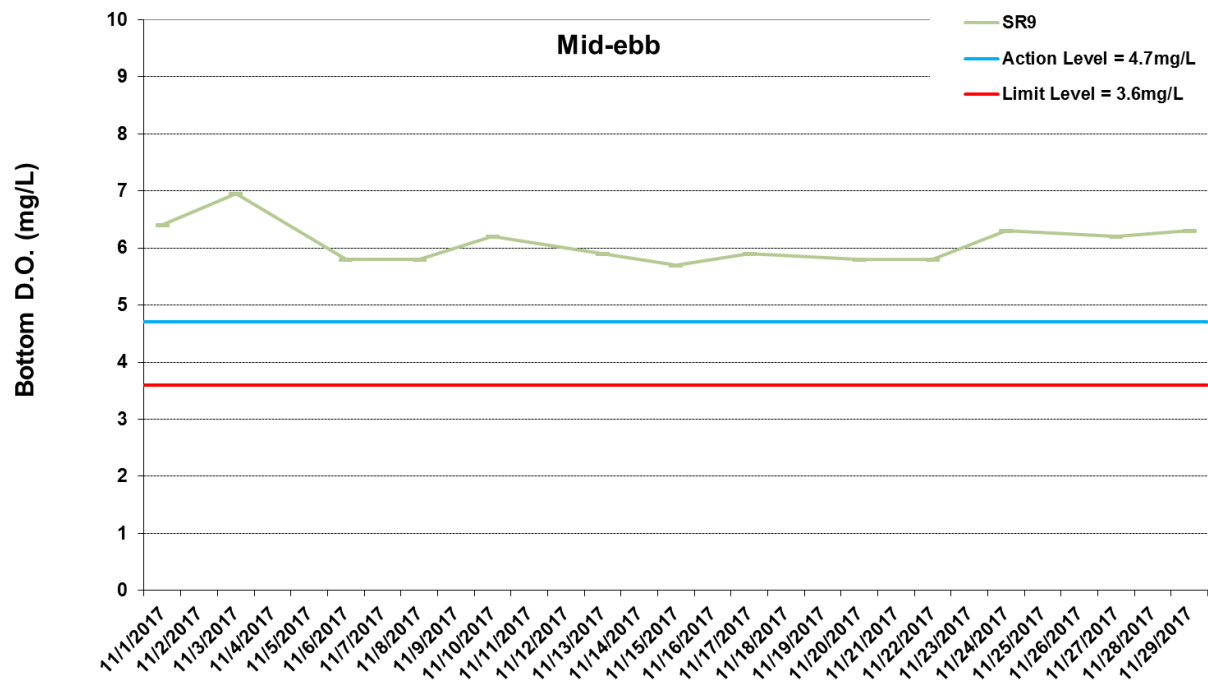


Figure I25 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2017 and 30 November 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



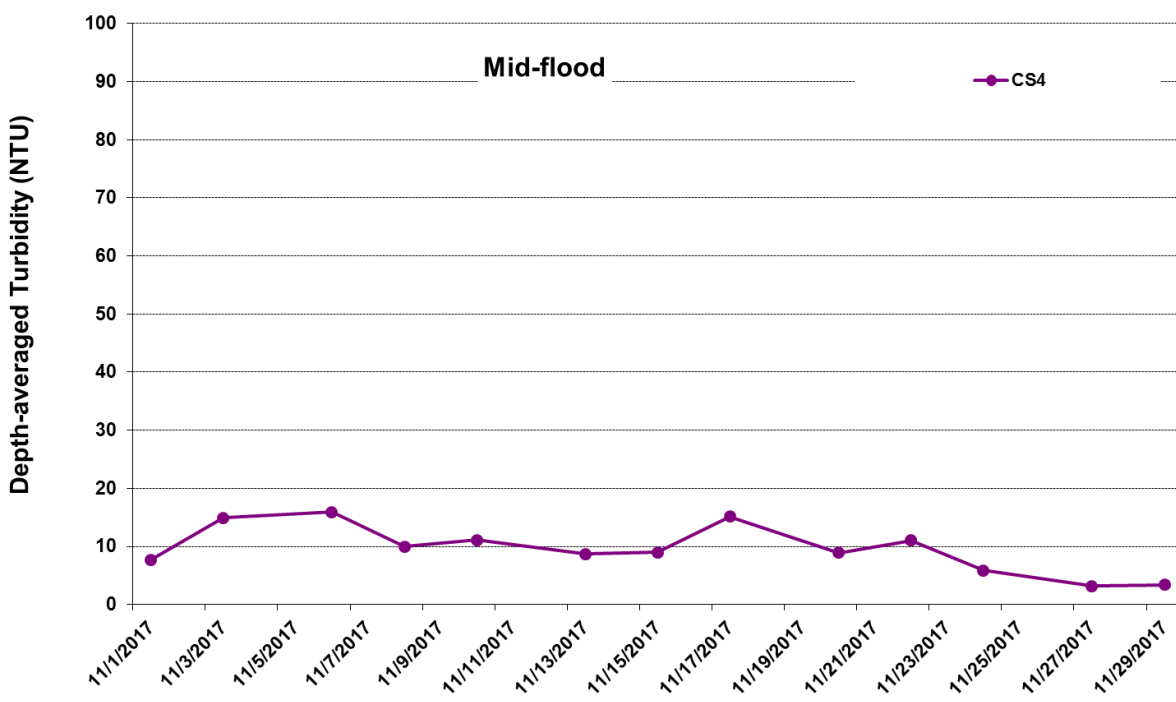
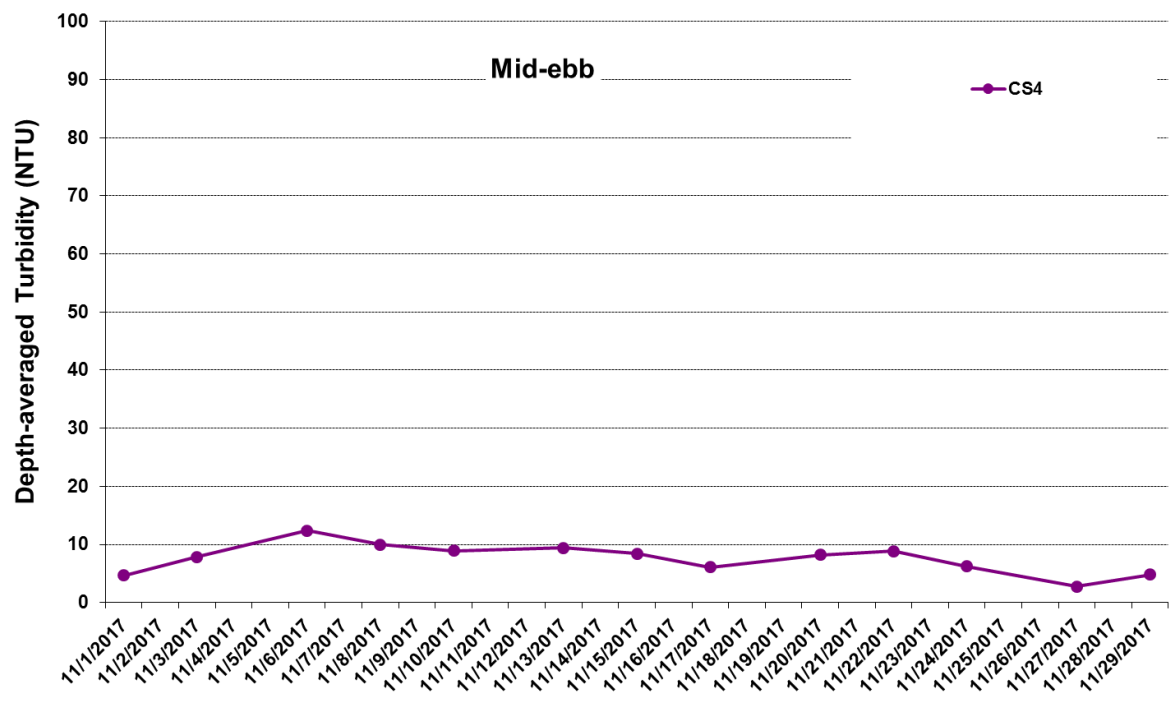


Figure I26 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

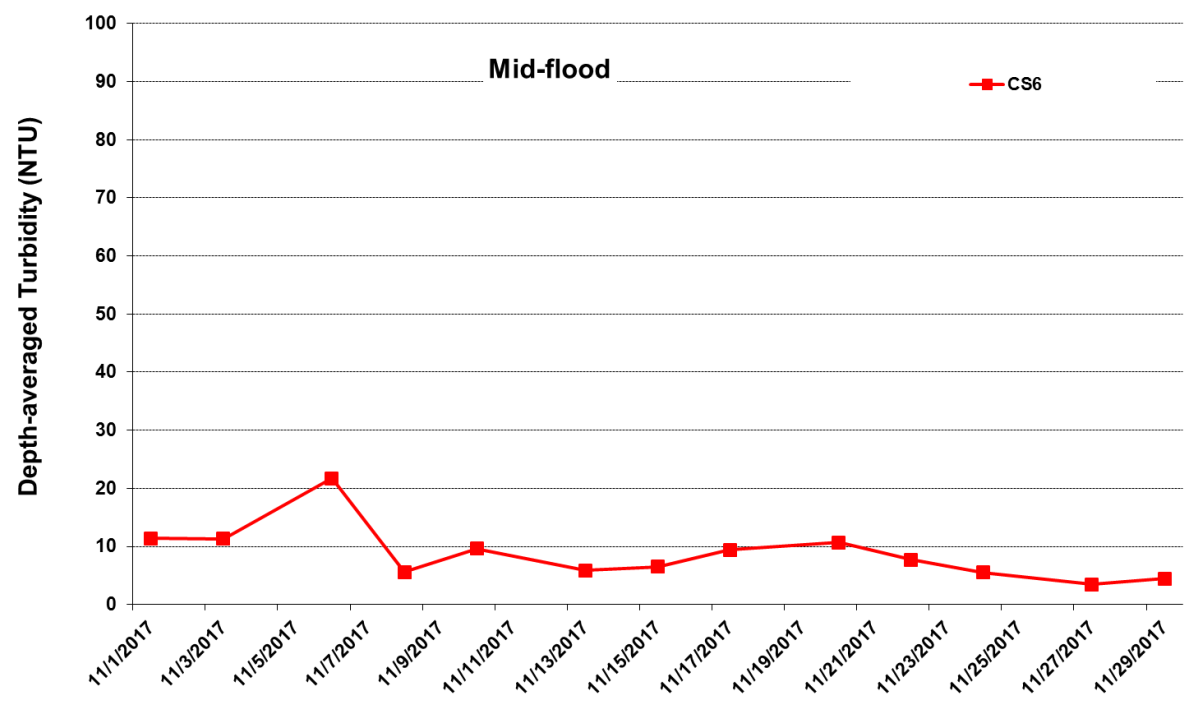
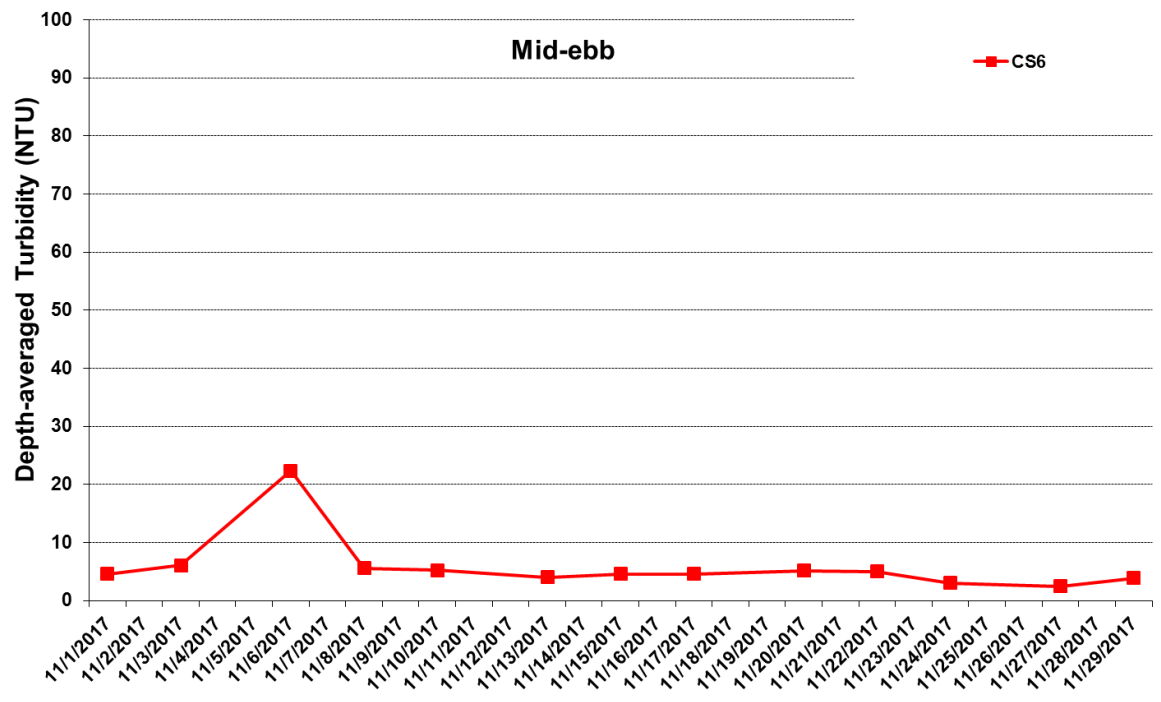


Figure I27 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

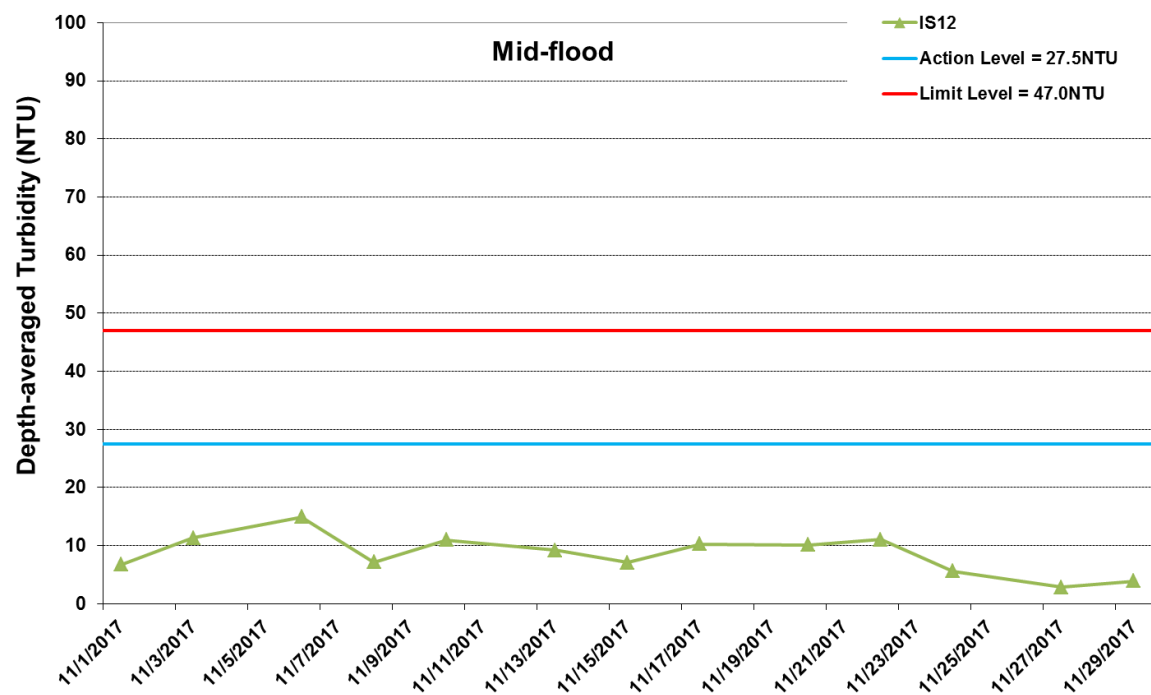
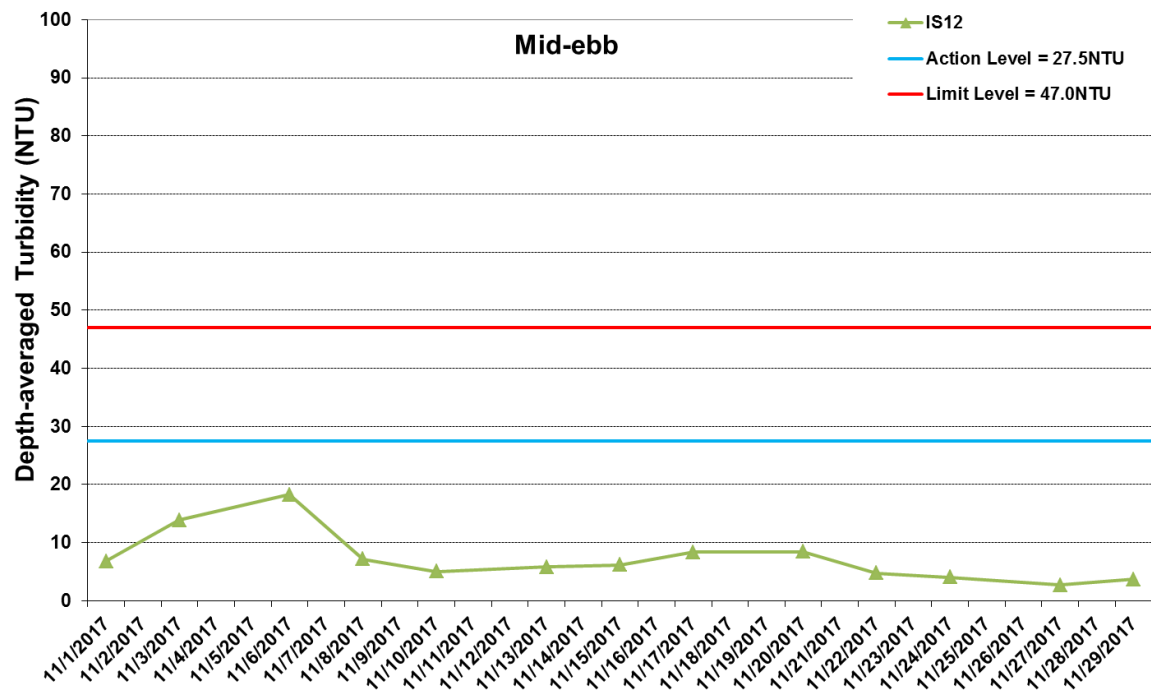


Figure I28 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 – 30/11/2017).



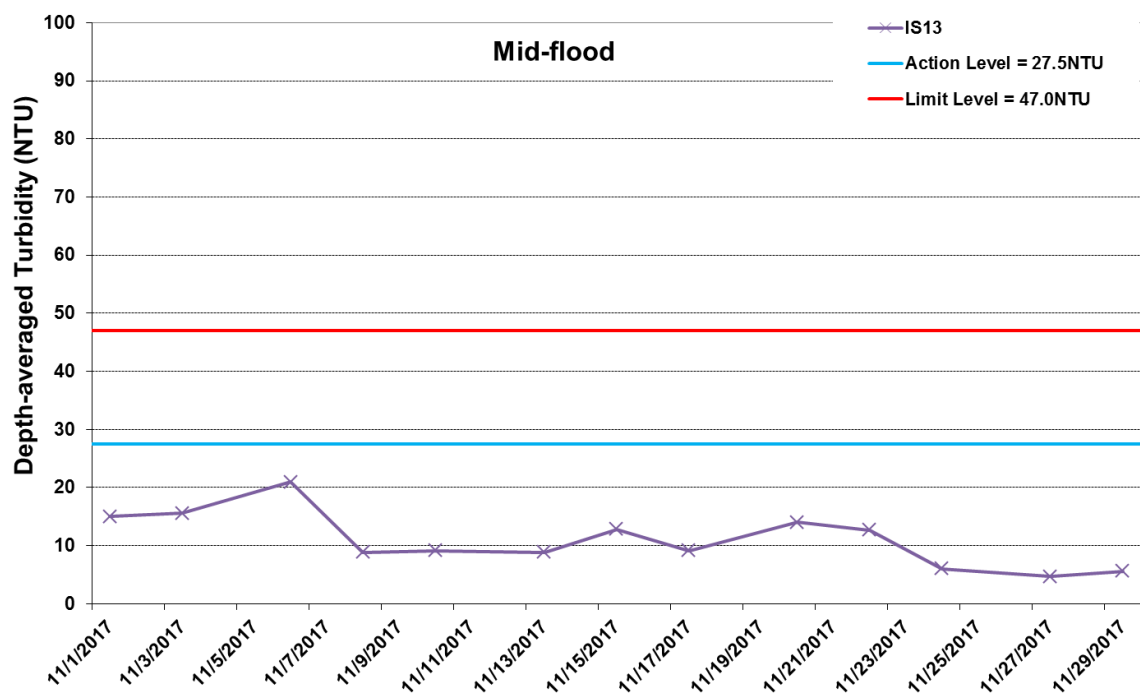
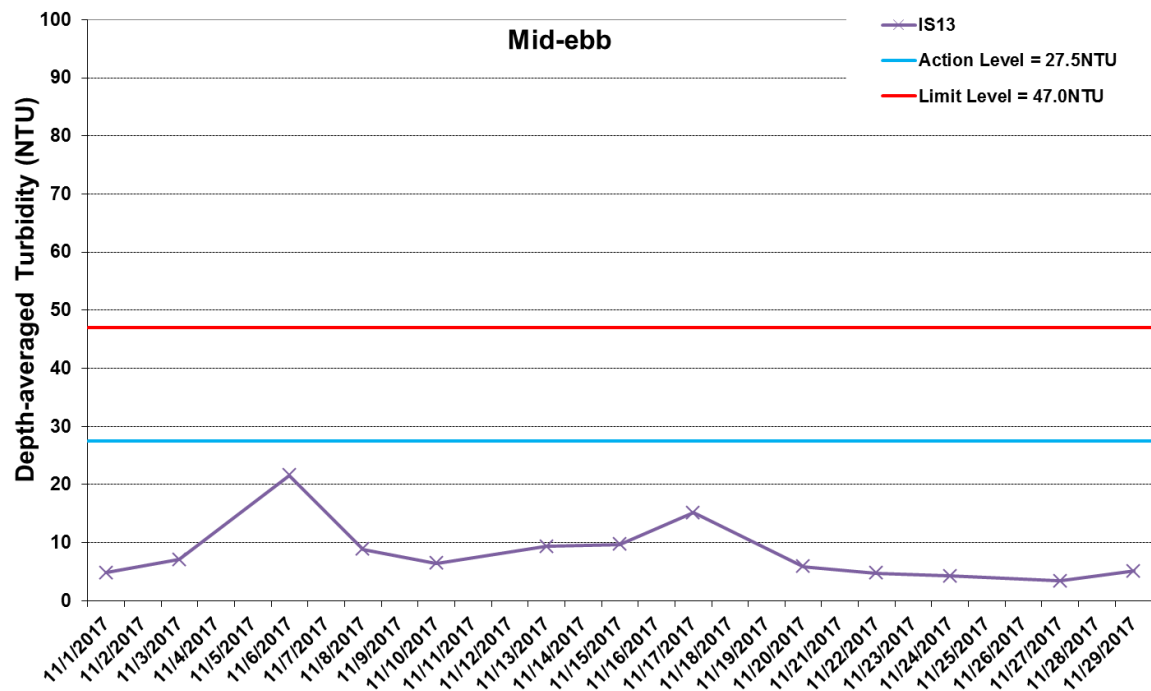


Figure I29 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



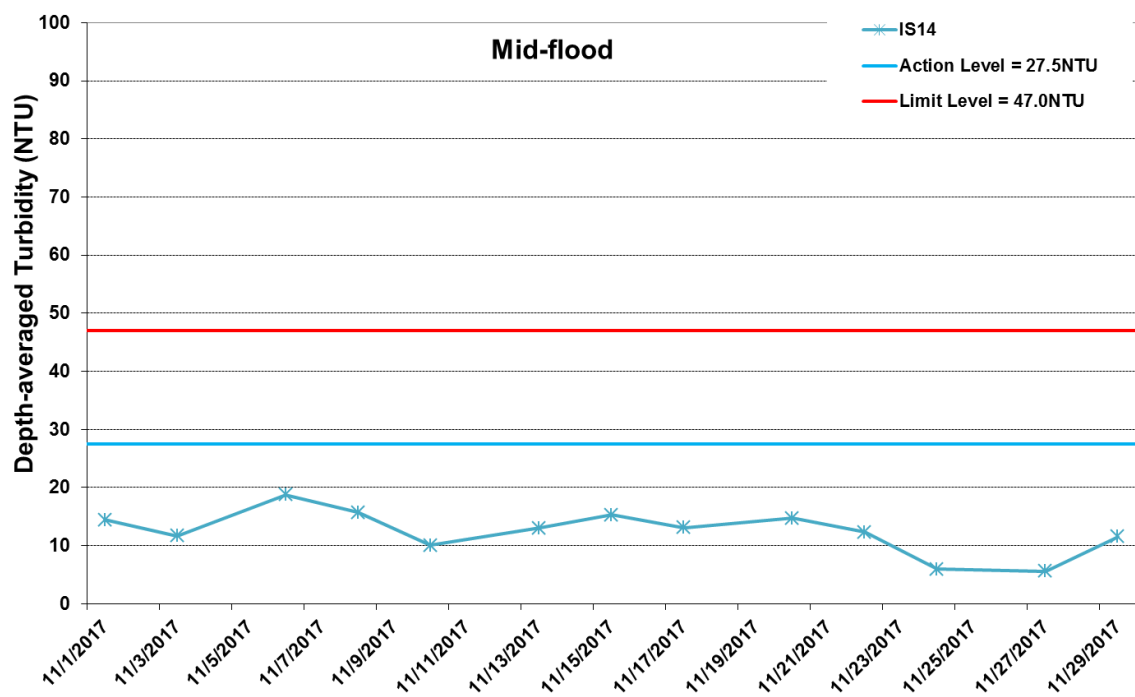
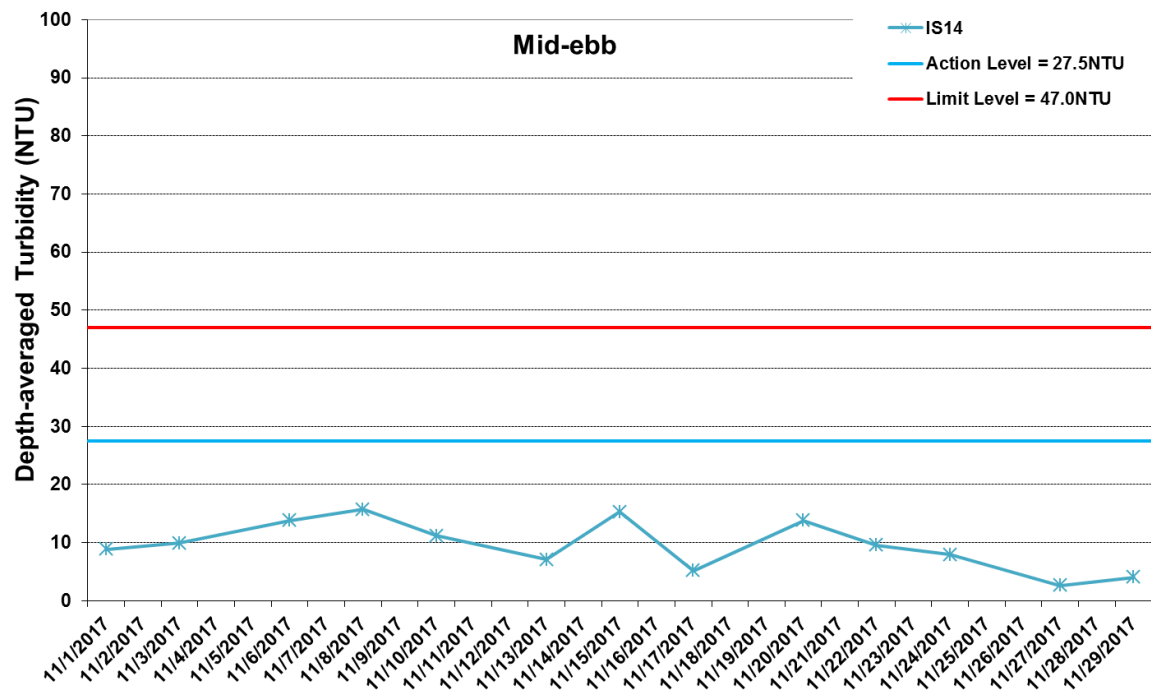


Figure I30 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



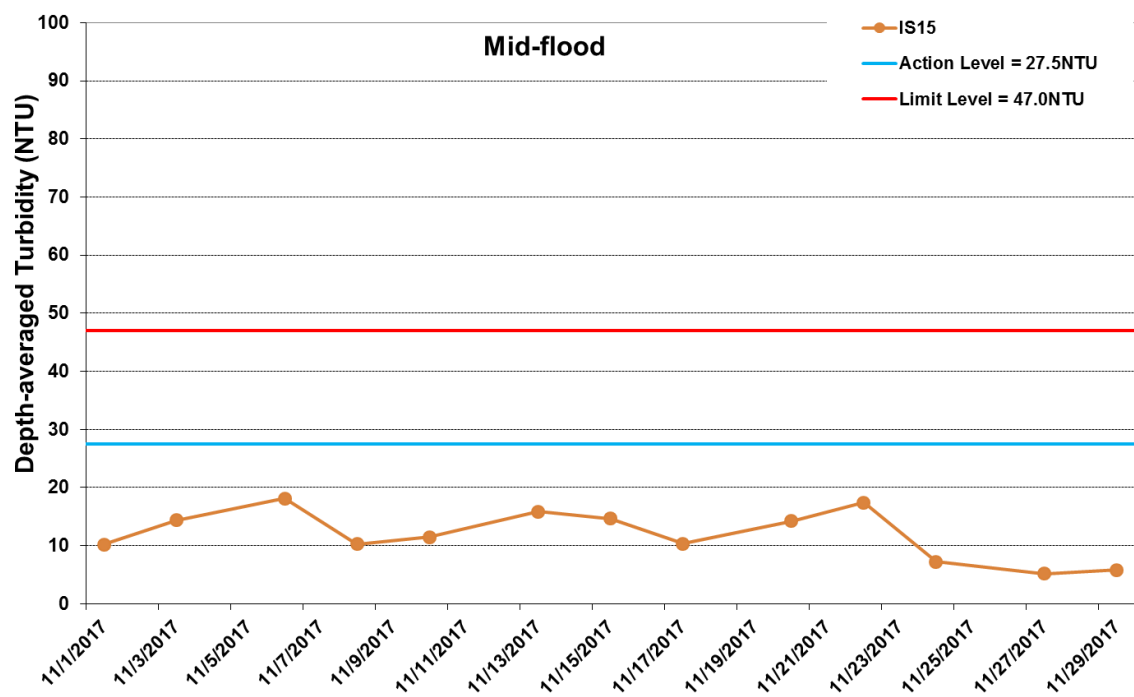
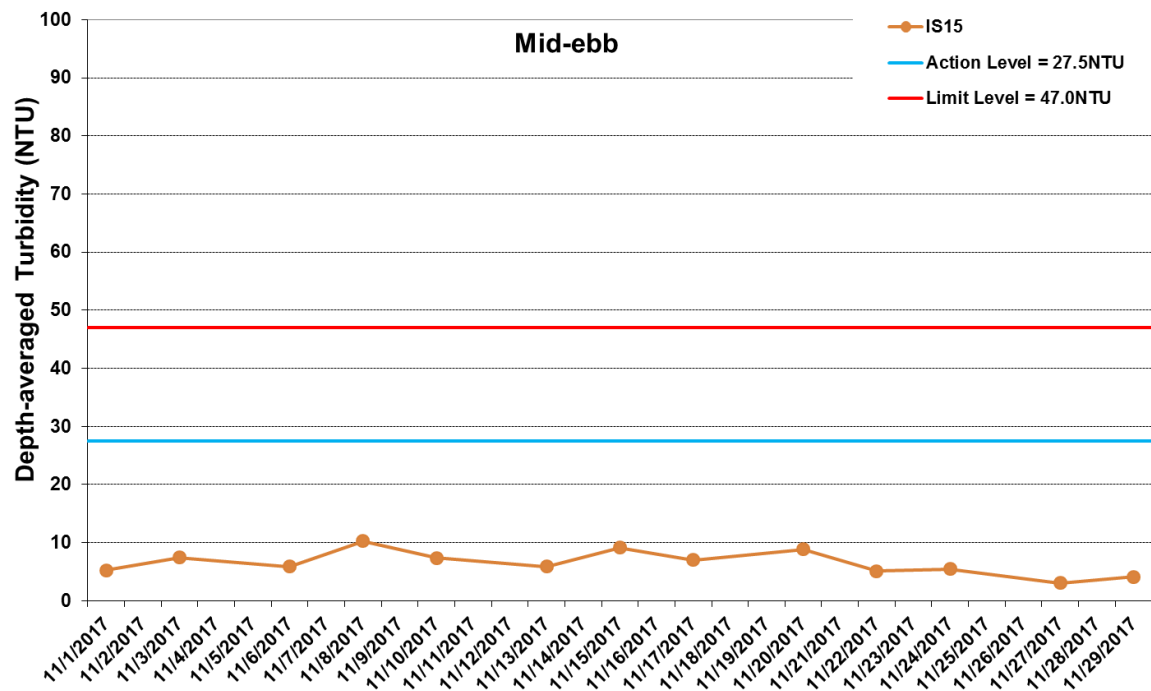


Figure I31 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



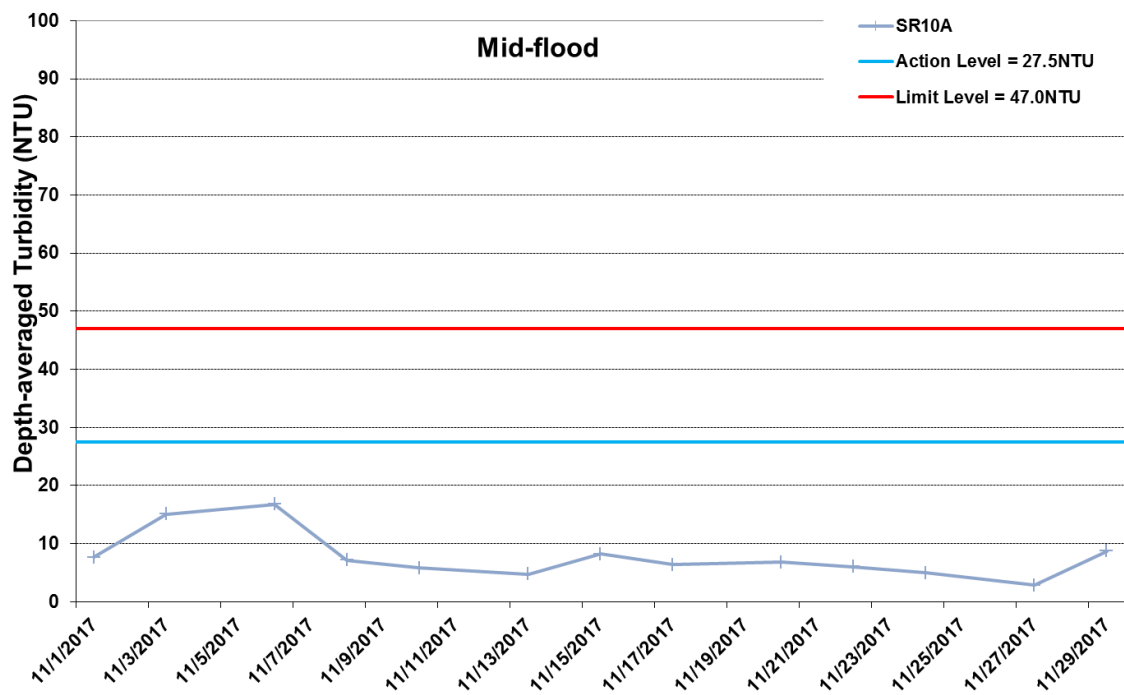
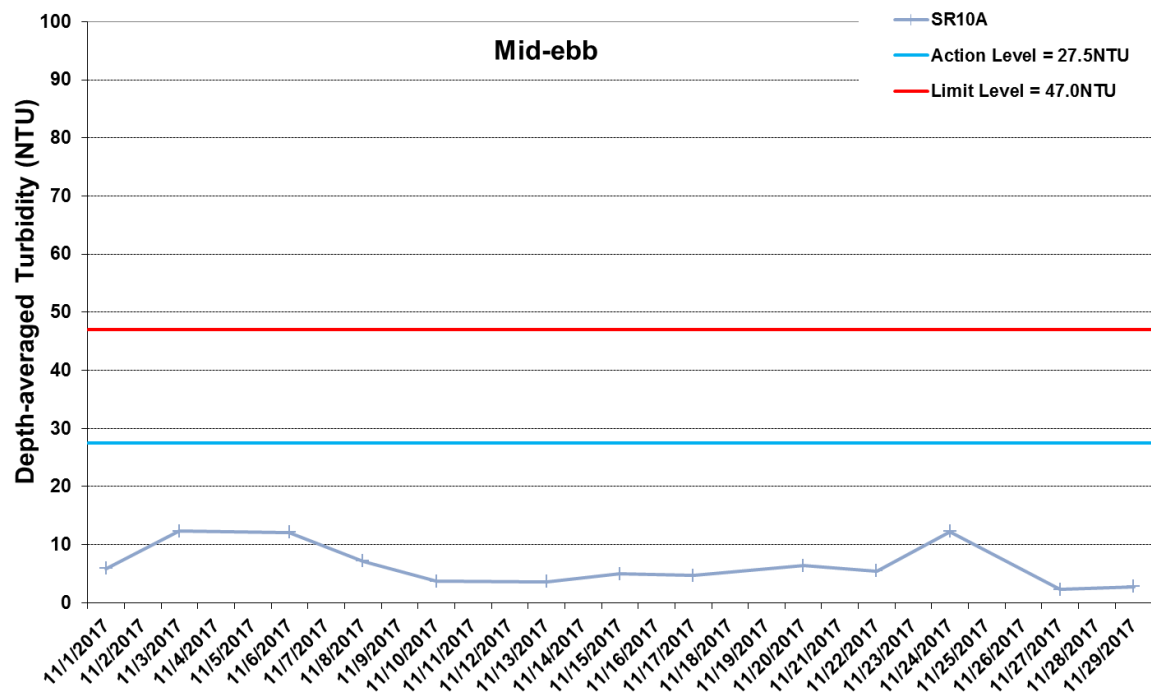


Figure I32 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



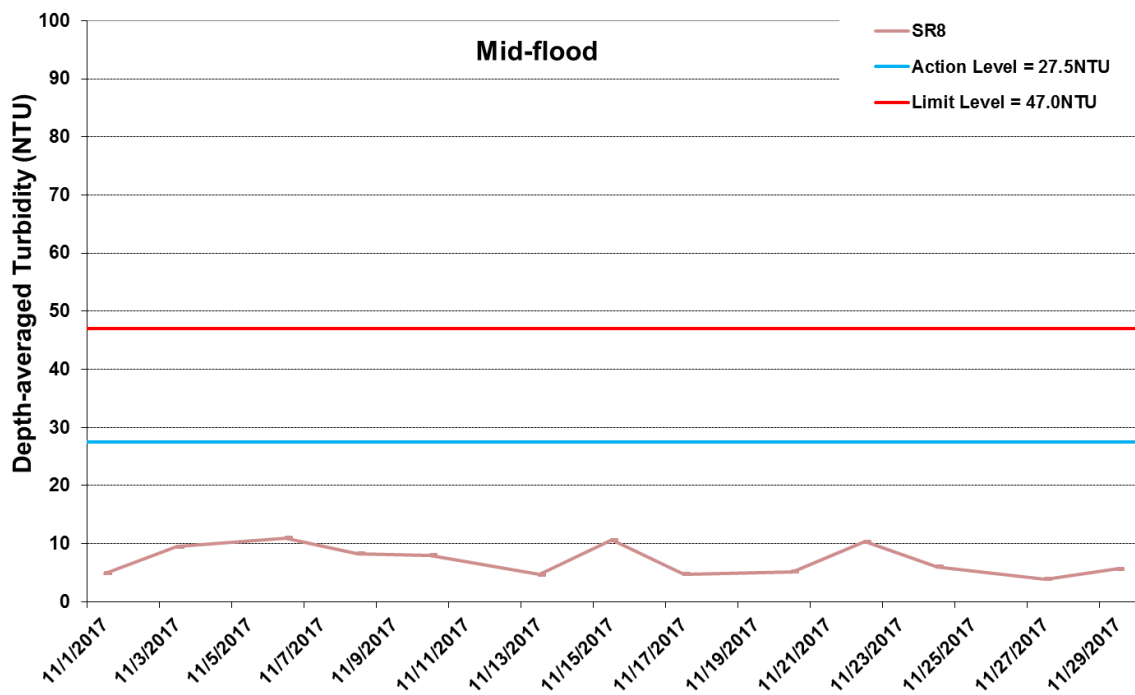
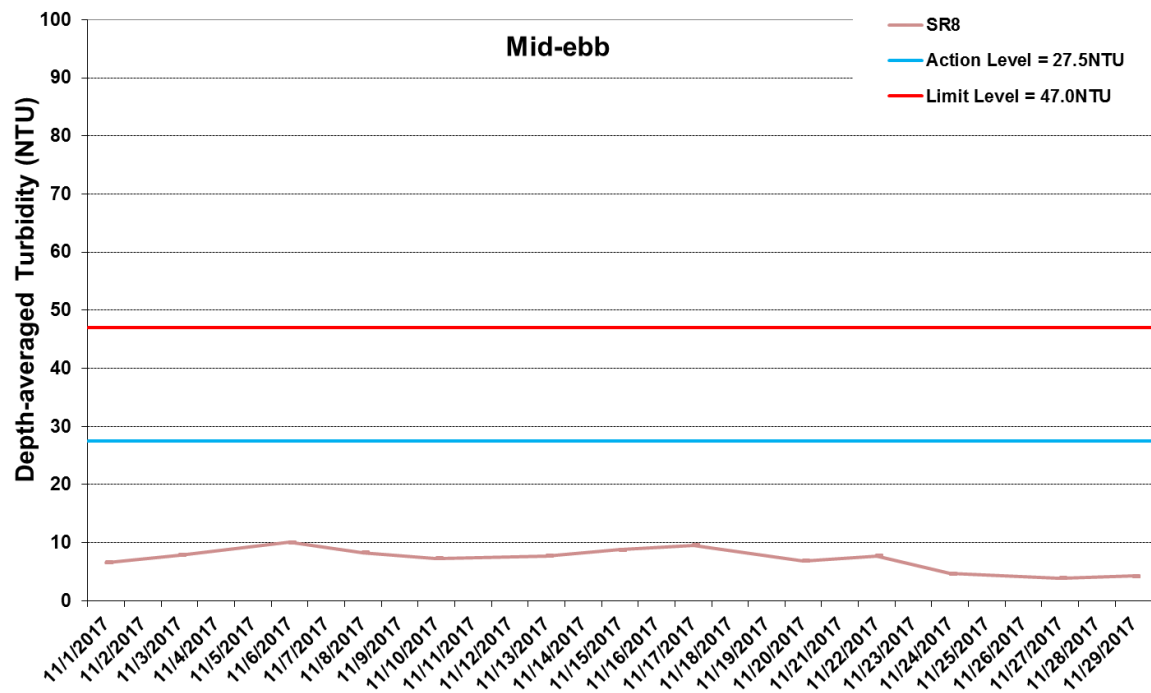


Figure I33 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



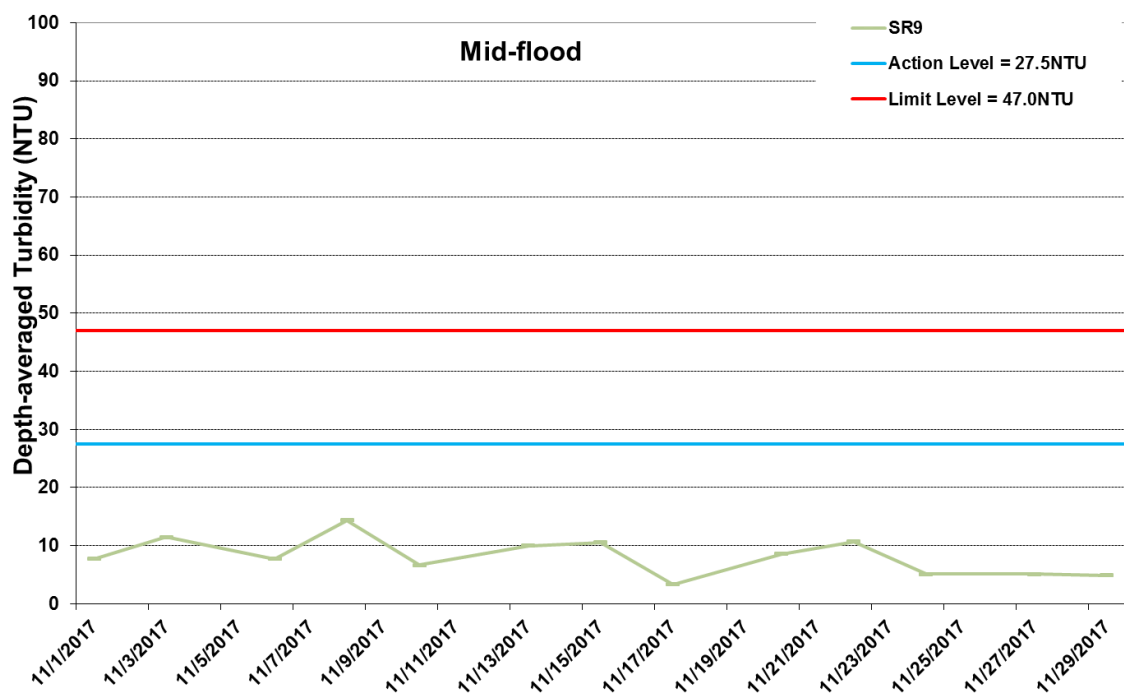
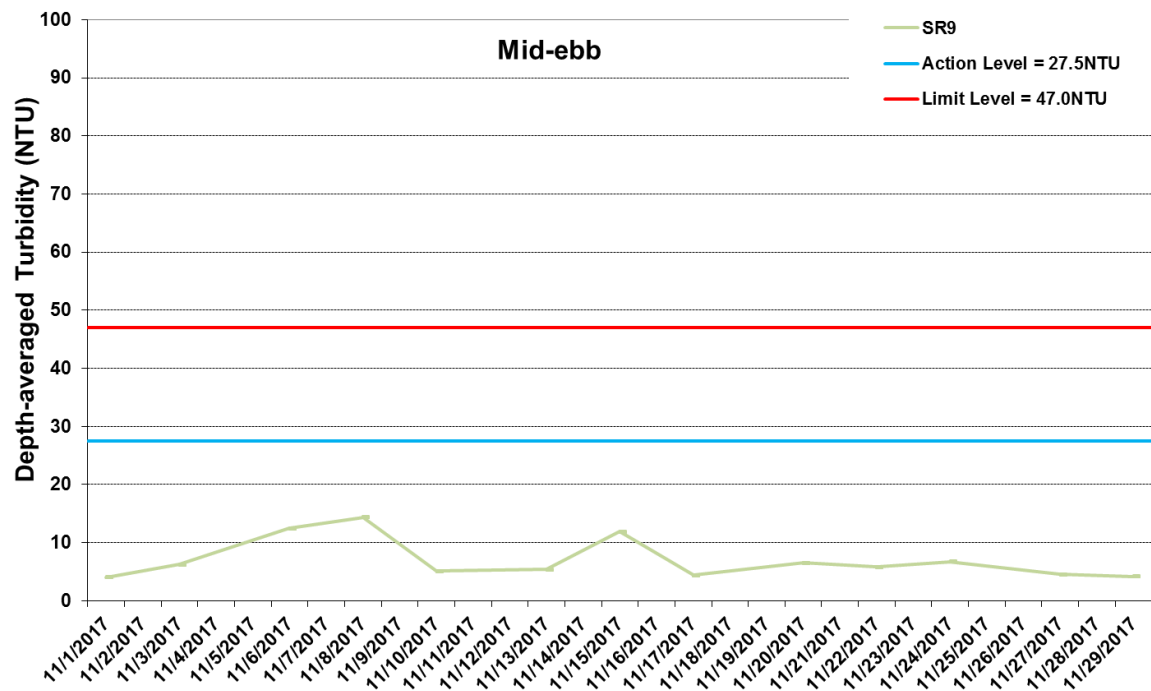


Figure I34 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2017 and 30 November 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



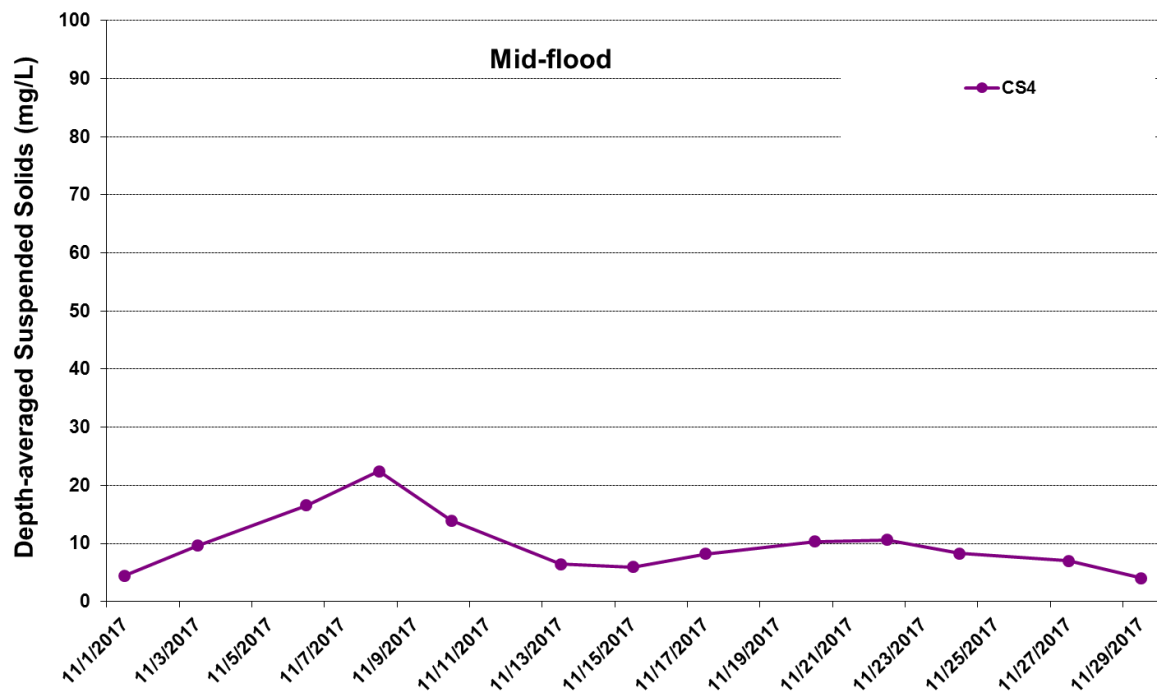
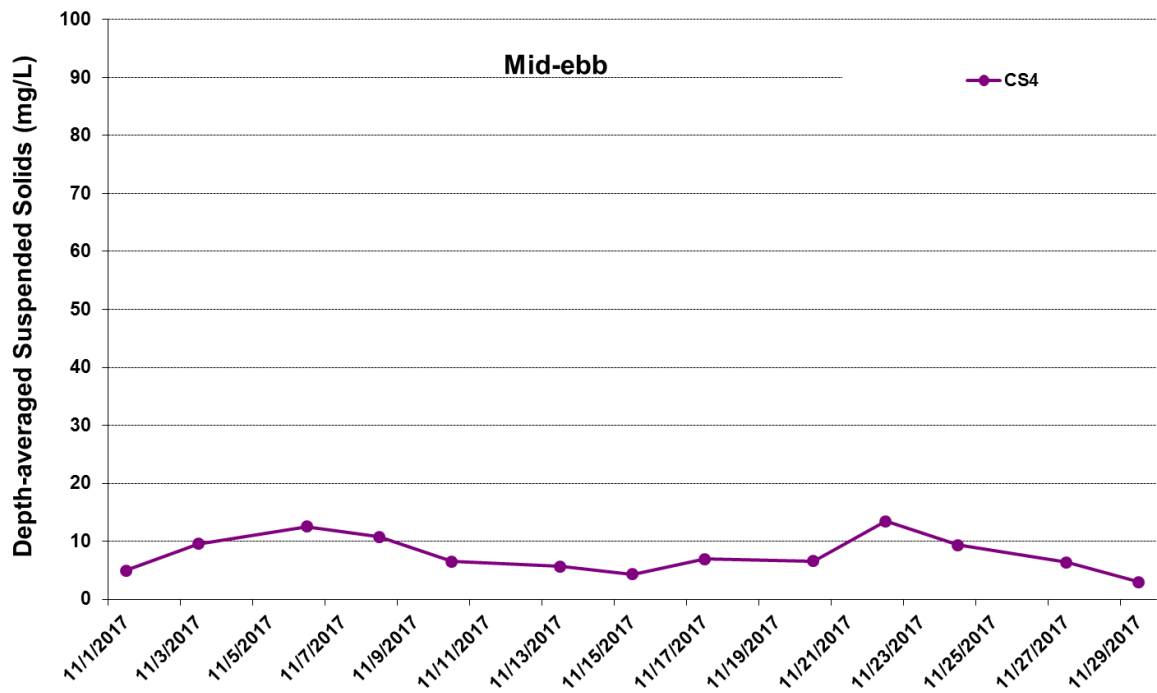


Figure I35 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

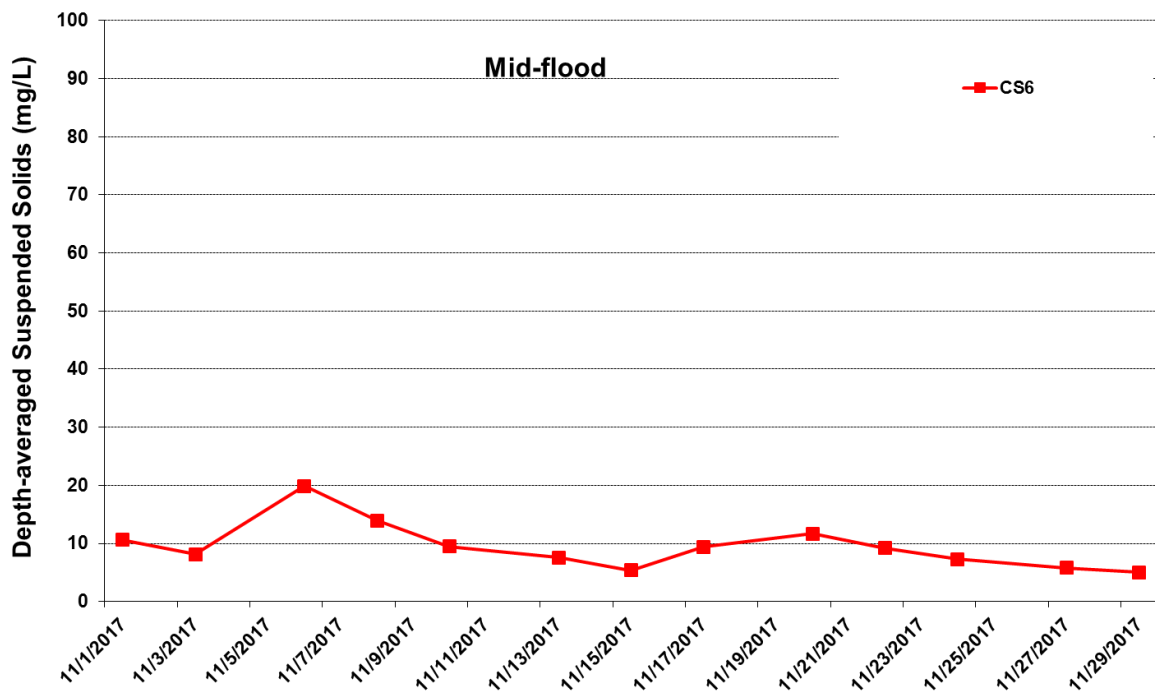
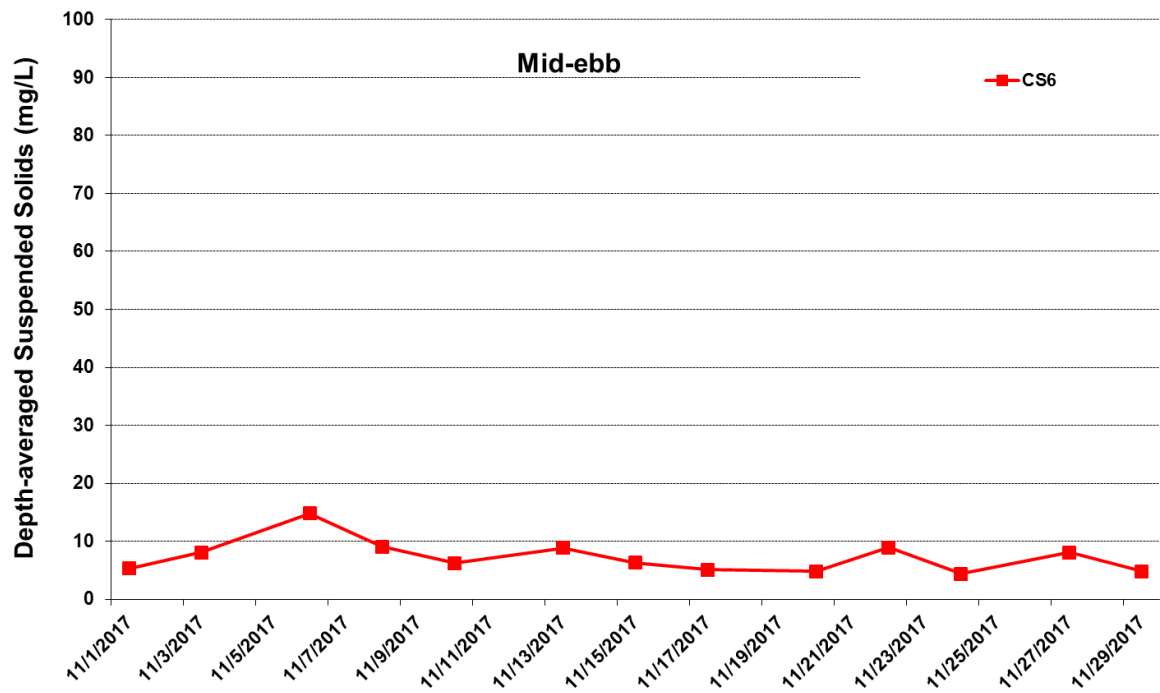


Figure I36 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



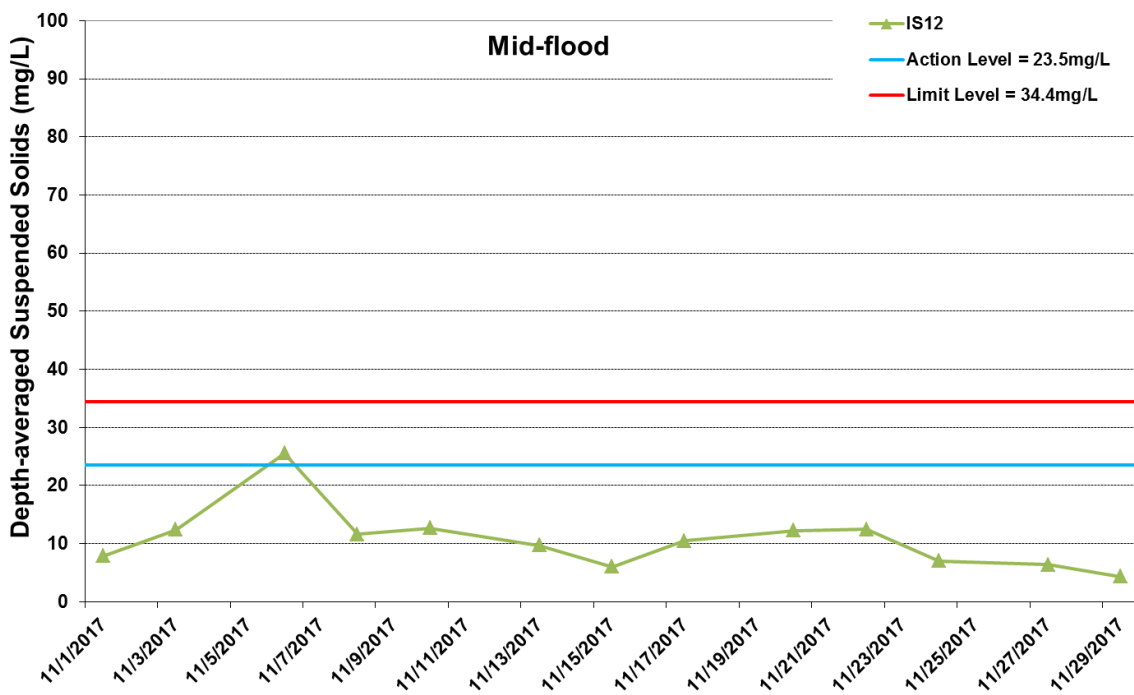
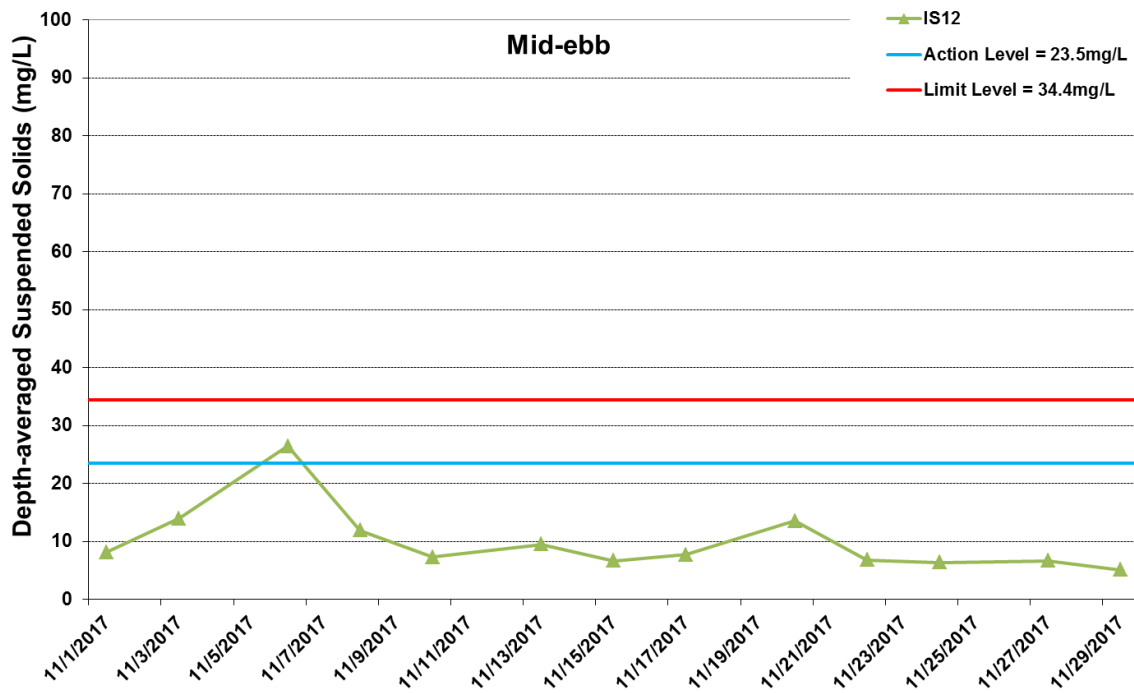


Figure I37 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



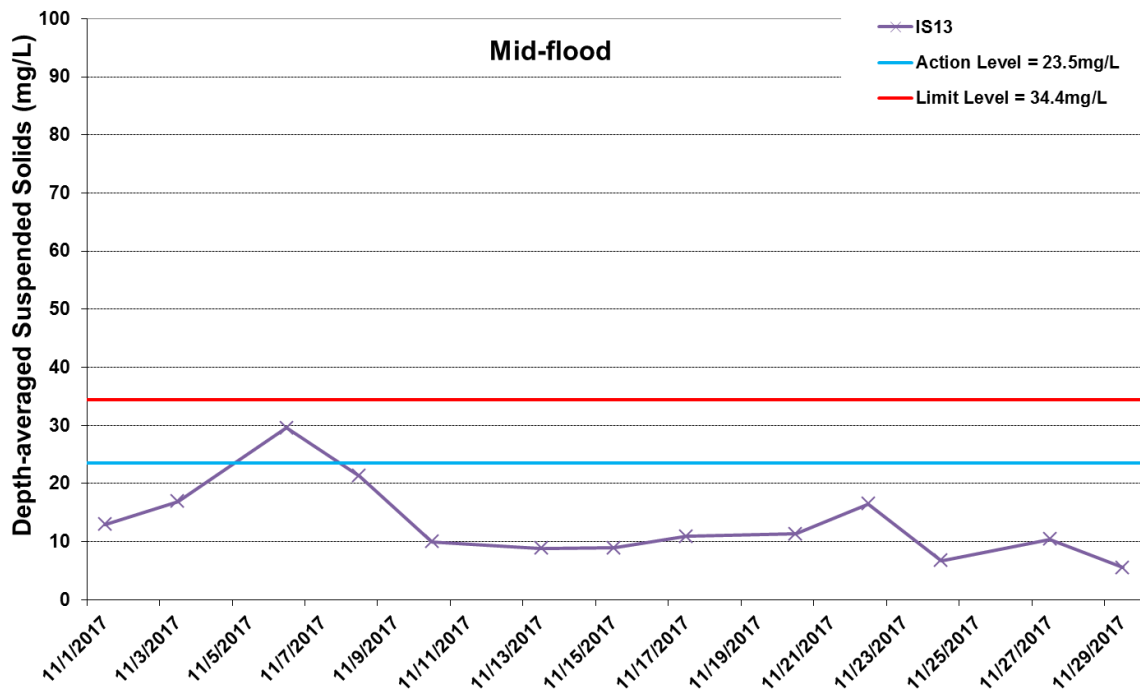
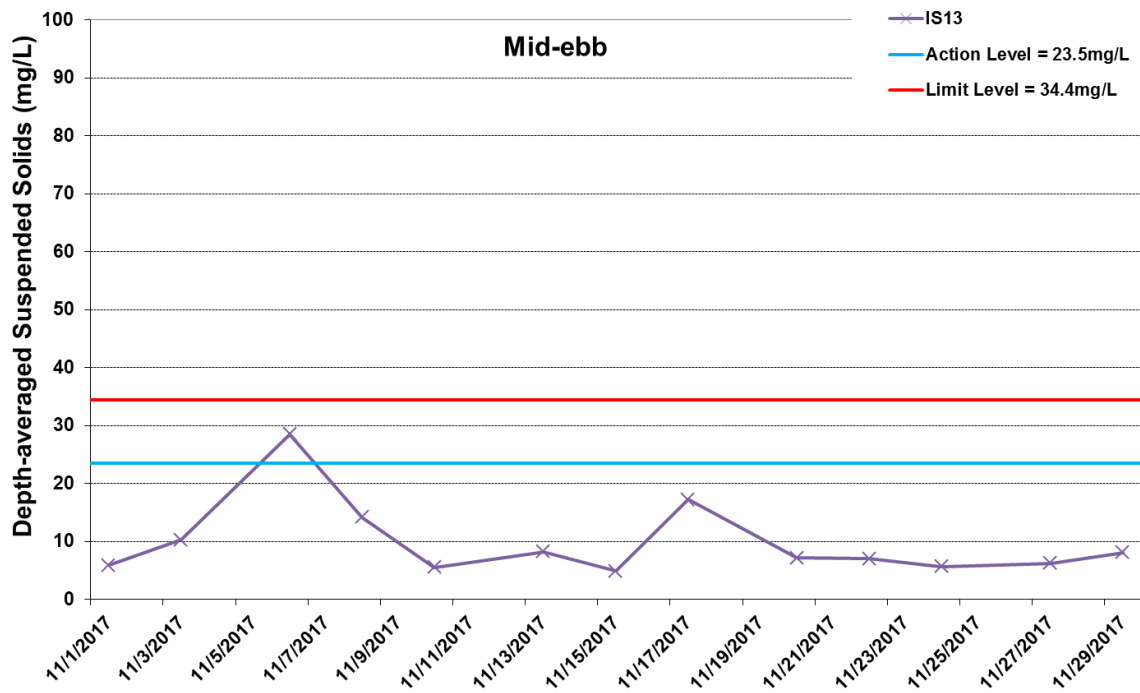


Figure I38 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



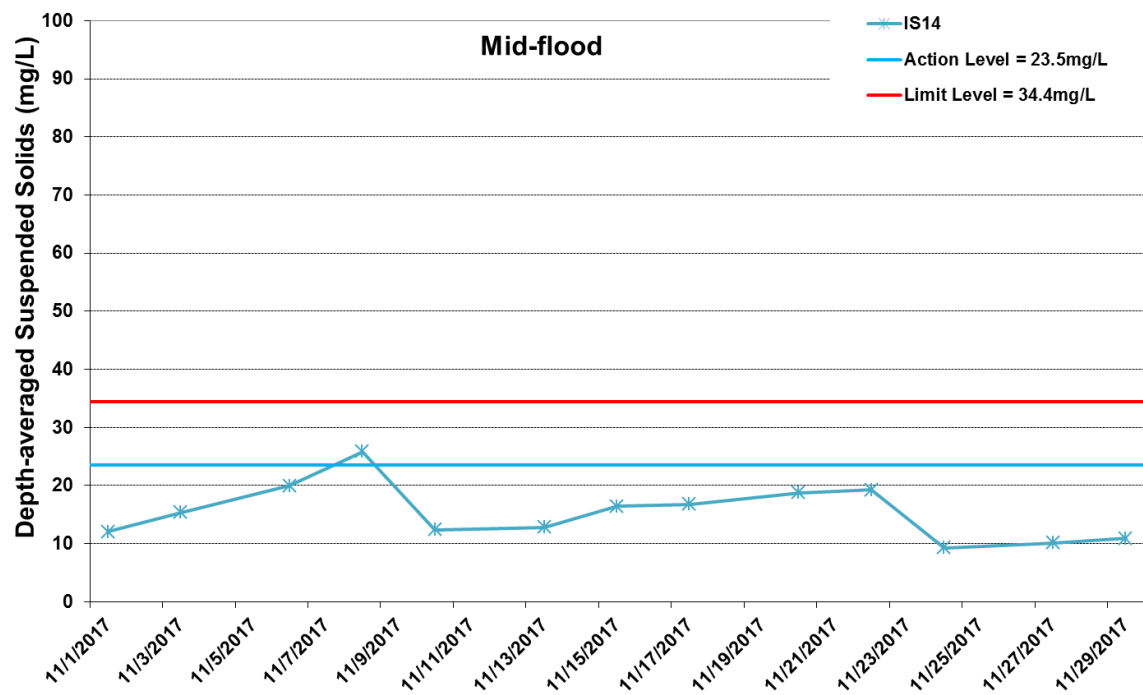
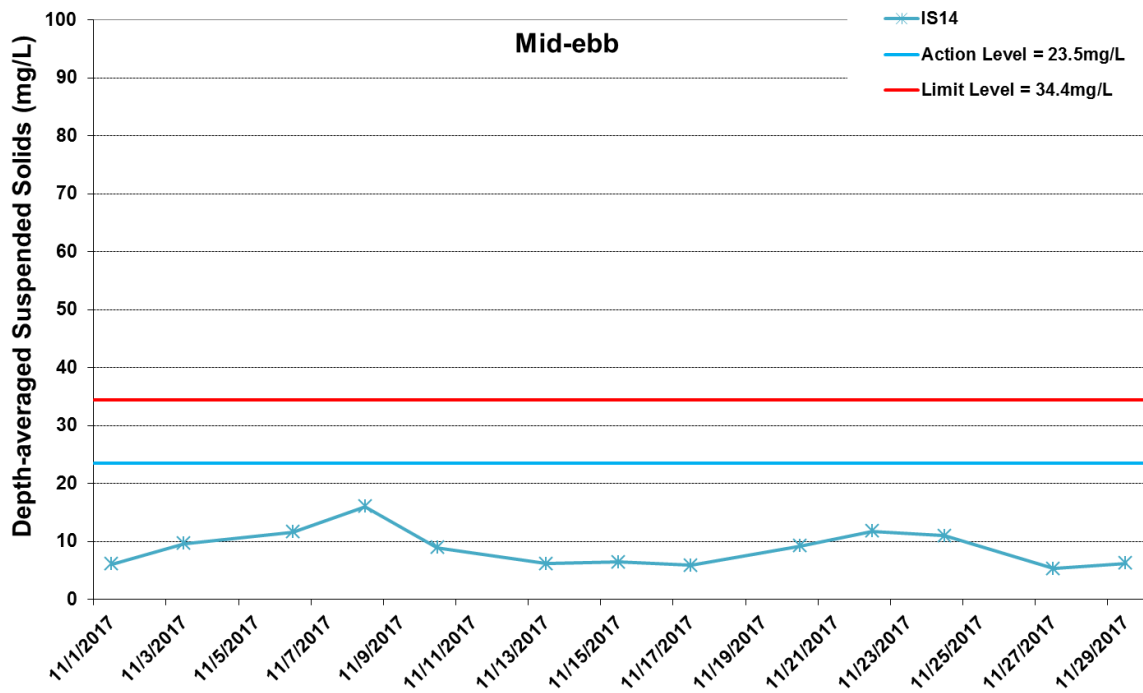


Figure I39 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



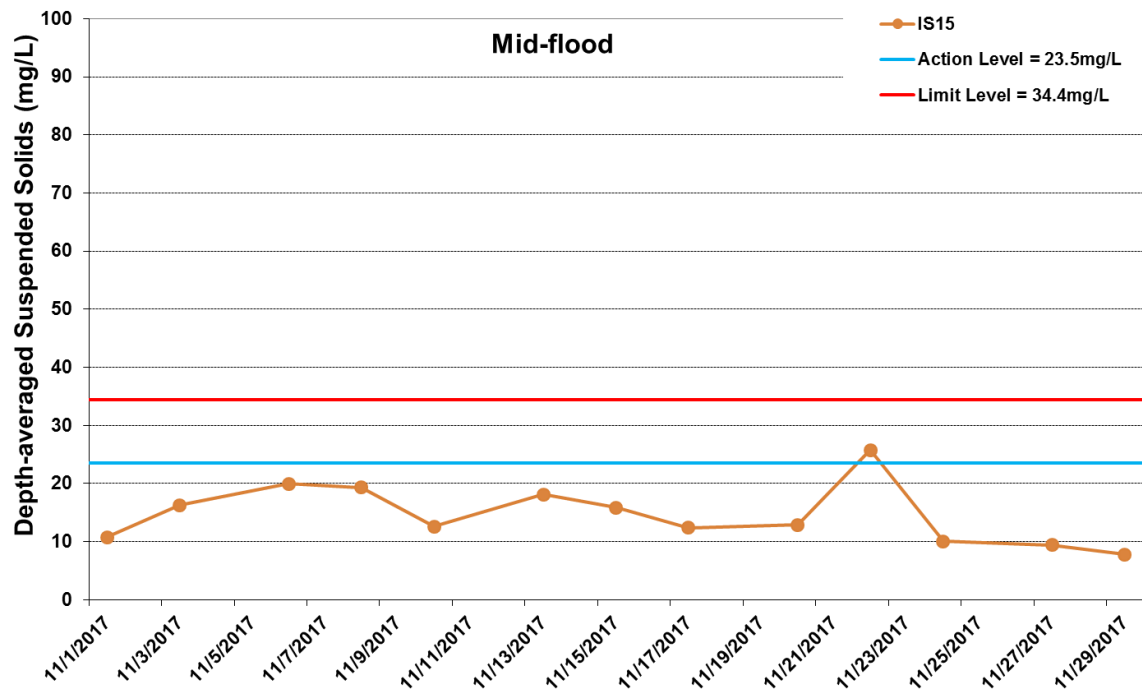
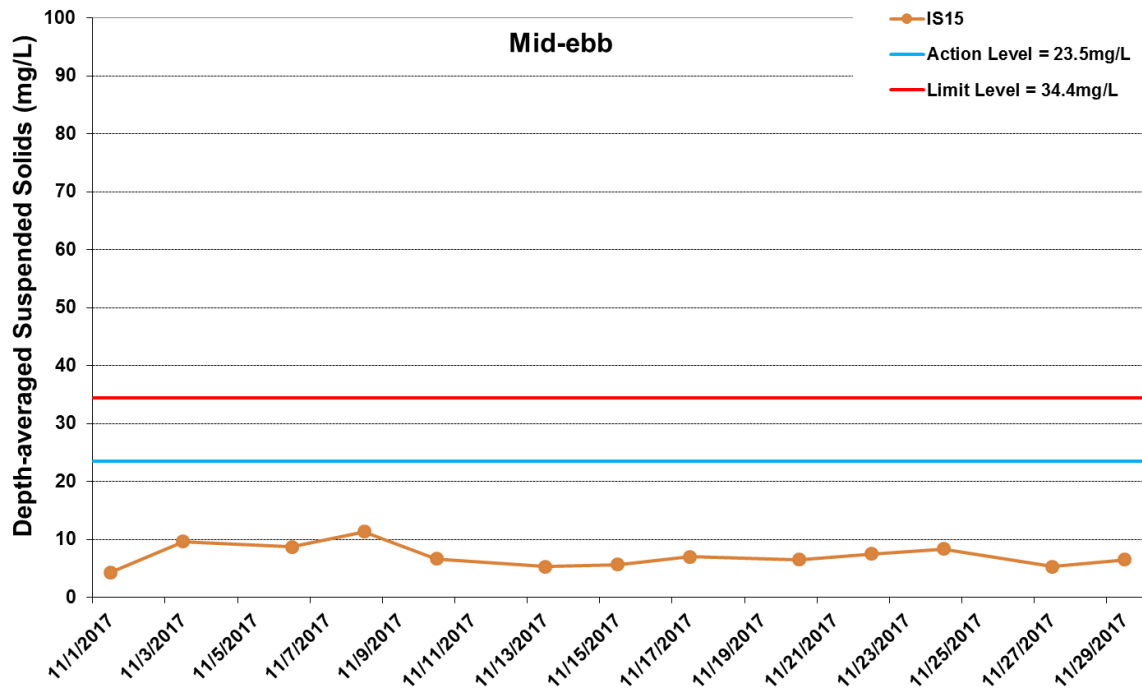


Figure I40 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



Ref: 0212330_Impact-WQM_May2017_graphs_Rev a.xls

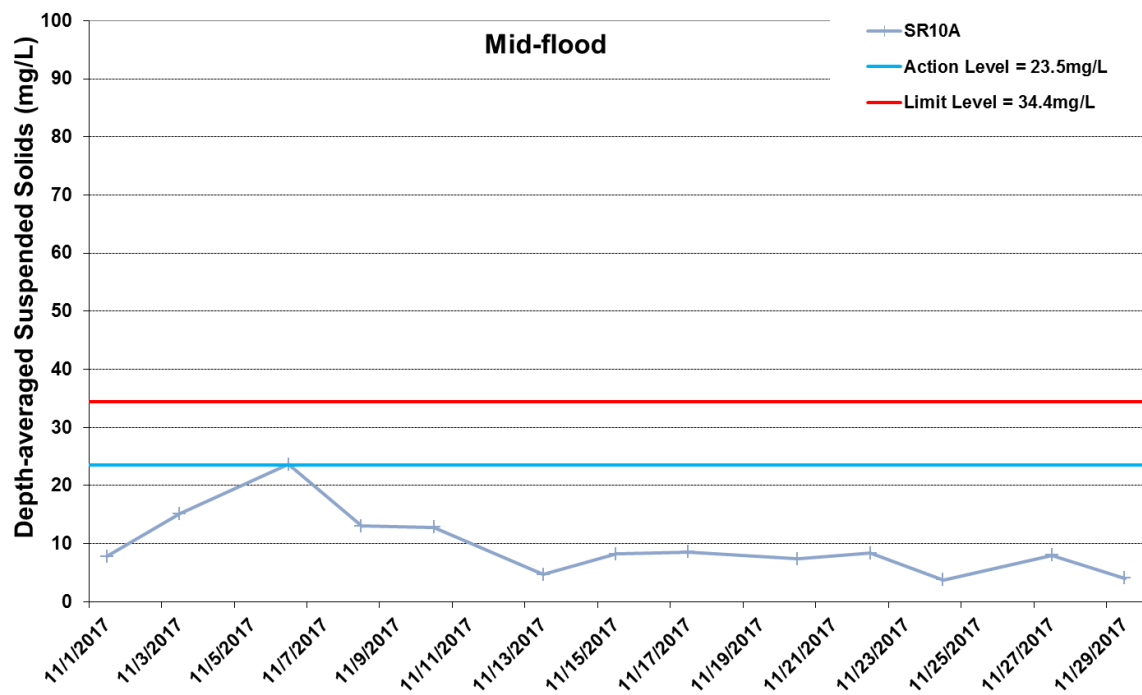
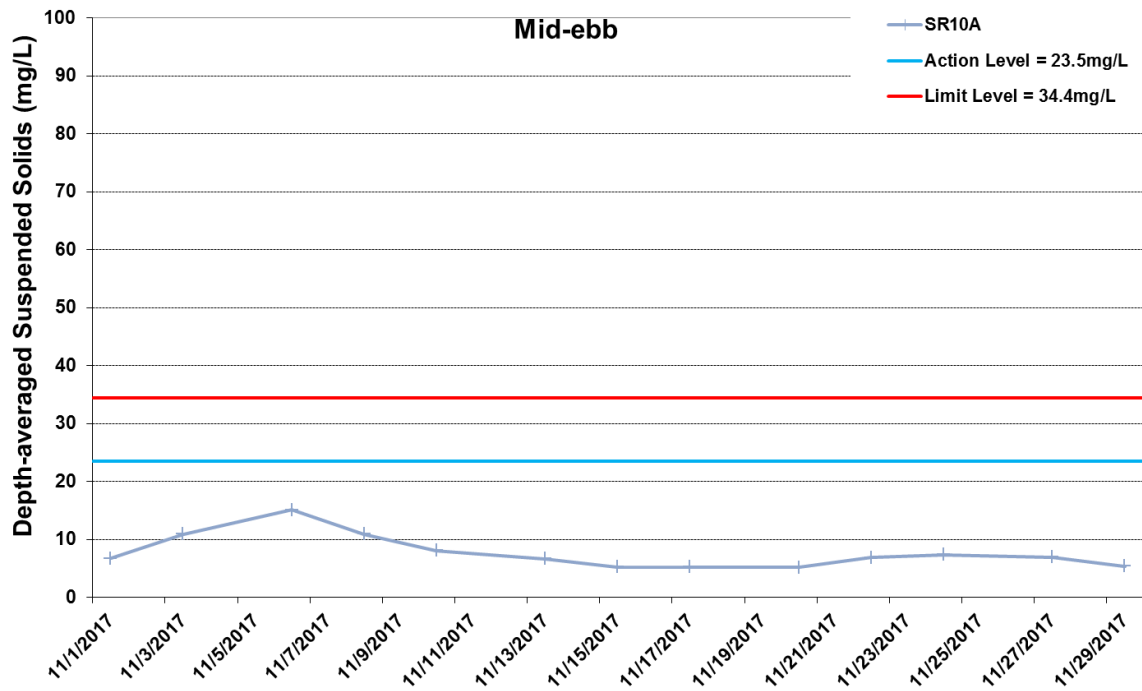


Figure I41 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



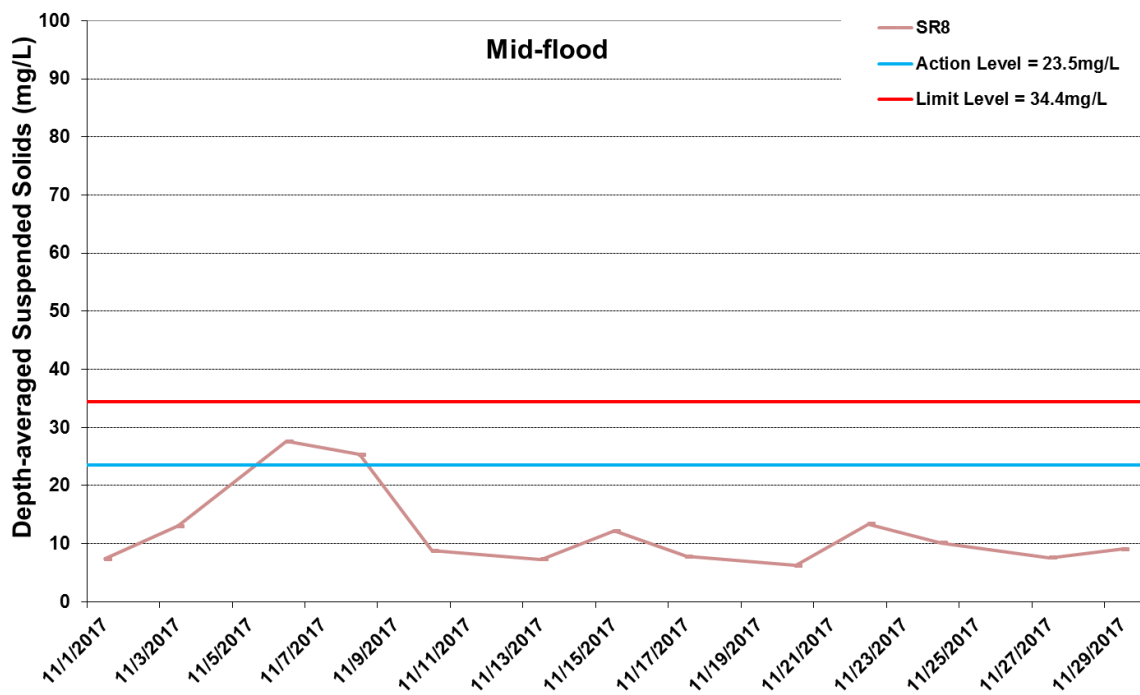
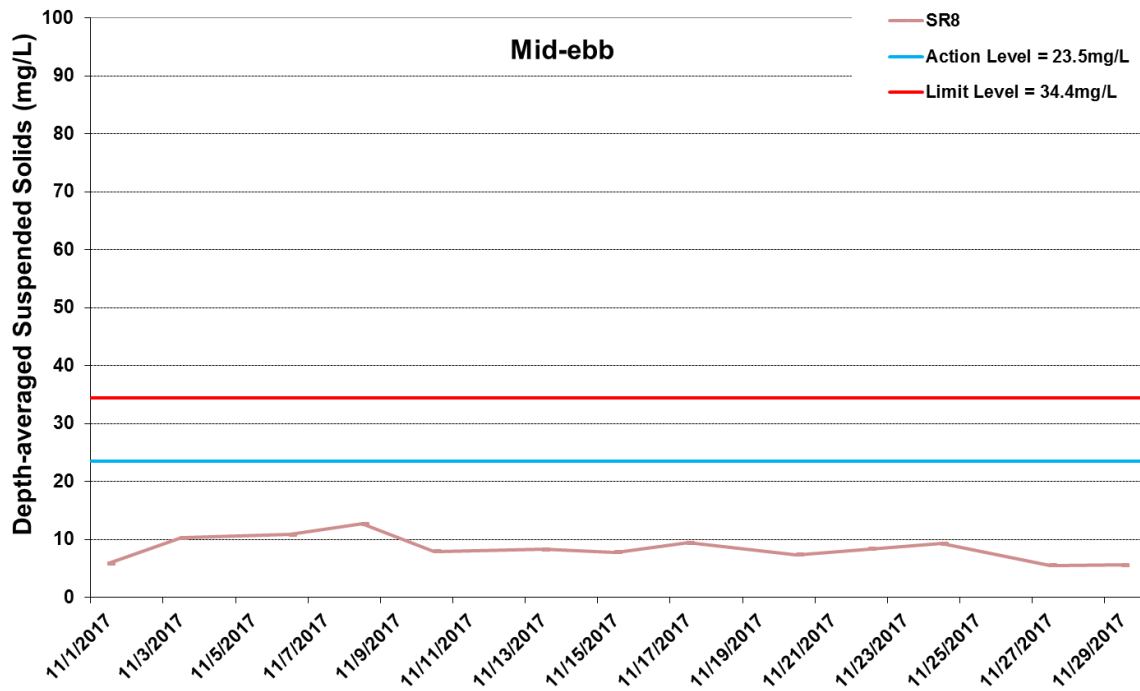


Figure I42 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



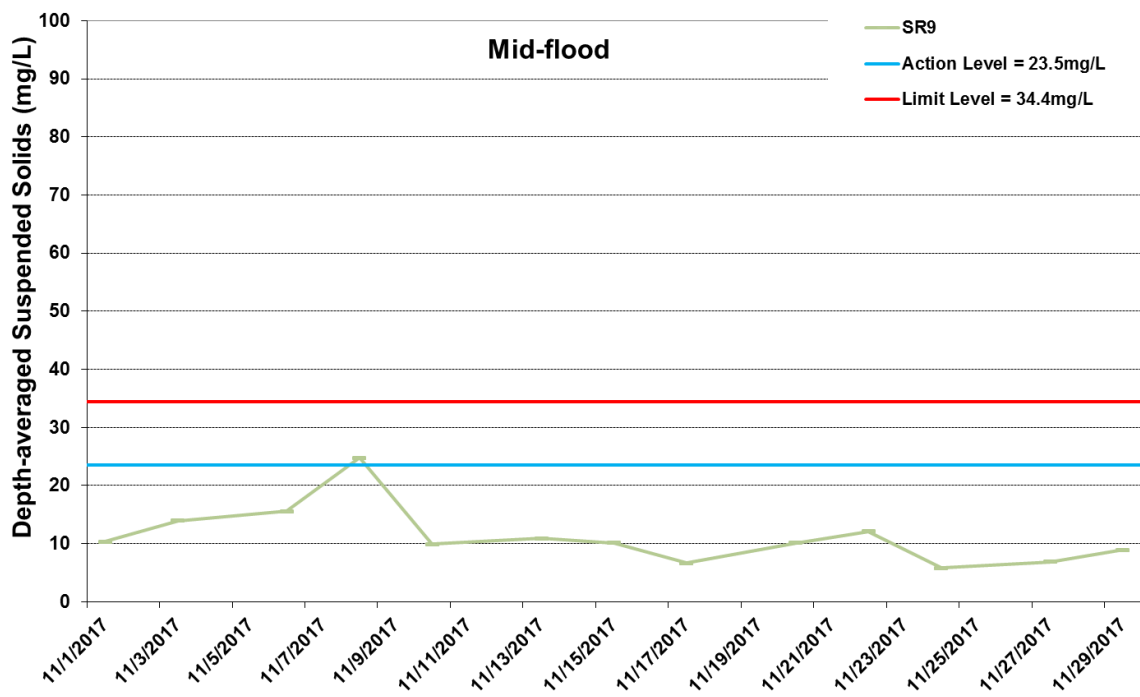
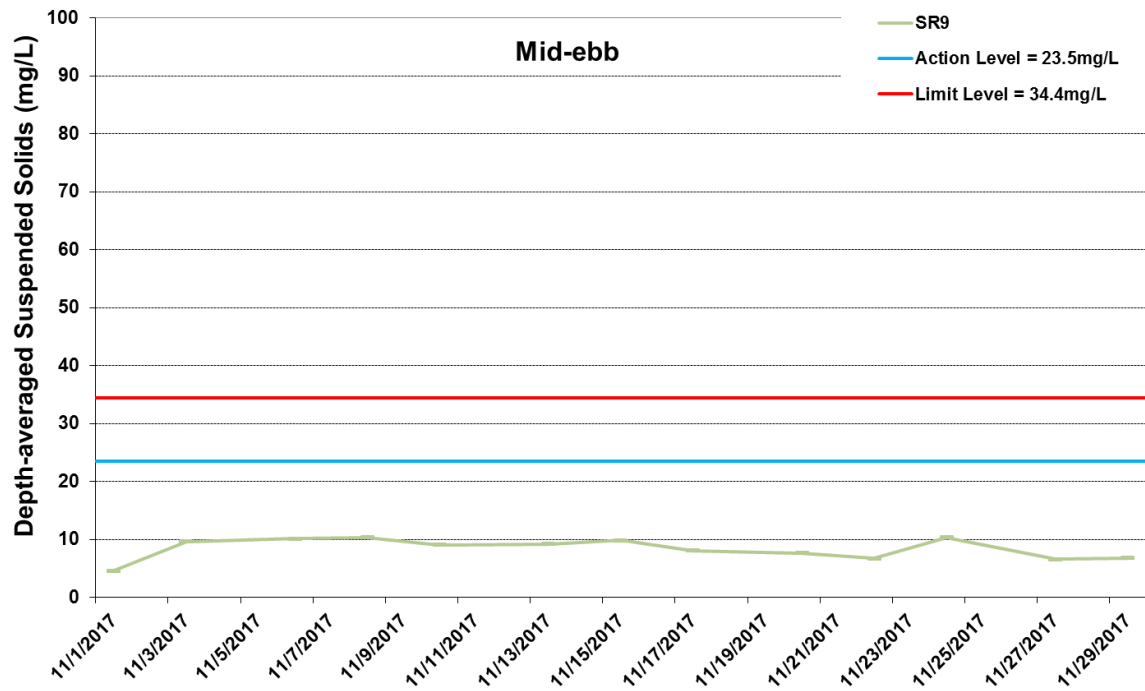


Figure I43 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2017 and 30 November 2017 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Construction and Filling works at Portion N-A, Seawall Enhancement works at Portion N-C (1/11/2017 - 30/11/2017).



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**

*16th Quarterly Progress Report (September-November 2017)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

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

13 March 2018

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 16th 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 September to November 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	805476	820800		14	Start Point	817537	820220
2	End Point	805476	826654		14	End Point	817537	824613
3	Start Point	806464	821150		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	821500		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	821850		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	822150		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	822000		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321

8	Start Point	811508	821123		20	Start Point	823477	823402
8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	821303		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562
10	Start Point	813525	821176		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818853		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807		24	Start Point	805476	815900
12	End Point	815542	824882		24	End Point	805476	819100

- 2.1.2. The HKLR03 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 20 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2017). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

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

2.2. Photo-identification Work

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

2.3. Data Analysis

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

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

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

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

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

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

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

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

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

3. Monitoring Results

3.1. Summary of survey effort and dolphin sightings

- 3.1.1. During the period of September to November 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.
- 3.1.2. From these HKLR03 surveys, a total of 802.12 km of survey effort was collected, with 96.0% 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, 297.00 km and 505.12 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.1.3. The total survey effort conducted on primary lines was 578.16 km, while the effort on secondary lines was 223.96 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.
- 3.1.4. During the six sets of HKLR03 monitoring surveys from September to November 2017, 13 groups of 50 Chinese White Dolphins were sighted. All dolphin sightings were made

during on-effort search in this quarter, and 12 of the 13 on-effort dolphin sightings were made on primary lines. A summary table of dolphin sightings is shown in Appendix II.

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

3.2. *Distribution*

- 3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from September to November 2017 is shown in Figure 1. Almost all sightings were made at the northwest portion of the North Lantau region, mainly to the east of Lung Kwu Chau and at the mouth of Deep Bay near Black Point (Figure 1). One dolphin group was also sighted at the southwestern end of NWL survey area, or near the HKLR09 alignment. As consistently recorded in the previous monitoring quarters, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).
- 3.2.2. All dolphin sightings were located far away from the alignments of TM-CLKL as well as the HKBCF and HKLR03 reclamation sites (Figure 1). However, one dolphin group was sighted near the alignment of HKLR09 as mentioned above.
- 3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (September to November 2017) was drastically different from the one during the baseline monitoring period (Figure 1). In the present quarter, dolphins have disappeared from the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past 18 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, dolphins were infrequently sighted here, and mainly at the northwestern end of the area, which was in stark contrast with their frequent occurrences throughout the area during the baseline period (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the five quarterly periods of autumn months in 2013-17 (Figure 2). Among the five autumn periods, dolphins were still sighted regularly in NWL waters in 2013 and 2014, but their usage there was progressively reduced in the three subsequent autumn periods, with the only occurrences mostly concentrated at the northwestern portion of the survey area (Figure 2).

3.3. *Encounter rate*

- 3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) for each set of the HKLR03 surveys in NEL and NWL are shown in Table 2. The average encounter rates deduced from the six

sets of HKLR03 surveys were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during September-November 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 (15 & 18 Sep 2017)	0.00	0.00
	Set 2 (22 & 29 Sep 2017)	0.00	0.00
	Set 3 (4 & 9 Oct 2017)	0.00	0.00
	Set 4 (18 & 26 Oct 2017)	0.00	0.00
	Set 5 (1 & 8 Nov 2017)	0.00	0.00
	Set 6 (17 & 24 Nov 2017)	0.00	0.00
Northwest Lantau	Set 1 (15 & 18 Sep 2017)	0.00	0.00
	Set 2 (22 & 29 Sep 2017)	3.63	16.34
	Set 3 (4 & 9 Oct 2017)	1.86	9.30
	Set 4 (18 & 26 Oct 2017)	4.89	4.89
	Set 5 (1 & 8 Nov 2017)	4.99	26.60
	Set 6 (17 & 24 Nov 2017)	3.33	5.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (September - November 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; ± 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 2017	September – November 2011	September – November 2017	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	3.12 ± 1.91	9.85 ± 5.85	10.35 ± 9.66	44.66 ± 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 2.5 sightings and 9.9 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 18 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 **autumn** 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
March-May 2017 (Impact)	0.00	0.00
June-August 2017 (Impact)	0.00	0.00
September-November 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 68.3% and 76.8% 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 **autumn** 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)	9.85 ± 5.85	44.66 ± 29.85
December 2012-February 2013 (Impact)	8.36 ± 5.03	35.90 ± 23.10
March-May 2013 (Impact)	7.75 ± 3.96	24.23 ± 18.05
June-August 2013 (Impact)	6.56 ± 3.68	27.00 ± 18.71
September-November 2013 (Impact)	8.04 ± 1.10	32.48 ± 26.51
December 2013-February 2014 (Impact)	8.21 ± 2.21	32.58 ± 11.21
March-May 2014 (Impact)	6.51 ± 3.34	19.14 ± 7.19
June-August 2014 (Impact)	4.74 ± 3.84	17.52 ± 15.12
September-November 2014 (Impact)	5.10 ± 4.40	20.52 ± 15.10
December 2014-February 2015 (Impact)	2.91 ± 2.69	11.27 ± 15.19
March-May 2015 (Impact)	0.47 ± 0.73	2.36 ± 4.07
June-August 2015 (Impact)	2.53 ± 3.20	9.21 ± 11.57
September-November 2015 (Impact)	3.94 ± 1.57	21.05 ± 17.19
December 2015-February 2016 (Impact)	2.64 ± 1.52	10.98 ± 3.81
March-May 2016 (Impact)	0.98 ± 1.10	4.78 ± 6.85
June-August 2016 (Impact)	1.72 ± 2.17	7.48 ± 10.98
September-November 2016 (Impact)	2.86 ± 1.98	10.89 ± 10.98
December 2016-February 2017 (Impact)	3.80 ± 3.79	14.52 ± 17.21
March-May 2017 (Impact)	0.93 ± 1.03	5.25 ± 9.53
June-August 2017 (Impact)	2.20 ± 2.88	6.58 ± 8.12
September-November 2017 (Impact)	3.12 ± 1.91	10.35 ± 9.66

3.3.5. Dolphin encounter rates in NWL during autumn 2017 was similar to the previous autumn period in 2016, but was much lower than the ones in the autumn periods of 2013, 2014

and 2015 (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 discussed in Hung (2017), 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. Apparently such noticeable decline has already extended to NWL waters progressively in the past few years with no sign of recovery, even though the HZMB-related construction activities have 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 (20th quarter of the HKLR03 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0057 and 0.0278 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 20 quarters of the HKLR03 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.000000 and 0.000000 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 of the past few years.
- 3.3.11. The dramatic decline in dolphin usage of North Lantau region raises serious concern, as the timing of the decline in dolphin usage in North Lantau waters coincided well with the construction schedule of the HZMB-related projects (Hung 2017). Apparently there was no sign of recovery of dolphin usage even though almost all marine works associated with the HZMB construction have been completed.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from one to 12 individuals per group in North Lantau region during September to November 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.

- 3.4.2. The average dolphin group size in NWL waters during September to November 2017 was only slightly higher than the one recorded during the three-month baseline period, but it should also be noted that the sample size of 13 dolphin groups in the present quarter was very small when compared to the 66 groups sighted during the baseline period (Table 6).

Table 6. Comparison of average dolphin group sizes from impact monitoring period (September – November 2017) and baseline monitoring period (September – November 2011) (Note: \pm denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	September – November 2017	September – November 2011
Overall	3.85 \pm 3.39 (n = 13)	3.72 \pm 3.13 (n = 66)
Northeast Lantau	---	3.18 \pm 2.16 (n = 17)
Northwest Lantau	3.85 \pm 3.39 (n = 13)	3.92 \pm 3.40 (n = 49)

- 3.4.3. Notably, 8 of these 14 dolphin groups were composed of 1-3 individuals only, while there were four medium-sized groups with 5-8 dolphins per group, and one large group of 12 dolphins (Appendix II).
- 3.4.4. Distribution of the larger dolphin groups with five individuals or more per group during the present quarter is shown in Figure 3, with comparison to the one in baseline period. The medium-sized group with 5-8 dolphins were scattered at the northwestern portion of the NWL survey area with no particular concentration, while the one large group of 12 dolphins was sighted at the mouth of Deep Bay (Figure 3). Such distribution pattern was very different from the baseline period, when the larger dolphin groups were frequently sighted and evenly distributed in NWL waters, and a few were also sighted in NEL waters (Figure 3).
- 3.5. *Habitat use*
- 3.5.1. From September to November 2017, four of the five grids with moderately high to high dolphin densities were located to the north of Lung Kwu Chau, while one grid to the east of Sha Chau also recorded moderately high dolphin density (Figures 4a and 4b). All grids near HKLR03/HKBCF reclamation sites as well as TMCLKL alignment 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 high dolphin usage throughout the area, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. In contrast, only several grids with moderately high to high dolphin densities were located near Lung Kwu Chau and Sha Chau during the present impact phase period (Figure 5).

3.6. *Mother-calf pairs*

3.6.1. During the present quarterly period, no young calf was sighted at all among the 13 groups of dolphins.

3.7. *Activities and associations with fishing boats*

3.7.1. One of the thirteen dolphin groups were engaged in feeding activity, while another two groups were engaged in socializing activity. However, none of them was engaged in traveling or milling/resting activity during the three-month study period.

3.7.2. The percentages of sightings associated with feeding activities (7.7%) was lower than the one recorded during the baseline period (11.6%), while the one for socializing activities (15.4%) was much higher than the ones recorded during the baseline period (5.4% respectively). However, it should be noted the sample sizes on total numbers of dolphin sightings were very different between the two periods.

3.7.3. Distribution of dolphins engaged in various activities during the present three-month period and baseline period is shown in Figure 6. The one dolphin group engaged in feeding activity was sighted at the southeast corner of Lung Kwu Chau, while the two dolphin groups engaged in socializing activities were both located to the north of Lung Kwu Chau (Figure 6).

3.7.4. When compared to the baseline period, distribution of various dolphin activities during the present impact phase monitoring period was drastically different with a much more restricted area of occurrences (Figure 6).

3.7.5. Notably, one group of a single dolphin was found to be associated with an operating purse-seiner adjacent to Lung Kwu Chau within the marine park during the present impact phase period.

3.8. *Summary of photo-identification works*

3.8.1. From September to November 2017, over 2,500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, 23 individuals sighted 42 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. Six individuals (i.e. CH34, NL33, NL46, NL49, NL320, NL322, NL328 and WL05) were re-sighted twice, while four other individuals (i.e. NL136, NL182, NL202 and NL286) were re-sighted 3-4 times during the three-month period (Appendix III).

3.8.3. Notably, ten of these 23 individuals (i.e. CH34, NL12, NL49, NL104, NL136, NL182, NL202, NL320, NL321 and WL05) were also sighted in Northwest Lantau during the HKBCF monitoring surveys under the same three-month period. Moreover, six individuals (i.e. CH34, NL12, NL49, NL182, NL210 and WL05) were also sighted in West Lantau waters during the HKLR09 monitoring surveys from September to November 2017, showing their extensive individual movements across different survey areas.

3.9. *Individual range use*

3.9.1. Ranging patterns of the 23 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, three individuals (i.e. NL12, NL182 and NL210) consistently utilized North Lantau waters in the past have extended their range use to WL during the present quarter.

3.9.4. 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 2017).

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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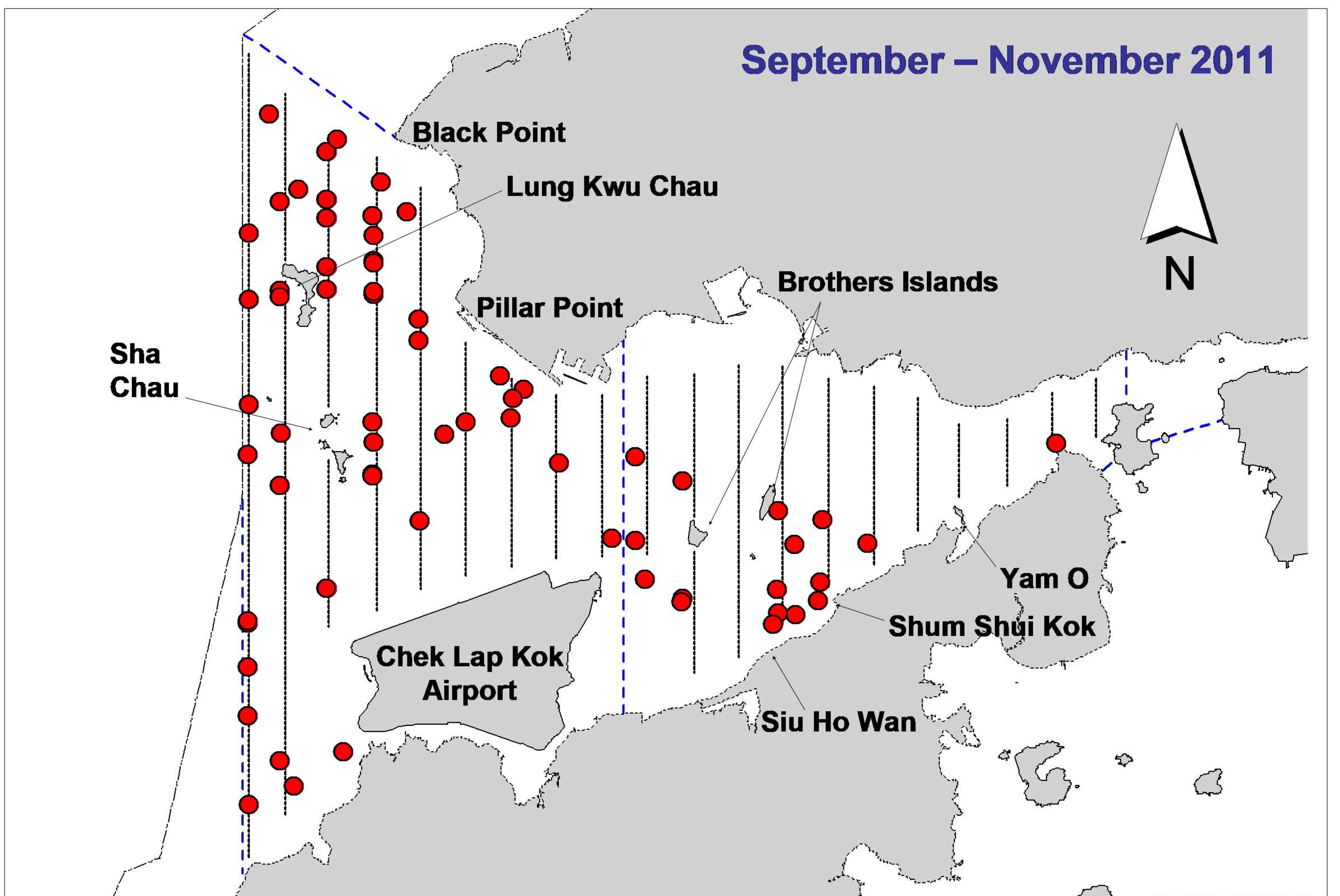
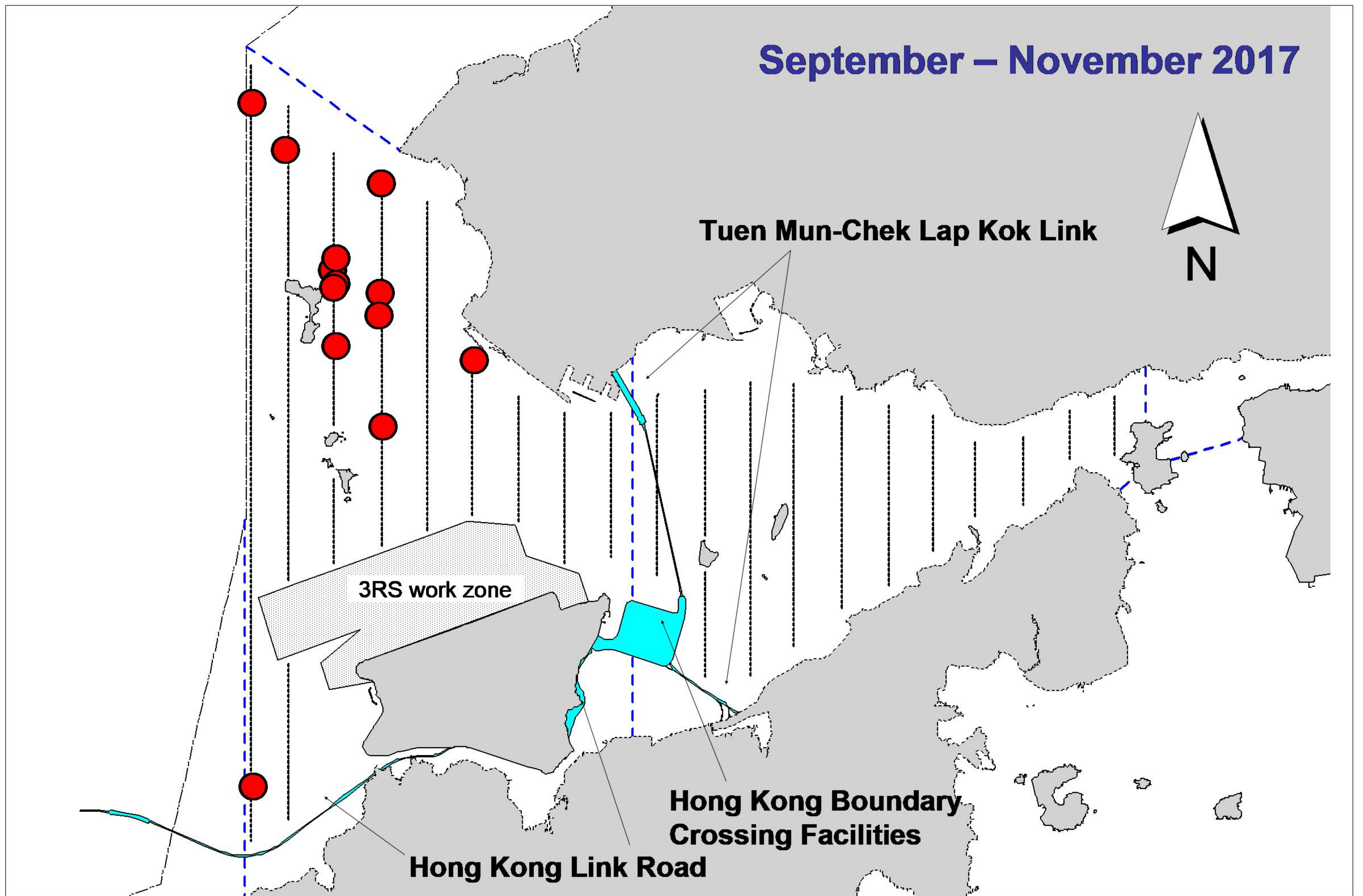


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

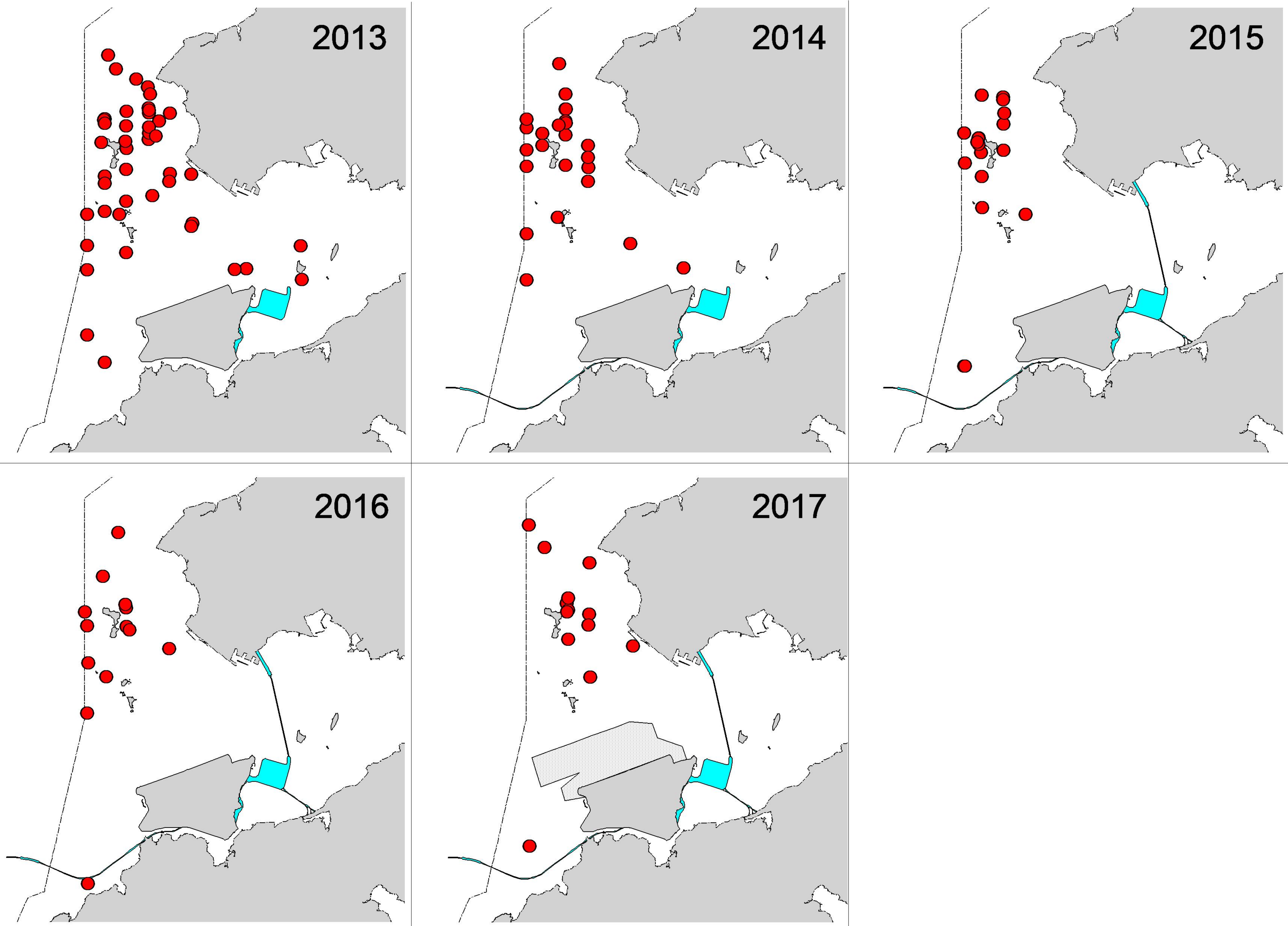


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past five autumn quarters (September-November) of HKLR03 impact phase in 2013-17

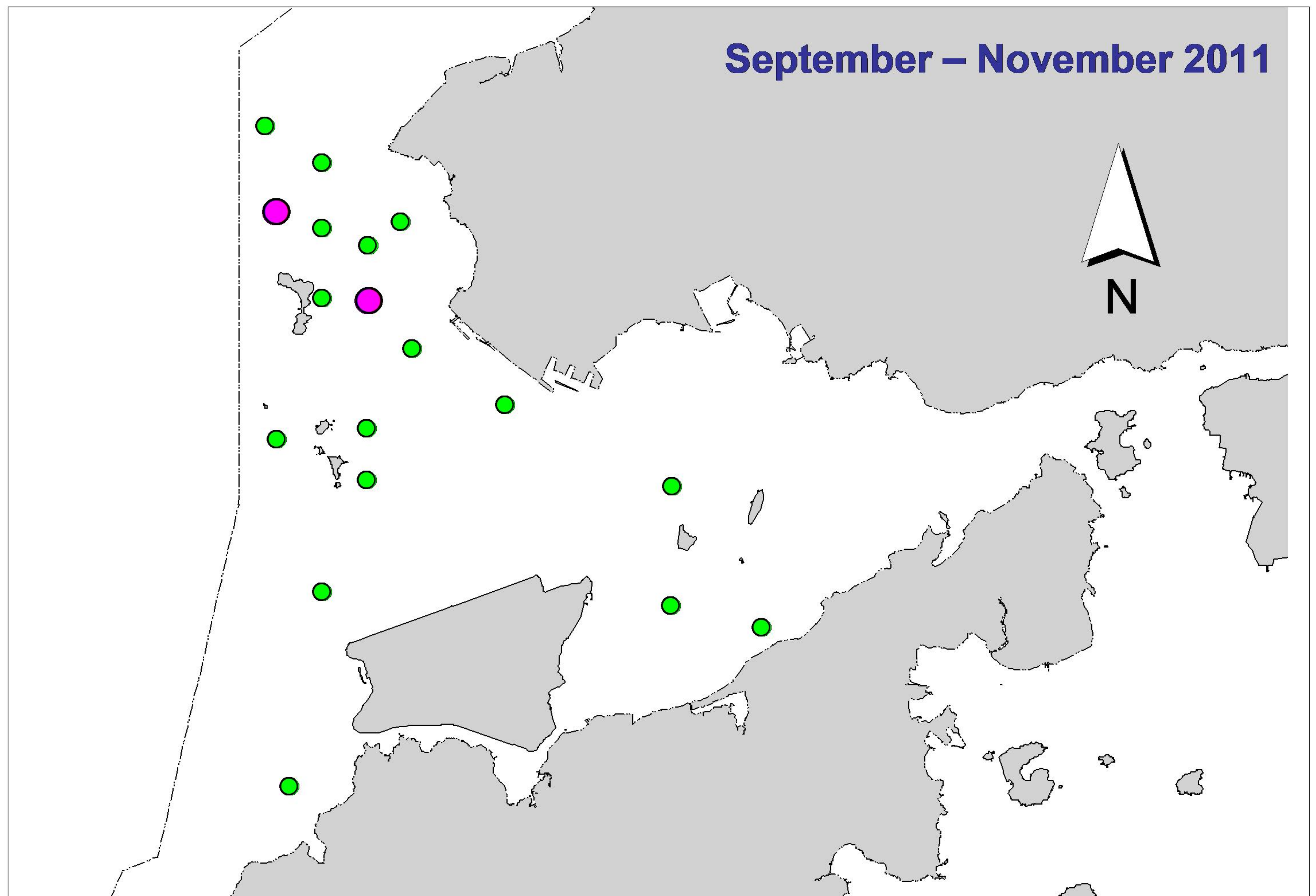
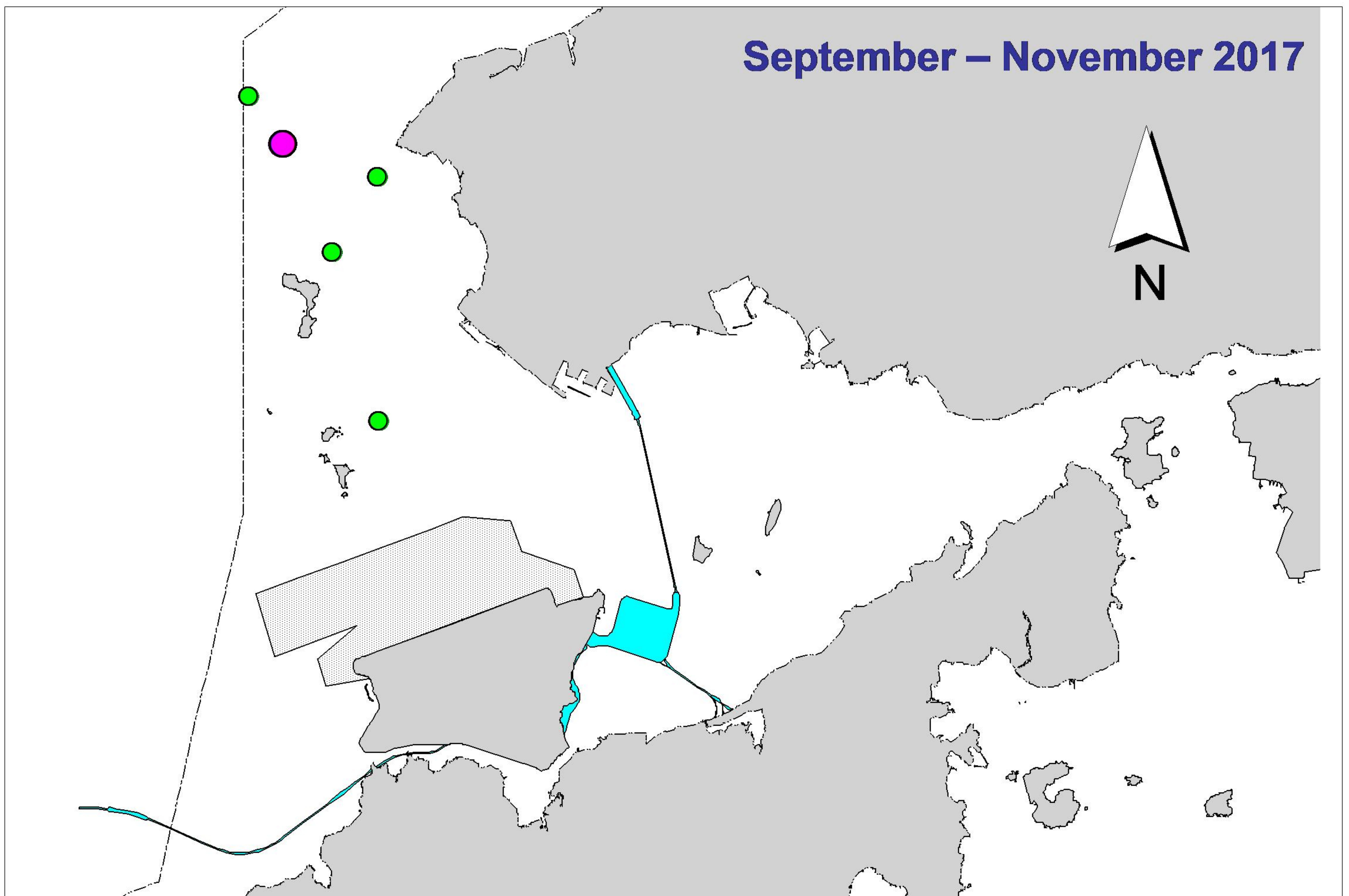


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

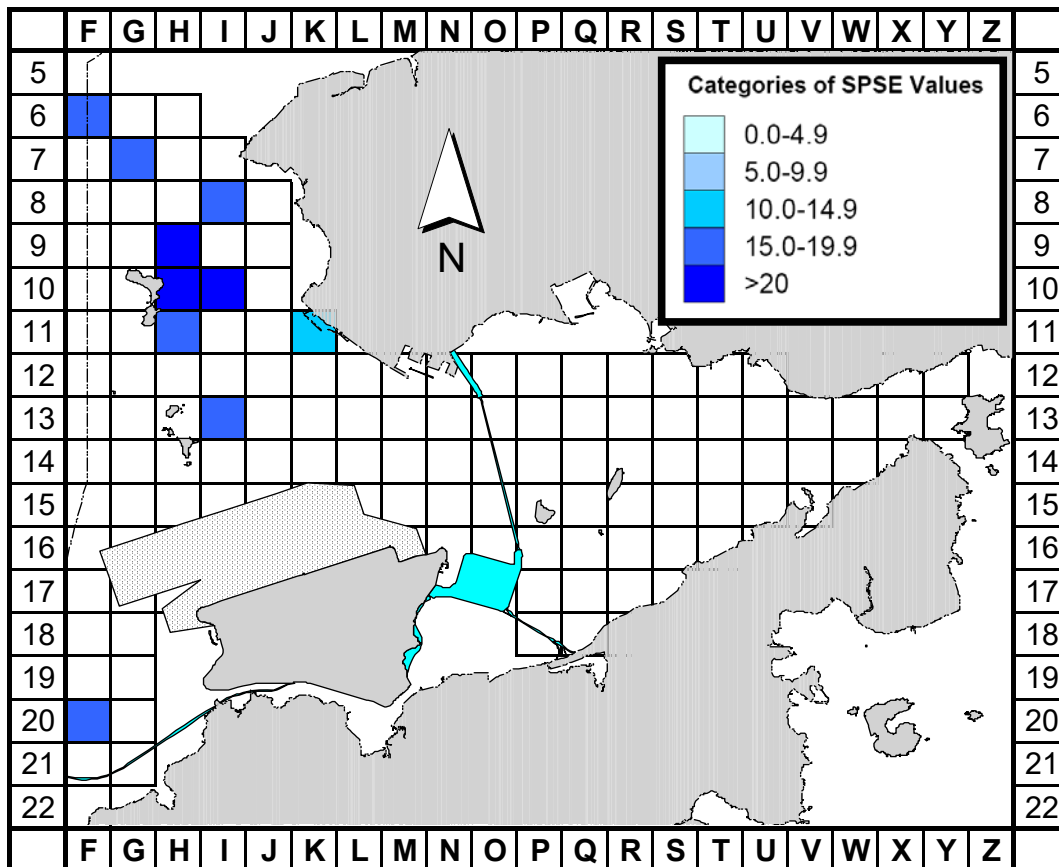


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Sep-Nov 17) (SPSE = no. of on-effort sightings per 100 units of survey effort)

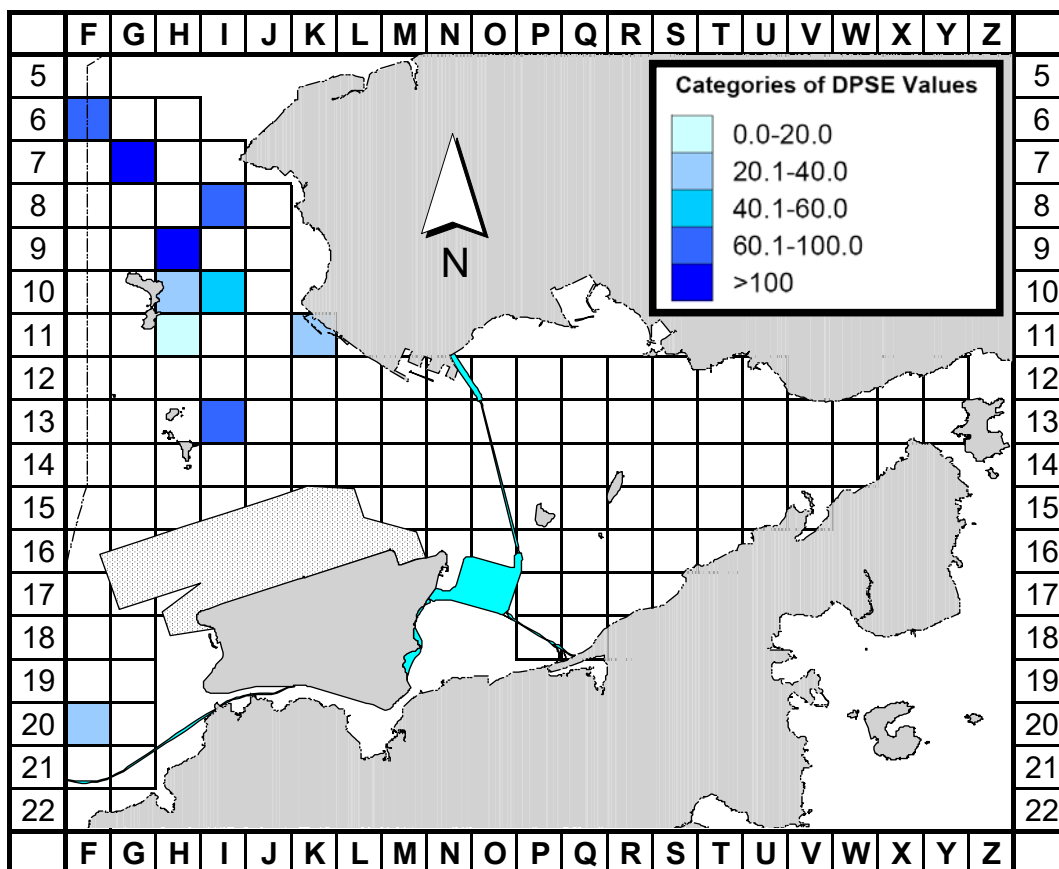


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Sep-Nov 17) (DPSE = no. of dolphins per 100 units of survey effort)

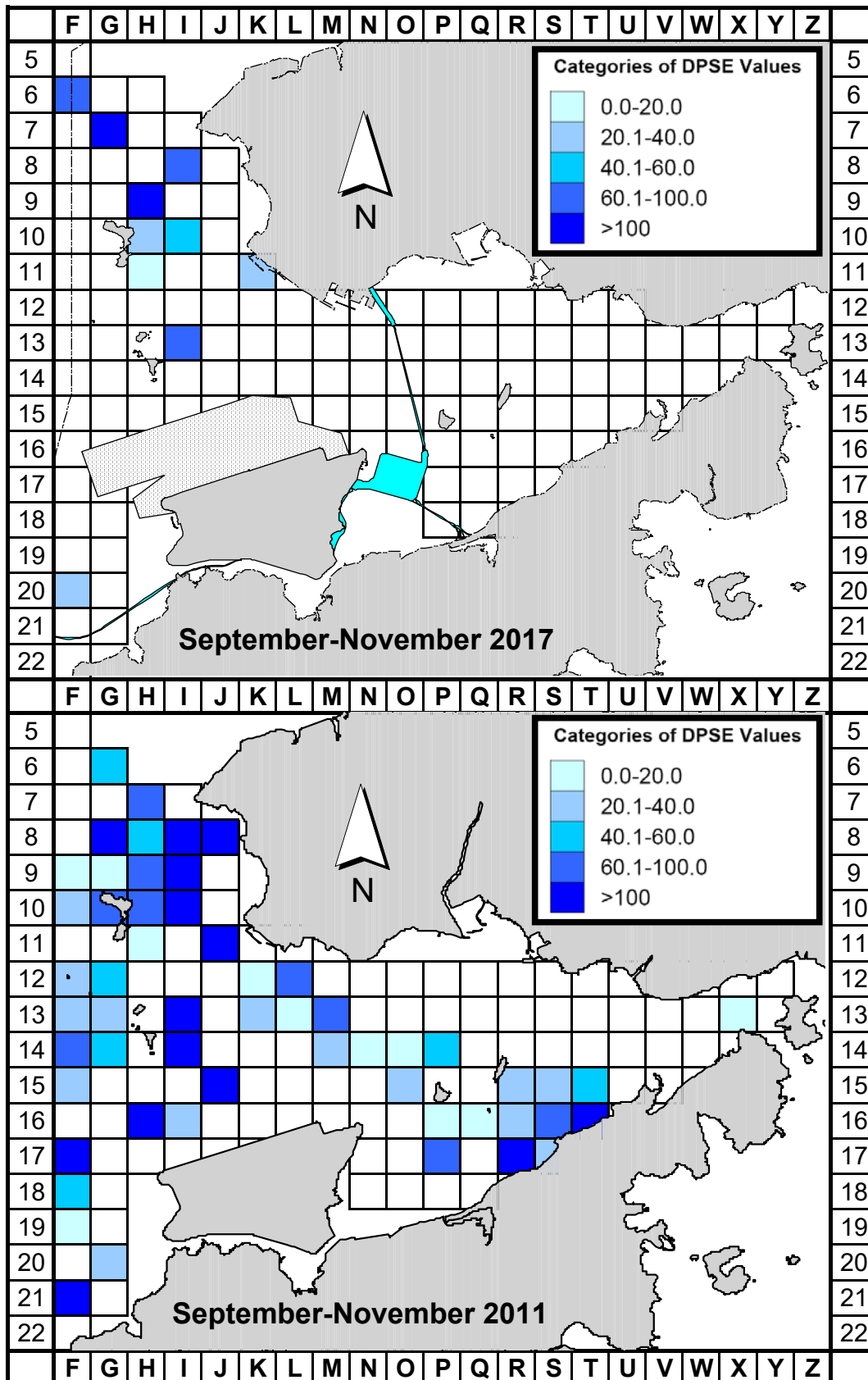


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (September-November 2017) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of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

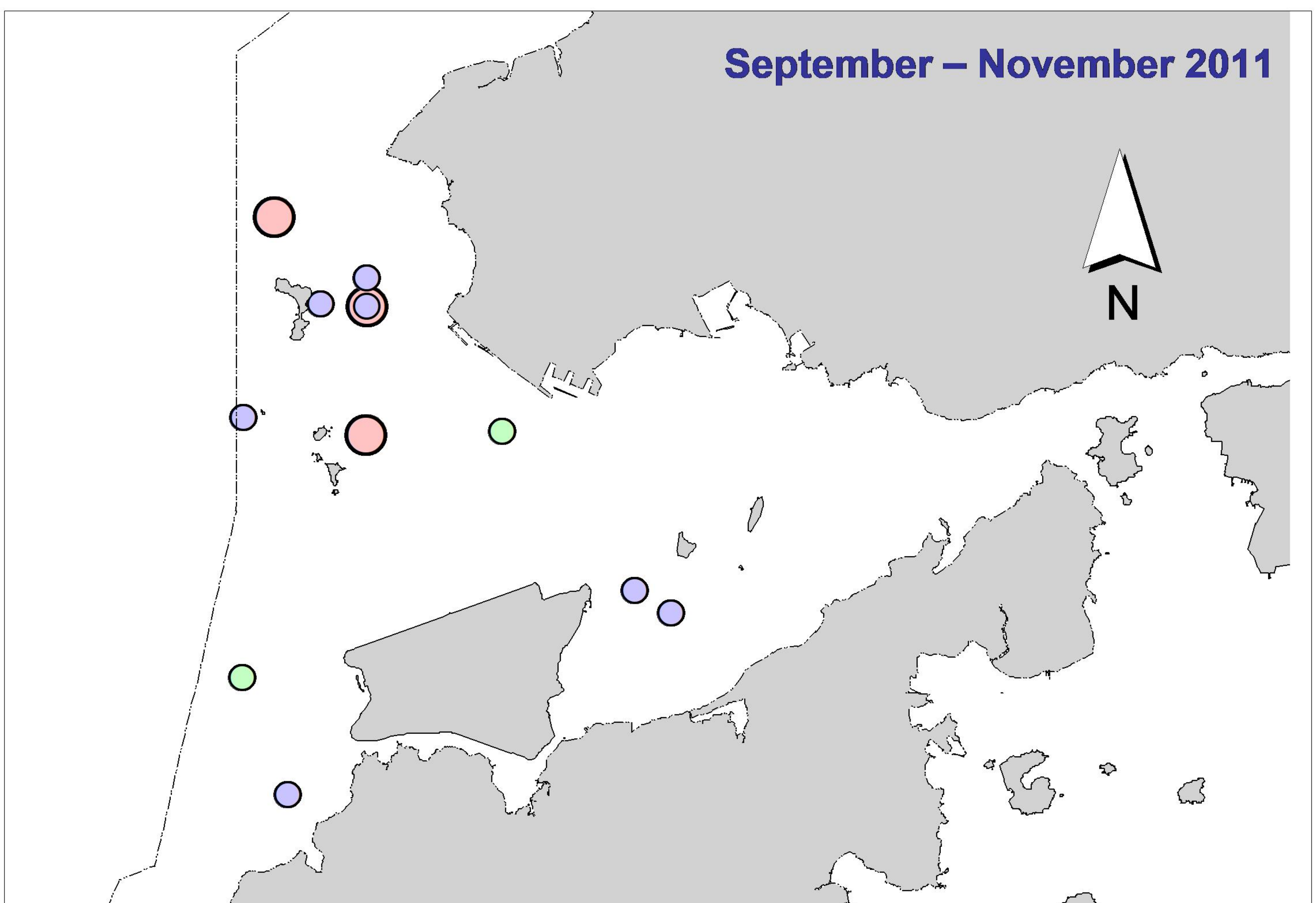
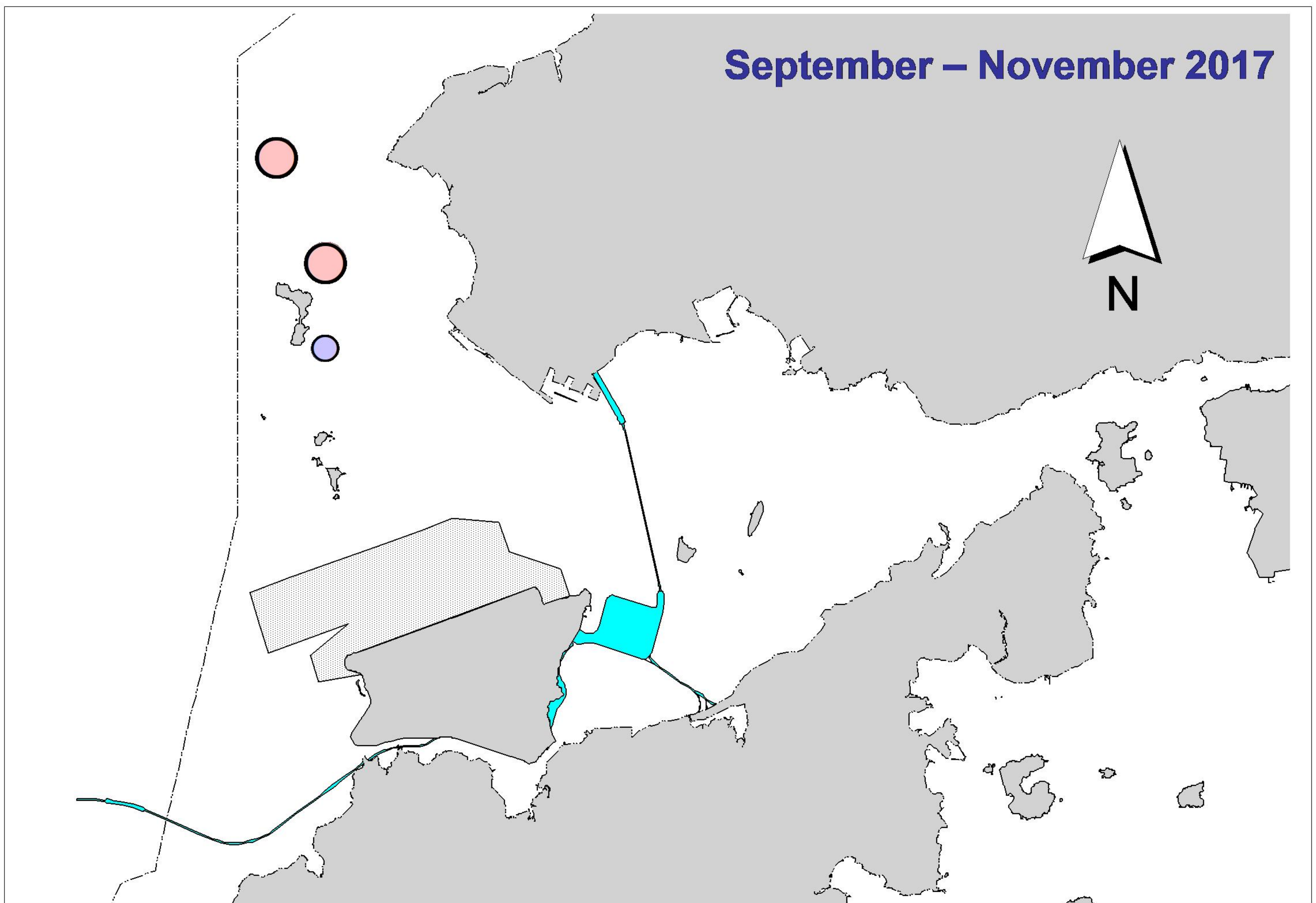


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (September-November 2017)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
15-Sep-17	NW LANTAU	2	26.51	AUTUMN	STANDARD36826	HKLR	P
15-Sep-17	NW LANTAU	2	10.09	AUTUMN	STANDARD36826	HKLR	S
15-Sep-17	NW LANTAU	3	1.20	AUTUMN	STANDARD36826	HKLR	S
15-Sep-17	NE LANTAU	2	34.49	AUTUMN	STANDARD36826	HKLR	P
15-Sep-17	NE LANTAU	3	2.20	AUTUMN	STANDARD36826	HKLR	P
15-Sep-17	NE LANTAU	2	12.01	AUTUMN	STANDARD36826	HKLR	S
18-Sep-17	NW LANTAU	2	28.84	AUTUMN	STANDARD36826	HKLR	P
18-Sep-17	NW LANTAU	3	7.20	AUTUMN	STANDARD36826	HKLR	P
18-Sep-17	NW LANTAU	2	12.96	AUTUMN	STANDARD36826	HKLR	S
22-Sep-17	NW LANTAU	1	6.05	AUTUMN	STANDARD36826	HKLR	P
22-Sep-17	NW LANTAU	2	18.48	AUTUMN	STANDARD36826	HKLR	P
22-Sep-17	NW LANTAU	3	0.56	AUTUMN	STANDARD36826	HKLR	P
22-Sep-17	NW LANTAU	1	1.58	AUTUMN	STANDARD36826	HKLR	S
22-Sep-17	NW LANTAU	2	9.25	AUTUMN	STANDARD36826	HKLR	S
22-Sep-17	NE LANTAU	2	4.68	AUTUMN	STANDARD36826	HKLR	P
22-Sep-17	NE LANTAU	3	31.06	AUTUMN	STANDARD36826	HKLR	P
22-Sep-17	NE LANTAU	2	3.30	AUTUMN	STANDARD36826	HKLR	S
22-Sep-17	NE LANTAU	3	9.06	AUTUMN	STANDARD36826	HKLR	S
29-Sep-17	NW LANTAU	1	3.40	AUTUMN	STANDARD36826	HKLR	P
29-Sep-17	NW LANTAU	2	13.70	AUTUMN	STANDARD36826	HKLR	P
29-Sep-17	NW LANTAU	3	12.90	AUTUMN	STANDARD36826	HKLR	P
29-Sep-17	NW LANTAU	4	5.60	AUTUMN	STANDARD36826	HKLR	P
29-Sep-17	NW LANTAU	2	1.15	AUTUMN	STANDARD36826	HKLR	S
29-Sep-17	NW LANTAU	3	10.06	AUTUMN	STANDARD36826	HKLR	S
4-Oct-17	NW LANTAU	2	0.88	AUTUMN	STANDARD36826	HKLR	P
4-Oct-17	NW LANTAU	3	20.90	AUTUMN	STANDARD36826	HKLR	P
4-Oct-17	NW LANTAU	4	2.00	AUTUMN	STANDARD36826	HKLR	P
4-Oct-17	NW LANTAU	2	3.80	AUTUMN	STANDARD36826	HKLR	S
4-Oct-17	NW LANTAU	3	5.02	AUTUMN	STANDARD36826	HKLR	S
4-Oct-17	NW LANTAU	4	2.40	AUTUMN	STANDARD36826	HKLR	S
4-Oct-17	NE LANTAU	2	8.22	AUTUMN	STANDARD36826	HKLR	P
4-Oct-17	NE LANTAU	3	11.59	AUTUMN	STANDARD36826	HKLR	P
4-Oct-17	NE LANTAU	2	9.49	AUTUMN	STANDARD36826	HKLR	S
4-Oct-17	NE LANTAU	3	1.30	AUTUMN	STANDARD36826	HKLR	S
9-Oct-17	NW LANTAU	2	1.68	AUTUMN	STANDARD36826	HKLR	P
9-Oct-17	NW LANTAU	3	30.32	AUTUMN	STANDARD36826	HKLR	P
9-Oct-17	NW LANTAU	4	2.50	AUTUMN	STANDARD36826	HKLR	P
9-Oct-17	NW LANTAU	2	2.30	AUTUMN	STANDARD36826	HKLR	S
9-Oct-17	NW LANTAU	3	4.90	AUTUMN	STANDARD36826	HKLR	S
9-Oct-17	NW LANTAU	4	6.70	AUTUMN	STANDARD36826	HKLR	S
9-Oct-17	NE LANTAU	3	6.99	AUTUMN	STANDARD36826	HKLR	P
9-Oct-17	NE LANTAU	4	9.93	AUTUMN	STANDARD36826	HKLR	P
9-Oct-17	NE LANTAU	3	6.79	AUTUMN	STANDARD36826	HKLR	S
9-Oct-17	NE LANTAU	4	3.09	AUTUMN	STANDARD36826	HKLR	S
18-Oct-17	NW LANTAU	2	11.46	AUTUMN	STANDARD36826	HKLR	P
18-Oct-17	NW LANTAU	3	20.72	AUTUMN	STANDARD36826	HKLR	P
18-Oct-17	NW LANTAU	2	8.55	AUTUMN	STANDARD36826	HKLR	S
18-Oct-17	NW LANTAU	3	2.50	AUTUMN	STANDARD36826	HKLR	S
18-Oct-17	NE LANTAU	1	2.44	AUTUMN	STANDARD36826	HKLR	P
18-Oct-17	NE LANTAU	2	27.42	AUTUMN	STANDARD36826	HKLR	P

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
18-Oct-17	NE LANTAU	3	5.50	AUTUMN	STANDARD36826	HKLR	P
18-Oct-17	NE LANTAU	1	1.70	AUTUMN	STANDARD36826	HKLR	S
18-Oct-17	NE LANTAU	2	11.34	AUTUMN	STANDARD36826	HKLR	S
26-Oct-17	NW LANTAU	2	24.70	AUTUMN	STANDARD36826	HKLR	P
26-Oct-17	NW LANTAU	3	4.44	AUTUMN	STANDARD36826	HKLR	P
26-Oct-17	NW LANTAU	2	11.91	AUTUMN	STANDARD36826	HKLR	S
26-Oct-17	NW LANTAU	3	0.85	AUTUMN	STANDARD36826	HKLR	S
1-Nov-17	NW LANTAU	2	17.00	AUTUMN	STANDARD36826	HKLR	P
1-Nov-17	NW LANTAU	3	15.32	AUTUMN	STANDARD36826	HKLR	P
1-Nov-17	NW LANTAU	2	8.38	AUTUMN	STANDARD36826	HKLR	S
1-Nov-17	NW LANTAU	3	2.53	AUTUMN	STANDARD36826	HKLR	S
1-Nov-17	NE LANTAU	2	29.72	AUTUMN	STANDARD36826	HKLR	P
1-Nov-17	NE LANTAU	3	5.10	AUTUMN	STANDARD36826	HKLR	P
1-Nov-17	NE LANTAU	2	10.07	AUTUMN	STANDARD36826	HKLR	S
1-Nov-17	NE LANTAU	3	2.41	AUTUMN	STANDARD36826	HKLR	S
8-Nov-17	NW LANTAU	2	13.77	AUTUMN	STANDARD36826	HKLR	P
8-Nov-17	NW LANTAU	3	14.05	AUTUMN	STANDARD36826	HKLR	P
8-Nov-17	NW LANTAU	2	10.58	AUTUMN	STANDARD36826	HKLR	S
8-Nov-17	NW LANTAU	3	1.80	AUTUMN	STANDARD36826	HKLR	S
17-Nov-17	NW LANTAU	2	8.53	AUTUMN	STANDARD36826	HKLR	P
17-Nov-17	NW LANTAU	3	18.98	AUTUMN	STANDARD36826	HKLR	P
17-Nov-17	NW LANTAU	2	9.37	AUTUMN	STANDARD36826	HKLR	S
17-Nov-17	NW LANTAU	3	3.55	AUTUMN	STANDARD36826	HKLR	S
24-Nov-17	NW LANTAU	2	3.81	AUTUMN	STANDARD36826	HKLR	P
24-Nov-17	NW LANTAU	3	28.72	AUTUMN	STANDARD36826	HKLR	P
24-Nov-17	NW LANTAU	2	4.40	AUTUMN	STANDARD36826	HKLR	S
24-Nov-17	NW LANTAU	3	6.27	AUTUMN	STANDARD36826	HKLR	S
24-Nov-17	NE LANTAU	2	30.83	AUTUMN	STANDARD36826	HKLR	P
24-Nov-17	NE LANTAU	3	4.97	AUTUMN	STANDARD36826	HKLR	P
24-Nov-17	NE LANTAU	1	1.20	AUTUMN	STANDARD36826	HKLR	S
24-Nov-17	NE LANTAU	2	10.10	AUTUMN	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (September-November 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 Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
22-Sep-17	1	1152	6	NW LANTAU	2	320	ON	HKLR	823991	807501	AUTUMN	NONE	P
22-Sep-17	2	1244	3	NW LANTAU	1	250	ON	HKLR	825349	809502	AUTUMN	NONE	P
29-Sep-17	1	1309	2	NW LANTAU	4	140	ON	HKLR	827215	806416	AUTUMN	NONE	P
4-Oct-17	1	1143	5	NW LANTAU	3	52	ON	HKLR	828985	807490	AUTUMN	NONE	P
18-Oct-17	1	1149	1	NW LANTAU	2	65	ON	HKLR	826905	806487	AUTUMN	NONE	P
18-Oct-17	2	1159	1	NW LANTAU	2	264	ON	HKLR	825632	806485	AUTUMN	PURSE-SEINE	P
26-Oct-17	1	1135	1	NW LANTAU	2	34	ON	HKLR	826737	807455	AUTUMN	NONE	P
1-Nov-17	1	1126	6	NW LANTAU	3	371	ON	HKLR	830641	804652	AUTUMN	NONE	P
1-Nov-17	2	1152	8	NW LANTAU	2	529	ON	HKLR	827437	806499	AUTUMN	NONE	P
8-Nov-17	1	1129	2	NW LANTAU	2	317	ON	HKLR	826272	807434	AUTUMN	NONE	P
17-Nov-17	1	1155	12	NW LANTAU	2	627	ON	HKLR	829665	805381	AUTUMN	NONE	S
24-Nov-17	1	1023	2	NW LANTAU	3	8	ON	HKLR	816588	804674	AUTUMN	NONE	P
24-Nov-17	2	1155	1	NW LANTAU	3	0	ON	HKLR	826850	806436	AUTUMN	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in September - November 2017

ID#	DATE	STG#	AREA
CH34	01/11/17	2	NW LANTAU
	17/11/17	1	NW LANTAU
NL12	04/10/17	1	NW LANTAU
NL33	01/11/17	2	NW LANTAU
	17/11/17	1	NW LANTAU
NL46	22/09/17	1	NW LANTAU
	17/11/17	1	NW LANTAU
NL49	22/09/17	1	NW LANTAU
	17/11/17	1	NW LANTAU
NL104	04/10/17	1	NW LANTAU
NL123	22/09/17	1	NW LANTAU
NL136	04/10/17	1	NW LANTAU
	18/10/17	2	NW LANTAU
	01/11/17	2	NW LANTAU
	08/11/17	1	NW LANTAU
NL145	17/11/17	1	NW LANTAU
NL182	04/10/17	1	NW LANTAU
	18/10/17	1	NW LANTAU
	01/11/17	2	NW LANTAU
	24/11/17	2	NW LANTAU
NL202	22/09/17	2	NW LANTAU
	29/09/17	1	NW LANTAU
	01/11/17	2	NW LANTAU
NL210	01/11/17	2	NW LANTAU
NL242	22/09/17	1	NW LANTAU
NL261	17/11/17	1	NW LANTAU
NL272	17/11/17	1	NW LANTAU
NL286	22/09/17	2	NW LANTAU
	29/09/17	1	NW LANTAU
	01/11/17	2	NW LANTAU
	17/11/17	1	NW LANTAU
NL296	22/09/17	1	NW LANTAU
NL320	01/11/17	2	NW LANTAU
	17/11/17	1	NW LANTAU
NL321	04/10/17	1	NW LANTAU
NL322	01/11/17	2	NW LANTAU
	17/11/17	1	NW LANTAU
NL328	08/11/17	1	NW LANTAU
	17/11/17	1	NW LANTAU
WL05	22/09/17	1	NW LANTAU
	17/11/17	1	NW LANTAU
WL145	24/11/17	1	NW LANTAU

Appendix IV. Twenty-three individual dolphins that were identified during September to November 2017 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)

NL49



NL104



NL123



NL136



Appendix IV. (cont'd)

NL145



NL182



NL202



NL210



Appendix IV. (cont'd)

NL242



NL261



NL272



NL286



Appendix IV. (cont'd)

NL296



NL320



NL321



NL322



Appendix IV. (cont'd)

NL328



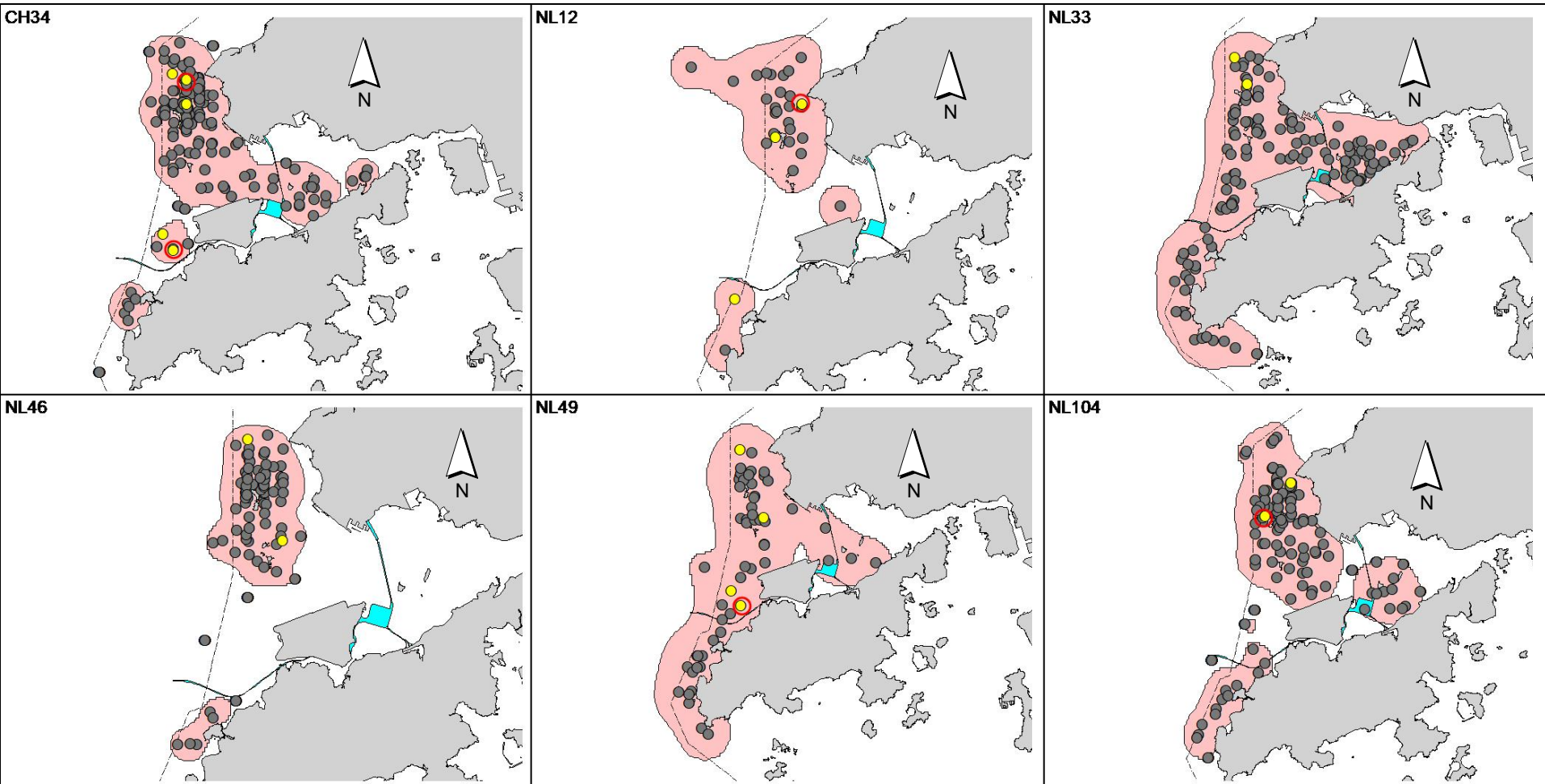
WL05



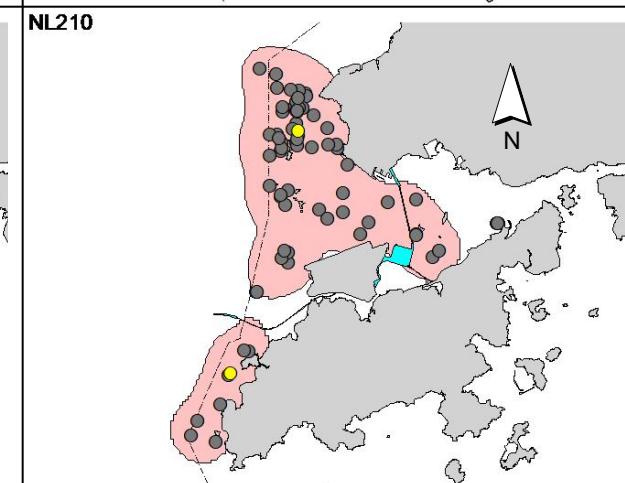
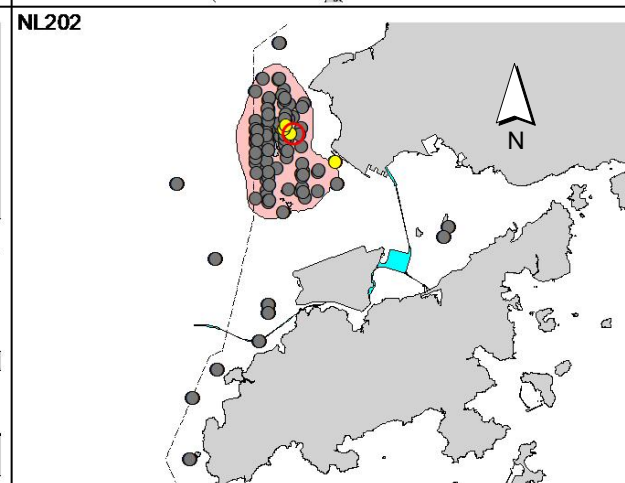
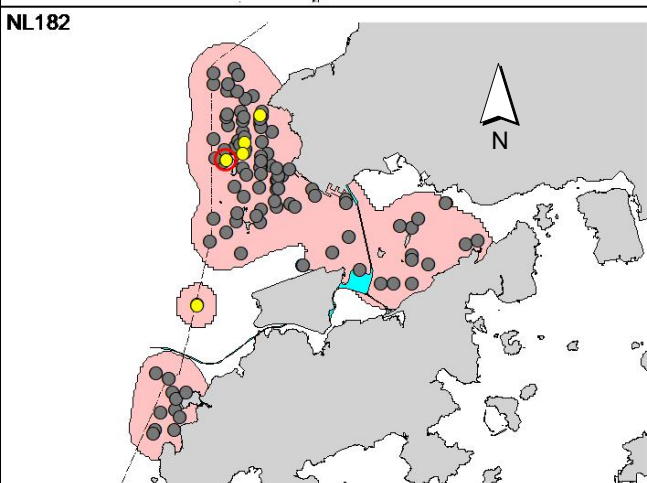
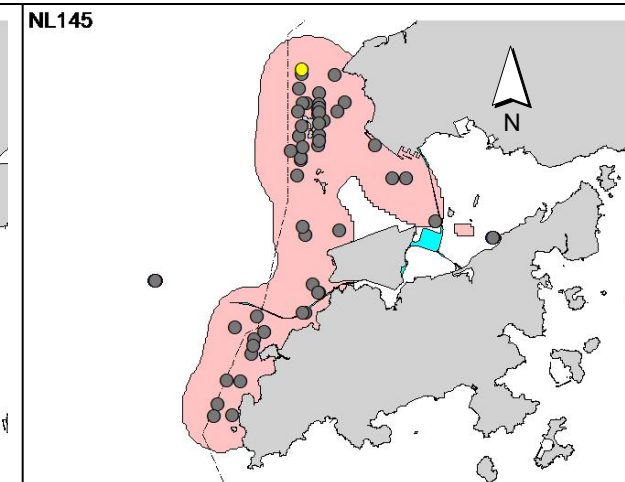
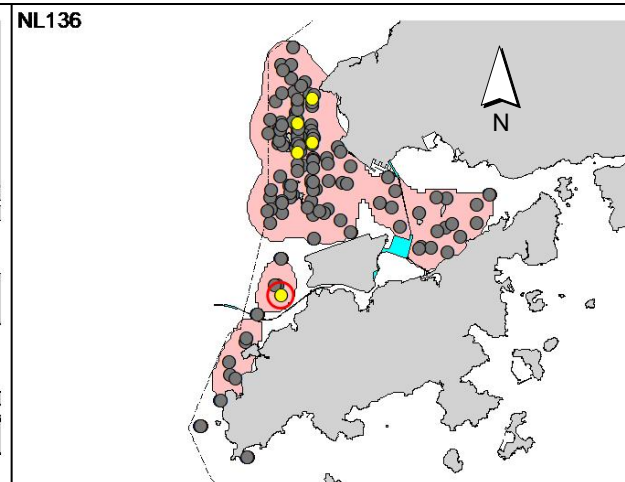
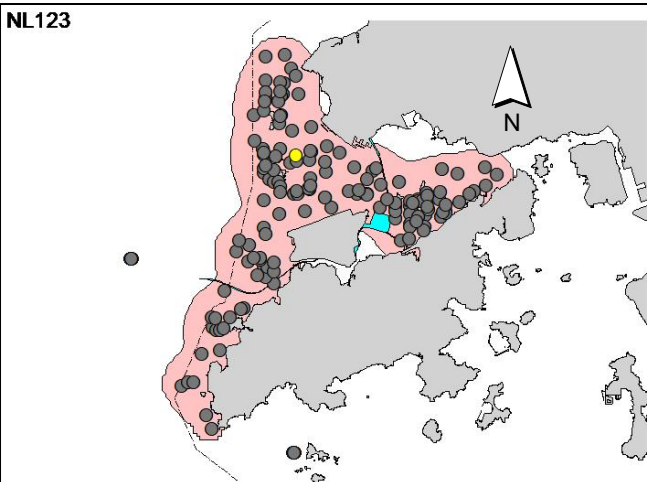
WL145



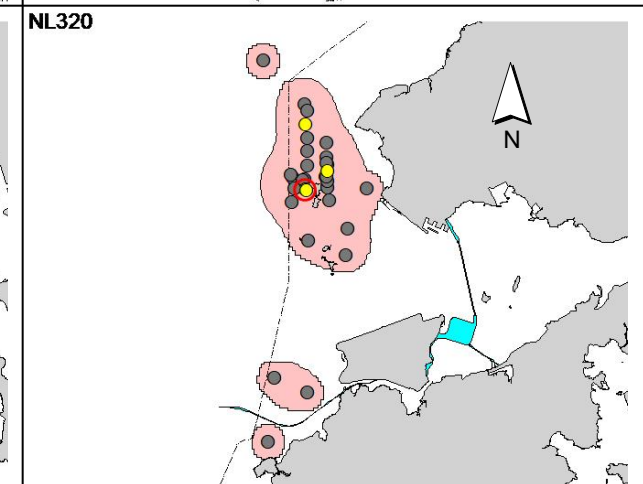
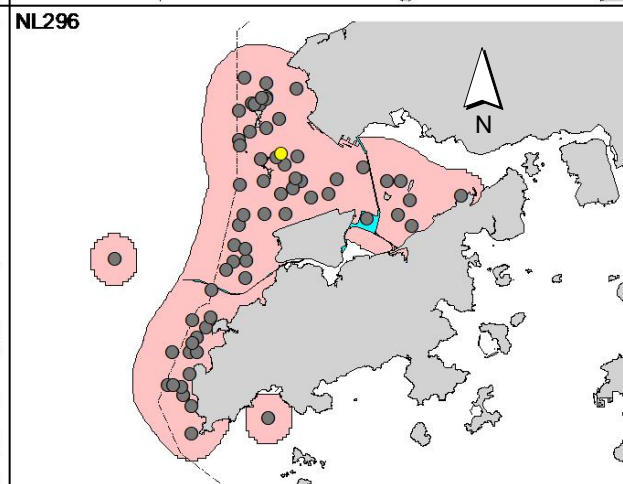
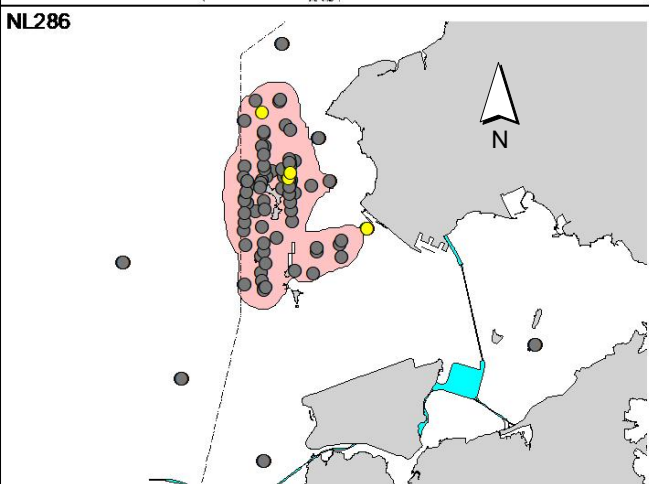
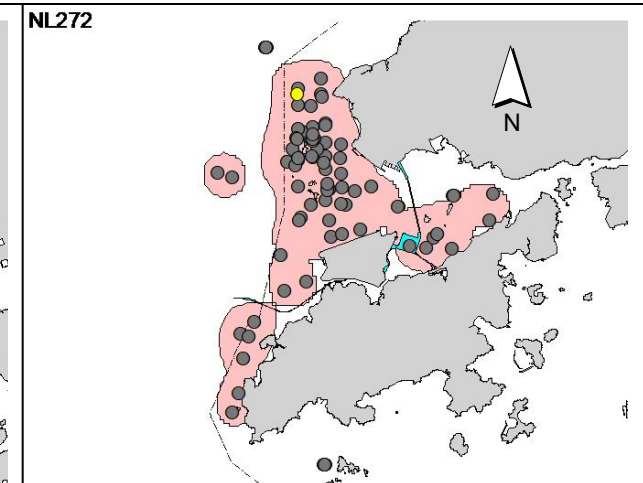
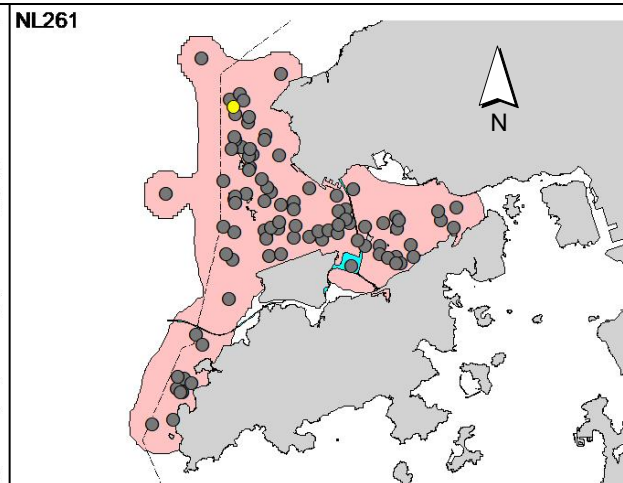
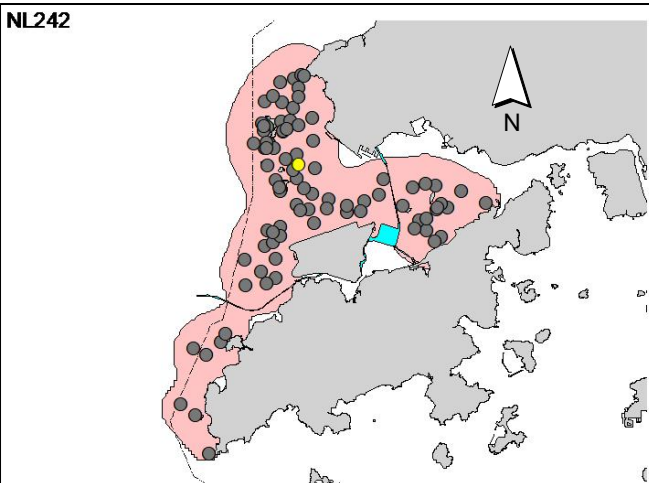
Appendix V. Ranging patterns (95% kernel ranges) of 23 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicate sightings made in September – November 2017 during HKLR03 and HKLR09 monitoring surveys; the yellow dots with the red circles indicate the ones made during HKBCF monitoring surveys)



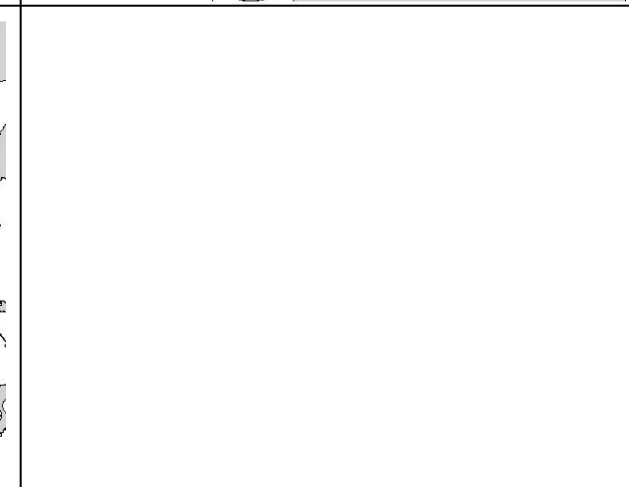
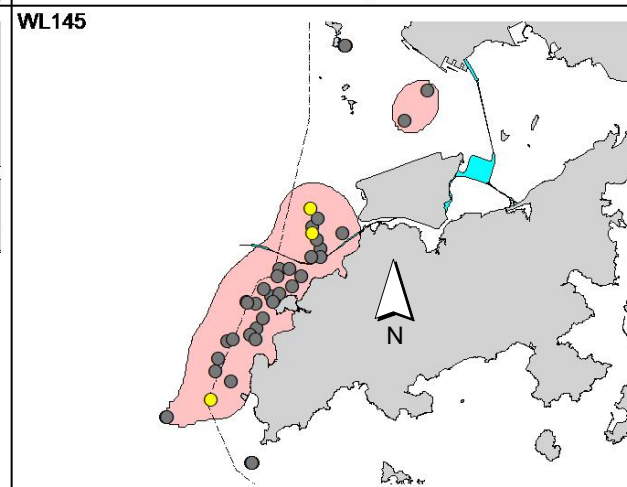
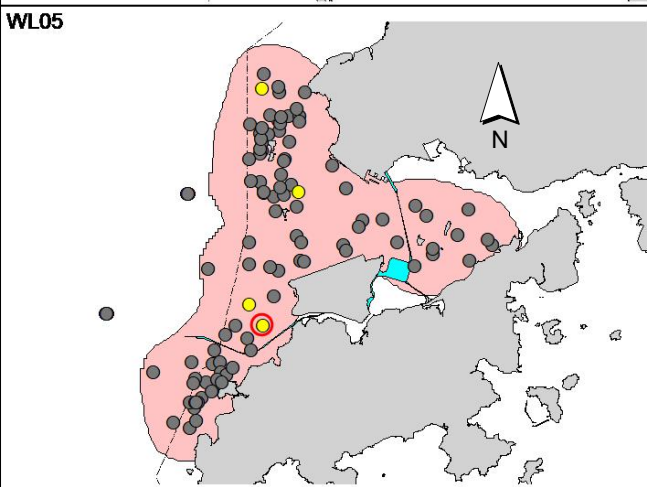
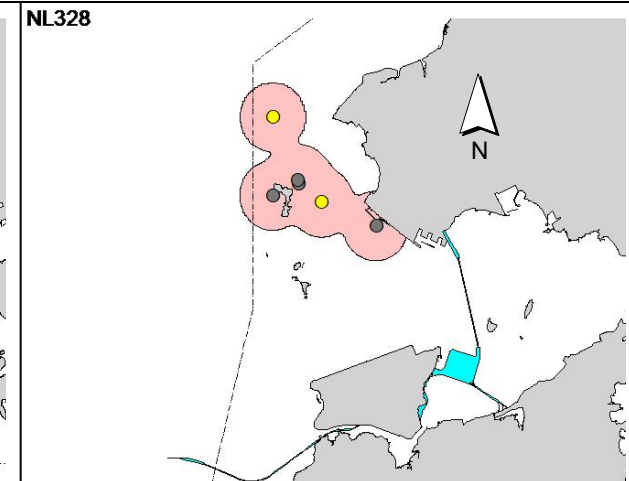
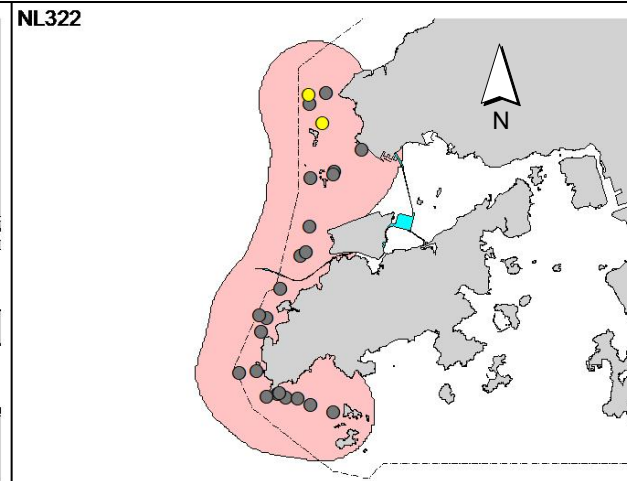
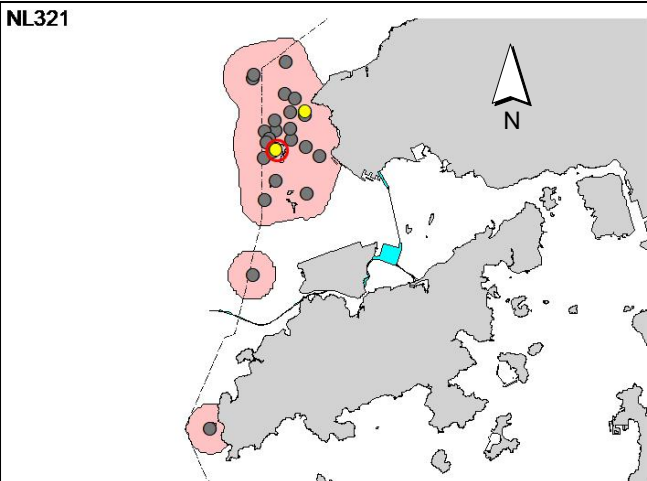
Appendix V. (cont'd)



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

	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	14	48
	Limit	2	4
24-Hr TSP	Action	1	6
	Limit	0	1
Water Quality	Action	10	16
	Limit	0	1
Impact Dolphin Monitoring	Action	0	9
	Limit	1	11

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

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Period (September 2017 to November 2017)	1	0	0
Total No. received since project commencement	15	1	0

Email
message

Environmental
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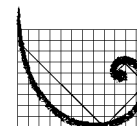
To Ramboll Environ - Hong Kong, Limited (ENPO)

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 Air Quality
Impact Monitoring



ERM

Date 12 September 2017

Dear Sir or Madam,

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

0212330_12September2017_1hrTSP_Station ASR1
0212330_12September2017_1hrTSP_Station ASR1
0212330_12September2017_1hrTSP_Station ASR1
0212330_12September2017_1hrTSP_Station ASR5

Three Action Level and one Limit Level Exceedances were recorded on 12
September 2017.

Regards,

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

Mr Jovy Tam
Environmental Team Leader

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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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_12September2017_1hrTSP_Station ASR1 0212330_12September2017_1hrTSP_Station ASR1 0212330_12September2017_1hrTSP_Station ASR1 0212330_12September2017_1hrTSP_Station ASR5 [Total No. of Exceedances = 4]	
Date	12 September 2017 (Measured) 21 September 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR1 (332 $\mu\text{g}/\text{m}^3$) during 1338 - 1438 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR1 (413 $\mu\text{g}/\text{m}^3$) during 1542 - 1642 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR5 (367 $\mu\text{g}/\text{m}^3$) during 1327 - 1427 hrs. Limit Level Exceedance for 1-hr TSP is observed at ASR1 (545 $\mu\text{g}/\text{m}^3$) during 1440 - 1540 hrs.	
Works Undertaken (at the time of monitoring event)	On 12 September 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	

Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> • According to the construction information provided by the Contractor, the majority of construction works on 12 September 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying by water trucks on exposed soil within the Project site and associated work areas; use of wheel washing facilities). • Whilst exceedances of Action Level and Limit Level were observed at ASR1 and ASR5, the 24-hr TSP level at the monitoring station (ASR1 = 138 µg/m³, ASR5 = 97µg/m³) on 12 September 2017 were in compliance with the Action and Limit Levels. • As stated in the EIA report (Section 4.2.3), the background TSP level of Tuen Mun is higher than the other region of Hong Kong, thus the exceedances may be also contributed cumulatively by the other construction works / traffic within the Tuen Mun Area rather than causing by the construction works of the Project. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>
Actions Taken/ To Be Taken	<p>Based on the contractor's photo record on 12 September 2017, no dust nuisance was recorded at the Northern Landfall and activities conducted in this Contract's work have strictly followed the requirements stated in the EP (EP-354/2009/D). Site inspection was carried out on 27 September 2017 to audit proper implementation of mitigation measures. In addition, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of wheel washing facilities, use of sprinklers for water spraying, materials having the potential to create dust covered by a clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period, no additional mitigation is deemed necessary. Inspection on the air quality monitoring stations was also carried out on 6 October 2017. No dust nuisance was observed. Photo record is provided in <i>Annex A</i>. Weekly water spraying record is also provided. The Enhanced TSP Monitoring has commenced on 24 October 2014, the ET will monitor for future trends in exceedances.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

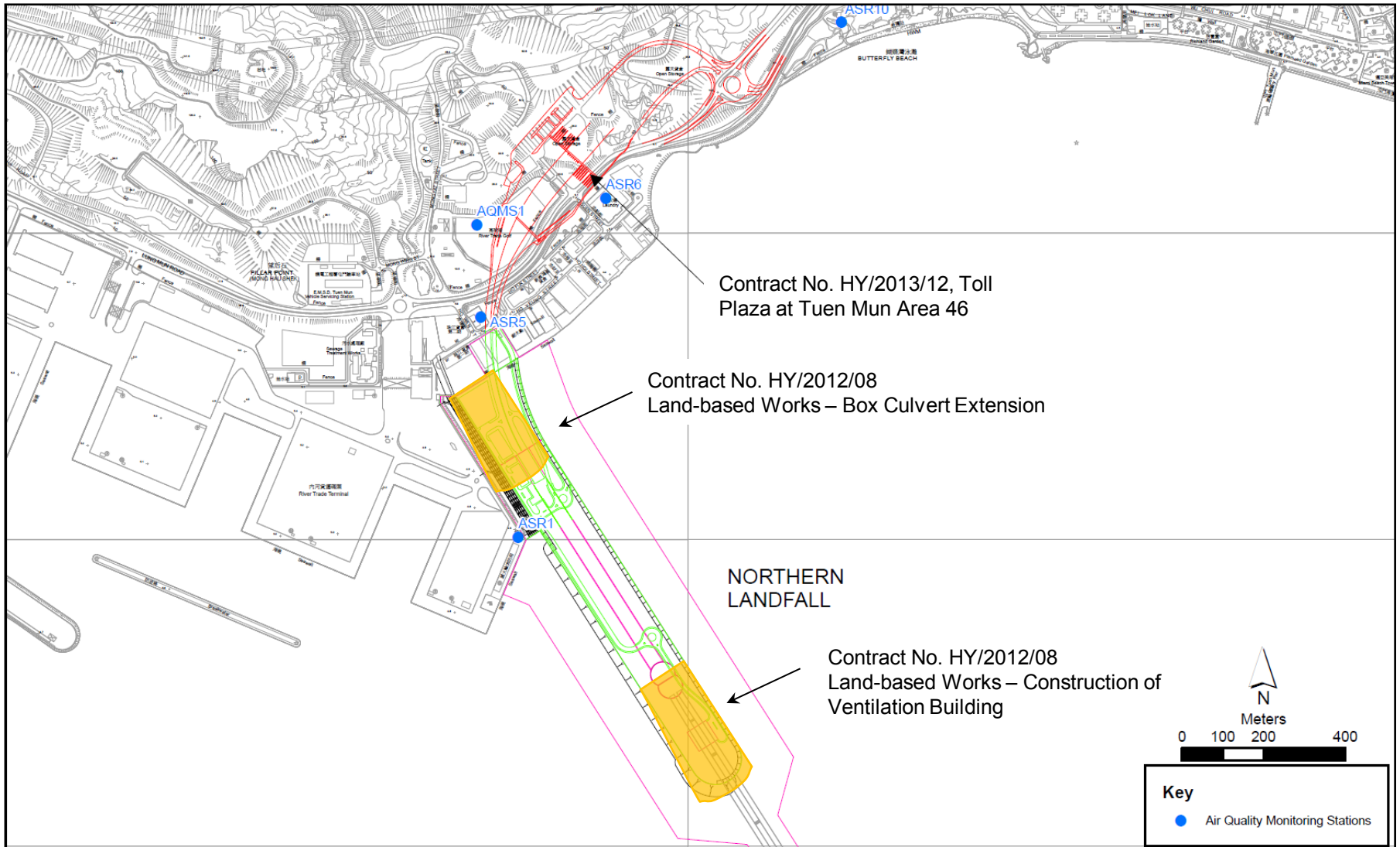


Figure 1

Indicative Construction Works Area on 12 September 2017



Annex A Photo Records provided by the Contractor

*Note: Photos taken on 12/9/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



No dust nuisance was observed. (Works Area Portion N-B)



Annex A Photo Records provided by the Contractor

*Note: Photos taken on 12/9/2017



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)

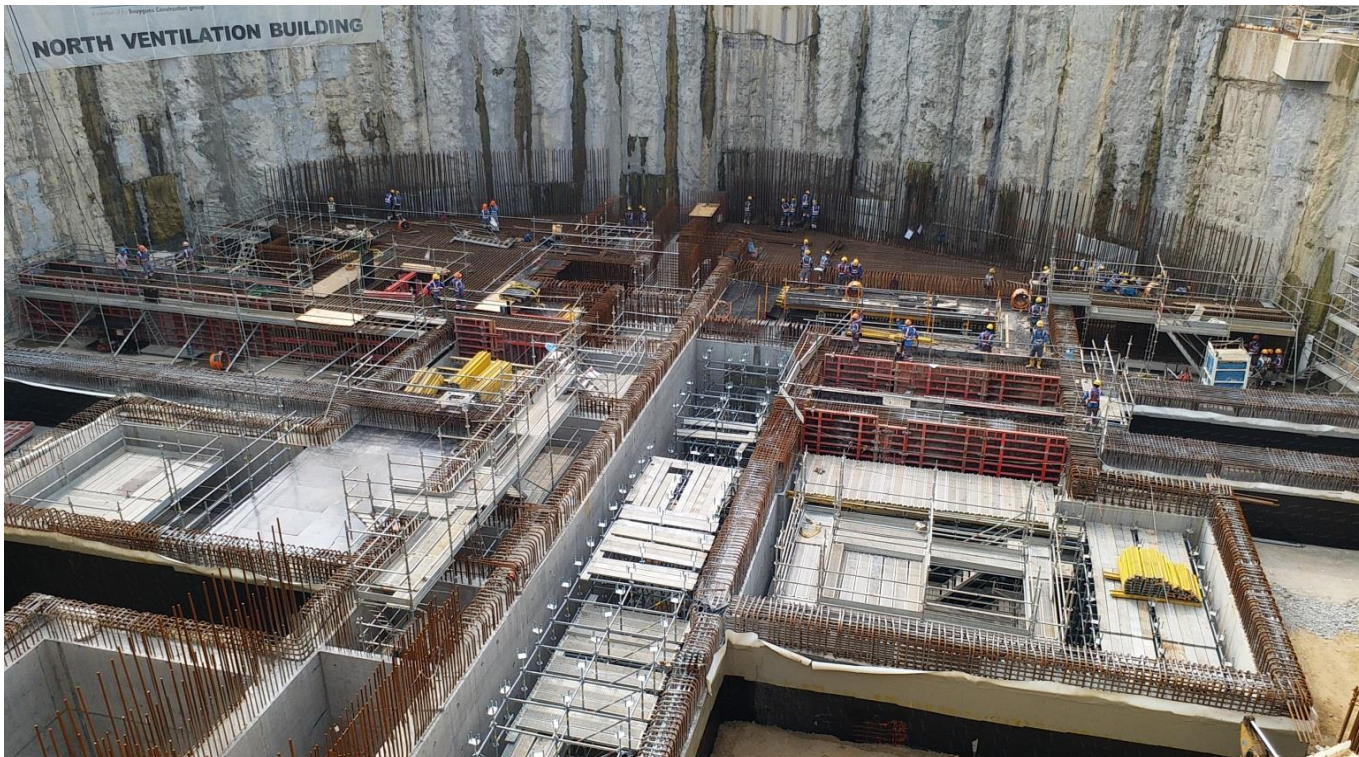


Annex A Photo Records provided by the Contractor

*Note: Photos taken on 12/9/2017



Box Culvert Extension. (Works Area Portion N-A)



Construction of Ventilation Building (Works Area Portion N-C)



Annex A Photo Records during site inspection

*Note: Photos taken on 27/9/2017



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Exposed soil surface are covered by tarpaulin sheets to prevent dust nuisance. (Works Area Portion N-A)



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

Weekly Water Spraying Record
每週灑水檢查記錄

Site Location 地盤位置: Northern Landfill

Date 日期: 11th Sep. 2017 to 至 17th Sep. 2017

	Time 時間	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	8:00 – 8:45	/	/	/	/	/	/	/
2	8:45 – 9:30	/	/	/	/	/	/	/
3	9:30 – 10:15	/	/	/	/	/	/	/
4	10:15 – 11:00	/	/	/	/	/	/	/
5	11:00 – 11:45	/	/	/	/	/	/	/
6	11:45 – 12:30	/	/	/	/	/	/	/
7	12:30 – 13:15	/	/	/	/	/	/	/
8	13:15 – 14:00	/	/	/	/	/	/	/
9	14:00 – 14:45	/	/	/	/	/	/	/
10	14:45 – 15:30	/	/	/	/	/	/	/
11	15:30 – 16:45	/	/	/	/	/	/	/
12	16:45 – 17:30	/	/	/	/	/	/	/
	Verified by Site Foreman 地盤科文簽署確認	T	T	T	T	T	T	T

Night shift 夜間工作 (if necessary 如需要)

	17:30 – 19:00						
	19:00 – 20:30						
	20:30 – 22:00						
	22:00 – 23:00						

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

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

Remarks:

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

備註:

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

TMCLKL	HY/2012/08	12/9/2017	AQMS1	Sunny	13:49	1-hour TSP	277	ug/m3
TMCLKL	HY/2012/08	12/9/2017	AQMS1	Sunny	14:51	1-hour TSP	209	ug/m3
TMCLKL	HY/2012/08	12/9/2017	AQMS1	Sunny	15:53	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR1	Sunny	13:38	1-hour TSP	332	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR1	Sunny	14:40	1-hour TSP	545	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR1	Sunny	15:42	1-hour TSP	413	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR10	Sunny	13:02	1-hour TSP	165	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR10	Sunny	14:04	1-hour TSP	240	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR10	Sunny	15:06	1-hour TSP	186	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR5	Sunny	13:27	1-hour TSP	367	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR5	Sunny	14:29	1-hour TSP	308	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR5	Sunny	15:31	1-hour TSP	253	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR6	Sunny	13:15	1-hour TSP	285	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR6	Sunny	14:17	1-hour TSP	299	ug/m3
TMCLKL	HY/2012/08	12/9/2017	ASR6	Sunny	15:19	1-hour TSP	262	ug/m3

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 Air Quality
Impact Monitoring



ERM

Date 18 September 2017

Dear Sir or Madam,

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

0212330_18September2017_1hrTSP_Station AQMS1

One Action Level Exceedance was recorded on 18 September 2017.

Regards,

A handwritten signature in black ink, appearing to read 'Jovy Tam'.

Mr Jovy Tam
Environmental Team Leader

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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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_18September2017_1hrTSP_Station AQMS1 [Total No. of Exceedances = 1]	
Date	18 September 2017 (Measured) 29 September 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at AQMS1 ($473 \mu\text{g}/\text{m}^3$) during 1352 - 1452 hrs.	
Works Undertaken (at the time of monitoring event)	On 18 September 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance is unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of construction works on 18 September 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying by water trucks on exposed soil within the Project site and associated work areas; use of wheel washing facilities). Whilst exceedances of Action Level was observed at AQMS1, the 24-hr TSP level at the monitoring station (AQMS1 = $92 \mu\text{g}/\text{m}^3$) on 18 September 2017 were in compliance with the Action and Limit Levels. As stated in the EIA report (Section 4.2.3), the background TSP level of Tuen Mun is higher than the other region of Hong Kong, thus the exceedances may be also contributed cumulatively by the other construction works / traffic within the Tuen Mun Area rather than causing by the construction works of the Project. <p>Based on the above, the exceedance is unlikely to be due to the project.</p>	

Actions Taken/ To Be Taken	<p>Based on the contractor's photo record on 18 September 2017, no dust nuisance was recorded at the Northern Landfall and activities conducted in this Contract's work have strictly followed the requirements stated in the EP (EP-354/2009/D). Site inspection was carried out on 27 September 2017 audit proper implementation of mitigation measures. In addition, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of wheel washing facilities, use of sprinklers for water spraying, materials having the potential to create dust covered by a clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period, no additional mitigation is deemed necessary. Inspection on the air quality monitoring stations was also carried out on 6 October 2017. No dust nuisance was observed. Photo record is provided in <i>Annex A</i>. Weekly water spraying record is also provided. The Enhanced TSP Monitoring has commenced on 24 October 2014, the ET will monitor for future trends in exceedances.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

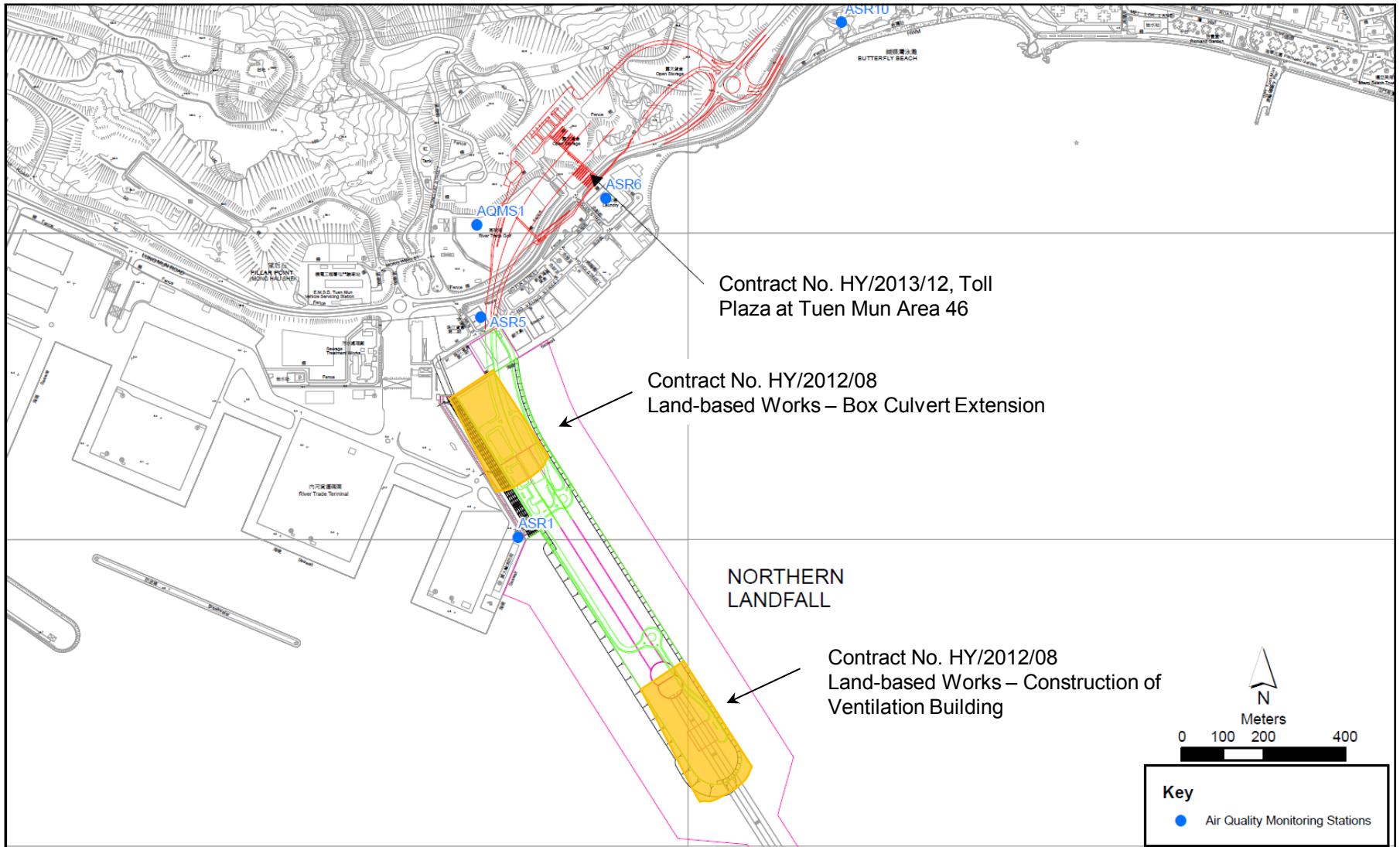


Figure 1

Indicative Construction Works Area on 18 September 2017



Annex A Photo Records provided by the Contractor

*Note: Photos taken on 18/9/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



No dust nuisance was observed. (Works Area Portion N-B)



Annex A Photo Records provided by the Contractor

*Note: Photos taken on 18/9/2017



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Use of sprinklers for water spraying,. (Works Area Portion N-C)



Annex A Photo Records provided by the Contractor

*Note: Photos taken on 18/9/2017



Box Culvert Extension. (Works Area Portion N-A)



Construction of Ventilation Building. (Works Area Portion N-C)



Annex A Photo Records during site inspection

*Note: Photos taken on 27/9/2017



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Exposed soil surface are covered by tarpaulin sheets to prevent dust nuisance. (Works Area Portion N-A)



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

Weekly Water Spraying Record
每週灑水檢查記錄

Site Location 地盤位置: Northern Landfall

Date 日期: 18th Sep - 2017 to 至 24th Sep. 2017

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

Night shift 夜間工作 (if necessary 如需要)

	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

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

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

Remarks:

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

備註:

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

TMCLKL	HY/2012/08	18/9/2017	AQMS1	Sunny	13:52	1-hour TSP	473	ug/m3
TMCLKL	HY/2012/08	18/9/2017	AQMS1	Sunny	14:54	1-hour TSP	312	ug/m3
TMCLKL	HY/2012/08	18/9/2017	AQMS1	Sunny	15:56	1-hour TSP	170	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR1	Sunny	13:40	1-hour TSP	204	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR1	Sunny	14:42	1-hour TSP	196	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR1	Sunny	15:44	1-hour TSP	171	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR10	Sunny	13:06	1-hour TSP	104	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR10	Sunny	14:08	1-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR10	Sunny	15:10	1-hour TSP	104	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR5	Sunny	13:29	1-hour TSP	237	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR5	Sunny	14:31	1-hour TSP	202	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR5	Sunny	15:33	1-hour TSP	148	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR6	Sunny	13:17	1-hour TSP	194	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR6	Sunny	14:19	1-hour TSP	147	ug/m3
TMCLKL	HY/2012/08	18/9/2017	ASR6	Sunny	15:21	1-hour TSP	134	ug/m3

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To Ramboll Environ - Hong Kong, Limited (ENPO)

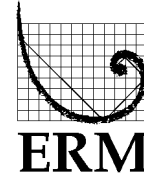
From ERM- Hong Kong, Limited

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

Subject Notification of Exceedance for Air Quality
Impact Monitoring

Date 27 September 2017

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



Dear Sir or Madam,

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

0212330_27September2017_1hrTSP_Station ASR5
0212330_27September2017_1hrTSP_Station ASR5

Two Action Level Exceedances were recorded on 27 September 2017.

Regards,



Mr Jovy Tam
Environmental Team Leader

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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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_27September2017_1hrTSP_Station ASR5 0212330_27September2017_1hrTSP_Station ASR5 [Total No. of Exceedances = 2]	
Date	27 September 2017 (Measured) 10 October 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 ($355 \mu\text{g}/\text{m}^3$) during 1430 - 1530 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR5 ($456 \mu\text{g}/\text{m}^3$) during 1532 - 1632 hrs.	
Works Undertaken (at the time of monitoring event)	On 27 September 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of construction works on 27 September 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying by water trucks on exposed soil within the Project site and associated work areas; use of wheel washing facilities). Whilst exceedances of Action Level was observed at ASR5, the 24-hr TSP level at the monitoring station ($ASR5 = 91 \mu\text{g}/\text{m}^3$) on 27 September 2017 were in compliance with the Action and Limit Levels. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>	

Actions Taken / To Be Taken	<p>Based on the site photo record on 27 September 2017, no dust nuisance was recorded at the Northern Landfall and activities conducted in this Contract's work have strictly followed the requirements stated in the EP (EP-354/2009/D). Site inspection was carried out on 27 September 2017 and 11 October 2017 to audit proper implementation of mitigation measures. In addition, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of wheel washing facilities, use of sprinklers for water spraying, materials having the potential to create dust covered by a clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period, no additional mitigation is deemed necessary. Inspection on the air quality monitoring stations was also carried out on 6 October 2017. No dust nuisance was observed. Photo record is provided in <i>Annex A</i>. Weekly water spraying record is also provided. The Enhanced TSP Monitoring has commenced on 24 October 2014, the ET will monitor for future trends in exceedances.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

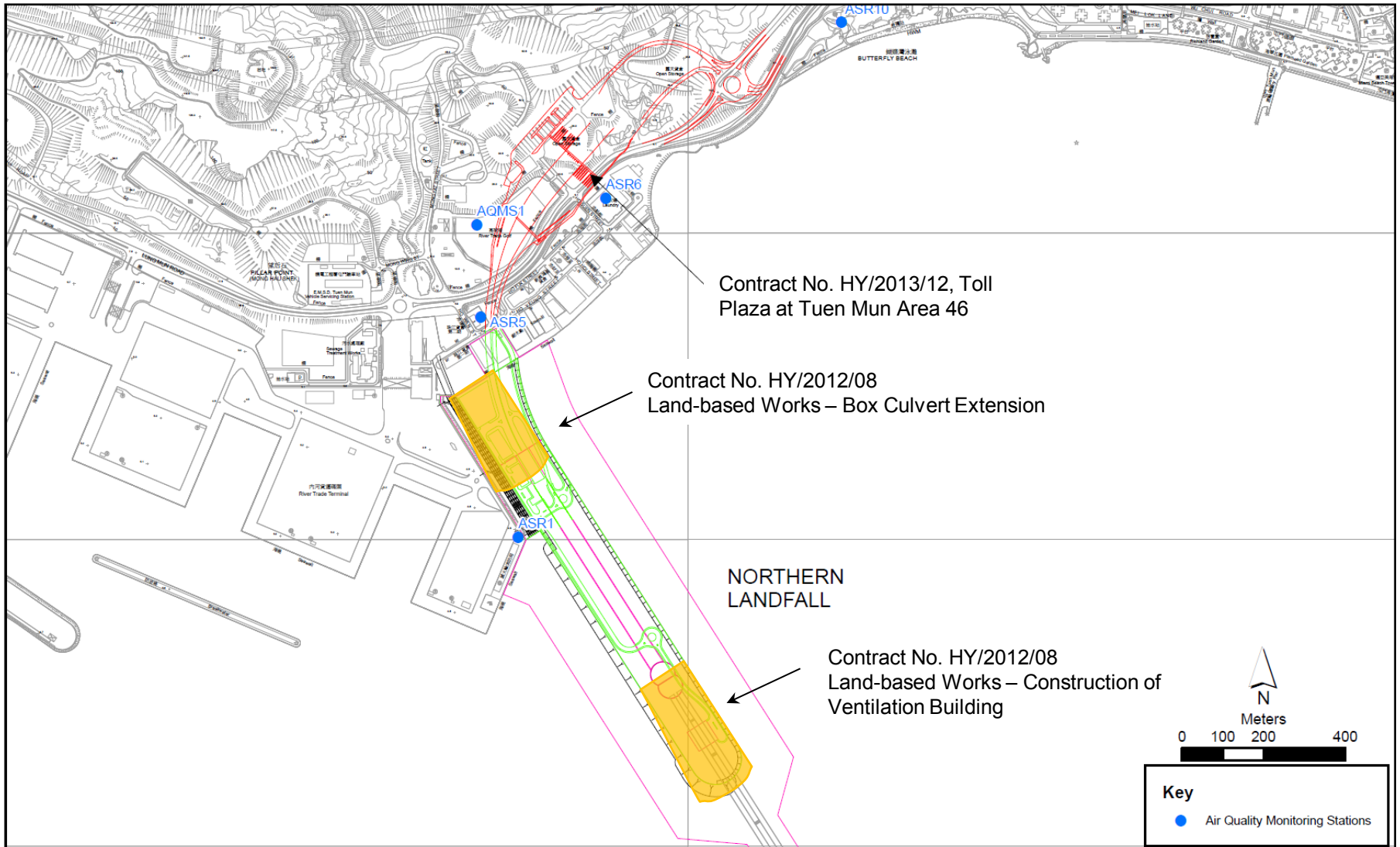


Figure 1

Indicative Construction Works Area on 27 September 2017



Annex A Photo Record during site inspection

*Note: Photos taken on 27/9/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



No dust nuisance was observed. (Works Area Portion N-A)



Annex A Photo Record during site inspection

*Note: Photos taken on 27/9/2017



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Water spraying was applied frequently during dry conditions. (Works Area Portion N-B)



Annex A Photo Record provided by the Contractor

*Note: Photos taken on 27/9/2017



Box Culvert Extension. (Works Area Portion N-A)



Construction of Ventilation Building. (Works Area Portion N-C)



Annex A Photo Record during inspection on AQM stations

*Note: Photos taken on 6/10/2017



Photo at ASR5 during 1-hour TSP monitoring



Photo at ASR5 during 1-hour TSP monitoring



Annex A Photo Record during site inspection

*Note: Photos taken on 11/10/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)

Site Location 地盤位置:

Northern Landfall

Date 日期:

日期:

25th Sep. 2017 to 至 1st Oct. 2017

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

Night shift 夜間工作 (if necessary 如需要)

	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

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

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

Remarks:

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

備註:

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

TMCLKL	HY/2012/08	27/9/2017	AQMS1	Sunny	13:50	1-hour TSP	230	ug/m3
TMCLKL	HY/2012/08	27/9/2017	AQMS1	Sunny	14:52	1-hour TSP	233	ug/m3
TMCLKL	HY/2012/08	27/9/2017	AQMS1	Sunny	15:54	1-hour TSP	221	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR1	Sunny	13:40	1-hour TSP	275	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR1	Sunny	14:42	1-hour TSP	252	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR1	Sunny	15:44	1-hour TSP	259	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR10	Sunny	13:15	1-hour TSP	159	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR10	Sunny	14:17	1-hour TSP	183	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR10	Sunny	15:19	1-hour TSP	196	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR5	Sunny	13:28	1-hour TSP	321	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR5	Sunny	14:30	1-hour TSP	355	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR5	Sunny	15:32	1-hour TSP	456	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR6	Sunny	13:27	1-hour TSP	297	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR6	Sunny	14:29	1-hour TSP	302	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR6	Sunny	15:31	1-hour TSP	310	ug/m3
TMCLKL	HY/2012/08	27/9/2017	AQMS1	Sunny	16:56	24-hour TSP	44	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR1	Sunny	16:46	24-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR10	Sunny	16:21	24-hour TSP	47	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR5	Sunny	16:34	24-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	27/9/2017	ASR6	Sunny	16:33	24-hour TSP	99	ug/m3

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**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 Air Quality
Impact Monitoring



ERM

Date 21 October 2017

Dear Sir or Madam,

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

0212330_21October2017_1hrTSP_Station ASR1
0212330_21October 2017_1hrTSP_Station ASR1
0212330_21October 2017_24hrTSP_Station ASR1

Three Action Level Exceedances were recorded on 21 October 2017.

Regards,

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

Mr Jovy Tam
Environmental Team Leader

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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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_21October2017_1hrTSP_Station ASR1 0212330_21October 2017_1hrTSP_Station ASR1 0212330_21October 2017_24hrTSP_Station ASR1 [Total No. of Exceedances = 3]	
Date	21 October 2017 (Measured) 27 October 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSPf	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR1 (372 $\mu\text{g}/\text{m}^3$) during 1047 - 1147 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR1 (439 $\mu\text{g}/\text{m}^3$) during 1149 - 1249 hrs. Action Level Exceedance for 24-hr TSP is observed at ASR1 (220 $\mu\text{g}/\text{m}^3$) during 1353 - 1353 hrs.	
Works Undertaken (at the time of monitoring event)	On 21 October 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	

<p>Possible Reason for Action or Limit Level Exceedance(s)</p>	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> • According to the construction information provided by the Contractor, the majority of ground construction works on 21 October 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. The two action level exceedances for 1-hr TSP are unlikely to be due to the project as the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying on exposed soil within the Project site and associated works areas; exposed soil covered by tarpaulin sheets) during the period of recorded exceedances. • As stated in the EIA report (Section 4.2.3), the background TSP level of Tuen Mun is higher than the other region of Hong Kong, thus the exceedances may be also contributed cumulatively by the other construction works / traffic within the Tuen Mun Area rather than causing by the construction works of the Project. • The action level exceedance for 24-hr TSP is unlikely to be due to the project as the average wind direction was from ASR1 to the site area during the construction period. From 13:00 to 19:00, the average wind direction ranged between 294° to 355° and station ASR1 are located downstream of the major construction activities at Portion N-A. However, dust suppression measures were implemented properly on site. Water spraying was applied. From 19:00(21 Oct) to 07:00(22 Oct), there was no ground construction works. Inspection team from SOR also confirmed that proper dust suppression measures have been implemented during 19:00 to 07:00. From 07:00 to 14:00(22 Oct), there was only housekeeping works in the early morning followed by tunnelling works in the afternoon. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>
---	---

Actions Taken/ To Be Taken	<p>Based on the site photo record on 21 October 2017, no dust nuisance was recorded at the Northern Landfall and activities conducted in this Contract's work have strictly followed the requirements stated in the EP (EP-354/2009/D). Mitigation measures implemented on 21 October 2017 are as follow:</p> <ol style="list-style-type: none"> 1. watering to maintain all exposed road surfaces and dust sources wet 2. use of sprinklers for water spraying 3. covering materials having the potential to create dust by clean tarpaulin sheets 4. watering on all exposed soil within the Project site <p>Photos showing the mitigation measures implemented on 21 October 2017 were provided by the Contractor and put in Annex A. Follow-up Site inspection was carried out on 1 November 2017 to audit proper implementation of mitigation measures. The above mitigation measures were properly implemented during the site inspection. Photo record is provided in Annex A. Weekly water spraying record is also provided.</p> <p>The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period. The Contractor was also reminded to ensure all dust mitigating measures are provided at Portion N-A and Portion N-C, where the construction works are carried out.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

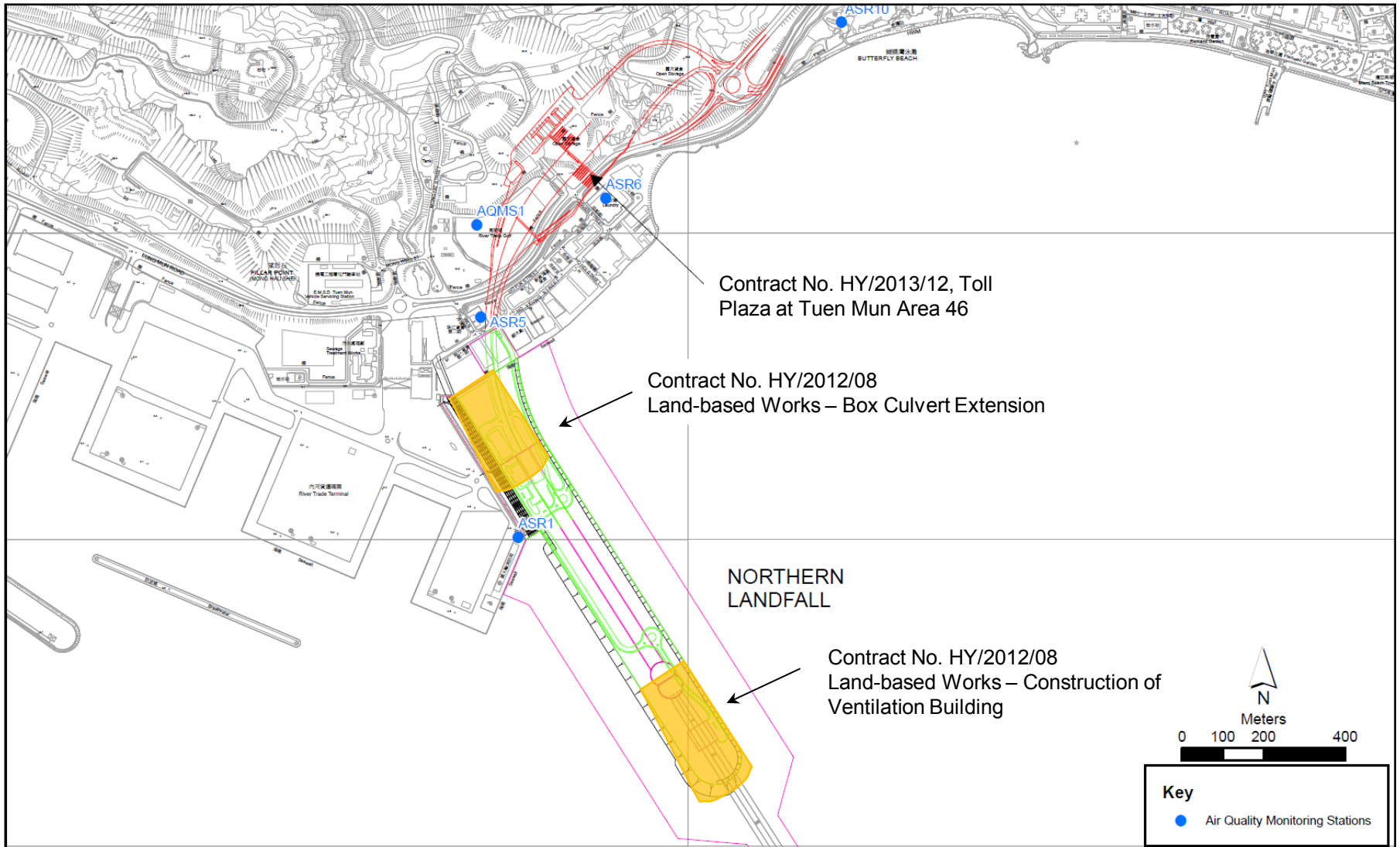


Figure 1

Indicative Construction Works Area on 21 October 2017



Annex A Photos provided by the Contractor

*Note: Photos taken on 21/10/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



Exposed soil are covered by tarpaulin sheets. (Works Area Portion N-A)



Annex A Photo record during site inspection

*Note: Photos taken on 1/11/2017



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



Dragages - Bouygues Joint Venture 寶島 - 布魯格聯號

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

Weekly Water Spraying Record
每週灑水檢查記錄

Site Location 地盤位置: Northern Landfill

Date 日期: 16th Oct. 2017 to 至 22nd Oct. 2017

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

Night shift 夜間工作 (if necessary 如需要)

	17:30 - 19:00							
	19:00 - 20:30							
	20:30 - 22:00							
	22:00 - 23:00							

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

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

Remarks:

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

備註:

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

TMCLKL	HY/2012/08	21/10/2017	AQMS1	Sunny	10:58	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	21/10/2017	AQMS1	Sunny	12:00	1-hour TSP	41	ug/m3
TMCLKL	HY/2012/08	21/10/2017	AQMS1	Sunny	13:02	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR1	Sunny	10:47	1-hour TSP	372	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR1	Sunny	11:49	1-hour TSP	439	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR1	Sunny	12:51	1-hour TSP	307	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR10	Sunny	10:12	1-hour TSP	307	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR10	Sunny	11:14	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR10	Sunny	12:16	1-hour TSP	219	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR5	Sunny	10:35	1-hour TSP	181	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR5	Sunny	11:37	1-hour TSP	168	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR5	Sunny	12:39	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR6	Sunny	10:24	1-hour TSP	150	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR6	Sunny	11:26	1-hour TSP	88	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR6	Sunny	12:28	1-hour TSP	156	ug/m3
TMCLKL	HY/2012/08	21/10/2017	AQMS1	Sunny	14:04	24-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR1	Sunny	13:53	24-hour TSP	220	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR10	Sunny	13:18	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR5	Sunny	13:41	24-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	21/10/2017	ASR6	Sunny	13:30	24-hour TSP	101	ug/m3

Meteorological Data for Impact Monitoring in the reporting period

Date (yy-mm-dd)	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction(degree)
17/10/21	0:00	3.6	342
17/10/21	1:00	4.5	352
17/10/21	2:00	3.6	351
17/10/21	3:00	3.6	339
17/10/21	4:00	2.2	348
17/10/21	5:00	3.1	347
17/10/21	6:00	3.1	350
17/10/21	7:00	3.1	338
17/10/21	8:00	3.1	340
17/10/21	9:00	2.2	52
17/10/21	10:00	2.2	48
17/10/21	11:00	2.2	42
17/10/21	12:00	1.8	45
17/10/21	13:00	1.8	350
17/10/21	14:00	2.7	341
17/10/21	15:00	3.1	339
17/10/21	16:00	3.6	305
17/10/21	17:00	2.7	310
17/10/21	18:00	1.3	294
17/10/21	19:00	1.3	355
17/10/21	20:00	1.8	340
17/10/21	21:00	1.3	337
17/10/21	22:00	1.3	346
17/10/21	23:00	0.9	344
17/10/22	0:00	1.3	336
17/10/22	1:00	3.1	331
17/10/22	2:00	3.6	335
17/10/22	3:00	3.6	16
17/10/22	4:00	2.7	15
17/10/22	5:00	3.1	20
17/10/22	6:00	3.1	15
17/10/22	7:00	3.1	14

17/10/22	8:00	3.1	46
17/10/22	9:00	3.6	50
17/10/22	10:00	3.1	42
17/10/22	11:00	2.7	48
17/10/22	12:00	1.8	47
17/10/22	13:00	1.8	350
17/10/22	14:00	2.2	342



ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_27October2017_1hrTSP_Station ASR5 0212330_27 October 2017_1hrTSP_Station ASR6 [Total No. of Exceedances = 2]	
Date	27 October 2017 (Measured) 3 November 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 ($368 \mu\text{g}/\text{m}^3$) during 1542 - 1642 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR6 ($388 \mu\text{g}/\text{m}^3$) during 1532 - 1632 hrs.	
Works Undertaken (at the time of monitoring event)	On 27 October 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of ground construction works on 27 October 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying on exposed soil within the Project site and associated works areas; exposed soil covered by tarpaulin sheets). With reference to the recorded wind direction (ranged between 19° and 119°, blowing from a Easterly direction) and wind speed (ranged from 1.3 to 2.2 m/s) during the period of the observed 1-hr TSP exceedances, ASR5 and ASR6 are located upstream from the land-based construction area, thus the observed exceedances should not be due to the dust, if any, generated by the construction activities under this Contract. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>	

Actions Taken/ To Be Taken	<p>Based on the site photo record on 27 October 2017, no dust nuisance was recorded at the Northern Landfall and activities conducted in this Contract's work have strictly followed the requirements stated in the EP (EP-354/2009/D). Photos showing the mitigation measures implemented on 27 October 2017 were provided by the Contractor and put in Annex A. Follow-up Site inspection was carried out on 8 November 2017 to audit proper implementation of mitigation measures. Photo record is provided in Annex A. Weekly water spraying record is also provided.</p> <p>The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period. The Contractor was also reminded to ensure all dust mitigating measures are provided at Portion N-A and Portion N-C, where the construction works are carried out.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

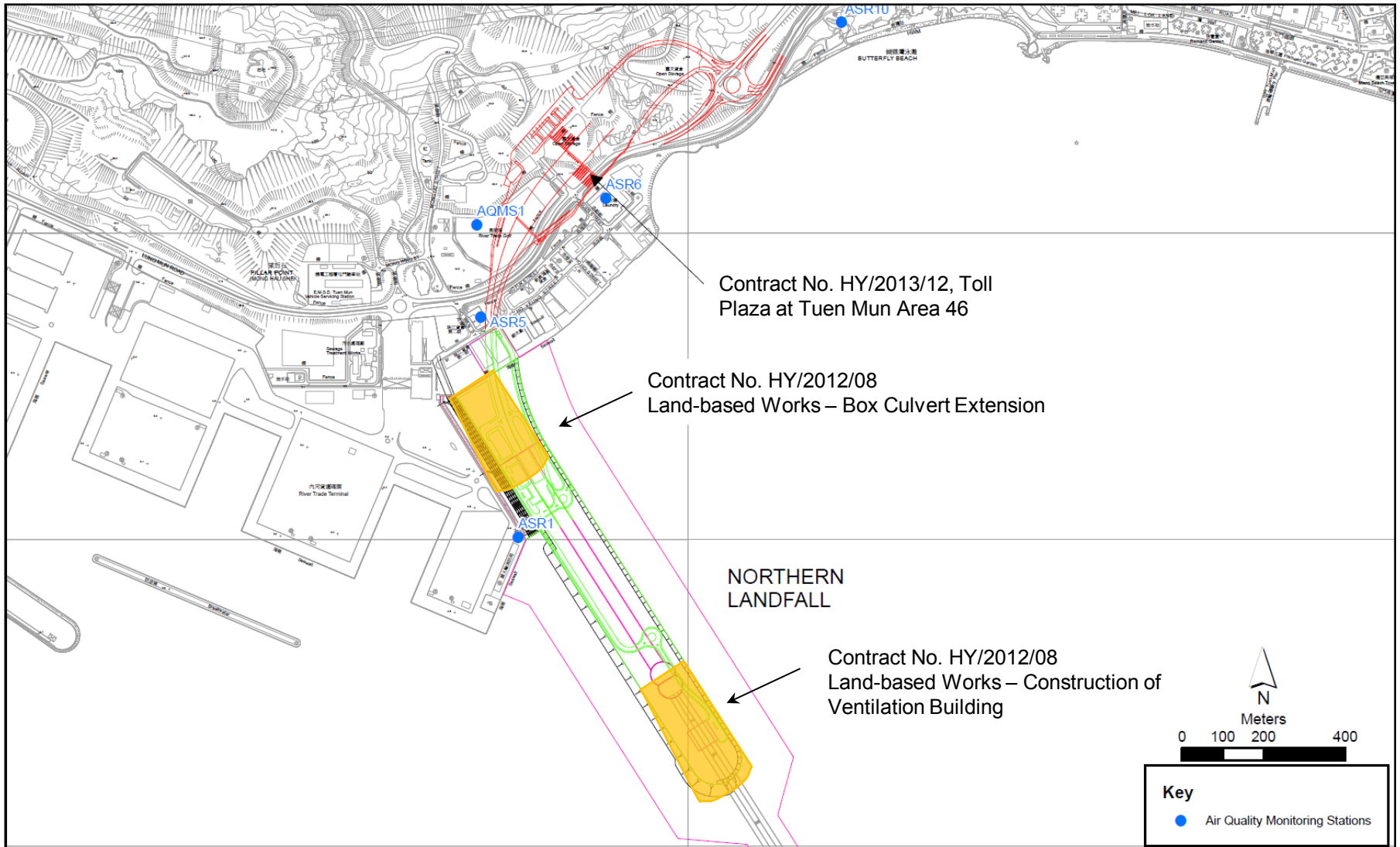


Figure 1

Indicative Construction Works Area on 27 October 2017



Annex A Photos provided by the Contractor

*Note: Photos taken on 27/10/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Annex A Photo record during site inspection

*Note: Photos taken on 8/11/2017



Exposed soil are covered by tarpaulin sheets. (Works Area Portion N-A)



Water spraying was applied frequently during dry conditions. (Works Area Portion N-A)



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

Weekly Water Spraying Record
每週灑水檢查記錄

Site Location 地盤位置: Northern Landfill
Date 日期: 23rd Oct. 2017 to 至 29th Oct. 2017

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

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

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

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

Remarks:

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

備註:

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

TMCLKL	HY/2012/08	27/10/2017	AQMS1	Sunny	14:02	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	27/10/2017	AQMS1	Sunny	15:04	1-hour TSP	227	ug/m3
TMCLKL	HY/2012/08	27/10/2017	AQMS1	Sunny	16:06	1-hour TSP	234	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR1	Sunny	13:51	1-hour TSP	228	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR1	Sunny	14:53	1-hour TSP	225	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR1	Sunny	15:55	1-hour TSP	293	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR10	Sunny	13:17	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR10	Sunny	14:14	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR10	Sunny	15:21	1-hour TSP	148	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR5	Sunny	13:39	1-hour TSP	207	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR5	Sunny	14:41	1-hour TSP	219	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR5	Sunny	15:42	1-hour TSP	368	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR6	Sunny	13:28	1-hour TSP	152	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR6	Sunny	14:30	1-hour TSP	154	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR6	Sunny	15:32	1-hour TSP	388	ug/m3
TMCLKL	HY/2012/08	27/10/2017	AQMS1	Sunny	17:08	24-hour TSP	94	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR1	Sunny	16:57	24-hour TSP	191	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR10	Sunny	16:23	24-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR5	Sunny	16:44	24-hour TSP	119	ug/m3
TMCLKL	HY/2012/08	27/10/2017	ASR6	Sunny	16:34	24-hour TSP	108	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction(degree)
17/10/27	0:00	0	-
17/10/27	1:00	0.9	352
17/10/27	2:00	0.9	339
17/10/27	3:00	0.4	345
17/10/27	4:00	0.4	351
17/10/27	5:00	0.4	355
17/10/27	6:00	0.4	6
17/10/27	7:00	0.4	3
17/10/27	8:00	0.9	48
17/10/27	9:00	1.8	49
17/10/27	10:00	1.8	50
17/10/27	11:00	2.2	71
17/10/27	12:00	1.8	43
17/10/27	13:00	1.8	40
17/10/27	14:00	2.2	225
17/10/27	15:00	1.3	19
17/10/27	16:00	1.8	119
17/10/27	17:00	2.2	94
17/10/27	18:00	2.2	93
17/10/27	19:00	0.9	88
17/10/27	20:00	0	-
17/10/27	21:00	0	-
17/10/27	22:00	0	-
17/10/27	23:00	0	-



ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_02November2017_1hrTSP_Station ASR10 0212330_02November2017_1hrTSP_Station ASR10 0212330_02November2017_1hrTSP_Station ASR5 [Total No. of Exceedances = 3]	
Date	2 November 2017 (Measured) 8 November 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR10 ($403 \mu\text{g}/\text{m}^3$) during 1245 - 1345 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR5 ($351 \mu\text{g}/\text{m}^3$) during 1308 - 1408 hrs. Limit Level Exceedance for 1-hr TSP is observed at ASR10 ($816 \mu\text{g}/\text{m}^3$) during 1535 - 1635 hrs.	
Works Undertaken (at the time of monitoring event)	On 2 November 2017, installation of seawall block and box culvert extension were carried out at Works Area Portion N-A.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of construction works on 2 November 2017 at the time of monitoring event were installation of seawall blocks and box culvert extension at Portions N-A. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying on exposed soil within the Project site and associated works areas; exposed soil covered by tarpaulin sheets). The Action Level and Limit Level Exceedances at ASR10 are likely due to the maintenance works at the toilet nearby. The toilet is located within 5 meters from the high volume sampler at ASR 10. Concrete debris was found on the ground. Dusty environment was observed during the AQM inspection on 2 November 2017. The maintenance works at the toilet are considered to have major effect on dust generation. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>	

Actions Taken/ To Be Taken	<p>Based on the site photo record on 2 November 2017, no dust nuisance was recorded at the Northern Landfall and activities conducted in this Contract's work have strictly followed the requirements stated in the EP (EP-354/2009/D). Photos showing the mitigation measures implemented on 2 November 2017 were provided by the Contractor and put in Annex A. Photos showing the maintenance works carried out near ASR10 are also provided in Annex A.</p> <p>The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period. The Contractor was also reminded to ensure all dust mitigating measures are provided at Portion N-A, where the major construction works are carried out.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

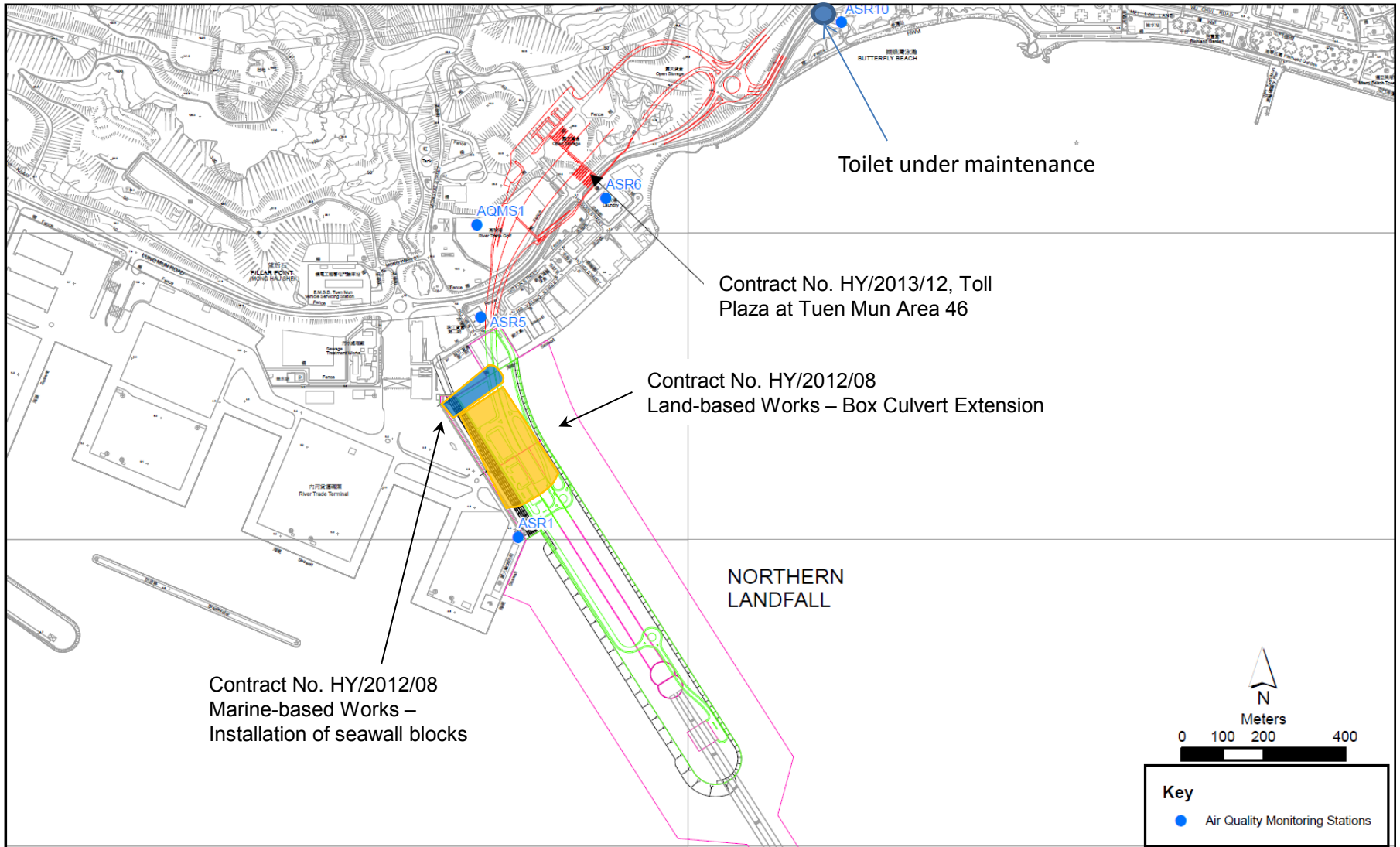


Figure 1

Indicative Construction Works Area on 2 November 2017



Annex A Photos provided by the Contractor

*Note: Photos taken on 2/11/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Annex A Photo record during AQM inspection

*Note: Photos taken on 2/11/2017



Maintenance works are carried out near ASR10.



Maintenance works are carried out near ASR10.



Annex A Photo record during AQM inspection

*Note: Photos taken on 2/11/2017



Dusty materials are placed on the ground near ASR10.

TMCLKL	HY/2012/08	2/11/2017	AQMS1	Sunny	13:30	1-hour TSP	259	ug/m3
TMCLKL	HY/2012/08	2/11/2017	AQMS1	Sunny	15:22	1-hour TSP	209	ug/m3
TMCLKL	HY/2012/08	2/11/2017	AQMS1	Sunny	16:24	1-hour TSP	158	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR1	Sunny	13:19	1-hour TSP	221	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR1	Sunny	15:10	1-hour TSP	214	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR1	Sunny	16:12	1-hour TSP	215	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR10	Sunny	12:45	1-hour TSP	403	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR10	Sunny	14:35	1-hour TSP	169	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR10	Sunny	15:35	1-hour TSP	816	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR5	Sunny	13:08	1-hour TSP	351	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR5	Sunny	14:59	1-hour TSP	315	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR5	Sunny	16:01	1-hour TSP	290	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR6	Sunny	12:57	1-hour TSP	267	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR6	Sunny	14:47	1-hour TSP	264	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR6	Sunny	15:49	1-hour TSP	248	ug/m3
TMCLKL	HY/2012/08	2/11/2017	AQMS1	Sunny	17:26	24-hour TSP	207	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR1	Sunny	17:14	24-hour TSP	203	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR10	Sunny	16:39	24-hour TSP	188	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR5	Sunny	17:03	24-hour TSP	222	ug/m3
TMCLKL	HY/2012/08	2/11/2017	ASR6	Sunny	16:51	24-hour TSP	150	ug/m3

Meteorological Data for Impact Monitoring in the reporting period

Date (yy-	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction(degree)
02/11/17	0:00	0	-
02/11/17	1:00	0.4	5
02/11/17	2:00	0	-
02/11/17	3:00	0.4	12
02/11/17	4:00	0.4	301
02/11/17	5:00	0.4	312
02/11/17	6:00	0	-
02/11/17	7:00	0	-
02/11/17	8:00	0.9	95
02/11/17	9:00	1.3	223
02/11/17	10:00	1.8	14
02/11/17	11:00	1.8	13
02/11/17	12:00	1.8	46
02/11/17	13:00	1.8	231
02/11/17	14:00	1.3	225
02/11/17	15:00	1.3	226
02/11/17	16:00	1.8	230
02/11/17	17:00	1.3	205
02/11/17	18:00	1.8	310
02/11/17	19:00	0.9	349
02/11/17	20:00	0.4	70
02/11/17	21:00	0.9	351
02/11/17	22:00	0.9	352
02/11/17	23:00	0.9	348

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To Ramboll Environ - Hong Kong, Limited (ENPO)

16/F Berkshire House,
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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 Air Quality
Impact Monitoring



ERM

Date 11 November 2017

Dear Sir or Madam,

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

0212330_11November2017_1hrTSP_Station ASR5

One Action Level Exceedance was recorded on 11 November 2017.

Regards,

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

Mr Jovy Tam
Environmental Team Leader

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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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_11November2017_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]	
Date	11 November 2017 (Measured) 19 November 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (389 $\mu\text{g}/\text{m}^3$) during 0845 - 0945 hrs.	
Works Undertaken (at the time of monitoring event)	On 11 November 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of ground construction works on 11 November 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying on exposed soil within the Project site and associated works areas; exposed soil covered by tarpaulin sheets). With reference to the recorded wind direction (ranged between 40° and 131°, blowing from a Easterly direction) and wind speed (ranged from 0.9 to 1.8 m/s) during the period of the observed 1-hr TSP exceedances, Station ASR5 is located perpendicular to the land-based construction activities at Portion N-A, thus the observed exceedance should not be affected by the dust, if any, generated by the construction activities under this Contract. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>	

Actions Taken/ To Be Taken	<p>Site inspection was carried out on 15 November 2017 and 22 November 2017 to audit proper implementation of mitigation measures. Dust suppression measures were also properly implemented during the site inspections. Photo record is provided in Annex A. Based on the above, no additional action is required.</p> <p>The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period. The Contractor was also reminded to ensure all dust mitigating measures are provided at Portion N-A and Portion N-C, where the construction works are carried out.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>



Annex A Photos provided by the Contractor

*Note: Photos taken on 11/11/2017



Water spraying was applied frequently during dry conditions.
Exposed soil was covered by tarpaulin sheets. (Works Area Portion N-A)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-C)



Annex A Photos taken during site inspection

*Note: Photos taken on 15/11/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-C)



Annex A Photos taken during site inspection

*Note: Photos taken on 22/11/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-C)

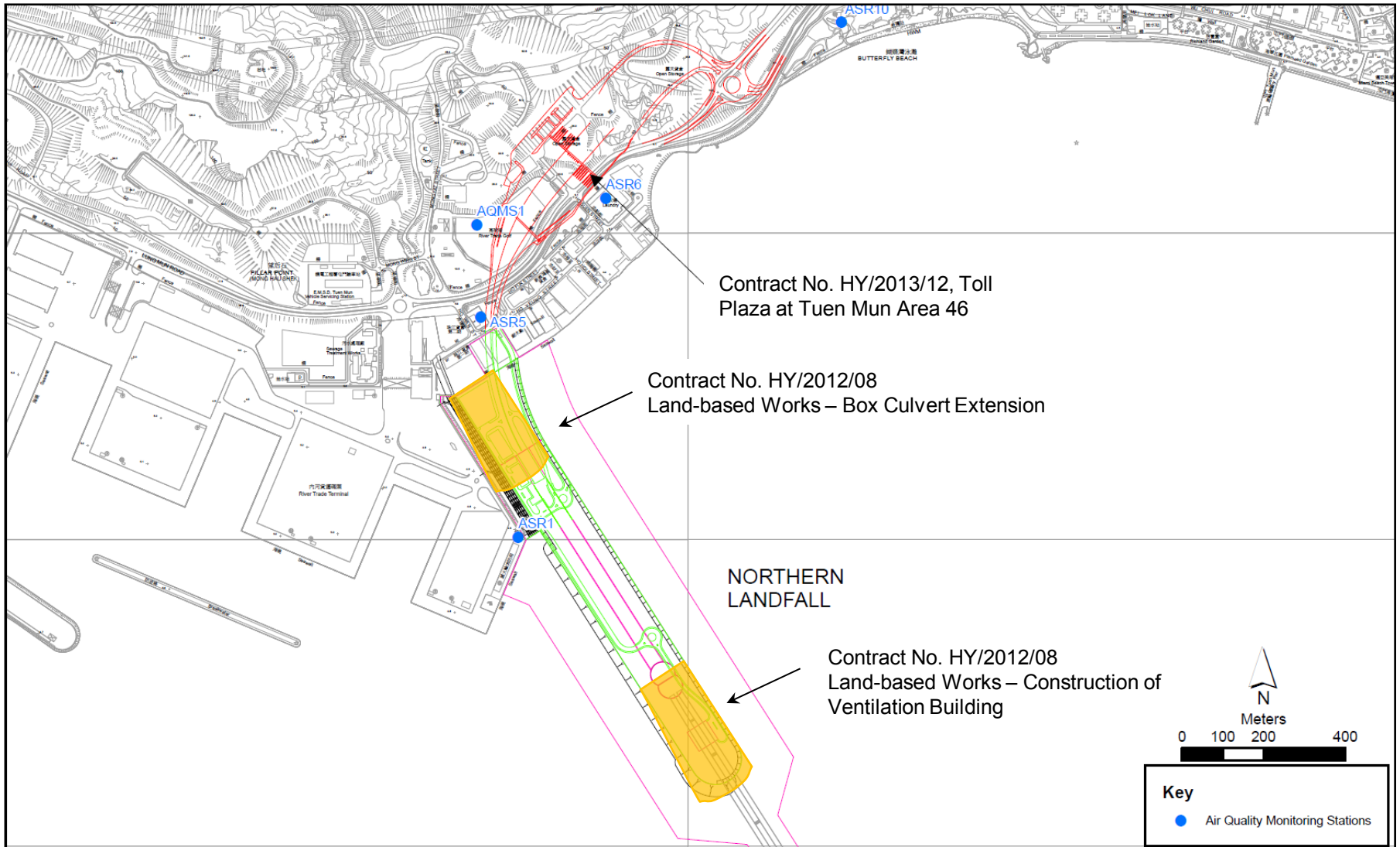


Figure 1

Indicative Construction Works Area on 11 November 2017

Date	Time	Wind Speed	Wind Direction
17/11/11	12:00 a	1.3	94
17/11/11	1:00 a	2.2	91
17/11/11	2:00 a	0.9	113
17/11/11	3:00 a	0.4	351
17/11/11	4:00 a	0.4	358
17/11/11	5:00 a	0.9	80
17/11/11	6:00 a	1.3	94
17/11/11	7:00 a	1.3	96
17/11/11	8:00 a	0.9	40
17/11/11	9:00 a	1.8	118
17/11/11	10:00 a	1.8	131
17/11/11	11:00 a	1.3	134
17/11/11	12:00 p	3.1	109
17/11/11	1:00 p	3.1	141
17/11/11	2:00 p	3.1	113
17/11/11	3:00 p	1.8	108
17/11/11	4:00 p	2.7	117
17/11/11	5:00 p	2.7	112
17/11/11	6:00 p	3.6	94
17/11/11	7:00 p	3.6	105
17/11/11	8:00 p	3.1	92
17/11/11	9:00 p	2.2	84
17/11/11	10:00 p	3.1	86
17/11/11	11:00 p	1.8	71

TMCLKL	HY/2012/08	11/11/2017	AQMS1	Sunny	9:08	1-hour TSP	163	ug/m3
TMCLKL	HY/2012/08	11/11/2017	AQMS1	Sunny	10:10	1-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	11/11/2017	AQMS1	Sunny	11:12	1-hour TSP	138	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR1	Sunny	8:56	1-hour TSP	251	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR1	Sunny	9:58	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR1	Sunny	11:00	1-hour TSP	195	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR10	Sunny	8:22	1-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR10	Sunny	9:24	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR10	Sunny	10:16	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR5	Sunny	8:45	1-hour TSP	389	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR5	Sunny	9:47	1-hour TSP	196	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR5	Sunny	10:49	1-hour TSP	217	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR6	Sunny	8:33	1-hour TSP	236	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR6	Sunny	9:35	1-hour TSP	172	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR6	Sunny	10:37	1-hour TSP	146	ug/m3
TMCLKL	HY/2012/08	11/11/2017	AQMS1	Sunny	12:14	24-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR1	Sunny	12:02	24-hour TSP	106	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR10	Sunny	11:28	24-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR5	Sunny	11:51	24-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	11/11/2017	ASR6	Sunny	11:39	24-hour TSP	98	ug/m3

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**Environmental
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To Ramboll Environ - Hong Kong, Limited (ENPO)

16/F Berkshire House,
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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 Air Quality
Impact Monitoring



ERM

Date 18 December 2017

Dear Sir or Madam,

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

0212330_29November2017_1hrTSP_Station ASR10

One Action Level Exceedance was recorded on 29 November 2017.

Regards,

A handwritten signature in black ink, appearing to read 'Jovy Tam'.

Mr Jovy Tam
Environmental Team Leader

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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

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_29November2017_1hrTSP_Station ASR10 [Total No. of Exceedances = 1]	
Date	29 November 2017 (Measured) 10 December 2017 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR10 ($455 \mu\text{g}/\text{m}^3$) during 1410 - 1510 hrs.	
Works Undertaken (at the time of monitoring event)	On 29 November 2017, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building at Portion N-C.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of ground construction works on 29 November 2017 were box culvert extension at Works Area Portion N-A and Construction of Ventilation Building at Portions N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying on exposed soil within the Project site and associated works areas; exposed soil covered by tarpaulin sheets). The Action Level at ASR10 is likely due to the maintenance works at the toilet nearby. The toilet is located within 5 meters from the high volume sampler at ASR 10. Concrete debris was found on the ground. Dusty environment was observed during the AQM inspection on 11 December 2017. The maintenance works at the toilet are considered to have major effect on dust generation. <p>Based on the above, the exceedances are unlikely to be due to the project.</p>	

Actions Taken/ To Be Taken	<p>Site inspection was carried out on 13 December 2017 to audit proper implementation of mitigation measures. Dust suppression measures were also properly implemented during the site inspections. Based on the above, no additional action is required.</p> <p>The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Project site) throughout the construction period. The Contractor was also reminded to ensure all dust mitigating measures are provided at Portion N-A and Portion N-C, where the construction works are carried out.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached. Photo Record is provided in Annex A.</p>

TMCLKL	HY/2012/08	29/11/2017	AQMS1	Sunny	13:52	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	29/11/2017	AQMS1	Sunny	14:54	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	29/11/2017	AQMS1	Sunny	15:56	1-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR1	Sunny	13:41	1-hour TSP	240	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR1	Sunny	14:43	1-hour TSP	164	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR1	Sunny	15:45	1-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR10	Sunny	13:08	1-hour TSP	254	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR10	Sunny	14:10	1-hour TSP	455	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR10	Sunny	15:12	1-hour TSP	145	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR5	Sunny	13:31	1-hour TSP	300	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR5	Sunny	14:33	1-hour TSP	260	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR5	Sunny	15:35	1-hour TSP	143	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR6	Sunny	13:20	1-hour TSP	204	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR6	Sunny	14:22	1-hour TSP	335	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR6	Sunny	15::24	1-hour TSP	140	ug/m3
TMCLKL	HY/2012/08	29/11/2017	AQMS1	Sunny	16:58	24-hour TSP	48	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR1	Sunny	16:47	24-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR10	Sunny	16:14	24-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR5	Sunny	16:37	24-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	29/11/2017	ASR6	Sunny	16:26	24-hour TSP	81	ug/m3

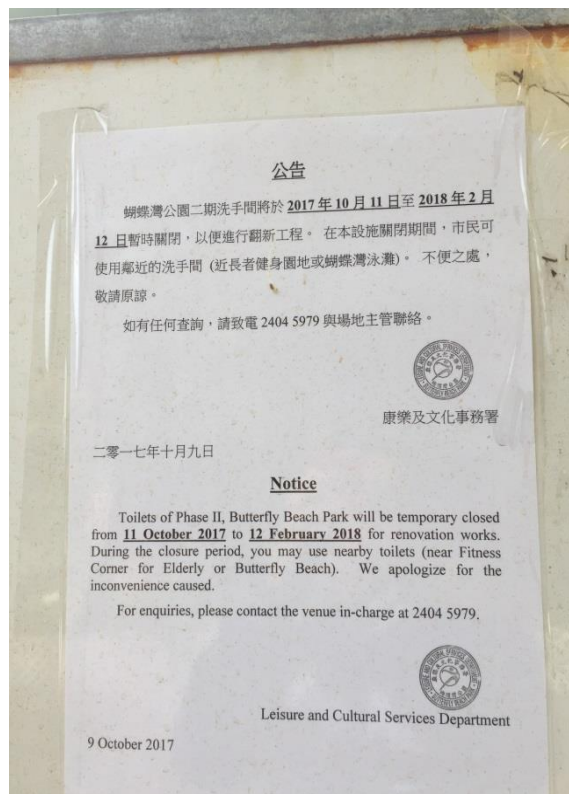


Annex A Photos taken during site inspection

*Note: Photos taken on 11/12/2017



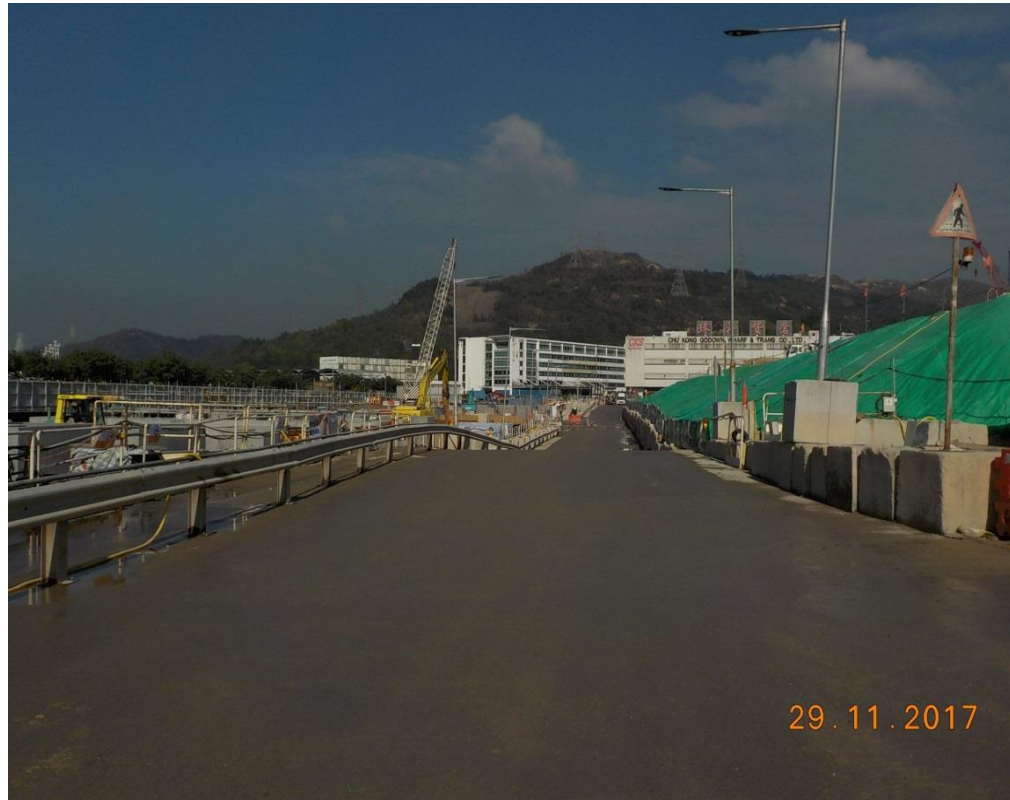
ASR10



Notification of works at ASR10



Annex A Photos taken during site inspection



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-A)



Annex A Photos provided by the Contractor

*Note: Photos taken on 29/11/2017



Water spraying was applied frequently during dry conditions.(Works Area Portion N-B)



Water spraying was applied frequently during dry conditions.(Works Area Portion N-C)

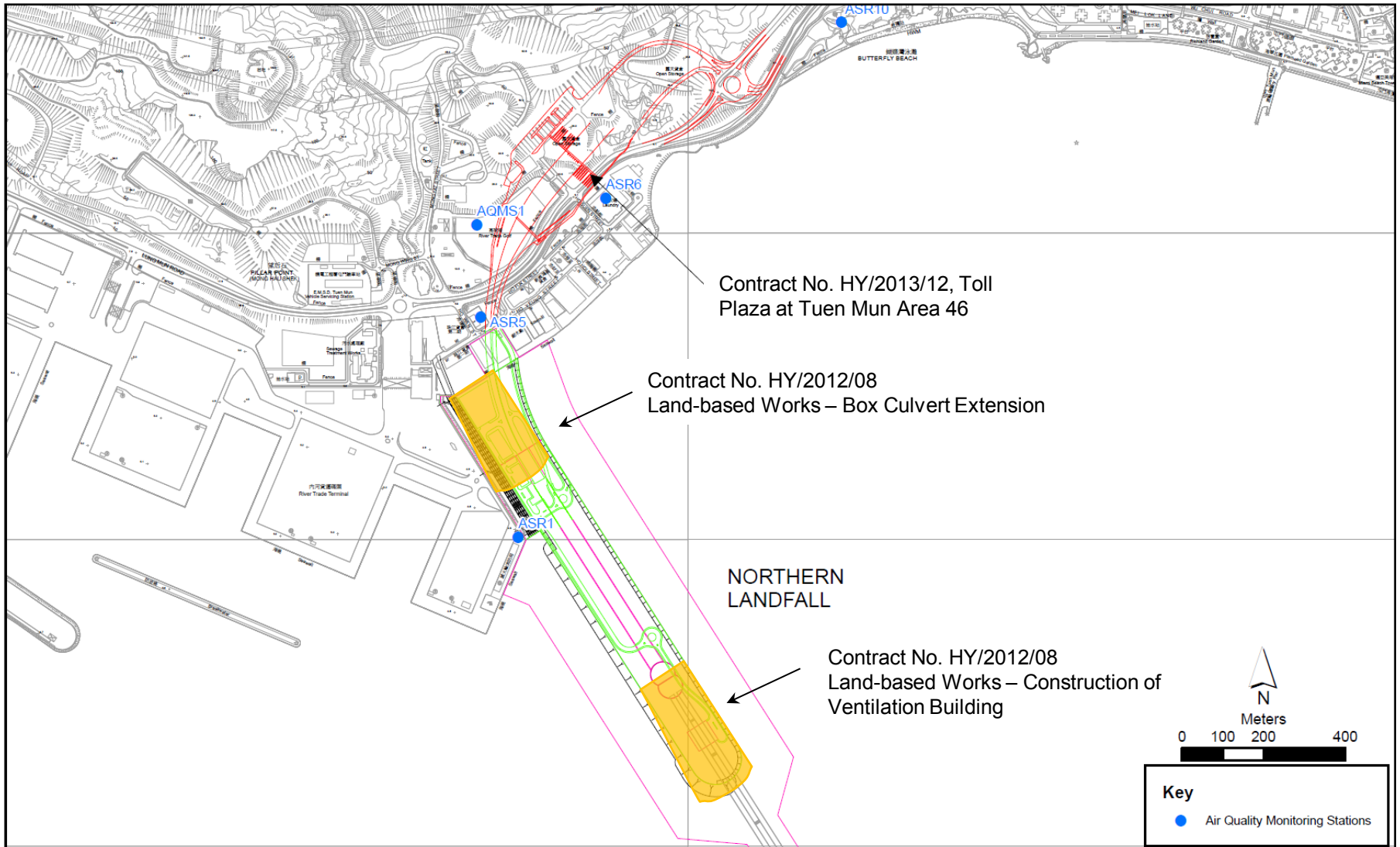


Figure 1

Indicative Construction Works Area on 29 November 2017



Toilet under renovation works

蝴蝶灣公園廁所

ASR10

蝴蝶灣公園

蝴蝶灣停車場

屯門蝴蝶灣小食亭

蝴蝶灣公園

白角污水泵房

蝴蝶灣泳灘

龍富路

龍富路

龍富路

龍富路

龍門路

龍門路

龍門路

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To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

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

Subject Notification of Exceedance for Water Quality
Impact Monitoring

Date 6 November 2017

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E-mail: jovy.tam@erm.com



ERM

Dear Sir or Madam,

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

Action Level Exceedance

0212330_6November2017_Depth-averaged SS_E_Station_IS12
0212330_6November2017_Depth-averaged SS_E_Station_IS13
0212330_6November2017_Depth-averaged SS_F_Station_SR8
0212330_6November2017_Depth-averaged SS_F_Station_SR10A
0212330_6November2017_Depth-averaged SS_F_Station_IS12
0212330_6November2017_Depth-averaged SS_F_Station_IS13

A total of six Action Level Exceedances were recorded on 6 November 2017.

Regards,



Mr Jovy Tam
Environmental Team Leader

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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

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	0212330_6November2017_Depth-averaged SS_E_Station_IS12 0212330_6November2017_Depth-averaged SS_E_Station_IS13 0212330_6November2017_Depth-averaged SS_F_Station_SR8 0212330_6November2017_Depth-averaged SS_F_Station_SR10A 0212330_6November2017_Depth-averaged SS_F_Station_IS12 0212330_6November2017_Depth-averaged SS_F_Station_IS13 [Total No. of Exceedances = 6]	
Date	6 November 2017 (Measured) 7 November 2017 (<i>In situ</i> results received by ERM) 15 November 2017 (Laboratory results received by ERM)	
Monitoring Station	CS4, CS6, SR8, SR9, SR10A, IS12, IS13, IS14, IS15	
Parameter(s) with Exceedance(s)	Depth-averaged Suspended Solids (SS, mg/L)	
Action Levels	SS	120% of upstream control station at the same tide of the same day (i.e., CS6: $10.8 \times 120\% = 13.0$ mg/L for mid-flood; CS4: $12.4 \times 120\% = 14.9$ mg/L for mid-ebb) <u>and</u> 95%-ile of baseline data (i.e., 23.5 mg/L).
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun (i.e., CS6: $10.8 \times 130\% = 14.0$ mg/L for mid-flood; CS4: $12.4 \times 130\% = 16.1$ mg/L for mid-ebb) <u>and</u> 99%-ile of baseline data. (i.e., 34.4 mg/L)
Measured Levels	Action Level Exceedance for SS is observed at IS12 (26.4 mg/L) during mid-ebb tide. Action Level Exceedance for SS is observed at IS13 (28.5 mg/L) during mid-ebb tide. Action Level Exceedance for SS is observed at SR8 (27.6 mg/L) during mid-flood tide. Action Level Exceedance for SS is observed at SR10A (23.6 mg/L) during mid-flood tide. Action Level Exceedance for SS is observed at IS12 (25.6 mg/L) during mid-flood tide. Action Level Exceedance for SS is observed at IS13 (29.6 mg/L) during mid-flood tide.	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, marine works conducted on 6 November 2017 included: <ul style="list-style-type: none"> • Filling for Phase II reclamation at Portion N-A Filling materials were transported by barge to the site. One barge was deployed for the filling works.	

Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> • Apart from observed exceedances, SS levels at all other monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • IS15 and SR9 were closer to the marine-based construction area than the WQM stations where exceedances were observed. While average SS value recorded in the above stations were also in compliance with the Action and Limit Levels in both mid-ebb and mid-flood tides, the observed exceedances at other remote stations were unlikely to be due to the marine works of this Contract • Depth-averaged Turbidity levels at all stations were in compliance with the Action and Limit Levels during both tides on the same day. Likewise, dissolved oxygen (DO) at all levels were also in compliance with the Action and Limit Levels in both mid-ebb and mid-flood tides. • No water quality impact was observed during the monitoring. Photos taken at the stations at which exceedances were recorded during monitoring were provided in Annex A.
Actions Taken/ To Be Taken	<p>According to EP EP-354/2009/D Figure 3 stage 5, a single layer silt curtain should be deployed during Northern reclamation. The drawings are provided in Annex B. Reclamation filling in Phase II remaining section was undertaken after the completion of seawall with a single layer silt curtain being deployed as a precautionary measure to reduce dispersion of suspended solids, which complied with the requirement specified in the EP. No immediate action is considered necessary. The ET will monitor for future trends in exceedances.</p>
Remarks	<p>The monitoring results and the locations of water quality monitoring stations are attached.</p>

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS14	13:19	Surface	1	1	25.0	8.0	38.4	5.9	5.9	9.7	13.8	9.8	11.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS14	13:19	Surface	1	2	25.0	8.0	38.6	5.8		9.6		8.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS14	13:19	Middle	2	1	25.0	8.0	38.4	5.9		8.1		11.1			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS14	13:19	Middle	2	2	25.0	8.0	38.7	5.8		8.2		12.2			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS14	13:19	Bottom	3	1	24.9	8.0	38.4	5.8		23.7		13.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS14	13:19	Bottom	3	2	24.9	8.0	38.7	5.8	5.8	23.5	14.1				
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS15	13:46	Surface	1	1	25.0	8.0	38.4	6.0	6.0	5.3	5.9	4.9	8.7		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS15	13:46	Surface	1	2	25.1	8.0	38.7	6.0		5.2		5.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS15	13:46	Middle	2	1	25.0	8.0	38.4	5.9		5.8		9.2			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS15	13:46	Middle	2	2	25.0	8.0	38.7	5.9		5.8		8.7			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS15	13:46	Bottom	3	1	24.9	8.0	38.4	5.9		6.6		11.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS15	13:46	Bottom	3	2	24.9	8.0	38.7	5.9	5.9	6.6	12.0				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS6	8:14	Surface	1	1	24.9	8.0	35.2	6.4	6.4	10.9	21.7	19.5	19.9		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS6	8:14	Surface	1	2	24.9	8.0	35.4	6.4		10.8		20.9			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS6	8:14	Middle	2	1	24.9	8.0	35.2	6.4		12.7		20.0			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS6	8:14	Middle	2	2	24.9	8.0	35.4	6.4		12.7		20.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS6	8:14	Bottom	3	1	24.9	8.0	35.2	6.3		41.6		19.2			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS6	8:14	Bottom	3	2	24.9	8.0	35.4	6.3	6.3	41.5	19.0				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS4	9:43	Surface	1	1	24.7	8.0	35.0	6.5	6.4	13.9	15.9	13.6	16.5		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS4	9:43	Surface	1	2	24.8	8.0	35.2	6.4		13.8		13.9			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS4	9:43	Middle	2	1	24.7	8.0	35.0	6.4		16.5		16.6			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS4	9:43	Middle	2	2	24.7	8.0	35.2	6.4		16.4		15.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS4	9:43	Bottom	3	1	24.7	8.0	35.0	6.4		6.4		17.5		19.2	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	CS4	9:43	Bottom	3	2	24.7	8.0	35.2	6.4	6.4	17.5	20.0				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR8	8:25	Surface	1	1	25.0	8.0	35.2	6.3	6.3	13.0	11.0	22.5	27.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR8	8:25	Surface	1	2	25.0	8.0	35.4	6.3		13.0		22.7			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR8	8:25	Middle	2	1											
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR8	8:25	Middle	2	2											
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR8	8:25	Bottom	3	1	25.0	8.0	35.2	6.3		6.3		9.0		32.8	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR8	8:25	Bottom	3	2	25.0	8.0	35.4	6.3	6.3	9.0	32.5				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR9	8:46	Surface	1	1	25.0	8.0	35.2	6.2	6.2	7.2	7.8	13.9	15.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR9	8:46	Surface	1	2	25.0	8.0	35.4	6.2		7.1		12.4			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR9	8:46	Middle	2	1											
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR9	8:46	Middle	2	2											
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR9	8:46	Bottom	3	1	25.0	8.0	35.2	6.2		6.2		8.4		18.6	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR9	8:46	Bottom	3	2	25.0	8.0	35.4	6.2	6.2	8.3	17.5				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR10A	7:30	Surface	1	1	25.1	7.9	32.4	6.2	6.2	16.3	16.8	18.9	23.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR10A	7:30	Surface	1	2	24.9	8.0	32.6	6.2		16.3		18.0			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR10A	7:30	Middle	2	1	25.1	7.9	32.4	6.2		16.9		24.2			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR10A	7:30	Middle	2	2	24.9	8.0	32.6	6.2		16.9		25.7			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR10A	7:30	Bottom	3	1	25.1	7.9	32.4	6.2		6.2		17.2		27.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	SR10A	7:30	Bottom	3	2	24.9	8.0	32.6	6.2	6.2	17.1	27.5				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS12	9:11	Surface	1	1	25.0	8.0	34.9	6.4	6.4	10.4	14.9	16.6	25.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS12	9:11	Surface	1	2	25.0	8.0	35.2	6.4		10.3		15.8			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS12	9:11	Middle	2	1	24.8	8.0	35.0	6.4		13.8		22.7			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS12	9:11	Middle	2	2	24.9	8.0	35.3	6.4		13.8		21.3			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS12	9:11	Bottom	3	1	24.8	8.0	35.1	6.4		6.4		20.7		38.5	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS12	9:11	Bottom	3	2	24.8	8.0	35.3	6.4	6.4	20.6	38.5				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS13	9:03	Surface	1	1	25.0	8.0	35.1	6.3	6.3	12.8	21.0	27.9	29.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS13	9:03	Surface	1	2	25.0	8.0	35.4	6.3		12.8		29.5			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS13	9:03	Middle	2	1	25.0	8.0	35.1	6.3		19.1		30.2			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS13	9:03	Middle	2	2	25.1	8.0	35.4	6.3		19.2		30.1			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS13	9:03	Bottom	3	1	25.0	8.0	35.1	6.3		6.3		30.9		29.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS13	9:03	Bottom	3	2	25.0	8.0	35.4	6.3	6.3	30.9	30.2				
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS14	9:20	Surface	1	1	25.0	8.0	35.1	6.2	6.2	12.8	18.8	14.6	19.9		
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS14	9:20	Surface	1	2	25.1	8.0	35.4	6.2		12.8		15.1			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS14	9:20	Middle	2	1	25.0	8.0	35.1	6.2		18.7		20.3			
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS14	9:20	Middle	2	2	25.1	8.0	35.4	6.2		18.6		21.4			

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS6	14:36	Surface	1	1	25.0	8.0	38.4	5.8	5.8	13.1	22.4	13.1	14.8
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS6	14:36	Surface	1	2	25.0	8.0	38.7	5.8		13.2		11.5	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS6	14:36	Middle	2	1	25.0	8.0	38.4	5.8		24.4		13.1	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS6	14:36	Middle	2	2	25.1	8.0	38.7	5.8		24.4		11.3	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS6	14:36	Bottom	3	1	25.0	8.0	38.4	5.8		29.6		20.7	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS6	14:36	Bottom	3	2	25.1	8.0	38.7	5.8	5.8	29.5	19.3		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS4	13:01	Surface	1	1	24.8	8.0	37.8	6.1	6.0	6.6	12.4	7.9	12.5
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS4	13:01	Surface	1	2	24.8	8.0	38.1	6.0		6.6		8.7	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS4	13:01	Middle	2	1	24.7	8.0	38.3	5.9		9.1		10.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS4	13:01	Middle	2	2	24.8	8.0	38.6	5.9		9.1		10.8	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS4	13:01	Bottom	3	1	24.6	8.0	38.3	5.9		5.9		21.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	CS4	13:01	Bottom	3	2	24.7	8.0	38.6	5.8	5.9	21.4	19.4		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR8	14:15	Surface	1	1	25.2	8.0	38.4	5.9	5.9	8.6	10.1	8.5	10.9
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR8	14:15	Surface	1	2	25.2	8.0	38.7	5.9		8.5		9.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR8	14:15	Middle	2	1									
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR8	14:15	Middle	2	2									
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR8	14:15	Bottom	3	1	25.1	8.0	38.4	5.9		5.9		11.6	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR8	14:15	Bottom	3	2	25.1	8.0	38.7	5.9	5.9	11.6	12.7		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR9	13:58	Surface	1	1	25.0	8.0	38.4	5.9	5.9	7.6	12.4	8.9	10.1
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR9	13:58	Surface	1	2	25.0	8.0	38.7	5.9		7.5		8.2	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR9	13:58	Middle	2	1									
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR9	13:58	Middle	2	2									
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR9	13:58	Bottom	3	1	24.9	8.0	38.4	5.8		5.8		17.3	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR9	13:58	Bottom	3	2	25.0	8.0	38.7	5.8	5.8	17.3	11.7		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR10A	14:33	Surface	1	1	25.1	8.0	32.7	6.0	6.0	11.8	12.1	14.6	15.1
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR10A	14:33	Surface	1	2	25.3	7.9	32.4	6.0		11.8		15.0	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR10A	14:33	Middle	2	1	25.1	8.0	32.7	6.0		12.6		15.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR10A	14:33	Middle	2	2	25.3	7.9	32.4	6.0		12.7		15.7	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR10A	14:33	Bottom	3	1	25.1	8.0	32.7	6.0		6.0		11.9	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	SR10A	14:33	Bottom	3	2	25.3	7.9	32.4	6.0	6.0	11.9	14.6		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS12	13:25	Surface	1	1	25.0	8.0	38.4	5.9	5.9	8.0	18.3	9.0	26.4
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS12	13:25	Surface	1	2	25.0	8.0	38.7	5.9		8.0		8.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS12	13:25	Middle	2	1	24.9	8.0	38.4	5.8		13.5		15.8	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS12	13:25	Middle	2	2	25.0	8.0	38.7	5.8		13.4		14.0	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS12	13:25	Bottom	3	1	24.9	8.0	38.4	5.8		5.8		33.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS12	13:25	Bottom	3	2	25.0	8.0	38.7	5.8	5.8	33.4	56.2		
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS13	13:36	Surface	1	1	25.0	8.0	38.4	5.8	5.7	8.6	21.6	21.7	28.5
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS13	13:36	Surface	1	2	25.1	8.0	38.6	5.7		8.5		22.1	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS13	13:36	Middle	2	1	25.0	8.0	38.4	5.7		16.3		26.1	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS13	13:36	Middle	2	2	25.1	8.0	38.6	5.7		16.2		25.0	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS13	13:36	Bottom	3	1	25.0	8.0	38.4	5.7		5.7		40.0	
TMCLKL	HY/2012/08	2017/11/06	Mid-Ebb	IS13	13:36	Bottom	3	2	25.0	8.0	38.6	5.7	5.7	40.0	38.5		

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS14	9:20	Bottom	3	1	25.0	8.0	35.1	6.2	6.2	24.8		24.9	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS14	9:20	Bottom	3	2	25.1	8.0	35.4	6.2		24.8		23.3	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS15	8:53	Surface	1	1	25.0	8.0	35.1	6.3	6.3	11.7	18.1	14.6	20.0
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS15	8:53	Surface	1	2	25.1	8.0	35.4	6.3		11.7		15.6	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS15	8:53	Middle	2	1	25.1	8.0	35.1	6.3		15.5		19.4	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS15	8:53	Middle	2	2	25.1	8.0	35.4	6.3		15.4		20.3	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS15	8:53	Bottom	3	1	25.1	8.0	35.2	6.3	6.3	27.1		25.1	
TMCLKL	HY/2012/08	2017/11/06	Mid-Flood	IS15	8:53	Bottom	3	2	25.1	8.0	35.4	6.3		27.1		24.7	

Note: Indicates Ex:2017/11/01
Indicates Ex:2017/11/01

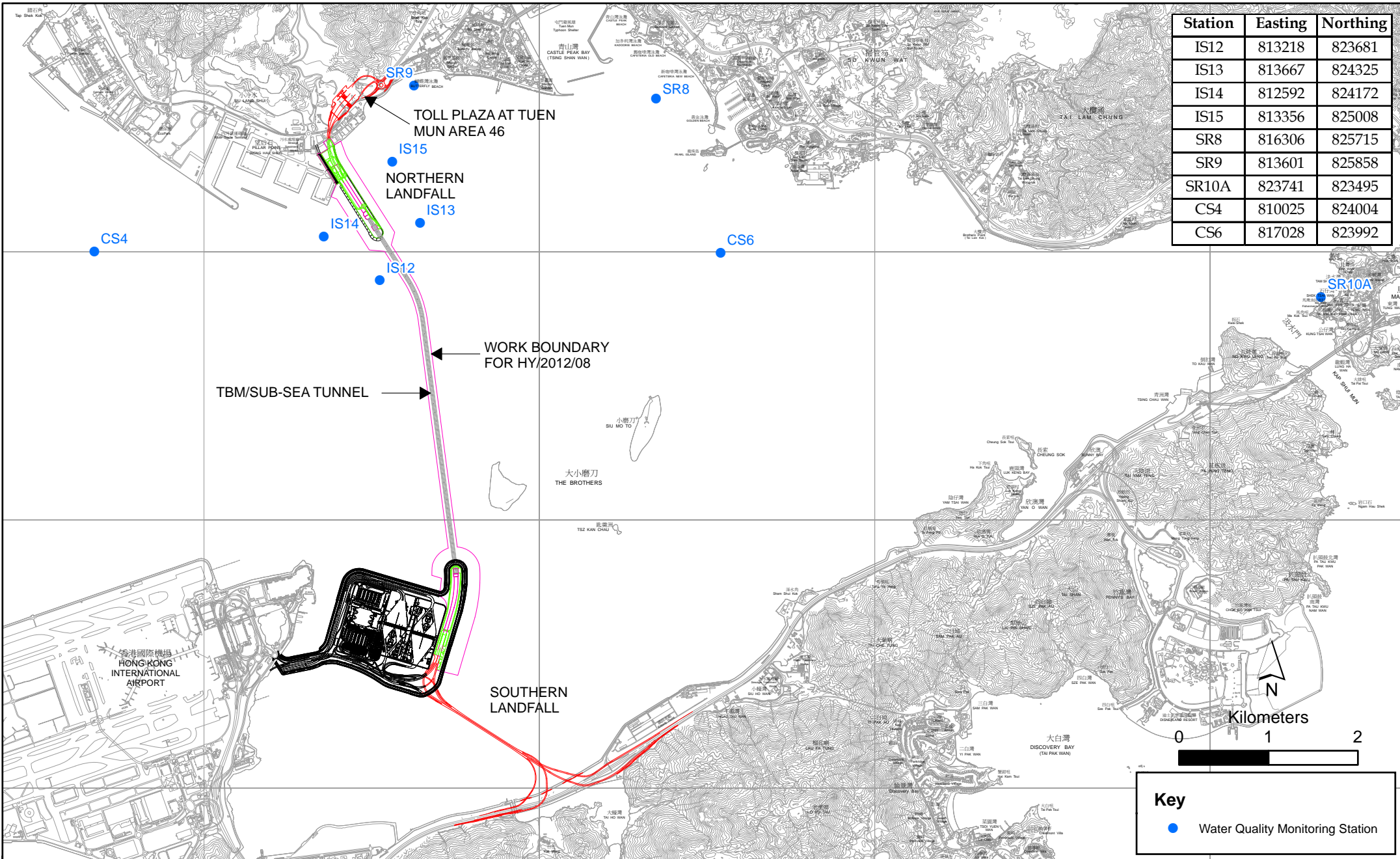
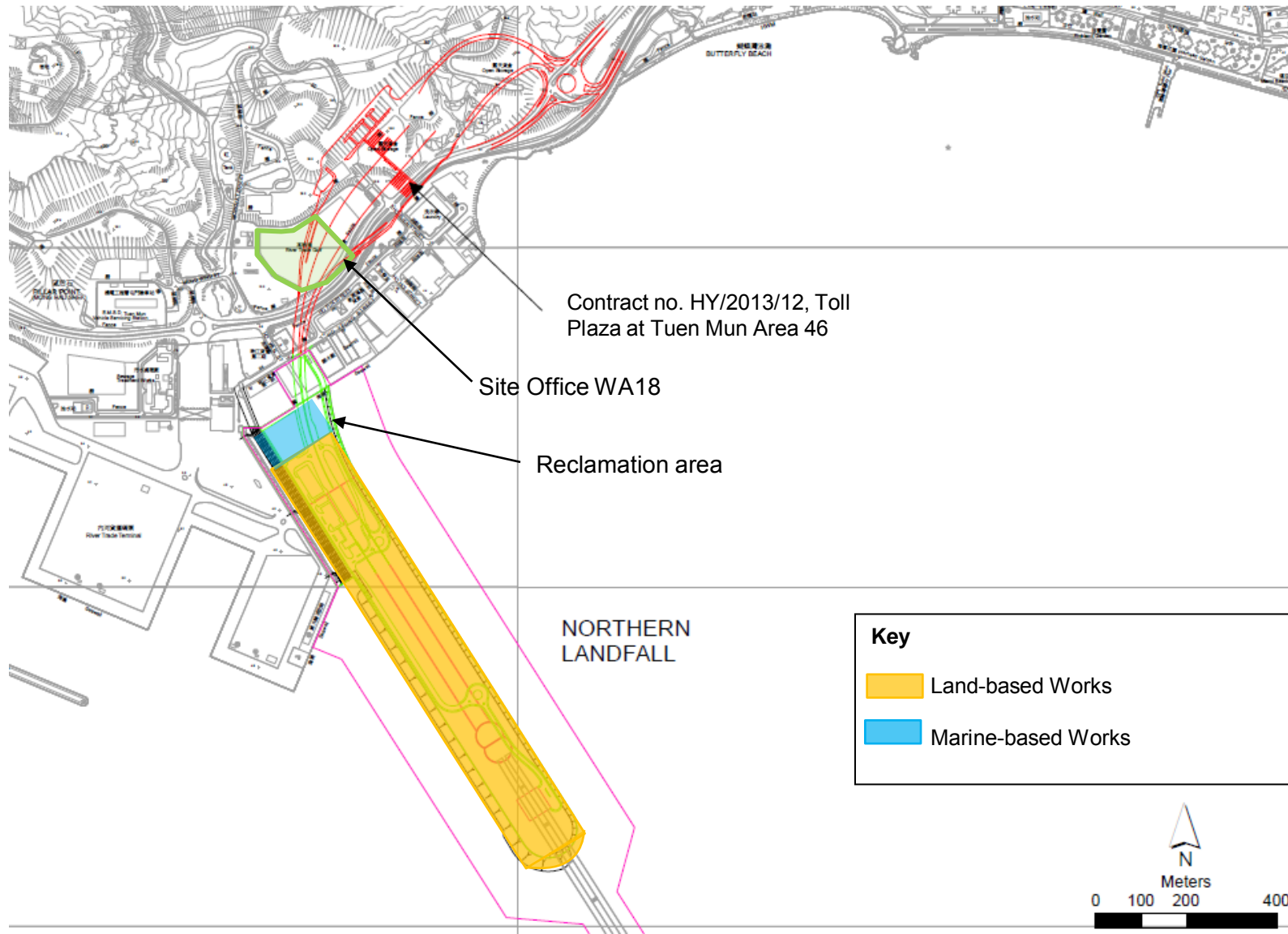


Figure 2.2

Water Quality Monitoring Station

Key

- Water Quality Monitoring Station



Annex A

Photo Record



Annex A Photos taken during Water Quality Monitoring

*Note: Photos taken on 6/11/2017



IS12 - Ebb tide



IS13 - Ebb tide



Annex A Photos taken during Water Quality Monitoring

*Note: Photos taken on 6/11/2017



IS12 - Flood tide



IS13 - Flood tide



Annex A Photos taken during Water Quality Monitoring

*Note: Photos taken on 6/11/2017



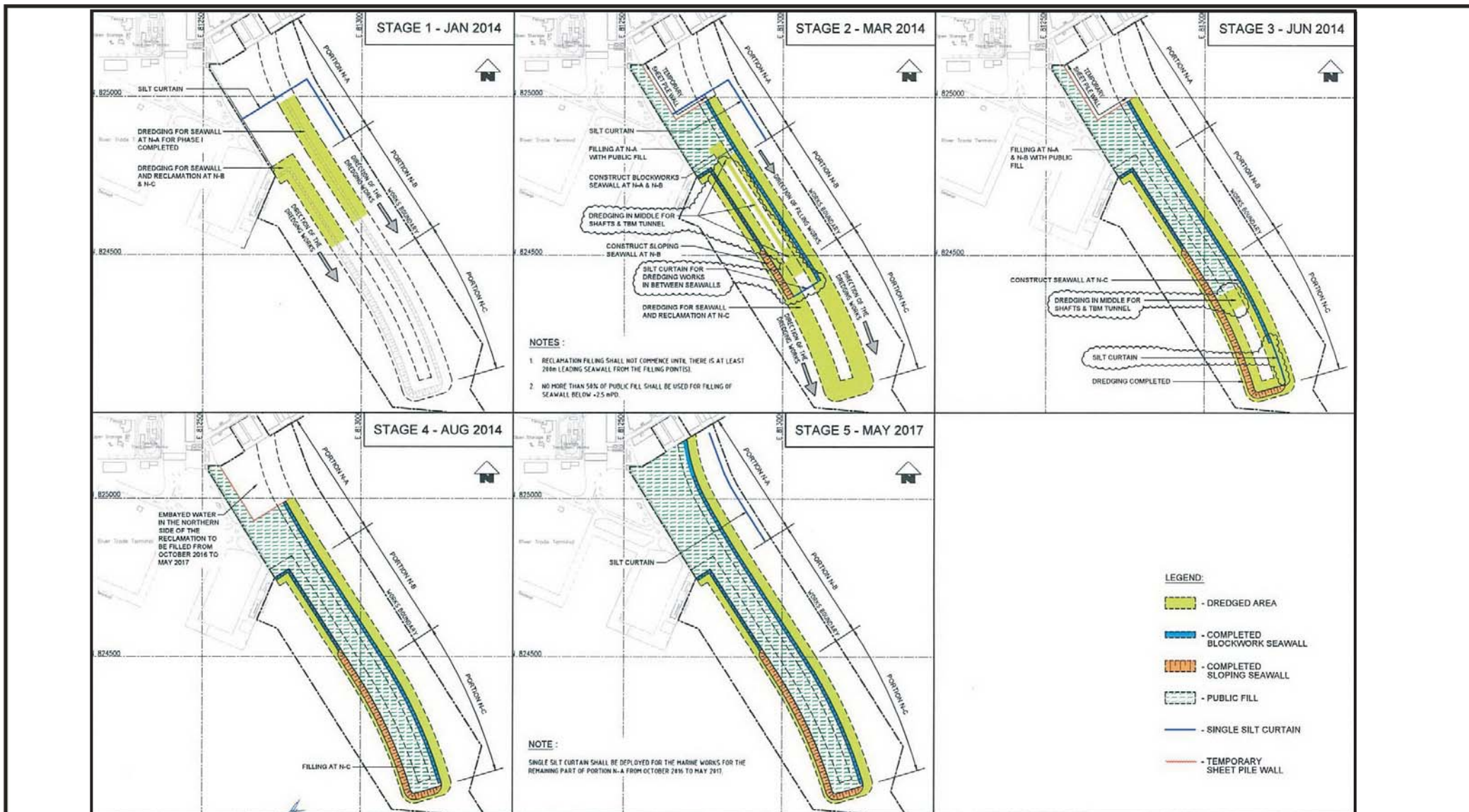
SR8 - Flood tide



SR10A - Flood tide

Annex B

EP EP-354/2009/D
Figure 3



Project Title: Tuen Mun - Chek Lap Kok Link

工程項目名稱: 屯門至赤鱗角連接路

Northern Reclamation Construction Sequence

北面填海施工程序

(Plan originated from Figure 2.2 of submitted documents dated 20/1/2014 with Application for Variation of an Environmental Permit no. VEP-426/2014)

(圖則源自於2014年1月20日提交跟更改環境許可證申請編號VEP-426/2014的文件 圖2.2)

Environmental Protection Department
環境保護署



Environmental Permit No.: EP-354/2009/D

環境許可證編號: EP-354/2009/D

Figure 3

圖3

Email
message

Environmental
Resources
Management

To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

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

Subject Notification of Exceedance for Water Quality
Impact Monitoring

Date 8 November 2017

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



ERM

Dear Sir or Madam,

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

Action Level Exceedance

0212330_8November2017_Depth-averaged SS_F_Station_SR8
0212330_8November2017_Depth-averaged SS_F_Station_SR9
0212330_8November2017_Depth-averaged SS_F_Station_IS14

A total of three Action Level Exceedances were recorded on 8 November 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

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	0212330_8November2017_Depth-averaged SS_F_Station_SR8 0212330_8November2017_Depth-averaged SS_F_Station_SR9 0212330_8November2017_Depth-averaged SS_F_Station_IS14 [Total No. of Exceedances = 3]	
Date	8 November 2017 (Measured) 9 November 2017 (<i>In situ</i> results received by ERM) 16 November 2017 (Laboratory results received by ERM)	
Monitoring Station	CS4, CS6, SR8, SR9, SR10A, IS12, IS13, IS14, IS15	
Parameter(s) with Exceedance(s)	Depth-averaged Suspended Solids (SS, mg/L)	
Action Levels	SS	120% of upstream control station at the same tide of the same day (i.e., CS6: 10.8 x 120% = 13.0 mg/L for mid-flood; CS4: 12.4 x 120% = 14.9 mg/L for mid-ebb) <u>and</u> 95%-ile of baseline data (i.e., 23.5 mg/L).
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun (i.e., CS6: 10.8 x 130% = 14.0 mg/L for mid-flood; CS4: 12.4 x 130% = 16.1 mg/L for mid-ebb) <u>and</u> 99%-ile of baseline data. (i.e., 34.4 mg/L)
Measured Levels	Action Level Exceedance for SS is observed at SR8 (25.3 mg/L) during mid- flood tide. Action Level Exceedance for SS is observed at SR9 (24.8 mg/L) during mid- flood tide. Action Level Exceedance for SS is observed at IS14 (25.8 mg/L) during mid- flood tide.	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, marine works conducted on 8 November 2017 included: <ul style="list-style-type: none"> Filling for Phase II reclamation at Portion N-A Filling materials were transported by barge to the site. One barge was deployed for the filling works.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances are unlikely to be due to the Project, in view of the following: <ul style="list-style-type: none"> Apart from observed exceedances, SS levels at all other monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. IS15 was closer to the marine-based construction area than the WQM stations where exceedances were observed. While average SS value recorded at IS15 was in compliance with the Action and Limit Levels in both mid-ebb and mid-flood tides, the observed exceedances at other remote stations were unlikely to be due to the marine works of this Contract. The average current flow direction during flood tide was from CS6 to CS4. The current flow direction did not favour the dispersion of suspended solids, if any, generated by the marine works under this Contract. Consider the normal average SS value recorded at IS15, which is the closest WQM station to the marine-based construction area, the observed exceedances at other remote stations were unlikely to be due to the marine works of this Contract. Depth-averaged Turbidity levels at all stations were in compliance with the Action and Limit Levels during both tides on the same day. Likewise, dissolved oxygen (DO) at all levels were also in compliance with the Action and Limit Levels in both mid-ebb and mid-flood tides. No water quality impact was observed during the monitoring. Photos taken at the stations at which exceedances were recorded during monitoring were provided in Annex A. 	

Actions Taken/ To Be Taken	According to EP EP-354/2009/D Figure 3 stage 5, a single layer silt curtain should be deployed at all stages of Northern reclamation. The drawings are provided in Annex B. Reclamation filling in Phase II remaining section was undertaken after the completion of seawall with a single layer silt curtain being deployed as a precautionary measure to reduce dispersion of suspended solids, which complied with the requirement specified in the EP. No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results and the locations of water quality monitoring stations are attached.

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS6	15:42	Surface	1	1	25.0	7.9	32.4	5.6	5.6	4.6	5.6	8.5	9.1
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS6	15:42	Surface	1	2	25.0	8.0	32.8	5.6		4.8		8.4	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS6	15:42	Middle	2	1	25.0	7.9	32.4	5.6		4.8		9.7	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS6	15:42	Middle	2	2	25.0	8.0	32.8	5.5		5.0		9.9	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS6	15:42	Bottom	3	1	25.0	7.9	32.4	5.6		6.8		9.3	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS6	15:42	Bottom	3	2	25.0	8.0	32.8	5.5	5.6	7.4	8.6		
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS4	14:25	Surface	1	1	24.7	8.0	32.0	6.1	6.1	5.0	10.0	8.1	10.8
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS4	14:25	Surface	1	2	24.7	8.0	32.3	6.1		6.1		8.8	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS4	14:25	Middle	2	1	24.6	8.0	32.0	6.0		10.0		11.6	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS4	14:25	Middle	2	2	24.6	8.0	32.3	6.0		11.4		12.7	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS4	14:25	Bottom	3	1	24.7	8.0	32.1	5.9		13.4		11.8	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	CS4	14:25	Bottom	3	2	24.7	8.0	32.4	5.9	5.9	14.1	11.5		
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR8	15:25	Surface	1	1	24.9	8.0	32.2	6.0	6.0	6.1	8.3	10.7	12.7
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR8	15:25	Surface	1	2	24.9	8.0	32.6	6.0		6.8		10.1	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR8	15:25	Middle	2	1									
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR8	15:25	Middle	2	2									
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR8	15:25	Bottom	3	1	24.9	8.0	32.2	6.0		9.7		15.7	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR8	15:25	Bottom	3	2	24.9	8.0	32.6	5.9	6.0	10.4	14.4		
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR9	15:09	Surface	1	1	24.9	8.0	32.2	5.9	5.9	9.6	14.4	9.3	10.3
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR9	15:09	Surface	1	2	24.9	8.0	32.5	5.9		10.8		8.1	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR9	15:09	Middle	2	1									
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR9	15:09	Middle	2	2									
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR9	15:09	Bottom	3	1	24.9	8.0	32.3	5.8		18.2		12.3	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR9	15:09	Bottom	3	2	24.9	8.0	32.6	5.8	5.8	18.9	11.6		
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR10A	16:25	Surface	1	1	25.0	8.0	32.4	6.0	6.0	7.0	7.2	11.4	10.9
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR10A	16:25	Surface	1	2	24.9	8.0	32.6	6.0		7.0		10.3	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR10A	16:25	Middle	2	1	25.0	8.0	32.4	6.0		7.2		11.6	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR10A	16:25	Middle	2	2	24.9	8.0	32.6	6.0		7.3		10.5	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR10A	16:25	Bottom	3	1	25.0	8.0	32.4	6.1		7.2		10.8	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	SR10A	16:25	Bottom	3	2	24.9	8.0	32.6	6.1	6.1	7.2	11.0		
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS12	14:49	Surface	1	1	24.9	8.0	32.2	6.0	6.0	5.1	7.2	7.7	11.9
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS12	14:49	Surface	1	2	24.9	8.0	32.5	6.0		6.3		8.2	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS12	14:49	Middle	2	1	24.8	8.0	32.2	5.9		6.6		11.1	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS12	14:49	Middle	2	2	24.8	8.0	32.5	5.9		7.8		10.3	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS12	14:49	Bottom	3	1	24.8	8.0	32.2	5.9		7.9		16.8	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS12	14:49	Bottom	3	2	24.9	8.0	32.5	5.9	5.9	9.2	17.4		
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS13	14:56	Surface	1	1	24.9	8.0	32.2	5.9	5.9	8.4	8.8	14.0	14.2
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS13	14:56	Surface	1	2	24.9	8.0	32.6	5.9		8.8		13.5	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS13	14:56	Middle	2	1	24.9	8.0	32.2	5.9		8.1		13.7	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS13	14:56	Middle	2	2	24.9	8.0	32.6	5.9		9.3		13.9	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS13	14:56	Bottom	3	1	24.9	8.0	32.2	5.9		8.7		15.5	
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS13	14:56	Bottom	3	2	24.9	8.0	32.6	5.9	5.9	9.6	14.3		

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS			
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS14	14:43	Surface	1	1	24.9	8.0	32.2	5.9	5.9	7.2	15.7	13.5	16.0			
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS14	14:43	Surface	1	2	24.9	8.0	32.6	5.9		8.0		14.3				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS14	14:43	Middle	2	1	24.8	8.0	32.2	5.9		15.1		16.5				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS14	14:43	Middle	2	2	24.8	8.0	32.5	5.9		16.1		16.1				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS14	14:43	Bottom	3	1	24.8	8.0	32.2	5.9		23.7		17.2				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS14	14:43	Bottom	3	2	24.8	8.0	32.5	5.9	5.9	24.0	18.6					
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS15	15:02	Surface	1	1	24.9	8.0	32.3	6.0	6.0	4.9	10.3	10.5	11.3			
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS15	15:02	Surface	1	2	25.0	8.0	32.6	6.0		5.9		11.2				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS15	15:02	Middle	2	1	24.9	8.0	32.3	5.9		8.9		11.7				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS15	15:02	Middle	2	2	24.9	8.0	32.6	5.9		9.5		11.8				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS15	15:02	Bottom	3	1	24.8	8.0	32.3	5.9		16.0		11.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Ebb	IS15	15:02	Bottom	3	2	24.8	8.0	32.6	5.8	5.9	16.3	11.4					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS6	15:42	Surface	1	1	25.0	7.9	32.4	5.6	5.6	4.6	5.6	12.2	13.9			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS6	15:42	Surface	1	2	25.0	8.0	32.8	5.6		4.8		11.7				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS6	15:42	Middle	2	1	25.0	7.9	32.4	5.6		4.8		15.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS6	15:42	Middle	2	2	25.0	8.0	32.8	5.5		5.0		14.5				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS6	15:42	Bottom	3	1	25.0	7.9	32.4	5.6		6.8		14.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS6	15:42	Bottom	3	2	25.0	8.0	32.8	5.5	5.6	7.4	15.4					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS4	14:25	Surface	1	1	24.7	8.0	32.0	6.1	6.1	5.0	10.0	19.2	22.5			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS4	14:25	Surface	1	2	24.7	8.0	32.3	6.1		6.1		18.7				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS4	14:25	Middle	2	1	24.6	8.0	32.0	6.0		10.0		23.0				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS4	14:25	Middle	2	2	24.6	8.0	32.3	6.0		11.4		22.1				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS4	14:25	Bottom	3	1	24.7	8.0	32.1	5.9		13.4		26.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	CS4	14:25	Bottom	3	2	24.7	8.0	32.4	5.9	5.9	14.1	25.3					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR8	15:25	Surface	1	1	24.9	8.0	32.2	6.0	6.0	6.1	8.3	18.0	25.3			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR8	15:25	Surface	1	2	24.9	8.0	32.6	6.0		6.8		19.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR8	15:25	Middle	2	1												
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR8	15:25	Middle	2	2												
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR8	15:25	Bottom	3	1	24.9	8.0	32.2	6.0		6.0		9.7		31.6		
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR8	15:25	Bottom	3	2	24.9	8.0	32.6	5.9	6.0	10.4	32.3					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR9	15:09	Surface	1	1	24.9	8.0	32.2	5.9	5.9	9.6	14.4	21.5	24.8			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR9	15:09	Surface	1	2	24.9	8.0	32.5	5.9		10.8		22.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR9	15:09	Middle	2	1												
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR9	15:09	Middle	2	2												
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR9	15:09	Bottom	3	1	24.9	8.0	32.3	5.8		5.8		18.2		27.1		
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR9	15:09	Bottom	3	2	24.9	8.0	32.6	5.8	5.8	18.9	28.0					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR10A	16:25	Surface	1	1	25.0	8.0	32.4	6.0	6.0	7.0	7.2	12.6	13.0			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR10A	16:25	Surface	1	2	24.9	8.0	32.6	6.0		7.0		11.8				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR10A	16:25	Middle	2	1	25.0	8.0	32.4	6.0		7.2		10.9				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR10A	16:25	Middle	2	2	24.9	8.0	32.6	6.0		7.3		11.7				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR10A	16:25	Bottom	3	1	25.0	8.0	32.4	6.1		7.2		16.1				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	SR10A	16:25	Bottom	3	2	24.9	8.0	32.6	6.1	6.1	7.2	15.1					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS12	14:49	Surface	1	1	24.9	8.0	32.2	6.0	6.0	5.1	7.2	7.3	11.6			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS12	14:49	Surface	1	2	24.9	8.0	32.5	6.0		6.3		8.8				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS12	14:49	Middle	2	1	24.8	8.0	32.2	5.9		6.6		11.2				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS12	14:49	Middle	2	2	24.8	8.0	32.5	5.9		7.8		12.2				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS12	14:49	Bottom	3	1	24.8	8.0	32.2	5.9		5.9		7.9		14.3		
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS12	14:49	Bottom	3	2	24.9	8.0	32.5	5.9	5.9	9.2	15.9					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS13	14:56	Surface	1	1	24.9	8.0	32.2	5.9	5.9	8.4	8.8	20.2	21.3			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS13	14:56	Surface	1	2	24.9	8.0	32.6	5.9		8.8		20.6				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS13	14:56	Middle	2	1	24.9	8.0	32.2	5.9		8.1		20.4				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS13	14:56	Middle	2	2	24.9	8.0	32.6	5.9		9.3		19.6				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS13	14:56	Bottom	3	1	24.9	8.0	32.2	5.9		5.9		8.7		24.0		
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS13	14:56	Bottom	3	2	24.9	8.0	32.6	5.9	5.9	9.6	23.0					
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS14	14:43	Surface	1	1	24.9	8.0	32.2	5.9	5.9	7.2	15.7	25.6	25.8			
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS14	14:43	Surface	1	2	24.9	8.0	32.6	5.9		8.0		24.1				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS14	14:43	Middle	2	1	24.8	8.0	32.2	5.9		15.1		24.6				
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS14	14:43	Middle	2	2	24.8	8.0	32.5	5.9		16.1		24.6				

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS14	14:43	Bottom	3	1	24.8	8.0	32.2	5.9	5.9	23.7		28.9	
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS14	14:43	Bottom	3	2	24.8	8.0	32.5	5.9		24.0		27.0	
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS15	15:02	Surface	1	1	24.9	8.0	32.3	6.0	6.0	4.9	10.3	16.1	19.3
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS15	15:02	Surface	1	2	25.0	8.0	32.6	6.0		5.9		16.3	
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS15	15:02	Middle	2	1	24.9	8.0	32.3	5.9		8.9		17.4	
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS15	15:02	Middle	2	2	24.9	8.0	32.6	5.9		9.5		17.2	
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS15	15:02	Bottom	3	1	24.8	8.0	32.3	5.9		16.0		24.3	
TMCLKL	HY/2012/08	2017/11/08	Mid-Flood	IS15	15:02	Bottom	3	2	24.8	8.0	32.6	5.8	5.9	16.3	24.6		

Note: Indicates Ex 2017/11/01
Indicates Ex 2017/11/01

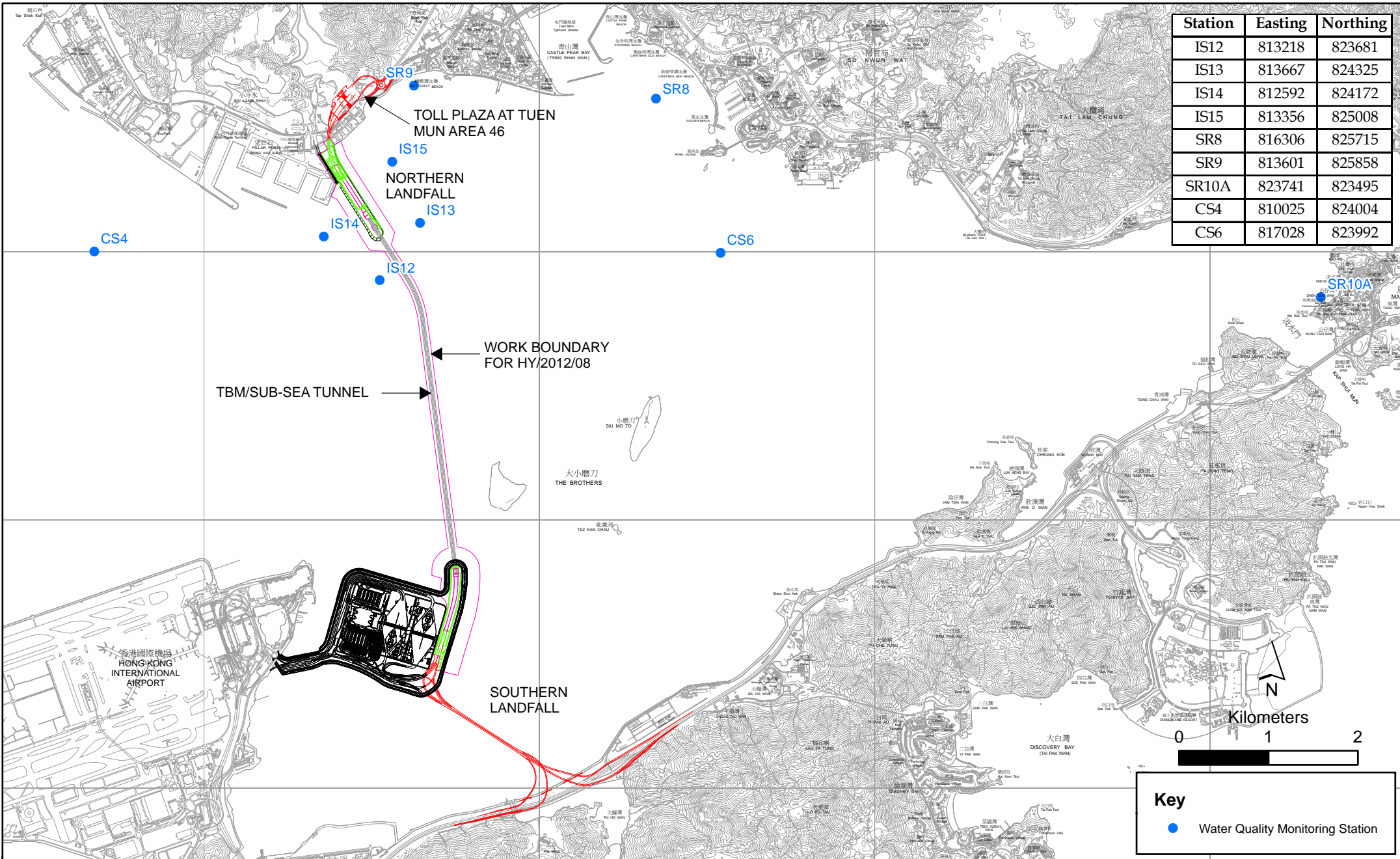
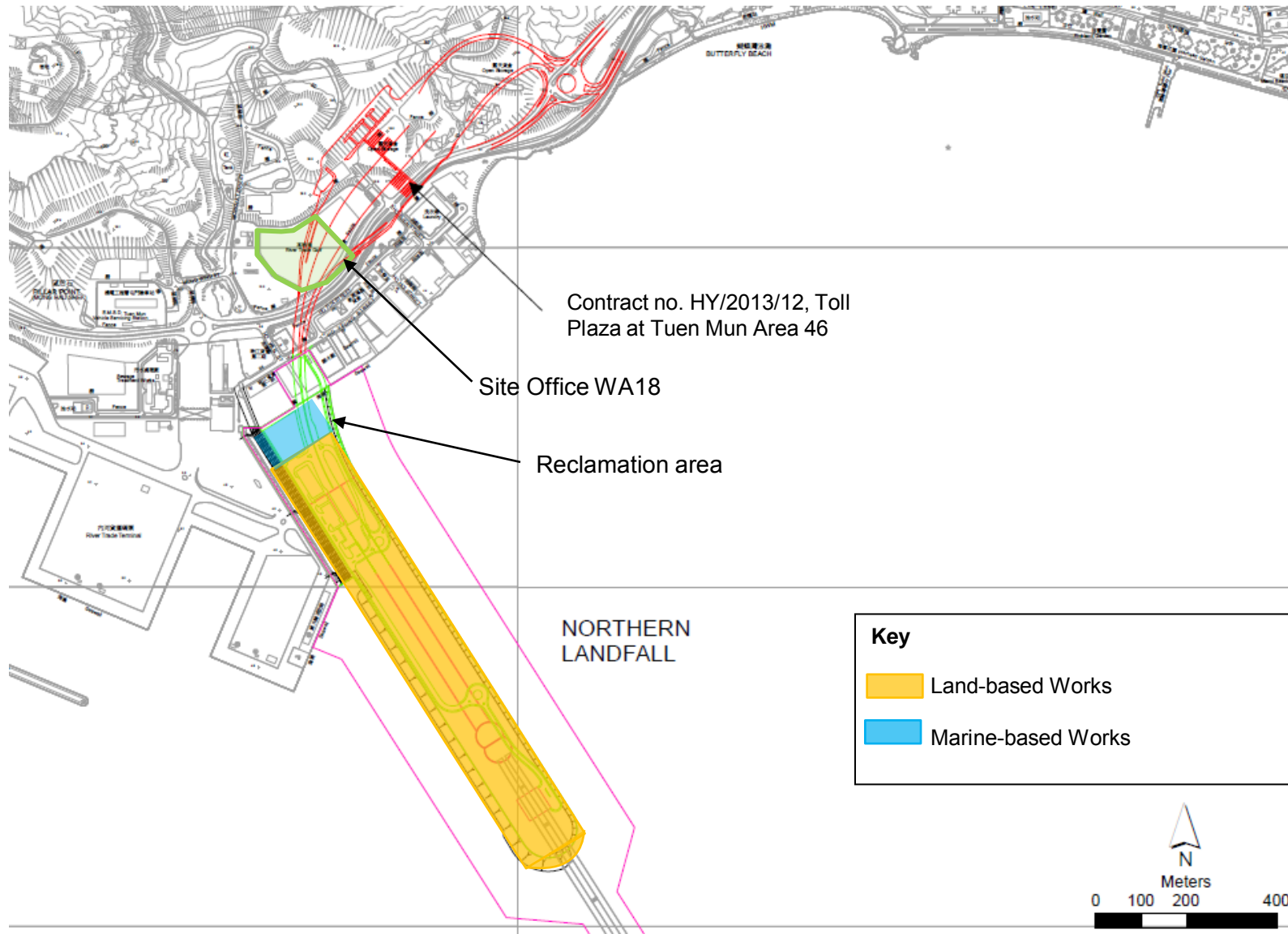


Figure 2.2

Water Quality Monitoring Station



Annex A

Photo Record



Annex A Photos taken during Water Quality Monitoring

*Note: Photos taken on 8/11/2017



SR8 - Flood tide



SR9 - Flood tide



Annex A Photos taken during Water Quality Monitoring

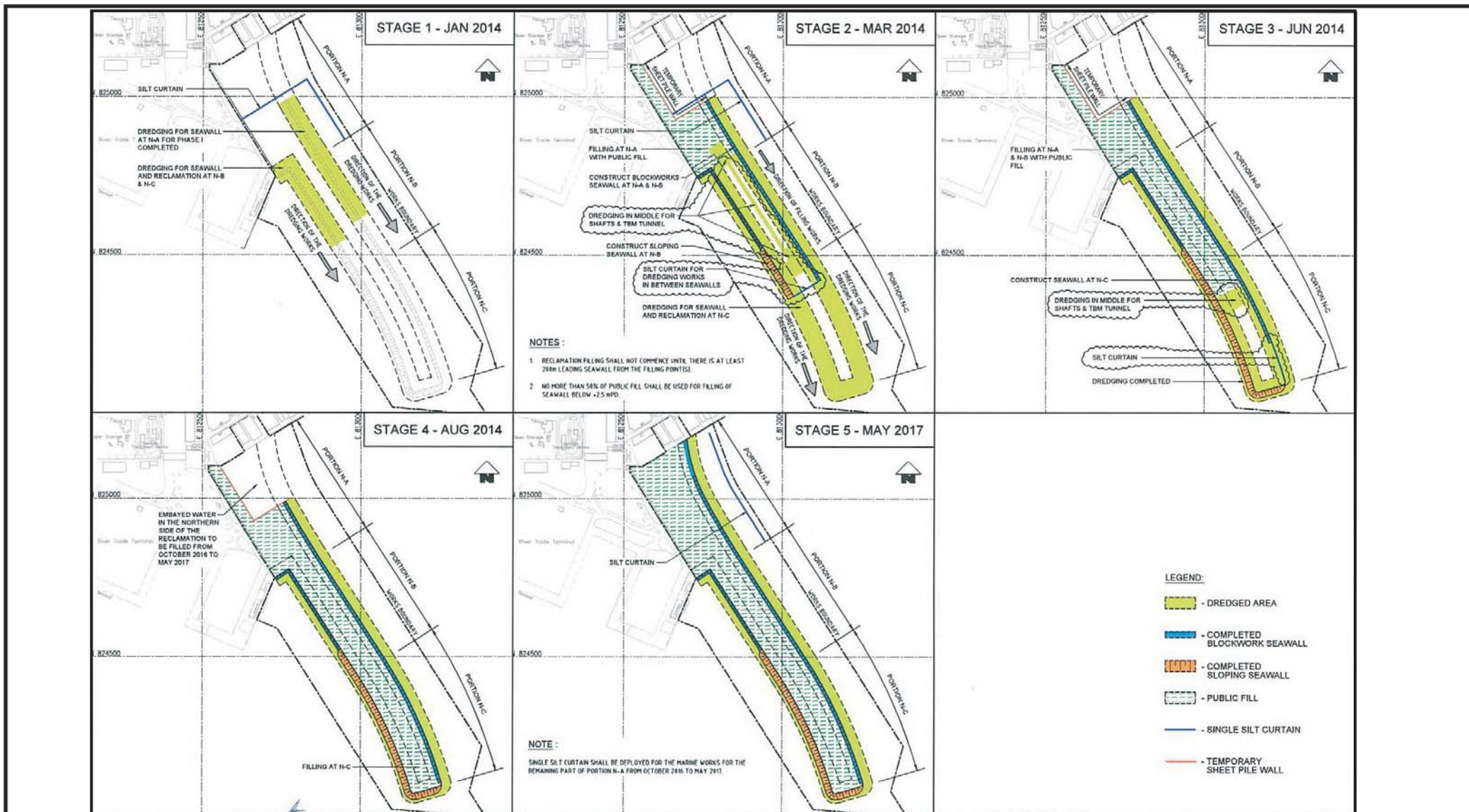
*Note: Photos taken on 8/11/2017



IS14 - Flood tide

Annex B

EP EP-354/2009/D
Figure 3



Project Title: Tuen Mun - Chek Lap Kok Link

工程項目名稱: 屯門至赤鱗角連接路

Northern Reclamation Construction Sequence

北面填海施工程序

(Plan originated from Figure 2.2 of submitted documents dated 20/1/2014 with Application for Variation of an Environmental Permit no. VEP-426/2014)

(圖則源自於2014年1月20日提交跟更改環境許可證申請編號VEP-426/2014的文件 圖2.2)

Environmental Protection Department
環境保護署



Environmental Permit No.: EP-354/2009/D

環境許可證編號: EP-354/2009/D

Figure 3

圖3

Email
message

Environmental
Resources
Management

To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

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

Subject Notification of Exceedance for Water Quality
Impact Monitoring

Date 22 November 2017

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



ERM

Dear Sir or Madam,

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

Action Level Exceedance
0212330_22November2017_Depth-averaged SS_F_Station_IS15

A total of one Action Level Exceedance was recorded on 22 November 2017.

Regards,

A handwritten signature in black ink, appearing to read 'Jovy Tam'.

Mr Jovy Tam
Environmental Team Leader

CONFIDENTIALITY NOTICE

This facsimile transmission is intended only for the use of the addressee and is confidential. If you are not the addressee it may be unlawful for you to read, copy, distribute, disclose or otherwise use the information in this facsimile. If you are not the intended recipient, please telephone or fax us.



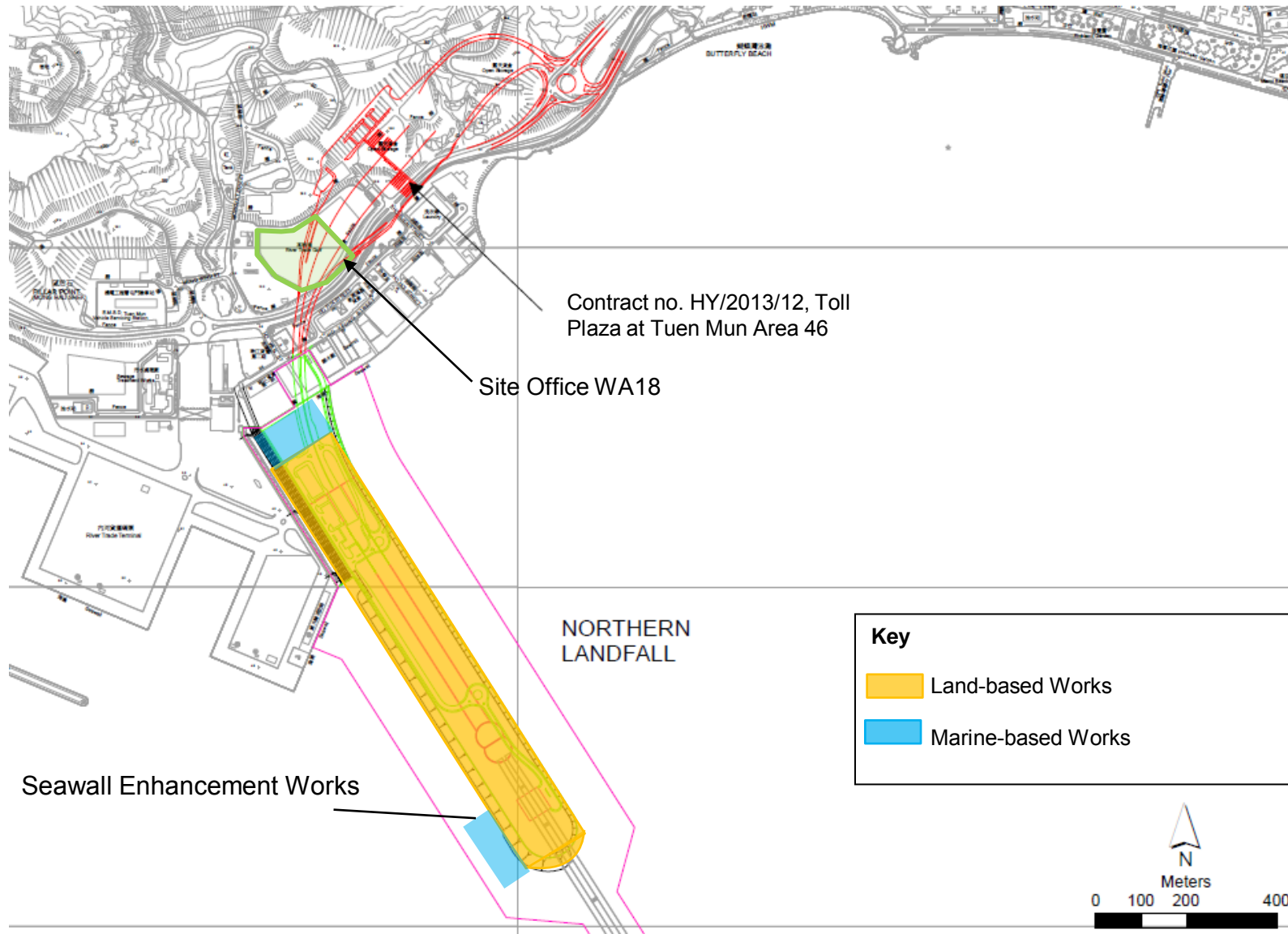
ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08

TUEN MUN – CHEK LAP KOK LINK –
NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Marine Water Quality Impact Monitoring
Notification of Exceedance

Log No.	0212330_22November2017_Depth-averaged SS_F_Station_IS15 [Total No. of Exceedances = 1]	
Date	22 November 2017 (Measured) 23 November 2017 (<i>In situ</i> results received by ERM) 1 December 2017 (Laboratory results received by ERM)	
Monitoring Station	CS4, CS6, SR8, SR9, SR10A, IS12, IS13, IS14, IS15	
Parameter(s) with Exceedance(s)	Depth-averaged Suspended Solids (SS, mg/L)	
Action Levels	SS	120% of upstream control station at the same tide of the same day (i.e., CS6: $9.2 \times 120\% = 11.0$ mg/L for mid-flood; CS4: $13.5 \times 120\% = 16.2$ mg/L for mid-ebb) <u>and</u> 95%-ile of baseline data (i.e., 23.5 mg/L).
Limit Levels	SS	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun (i.e., CS6: $9.2 \times 130\% = 12.0$ mg/L for mid-flood; CS4: $13.5 \times 130\% = 17.6$ mg/L for mid-ebb) <u>and</u> 99%-ile of baseline data. (i.e., 34.4 mg/L)
Measured Levels	Action Level Exceedance for SS is observed at IS15 (25.8 mg/L) during mid-flood tide.	
Works Undertaken (at the time of monitoring event)	According to the information provided by the Contractor, marine works conducted on 22 November 2017 included: <ul style="list-style-type: none"> Seawall Enhancement Works at Portion N-C 	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> Apart from observed exceedances, SS levels at all other monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. IS12 and IS14 were closer to the marine-based construction area than the WQM stations where exceedances were observed. While average SS value recorded at IS12 and IS14 were in compliance with the Action and Limit Levels in both mid-ebb and mid-flood tides, the observed exceedances at other remote stations were unlikely to be due to the marine works of this Contract. The average current flow direction during flood tide was from CS6 to CS4. The current flow direction did not favour the dispersion of suspended solids to IS15, if any, generated by the marine works under this Contract. Consider the normal average SS value recorded at IS12 and IS14, which is the closest WQM station to the marine-based construction area, the observed exceedances at other remote stations were unlikely to be due to the marine works of this Contract. Depth-averaged Turbidity levels at all stations were in compliance with the Action and Limit Levels during both tides on the same day. Likewise, dissolved oxygen (DO) at all levels were also in compliance with the Action and Limit Levels in both mid-ebb and mid-flood tides. 	
Actions Taken/ To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results and the locations of water quality monitoring stations are attached.	



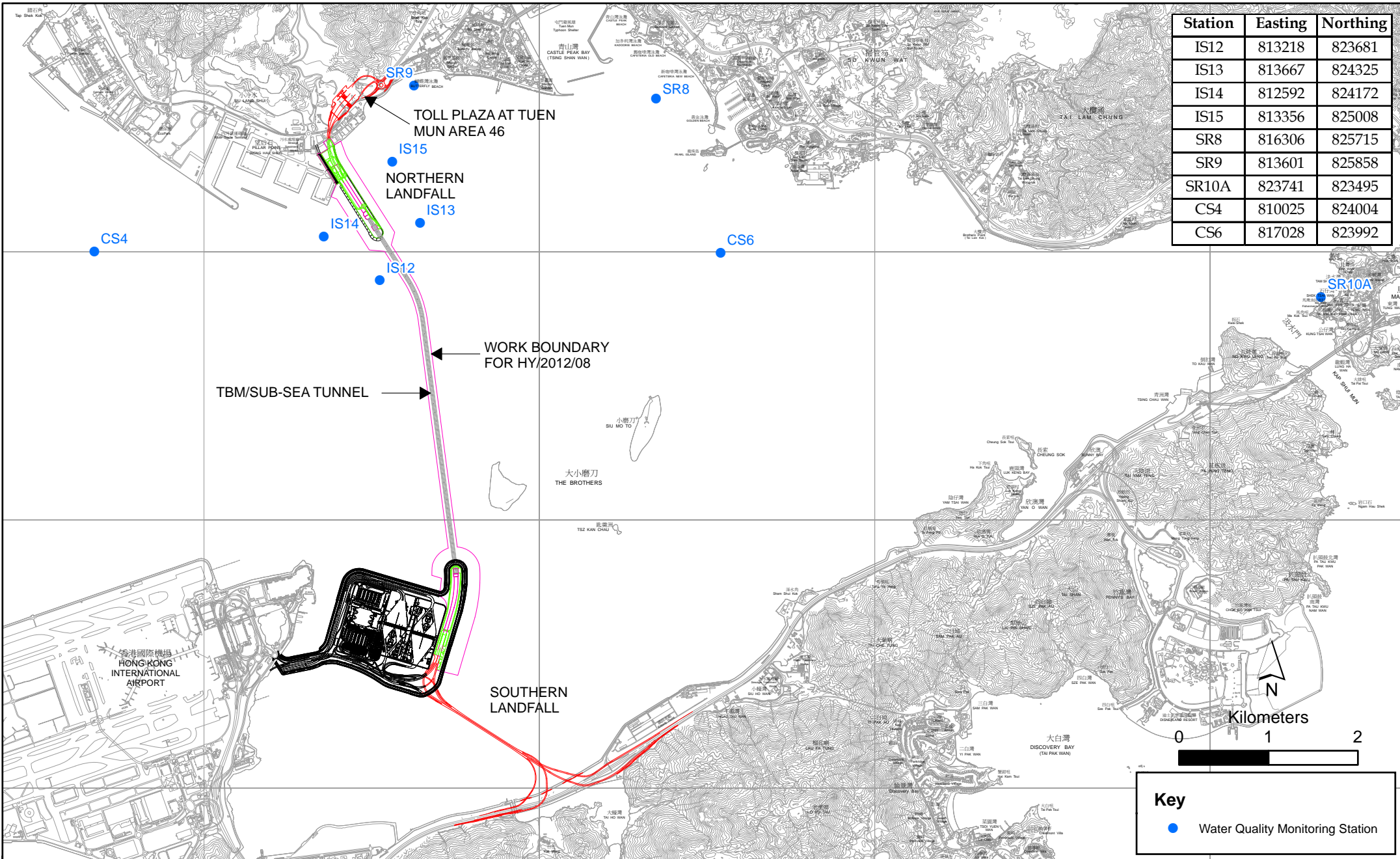


Figure 2.2

Water Quality Monitoring Station

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS6	14:54	Surface	1	1	23.8	8.0	32.2	5.7	5.7	3.4	5.0	7.1	8.9
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS6	14:54	Surface	1	2	23.8	8.0	32.3	5.7		3.4		8.4	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS6	14:54	Middle	2	1	23.7	8.0	32.3	5.7		5.1		8.5	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS6	14:54	Middle	2	2	23.8	8.0	32.3	5.6		4.9		9.3	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS6	14:54	Bottom	3	1	23.7	8.0	32.3	5.7		6.6		10.0	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS6	14:54	Bottom	3	2	23.8	8.0	32.3	5.6	5.7	6.7	10.3		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS4	13:39	Surface	1	1	23.7	8.1	31.6	6.0	5.9	6.3	8.8	9.9	13.5
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS4	13:39	Surface	1	2	23.7	8.0	31.6	5.9		6.2		8.9	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS4	13:39	Middle	2	1	23.7	8.1	31.6	5.9		6.5		13.5	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS4	13:39	Middle	2	2	23.7	8.0	31.6	5.9		6.8		13.7	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS4	13:39	Bottom	3	1	23.7	8.1	31.6	5.9		5.9		13.5	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	CS4	13:39	Bottom	3	2	23.7	8.0	31.6	5.9	5.9	13.7	17.7		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR8	14:40	Surface	1	1	23.9	8.0	31.8	5.8	5.8	5.9	7.7	8.7	8.4
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR8	14:40	Surface	1	2	23.9	8.0	31.8	5.8		5.5		7.1	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR8	14:40	Middle	2	1									
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR8	14:40	Middle	2	2									
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR8	14:40	Bottom	3	1	23.8	8.0	31.8	5.9		9.9		8.8	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR8	14:40	Bottom	3	2	23.8	8.0	31.9	5.9	5.9	9.5	8.8		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR9	14:25	Surface	1	1	24.0	8.0	31.8	5.9	5.9	4.8	5.8	6.8	6.7
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR9	14:25	Surface	1	2	24.0	8.0	31.8	5.9		4.7		6.3	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR9	14:25	Middle	2	1									
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR9	14:25	Middle	2	2									
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR9	14:25	Bottom	3	1	23.7	8.0	31.8	5.8		6.9		7.0	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR9	14:25	Bottom	3	2	23.8	8.0	31.8	5.8	5.8	6.8	6.7		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR10A	15:38	Surface	1	1	23.6	8.0	32.1	6.1	6.1	5.8	5.5	7.0	6.9
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR10A	15:38	Surface	1	2	23.8	7.8	31.9	6.1		5.7		7.2	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR10A	15:38	Middle	2	1	23.6	8.0	32.1	6.1		5.3		7.8	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR10A	15:38	Middle	2	2	23.8	7.8	31.9	6.1		5.2		6.0	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR10A	15:38	Bottom	3	1	23.6	8.0	32.1	6.2		5.4		6.4	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	SR10A	15:38	Bottom	3	2	23.8	7.8	31.9	6.2	6.2	5.4	6.7		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS12	14:02	Surface	1	1	23.7	8.1	31.7	6.1	5.9	3.6	4.7	5.9	6.8
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS12	14:02	Surface	1	2	23.8	8.0	31.7	6.1		3.7		5.9	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS12	14:02	Middle	2	1	23.8	8.0	31.9	5.7		4.4		7.0	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS12	14:02	Middle	2	2	23.8	8.0	31.9	5.7		4.6		6.4	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS12	14:02	Bottom	3	1	23.8	8.0	32.0	5.8		6.1		7.6	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS12	14:02	Bottom	3	2	23.8	8.0	32.0	5.7	5.8	6.0	8.2		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS13	14:11	Surface	1	1	23.8	8.0	31.8	5.9	5.9	3.5	4.7	4.6	7.0
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS13	14:11	Surface	1	2	23.8	8.0	31.8	5.9		3.6		5.2	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS13	14:11	Middle	2	1	23.7	8.0	31.8	5.8		4.6		7.1	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS13	14:11	Middle	2	2	23.8	8.0	31.8	5.8		4.7		7.7	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS13	14:11	Bottom	3	1	23.8	8.0	31.9	5.8		6.3		8.8	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS13	14:11	Bottom	3	2	23.8	8.0	31.9	5.8	5.8	5.6	8.5		

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS14	13:55	Surface	1	1	23.7	8.0	31.7	5.8	5.8	6.4	9.6	8.2	11.8	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS14	13:55	Surface	1	2	23.7	8.0	31.7	5.8		6.6		8.4		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS14	13:55	Middle	2	1	23.7	8.0	31.7	5.8		8.6		11.5		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS14	13:55	Middle	2	2	23.7	8.0	31.7	5.8		8.7		10.5		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS14	13:55	Bottom	3	1	23.6	8.0	31.7	5.8		13.1		16.6		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS14	13:55	Bottom	3	2	23.6	8.0	31.7	5.8	5.8	14.1	15.3			
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS15	14:18	Surface	1	1	24.0	8.0	31.8	5.8	5.8	4.5	5.1	6.1	7.5	
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS15	14:18	Surface	1	2	24.0	8.0	31.8	5.8		4.3		5.9		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS15	14:18	Middle	2	1	23.9	8.0	31.9	5.7		5.0		7.3		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS15	14:18	Middle	2	2	23.9	8.0	31.9	5.7		5.1		6.9		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS15	14:18	Bottom	3	1	23.8	8.0	31.9	5.7		5.6		8.7		
TMCLKL	HY/2012/08	2017/11/22	Mid-Ebb	IS15	14:18	Bottom	3	2	23.8	8.0	31.9	5.7	5.7	6.0	10.0			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS6	8:45	Surface	1	1	23.4	8.1	31.5	6.0	6.0	5.7	7.7	8.2	9.2	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS6	8:45	Surface	1	2	23.3	8.1	31.5	6.1		5.8		7.5		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS6	8:45	Middle	2	1	23.5	8.0	31.7	5.9		5.7		8.4		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS6	8:45	Middle	2	2	23.5	8.1	31.7	6.0		5.5		9.1		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS6	8:45	Bottom	3	1	23.6	8.0	31.8	5.9		11.6		11.4		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS6	8:45	Bottom	3	2	23.6	8.1	31.8	5.9	5.9	12.1	10.5			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS4	10:02	Surface	1	1	23.3	8.1	31.2	6.1	6.1	8.5	11.0	9.1	10.6	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS4	10:02	Surface	1	2	23.2	8.1	31.2	6.2		8.5		10.3		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS4	10:02	Middle	2	1	23.2	8.1	31.2	6.1		10.5		10.9		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS4	10:02	Middle	2	2	23.2	8.1	31.2	6.1		10.6		9.8		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS4	10:02	Bottom	3	1	23.2	8.1	31.2	6.1		6.1		14.1		12.3
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	CS4	10:02	Bottom	3	2	23.2	8.1	31.2	6.1	6.1	14.0	11.4			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR8	9:00	Surface	1	1	23.6	8.0	31.8	5.8	5.9	7.5	10.3	9.8	13.4	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR8	9:00	Surface	1	2	23.6	8.0	31.8	5.9		7.4		8.4		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR8	9:00	Middle	2	1										
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR8	9:00	Middle	2	2										
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR8	9:00	Bottom	3	1	23.6	8.0	31.8	5.9		6.0		13.1		17.6
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR8	9:00	Bottom	3	2	23.6	8.0	31.8	6.1		13.3	17.6			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR9	9:16	Surface	1	1	23.6	8.0	31.8	5.7	5.7	8.8	10.7	9.8	12.1	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR9	9:16	Surface	1	2	23.6	8.0	31.7	5.7		9.0		9.4		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR9	9:16	Middle	2	1										
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR9	9:16	Middle	2	2										
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR9	9:16	Bottom	3	1	23.6	8.0	31.8	5.7		5.8		12.3		14.5
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR9	9:16	Bottom	3	2	23.6	8.0	31.7	5.8		12.8	14.6			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR10A	8:21	Surface	1	1	23.6	7.9	31.8	6.0	6.0	5.7	6.1	7.4	8.4	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR10A	8:21	Surface	1	2	23.7	7.9	31.6	6.0		5.7		7.5		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR10A	8:21	Middle	2	1	23.6	7.9	31.8	6.0		6.3		6.1		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR10A	8:21	Middle	2	2	23.7	7.9	31.6	6.0		6.3		7.3		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR10A	8:21	Bottom	3	1	23.6	7.9	31.8	6.0		6.0		6.2		10.6
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	SR10A	8:21	Bottom	3	2	23.7	7.9	31.6	6.0	6.0	6.1	11.2			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS12	9:35	Surface	1	1	23.3	8.0	31.2	6.1	6.1	4.8	11.1	6.7	12.5	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS12	9:35	Surface	1	2	23.3	8.1	31.2	6.1		4.8		7.7		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS12	9:35	Middle	2	1	23.4	8.0	31.4	6.0		11.9		10.4		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS12	9:35	Middle	2	2	23.4	8.1	31.4	6.0		11.7		9.2		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS12	9:35	Bottom	3	1	23.5	8.0	31.5	5.9		5.9		17.7		20.1
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS12	9:35	Bottom	3	2	23.5	8.0	31.5	5.9		15.4	20.7			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS13	9:30	Surface	1	1	23.4	8.0	31.5	6.1	6.1	10.5	12.7	13.2	16.5	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS13	9:30	Surface	1	2	23.4	8.1	31.4	6.1		10.1		13.8		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS13	9:30	Middle	2	1	23.4	8.0	31.5	6.0		12.5		16.1		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS13	9:30	Middle	2	2	23.4	8.1	31.5	6.0		12.8		15.7		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS13	9:30	Bottom	3	1	23.4	8.0	31.6	6.0		6.0		15.4		20.4
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS13	9:30	Bottom	3	2	23.4	8.0	31.5	6.0	6.0	14.8	19.9			
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Surface	1	1	23.7	8.0	31.7	5.7	5.7	12.8	12.4	15.5	19.3	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Surface	1	2	23.7	8.0	31.7	5.7		12.8		16.0		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Middle	2	1	23.7	8.0	31.7	5.7		10.5		18.8		
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Middle	2	2	23.7	8.0	31.7	5.7						
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Middle	2	2	23.7	8.0	31.7	5.7						

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Lev_Cod	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Bottom	3	1	23.7	8.0	31.7	5.7	5.7	13.7		23.7	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS14	9:42	Bottom	3	2	23.7	8.0	31.7	5.7		14.1		23.6	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS15	9:23	Surface	1	1	23.5	8.0	31.8	5.9	5.9	16.9	17.4	24.9	25.8
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS15	9:23	Surface	1	2	23.5	8.1	31.8	5.9		17.1		24.4	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS15	9:23	Middle	2	1	23.5	8.0	31.8	5.9		14.2		25.3	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS15	9:23	Middle	2	2	23.5	8.1	31.8	5.9		14.7		26.7	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS15	9:23	Bottom	3	1	23.5	8.0	31.8	5.9	5.9	22.9		26.0	
TMCLKL	HY/2012/08	2017/11/22	Mid-Flood	IS15	9:23	Bottom	3	2	23.5	8.1	31.8	5.9		18.6		27.3	

Note: Indicates Ex:2017/11/01
Indicates Ex:2017/11/01

ENVIRONMENTAL COMPLAINT/ENQUIRY INVESTIGATION REPORT

Our Reference: 0212330_Complaint LOG_20171025_14

Basic Information of Complaint/Enquiry

Reference Number:	Not disclosed
Date of Complaint/Enquiry Received	20/10/2017
Location of Complaint/Enquiry	Tuen Mun Pier
Nature of Complaint/Enquiry	Light pollution
Complaint/Enquiry Received by	EPD
Via	Letter
Complainant/Enquirer	District Councillor Yan Siu-nam

Details of Complaint/Enquiry

On 20 October 2017, a complaint case was received by EPD regarding light pollution from the site of TMCLKL Northern Connection Sub-sea Tunnel Section opposite Tuen Mun Pier at midnight. The complainant Yan Siu-nam, who is the District Councillor, reflected the opinions of the residents and enquired the working hour of the concerned project and possible measures to mitigate the light nuisance to the residents. The SOR, the Environmental Team (ET) and the Contractor(DBJV) received the complaint notification from IEC on 25 October 2017.

Investigation Report

Upon receiving the case notification from IEC on 25 October 2017, the Contractor had promptly checked the construction schedule of October 2017.

In this project, the construction works are required to operate 24 hours a day. Night-time lighting is essential to illuminate the main access road in order to provide a safe and efficient working environment for the site staff. Traffic routes within the site were also illuminated for the transportation of construction materials. Photos of the site during night-time are provided in Annex A.

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

The Contractor has been reminded to implement all relevant mitigation measures of light impact to avoid causing visual impact.

The following mitigation measures have been implemented by the Contractor to minimize the light pollution and visual impact during night-time:

1. All lights shall not project skyward. For those lighting that may spill out into the sky, they should be capped at the top to avoid causing glare.
2. Avoid over-illumination. Trim down any unnecessary lighting on site.
3. All lighting should be directed to the site only.
4. Brief the frontline staff to switch off unnecessary lighting on site.

Site inspection was carried out on 1 November 2017 after the implementation of mitigation measures. Any unnecessary lighting was turned down and direction of the lighting was adjusted towards the ground. Photos of the site inspection are provided in Annex A.

ET, IEC and SOR have carried out a joint site inspection on 29 November 2017. Mitigation measures of light impact were reviewed. All lighting was adjusted to direct to the site. There was no adverse comment on the mitigation measures implemented on site from both parties.

Date of File Closed : 29 November 2017

Approved and Filed by:



(Jovy Tam, ET Leader)

Date: 29 November
2017

Annex A

Photo Record



Annex A Photo provided by the Contractor



View of the site from Tuen Mun Pier



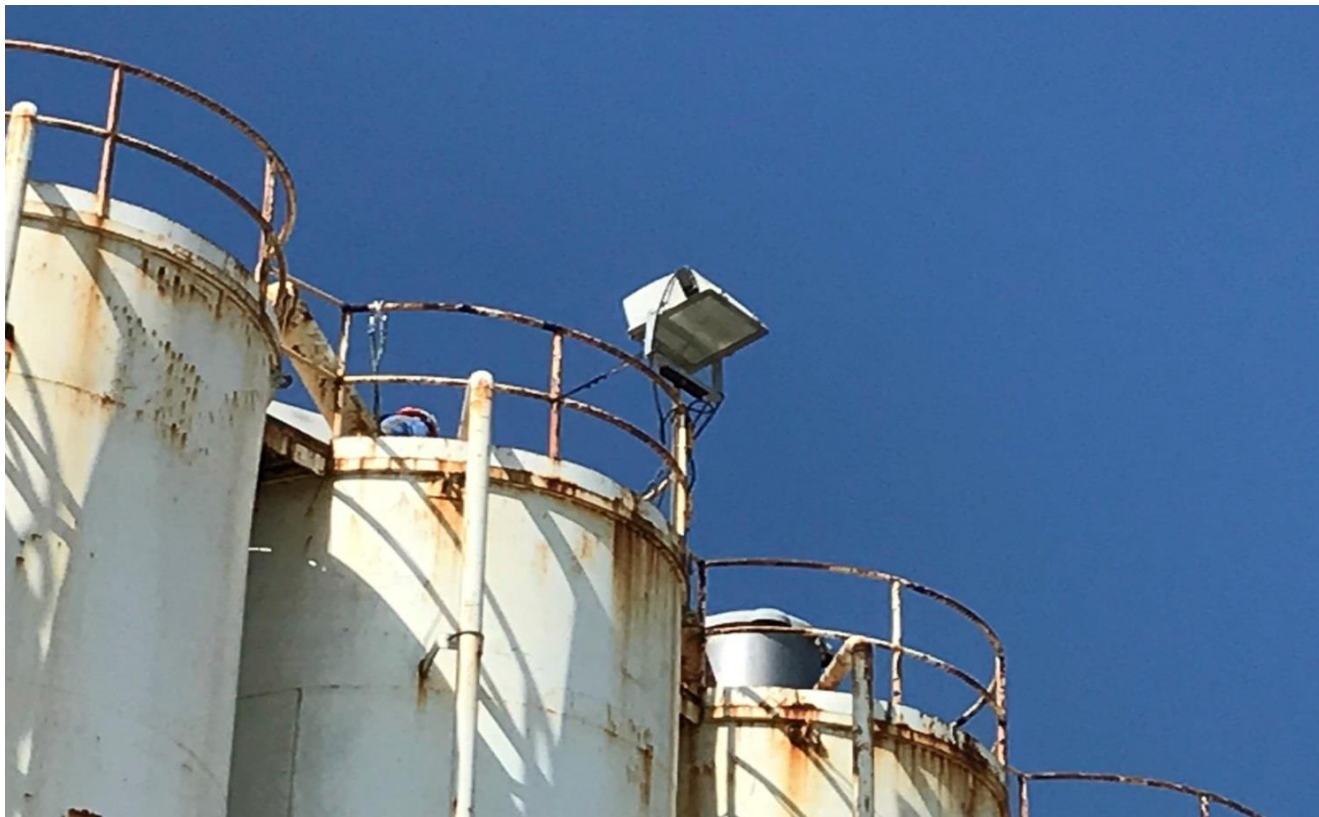
View of the site from Tuen Mun Pier



Annex A Photo taken during the site inspection on 1 Nov 2017



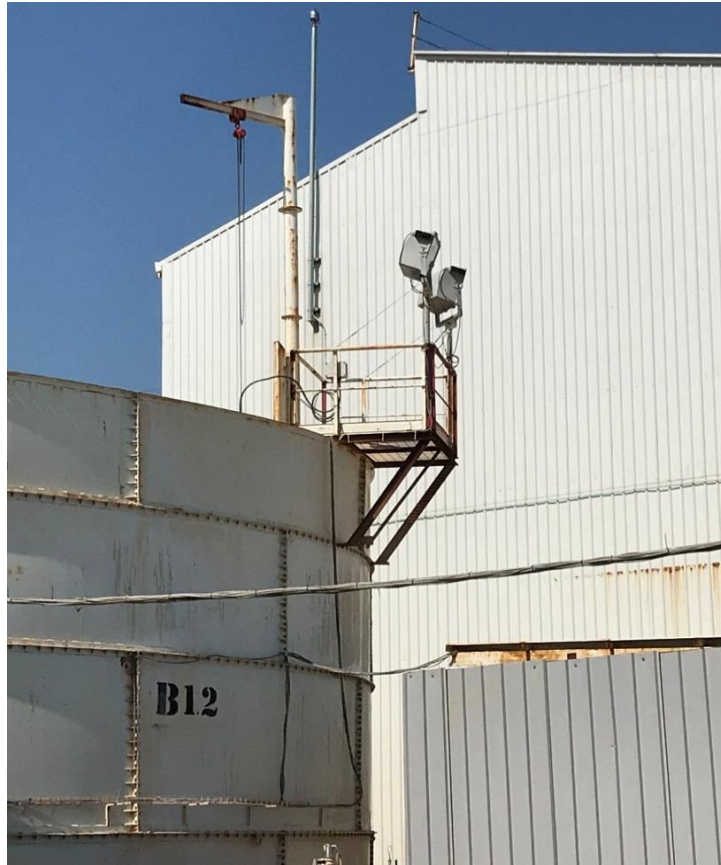
Direction of the lighting at STP silo is adjusted towards the ground.(Before)



Direction of the lighting at STP silo is adjusted towards the ground.(After)



Annex A Photo taken during the site inspection on 1 Nov 2017



Direction of the lighting at STP is adjusted towards the ground.(Before)



Direction of the lighting at STP is adjusted towards the ground.(After)

Email
message

**Environmental
Resources
Management**

To Ramboll Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

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

Subject Notification of Exceedance for Impact Dolphin
Monitoring

Date 31 May 2018

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



Dear Sir or Madam,

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

0212330_Sep2017/Nov2017_dolphin_STG&ANI_NEL&NWL

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

Regards,

Mr Jovy Tam
Environmental Team Leader

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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_ Sep2017/Nov2017_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedances = 1 Limit Level Exceedance]	
Date	September to November 2017 (monitored) 14 March 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 & ANI = 0
	NWL	STG = 3.12 & ANI = 10.35
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between June 2017 and August 2017. The exceedance was reported in the approved <i>Forty-ninth Monthly EM&A Report</i> dated 13 September 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 impact quarter, September to November 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 ($p = 0.0057$) and ANI ($p = 0.0278$) 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 August 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 quarter. By setting $\alpha = 0.00001$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000000$) and in ANI ($p = 0.000000$) between Cumulative Period and Location were detected. <p>*Note: The commencement date under <i>Contract No. HY/2012/08</i> is 1 November 2013.</p>	
Works Undertaken (in the monitoring quarter)	In the quarter between September 2017 and November 2017, marine based works were carried out. Seawall Construction and Filling works was carried out at Portion N-A. Seawall Enhancement works was carried out at Portion N-C.	

<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 (2016 – 17)</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. Seawall enhancement works were on-going during the reporting quarter, while the seawall construction and filling works were completed on 7 November 2017. During this quarter of dolphin monitoring, no adverse impact on CWD due to the activities under this Contract was observed. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between September and November 2017, there were ten (10) Action Level of Suspended Solids (SS) exceedances for water quality impact monitoring in the reporting period. The exceedances were considered not related to this Contract upon further investigation and the investigation report is presented in <i>Appendix J</i> of the 16th Quarterly EM&A report. <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 September 2017 and November 2017.</p>
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(1) Hung S K Y (2017). Prepared for AFCD. Available at: https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2016_17.pdf

<p>Actions Taken/ To Be Taken</p>	<p>In the quarter between September 2017 and November 2017, marine based works were carried out. Seawall Construction and Filling works was carried out at Portion N-A. Seawall Enhancement works was carried out at Portion N-C.</p> <p>Below are the mitigation measures implemented 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. Marine Travel Route Plan 5. 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 7 March 2018 for discussion on CWD trend, with attendance of ENPO, Representatives of Resident Site Staff (RSS), Representatives of Environmental Team (ET) for Contract No. HY/2010/02, HY/2011/03, 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 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 Brothers Marine Park (BMP) boundary in the Regular Marine Travel Route Plan. 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 Brothers Marine Park (BMP) shall be implemented to provide a better habitat for dolphin recovery. It is noted that even though marine vessels may moor within the mooring site of BMP, commercial activities including loading / unloading / transshipment are not allowed except a permit is obtained. The HZMB works vessels were recommended to avoid the BMP. It was also recommended that the marine works footprint and vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible.</p> <p>Dolphin specialists of the Projects confirmed that the CWD sighting nearby north of Sha Chau and Lung Kwu Chau Marine Park has significantly declined. The reason for the decline was likely related to the re-routing of high-speed ferry from Sky Pier. 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>Forty-seventh</i> to <i>Forty-ninth 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 November 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	7.508	0.000	0.000	0.000	7.508
Apr-2017	15.603	0.000	0.000	0.000	15.603
May-2017	12.358	0.000	0.000	0.000	12.358
Jun-2017	0.194	0.000	0.000	0.000	0.194
Half Year Sub-total	113.811	0.000	0.000	0.000	113.811
Jul-2017	0.652	0.000	0.000	0.000	0.652
Aug-2017	1.624	0.000	0.000	0.000	1.624
Sep-2017	0.886	0.000	0.000	0.000	0.886
Oct-2017	0.706	0.000	0.000	0.000	0.706
Nov-2017	3.259	0.000	0.000	0.000	3.259
Dec-2017					
Project Total Quantities	1218.403	0.000	0.000	0.000	1218.403

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	0.000	0.000	0.000	0.000	0.000	0.000	6.100	6.100	0.286
Apr-2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.237
May-2017	0.000	0.000	0.000	0.000	0.000	0.000	10.400	10.400	0.300
Jun-2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317
Half Year Sub-total	0.000	0.000	0.200	0.200	0.000	0.000	19.900	19.900	1.737
Jul-2017	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.272
Aug-2017	141.990	141.990	0.200	0.200	0.000	0.000	0.000	0.000	0.305
Sep-2017	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.300
Oct-2017	132.270	132.270	0.000	0.000	0.000	0.000	0.000	0.000	0.244
Nov-2017	343.270	343.270	0.200	0.200	0.000	0.000	3.800	3.800	0.345
Dec-2017									
Project Total Quantities	619.380	619.380	4.150	4.150	6.870	6.870	33.150	33.150	7.793

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)
3.000	0.000	0.000	0.000	3.000

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)
50.000	0.000	0.000	0.000	0.200

- 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).