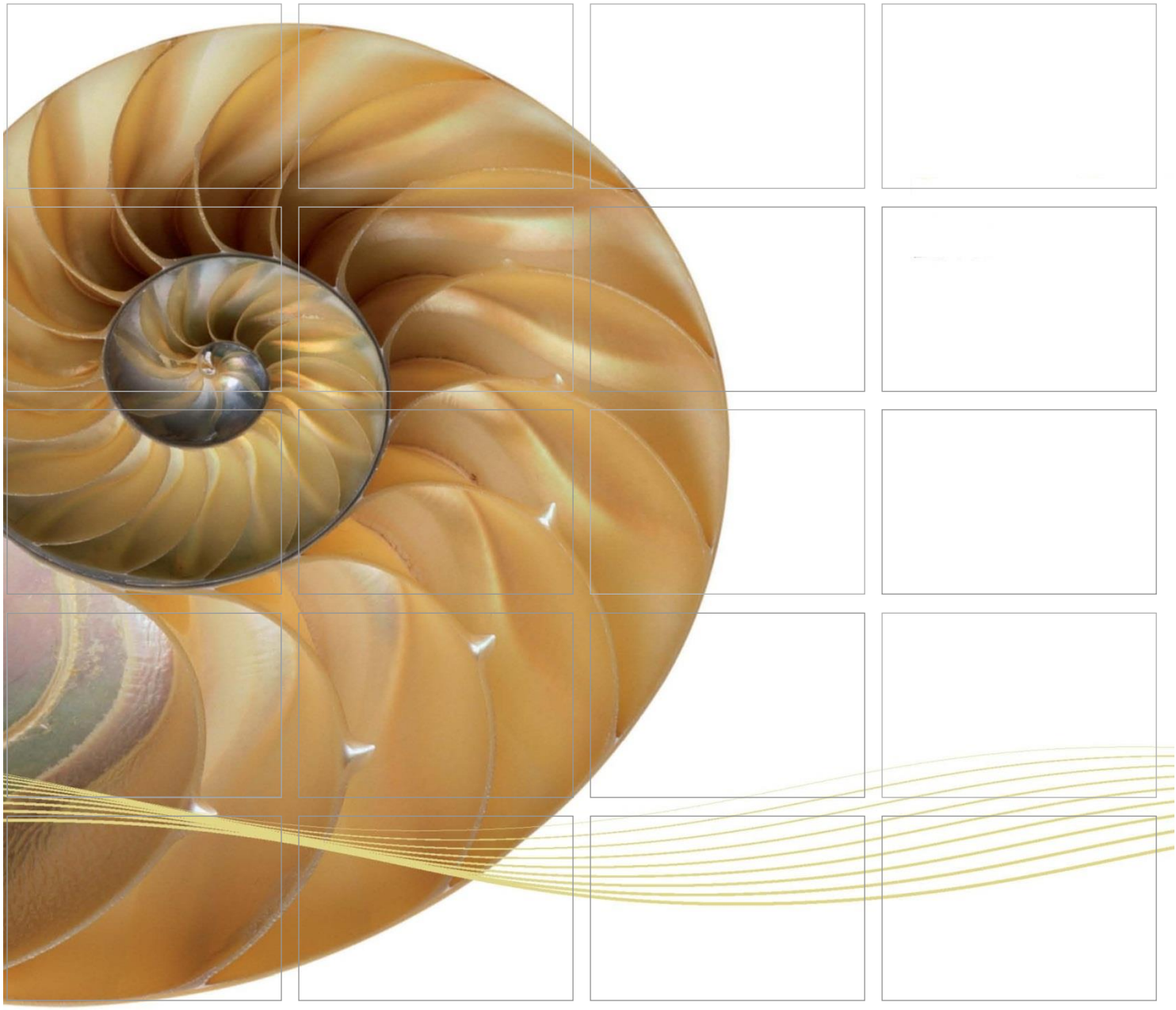
Report



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

Fifty-fourth Monthly Environmental Monitoring & Audit (EM&A) Report

14 May 2018

Environmental Resources Management
16/F, Berkshire House
25 Westlands Road
Quarry Bay, Hong Kong
Telephone 2271 3000
Facsimile 2723 5660

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The business of sustainability

RAMBOLL

Ref.: HYDHZMBEEM00_0_6493L.18 15 May 2018

AECOM By Fax (2293 6300) and By Post
Supervising Officer Representative's Office
No.8 Mong Fat Street, Tuen Mun,
New Territories, Hong Kong

Attention: Messrs. Andy Westmoreland / Roger Man

Dear Sirs,

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

Contract No. HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
54th Monthly EM&A Report for April 2018 (EP-354/2009/D)

Reference is made to the Monthly Environmental Monitoring and Audit (EM&A) Report (April 2018) (ET's ref.: "*0212330_54th Monthly EM&A_20180514.doc*" dated 14 May 2018) certified by the ET Leader and provided to us via e-mail on 15 May 2018.

Please be informed that we have no adverse comments on the captioned Report. We write to verify the captioned submission in accordance with Condition 4.4 of EP-354/2009/D.

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

Yours sincerely,

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

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

Internal: DY, YH, TMC, ENPO Site

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\2018\HYDHZMBEEM00_0_6493L.18.docx

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

Fifty-fourth Monthly Environmental Monitoring & Audit (EM&A) Report

Document Code: 0212330_54th Monthly EM&A_20180514.doc

Environmental Resources Management

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Client: DBJV	Project No: 0212330
Summary: This document presents the Fifty-fourth Monthly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.	Date: 14 May 2018 Approved by: *Mr Craig Reid* *Partner* Certified by: *Mr Jovy Tam* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	54th Monthly EM&A Report	VAR	JT	CAR	14/05/18

Distribution

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TABLE OF CONTENTS

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 Hong Kong Ltd. was employed by HyD as them 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 Fifty-fourth Monthly EM&A report presenting the EM&A works carried out during the period from 1 to 30 April 2018 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, major activities in the reporting period 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;
- Cross Passage Construction by Pipe Jacking – TBM Tunnel;
- Corbel & OVHD Construction – TBM Tunnel;
- Parapet wall Installation – TBM Tunnel;
- Bulk Excavation – Portion S-A; and
- CSM treatment, Jet Grouting works and D-wall Construction

There was no dredging, reclamation or marine sheet piling works in open waters during this reporting period.

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

24-hour TSP Monitoring	10 sessions
1-hour TSP Monitoring	10 sessions
Impact Dolphin Monitoring	2 sessions
Joint Environmental Site Inspection	4 sessions

Implementation of Marine Mammal Exclusion Zone

There was no dredging, reclamation or marine sheet piling works in open waters during this reporting period. Thus, Passive Acoustic Monitoring (PAM) and the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers were not in effect during the reporting period.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

One (1) Action Level exceedance of 1-hour TSP was recorded on 13 April 2018. Investigation report is provided in Appendix K.

Breaches of Action and Limit Levels for Dolphin Monitoring .

Due to monthly variation in dolphin occurrence within the survey area, it would be more appropriate to draw conclusion on whether any unacceptable impacts on dolphins have been detected in relation to the construction activities of this Project in the quarterly EM&A reports, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period and baseline monitoring period will be made.

Environmental Complaints, Non-compliance & Summons

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

Reporting Change

There was no reporting change required in the reporting period.

Upcoming Works for the Next Reporting Month

Works to be undertaken in the next monitoring period of May 2018 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;
- Parapet wall Installation – TBM Tunnel
- Corbel Construction – TBM Tunnel;
- Bulk Excavation – Portion S-A;
- TBM Excavation – Portion S-A; and
- CSM treatment, Jet Grouting works and D-wall Construction;

Marine-based Works

- Seawall Modificaton Works – Portion S-A

Future Key Issue

Potential environmental impacts arising from the above upcoming construction activities in the next reporting month of May 2018 are mainly associated with dust, marine water quality, marine ecology and waste management issues.

1 INTRODUCTION

1.1 BACKGROUND

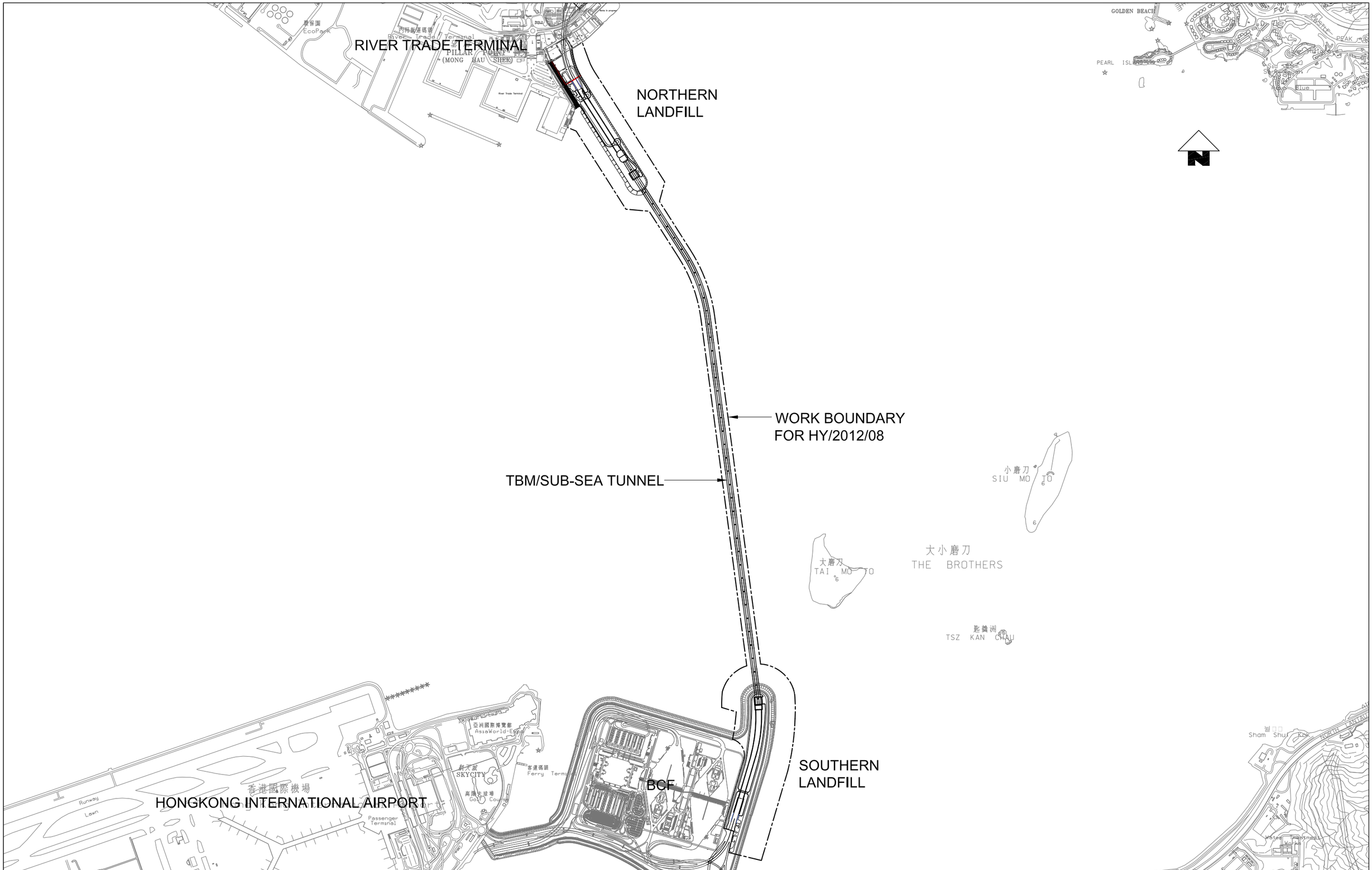
According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated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

An Environmental Impact Assessment (EIA) of TM-CLKL (the Project) was prepared in accordance with the EIA Study Brief (No. ESB-175/2007) and the *Technical Memorandum of the Environmental Impact Assessment Process* (*EIAO-TM*). The EIA Report was submitted under the Environmental Impact Assessment Ordinance (EIAO) in August 2009. Subsequent to the approval of the EIA Report (EIAO Register Number AEIAR-146/2009), an Environmental Permit (EP-354/2009) for TM-CLKL was granted by the Director of Environmental Protection (DEP) on 4 November 2009, and EP variation (VEP) (EP-354/2009/A) was issued on 8 December 2010. Subsequent applications for variation of environmental permits (VEPs), *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). Ramboll Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO).

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

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.



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

Main Contractor

香寶嘉 Dragages HongKong

A member of the Bouygues Construction group

BOUYGUES TRAVAUX PUBLICS

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

路政署 HIGHWAYS DEPARTMENT

Contractor's Designer

ARUP Ove Arup & Partners Hong Kong Limited

Project

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

Drawing Title

Figure 1.1

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

1.2 SCOPE OF REPORT

This is the Fifty-fourth Monthly 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 in April 2018.

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 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*.

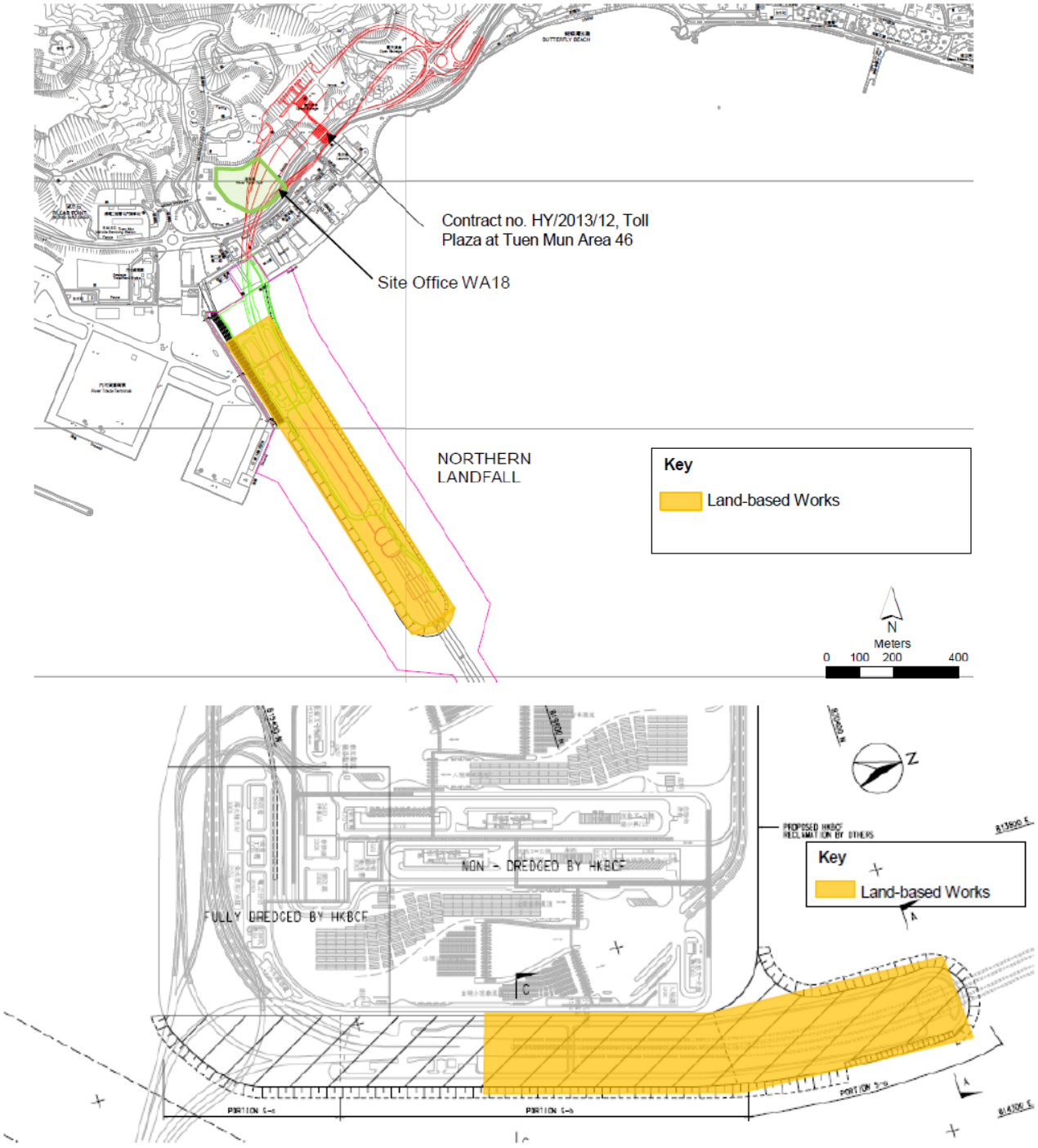
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

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
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; • Cross Passage Construction by Pipe Jacking – TBM Tunnel; • Corbel & OVHD Construction – TBM Tunnel; • Parapet wall Installation – TBM Tunnel; • Bulk Excavation – Portion S-A; and • CSM treatment, Jet Grouting works and D-wall Construction;

Figure 1.2 Locations of Construction Activities – April 2018



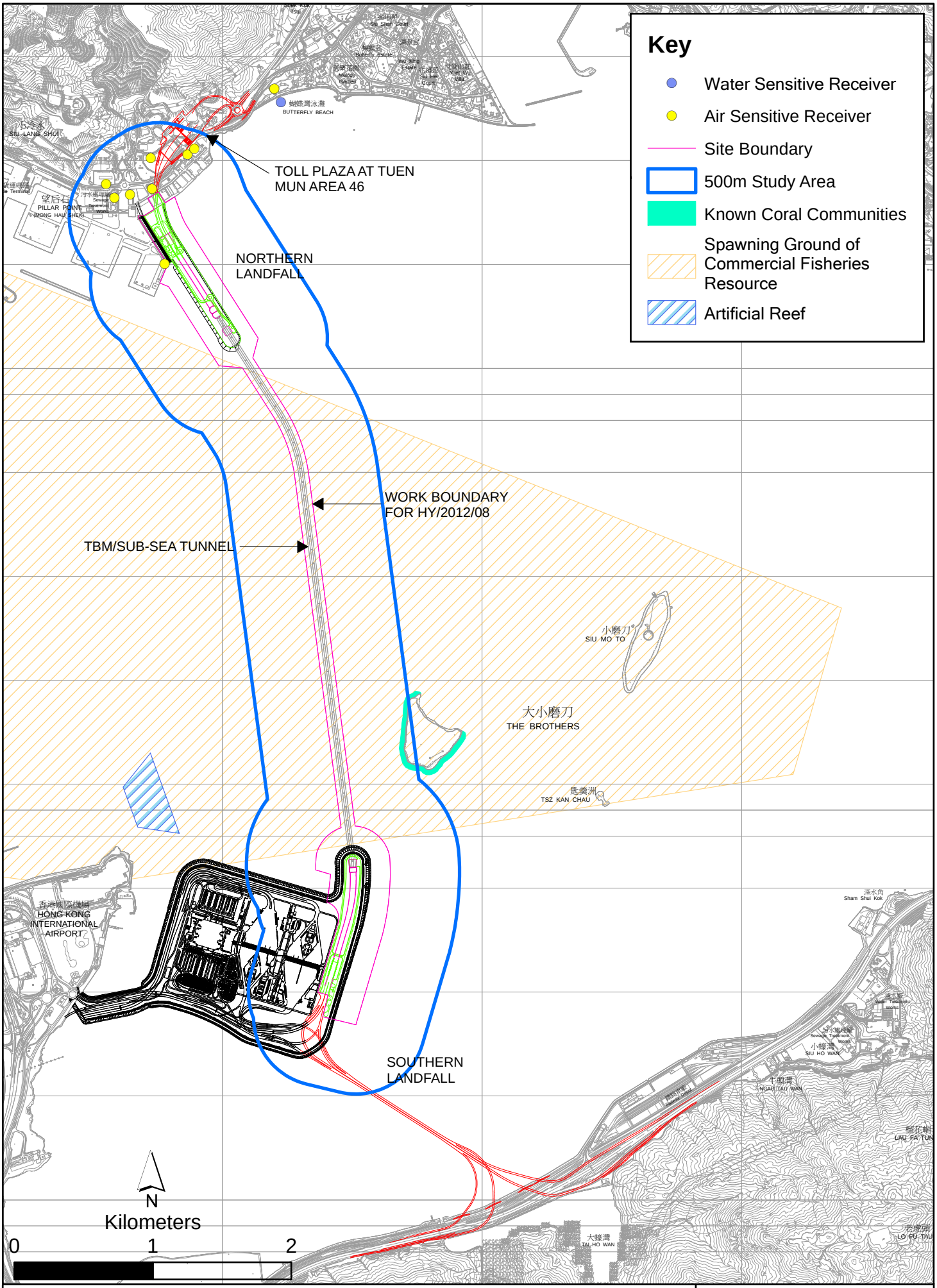


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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Date: 15/4/2014

Environmental Resources Management

2 EM&A RESULTS

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

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 every six (6) days and impact 24-hour TSP monitoring was carried out once 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 on 1, 4, 7, 10, 13, 16, 19, 22, 25 and 28 April 2018 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 meter 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*. Copies of the calibration certificates for the equipment are presented in *Appendix E*.

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

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR1	1, 4, 7, 10, 13, 16, 19, 22, 25 and 28 April 2018	Tuen Mun Fireboat Station	Office	TSP monitoring • 1-hour Total Suspended Particulates (1-hour TSP, µg/m³), 3 times in every 6 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour in every 6 days Enhanced TSP monitoring (commenced on 24 October 2014) • 1-hour Total Suspended Particulates (1-hour TSP, µg/m³), 3 times in every 3 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour in every 3 days
ASR5		Pillar Point Fire Station	Office	
AQMS1		Previous River Trade Golf	Bare ground	
ASR6		Butterfly Beach Laundry	Office	
ASR10		Butterfly Beach Park	Recreational uses	

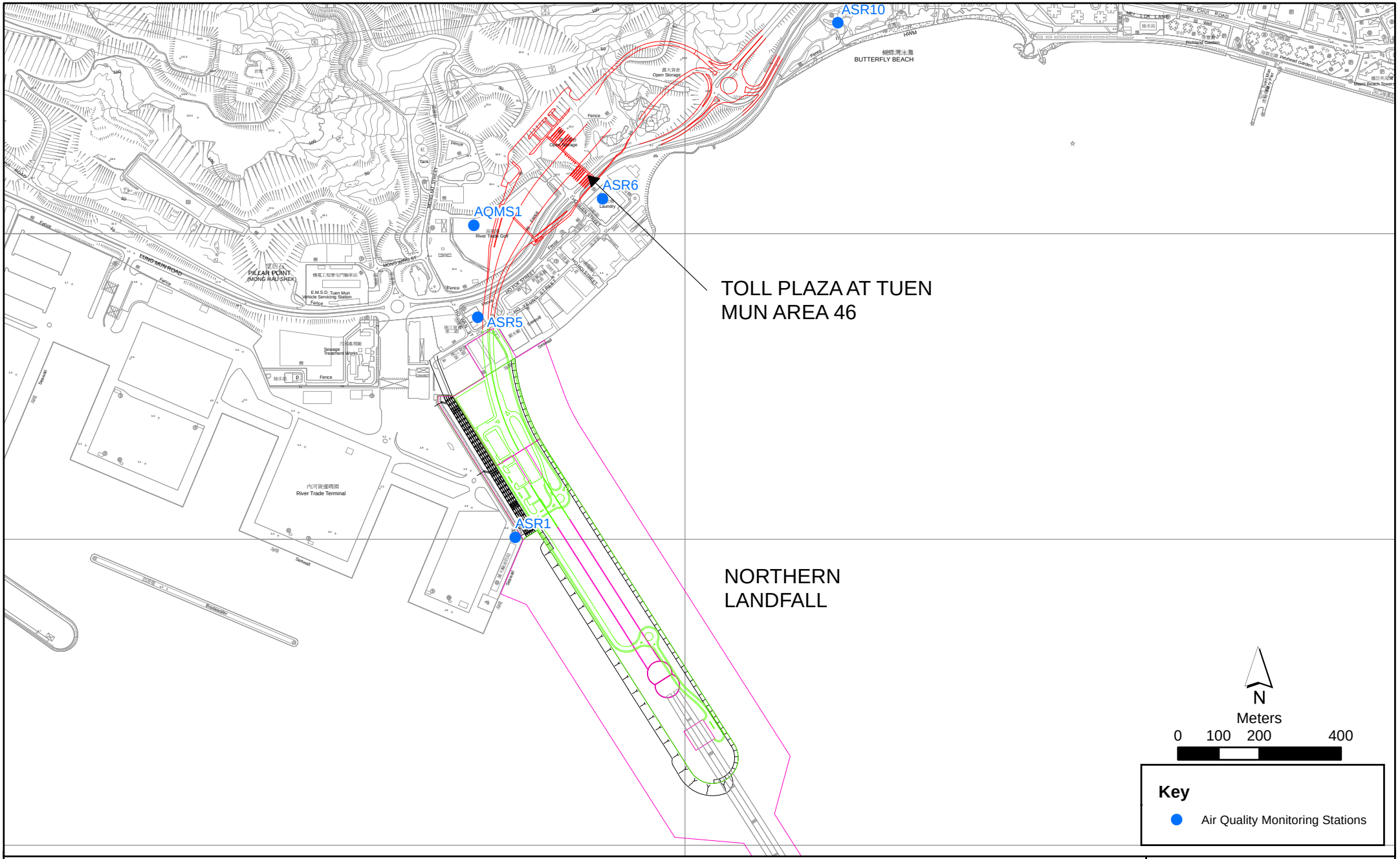

Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

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Date: 21/2/2014

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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 J.*

2.1.3 Monitoring Schedule for the Reporting Month

The schedule for air quality monitoring in April 2018 is provided in *Appendix F*.

2.1.4 Results and Observations

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3* and *2.4,* respectively. Detailed impact air quality monitoring results and graphical presentations are presented in *Appendix G*.

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

Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
ASR1	130	51 - 310	331	500
ASR5	171	65 - 389	340	500
AQMS1	101	55 - 197	335	500
ASR6	112	59 - 179	338	500
ASR10	83	41 - 164	337	500

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

Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
ASR1	96	62 - 176	213	260
ASR5	94	62 - 179	238	260
AQMS1	70	45 - 124	213	260
ASR6	82	43 - 164	238	260
ASR10	63	29 - 132	214	260

The weather condition during the monitoring period varied from sunny to cloudy. The major dust sources in the reporting period included construction activities under the Contract as well as nearby traffic emissions.

A total of 10 1-hour TSP and 24-hour TSP monitoring were undertaken in which one (1) Action Level exceedance of 1-hour TSP was recorded in this reporting month.

Meteorological information collected at the ASR5, including wind speed and wind direction, is provided in *Appendix H*.

2.2 WATER QUALITY MONITORING

Seawall Enhancement Works at Northern Landfall has been completed on 31 December 2017. Notification of suspension of water quality monitoring has been approved by EPD on 2 March 2018. Water Quality Monitoring will resume after the commencement of Seawall Modification Works at Southern Landfall in May 2018 tentatively.

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 2.5 summarises the equipment used for the impact dolphin monitoring.

Table 2.5 Dolphin Monitoring Equipment

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

2.3.3 Monitoring Parameter, Frequencies & Duration

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

2.3.4 Monitoring Location

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.2*. The co-ordinates of all transect lines are shown in *Table 2.6* below.

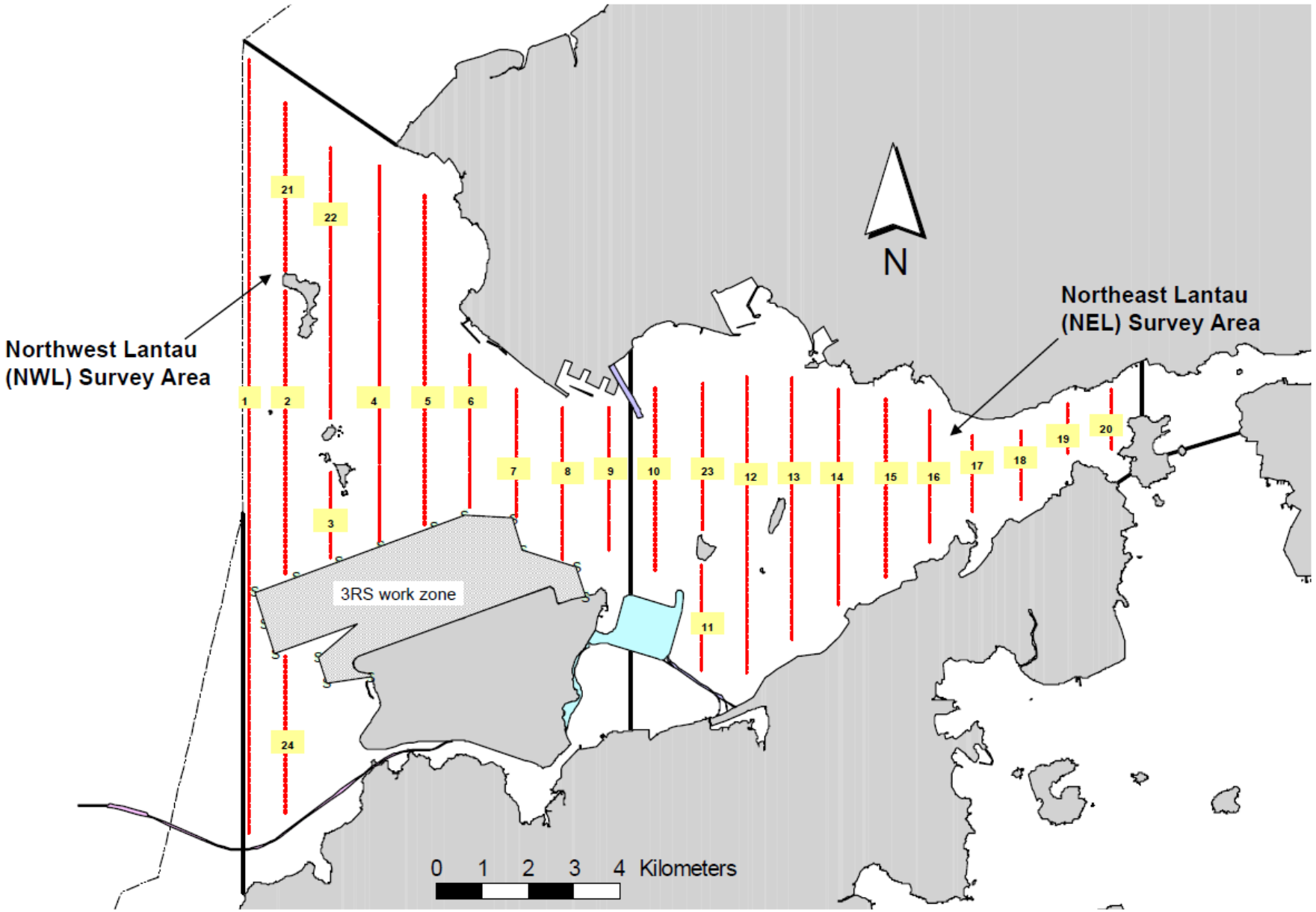

Figure 2.2

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

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Date: 29/11/2013

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Table 2.6 Impact Dolphin Monitoring Line Transect Co-ordinates

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

Remarks: The coordinates of several starting and ending points have been revised 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 impact dolphin monitoring are shown in *Appendix D*. The Event and Action plan is presented in *Appendix J*.

2.3.6 Monitoring Schedule for the Reporting Month

Dolphin monitoring was carried out on 10, 17, 19 and 25 of April 2018. The dolphin monitoring schedule for the reporting month is shown in *Appendix F*.

2.3.7 Results & Observations

A total of 267.09 km of survey effort was collected, with 100% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) in April 2018. Among the two areas, 97.20 km and 169.89 km of survey effort were collected from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 194.96 km and 72.13 km respectively. The survey efforts are summarized in *Appendix I.*

Three groups of 4 Chinese White Dolphins sightings were recorded during the two sets of surveys in April 2018. All dolphin sightings were made in NWL, while none was sighted in NEL. All dolphin sightings were made during on-effort search and two of the three were made on primary lines. None of the dolphin groups were associated with any operating fishing vessel.

No dolphin sighting was made in the proximity of the TM-CLKL alignment. The distribution of dolphin sightings during the reporting month is shown in *Figure 2.3*.

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) in April 2018 with the results present in *Tables 2.7* and *2.8*.

Table 2.7 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: April 10th / 17th	0.0	0.0
	Set 2: April 19th / 25th	0.0	0.0
NWL	Set 1: April 10th / 17th	0.0	0.0
	Set 2: April 19th / 25th	3.2	4.9

Note: Dolphin Encounter Rates are deduced from the Two Sets of Surveys (Two Surveys in Each Set) in April 2018 in Northeast (NEL) and Northwest Lantau (NWL)

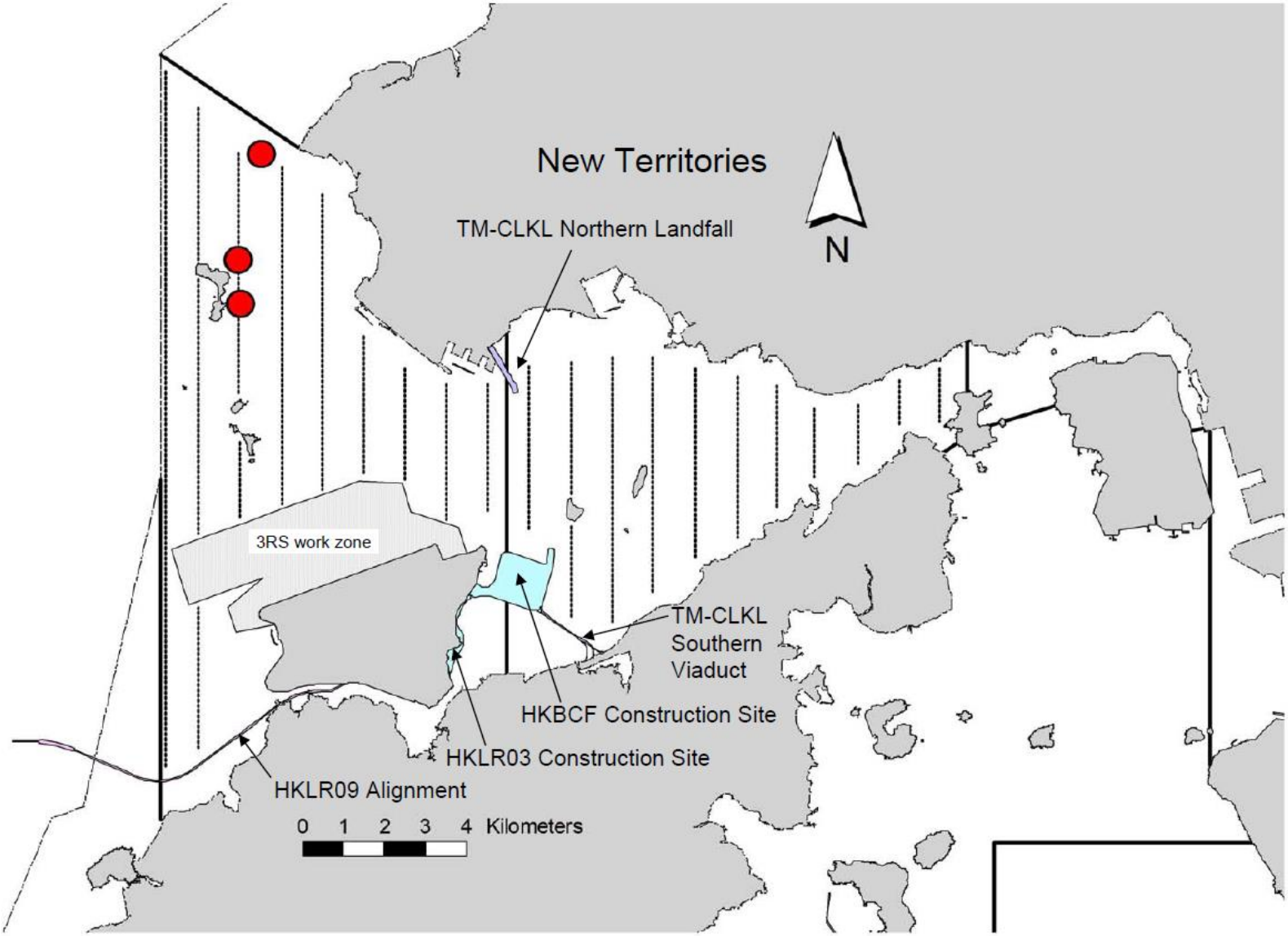

Figure 2.3

HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
The distribution of dolphin sightings during the reporting period
(Source: Adopted from HKLR03 Monitoring Survey in April 2018)

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Table 2.8 Monthly 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)	
	Primary Lines Only	Both Primary and Secondary Lines	Primary Lines Only	Both Primary and Secondary Lines
Northeast Lantau	0.0	0.0	0.0	0.0
Northwest Lantau	1.6	1.8	2.5	2.4

Note: Overall dolphin encounter rates (sightings per 100 km of survey effort) from all four surveys are conducted in April 2018 on primary lines only as well as both primary lines and secondary lines in Northeast and Northwest Lantau.

Due to monthly variation in dolphin occurrence within the survey area, it would be more appropriate to draw conclusion on whether any unacceptable impacts on dolphins have been detected in relation to the construction activities of this Project in the quarterly EM&A reports, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period and baseline monitoring period will be made.

2.3.8 Implementation of Marine Mammal Exclusion Zone

There was no dredging, reclamation or marine sheet piling works in open waters during this reporting period. Thus, Passive Acoustic Monitoring (PAM) and the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers were not in effect during the reporting period.

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. In the reporting month, four (4) site inspections were carried out on 4, 11, 18 and 25 April 2018.

Key observations and recommendations during the site inspections in this reporting period are summarized in *Table 2.9*.

Table 2.9 Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Month

Inspection Date	Observations	Recommendations/ Remarks
4 April 2018	Works Area – Portion S-B • The cement bags should be covered with impervious sheeting. Works Area – Portion N-C • Stagnant water should be pumped off to avoid mosquito larva breeding.	Works Area – Portion S-B • The Contractor was reminded to cover the cement bags with impervious sheeting. Works Area – Portion N-C • The Contractor was reminded to pump off the stagnant water to avoid mosquito breeding.
11 April 2018	Works Area – Portion S-B • Drip tray should be provided to the chemical containers. Works Area – Portion N-C • Stagnant water should be pumped off to avoid mosquito larva breeding. Works Area – Portion N-A • Proper NRMM label should be displayed. Reminder from SOR Works Area - Portion S-B • The broken water barriers should be replaced.	Works Area – Portion S-B • The Contractor was reminded to provide drip tray to the chemical containers. Works Area – Portion N-C • The Contractor was reminded to pump off the stagnant water to avoid mosquito breeding. Works Area – Portion N-A • The Contractor was reminded to display proper NRMM label. Reminder from SOR Works Area - Portion S-B • The Contractor was reminded to replace the broken barriers.
18 April 2018	Works Area – TBM tunnel • Drip tray should be provided for the chemical containers. Works Area - Portion S-B • NRMM label should be displayed on the generator.	Works Area – TBM tunnel • The Contractor was reminded to provide drip tray to the chemical containers. Works Area - Portion S-B • The Contractor was reminded to display NRMM label on the generator.
25 April 2018	Works Area - Portion S-B • Proper NRMM label should be displayed on the excavator. • Drip tray should be provided for the chemical containers Works Area - Portion N-C • Faded NRMM label should be replaced by standard NRMM label.	Works Area - Portion S-B • The Contractor was reminded to display proper NRMM label on the excavator. • The Contractor was reminded to provide drip tray for the chemical containers. Works Area - Portion N-C • The Contractor was reminded to replace the faded NRMM label with standard NRMM label.

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

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 included mainly construction wastes (inert and non-inert), chemical wastes and marine sediment. Reference has been made to the waste flow table prepared by the Contractor (*Appendix L*). The quantities of different types of wastes are summarized in *Table 2.10*.

Table 2.10 Quantities of Different Waste Generated in the Reporting Month

Month/Year	Inert Construction Waste [a] (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste [b] (tonnes)	Imported Fill (m3) [d]	Recyclable Materials [c] (kg)	Chemical Wastes (kg)	Marine Sediment (m^3)	
							Category L	Category M (M_p & M_f)
April 2018	123,942	50,648	281	42,573	195,550	8,600	0	1,957

Notes:

(a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.

(b) Non-inert construction wastes include general refuse disposed at landfill.

(c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

(d) The origin of imported fill is from *Contract No. HY/2013/03*.

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 2.11* below.

Table 2.11 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	13 March 2015	Throughout the Contract	HyD	Application for VEP on 3 March 2015 to supersede EP-354/2009/C
Construction Dust Notification	363510	19 August 2013	Throughout the Contract	DBJV	Northern Landfall
Construction Dust Notification	403620	10 June 2016	Throughout the Contract	DBJV	Southern Landfall
Chemical Waste Registration	5213-422-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Construction Waste Disposal Account	7021715	17 April 2018	17 July 2018	DBJV	Vessel Disposal
Waste Water Discharge License	WT00017707-2013	18 November 2013	30 November 2018	DBJV	For site WA18
Waste Water Discharge License	WT00019248-2014	5 June 2014	30 June 2019	DBJV	For site Portion N6 and Reclamation Area E
Waste Water Discharge License	WT00025944-2016	15 December 2016	31 December 2021	DBJV	Southern Landfall
Marine Dumping Permit	EP/MD/19-001	24 April 2018	23 May 2018	DBJV	Type 1 (Dedicated site) and Type 2 (Confined Marine Disposal)
Marine Dumping Permit	EP/MD/18-133	22 March 2018	21 April 2018	DBJV	Type 1 (Dedicated site) and Type 2 (Confined Marine Disposal)
Construction Noise Permit	GW-RW0538-17	16 April 2018	15 October 2018	DBJV	For Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0641-17	16 December 2017	6 December 2018	DBJV	WA23 @ Tsing Yi
Construction Noise Permit	PP-RS0026-17	3 April 2017	31 July 2018	DBJV	Southern Landfall (Percussive Piling)
Construction Noise Permit	GW-RS0878-17	11 October 2017	2 April 2018	DBJV	Southern Landfall
Construction Noise Permit	GW-RW0060-18	20 February 2018	19 August 2018	DBJV	WA23 @ Tsing Yi
Construction Noise Permit	GW-RS0027-18	22 January 2018	14 July 2018	DBJV	Southern Landfall

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

One (1) Action Level exceedance of 1-hour TSP was recorded on 13 April 2018. Investigation report is provided in Appendix K.

Cumulative statistics are provided in *Appendix K*.

2.9 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

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

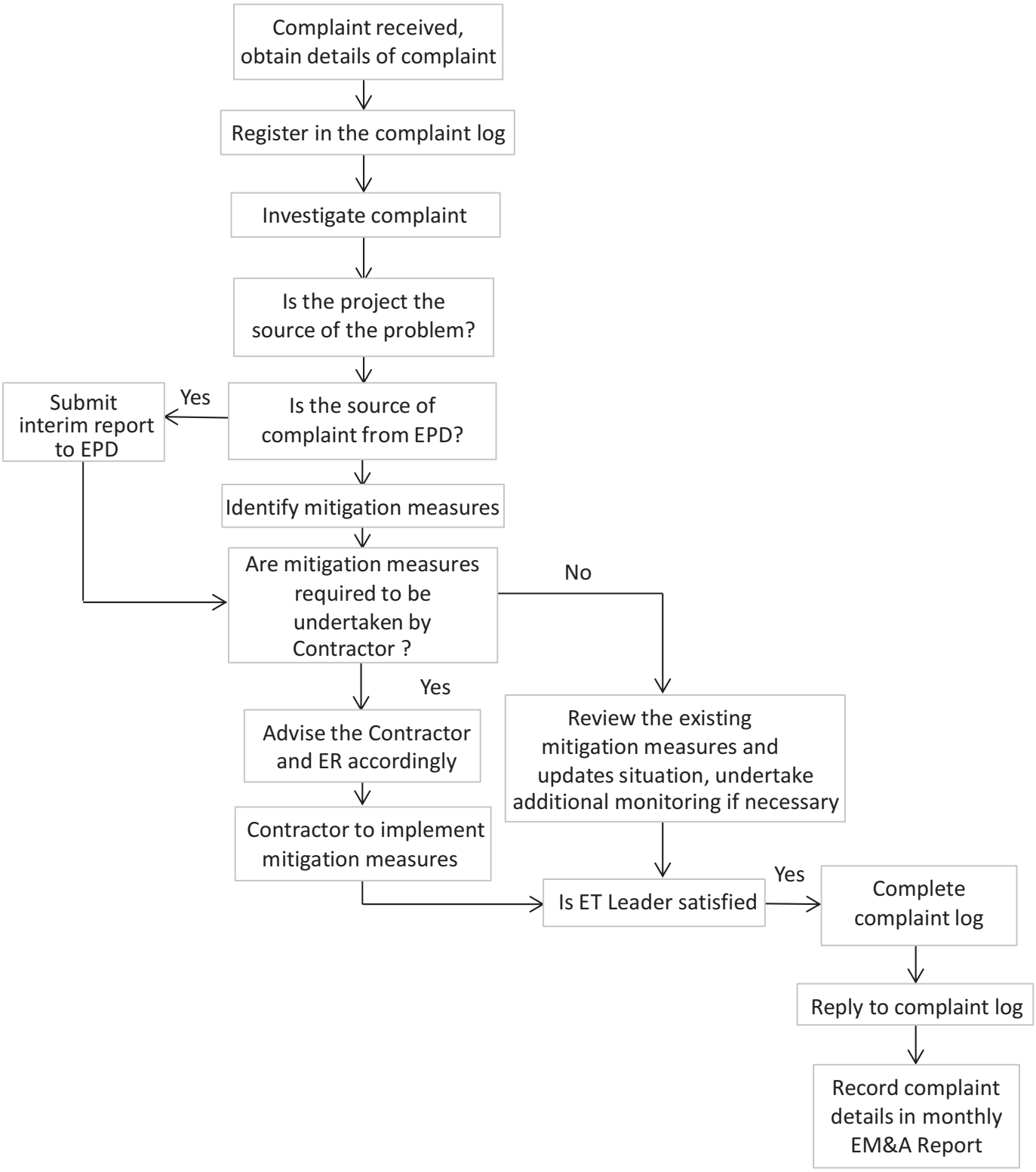

Figure 2.4 Environmental Complaint Handling Procedure

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DATE: 06/12/2013

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3 FUTURE KEY ISSUES

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING MONTH

As informed by the Contractor, the major works for the Project in May 2018 are summarized in *Table 3.1*.

Table 3.1 Construction Works to Be Undertaken in the Coming Month

Works to be undertaken
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; • Parapet wall Installation – TBM Tunnel • Corbel Construction – TBM Tunnel; • Bulk Excavation – Portion S-A; • TBM Excavation – Portion S-A; and • CSM treatment, Jet Grouting works and D-wall Construction; *Marine-based Works* • Seawall Modificaton Works – Portion S-A

3.2 KEY ISSUES FOR THE COMING MONTH

Potential environmental impacts arising from the above upcoming construction activities in the next reporting month of May 2018 are mainly associated with dust, marine ecology, water quality and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING MONTH

The tentative schedule for environmental monitoring in May 2018 is provided in *Appendix F*.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

This Fifty-Fourth Monthly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 to 30 April 2018, in accordance with the Updated EM&A Manual and the requirements of EP-354/2009/D.

Air quality (including 1-hour TSP and 24-hour TSP) and dolphin monitoring were carried out in this reporting month.

One (1) Action Level exceedance of 1-hour TSP was recorded on 13 April 2018. Investigation report is provided in Appendix K.

Three groups of 4 Chinese White Dolphins sightings were recorded during the two sets of surveys in April 2018. All dolphin sightings were made in NWL, while none was sighted in NEL. All dolphin sightings were made during on-effort search and two of the three were made on primary lines. None of the dolphin groups were associated with any operating fishing vessel.

Environmental site inspection was carried out four (4) times in April 2018. Remedial actions recommended for the deficiencies identified during the site audits were properly implemented by the Contractor.

No non-compliance event was recorded during the reporting period.

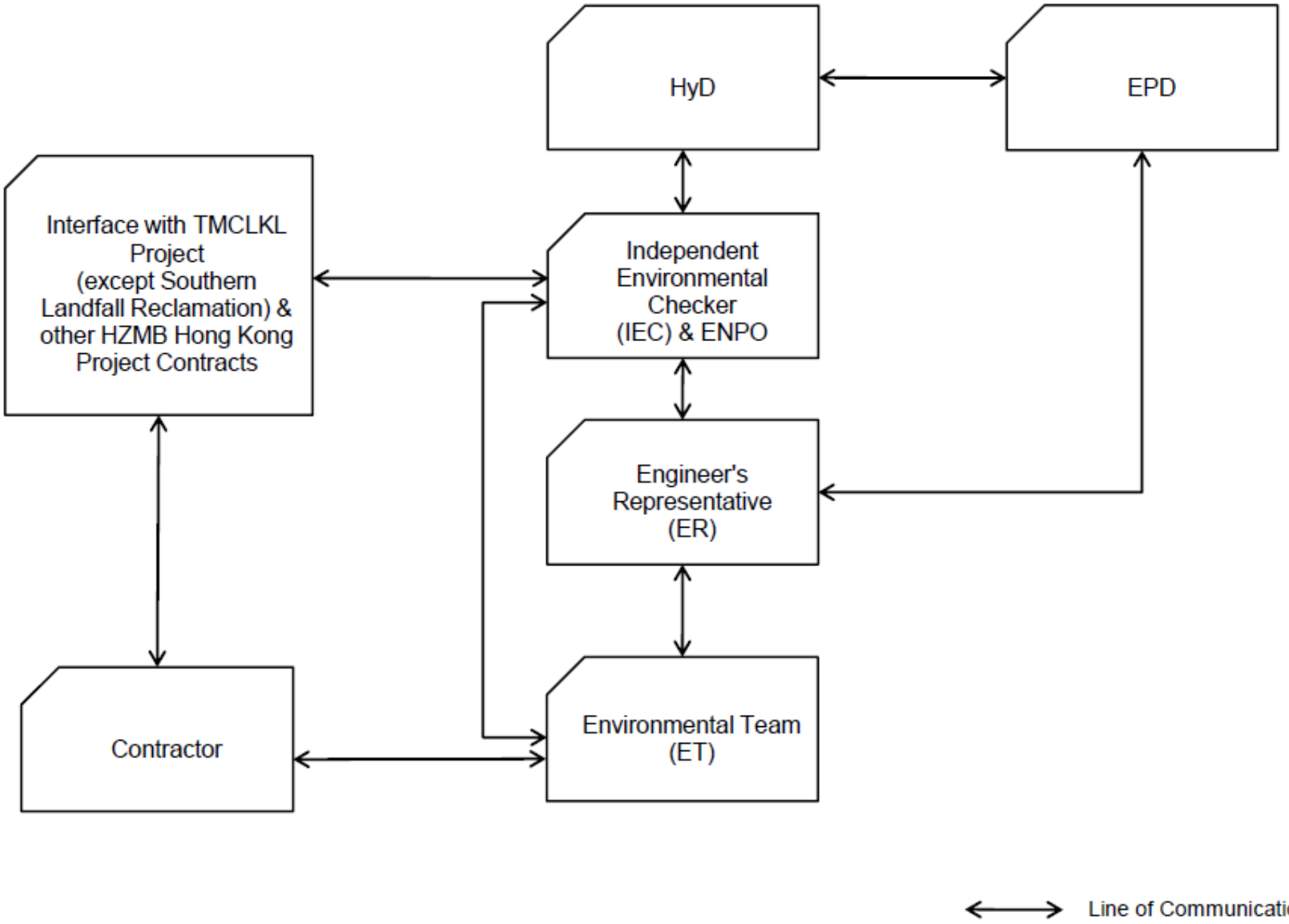
No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A

Project Organization for Environmental Works



Appendix A1

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

DATE: 06/03/2013

Environmental Resources Management

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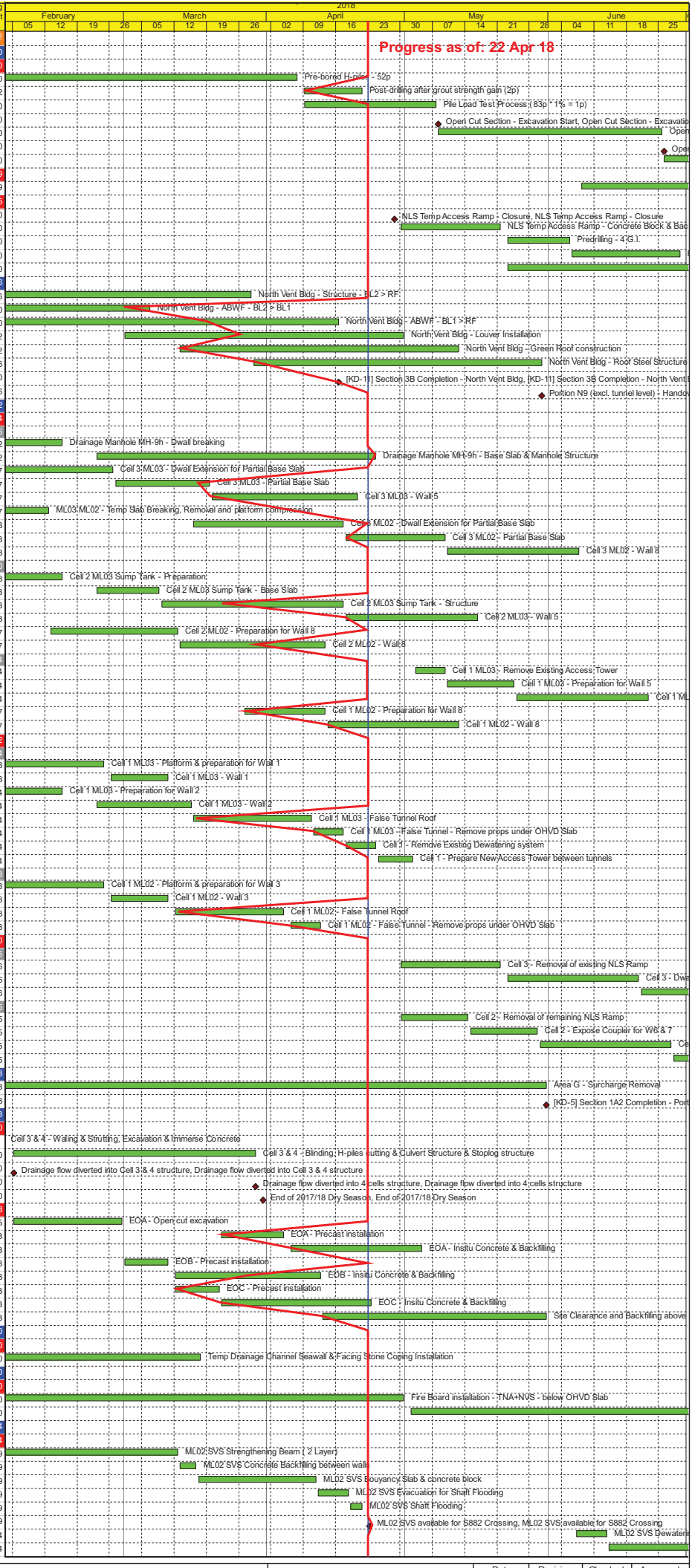
Appendix B

Construction Programme

Activity Name	Dur	Start	Finish	Remaining Float
TMCLKL Northern Connection Sub-sea Tunnel Section	253	01-Sep-17 A	15-Dec-18	402
North Approach Ramp	192	22-Jan-18 A	04-Oct-18	10
Portion N12 Section	192	22-Jan-18 A	04-Oct-18	0
Pre-bored H-piles - 52p	39	22-Jan-18 A	07-Apr-18	0
Post-drilling after grout strength gain (2p)	12	09-Apr-18	21-Apr-18	12
Pile Load Test Process (83p * 1% = 1p)	24	09-Apr-18	07-May-18	0
Open Cut Section - Excavation Start	0	08-May-18		0
Open Cut Excavation - 24,000m3	40	08-May-18	25-Jun-18	0
Open Cut Section - Structure Start	0	26-Jun-18		0
Open cut Section - Ramp Structure	84	26-Jun-18	04-Oct-18	0
Non-Access Ramp Section	73	08-Jun-18	03-Sep-18	19
PPW - TAM Grouting - Non-ramp section	73	08-Jun-18	03-Sep-18	19
Access Ramp Section	105	28-Apr-18	03-Sep-18	35
NLS Temp Access Ramp - Closure	0		28-Apr-18	0
NLS Temp Access Ramp - Concrete Block & Backfill	18	30-Apr-18	21-May-18	0
Predrilling - 4 G.I.	12	23-May-18	05-Jun-18	90
Pre-bored H-piles - 12p	20	06-Jun-18	29-Jun-18	90
Pipe Pile Wall - Access Ramp Section	87	23-May-18	03-Sep-18	0
North Ventilation Building	99	01-Sep-17 A	30-May-18	-36
North Vent Bldg - Structure - BL2 > RF	60	01-Sep-17 A	28-Mar-18	-36
North Vent Bldg - ABWF - BL2 > BL1	21	27-Dec-17 A	06-Mar-18	0
North Vent Bldg - ABWF - BL1 > RF	62	31-Jan-18 A	16-Apr-18	0
North Vent Bldg - Louver Installation	48	01-Mar-18	30-Apr-18	-12
North Vent Bldg - Green Roof construction	48	13-Mar-18	12-May-18	-22
North Vent Bldg - Roof Steel Structure	48	29-Mar-18	30-May-18	-36
[KD-11] Section 3B Completion - North Vent Bldg	0		16-Apr-18*	0
Portion N9 (excl. tunnel level) - Handover	0		30-May-18*	-36
North Launching Shaft	128	23-Jan-18 A	19-Jul-18	62
NLS Cell 1-3 External Walls	106	23-Jan-18 A	22-Jun-18	84
Cell 3	94	23-Jan-18 A	07-Jun-18	96
Drainage Manhole MH-9h - Dwall breaking	18	26-Jan-18 A	15-Feb-18	132
Drainage Manhole MH-9h - Base Slab & Manhole Structure	48	23-Feb-18	24-Apr-18	132
Cell 3 ML03 - Dwall Extension for Partial Base Slab	18	30-Jan-18 A	26-Feb-18	117
Cell 3 ML03 - Partial Base Slab	18	27-Feb-18	19-Mar-18	117
Cell 3 ML03 - Wall 5	24	20-Mar-18	20-Apr-18	117
ML03 ML02 - Temp Slab Breaking, Removal and platform compression	18	23-Jan-18 A	12-Feb-18	117
Cell 3 ML02 - Dwall Extension for Partial Base Slab	24	16-Mar-18	17-Apr-18	78
Cell 3 ML02 - Partial Base Slab	18	18-Apr-18	09-May-18	78
Cell 3 ML02 - Wall 8	24	10-May-18	07-Jun-18	78
Cell 2	76	27-Jan-18 A	16-May-18	90
Cell 2 ML03 Sump Tank - Preparation	18	27-Jan-18 A	15-Feb-18	73
Cell 2 ML03 Sump Tank - Base Slab	12	23-Feb-18	08-Mar-18	73
Cell 2 ML03 Sump Tank - Structure	30	09-Mar-18	17-Apr-18	73
Cell 2 ML03 - Wall 5	24	18-Apr-18	16-May-18	73
Cell 2 ML02 - Preparation for Wall 8	18	13-Feb-18	12-Mar-18	117
Cell 2 ML02 - Wall 8	24	13-Mar-18	13-Apr-18	117
Cell 1	69	27-Mar-18	22-Jun-18	84
Cell 1 ML03 - Remove Existing Access Tower	6	03-May-18	09-May-18	84
Cell 1 ML03 - Preparation for Wall 5	12	10-May-18	24-May-18	84
Cell 1 ML03 - Wall 5	24	25-May-18	22-Jun-18	84
Cell 1 ML02 - Preparation for Wall 8	12	27-Mar-18	13-Apr-18	117
Cell 1 ML02 - Wall 8	24	14-Apr-18	12-May-18	117
NLS Cell 1 False Tunnel	64	29-Jan-18 A	02-May-18	102
ML03	64	29-Jan-18 A	02-May-18	84
Cell 1 ML03 - Platform & preparation for Wall 1	18	29-Jan-18 A	24-Feb-18	88
Cell 1 ML03 - Wall 1	12	26-Feb-18	10-Mar-18	88
Cell 1 ML03 - Preparation for Wall 2	15	30-Jan-18 A	15-Feb-18	84
Cell 1 ML03 - Wall 2	18	23-Feb-18	15-Mar-18	84
Cell 1 ML03 - False Tunnel Roof	18	16-Mar-18	10-Apr-18	84
Cell 1 ML03 - False Tunnel - Remove props under OHVD Slab	6	11-Apr-18	17-Apr-18	84
Cell 1 - Remove Existing Dewatering system	6	18-Apr-18	24-Apr-18	84
Cell 1 - Prepare New Access Tower between tunnels	6	25-Apr-18	02-May-18	84
ML02	48	29-Jan-18 A	12-Apr-18	118
Cell 1 ML02 - Platform & preparation for Wall 3	18	29-Jan-18 A	24-Feb-18	118
Cell 1 ML02 - Wall 3	12	26-Feb-18	10-Mar-18	118
Cell 1 ML02 - False Tunnel Roof	18	12-Mar-18	04-Apr-18	118
Cell 1 ML02 - False Tunnel - Remove props under OHVD Slab	6	06-Apr-18	12-Apr-18	118
NLS Cell 1-3 Structure for Cell 3 Dwall opening	66	30-Apr-18	19-Jul-18	20
Cell 3	60	30-Apr-18	12-Jul-18	26
Cell 3 - Removal of existing NLS Ramp	18	30-Apr-18	21-May-18	26
Cell 3 - Dwall extension	24	23-May-18	20-Jun-18	26
Cell 3 - Remaining Base Slab	18	21-Jun-18	12-Jul-18	26
Cell 2	66	30-Apr-18	19-Jul-18	15
Cell 2 - Removal of remaining NLS Ramp	12	30-Apr-18	14-May-18	15
Cell 2 - Expose Coupler for W6 & 7	12	15-May-18	29-May-18	15
Cell 2 - Wall 6 & 7	24	30-May-18	27-Jun-18	15
Cell 2 - ML03 - Prepare Scaffolding for Top Beams	18	28-Jun-18	19-Jul-18	15
North - Phase 2 Reclamation	88	07-Oct-17 A	31-May-18	-153
Area G - Surcharge Removal	29	07-Oct-17 A	31-May-18	-153
[KD-5] Section 1A2 Completion - Portion N1 to N4 completion	0		31-May-18*	-153
Box Culvert Extension	88	05-Jan-18 A	31-May-18	-48
Main Culvert Structure (Ch000-399)	70	05-Jan-18 A	31-Mar-18	0
Cell 3 & 4 - Waling & Strutting, Excavation & Immerse Concrete	6	05-Jan-18 A	03-Feb-18 A	
Cell 3 & 4 - Blinding, H-piles cutting & Culvert Structure & Stoplog structure	40	05-Feb-18	29-Mar-18	0
Drainage flow diverted into Cell 3 & 4 structure	0		05-Feb-18	0
Drainage flow diverted into 4 cells structure	0		29-Mar-18	0
End of 2017/18 Dry Season	0		31-Mar-18*	0
EOA/ EOB / EOC	88	05-Feb-18	31-May-18	-153
EOA - Open cut excavation	15	05-Feb-18	28-Feb-18	-135
EOA - Precast installation	9	22-Mar-18	04-Apr-18	-153
EOA - Insitu Concrete & Backfilling	24	06-Apr-18	04-May-18	-153
EOB - Precast installation	9	01-Mar-18*	10-Mar-18	-153
EOB - Insitu Concrete & Backfilling	24	12-Mar-18	12-Apr-18	-153
EOC - Precast installation	9	12-Mar-18	21-Mar-18	-153
EOC - Insitu Concrete & Backfilling	24	22-Mar-18	23-Apr-18	-153
Site Clearance and Backfilling above Box Cuvlert	40	13-Apr-18	31-May-18	-153
NLF Demobilization & At-grade works	48	28-Dec-17 A	17-Mar-18	0
Portion N12 & Portion N6B	48	28-Dec-17 A	17-Mar-18	0
Temp Drainage Channel Seawall & Facing Stone Coping Installation	48	28-Dec-17 A	17-Mar-18	0
North Approach & Sub-sea Tunnel - Thermal Barrier	252	15-Jan-18 A	15-Dec-18	0
Fire board Installation below OHVD	252	15-Jan-18 A	15-Dec-18	0
Fire Board installation - TNA+NVS - below OHVD Slab	81	15-Jan-18 A	30-Apr-18	0
Fire Board installation - TSS NVS to CP33 - below OHVD Slab	190	02-May-18	15-Dec-18	0
ML02 South Ventilation Shaft	117	30-Jan-18 A	06-Jul-18	44
Concrete Bell Options	117	30-Jan-18 A	06-Jul-18	44
ML02 SVS Strengthening Beam (2 Layer)	15	30-Jan-18 A	12-Mar-18	29
ML02 SVS Concrete Backfilling between walls	4	13-Mar-18	16-Mar-18	29
ML02 SVS Bouyancy Slab & concrete block	18	17-Mar-18	11-Apr-18	29
ML02 SVS Evacuation for Shaft Flooding	6	12-Apr-18	18-Apr-18	29
ML02 SVS Shaft Flooding	3	19-Apr-18	21-Apr-18	29
ML02 SVS available for S882 Crossing	0	23-Apr-18		29
ML02 SVS Dewatering	6	07-Jun-18	13-Jun-18	44
ML02 SVS Bouyancy Slab Breaking	18	14-Jun-18	06-Jul-18	44



◆ Milestone

Planned Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. I

Three Months Rolling Programme Progress as of 22 Apr 18

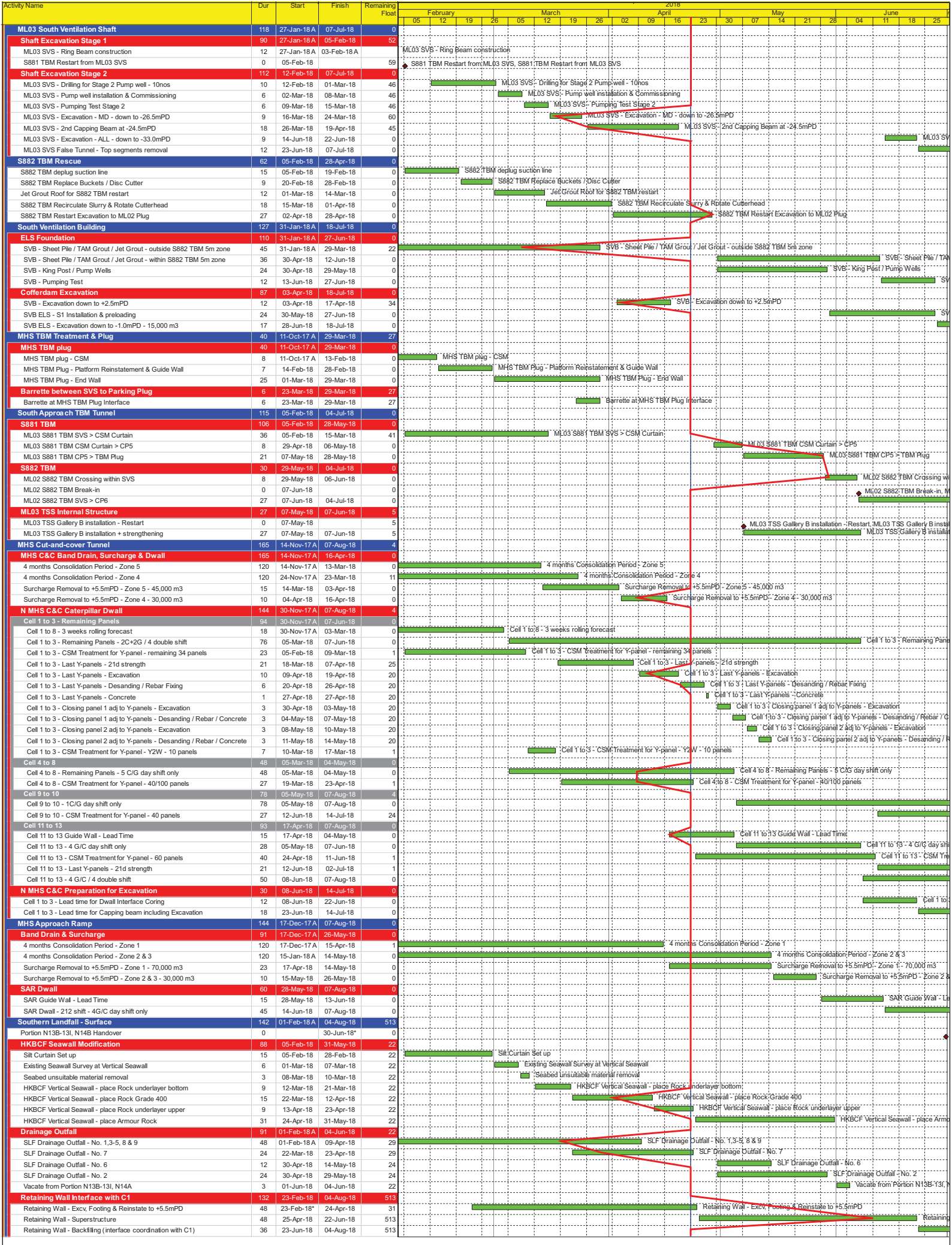
Dragages HongKong 香港寶嘉

A member of the Bouygues Construction group

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

BOUYGUES TRAVAUX PUBLICS

Date	Revision	Checked	Approved



Activity Name	Dur	Start	Finish	Remaining Float
ML03 South Ventilation Shaft	118	27-Jan-18 A	07-Jul-18	0
Shaft Excavation Stage 1	90	27-Jan-18 A	05-Feb-18	52
ML03 SVS - Ring Beam construction	12	27-Jan-18 A	03-Feb-18 A	
S881 TBM Restart from ML03 SVS	0	05-Feb-18		59
Shaft Excavation Stage 2	112	12-Feb-18	07-Jul-18	0
ML03 SVS - Drilling for Stage 2 Pump well - 10nos	10	12-Feb-18	01-Mar-18	46
ML03 SVS - Pump well installation & Commissioning	6	02-Mar-18	08-Mar-18	46
ML03 SVS - Pumping Test Stage 2	6	09-Mar-18	15-Mar-18	46
ML03 SVS - Excavation - MD - down to -26.5mPD	9	16-Mar-18	24-Mar-18	60
ML03 SVS - 2nd Capping Beam at -24.5mPD	18	26-Mar-18	19-Apr-18	45
ML03 SVS - Excavation - ALL - down to -33.0mPD	9	14-Jun-18	22-Jun-18	0
ML03 SVS False Tunnel - Top segments removal	12	23-Jun-18	07-Jul-18	0
S882 TBM Rescue	62	05-Feb-18	28-Apr-18	0
S882 TBM deplug suction line	15	05-Feb-18	19-Feb-18	0
S882 TBM Replace Buckets / Disc Cutter	9	20-Feb-18	28-Feb-18	0
Jet Grout Roof for S882 TBM restart	12	01-Mar-18	14-Mar-18	0
S882 TBM Recirculate Slurry & Rotate Cutterhead	18	15-Mar-18	01-Apr-18	0
S882 TBM Restart Excavation to ML02 Plug	27	02-Apr-18	28-Apr-18	0
South Ventilation Building	127	31-Jan-18 A	18-Jul-18	0
ELS Foundation	110	31-Jan-18 A	27-Jun-18	0
SVB - Sheet Pile / TAM Grout / Jet Grout - outside S882 TBM 5m zone	45	31-Jan-18 A	29-Mar-18	22
SVB - Sheet Pile / TAM Grout / Jet Grout - within S882 TBM 5m zone	36	30-Apr-18	12-Jun-18	0
SVB - King Post / Pump Wells	24	30-Apr-18	29-May-18	0
SVB - Pumping Test	12	13-Jun-18	27-Jun-18	0
Cofferdam Excavation	87	03-Apr-18	18-Jul-18	0
SVB - Excavation down to +2.5mPD	12	03-Apr-18	17-Apr-18	34
SVB ELS - S1 Installation & preloading	24	30-May-18	27-Jun-18	0
SVB ELS - Excavation down to -1.0mPD - 15,000 m3	17	28-Jun-18	18-Jul-18	0
MHS TBM Treatment & Plug	40	11-Oct-17 A	29-Mar-18	27
MHS TBM plug	40	11-Oct-17 A	29-Mar-18	0
MHS TBM plug - CSM	8	11-Oct-17 A	13-Feb-18	0
MHS TBM Plug - Platform Reinstatement & Guide Wall	7	14-Feb-18	28-Feb-18	0
MHS TBM Plug - End Wall	25	01-Mar-18	29-Mar-18	0
Barrette between SVS to Parking Plug	6	23-Mar-18	29-Mar-18	27
Barrette at MHS TBM Plug Interface	6	23-Mar-18	29-Mar-18	27
South Approach TBM Tunnel	115	05-Feb-18	04-Jul-18	0
S881 TBM	106	05-Feb-18	28-May-18	0
ML03 S881 TBM SVS > CSM Curtain	36	05-Feb-18	15-Mar-18	41
ML03 S881 TBM CSM Curtain > CP5	8	29-Apr-18	06-May-18	0
ML03 S881 TBM CP5 > TBM Plug	21	07-May-18	28-May-18	0
S882 TBM	30	29-May-18	04-Jul-18	0
ML02 S882 TBM Crossing within SVS	8	29-May-18	06-Jun-18	0
ML02 S882 TBM Break-in	0	07-Jun-18		0
ML02 S882 TBM SVS > CP6	27	07-Jun-18	04-Jul-18	0
ML03 TSS Internal Structure	27	07-May-18	07-Jun-18	5
ML03 TSS Gallery B installation - Restart	0	07-May-18		5
ML03 TSS Gallery B installation + strengthening	27	07-May-18	07-Jun-18	5
MHS Cut-and-cover Tunnel	165	14-Nov-17 A	07-Aug-18	4
MHS C&C Band Drain, Surcharge & Dwall	165	14-Nov-17 A	16-Apr-18	0
4 months Consolidation Period - Zone 5	120	14-Nov-17 A	13-Mar-18	0
4 months Consolidation Period - Zone 4	120	24-Nov-17 A	23-Mar-18	11
Surcharge Removal to +5.5mPD - Zone 5 - 45,000 m3	15	14-Mar-18	03-Apr-18	0
Surcharge Removal to +5.5mPD - Zone 4 - 30,000 m3	10	04-Apr-18	16-Apr-18	0
N MHS C&C Caterpillar Dwall	144	30-Nov-17 A	07-Aug-18	4
Cell 1 to 3 - Remaining Panels	94	30-Nov-17 A	07-Jun-18	0
Cell 1 to 8 - 3 weeks rolling forecast	18	30-Nov-17 A	03-Mar-18	0
Cell 1 to 3 - Remaining Panels - 2C+2G / 4 double shift	76	05-Mar-18	07-Jun-18	0
Cell 1 to 3 - CSM Treatment for Y-panel - remaining 34 panels	23	05-Feb-18	09-Mar-18	1
Cell 1 to 3 - Last Y-panels - 21d strength	21	18-Mar-18	07-Apr-18	25
Cell 1 to 3 - Last Y-panels - Excavation	10	09-Apr-18	19-Apr-18	20
Cell 1 to 3 - Last Y-panels - Desanding / Rebar Fixing	6	20-Apr-18	26-Apr-18	20
Cell 1 to 3 - Last Y-panels - Concrete	1	27-Apr-18	27-Apr-18	20
Cell 1 to 3 - Closing panel 1 adj to Y-panels - Excavation	3	30-Apr-18	03-May-18	20
Cell 1 to 3 - Closing panel 1 adj to Y-panels - Desanding / Rebar / Concrete	3	04-May-18	07-May-18	20
Cell 1 to 3 - Closing panel 2 adj to Y-panels - Excavation	3	08-May-18	10-May-18	20
Cell 1 to 3 - Closing panel 2 adj to Y-panels - Desanding / Rebar / Concrete	3	11-May-18	14-May-18	20
Cell 1 to 3 - CSM Treatment for Y-panel - Y2W - 10 panels	7	10-Mar-18	17-Mar-18	1
Cell 4 to 8	48	05-Mar-18	04-May-18	0
Cell 4 to 8 - Remaining Panels - 5 C/G day shift only	48	05-Mar-18	04-May-18	0
Cell 4 to 8 - CSM Treatment for Y-panel - 40/100 panels	27	19-Mar-18	23-Apr-18	1
Cell 9 to 10	78	05-May-18	07-Aug-18	4
Cell 9 to 10 - 1C/G day shift only	78	05-May-18	07-Aug-18	0
Cell 9 to 10 - CSM Treatment for Y-panel - 40 panels	27	12-Jun-18	14-Jul-18	24
Cell 11 to 13	93	17-Apr-18	07-Aug-18	0
Cell 11 to 13 Guide Wall - Lead Time	15	17-Apr-18	04-May-18	0
Cell 11 to 13 - 4 G/C day shift only	28	05-May-18	07-Jun-18	0
Cell 11 to 13 - CSM Treatment for Y-panel - 60 panels	40	24-Apr-18	11-Jun-18	1
Cell 11 to 13 - Last Y-panels - 21d strength	21	12-Jun-18	02-Jul-18	1
Cell 11 to 13 - 4 G/C / 4 double shift	50	08-Jun-18	07-Aug-18	0
N MHS C&C Preparation for Excavation	30	08-Jun-18	14-Jul-18	0
Cell 1 to 3 - Lead time for Dwall Interface Coring	12	08-Jun-18	22-Jun-18	0
Cell 1 to 3 - Lead time for Capping beam including Excavation	18	23-Jun-18	14-Jul-18	0
MHS Approach Ramp	144	17-Dec-17 A	07-Aug-18	0
Band Drain & Surcharge	91	17-Dec-17 A	26-May-18	0
4 months Consolidation Period - Zone 1	120	17-Dec-17 A	15-Apr-18	1
4 months Consolidation Period - Zone 2 & 3	120	15-Jan-18 A	14-May-18	0
Surcharge Removal to +5.5mPD - Zone 1 - 70,000 m3	23	17-Apr-18	14-May-18	0
Surcharge Removal to +5.5mPD - Zone 2 & 3 - 30,000 m3	10	15-May-18	26-May-18	0
SAR Dwall	60	28-May-18	07-Aug-18	0
SAR Guide Wall - Lead Time	15	28-May-18	13-Jun-18	0
SAR Dwall - 212 shift - 4G/C day shift only	45	14-Jun-18	07-Aug-18	0
Southern Landfall - Surface	142	01-Feb-18 A	04-Aug-18	513
Portion N13B-13I, N14B Handover	0		30-Jun-18*	0
HKBCF Seawall Modification	88	05-Feb-18	31-May-18	22
Silt Curtain Set up	15	05-Feb-18	28-Feb-18	22
Existing Seawall Survey at Vertical Seawall	6	01-Mar-18	07-Mar-18	22
Seabed unsuitable material removal	3	08-Mar-18	10-Mar-18	22
HKBCF Vertical Seawall - place Rock underlayer bottom	9	12-Mar-18	21-Mar-18	22
HKBCF Vertical Seawall - place Rock Grade 400	15	22-Mar-18	12-Apr-18	22
HKBCF Vertical Seawall - place Rock underlayer upper	9	13-Apr-18	23-Apr-18	22
HKBCF Vertical Seawall - place Armour Rock	31	24-Apr-18	31-May-18	22
Drainage Outfall	91	01-Feb-18 A	04-Jun-18	22
SLF Drainage Outfall - No. 1,3-5, 8 & 9	48	01-Feb-18 A	09-Apr-18	29
SLF Drainage Outfall - No. 7	24	22-Mar-18	23-Apr-18	29
SLF Drainage Outfall - No. 6	12	30-Apr-18	14-May-18	24
SLF Drainage Outfall - No. 2	24	30-Apr-18	29-May-18	24
Vacate from Portion N13B-13I, N14A	3	01-Jun-18	04-Jun-18	22
Retaining Wall Interface with C1	132	23-Feb-18	04-Aug-18	513
Retaining Wall - Excv, Footing & Reinstate to +5.5mPD	48	23-Feb-18*	24-Apr-18	31
Retaining Wall - Superstructure	48	25-Apr-18	22-Jun-18	513
Retaining Wall - Backfilling (interface coordination with C1)	36	23-Jun-18	04-Aug-18	513

Project ID: DWPI0010

Data Date: 05-Feb-18

◆ Milestone

Planned Bar

TMCLKL Northern Connection Sub-sea Tunnel Section

Detailed Works Programme Rev. I

Three Months Rolling Programme Progress as of 22 Apr 18

Dragages HongKong 香寶嘉港

A member of the Bouygues Construction group

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

BOUYGUES TRAVAUX PUBLICS

Date	Revision	Checked	Approved

Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
Air Quality									
4.8.1	3.8	An effective watering programme of twice daily watering with complete coverage, is estimated to reduce by 50%. This is recommended for all areas in order to reduce dust levels to a minimum;	All areas / throughout construction period	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Watering of the construction sites in Lantau for 8 times/day and in Tuen Mun for 12 times/day to reduce dust emissions by 87.5% and 91.7% respectively and shall be undertaken.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓

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						D	C	O	
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit.	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
Marine Works (Sequence A)									
6.1 Figure 6.2a Appendix D6a	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓

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						D	C	O	
6.1	-	a maximum of 30% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL southern landfall	TM-CLKL southern landfall reclamation filling	Contractor	TM-EIAO		Y		N/A
6.1	-	a maximum of 100% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL northern landfall	TM-CLKL northern landfall reclamation filling	Contractor	TM-EIAO		Y		✓
6.1	-	Use of cage type silt curtains round allgrab dredgers during the HKBCF, HKLR and TM-CLKL southern reclamation works.	All areas dredging works	Contractor	TM-EIAO		Y		✓
	Figure 1.1 of Annex C	A layer of floating type silt curtain will be applied when dredging and reclamation works are being undertaken at Portion N-a as shown in Figure 1.1 of Annex C of the EM&A Manual.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	Trailer suction hopper dredgers shall not allow mud to overflow.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	The use of Lean Material Overboard (LMOB) systems shall be prohibited.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1 Figure 6.2b Appendix D6b	Annex A	For other parts of the reclamation works construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. It should be noted that the protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2b and detailed in Appendices D6b. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation; - Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		- 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		✓
General Marine Works									
6.1	-	Use of TBM for the construction of the submarine tunnel.	Tunnel works / Construction phase	Contractor	TM-EIAO		Y		N/A
6.1	-	Export dredged spoils from NWWCZ.	All areas as much as possible / dredging activities	Contractor	DASO Permit conditions		Y		✓
6.1	-	Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25%	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Where sand fill is proposed for filling below +2.5mPD, the fine content in the sand fill will be controlled to 5%.	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material.	All areas/ throughout construction period	Contractor	Marine Fill Committee		Y		✓

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						D	C	O	
					Guidelines. DASO permit conditions.				
6.1	-	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit		Y		✓

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						D	C	O	
					conditions.				
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
Land Works									
6.1	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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						D	C	O	
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		✓
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		✓

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						D	C	O	
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		✓
Water Quality Monitoring									
6.1	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period. One year operation phase water quality monitoring at designated stations.	Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, through-out marine construction period, post construction and monthly operational phase water quality monitoring for a year.	Contractor	EM&A Manual		Y	Y	✓
ECOLOGY									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓

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						D	C	O	
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m2 in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/towards end of construction period	TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	N/A. To be implemented by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for dredging and reclamation works	All areas/ Detailed Design/during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.5	Audit coral translocation success	Post translocation	Contractor	TMEIA		Y		✓
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		N/A
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (OM6)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓
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		Y		✓

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.				
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.	Contract Mobilisation	Contractor	TMEIA		Y		✓
12.6	8.1	The extent of cutting operation should be optimised where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The surplus surcharge should be transferred to a fill bank	Reclamation areas / after surcharge works	Contractor	TMEIA		Y		N/A
12.6	8.1	Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The site and surroundings shall be kept tidy and litter free.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	No waste shall be burnt on site.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.	Detailed Design	Design Consultant	TMEIA	Y			✓
12.6	8.1	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
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		✓

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.	Reclamation areas / throughout dredging works	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: *f* suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed;	All areas / throughout construction period	Contractor	TMEIA		Y		<>

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		f Having a capacity of <450L unless the specifications have been approved by the EPD; and w 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; *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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		N/A

*** Remarks:**

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

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

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

Appendix D

Summary of Action and Limit Levels

Table D1 Action and Limit Levels for 1-hour and 24-hour TSP

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

Table D2 Action and Limit Levels for Impact Dolphin Monitoring

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

Notes:

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

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

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

Appendix E

Copies of Calibration Certificates for Air Quality Monitoring

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR 5
Calibrated by	:	P.F.Yeung
Date	:	09/02/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 0816

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	289

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.5	3.597	1.743	52	52.91
2	13 holes	9.5	3.136	1.522	47	47.82
3	10 holes	7.0	2.692	1.309	40	40.70
4	7 holes	4.8	2.229	1.087	35	35.61
5	5 holes	2.3	1.543	0.758	28	28.49

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):25.228 Intercept(b):8.717 Correlation Coefficient(r): 0.9969

Checked by: Magnum Fan Date: 13/02/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR10
Calibrated by	:	P.F.Yeung
Date	:	09/02/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 8162

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	289

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.7	3.328	1.614	52	52.91
2	13 holes	8.6	2.984	1.449	48	48.84
3	10 holes	6.8	2.653	1.290	43	43.75
4	7 holes	4.8	2.229	1.087	35	35.61
5	5 holes	3.2	1.820	0.891	28	28.49

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):34.451 Intercept(b): -1.705 Correlation Coefficient(r): 0.9966

Checked by: Magnum Fan Date: 13/02/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	AQMS1
Calibrated by	:	P.F.Yeung
Date	:	09/02/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 1253

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	289

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	13.8	3.780	1.831	50	50.87
2	13 holes	10.8	3.344	1.622	45	45.79
3	10 holes	8.2	2.914	1.415	40	40.70
4	7 holes	5.6	2.408	1.173	33	33.58
5	5 holes	3.8	1.983	0.969	26	26.45

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):28.118 Intercept(b):0.059 Correlation Coefficient(r): 0.9971

Checked by: Magnum Fan Date: 13/02/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR 1
Calibrated by	:	P.F.Yeung
Date	:	09/02/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 0146

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	289

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.3	3.420	1.658	54	54.94
2	13 holes	9.3	3.103	1.506	50	50.87
3	10 holes	7.2	2.730	1.327	45	45.79
4	7 holes	4.7	2.206	1.076	40	40.70
5	5 holes	3.0	1.762	0.863	33	33.58

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):26.132 Intercept(b):11.566 Correlation Coefficient(r): 0.9973

Checked by: Magnum Fan Date: 13/02/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR 6
Calibrated by	:	P.F.Yeung
Date	:	09/02/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 3957

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	289

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	13.5	3.738	1.811	57	57.99
2	13 holes	11.2	3.405	1.651	50	50.87
3	10 holes	8.2	2.914	1.415	45	45.79
4	7 holes	5.6	2.408	1.173	37	37.65
5	5 holes	3.6	1.930	0.944	30	30.52

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):30.692 Intercept(b): 1.634 Correlation Coefficient(r): 0.9966

Checked by: Magnum Fan Date: 13/02/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR 5
Calibrated by	:	P.F.Yeung
Date	:	09/04/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 0816

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.6	3.257	1.594	52	52.02
2	13 holes	9.0	3.001	1.469	46	46.01
3	10 holes	6.6	2.570	1.259	40	40.01
4	7 holes	4.2	2.050	1.006	32	32.01
5	5 holes	2.8	1.674	0.822	25	25.01

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):33.715 Intercept(b):-2.451 Correlation Coefficient(r): 0.9978

Checked by: Magnum Fan Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR10
Calibrated by	:	P.F.Yeung
Date	:	09/04/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 8162

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.60	3.257	1.594	54	54.02
2	13 holes	8.60	2.933	1.436	49	49.01
3	10 holes	6.60	2.570	1.259	43	43.01
4	7 holes	4.40	2.098	1.029	35	35.01
5	5 holes	2.80	1.674	0.822	28	28.01

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):33.899 Intercept(b): 0.187 Correlation Coefficient(r): 0.9999

Checked by: Magnum Fan Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	AQMS1
Calibrated by	:	P.F.Yeung
Date	:	09/04/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 1253

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.0	3.465	1.695	52	52.02
2	13 holes	10.4	3.226	1.578	46	46.01
3	10 holes	7.6	2.758	1.350	41	41.01
4	7 holes	4.7	2.169	1.063	34	34.01
5	5 holes	3.3	1.817	0.892	27	27.01

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):28.841 Intercept(b):2.061 Correlation Coefficient(r): 0.9924

Checked by: Magnum Fan Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR 1
Calibrated by	:	P.F.Yeung
Date	:	09/04/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 0146

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.7	3.422	1.674	54	54.02
2	13 holes	8.8	2.967	1.453	49	49.01
3	10 holes	6.6	2.570	1.259	42	42.01
4	7 holes	4.4	2.098	1.029	34	34.01
5	5 holes	2.8	1.674	0.822	28	28.01

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):31.507 Intercept(b):2.113 Correlation Coefficient(r): 0.9975

Checked by: Magnum Fan Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR 6
Calibrated by	:	P.F.Yeung
Date	:	09/04/2018

Sampler

Model	:	TE-5170
Serial Number	:	S/N 3957

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

Pstd (hpa)	:	1013
Tstd (K)	:	298.18

Calibration Condition

Pa (hpa)	:	1017
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.8	3.579	1.750	54	54.02
2	13 holes	10.4	3.226	1.578	49	49.01
3	10 holes	8.0	2.829	1.385	42	42.01
4	7 holes	5.0	2.237	1.097	34	34.01
5	5 holes	3.2	1.789	0.879	28	28.01

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship (Linear Regression)

Slope(m):30.029 Intercept(b): 1238 Correlation Coefficient(r): 0.9989

Checked by: Magnum Fan Date: 11/04/2018

TISCH Environmental

TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVES, OH
45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 20, 2017 Rootsmeter S/N 0438320 Ta (K) - 293
Operator Tisch Orifice I.D. - 2454 Pa (mm) - 759.46

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4390	3.2	2.00
2	NA	NA	1.00	1.0240	6.4	4.00
3	NA	NA	1.00	0.9170	7.9	5.00
4	NA	NA	1.00	0.8730	8.8	5.50
5	NA	NA	1.00	0.7200	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0120	0.7033	1.4257		0.9958	0.6920	0.8784
1.0078	0.9842	2.0163		0.9916	0.9683	1.2423
1.0057	1.0967	2.2543		0.9895	1.0791	1.3889
1.0045	1.1507	2.3643		0.9884	1.1322	1.4567
0.9992	1.3878	2.8514		0.9831	1.3654	1.7568
Qstd slope (m) =		2.08464		Qa slope (m) =		1.30537
intercept (b) =		-0.03684		intercept (b) =		-0.02270
coefficient (r) =		0.99994		coefficient (r) =		0.99994
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760)(298/Ta))]- b}
Qa = 1/m{[SQRT H2O(Ta/Pa)]- b}

TISCH Environmental

RECALIBRATION DUE DATE:
March 19, 2019

Certificate of Calibration

Calibration Certification Information					
Cal. Date:	March 19, 2018	**Rootsmeter S/N:** 438320	**Ta:** 294	°K
Operator:	Jim Tisch		**Pa:** 746.8	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **2454**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4300	3.2	2.00
2	3	4	1	1.0040	6.4	4.00
3	5	6	1	0.9030	7.9	5.00
4	7	8	1	0.8590	8.7	5.50
5	9	10	1	0.7080	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
0.9917	0.6935	1.4113	0.9957	0.6963	0.8874
0.9874	0.9835	1.9959	0.9914	0.9875	1.2549
0.9854	1.0913	2.2315	0.9894	1.0957	1.4030
0.9843	1.1459	2.3405	0.9883	1.1506	1.4715
0.9789	1.3826	2.8227	0.9829	1.3882	1.7747
QSTD	**m=**	**2.05242**	**QA**	**m=**	**1.28519**
	b=	**-0.01383**		**b=**	**-0.00869**
	r=	**0.99994**		**r=**	**0.99994**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

ENVIROTECH SERVICES CO.

Calibration Report of Wind Meter

Date of Calibration : 18 October 2017

Brand of Test Meter: Davis

Model: Vantage Pro 2 (s/n: AS160104014)

Location : Roof of Tuen Mun Firestation

Procedures :

1. Wind Still Test : The wind speed sensor was hold by hand until it keep still

2.Wind Speed Test : The wind meter was on-site calibrated against the Anemometer

3.Wind Direction Test : The wind meter was on-site calibrated against the marine compass at four directions

Results:

Wind Still Test

Wind Speed (m/s)
0.00

Wind Speed Test

Davis (m/s)	Anemometer (m/s)
0.7	0.8
1.2	1.4
2.5	2.8

Wind Direction Test

Davis (o)	Marine Compass (o)
272	270
1	0
91	90
181	180

Calibrated by: Yeung Ping Fai (Technical Officer)

Checked by : Ho Kam Fat (Senior Technical Officer)

ENVIROTECH SERVICES CO.

Calibration Report of Wind Meter

Date of Calibration : 01 April 2018

Brand of Test Meter: Davis

Model: Vantage Pro 2 (s/n: AS160104014)

Location : Roof of Tuen Mun Firestation

Procedures :

1. Wind Still Test: The wind speed sensor was hold by hand until it keep still

2.Wind Speed Test: The wind meter was on-site calibrated against the Anemometer

3.Wind Direction Test : The wind meter was on-site calibrated against the marine compass at four directions

Results:

Wind Still Test

Wind Speed (m/s)
0.00

Wind Speed Test

Davis (m/s)	Anemometer (m/s)
0.5	0.4
1.0	0.9
1.7	1.5

Wind Direction Test

Davis (o)	Marine Compass (o)
269	270
359	0
91	90
179	180

Calibrated by: Ho

Yeung Ping Fai
(Technical Officer)

Checked by : Fat

Ho Kam Fat
(Senior Technical Officer)

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C175727
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-2277) Date of Receipt / 收件日期 : 3 October 2017

Description / 儀器名稱	:	Anemometer
Manufacturer / 製造商	:	Lutron
Model No. / 型號	:	AM-4201
Serial No. / 編號	:	AF.27513
Supplied By / 委託者	:	Envirotech Services Co. Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun, New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 13 October 2017

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- Testo Industrial Services GmbH, Germany

Tested By 測試 : H C Chan, Engineer

Certified By 核證 : K C Lee, Engineer

Date of Issue 簽發日期 : 16 October 2017

Sun Creation Engineering Limited - Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 - 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 E-mail 電郵: callab@suncreation.com Website 網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C175727
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 10 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL386	Multi-function Measuring Instrument	S16493

4. Test procedure : MA130N.

5. Results :

Air Velocity

Applied Value (m/s)	UUT Reading (m/s)	Measured Correction		
		Value (m/s)	Measurement Uncertainty	
			Expanded Uncertainty (m/s)	Coverage Factor
1.9	1.7	+0.2	0.2	2.0
4.0	3.8	+0.2	0.2	2.0
6.0	5.9	+0.1	0.3	2.0
8.0	8.0	0.0	0.3	2.0
10.0	10.1	-0.1	0.4	2.0

Remarks : - The Measured Corrections are defined as :
Value = Applied Value - UUT Reading

- The expanded uncertainties are for a level of confidence of 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Sun Creation Engineering Limited Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 E-mail 電郵: callab@suncreation.com Website 網址: www.suncreation.com

Appendix F

EM&A Monitoring Schedules

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - April 2018

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

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Air Quality Impact Monitoring Schedule - May 2018

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

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

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety,weather etc) conditions.

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - April 2018

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Impact Dolphin Monitoring Survey Monitoring Schedule - May 2018

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

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety,weather etc) conditions.

Appendix G

Impact Air Quality Monitoring Results

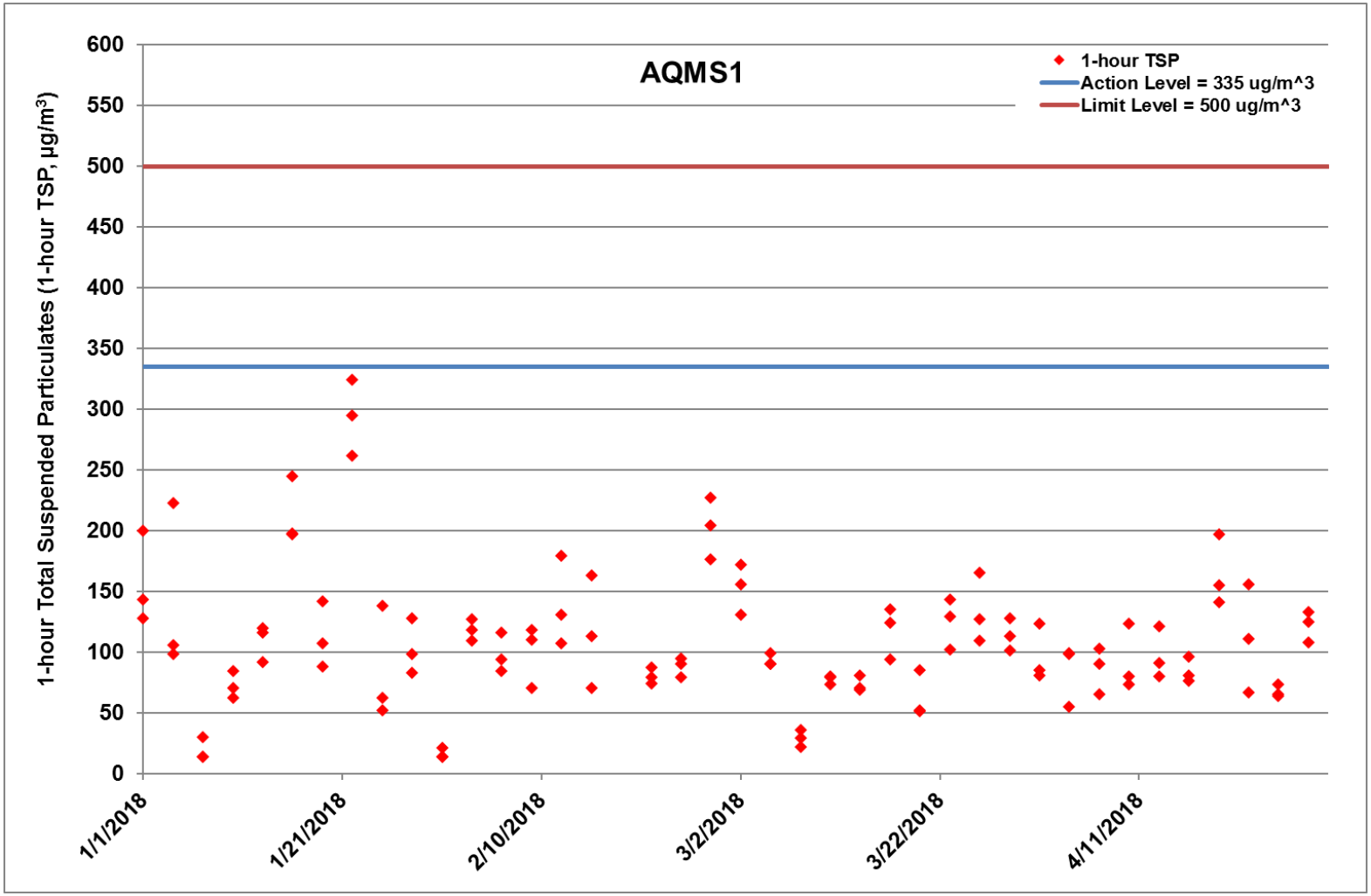


Figure G.1 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

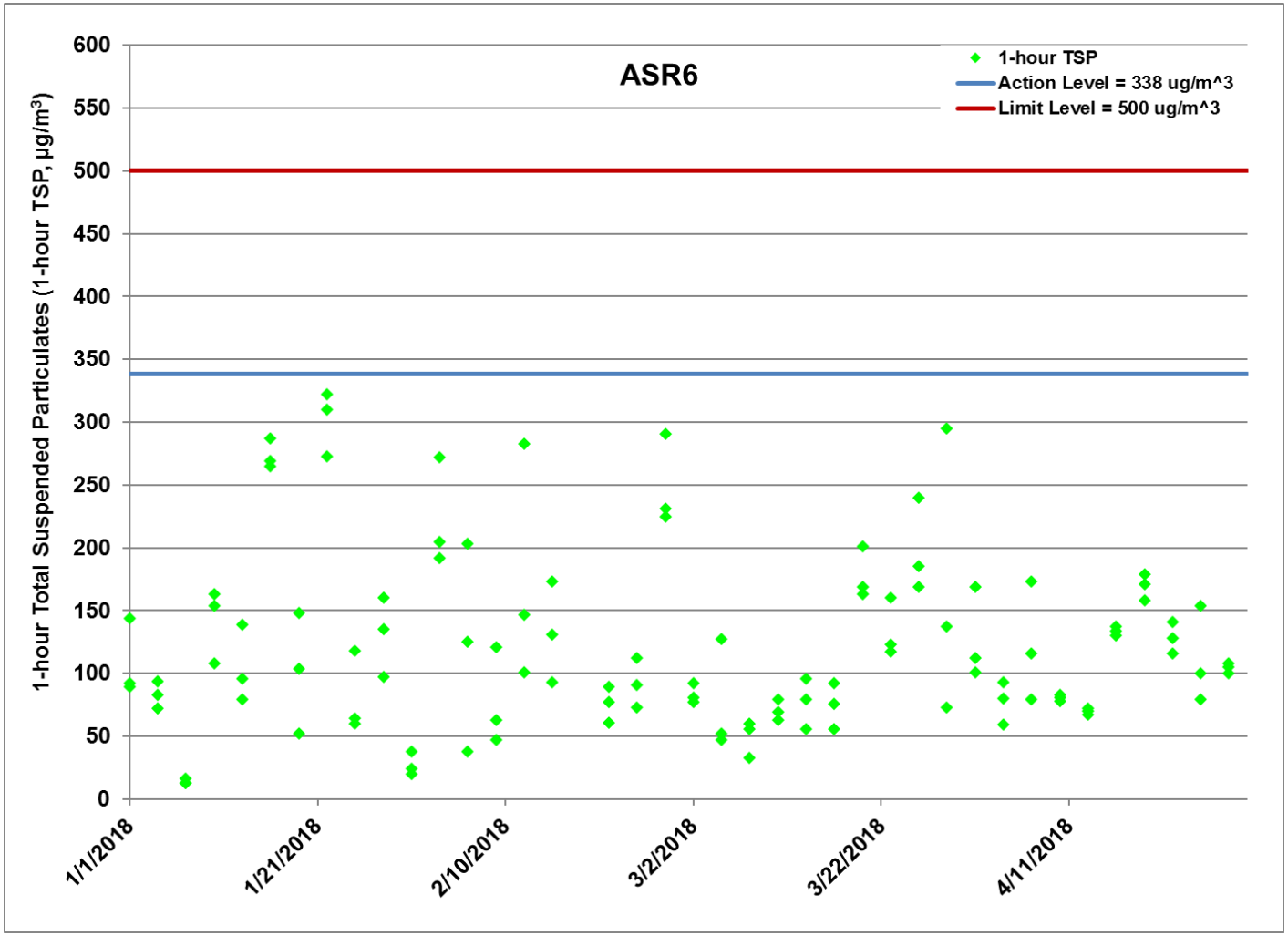


Figure G.2 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

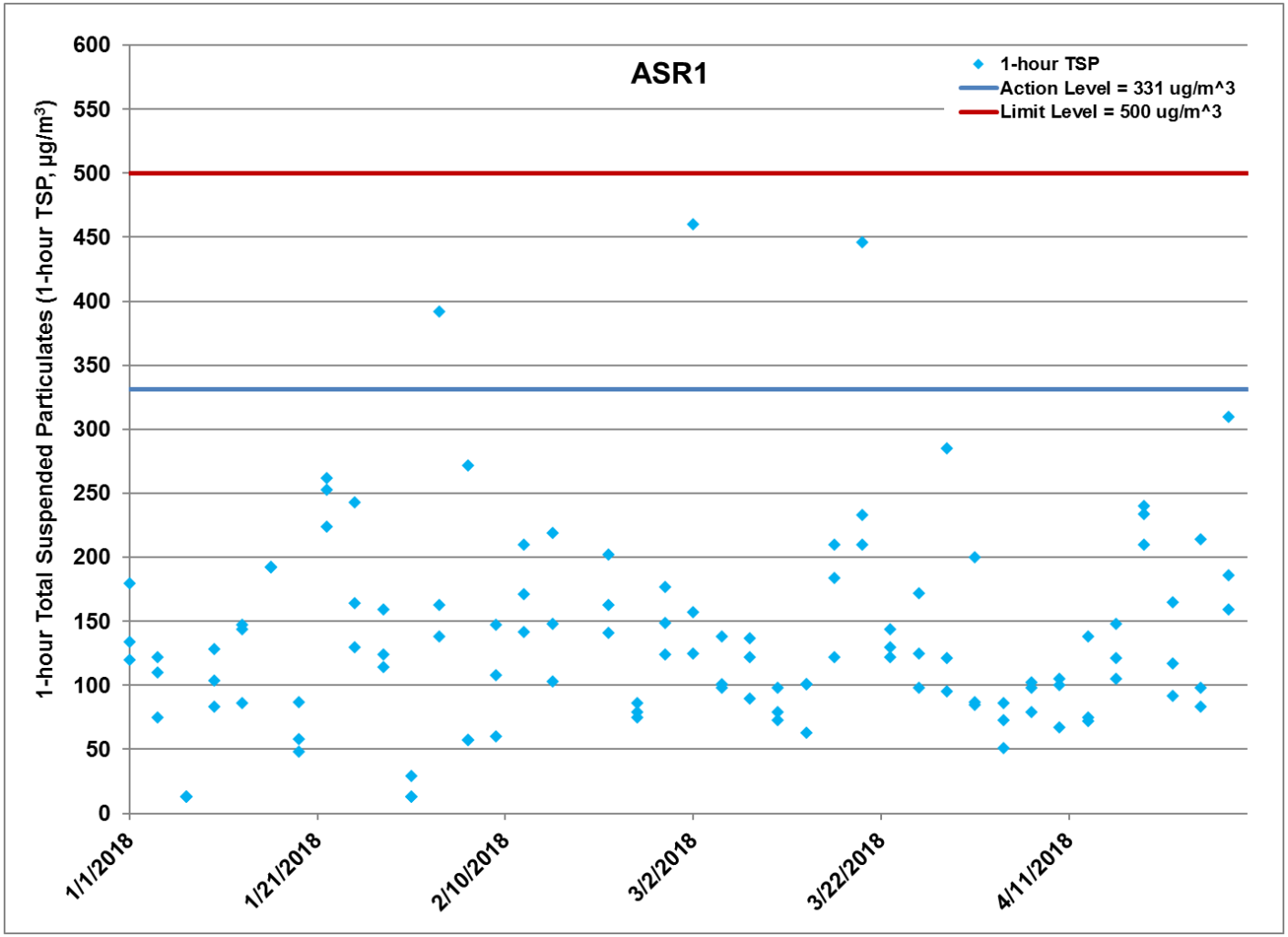


Figure G.3 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

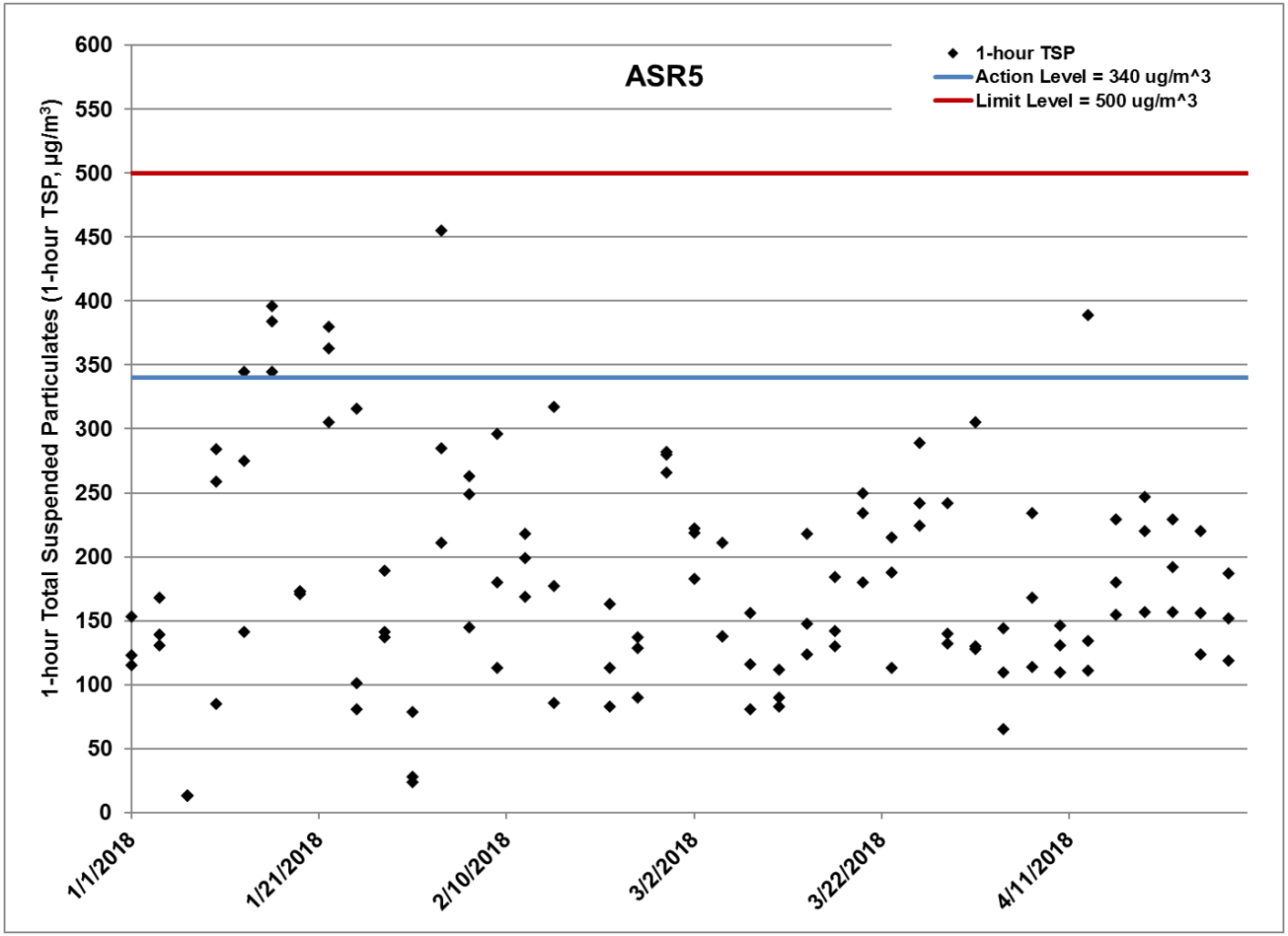


Figure G.4 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

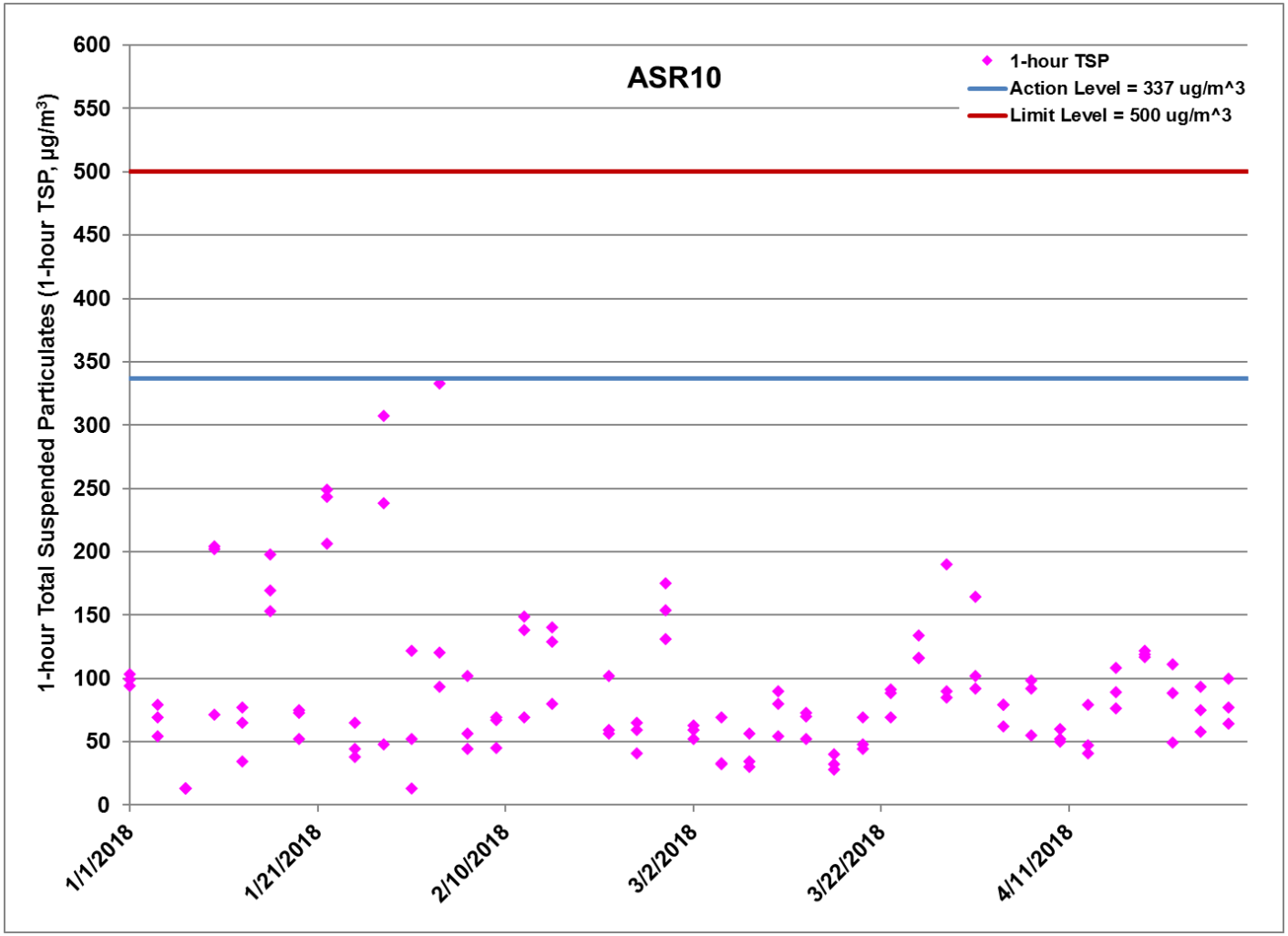


Figure G.5 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

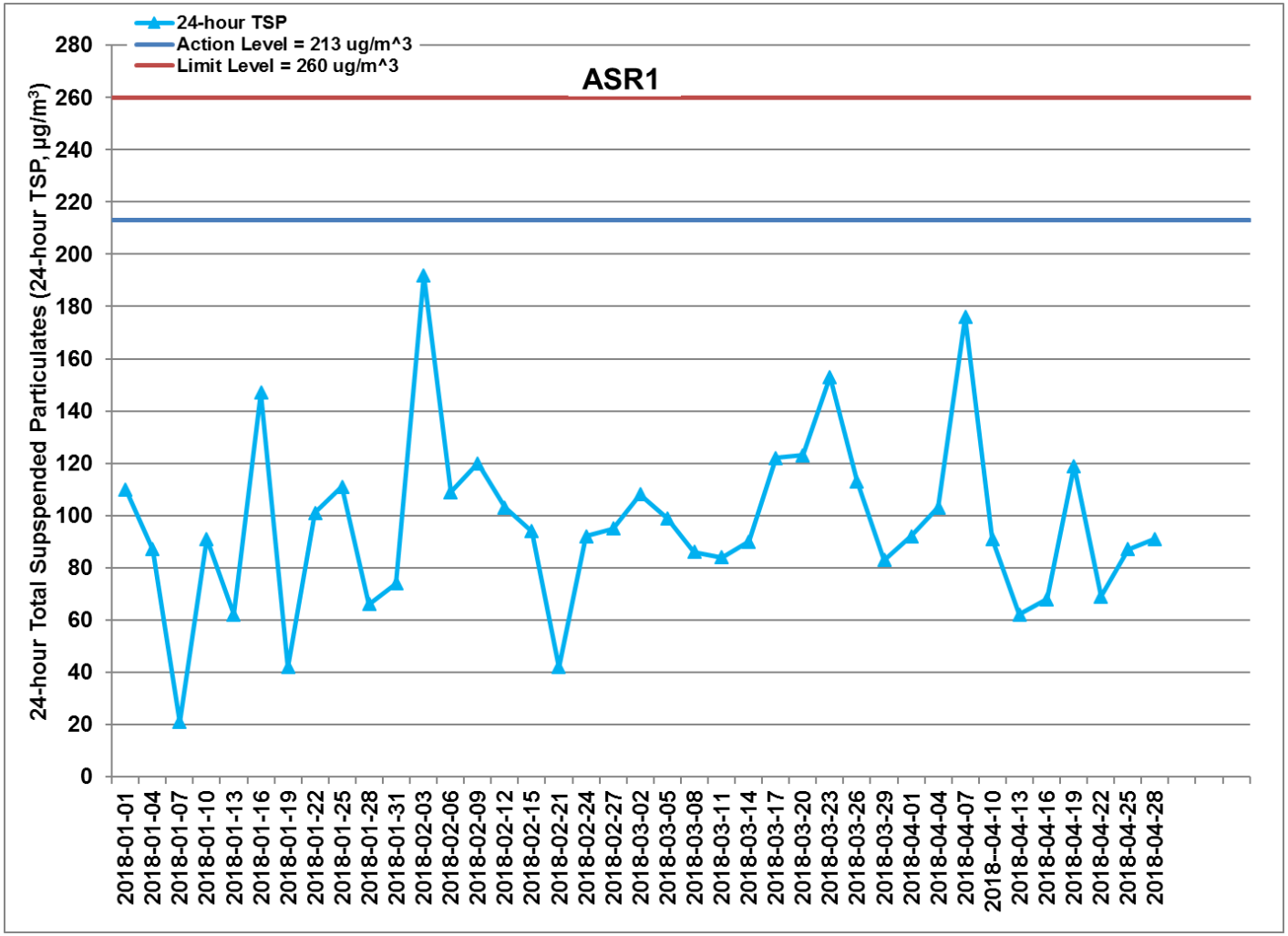


Figure G.6 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

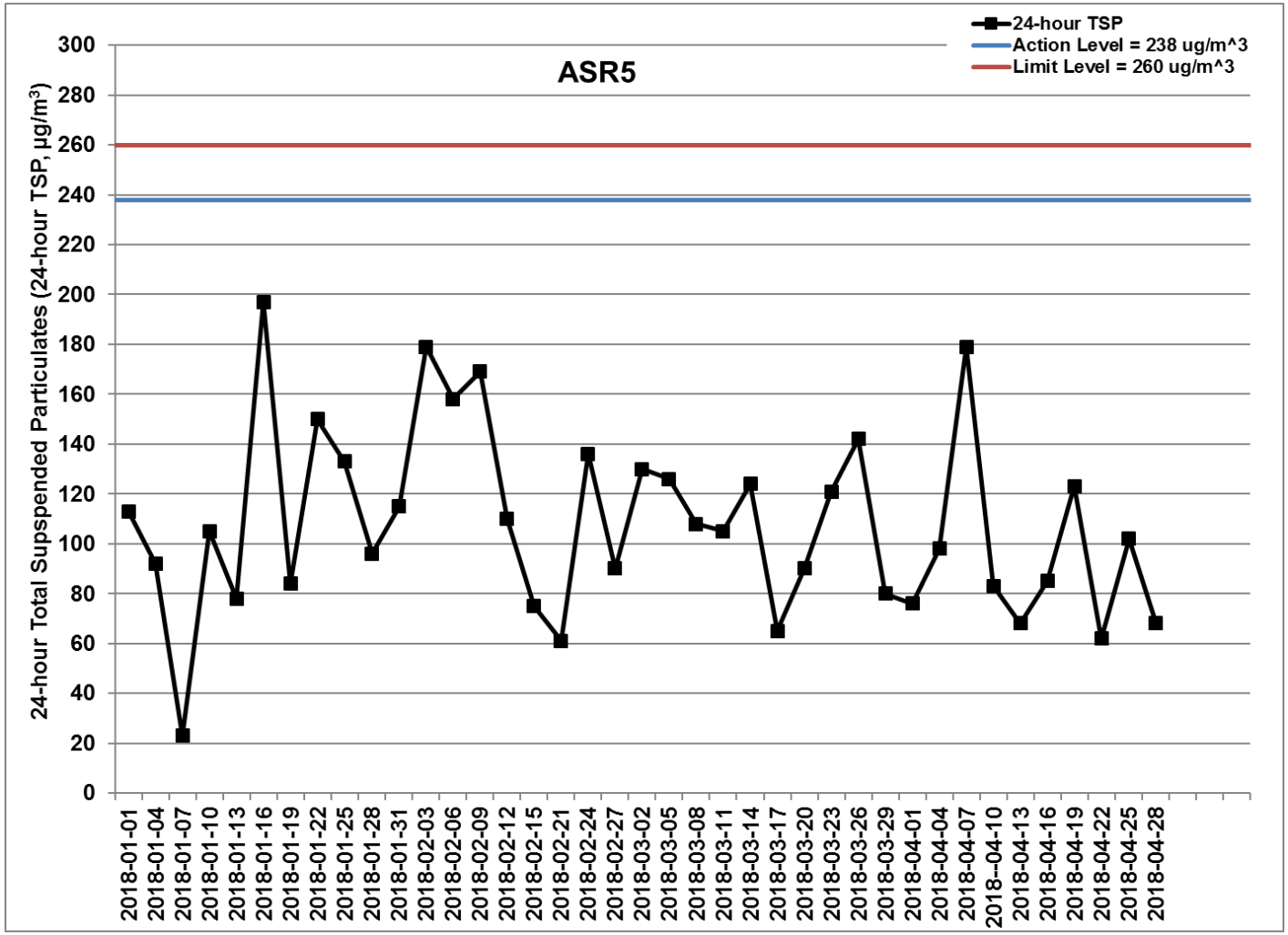


Figure G.7 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

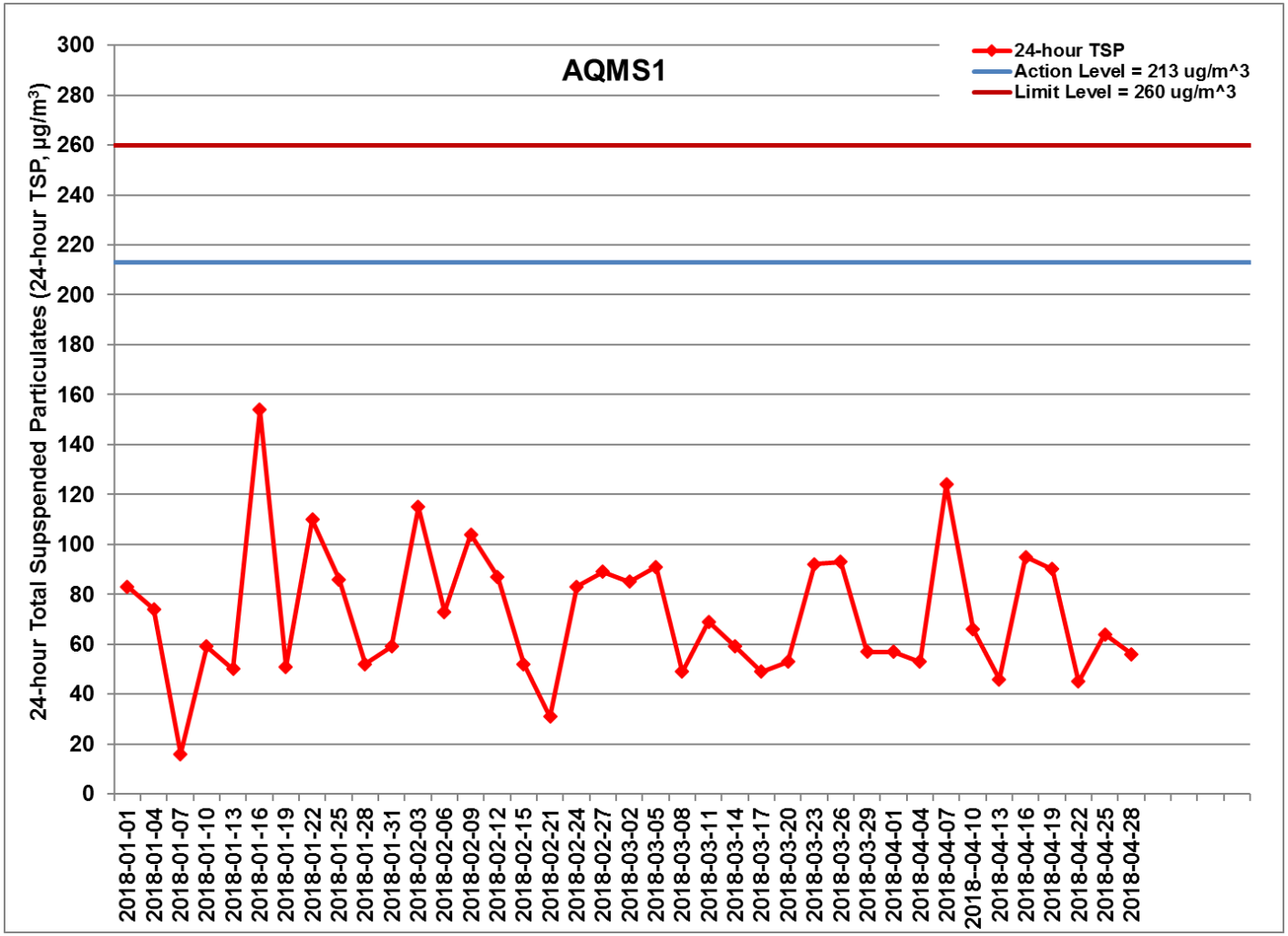


Figure G.8 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

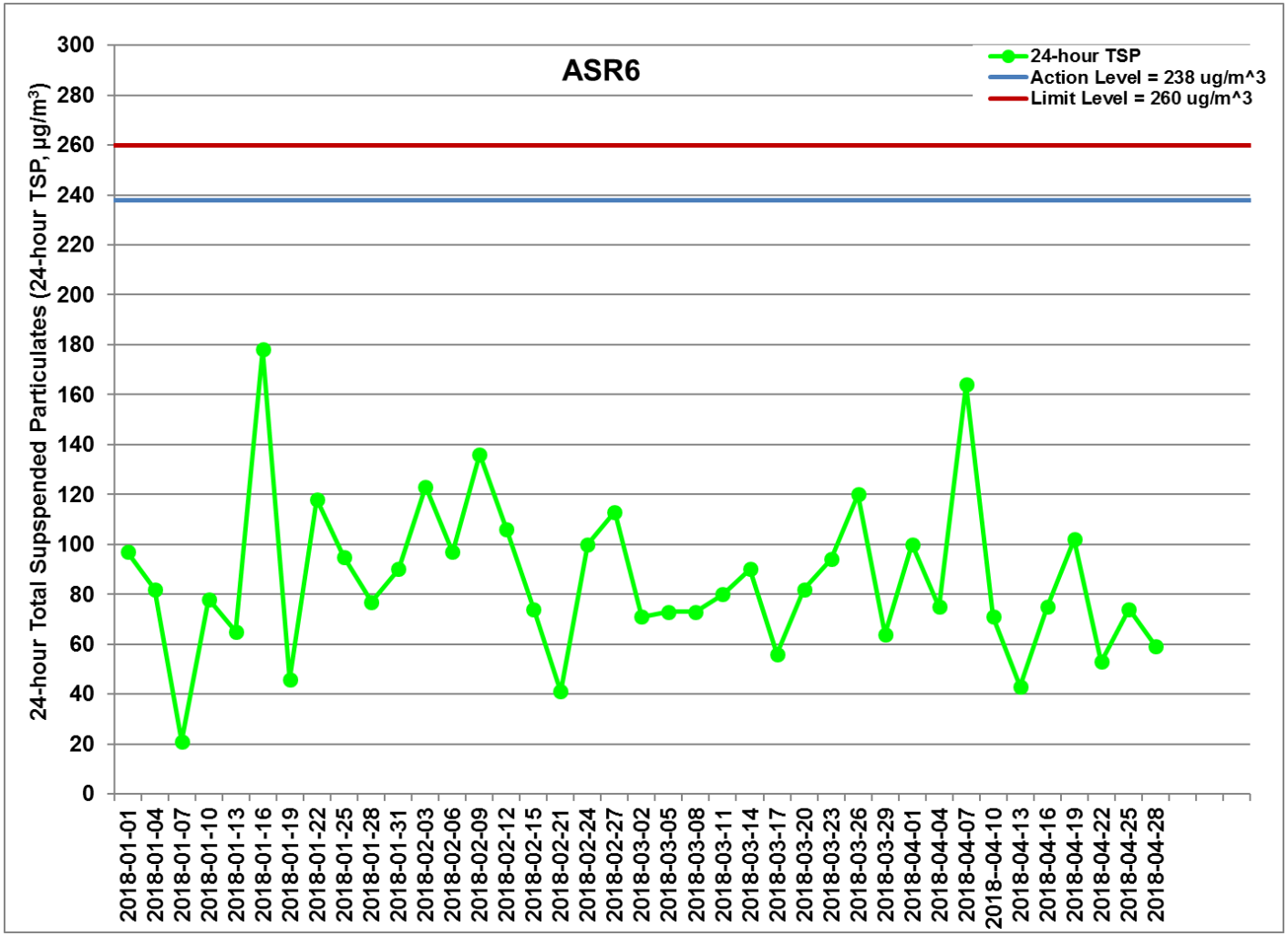


Figure G.9 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

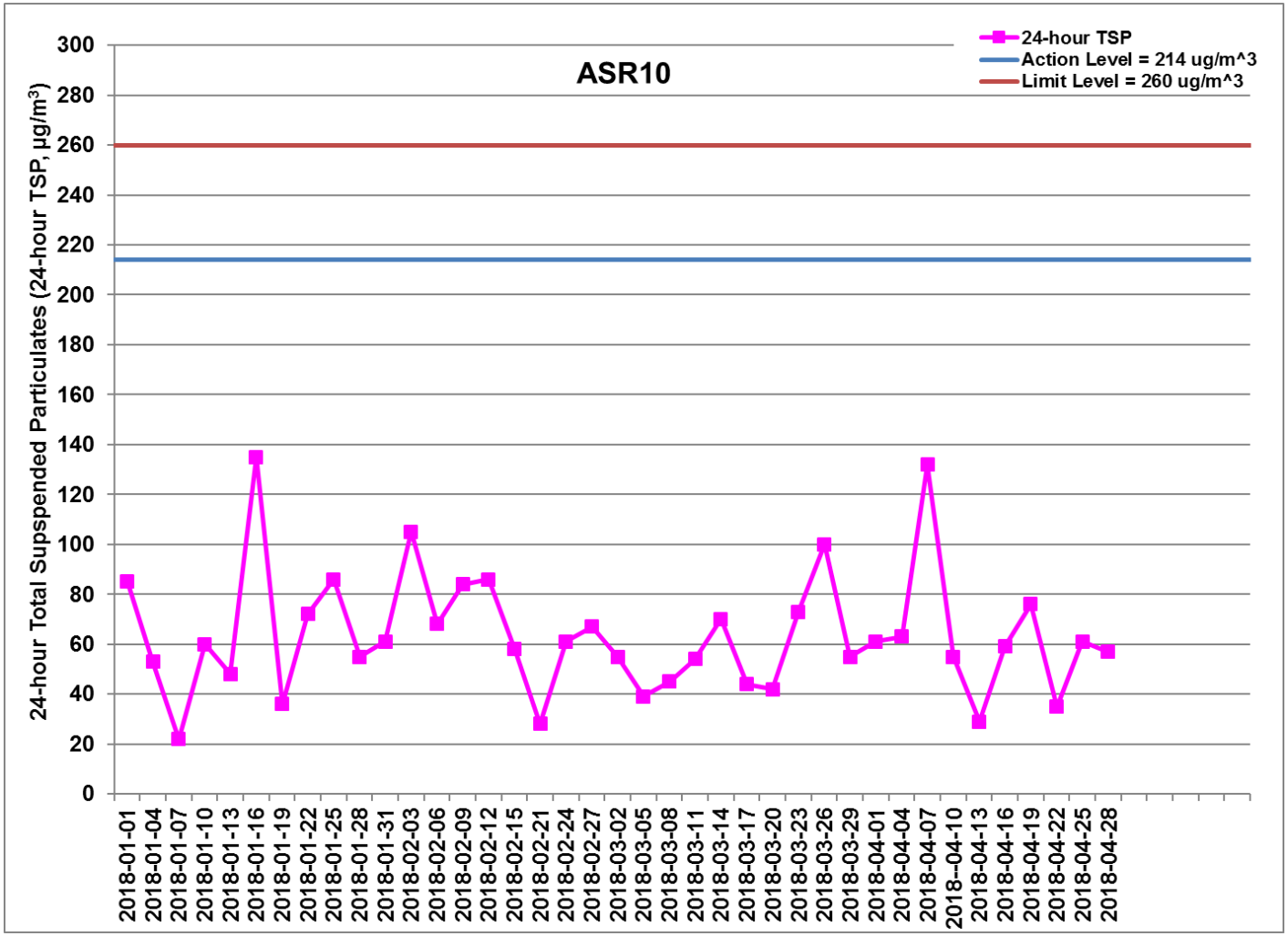


Figure G.10 Impact Monitoring – 24-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 January 2018 and 30 April 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/1/2018 – 30/4/2018)

Ref: 0212330_Impact AQM graphs_April 2018_REV a.xlsx

ERM

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-01	AQMS1	Sunny	09:03	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2018-04-01	AQMS1	Sunny	10:05	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-04-01	AQMS1	Sunny	11:07	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR1	Sunny	08:52	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR1	Sunny	09:54	1-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR1	Sunny	10:56	1-hour TSP	200	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR10	Sunny	08:20	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR10	Sunny	09:22	1-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR10	Sunny	10:24	1-hour TSP	164	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR5	Sunny	08:40	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR5	Sunny	09:42	1-hour TSP	130	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR5	Sunny	10:44	1-hour TSP	305	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR6	Sunny	08:30	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR6	Sunny	09:32	1-hour TSP	101	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR6	Sunny	10:34	1-hour TSP	169	ug/m3
TMCLKL	HY/2012/08	2018-04-04	AQMS1	Sunny	13:46	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2018-04-04	AQMS1	Sunny	14:48	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2018-04-04	AQMS1	Sunny	15:50	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR1	Sunny	13:35	1-hour TSP	86	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR1	Sunny	14:37	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR1	Sunny	15:39	1-hour TSP	51	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR10	Sunny	13:01	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR10	Sunny	14:03	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR10	Sunny	15:05	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR5	Sunny	13:23	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR5	Sunny	14:25	1-hour TSP	144	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR5	Sunny	15:27	1-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR6	Sunny	13:12	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR6	Sunny	14:14	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR6	Sunny	15:16	1-hour TSP	59	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-07	AQMS1	Sunny	14:09	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2018-04-07	AQMS1	Sunny	15:11	1-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2018-04-07	AQMS1	Sunny	16:13	1-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR1	Sunny	13:58	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR1	Sunny	15:00	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR1	Sunny	16:02	1-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR10	Sunny	13:26	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR10	Sunny	14:28	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR10	Sunny	15:30	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR5	Sunny	13:47	1-hour TSP	234	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR5	Sunny	14:49	1-hour TSP	168	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR5	Sunny	15:51	1-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR6	Sunny	13:36	1-hour TSP	173	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR6	Sunny	14:40	1-hour TSP	116	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR6	Sunny	15:42	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018--04-10	AQMS1	Sunny	14:01	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018--04-10	AQMS1	Sunny	15:03	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018--04-10	AQMS1	Sunny	16:05	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR1	Sunny	13:50	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR1	Sunny	14:52	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR1	Sunny	15:54	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR10	Sunny	13:17	1-hour TSP	52	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR10	Sunny	14:19	1-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR10	Sunny	15:21	1-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR5	Sunny	13:38	1-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR5	Sunny	14:40	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR5	Sunny	15:42	1-hour TSP	146	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR6	Sunny	13:28	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR6	Sunny	14:30	1-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR6	Sunny	15:32	1-hour TSP	83	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-13	AQMS1	Sunny	13:59	1-hour TSP	121	ug/m3
TMCLKL	HY/2012/08	2018-04-13	AQMS1	Sunny	15:01	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018-04-13	AQMS1	Sunny	16:03	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR1	Sunny	13:48	1-hour TSP	138	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR1	Sunny	14:50	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR1	Sunny	15:52	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR10	Sunny	13:14	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR10	Sunny	14:16	1-hour TSP	47	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR10	Sunny	15:18	1-hour TSP	41	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR5	Sunny	13:36	1-hour TSP	134	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR5	Sunny	14:38	1-hour TSP	389	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR5	Sunny	15:40	1-hour TSP	111	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR6	Sunny	13:25	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR6	Sunny	14:27	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR6	Sunny	15:29	1-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2018-04-16	AQMS1	Sunny	13:42	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2018-04-16	AQMS1	Sunny	14:44	1-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	2018-04-16	AQMS1	Sunny	15:46	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR1	Sunny	13:31	1-hour TSP	121	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR1	Sunny	14:33	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR1	Sunny	15:35	1-hour TSP	148	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR10	Sunny	13:00	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR10	Sunny	14:02	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR10	Sunny	15:04	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR5	Sunny	13:20	1-hour TSP	229	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR5	Sunny	14:22	1-hour TSP	155	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR5	Sunny	15:24	1-hour TSP	180	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR6	Sunny	13:10	1-hour TSP	137	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR6	Sunny	14:12	1-hour TSP	130	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR6	Sunny	15:14	1-hour TSP	134	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-19	AQMS1	Sunny	13:44	1-hour TSP	155	ug/m3
TMCLKL	HY/2012/08	2018-04-19	AQMS1	Sunny	14:46	1-hour TSP	197	ug/m3
TMCLKL	HY/2012/08	2018-04-19	AQMS1	Sunny	15:48	1-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR1	Sunny	13:32	1-hour TSP	234	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR1	Sunny	14:34	1-hour TSP	240	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR1	Sunny	15:36	1-hour TSP	210	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR10	Sunny	13:00	1-hour TSP	122	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR10	Sunny	14:02	1-hour TSP	119	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR10	Sunny	15:04	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR5	Sunny	13:21	1-hour TSP	247	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR5	Sunny	14:23	1-hour TSP	220	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR5	Sunny	15:25	1-hour TSP	157	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR6	Sunny	13:10	1-hour TSP	179	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR6	Sunny	14:12	1-hour TSP	171	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR6	Sunny	15:14	1-hour TSP	158	ug/m3
TMCLKL	HY/2012/08	2018-04-22	AQMS1	Sunny	08:53	1-hour TSP	111	ug/m3
TMCLKL	HY/2012/08	2018-04-22	AQMS1	Sunny	09:55	1-hour TSP	156	ug/m3
TMCLKL	HY/2012/08	2018-04-22	AQMS1	Sunny	10:57	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR1	Sunny	08:42	1-hour TSP	165	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR1	Sunny	09:44	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR1	Sunny	10:46	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR10	Sunny	08:09	1-hour TSP	88	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR10	Sunny	09:11	1-hour TSP	111	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR10	Sunny	10:13	1-hour TSP	49	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR5	Sunny	08:30	1-hour TSP	157	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR5	Sunny	09:32	1-hour TSP	229	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR5	Sunny	10:34	1-hour TSP	192	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR6	Sunny	08:20	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR6	Sunny	09:22	1-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR6	Sunny	10:24	1-hour TSP	116	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-25	AQMS1	Sunny	08:55	1-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2018-04-25	AQMS1	Sunny	09:57	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018-04-25	AQMS1	Sunny	10:59	1-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR1	Sunny	08:44	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR1	Sunny	09:46	1-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR1	Sunny	10:48	1-hour TSP	214	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR10	Sunny	08:10	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR10	Sunny	09:12	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR10	Sunny	10:14	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR5	Sunny	08:31	1-hour TSP	220	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR5	Sunny	09:33	1-hour TSP	156	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR5	Sunny	10:35	1-hour TSP	124	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR6	Sunny	08:20	1-hour TSP	154	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR6	Sunny	09:22	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR6	Sunny	10:24	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-04-28	AQMS1	Sunny	14:10	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2018-04-28	AQMS1	Sunny	15:12	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	2018-04-28	AQMS1	Sunny	16:14	1-hour TSP	125	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR1	Sunny	13:58	1-hour TSP	310	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR1	Sunny	15:00	1-hour TSP	159	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR1	Sunny	16:02	1-hour TSP	186	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR10	Sunny	13:26	1-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR10	Sunny	14:28	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR10	Sunny	15:30	1-hour TSP	77	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR5	Sunny	13:47	1-hour TSP	152	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR5	Sunny	14:49	1-hour TSP	187	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR5	Sunny	15:51	1-hour TSP	119	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR6	Sunny	13:37	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR6	Sunny	14:39	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR6	Sunny	15:41	1-hour TSP	100	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-01	AQMS1	Sunny	12:09	24-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR1	Sunny	11:58	24-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR10	Sunny	11:26	24-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR5	Sunny	11:46	24-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2018-04-01	ASR6	Sunny	11:36	24-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2018-04-04	AQMS1	Sunny	16:52	24-hour TSP	53	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR1	Sunny	16:41	24-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR10	Sunny	16:07	24-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR5	Sunny	16:29	24-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2018-04-04	ASR6	Sunny	16:18	24-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2018-04-07	AQMS1	Cloudy	17:15	24-hour TSP	124	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR1	Cloudy	17:04	24-hour TSP	176	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR10	Cloudy	16:32	24-hour TSP	132	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR5	Cloudy	16:53	24-hour TSP	179	ug/m3
TMCLKL	HY/2012/08	2018-04-07	ASR6	Cloudy	16:44	24-hour TSP	164	ug/m3
TMCLKL	HY/2012/08	2018--04-10	AQMS1	Sunny	17:07	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR1	Sunny	16:56	24-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR10	Sunny	16:23	24-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR5	Sunny	16:14	24-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2018--04-10	ASR6	Sunny	16:34	24-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2018-04-13	AQMS1	Sunny	17:05	24-hour TSP	46	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR1	Sunny	16:54	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR10	Sunny	15:18	24-hour TSP	29	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR5	Sunny	16:42	24-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2018-04-13	ASR6	Sunny	16:31	24-hour TSP	43	ug/m3
TMCLKL	HY/2012/08	2018-04-16	AQMS1	Sunny	16:48	24-hour TSP	95	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR1	Sunny	16:37	24-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR10	Sunny	16:16	24-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR5	Sunny	16:26	24-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-04-16	ASR6	Sunny	16:16	24-hour TSP	75	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-04-19	AQMS1	Sunny	16:50	24-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR1	Sunny	16:38	24-hour TSP	119	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR10	Sunny	16:06	24-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR5	Sunny	16:27	24-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	2018-04-19	ASR6	Sunny	16:16	24-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2018-04-22	AQMS1	Sunny	11:59	24-hour TSP	45	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR1	Sunny	11:48	24-hour TSP	69	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR10	Sunny	11:15	24-hour TSP	35	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR5	Sunny	11:36	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2018-04-22	ASR6	Sunny	11:26	24-hour TSP	53	ug/m3
TMCLKL	HY/2012/08	2018-04-25	AQMS1	Sunny	12:01	24-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR1	Sunny	11:50	24-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR10	Sunny	11:16	24-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR5	Sunny	11:37	24-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2018-04-25	ASR6	Sunny	11:26	24-hour TSP	74	ug/m3
TMCLKL	HY/2012/08	2018-04-28	AQMS1	Sunny	17:16	24-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR1	Sunny	17:04	24-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR10	Sunny	16:32	24-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR5	Sunny	16:53	24-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2018-04-28	ASR6	Sunny	16:43	24-hour TSP	59	ug/m3

Appendix H

Meteorological Data

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)**
18/04/01	0:00	2.2	91
18/04/01	1:00	0.9	56
18/04/01	2:00	0.9	75
18/04/01	3:00	0.9	64
18/04/01	4:00	0.4	37
18/04/01	5:00	0.4	36
18/04/01	6:00	0.4	24
18/04/01	7:00	0.4	5
18/04/01	8:00	1.3	89
18/04/01	9:00	1.3	156
18/04/01	10:00	1.3	133
18/04/01	11:00	1.3	129
18/04/01	12:00	1.8	227
18/04/01	13:00	1.8	215
18/04/01	14:00	1.3	256
18/04/01	15:00	0.9	192
18/04/01	16:00	1.3	87
18/04/01	17:00	1.3	89
18/04/01	18:00	1.3	36
18/04/01	19:00	1.3	74
18/04/01	20:00	1.3	74
18/04/01	21:00	0.9	59
18/04/01	22:00	0.9	67
18/04/02	23:00	0.9	77
18/04/02	0:00	0.9	62
18/04/02	1:00	0.4	55
18/04/02	2:00	0.4	78
18/04/02	3:00	0.4	77
18/04/02	4:00	0	-
18/04/02	5:00	0.1	70
18/04/02	6:00	0.1	79
18/04/02	7:00	0.9	69
18/04/02	8:00	0.9	79
18/04/02	9:00	1.3	74
18/04/02	10:00	1.8	112
18/04/02	11:00	1.3	124
18/04/02	12:00	1.3	116
18/04/02	13:00	2.2	231
18/04/02	14:00	2.7	215
18/04/02	15:00	2.2	216
18/04/02	16:00	1.3	222
18/04/02	17:00	1.8	99
18/04/02	18:00	1.8	101
18/04/02	19:00	1.3	91
18/04/02	20:00	0.9	77
18/04/02	21:00	0.9	62
18/04/02	22:00	0.9	61
18/04/04	23:00	0.9	96
18/04/04	0:00	0.9	79
18/04/04	1:00	0	-
18/04/04	2:00	0	-
18/04/04	3:00	0.1	65
18/04/04	4:00	0.1	66
18/04/04	5:00	0	-
18/04/04	6:00	0.1	25

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)**
18/04/04	7:00	0.1	63
18/04/04	8:00	0.9	67
18/04/04	9:00	1.3	68
18/04/04	10:00	1.3	62
18/04/04	11:00	2.2	122
18/04/04	12:00	1.8	202
18/04/04	13:00	1.3	253
18/04/04	14:00	1.3	105
18/04/04	15:00	2.2	113
18/04/04	16:00	3.1	138
18/04/04	17:00	2.7	132
18/04/04	18:00	2.2	89
18/04/04	19:00	3.6	99
18/04/04	20:00	2.7	94
18/04/04	21:00	2.7	96
18/04/04	22:00	2.2	85
18/04/05	23:00	1.3	93
18/04/05	0:00	0.9	91
18/04/05	1:00	0.4	77
18/04/05	2:00	0	-
18/04/05	3:00	0	-
18/04/05	4:00	0.1	81
18/04/05	5:00	0	-
18/04/05	6:00	0.1	92
18/04/05	7:00	0.4	68
18/04/05	8:00	1.3	67
18/04/05	9:00	2.7	99
18/04/05	10:00	2.7	87
18/04/05	11:00	3.1	88
18/04/05	12:00	3.1	90
18/04/05	13:00	3.1	116
18/04/05	14:00	4	135
18/04/05	15:00	3.6	126
18/04/05	16:00	3.6	145
18/04/05	17:00	2.2	88
18/04/05	18:00	2.2	96
18/04/05	19:00	1.8	93
18/04/05	20:00	1.8	101
18/04/05	21:00	1.3	46
18/04/05	22:00	1.3	36
18/04/06	23:00	1.3	321
18/04/07	0:00	1.3	5
18/04/07	1:00	1.8	34
18/04/07	2:00	3.6	354
18/04/07	3:00	6.7	14
18/04/07	4:00	5.8	34
18/04/07	5:00	5.4	13
18/04/07	6:00	2.7	20
18/04/07	7:00	2.7	23
18/04/07	8:00	2.2	34
18/04/07	9:00	2.2	26
18/04/07	10:00	2.7	26
18/04/07	11:00	3.1	21
18/04/07	12:00	3.1	29
18/04/07	13:00	3.1	30

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)**
18/04/07	14:00	1.3	18
18/04/07	15:00	1.8	30
18/04/07	16:00	1.8	17
18/04/07	17:00	1.8	43
18/04/07	18:00	1.8	31
18/04/07	19:00	1.8	349
18/04/07	20:00	1.3	351
18/04/07	21:00	0.9	348
18/04/07	22:00	0.9	3
18/04/07	23:00	0.9	301
18/04/08	0:00	0.4	11
18/04/08	1:00	0.9	39
18/04/08	2:00	0.9	62
18/04/08	3:00	1.8	17
18/04/08	4:00	2.7	13
18/04/08	5:00	2.2	13
18/04/08	6:00	1.8	34
18/04/08	7:00	2.2	29
18/04/08	8:00	2.2	20
18/04/08	9:00	1.8	22
18/04/08	10:00	1.8	22
18/04/08	11:00	1.3	174
18/04/08	12:00	0.9	120
18/04/08	13:00	1.3	119
18/04/08	14:00	1.3	260
18/04/08	15:00	1.3	256
18/04/08	16:00	1.8	237
18/04/08	17:00	1.3	226
18/04/08	18:00	2.2	118
18/04/08	19:00	2.2	140
18/04/08	20:00	1.3	127
18/04/08	21:00	0.4	71
18/04/08	22:00	0.4	68
18/04/08	23:00	0.4	78
18/04/10	0:00	1.8	82
18/04/10	1:00	1.8	87
18/04/10	2:00	1.8	99
18/04/10	3:00	1.3	87
18/04/10	4:00	0.9	100
18/04/10	5:00	0.4	73
18/04/10	6:00	0.4	70
18/04/10	7:00	0.4	45
18/04/10	8:00	0.9	84
18/04/10	9:00	1.3	74
18/04/10	10:00	1.3	91
18/04/10	11:00	1.8	87
18/04/10	12:00	2.2	113
18/04/10	13:00	1.8	119
18/04/10	14:00	1.8	221
18/04/10	15:00	1.3	117
18/04/10	16:00	1.3	134
18/04/10	17:00	3.1	130
18/04/10	18:00	2.7	81
18/04/10	19:00	2.7	80
18/04/10	20:00	1.8	79

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)**
18/04/10	21:00	2.2	84
18/04/10	22:00	1.8	91
18/04/10	23:00	1.3	81
18/04/11	0:00	1.3	96
18/04/11	1:00	0.9	47
18/04/11	2:00	0.9	44
18/04/11	3:00	0.9	35
18/04/11	4:00	0.9	41
18/04/11	5:00	0.9	46
18/04/11	6:00	0.4	39
18/04/11	7:00	0.4	24
18/04/11	8:00	0.9	84
18/04/11	9:00	1.3	110
18/04/11	10:00	1.3	103
18/04/11	11:00	1.8	97
18/04/11	12:00	1.8	109
18/04/11	13:00	1.3	168
18/04/11	14:00	1.3	114
18/04/11	15:00	1.3	227
18/04/11	16:00	1.3	106
18/04/11	17:00	2.2	101
18/04/11	18:00	2.2	89
18/04/11	19:00	1.8	98
18/04/11	20:00	2.2	87
18/04/11	21:00	2.2	91
18/04/11	22:00	1.3	73
18/04/11	23:00	1.3	92
18/04/13	0:00	2.2	94
18/04/13	1:00	2.2	86
18/04/13	2:00	1.8	88
18/04/13	3:00	1.3	78
18/04/13	4:00	1.8	100
18/04/13	5:00	2.7	90
18/04/13	6:00	2.7	93
18/04/13	7:00	2.7	89
18/04/13	8:00	2.2	92
18/04/13	9:00	3.1	84
18/04/13	10:00	3.1	88
18/04/13	11:00	3.1	84
18/04/13	12:00	3.6	88
18/04/13	13:00	3.6	108
18/04/13	14:00	3.6	135
18/04/13	15:00	3.6	135
18/04/13	16:00	4	130
18/04/13	17:00	3.1	124
18/04/13	18:00	2.7	143
18/04/13	19:00	2.2	123
18/04/13	20:00	2.2	81
18/04/13	21:00	1.8	100
18/04/13	22:00	1.8	87
18/04/13	23:00	0.9	49
18/04/14	0:00	0.9	55
18/04/14	1:00	0.9	19
18/04/14	2:00	0.4	70
18/04/14	3:00	0.9	61

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)**
18/04/14	4:00	0.4	36
18/04/14	5:00	0.4	51
18/04/14	6:00	0.4	35
18/04/14	7:00	0.4	2
18/04/14	8:00	1.3	87
18/04/14	9:00	1.3	93
18/04/14	10:00	1.3	82
18/04/14	11:00	2.2	104
18/04/14	12:00	1.8	97
18/04/14	13:00	2.2	126
18/04/14	14:00	2.7	138
18/04/14	15:00	1.8	131
18/04/14	16:00	0.9	130
18/04/14	17:00	0.9	115
18/04/14	18:00	0.9	95
18/04/14	19:00	0.9	68
18/04/14	20:00	1.3	65
18/04/14	21:00	0.9	34
18/04/14	22:00	0.9	76
18/04/14	23:00	1.3	285
18/04/16	0:00	1.8	348
18/04/16	1:00	2.2	31
18/04/16	2:00	2.2	23
18/04/16	3:00	2.2	28
18/04/16	4:00	2.7	32
18/04/16	5:00	2.2	14
18/04/16	6:00	0.9	357
18/04/16	7:00	1.3	21
18/04/16	8:00	1.8	30
18/04/16	9:00	1.8	11
18/04/16	10:00	2.2	24
18/04/16	11:00	1.8	16
18/04/16	12:00	1.8	49
18/04/16	13:00	1.8	35
18/04/16	14:00	2.2	12
18/04/16	15:00	1.8	29
18/04/16	16:00	0.9	305
18/04/16	17:00	1.3	352
18/04/16	18:00	1.3	3
18/04/16	19:00	1.3	48
18/04/16	20:00	1.3	18
18/04/16	21:00	1.3	20
18/04/16	22:00	2.7	26
18/04/16	23:00	2.2	15
18/04/17	0:00	1.8	15
18/04/17	1:00	1.8	31
18/04/17	2:00	0.9	33
18/04/17	3:00	1.3	31
18/04/17	4:00	1.3	28
18/04/17	5:00	2.2	26
18/04/17	6:00	2.2	15
18/04/17	7:00	1.8	34
18/04/17	8:00	1.8	29
18/04/17	9:00	1.3	33
18/04/17	10:00	0.4	55
18/04/17	11:00	0.9	105

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)**
18/04/17	12:00	1.3	111
18/04/17	13:00	2.2	134
18/04/17	14:00	1.3	235
18/04/17	15:00	1.3	231
18/04/17	16:00	1.3	229
18/04/17	17:00	0.9	263
18/04/17	18:00	0.4	229
18/04/17	19:00	0.4	122
18/04/17	20:00	1.3	119
18/04/17	21:00	1.8	93
18/04/17	22:00	2.7	96
18/04/17	23:00	1.3	34
18/04/19	0:00	0.9	43
18/04/19	1:00	0.9	46
18/04/19	2:00	0.9	35
18/04/19	3:00	0.9	32
18/04/19	4:00	0.9	33
18/04/19	5:00	0.9	47
18/04/19	6:00	0.9	41
18/04/19	7:00	1.3	79
18/04/19	8:00	1.3	45
18/04/19	9:00	3.1	86
18/04/19	10:00	3.1	103
18/04/19	11:00	2.7	87
18/04/19	12:00	3.1	87
18/04/19	13:00	3.1	114
18/04/19	14:00	3.1	128
18/04/19	15:00	3.6	80
18/04/19	16:00	3.1	96
18/04/19	17:00	2.7	91
18/04/19	18:00	1.8	88
18/04/19	19:00	1.8	87
18/04/19	20:00	2.7	95
18/04/19	21:00	2.7	86
18/04/19	22:00	2.7	81
18/04/19	23:00	3.1	97
18/04/20	0:00	3.6	95
18/04/20	1:00	2.7	80
18/04/20	2:00	0.9	37
18/04/20	3:00	0.9	72
18/04/20	4:00	1.3	64
18/04/20	5:00	1.8	93
18/04/20	6:00	1.3	93
18/04/20	7:00	0.9	62
18/04/20	8:00	0.9	66
18/04/20	9:00	2.7	90
18/04/20	10:00	3.6	86
18/04/20	11:00	4.9	85
18/04/20	12:00	4.9	85
18/04/20	13:00	4	83
18/04/20	14:00	3.6	83
18/04/20	15:00	4.5	87
18/04/20	16:00	4.9	80
18/04/20	17:00	4	100
18/04/20	18:00	4.5	100
18/04/20	19:00	4.5	86
18/04/20	20:00	4.5	92

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)**
18/04/20	21:00	4.5	81
18/04/20	22:00	4.9	82
18/04/20	23:00	5.4	84
18/04/22	0:00	2.7	94
18/04/22	1:00	2.7	98
18/04/22	2:00	2.7	89
18/04/22	3:00	2.2	94
18/04/22	4:00	1.8	92
18/04/22	5:00	1.8	83
18/04/22	6:00	1.8	92
18/04/22	7:00	1.8	88
18/04/22	8:00	1.8	99
18/04/22	9:00	1.3	101
18/04/22	10:00	1.8	95
18/04/22	11:00	1.8	118
18/04/22	12:00	3.1	96
18/04/22	13:00	3.6	82
18/04/22	14:00	3.1	115
18/04/22	15:00	2.7	105
18/04/22	16:00	2.7	132
18/04/22	17:00	2.2	86
18/04/22	18:00	1.8	84
18/04/22	19:00	2.2	90
18/04/22	20:00	2.7	80
18/04/22	21:00	1.3	95
18/04/22	22:00	1.3	98
18/04/22	23:00	1.8	98
18/04/23	0:00	1.8	86
18/04/23	1:00	2.2	98
18/04/23	2:00	2.2	79
18/04/23	3:00	2.2	87
18/04/23	4:00	1.8	82
18/04/23	5:00	0.9	79
18/04/23	6:00	0.4	35
18/04/23	7:00	0.4	75
18/04/23	8:00	1.3	92
18/04/23	9:00	1.3	99
18/04/23	10:00	1.8	131
18/04/23	11:00	1.3	98
18/04/23	12:00	1.3	128
18/04/23	13:00	2.2	219
18/04/23	14:00	2.2	86
18/04/23	15:00	2.7	88
18/04/23	16:00	1.8	123
18/04/23	17:00	1.3	142
18/04/23	18:00	1.3	59
18/04/23	19:00	1.8	91
18/04/23	20:00	1.8	83
18/04/23	21:00	1.8	93
18/04/23	22:00	1.8	92
18/04/23	23:00	1.8	97
18/04/25	0:00	0.4	306
18/04/25	1:00	0.9	294
18/04/25	2:00	1.3	30
18/04/25	3:00	2.2	30
18/04/25	4:00	2.2	27
18/04/25	5:00	2.7	11

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)**
18/04/25	6:00	2.2	11
18/04/25	7:00	1.8	11
18/04/25	8:00	0.9	18
18/04/25	9:00	0.9	91
18/04/25	10:00	0.9	73
18/04/25	11:00	0.9	87
18/04/25	12:00	0.4	85
18/04/25	13:00	1.8	87
18/04/25	14:00	2.2	97
18/04/25	15:00	1.3	89
18/04/25	16:00	2.2	85
18/04/25	17:00	2.2	88
18/04/25	18:00	0.9	359
18/04/25	19:00	0.9	72
18/04/25	20:00	0.9	92
18/04/25	21:00	1.3	91
18/04/25	22:00	1.3	94
18/04/25	23:00	0.9	99
18/04/26	0:00	0.4	99
18/04/26	1:00	0.4	83
18/04/26	2:00	0.9	84
18/04/26	3:00	0.9	38
18/04/26	4:00	0.9	42
18/04/26	5:00	0.9	87
18/04/26	6:00	0.9	70
18/04/26	7:00	2.2	101
18/04/26	8:00	2.2	84
18/04/26	9:00	2.7	97
18/04/26	10:00	2.2	92
18/04/26	11:00	2.2	123
18/04/26	12:00	2.7	99
18/04/26	13:00	2.7	121
18/04/26	14:00	2.2	93
18/04/26	15:00	1.8	89
18/04/26	16:00	1.8	132
18/04/26	17:00	2.2	86
18/04/26	18:00	2.7	92
18/04/26	19:00	3.1	87
18/04/26	20:00	2.2	95
18/04/26	21:00	1.3	84
18/04/26	22:00	1.8	97
18/04/26	23:00	1.3	93
18/04/28	0:00	0.9	74
18/04/28	1:00	1.3	91
18/04/28	2:00	0.9	96
18/04/28	3:00	2.2	98
18/04/28	4:00	2.7	98
18/04/28	5:00	3.1	92
18/04/28	6:00	2.7	98
18/04/28	7:00	2.7	79
18/04/28	8:00	2.7	87
18/04/28	9:00	3.1	81
18/04/28	10:00	4.5	100
18/04/28	11:00	4.5	96
18/04/28	12:00	3.6	94
18/04/28	13:00	2.7	125
18/04/28	14:00	1.8	103

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)**
18/04/28	15:00	2.2	116
18/04/28	16:00	3.1	104
18/04/28	17:00	3.6	113
18/04/28	18:00	3.1	109
18/04/28	19:00	3.1	121
18/04/28	20:00	3.1	116
18/04/28	21:00	3.1	100
18/04/28	22:00	3.6	97
18/04/28	23:00	3.1	95
18/04/29	0:00	4	81
18/04/29	1:00	3.6	89
18/04/29	2:00	3.1	108
18/04/29	3:00	2.2	120
18/04/29	4:00	1.8	97
18/04/29	5:00	1.8	95
18/04/29	6:00	1.3	97
18/04/29	7:00	2.2	79
18/04/29	8:00	2.7	90
18/04/29	9:00	2.7	85
18/04/29	10:00	3.1	110
18/04/29	11:00	3.1	99
18/04/29	12:00	3.1	120
18/04/29	13:00	3.1	102
18/04/29	14:00	2.7	123
18/04/29	15:00	1.8	107
18/04/29	16:00	2.2	91
18/04/29	17:00	3.1	79
18/04/29	18:00	3.1	94
18/04/29	19:00	2.7	87
18/04/29	20:00	1.8	81
18/04/29	21:00	2.2	96
18/04/29	22:00	2.2	86
18/04/29	23:00	2.2	84

Appendix I

Impact Dolphin Monitoring Survey

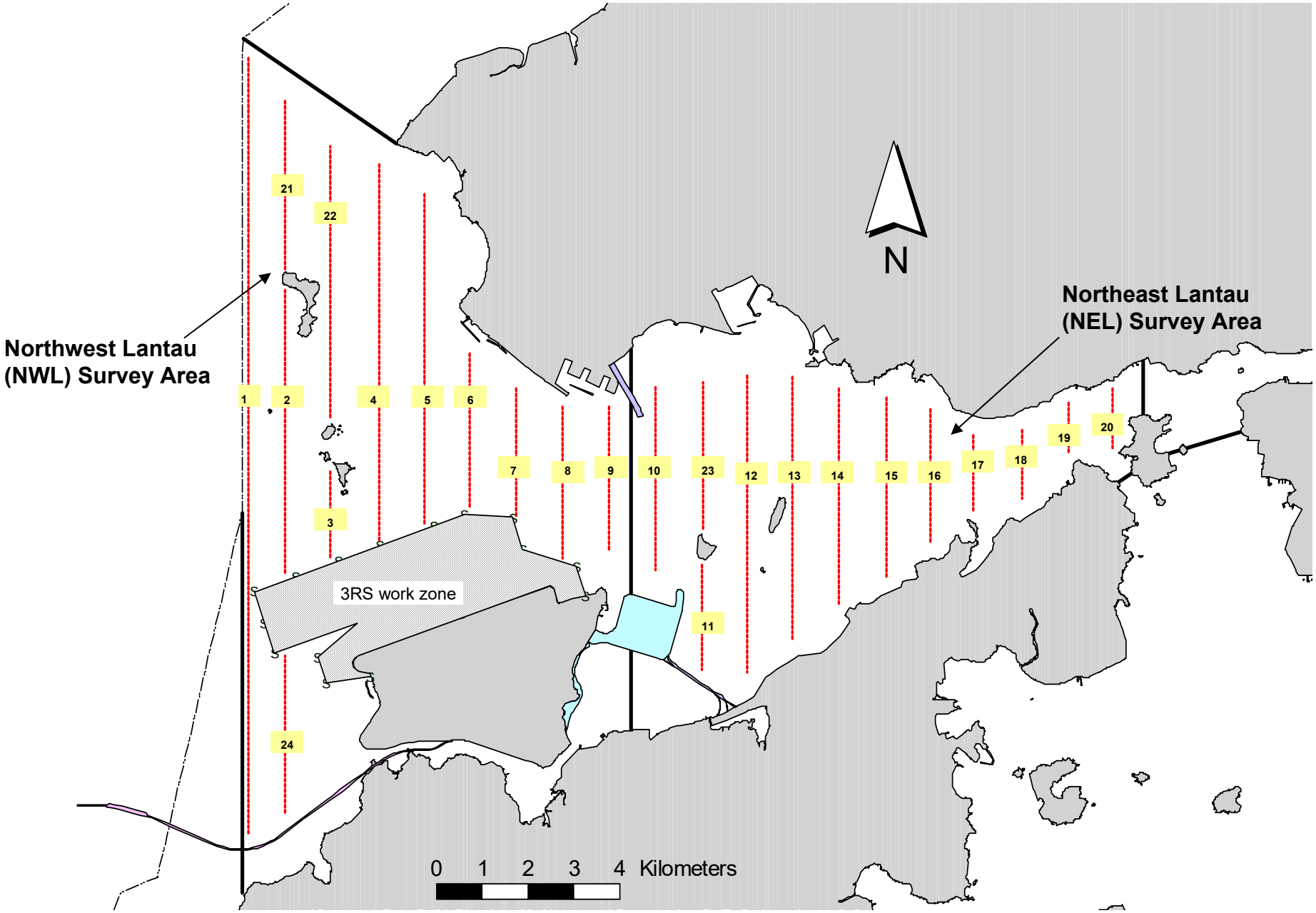


Figure 1. Transect Line Layout in Northwest and Northeast Lantau Survey Areas

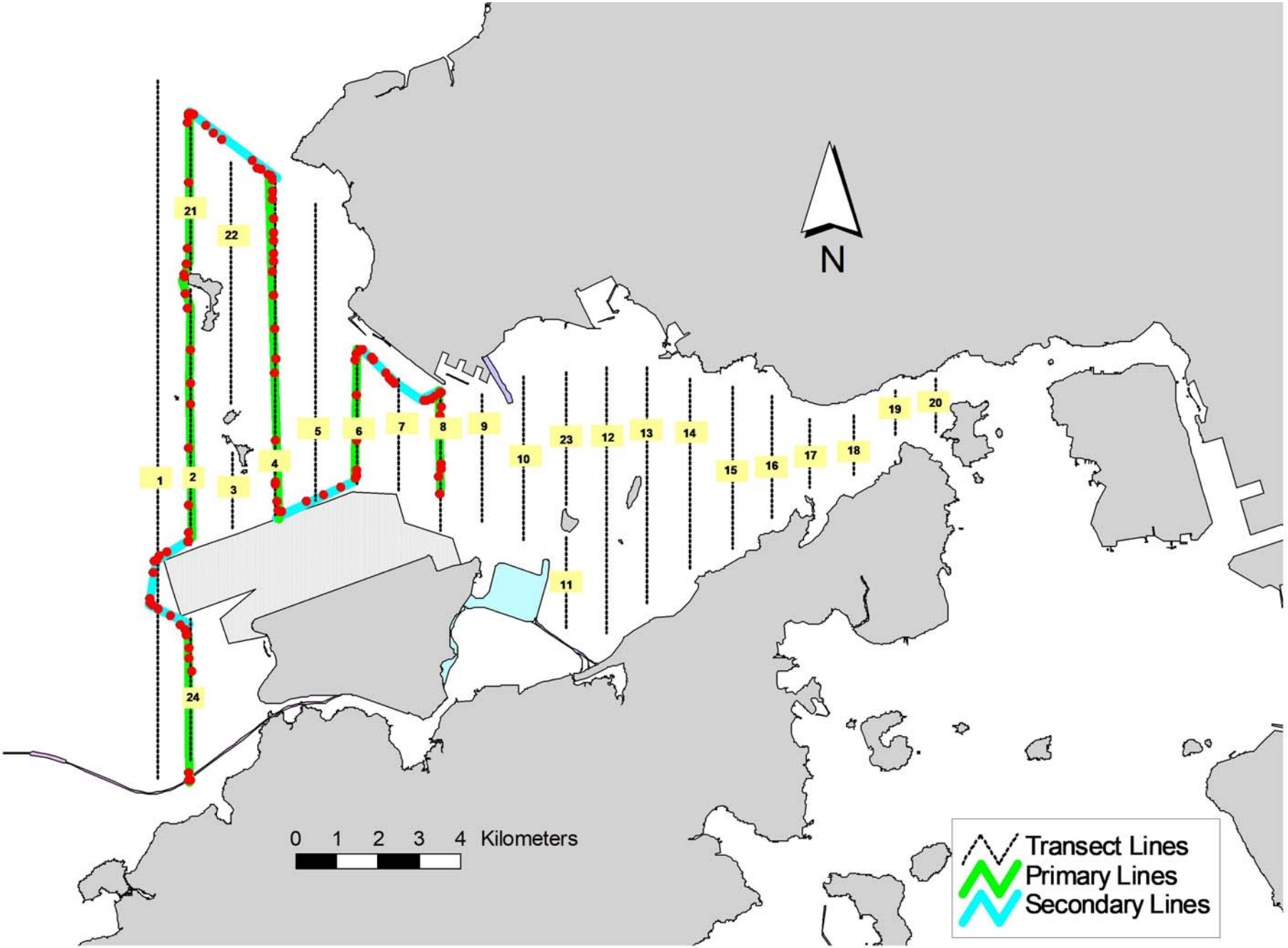


Figure 2. Survey Route on April 10th, 2018 (from HKLR03 project)

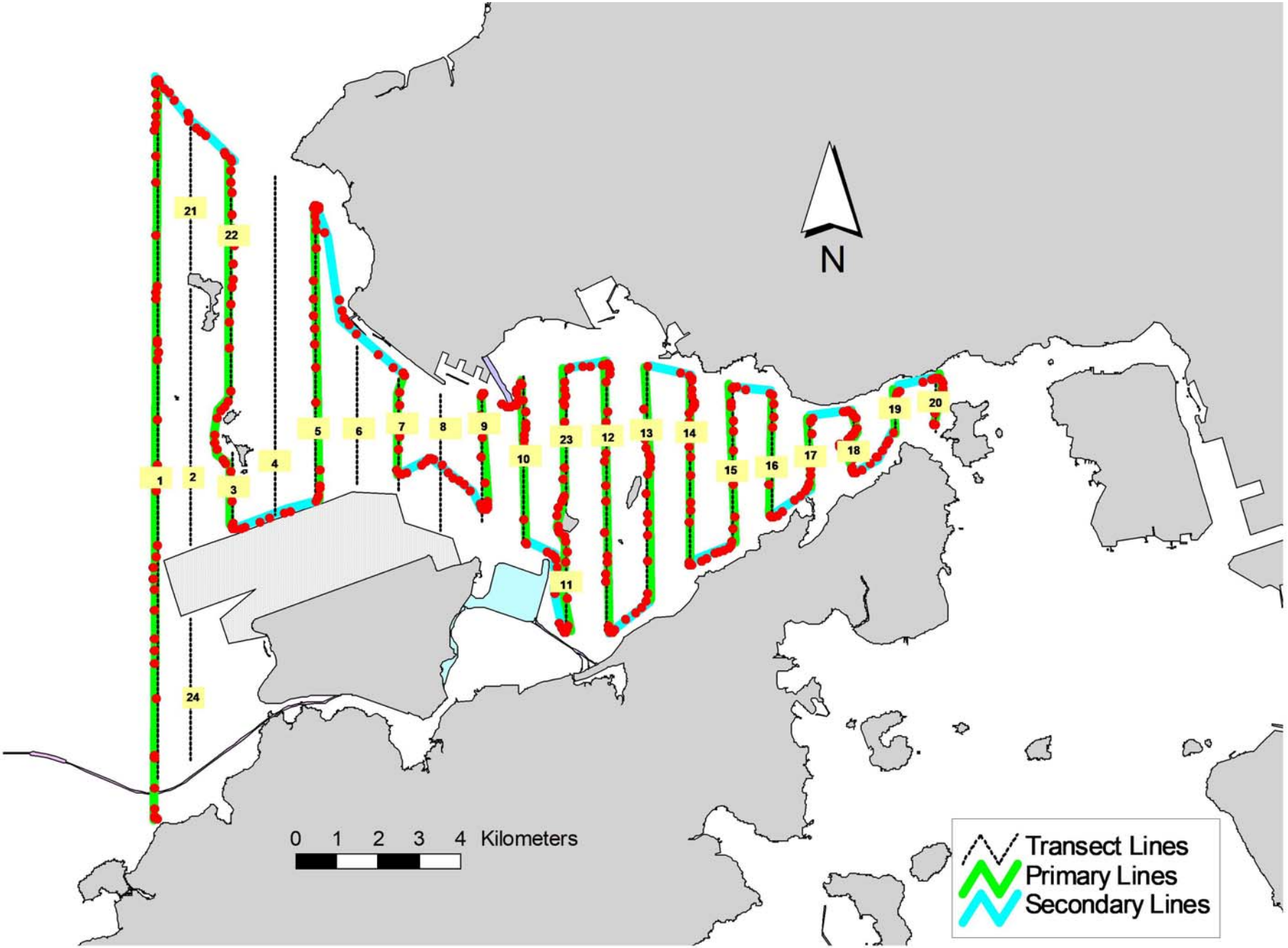


Figure 3. Survey Route on April 17th, 2018 (from HKLR03 project)

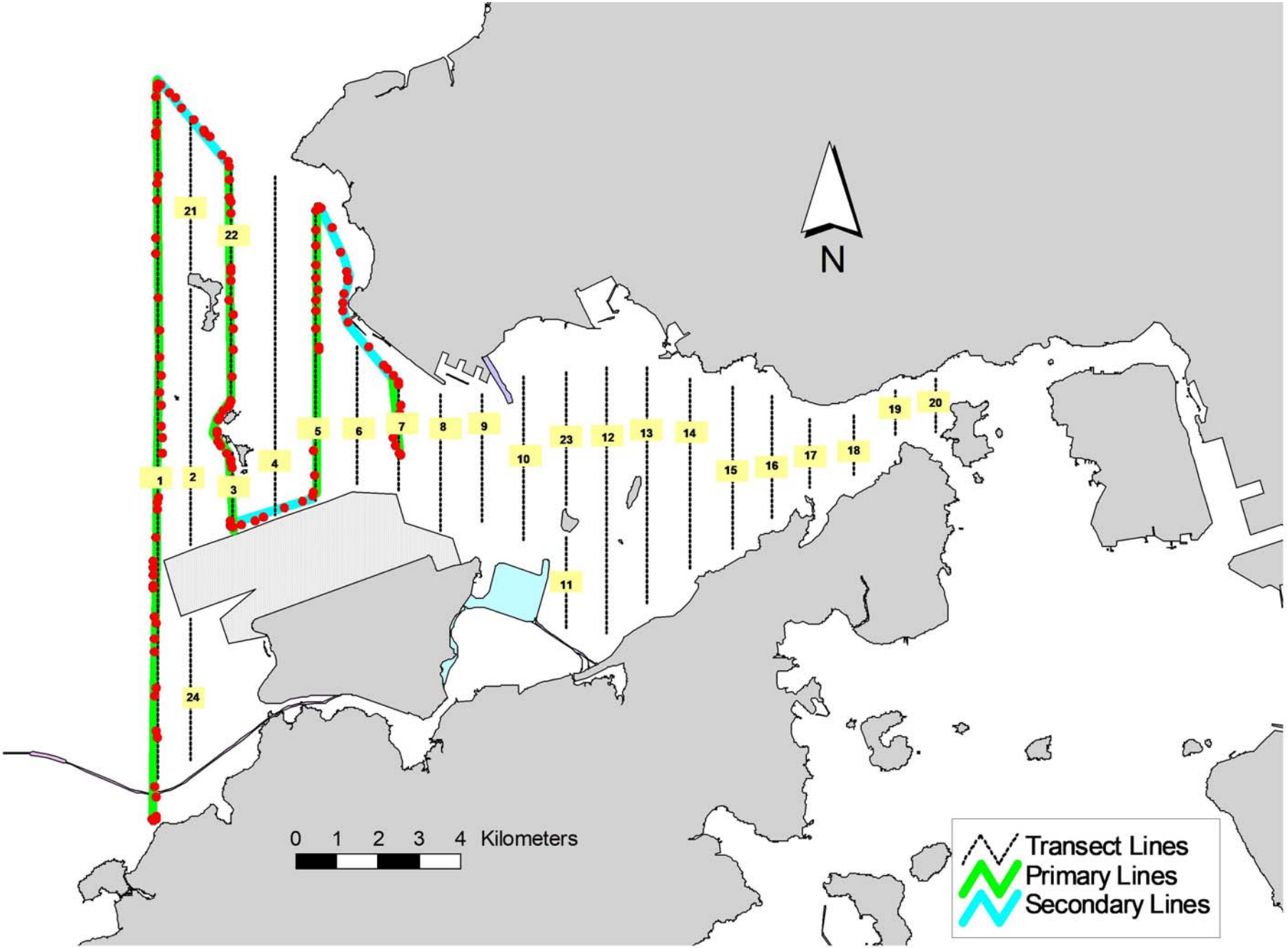


Figure 4. Survey Route on April 19th, 2018 (from HKLR03 project)

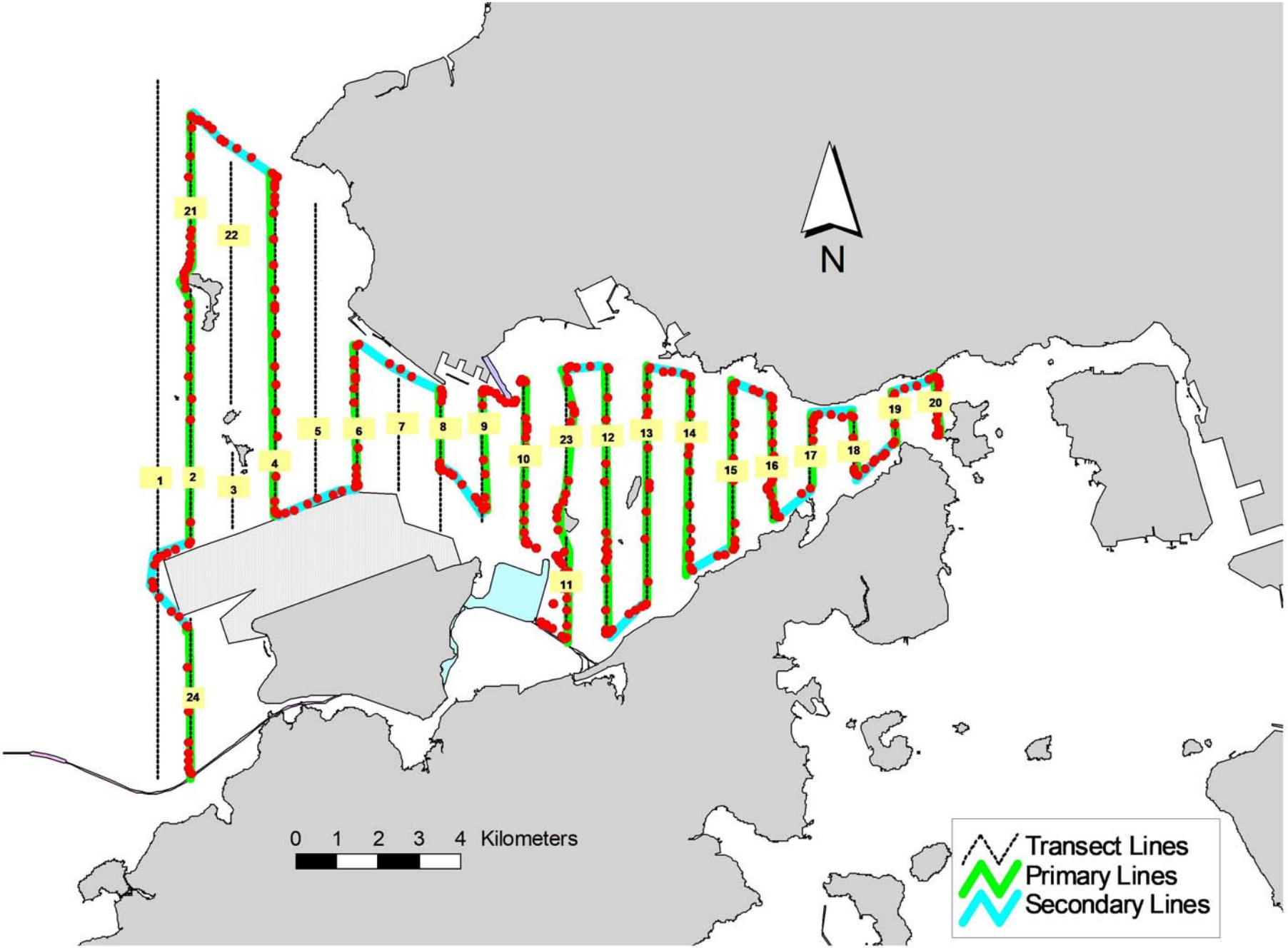


Figure 5. Survey Route on April 25th, 2018 (from HKLR03 project)

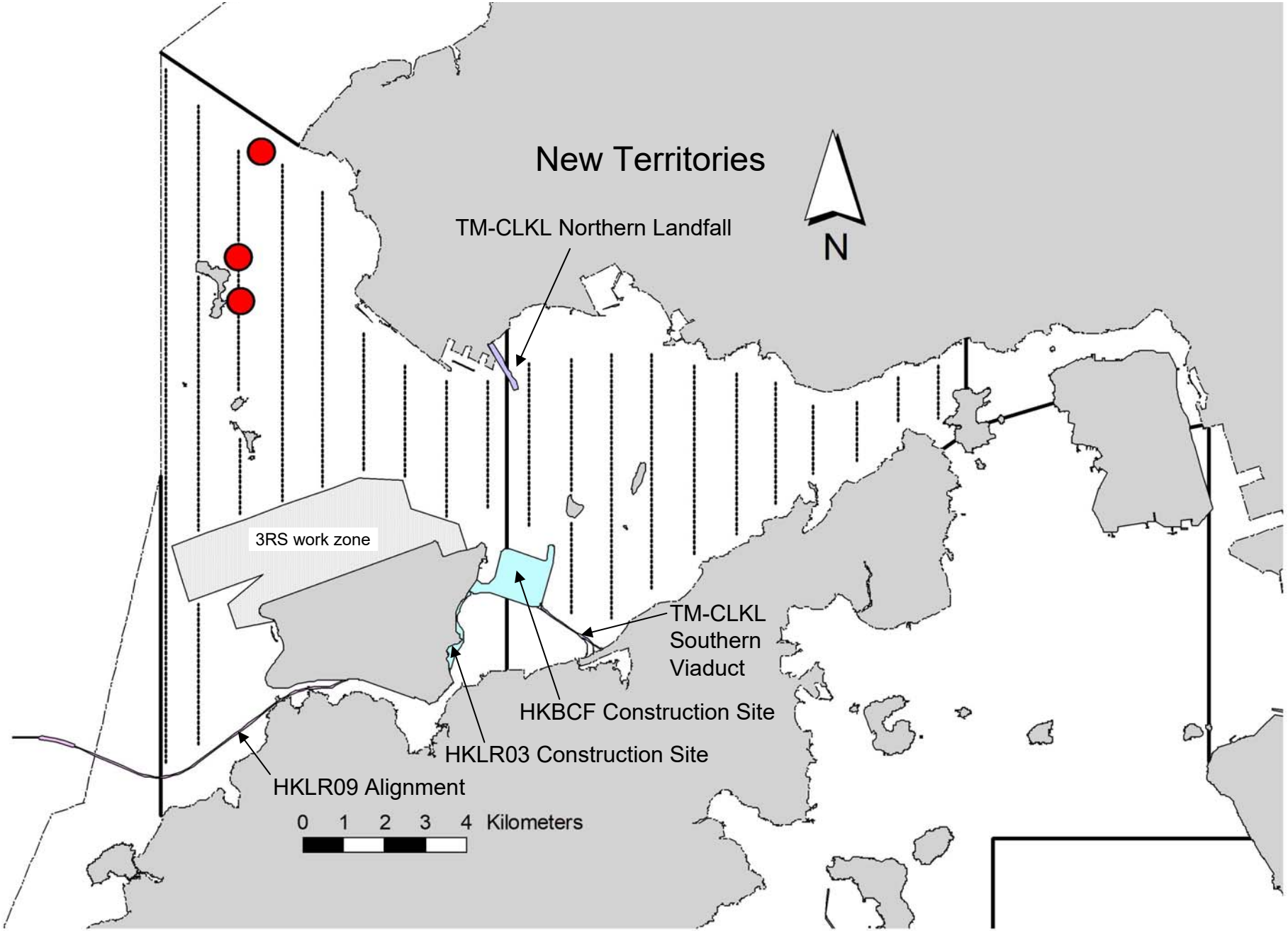


Figure 6. Distribution of Chinese White Dolphin Sightings during April 2018 HKLR03 Monitoring Surveys

Appendix I. HKLR03 Survey Effort Database (April 2018)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
10-Apr-18	NW LANTAU	2	23.74	SPRING	STANDARD36826	HKLR	P
10-Apr-18	NW LANTAU	3	1.23	SPRING	STANDARD36826	HKLR	P
10-Apr-18	NW LANTAU	2	11.73	SPRING	STANDARD36826	HKLR	S
17-Apr-18	NW LANTAU	1	2.20	SPRING	STANDARD36826	HKLR	P
17-Apr-18	NW LANTAU	2	33.50	SPRING	STANDARD36826	HKLR	P
17-Apr-18	NW LANTAU	2	14.10	SPRING	STANDARD36826	HKLR	S
17-Apr-18	NE LANTAU	1	1.20	SPRING	STANDARD36826	HKLR	P
17-Apr-18	NE LANTAU	2	34.52	SPRING	STANDARD36826	HKLR	P
17-Apr-18	NE LANTAU	1	1.10	SPRING	STANDARD36826	HKLR	S
17-Apr-18	NE LANTAU	2	12.58	SPRING	STANDARD36826	HKLR	S
19-Apr-18	NW LANTAU	1	3.85	SPRING	STANDARD36826	HKLR	P
19-Apr-18	NW LANTAU	2	8.59	SPRING	STANDARD36826	HKLR	P
19-Apr-18	NW LANTAU	3	20.48	SPRING	STANDARD36826	HKLR	P
19-Apr-18	NW LANTAU	1	2.26	SPRING	STANDARD36826	HKLR	S
19-Apr-18	NW LANTAU	2	8.21	SPRING	STANDARD36826	HKLR	S
25-Apr-18	NW LANTAU	1	10.61	SPRING	STANDARD36826	HKLR	P
25-Apr-18	NW LANTAU	2	18.13	SPRING	STANDARD36826	HKLR	P
25-Apr-18	NW LANTAU	1	1.60	SPRING	STANDARD36826	HKLR	S
25-Apr-18	NW LANTAU	2	9.66	SPRING	STANDARD36826	HKLR	S
25-Apr-18	NE LANTAU	2	36.91	SPRING	STANDARD36826	HKLR	P
25-Apr-18	NE LANTAU	2	10.89	SPRING	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (April 2018)

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

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
10-Apr-18	1	1125	1	NW LANTAU	2	24	ON	HKLR	829507	806966	SPRING	NONE	S
19-Apr-18	1	1133	2	NW LANTAU	3	363	ON	HKLR	826075	806486	SPRING	NONE	P
19-Apr-18	2	1146	1	NW LANTAU	3	208	ON	HKLR	827093	806426	SPRING	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in April 2018

ID#	DATE	STG#	AREA
NL182	19/04/18	2	NW LANTAU
NL226	19/04/18	1	NW LANTAU
NL261	19/04/18	1	NW LANTAU
NL286	10/04/18	1	NW LANTAU

Appendix IV. Photographs of Identified Individual Dolphins in April 2018 (HKLR03)

Appendix J

Event and Action Plan

Event and Action Plan for Impact Air Monitoring

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

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

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

Event / Action Plan for Impact Dolphin Monitoring

EVENT	ACTION			
	ET	**IEC**	**SOR**	**Contractor**
Action Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor.	1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If SOR is satisfied with the proposal of any other measures, SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.
Limit Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences;	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, SOR and	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If SOR is satisfied with the	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and SOR the necessity of additional dolphin monitoring and any other

EVENT	ACTION			
	ET	**IEC**	**SOR**	**Contractor**
	3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.	Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly.	proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, SOR to signify the agreement in writing on such proposals and any other mitigation measures. 3. Supervise the implementation of additional monitoring and/or any other mitigation measures.	potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

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

Appendix K

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

Table K1 *Cumulative Statistics on Exceedances*

Parameters	Level of Exceedance	Total No. recorded in this reporting month	Total No. recorded since project commencement
1-hr TSP	Action	1	67
	Limit	0	4
24-hr TSP	Action	0	7
	Limit	0	4
Water Quality	Action	0	20
	Limit	0	1
Impact Dolphin Monitoring	Action	0	11
	Limit	0	11

Table K2 *Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions*

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Month (April 2018)	0	0	0
Total No. received since project commencement	16	1	0

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	27 April 2018

ERM

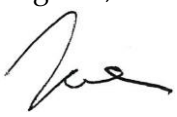
Dear Sir or Madam,

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

0212330_13April2018_1hrTSP_Station ASR5

One Action Level Exceedance was recorded on 13 April 2018.

Regards,



Mr Jovy Tam
Environmental Team Leader

ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**0212330_13April2018_1hrTSP_Station ASR5** **[Total No. of Exceedances = 1]**	
Date	13 April 2018 (Measured) 27 April 2018 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m³)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m³)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m³)	500
	24-hr TSP (µg/m³)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (389 µg/m3) during 1438 – 1538 hrs.	
Works Undertaken (at the time of monitoring event)	On 13 April 2018, 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)	The exceedance is unlikely to be due to the Project, in view of the following: • According to the construction information provided by the Contractor, the majority of ground construction works on 13 April 2018 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 exceedances are unlikely to be due to the project as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Based on the above, the exceedances are unlikely to be due to the project.	

Actions Taken / To Be Taken	According to the construction information provided by the Contractor, box culvert extension was carried out at Works Area Portion N-A and Construction of Ventilation Building was carried out at Portion N-C. Water spraying was applied to prevent dust. Photo record is provided in Annex A. Photos taken during AQM were also provided. No significant dust impact was observed at ASR5. Dust suppression measures were properly implemented during the site inspections. Based on the above, no additional action is required. 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 mitigation measures are provided at Portion N-A and Portion N-C, where the construction works are carried out.
Remarks	The monitoring results and the locations of air quality monitoring stations are attached.

ERM

Annex A Photos provided by the Contractor

*Note: Photos taken on 13/4/2018

Water spraying was applied frequently on site.
(Works Area Portion N-B)

Water spraying was applied frequently on site.
(Works Area Portion N-C)

ERM

Annex A Photos provided by the Contractor

*Note: Photos taken on 13/4/2018

Water spraying was applied frequently on site.
(Works Area Portion N-A)

Water spraying was applied frequently on site.
(Works Area Portion N-C)

ERM

Annex A Photos taken during AQM

*Note: Photos taken on 13/4/2018

ASR5

ASR5

TMCLKL	HY/2012/08	13/4/2018	AQMS1	Sunny	13:59	1-hour TSP	121	ug/m3
TMCLKL	HY/2012/08	13/4/2018	AQMS1	Sunny	15:01	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	13/4/2018	AQMS1	Sunny	16:03	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR1	Sunny	13:48	1-hour TSP	138	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR1	Sunny	14:50	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR1	Sunny	15:52	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR10	Sunny	13:14	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR10	Sunny	14:16	1-hour TSP	47	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR10	Sunny	15:18	1-hour TSP	41	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR5	Sunny	13:36	1-hour TSP	134	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR5	Sunny	14:38	1-hour TSP	389	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR5	Sunny	15:40	1-hour TSP	111	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR6	Sunny	13:25	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR6	Sunny	14:27	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR6	Sunny	15:29	1-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	13/4/2018	AQMS1	Sunny	17:05	24-hour TSP	46	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR1	Sunny	16:54	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR10	Sunny	15:18	24-hour TSP	29	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR5	Sunny	16:42	24-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	13/4/2018	ASR6	Sunny	16:31	24-hour TSP	43	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)**
18/04/13	0:00	2.2	94
18/04/13	1:00	2.2	86
18/04/13	2:00	1.8	88
18/04/13	3:00	1.3	78
18/04/13	4:00	1.8	100
18/04/13	5:00	2.7	90
18/04/13	6:00	2.7	93
18/04/13	7:00	2.7	89
18/04/13	8:00	2.2	92
18/04/13	9:00	3.1	84
18/04/13	10:00	3.1	88
18/04/13	11:00	3.1	84
18/04/13	12:00	3.6	88
18/04/13	13:00	3.6	108
18/04/13	14:00	3.6	135
18/04/13	15:00	3.6	135
18/04/13	16:00	4	130
18/04/13	17:00	3.1	124
18/04/13	18:00	2.7	143
18/04/13	19:00	2.2	123
18/04/13	20:00	2.2	81
18/04/13	21:00	1.8	100
18/04/13	22:00	1.8	87
18/04/13	23:00	0.9	49

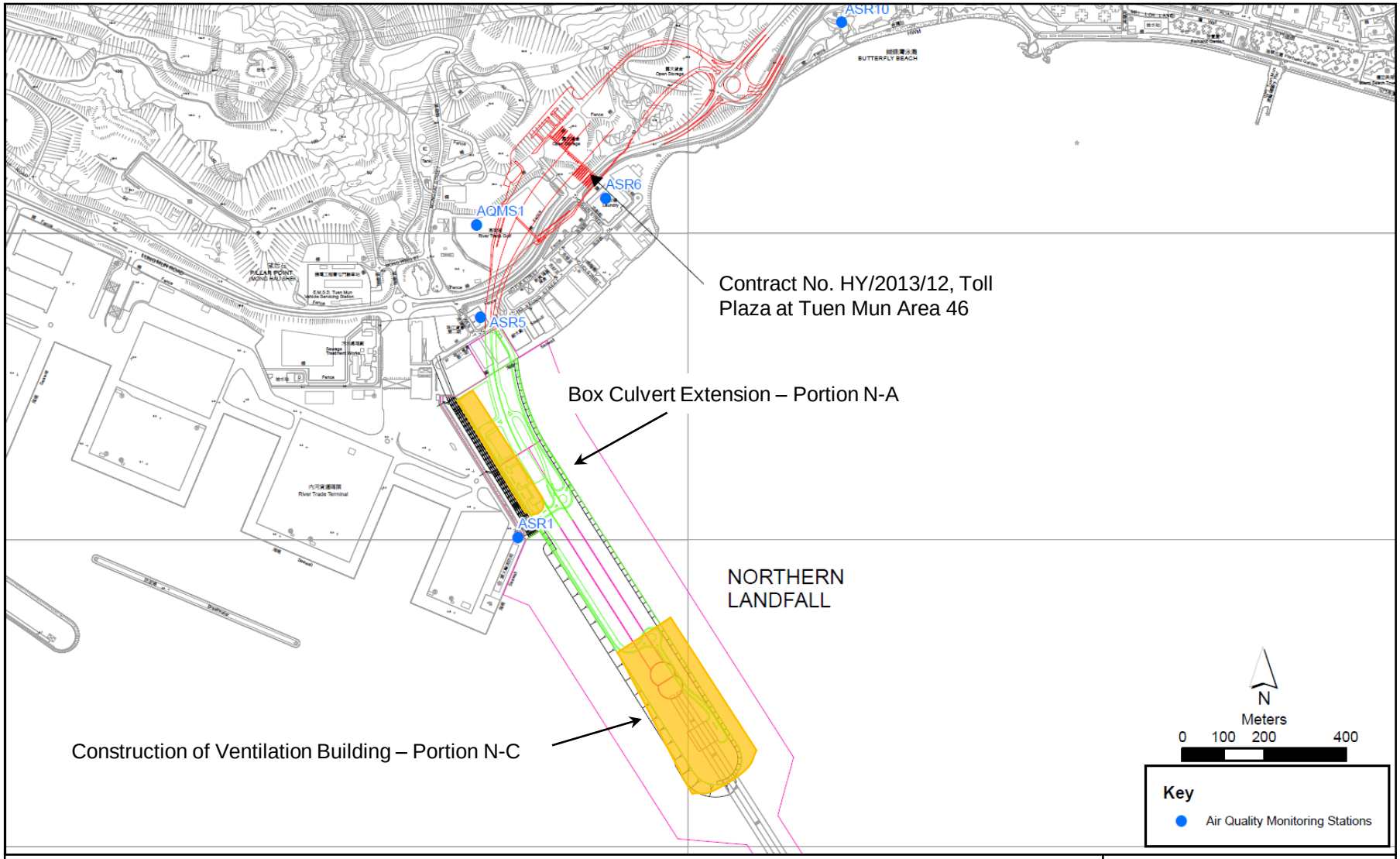


Figure 1

Indicative Construction Works Area on 13 April 2018

DATE: 06/03/2013

Environmental Resources Management

ERM

Appendix L

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 April 2018 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of Inert Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	1221.977	0.000	0.000	0.000	1221.977
Jan-2018	7.165	0.000	0.000	0.000	7.165
Feb-2018	1.762	0.000	0.000	0.000	1.762
Mar-2018	66.457	0.000	0.000	62.274	4.183
Apr-2018	123.942	0.000	0.000	50.648	73.294
May-2018					
Jun-2018					
Half Year Sub-total					
Jul-2018					
Aug-2018					
Sep-2018					
Oct-2018					
Nov-2018					
Dec-2018					
Project Total Quantities	1421.303	0.000	0.000	112.922	1308.381

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	619.380	619.380	4.150	4.150	6.870	6.870	33.150	33.150	8.259
Jan-2018	241.500	241.500	0.200	0.200	0.000	0.000	2.800	2.800	0.272
Feb-2018	256.940	256.940	0.200	0.200	0.000	0.000	0.000	0.000	0.258
Mar-2018	229.360	229.360	0.000	0.000	0.000	0.000	2.000	2.000	0.459
Apr-2018	195.550	195.550	0.000	0.000	0.000	0.000	8.600	8.600	0.281
May-2018									
Jun-2018									
Half Year Sub-total									
Jul-2018									
Aug-2018									
Sep-2018									
Oct-2018									
Nov-2018									
Dec-2018									
Project Total Quantities	1542.730	1542.730	4.550	4.550	6.870	6.870	46.550	46.550	9.529

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)
50.000	0.000	0.000	30.000	50.000

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)
150.000	0.000	0.000	5.000	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 m^3. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).