



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

*Thirty-first Monthly Environmental Monitoring  
& Audit (EM&A) Report*

14 June 2016

**Environmental Resources Management**  
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Ref.: HYDZHMBEEM00\_0\_4281L.16

15 June 2016

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

By Fax (2293 6300) and By Post

Attention: Messrs. Edwin Ching / Andy Westmoreland

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**

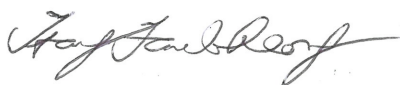
**Contract No. HY/2012/08 TM-CLKL Northern Connection Sub-sea  
Tunnel Section  
31<sup>st</sup> Monthly EM&A Report for May 2016 (EP-354/2009/D)**

Reference is made to the Monthly Environmental Monitoring and Audit (EM&A) Report (May 2016) (ET's ref.: "0212330\_31st Monthly EM&A\_20160607.doc" dated 14 June 2016) certified by the ET Leader and provided to us via e-mail on 15 June 2016.

Please be informed that we have no adverse comments on the captioned monthly EM&A 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. Matthew Fung (By Fax: 3188 6614)  
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)  
ERM – Mr. Jovy Tam (By Fax: 2723 5660)  
Dragages – Bouygues JV - Mr. C. F. Kwong (By Fax: 2293 7499)

Internal: DY, YH, ENPO Site

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# Contract No. HY/2012/08





## Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

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*Thirty-first Monthly Environmental Monitoring & Audit (EM&A) Report*

**Document Code: 0212330\_31st Monthly EM&A\_20160607.doc**

Client:  DBJV		Project No:  0212330			
Summary:  This document presents the thirty-first Monthly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.		Date: 14 June 2016			
		Approved by:  			
		Mr Craig Reid Partner			
		Certified by:  			
		Mr Jovy Tam ET Leader			
	31 <sup>st</sup> Monthly EM&A Report	VAR	JT	CAR	14/06/16
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p>			
		 			

## TABLE OF CONTENTS

	<i>EXECUTIVE SUMMARY</i>	<i>1</i>
<i>1</i>	<i>INTRODUCTION</i>	<i>4</i>
<i>1.1</i>	<i>BACKGROUND</i>	<i>4</i>
<i>1.2</i>	<i>SCOPE OF REPORT</i>	<i>5</i>
<i>1.3</i>	<i>ORGANIZATION STRUCTURE</i>	<i>5</i>
<i>1.4</i>	<i>SUMMARY OF CONSTRUCTION WORKS</i>	<i>6</i>
<i>2</i>	<i>EM&amp;A RESULTS</i>	<i>8</i>
<i>2.1</i>	<i>AIR QUALITY</i>	<i>8</i>
<i>2.2</i>	<i>WATER QUALITY MONITORING</i>	<i>10</i>
<i>2.3</i>	<i>DOLPHIN MONITORING</i>	<i>10</i>
<i>2.4</i>	<i>EM&amp;A SITE INSPECTION</i>	<i>14</i>
<i>2.5</i>	<i>WASTE MANAGEMENT STATUS</i>	<i>15</i>
<i>2.6</i>	<i>ENVIRONMENTAL LICENSES AND PERMITS</i>	<i>15</i>
<i>2.7</i>	<i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i>	<i>17</i>
<i>2.8</i>	<i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT</i>	<i>17</i>
<i>2.9</i>	<i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>	<i>17</i>
<i>3</i>	<i>FUTURE KEY ISSUES</i>	<i>18</i>
<i>3.1</i>	<i>CONSTRUCTION ACTIVITIES FOR THE COMING MONTH</i>	<i>18</i>
<i>3.2</i>	<i>KEY ISSUES FOR THE COMING MONTH</i>	<i>18</i>
<i>3.3</i>	<i>MONITORING SCHEDULE FOR THE COMING MONTH</i>	<i>18</i>
<i>4</i>	<i>CONCLUSIONS AND RECOMMENDATIONS</i>	<i>19</i>
<i>4.1</i>	<i>CONCLUSIONS</i>	<i>19</i>

<i>APPENDIX A</i>	<i>PROJECT ORGANIZATION FOR ENVIRONMENTAL WORKS</i>
<i>APPENDIX B</i>	<i>CONSTRUCTION PROGRAMME</i>
<i>APPENDIX C</i>	<i>ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULES (EMIS)</i>
<i>APPENDIX D</i>	<i>SUMMARY OF ACTION AND LIMIT LEVELS</i>
<i>APPENDIX E</i>	<i>COPIES OF CALIBRATION CERTIFICATE FOR AIR QUALITY MONITORING</i>
<i>APPENDIX F</i>	<i>EM&amp;A MONITORING SCHEDULES</i>
<i>APPENDIX G</i>	<i>IMPACT AIR QUALITY MONITORING RESULTS</i>
<i>APPENDIX H</i>	<i>METEOROLOGICAL DATA</i>
<i>APPENDIX I</i>	<i>IMPACT DOLPHIN MONITORING SURVEY</i>
<i>APPENDIX J</i>	<i>EVENT AND ACTION PLAN</i>
<i>APPENDIX K</i>	<i>CUMULATIVE STATISTICS ON EXCEEDANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>
<i>APPENDIX L</i>	<i>WASTE FLOW TABLE</i>

## EXECUTIVE SUMMARY

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of the Tuen Mun – Chek Lap Kok Link Project (TM-CLK Link Project) while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with *Environmental Permit No. EP-354/2009/A*. Ramboll Environ Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO). Subsequent applications for variation of environmental permits (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

The construction phase of the Project commenced on 1 November 2013 and will tentatively be completed by the end of 2018. The impact monitoring of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

This is the Thirty-first Monthly EM&A report presenting the EM&A works carried out during the period from 1 to 31 May 2016 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 Cross Passage Tympanum – TBM tunnel;
- Excavation of Sub-sea Tunnel – TBM tunnel;
- Thrust Frame Removal – TBM tunnel;
- Sub-sea Tunnel Gallery Installation – TBM tunnel;
- Slab Construction of Tunnel Protection Enhancement – TBM tunnel;
- Deep Band Drain Installation – Portion S-A;
- Dewatering Deep well Installation – Portion S-A; and
- CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.

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*

No Action Level or Limit Level of air quality exceedances were recorded in the air quality monitoring of this reporting month.

##### *Breaches of Action and Limit Levels for Dolphin Monitoring*

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March and May 2016, no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations. Due to monthly variation in dolphin occurrence within the study area, it would be more appropriate to draw conclusion on whether any impacts on dolphins have been detected related to the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section 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.

One (1) environmental complaint case regarding potential dust emission from the barge area at Southern Landfall was referred by EPD on 20 May 2016. The interim report was submitted to EPD on 24 May 2016.

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 June 2016 include the following:

#### *Land-based Works*

- Box Culvert Extension at Works Area – Portion N-A;
- Construction of Cross Passage Tympanum – TBM tunnel;
- Excavation of Sub-sea Tunnel – TBM tunnel;
- Thrust Frame Removal – TBM tunnel;
- Sub-sea Tunnel Gallery Installation – TBM tunnel;
- Slab Construction of Tunnel Protection Enhancement – TBM tunnel;
- Deep Band Drain Installation – Portion S-A;
- Dewatering Deep well Installation – Portion S-A; and
- Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.

### Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the next reporting month of June 2016 are mainly associated with dust, marine ecology and waste management issues.



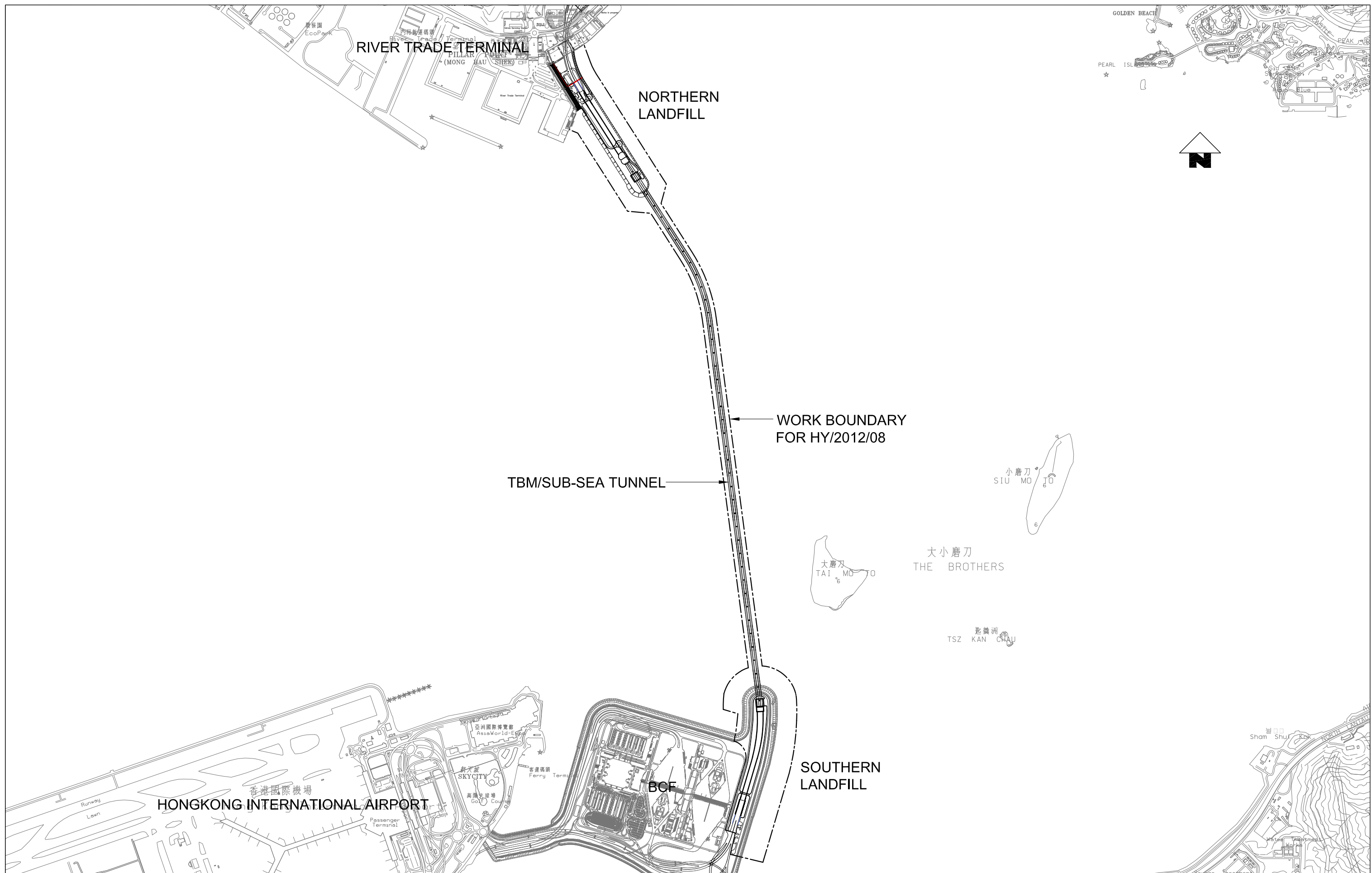
According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated 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 Environ Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO).

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

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

Main Contractor  

  
 A member of the Bouygues Construction group  
**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 Thirty-first 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 May 2016.

## 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 16/HZMB	Kenneth Lee	2762 4996	3188 6614
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Edwin Ching	2293 6388	2293 6300
		Andrew Westmoreland	2293 6360	2293 6300
ENPO / IEC (Ramboll Environ Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3547 2133	3465 2899
	IEC	Dr. F.C. Tsang	3547 2134	3465 2899
Contractor (Dragages – Bouygues Joint Venture)	Environmental Manager	C.F. Kwong	2293 7322	2293 7499
	Environmental Officer	Bryan Lee	2293 7323	2293 7499
	Environmental Officer	Ality Chan	5933 5904	2293 7499
	24-hour complaint hotline	Rachel Lam	2293 7330	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

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*.

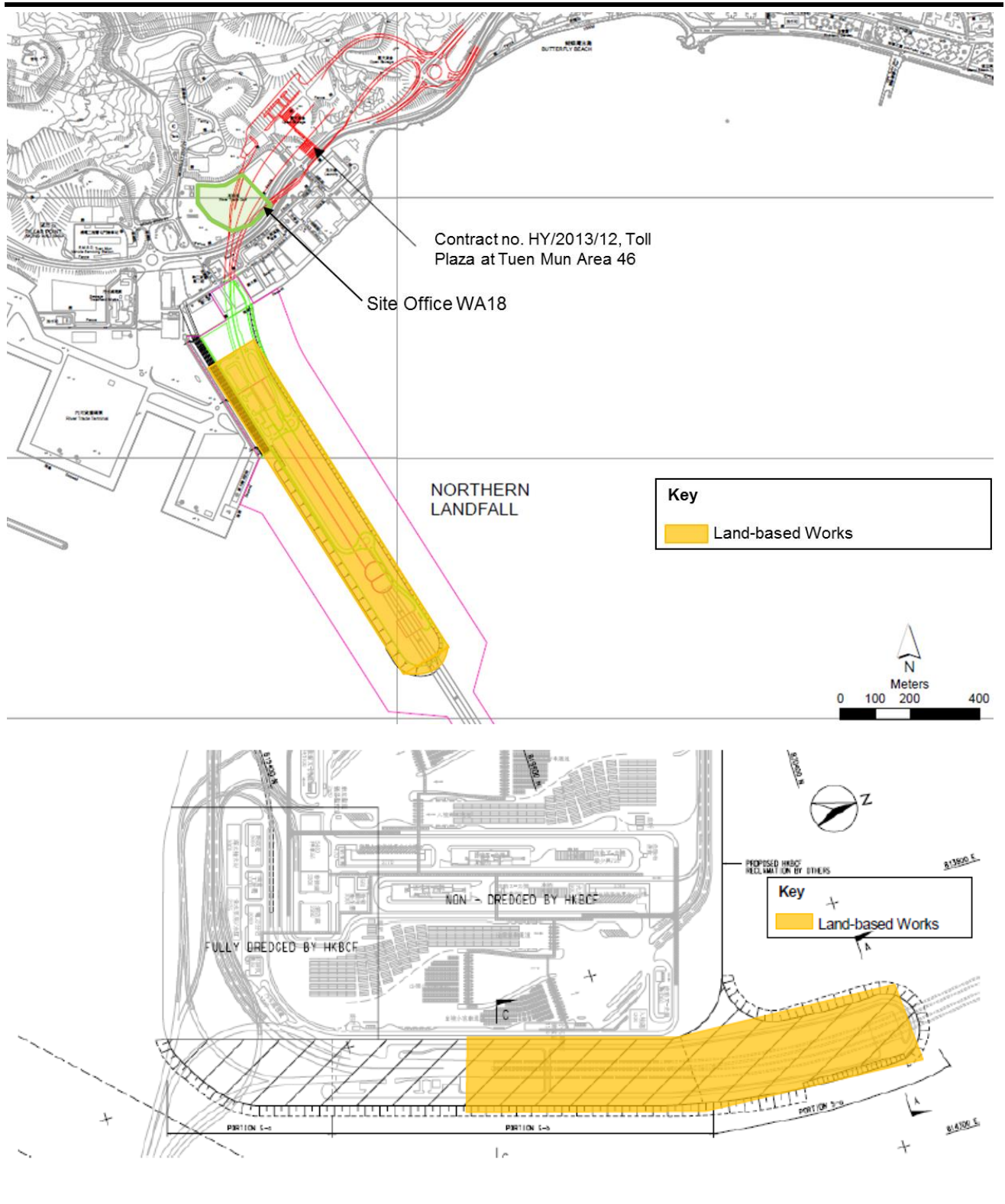
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

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

**Table 1.2** *Summary of Construction Activities Undertaken during the Reporting Period*

<b>Construction Activities Undertaken</b>
<i>Land-based Works</i>
<ul style="list-style-type: none"> <li>• Box Culvert Extension at Works Area – Portion N-A;</li> <li>• Construction of Cross Passage Tympanum – TBM tunnel;</li> <li>• Excavation of Sub-sea Tunnel – TBM tunnel;</li> <li>• Thrust Frame Removal – TBM tunnel;</li> <li>• Sub-sea Tunnel Gallery Installation – TBM tunnel;</li> <li>• Slab Construction of Tunnel Protection Enhancement – TBM tunnel;</li> <li>• Deep Band Drain Installation – Portion S-A;</li> <li>• Dewatering Deep well Installation – Portion S-A; and</li> <li>• CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A</li> </ul>

Figure 1.2 Locations of Construction Activities – May 2016



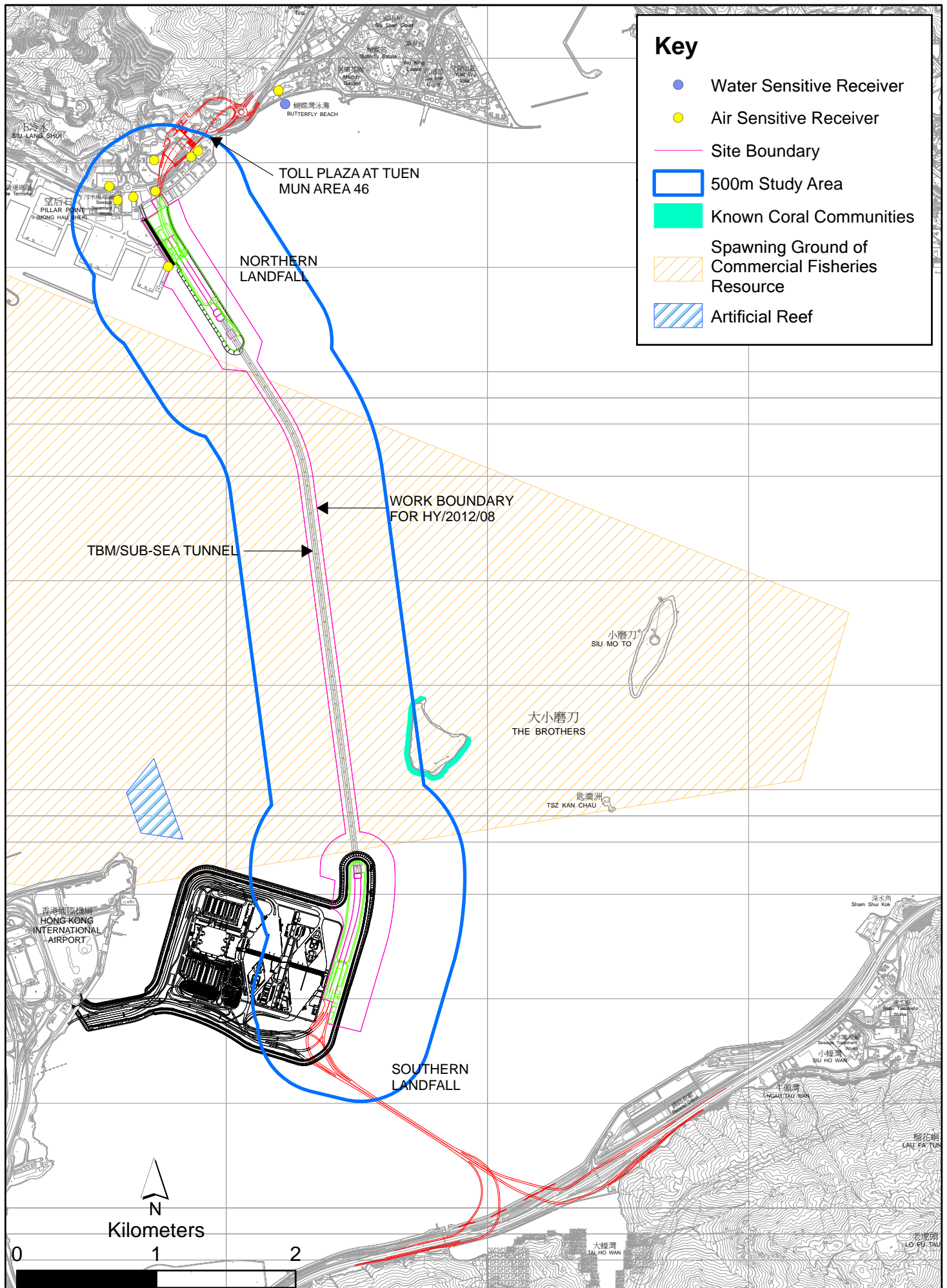


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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

## 2.1 AIR QUALITY

### 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 2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 May 2016 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	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 May 2016	Tuen Mun Fireboat Station	Office	TSP monitoring
ASR5		Pillar Point Fire Station	Office	<ul style="list-style-type: none"> <li>1-hour Total Suspended Particulates (1-hour TSP, <math>\mu\text{g}/\text{m}^3</math>), 3 times in every 6 days</li> <li>24-hour Total Suspended Particulates (24-hour TSP, <math>\mu\text{g}/\text{m}^3</math>), daily for 24-hour in every 6 days</li> </ul>
AQMS1		Previous River Trade Golf	Bare ground	Enhanced TSP monitoring (commenced on 24 October 2014)
ASR6		Butterfly Beach Laundry	Office	<ul style="list-style-type: none"> <li>1-hour Total Suspended Particulates (1-hour TSP, <math>\mu\text{g}/\text{m}^3</math>), 3 times in every 3 days</li> </ul>
ASR10		Butterfly Beach Park	Recreational uses	<ul style="list-style-type: none"> <li>24-hour Total Suspended Particulates (24-hour TSP, <math>\mu\text{g}/\text{m}^3</math>), daily for 24-hour in every 3 days</li> </ul>

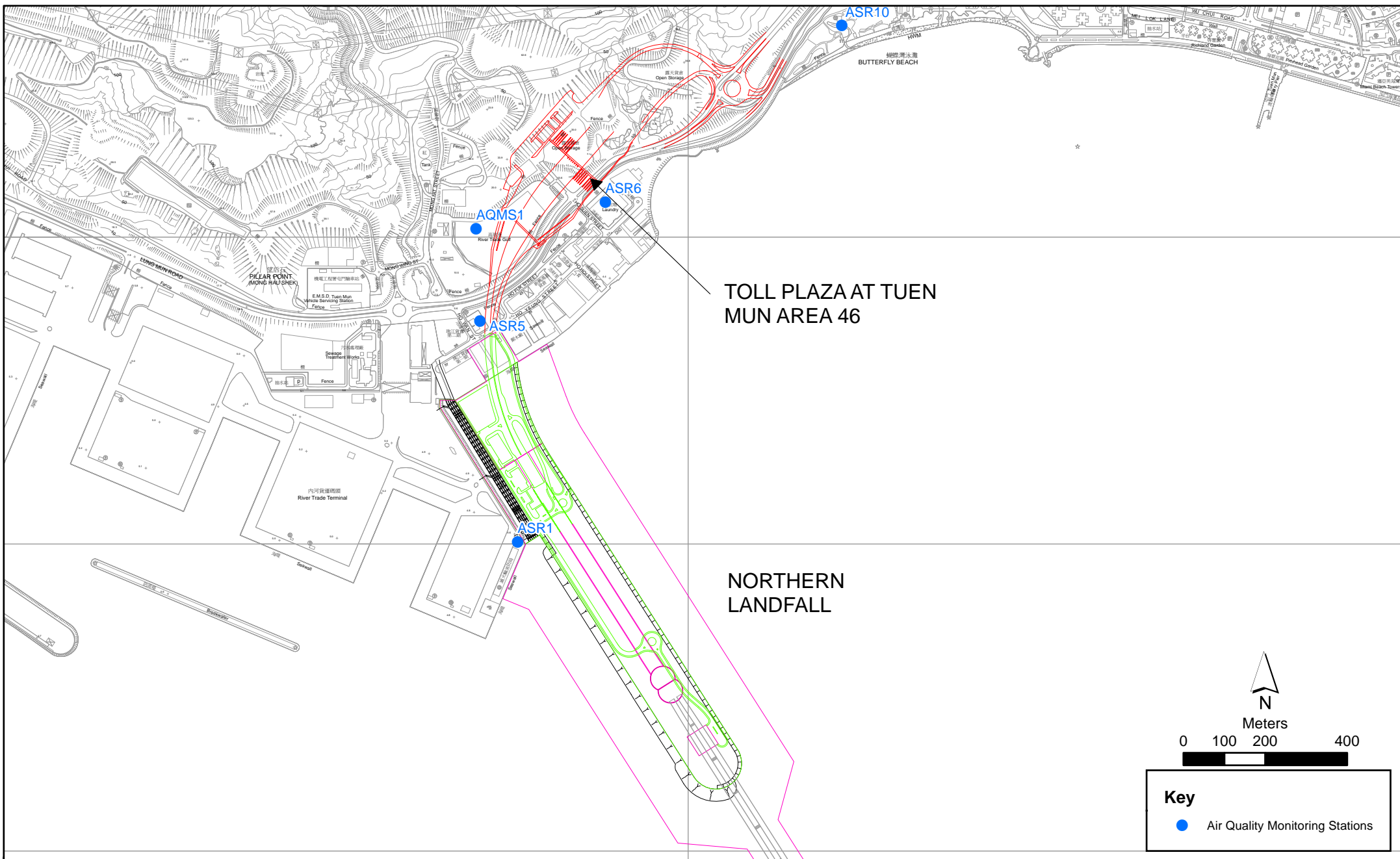


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring



**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: Weather Wizard III (S/N: WE90911A30)
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 May 2016 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 ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
ASR1	83	55 - 131	331	500
ASR5	105	55 - 186	340	500
AQMS1	88	50 - 137	335	500
ASR6	94	56 - 203	338	500
ASR10	76	49 - 136	337	500

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

Station	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
ASR1	62	49 - 75	213	260
ASR5	66	57 - 82	238	260
AQMS1	62	47 - 74	213	260
ASR6	63	50 - 72	238	260
ASR10	56	46 - 70	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 monitoring events were undertaken in which no Action or Limit Level exceedances of 1-hr TSP were recorded in this reporting month. No Action or Limit Level exceedances for 24-hr TSP were record.

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

## 2.2 WATER QUALITY MONITORING

As informed by the Contractor, Phase I Reclamation works for the Northern Landfall was substantially completed in December 2014, a proposal letter was sent to EPD on 21 May 2015 to seek approval for the temporary suspension of Water Quality Monitoring. Subsequently, a letter from EPD on 5 June 2015 stated that they have no strong objection to the temporary suspension of the water quality monitoring. Water Quality Monitoring was suspended from 6 June 2015 effectively and will resume when Phase II Reclamation commences in the fourth quarter of 2016 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**

<b>Equipment</b>	<b>Model</b>
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.

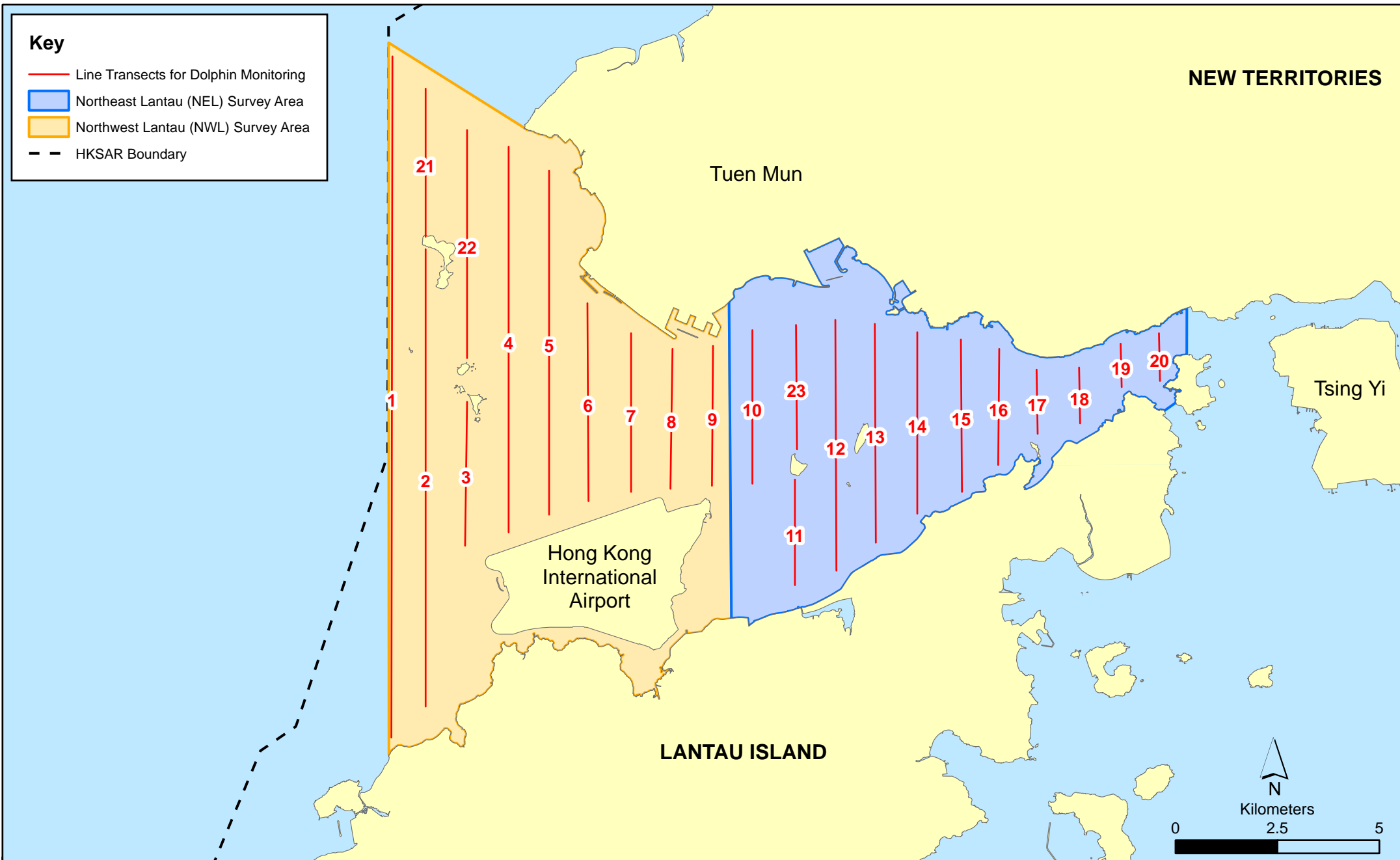


Figure 2.2

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

**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	805475	815913	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820880	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	821123	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	821303	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

**2.3.5 Action & Limit Levels**

The Action and Limit levels of 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 3, 12, 17 and 26 of May 2016. The dolphin monitoring schedule for the reporting month is shown in *Appendix F*.

### 2.3.7 *Results & Observations*

A total of 300.96 km of survey effort was collected, with 99.7% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) in May 2016. Among the two areas, 115.56 km and 185.40 km of survey effort were collected from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 217.80 km and 83.16 km respectively. The survey efforts are summarized in *Appendix I*.

No Chinese White Dolphins sightings were recorded during the two sets of surveys in May 2016.

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

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 May 2016.

Key observations and recommendations during the site inspections in this reporting period are summarized in *Table 2.7*.

**Table 2.7** *Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Month*

Inspection Date	Observations	Recommendations/ Remarks
4 May 2016	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> <li>Sandbags should be provided along the fencing.</li> <li>Accumulated sand should be removed.</li> </ul> <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>Drip trays should be provided to the oil drums.</li> </ul>	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to provide sandbags along the fencing.</li> <li>The Contractor was reminded to remove the accumulated sand.</li> </ul> <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to provide drip trays to the oil drums.</li> </ul>
11 May 2016	<p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>Water spraying should be applied more frequently during dry conditions.</li> <li>Water inside the drip tray should be cleared.</li> </ul> <p>Works Area – Portion S-B</p> <ul style="list-style-type: none"> <li>Drip trays should be provided to the oil drums.</li> <li>The rock breaker should be wrapped to prevent spread of dust.</li> </ul>	<p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to apply water spraying more frequently during dry conditions.</li> <li>The Contractor was reminded to clear the water inside the drip tray.</li> </ul> <p>Works Area – Portion S-B</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to provide drip trays to the oil drums.</li> <li>The contractor was reminded to wrap the rock breaker to prevent spread of dust.</li> </ul>
18 May 2016	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> <li>Sand bags should be fixed to prevent direct discharge of wastewater to the sea.</li> </ul> <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>Water spraying should be provided more frequently during dry conditions</li> <li>Preventive measures should be implemented to minimise dust impact..</li> </ul>	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to fix the sand bags.</li> </ul> <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to provide water spraying more frequently during dry conditions.</li> <li>The contractor was reminded to implement preventive measures to minimise dust impact.</li> </ul>
25 May 2016	<p>Works Area – Portion N-B</p> <ul style="list-style-type: none"> <li>Accumulated waste should be cleared.</li> </ul> <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>Water spraying should be provided more frequently during dry conditions.</li> <li>Accumulated waste should be cleared.</li> </ul>	<p>Works Area – Portion N-B</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to clear the accumulated waste.</li> </ul> <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to provide water spraying more frequently during dry conditions.</li> <li>The contractor was reminded to clear the accumulated waste.</li> </ul>

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), recyclable materials and chemical wastes. 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 2.8*.

**Table 2.8 Quantities of Different Waste Generated in the Reporting Month**

Month/Year	Inert Construction Waste <sup>(a)</sup> (tonnes)	Imported Fill (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste <sup>(b)</sup> (tonnes)	Recyclable Materials <sup>(c)</sup> (kg)	Chemical Wastes (kg)	Marine Sediment (m <sup>3</sup> )	
							Category L	Category M (M <sub>p</sub> & M <sub>f</sub> )
May 2016	2,392	0	0	202	200	0	0	0

**Notes:**

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

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 2.9* below.



**Table 2.9 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	-
Chemical Waste Registration	5213-422-D2516-01	10 September 2013	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	30 April 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Waste Water Discharge License	WT00017707-2013	18 November 2013	30 November 2018	DBJV	For site WA18
Waste Water Discharge License	WT00019248-2014	5 June 2014	30 June 2019	DBJV	For site Portion N6 and Reclamation Area E
Marine Dumping Permit	EP/MD/17-015	7 May 2016	6 June 2016	DBJV	Southern Landfall
Construction Noise Permit	GW-RW0180-16	9 April 2016	30 September 2016	DBJV	For Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0638-15	14 December 2015	13 June 2016	DBJV	For site WA23
Construction Noise Permit	GW-RW0143-16	29 March 2016	28 September 2016	DBJV	For Portion N6
Construction Noise Permit	GW-RS0324-16	18 April 2016	17 October 2016	DBJV	For excavation works at Southern Landfall

**Notes:**

HyD = Highways Department

DBJV = Dragages - Bouygues Joint Venture

VEP = Variation of Environmental Permit

## 2.7 *IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES*

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

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

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

No Action Level or Limit Level exceedances were recorded in the air quality monitoring of this reporting month.

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

Cumulative statistics are provided in *Appendix K*.

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

The Environmental Complaint Handling Procedure is provided in *Figure 2.3*.

One (1) environmental complaint case regarding dust emission from the barge area at Southern Landfall was referred by EPD on 20 May 2016. A joint site inspection was carried out with the Contractor, SOR and EPD on 23 May 2016 to verify the remedial measures. The complaint was handled in accordance with the Environmental Complaint Handling Procedure and the interim report was submitted to EPD on 24 May 2016. The final investigation report is presented in *Appendix K*.

No notification of summons and prosecution were received in the reporting period.

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

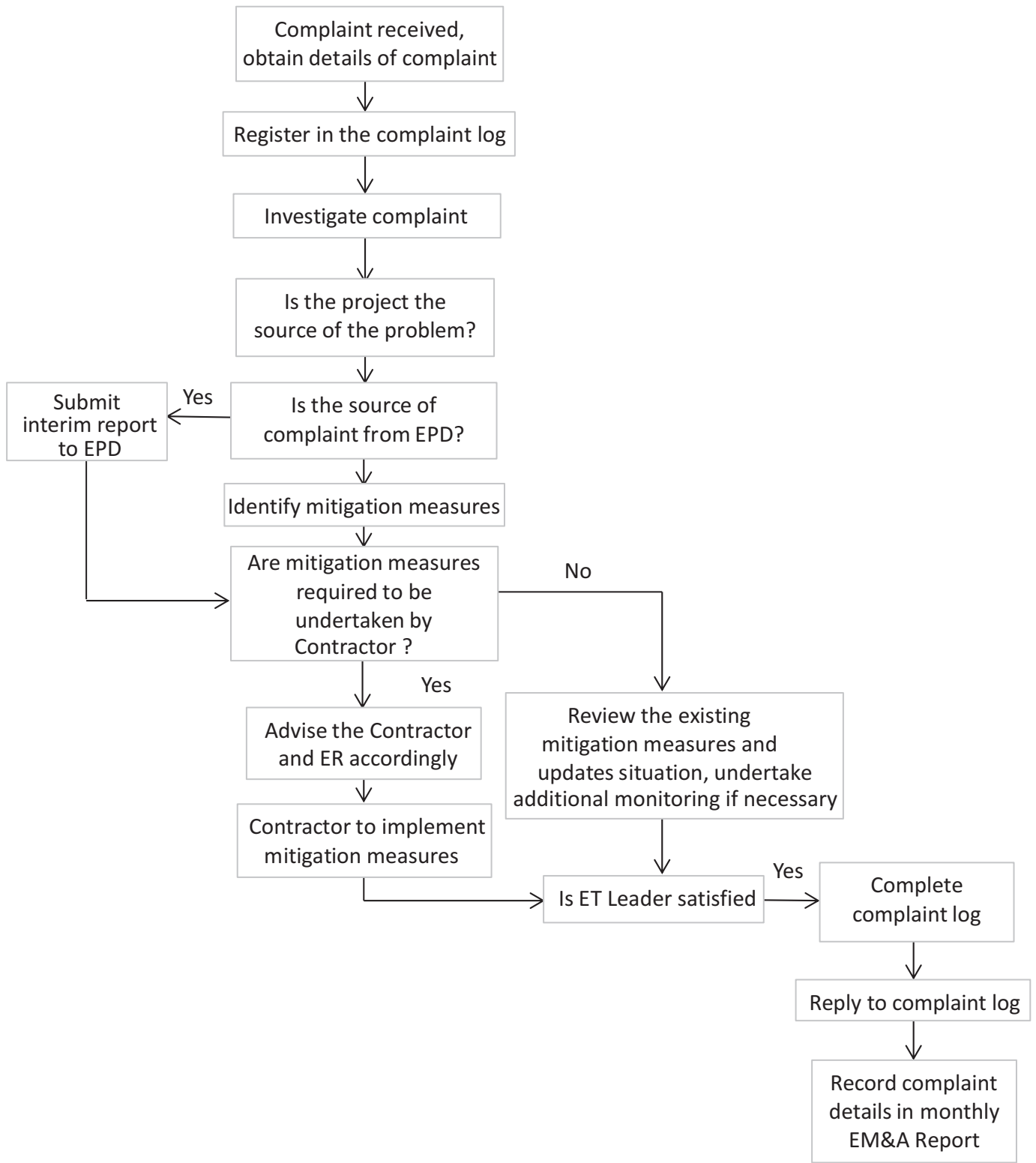


Figure 2.3

Environmental Complaint Handling Procedure

### 3 FUTURE KEY ISSUES

#### 3.1 CONSTRUCTION ACTIVITIES FOR THE COMING MONTH

As informed by the Contractor, the major works for the Project in June 2016 are summarized in *Table 3.1*.

*Table 3.1 Construction Works to Be Undertaken in the Coming Month*

<b>Works to be undertaken</b>
<i>Land-based Works</i>
<ul style="list-style-type: none"><li>• Box Culvert Extension at Works Area – Portion N-A;</li><li>• Construction of Cross Passage Tympanum – TBM tunnel;</li><li>• Excavation of Sub-sea Tunnel – TBM tunnel;</li><li>• Thrust Frame Removal – TBM tunnel;</li><li>• Sub-sea Tunnel Gallery Installation – TBM tunnel;</li><li>• Slab Construction of Tunnel Protection Enhancement – TBM tunnel;</li><li>• Deep Band Drain Installation – Portion S-A;</li><li>• Dewatering Deep well Installation – Portion S-A; and</li><li>• Jet Grouting, CSM Ground Treatment and Diaphragm Wall Construction – Portion S-A.</li></ul>

#### 3.2 KEY ISSUES FOR THE COMING MONTH

Potential environmental impacts arising from the above upcoming construction activities in the next reporting month of June 2016 are mainly associated with dust, marine ecology and waste management issues.

#### 3.3 MONITORING SCHEDULE FOR THE COMING MONTH

The tentative schedule for environmental monitoring in June 2016 is provided in *Appendix F*.

## 4.1

## CONCLUSIONS

This Thirty-first Monthly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 to 31 May 2016, 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. No Action Level or Limit Level exceedances were recorded in the air quality monitoring of this reporting month.

No Chinese White Dolphins sightings were recorded during the two sets of surveys in May 2016. No unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations during the dolphin monitoring in this reporting month. One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between March and May 2016, whilst no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations.

Environmental site inspection was carried out four (4) times in May 2016. Recommendations on 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.

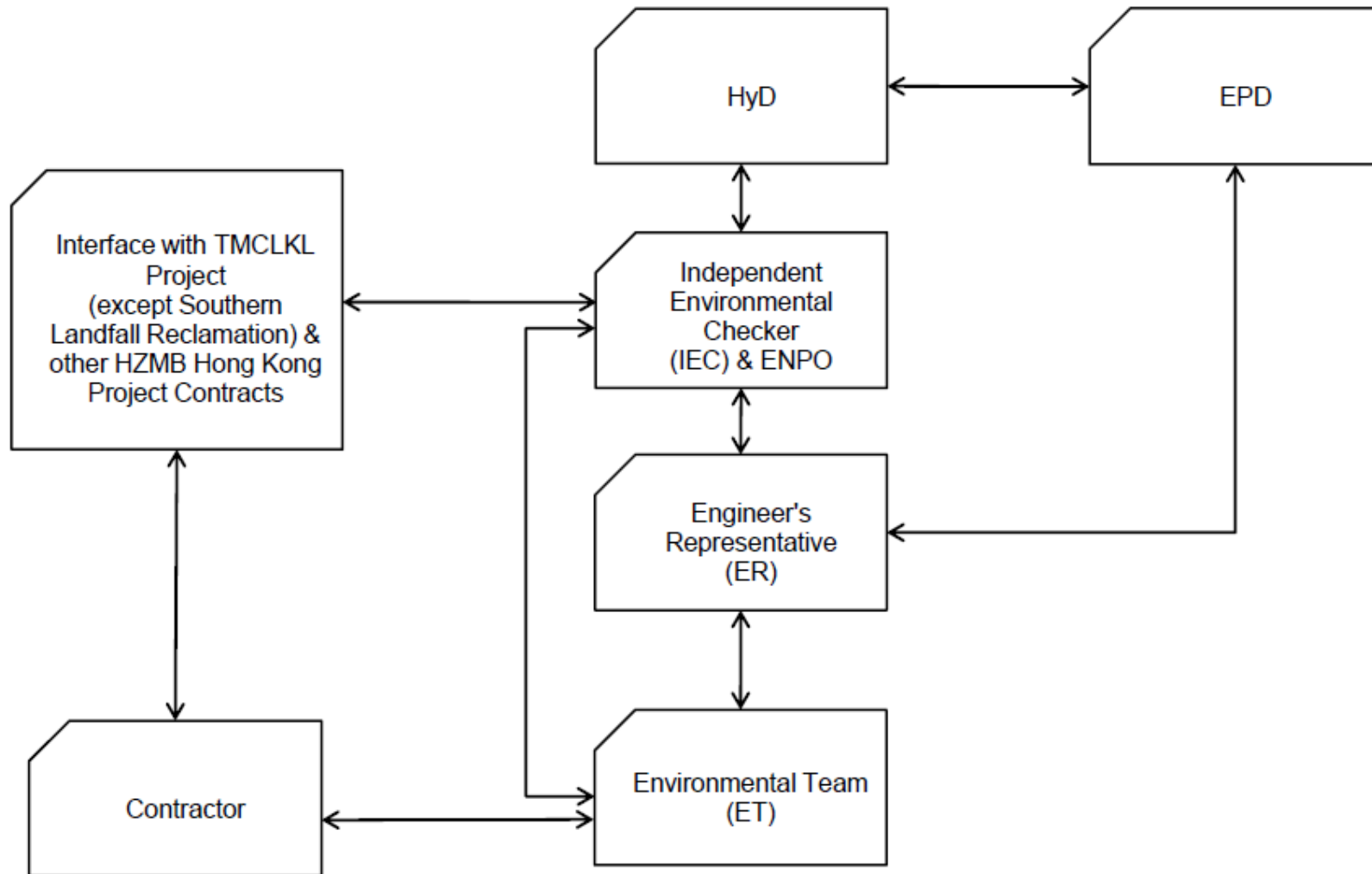
One (1) environmental complaint case regarding dust emission from the barge area at Southern Landfall was referred by EPD on 20 May 2016. The interim report was submitted to EPD on 24 May 2016.

No summons/ prosecution was received during the reporting period.

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

Appendix A

## Project Organization for Environmental Works



↔ Line of Communication

Appendix B

## Construction Programme



Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016							
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
<b>TMCLK - Northern Connection Sub-Sea Tunnel Section</b>											
<b>Contract Dates</b>											
<b>Site Possession Date</b>											
Portions: X1,(N10,11,13 & 14) - Sth Landfall				0	06-Aug-15						
<b>General Submissions</b>											
<b>Environmental</b>											
<b>Environmental Permit Submissions</b>											
<b>Supplementary WMP of C&amp;C Tunnel at Sth.Landfall</b>											
Supplementary WMP of C&C Tunnel at Sth.Landfall				0		28-Jun-14					
<b>Sediment Quality Report/Dumping Permit</b>											
<b>Southern Landfall</b>											
Southern landfall - Commencement of Shaft & C&C Tunnel Dwall				0	03-Oct-15						
Southern Landfall - Retrieval Shaft Excavation to tentative MD layer				0	15-Apr-16						
Southern Landfall - Commencement of C&C Tunnel Excavation				0	03-Mar-16						
Southern Landfall - Commencement of C&C Tunnel to tentative MD layer				0	02-Apr-16						
<b>Sediment Sampling &amp; Testing Plan (SSTP) - if required</b>											
Complete SSTP and Obtain EPD's approval				24	17-Feb-15	23-Mar-15					
<b>Sediment Quality Report (SQR) - if required</b>											
Advance Ground Investigation works for Sediment sampling				24	24-Mar-15	24-Apr-15					
Sediment Sample Testing & Report preparation				120	25-Apr-15	16-Sep-15					
<b>Dumping Permit for Load Dumping (Loading Permit) - if required</b>											
Finalize the application document and submit to EPD - for Dwall				24	20-Jan-15	16-Feb-15					
Notify the results and issue Loading Permit for Local & Cross Boundary Crossing - for Dwall				24	17-Feb-15	23-Mar-15					
<b>Cross Boundary Dumping Permit</b>											
Cross Boundary Dumping Approval				24	18-Feb-16	16-Mar-16					
Issuance of PRC Permit for Cat L, Mp				0		16-Mar-16					
<b>General Design Submissions</b>											
<b>(G6) IFA for Tunnel GBP</b>											
SO's Review				35	29-Apr-14	02-Jun-14					
SO Approval with Condition Received				0		03-Jun-14					
<b>PAYMENT MILESTONE</b>											
<b>Design and Design Checking of the Works</b>											
MS 2.20.3 Approve DDA for Cross Passages by the Supervising Officer by the Supervising Officer				0		31-Mar-15					
MS 2.32 Approve DDA for Approach Ramp Structures to Cut-and-cover Tunnels by the Supervising Officer				0		30-Apr-15					
MS 2.44 Approve DDA for South Ventilation Building by the Supervising Officer				0		30-Jun-15					
MS 2.48 Approve DDA for North Ventilation Building by the Supervising Officer				0		31-Jan-15					
MS 2.51 Submit DDA for Facilities Provision for TCSS				0		29-Nov-14					
MS 2.52 Approve DDA for Facilities Provision for TCSS by the Supervising Officer				0		28-Feb-15					
MS 2.56 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Southern Landfall by the Supervising Officer				0		30-Apr-15					
MS 2.60 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Northern Landfall by the Supervising Officer				0		31-Dec-14					
MS 2.69 Submit draft Operation and Maintenance Manual for all Tunnels and Cross Passgaes				0		29-Feb-16					
MS 2.70 Accept Operation and Maintenance Manual for all Tunnels and Cross Passgaes by the Supervising Officer				0		30-Jun-16					
MS 2.71 Submit draft Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes				0		29-Feb-16					
MS 2.72 Accept Operation and Maintenance Manual for all works except Tunnels and Cross Passgaes by the Supervising Offic				0		30-Jun-16					
<b>TBM Tunnel</b>											
MS 3.3.4 Complete walls of retrieval shaft				0		30-Jan-16					
MS 3.3.7 Completion of excavation, support and permanent lining for 1% of the total length (measured on plan) of the Nor				0		31-Dec-15					
MS 3.3.8 Completion of excavation, support and permanent lining for 2% of the total length (measured on plan) of the Nor				0		31-Dec-15					
MS 3.3.9 Completion of excavation, support and permanent lining for 3% of the total length (measured on plan) of the Nor				0		31-Dec-15					
MS 3.3.10 Completion of excavation, support and permanent lining for 4% of the total length (measured on plan) of the No				0		30-Jan-16					
MS 3.3.11 Completion of excavation, support and permanent lining for 5% of the total length (measured on plan) of the No				0		30-Jan-16					
MS 3.3.12 Completion of excavation, support and permanent lining for 6% of the total length (measured on plan) of the No				0		30-Jan-16					
MS 3.3.13 Completion of excavation, support and permanent lining for 7% of the total length (measured on plan) of the No				0		30-Jan-16					
MS 3.3.14 Completion of excavation, support and permanent lining for 8% of the total length (measured on plan) of the No				0		29-Feb-16					
MS 3.3.15 Completion of excavation, support and permanent lining for 9% of the total length (measured on plan) of the No				0		29-Feb-16					
MS 3.3.16 Completion of excavation, support and permanent lining for 10% of the total length (measured on plan) of the N				0		29-Feb-16					
MS 3.3.17 Completion of excavation, support and permanent lining for 11% of the total length (measured on plan) of the N				0		29-Feb-16					
MS 3.3.18 Completion of excavation, support and permanent lining for 12% of the total length (measured on plan) of the N				0		31-Mar-16					
MS 3.3.19 Completion of excavation, support and permanent lining for 13% of the total length (measured on plan) of the N				0		31-Mar-16					
MS 3.3.20 Completion of excavation, support and permanent lining for 14% of the total length (measured on plan) of the N				0		31-Mar-16					
MS 3.3.21 Completion of excavation, support and permanent lining for 15% of the total length (measured on plan) of the N				0		31-Mar-16					
MS 3.3.22 Completion of excavation, support and permanent lining for 16% of the total length (measured on plan) of the N				0		31-Mar-16					
MS 3.3.23 Completion of excavation, support and permanent lining for 17% of the total length (measured on plan) of the N				0		30-Apr-16					
MS 3.3.24 Completion of excavation, support and permanent lining for 18% of the total length (measured on plan) of the N				0		30-Apr-16					
MS 3.3.25 Completion of excavation, support and permanent lining for 19% of the total length (measured on plan) of the N				0		30-Apr-16					

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



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDUGEN-PRG-98507	WYu	SP
08-Apr-14	TMCLKDUGEN-PRG-98507 Rev.B	SP	WYu
28-Aug-14	TMCLKDUGEN-PRG-98507 Rev.C	CLa	WYu
10-Jun-15	TMCLKDUGEN-PRG-98507 Rev.F	WYu	



Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016								
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
MS 4.1.26 Complete excavation for 50% of total length (measured on plan) of all Cross Passages	0		31-Dec-15									
MS 4.1.27 Complete excavation for 100% of total length (measured on plan) of all Cross Passages	0		31-Mar-16		◆							
<b>Cut-and-cover Tunnel at Northern Landfall</b>												
MS 4.2.26 Complete 25% of permanent lining and internal structures for all Northern Landfall Cross Passages	0		30-Jul-16							◆		
MS 4.2.34 Complete Permanent junction structure at interface between Cut-and-cover and TBM Tunnel	0		30-Jul-16							◆		
<b>Approach Ramp Structures to Cut-and-cover Tunnel at Southern Landfall</b>												
MS 5.1.1 Complete 20% of excavation for approach ramp structures	0		31-Mar-16		◆							
MS 5.1.2 Complete 40% of excavation for approach ramp structures	0		31-Mar-16		◆							
MS 5.1.3 Complete 60% of excavation for approach ramp structures	0		31-Mar-16		◆							
MS 5.1.4 Complete 80% of excavation for approach ramp structures	0		30-Apr-16			◆						
MS 5.1.5 Complete 100% of excavation for approach ramp structures	0		30-Apr-16			◆						
MS 5.1.6 Complete retaining wall foundation for 10% of the total length (measured on plan) of approach ramp structure	0		31-Oct-15									
MS 5.1.7 Complete retaining wall foundation for 20% of the total length (measured on plan) of approach ramp structure	0		30-Nov-15									
MS 5.1.8 Complete retaining wall foundation for 30% of the total length (measured on plan) of approach ramp structure	0		30-Nov-15									
MS 5.1.9 Complete retaining wall foundation for 40% of the total length (measured on plan) of approach ramp structure	0		31-Dec-15									
MS 5.1.10 Complete retaining wall foundation for 50% of the total length (measured on plan) of approach ramp structure	0		31-Dec-15									
MS 5.1.11 Complete retaining wall foundation for 60% of the total length (measured on plan) of approach ramp structure	0		30-Jan-16									
MS 5.1.12 Complete retaining wall foundation for 70% of the total length (measured on plan) of approach ramp structure	0		30-Jan-16									
MS 5.1.13 Complete retaining wall foundation for 80% of the total length (measured on plan) of approach ramp structure	0		29-Feb-16									
MS 5.1.14 Complete retaining wall foundation for 90% of the total length (measured on plan) of approach ramp structure	0		29-Feb-16									
MS 5.1.15 Complete retaining wall foundation for 100% of the total length (measured on plan) of approach ramp structure	0		31-Mar-16			◆						
<b>South Ventilation Buildings</b>												
MS 7.1.3 Complete 100% of foundation for the ventilation building	0		30-Apr-16			◆						
<b>North Ventilation Buildings</b>												
MS 7.2.1 Complete 100% of cofferdam for excavation	0		31-May-16									
MS 7.2.2 Complete 100% of excavation to the formation level	0		31-May-16									
MS 7.2.4 Complete concreting works of 25% area of the total construction floor area for the ventilation building	0		30-Jul-16									◆

<b>Construction</b>												
<b>Northern Landfall</b>												
<b>North Reclamation (Phase 1)</b>												
<b>Construction</b>												
<b>Zone B</b>												
<b>Reclamation</b>												
Surcharge Removal - Zone B - (CH598 to 698) stage 1	10	28-Jul-16	08-Aug-16									■
Surcharge Period - Zone B - (CH648 to 698) stage 2	180	09-Aug-16	04-Feb-17									■
<b>Box Culvert Extension</b>												
<b>Construction</b>												
<b>Ch000-010 Culvert Outfall</b>												
Installation of temporary bulk head	26	10-Aug-15	08-Sep-15									
<b>CH000-150 Land Section</b>												
<b>ELS &amp; Structure</b>												
<b>Pile A43/A41 CJ to Pile A41/A39 CJ</b>												
<b>Box Culvert Structure</b>												
Pile cap construction	10	27-May-15	06-Jun-15									
Base slab construction including kicker	6	19-Jun-15	26-Jun-15									
Removal of strut S1	4	27-Jun-15	02-Jul-15									
System formworks delivery & setup	14	03-Jul-15	18-Jul-15									
Walls & top slab construction	6	20-Jul-15	25-Jul-15									
Removal of strut S2 & Backfilling up to required level	6	03-Aug-15	08-Aug-15									
<b>Pile A45/A43 CJ to Pile A43/A41 CJ</b>												
<b>Box Culvert Structure</b>												
Pile cap construction	10	08-Jun-15	18-Jun-15									
Base slab construction including kicker	6	27-Jun-15	04-Jul-15									
Removal of strut S1	4	06-Jul-15	09-Jul-15									
Walls & top slab construction	6	27-Jul-15	01-Aug-15									
Removal of strut S2 & Backfilling up to required level	6	10-Aug-15	15-Aug-15									
<b>Pile A47/A45 CJ to Pile A45/A43 CJ</b>												
<b>Box Culvert Structure</b>												
Pile cap construction	10	19-Jun-15	02-Jul-15									
Base slab construction including kicker	6	06-Jul-15	11-Jul-15									
Removal of strut S1	4	13-Jul-15	16-Jul-15									
Walls & top slab construction	6	03-Aug-15	08-Aug-15									
Removal of strut S2 & Backfilling up to required level	6	17-Aug-15	22-Aug-15									
<b>Pile A49/A47 CJ to Pile A47/A45 CJ</b>												
<b>Box Culvert Structure</b>												
Pile cap construction	10	03-Jul-15	14-Jul-15									
Base slab construction including kicker	6	15-Jul-15	21-Jul-15									

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016								
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Removal of strut S1	4	22-Jul-15	25-Jul-15									
Walls & top slab construction	6	10-Aug-15	15-Aug-15									
Removal of strut S2 & Backfilling up to required level	6	24-Aug-15	29-Aug-15									
<b>Pile A52/A49 CJ to Pile A49/A47 CJ</b>												
<b>Box Culvert Structure</b>												
Pile cap construction	10	22-Jul-15	01-Aug-15									
Base slab construction including kicker	6	03-Aug-15	08-Aug-15									
Removal of strut S1	4	10-Aug-15	13-Aug-15									
Walls & top slab construction	6	17-Aug-15	22-Aug-15									
Removal of strut S2 & Backfilling up to required level	6	31-Aug-15	05-Sep-15									
<b>Ch150-250 Marine Section</b>												
<b>ELS &amp; Structure</b>												
Dewatering well installation Ch180-250	12	19-Jun-15	04-Jul-15									
Dewatering well installation Ch100-180	12	06-Jul-15	18-Jul-15									
1st Pumping test	18	20-Jul-15	08-Aug-15									
Toe grouting Ch100-250	95	07-Sep-15	31-Dec-15									
<b>Pile A41/A39 CJ to Pile A39/A37 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	5	24-Feb-16	29-Feb-16									
Installation of strut S1	5	01-Mar-16	05-Mar-16									
Excavation to FEL	5	07-Mar-16	11-Mar-16									
<b>Box Culvert Structure</b>												
Pile cap construction	10	18-Mar-16	01-Apr-16									
Base slab construction including kicker	6	15-Apr-16	21-Apr-16									
Removal of strut S1	4	22-Apr-16	26-Apr-16									
Sliding formworks 1st assembly	18	27-Apr-16	19-May-16									
Walls & top slab construction	6	20-May-16	26-May-16									
Removal of strut S2 & Backfilling up to required level	6	03-Jun-16	10-Jun-16									
<b>Pile A39/A37 CJ to Pile A37/A35 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	5	01-Mar-16	05-Mar-16									
Installation of strut S1	5	07-Mar-16	11-Mar-16									
Excavation to FEL	5	12-Mar-16	17-Mar-16									
<b>Box Culvert Structure</b>												
Pile cap construction	10	02-Apr-16	14-Apr-16									
Base slab construction including kicker	6	22-Apr-16	28-Apr-16									
Removal of strut S1	4	29-Apr-16	04-May-16									
Walls & top slab construction	6	27-May-16	02-Jun-16									
Removal of strut S2 & Backfilling up to required level	6	11-Jun-16	17-Jun-16									
<b>Pile A37/A35 CJ to Pile A35/A33 CJ</b>												
<b>ELS</b>												
Installation of strut S2	6	26-Feb-16	03-Mar-16									
Excavation to 0.5m below strut S1	5	07-Mar-16	11-Mar-16									
Installation of strut S1	5	12-Mar-16	17-Mar-16									
Excavation to FEL	5	18-Mar-16	23-Mar-16									
<b>Box Culvert Structure</b>												
Pile cap construction	10	15-Apr-16	26-Apr-16									
Base slab construction including kicker	6	29-Apr-16	06-May-16									
Removal of strut S1	4	07-May-16	11-May-16									
Walls & top slab construction	6	03-Jun-16	10-Jun-16									
Removal of strut S2 & Backfilling up to required level	6	18-Jun-16	24-Jun-16									
<b>Pile A35/A33 CJ to Pile A33/P117 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S2	4	26-Feb-16	01-Mar-16									
Installation of strut S2	6	02-Mar-16	08-Mar-16									
Excavation to 0.5m below strut S1	5	12-Mar-16	17-Mar-16									
Installation of strut S1	5	18-Mar-16	23-Mar-16									
Excavation to FEL	5	24-Mar-16	01-Apr-16									
<b>Box Culvert Structure</b>												
Pile cap construction	10	27-Apr-16	09-May-16									
Base slab construction including kicker	6	10-May-16	17-May-16									
Removal of strut S1	4	18-May-16	21-May-16									
Walls & top slab construction	6	11-Jun-16	17-Jun-16									
Removal of strut S2 & Backfilling up to required level	6	25-Jun-16	02-Jul-16									
<b>Pile A33/P117 CJ to Pile P113/P109 CJ</b>												
<b>ELS</b>												

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



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12-Feb-14	TMCLKDBJGEN-PRG-98507	WYu	SPe
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10-Jun-15	TMCLKDBJGEN-PRG-98507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016								
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Excavation to 0.5m below strut S1	9	09-Mar-16	18-Mar-16	█								
Installation of strut S1	5	19-Mar-16	24-Mar-16		█							
Excavation to FEL	5	02-Apr-16	08-Apr-16			█						
<b>Box Culvert Structure</b>												
Base slab construction including kicker	6	18-May-16	24-May-16				█					
Removal of strut S1	4	25-May-16	28-May-16					█				
Walls & top slab construction	6	18-Jun-16	24-Jun-16						█			
Removal of strut S2 & Backfilling up to required level	6	04-Jul-16	09-Jul-16							█		
<b>Pile P113/P109 CJ to Pile P105/P101 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	9	17-Mar-16	30-Mar-16	█								
Installation of strut S1	5	31-Mar-16	06-Apr-16		█							
Excavation to FEL	5	09-Apr-16	14-Apr-16			█						
<b>Box Culvert Structure</b>												
Base slab construction including kicker	6	25-May-16	31-May-16				█					
Removal of strut S1	4	01-Jun-16	04-Jun-16					█				
Walls & top slab construction	6	25-Jun-16	02-Jul-16						█			
Removal of strut S2 & Backfilling up to required level	6	11-Jul-16	16-Jul-16							█		
<b>Pile P105/P101 CJ to Pile P97/P93 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	9	29-Mar-16	08-Apr-16	█								
Installation of strut S1	5	09-Apr-16	14-Apr-16		█							
Excavation to FEL	5	15-Apr-16	20-Apr-16			█						
<b>Box Culvert Structure</b>												
Base slab construction including kicker	6	01-Jun-16	07-Jun-16				█					
Removal of strut S1	4	08-Jun-16	13-Jun-16					█				
Walls & top slab construction	6	04-Jul-16	09-Jul-16						█			
Removal of strut S2 & Backfilling up to required level	6	18-Jul-16	23-Jul-16							█		
<b>Pile P97/P93 CJ to Pile P89/P85 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	9	07-Apr-16	16-Apr-16	█								
Installation of strut S1	5	18-Apr-16	22-Apr-16		█							
Excavation to FEL	5	23-Apr-16	28-Apr-16			█						
<b>Box Culvert Structure</b>												
Base slab construction including kicker	6	08-Jun-16	15-Jun-16				█					
Removal of strut S1	4	16-Jun-16	20-Jun-16					█				
Walls & top slab construction	6	11-Jul-16	16-Jul-16						█			
Removal of strut S2 & Backfilling up to required level	6	25-Jul-16	30-Jul-16							█		
<b>Pile P89/P85 CJ to Pile P81/P77 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	9	15-Apr-16	25-Apr-16	█								
Installation of strut S1	5	26-Apr-16	30-Apr-16		█							
Excavation to FEL	5	03-May-16	07-May-16			█						
<b>Box Culvert Structure</b>												
Base slab construction including kicker	6	16-Jun-16	22-Jun-16				█					
Removal of strut S1	4	23-Jun-16	27-Jun-16					█				
Walls & top slab construction	6	18-Jul-16	23-Jul-16						█			
Removal of strut S2 & Backfilling up to required level	6	01-Aug-16	06-Aug-16							█		
<b>Pile P81/P77 CJ to Pile P73/P69 CJ</b>												
<b>ELS</b>												
Excavation to 0.5m below strut S1	9	23-Apr-16	04-May-16	█								
Installation of strut S1	5	05-May-16	10-May-16		█							
Excavation to FEL	5	11-May-16	17-May-16			█						
<b>Box Culvert Structure</b>												
Base slab construction including kicker	6	23-Jun-16	29-Jun-16				█					
Removal of strut S1	4	30-Jun-16	05-Jul-16					█				
Walls & top slab construction	6	25-Jul-16	30-Jul-16						█			
Removal of strut S2 & Backfilling up to required level	6	08-Aug-16	13-Aug-16							█		
<b>Ch250-380 Marine Section</b>												
Installation of Dewatering & Observation Well Ch 250-380	23	04-Nov-15	30-Nov-15									
1st Pumping Test & Analysis	17	01-Dec-15	19-Dec-15									
Toe Grouting	106	21-Dec-15	07-May-16									
2nd Pumping test & Analysis	25	08-Apr-16	07-May-16									
Remaining toe grouting Ch250-380	51	09-May-16	09-Jul-16									
<b>Miscellaneous works</b>												
<b>Inspection Manhole (IM)</b>												

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



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10-Jun-15	TMCLKDBJGEN-PRG-98507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016										
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct			
Inspection Manhole IM-05 to IM-08 & backfilling to +6.0mPD	18	15-Aug-16	03-Sep-16											
<b>North Launching Shaft</b>														
<b>Design Submission</b>														
<b>(C1) DDA for North Approach Ramp Permanent Structure</b>														
IPs Review	28	23-Oct-14	19-Nov-14											
IP's No Objection Received	0		19-Nov-14											
SO's Review	35	23-Oct-14	26-Nov-14											
SO Approval with Condition Received	0		26-Nov-14											
<b>North Ventilation Shaft</b>														
<b>Construction</b>														
<b>North Ventilation Shaft Structure</b>														
NVS - ML03 Tunnel Structure	47	24-May-16	20-Jul-16											
NVS - ML02 Tunnel Structure	44	05-Apr-16	27-May-16											
<b>TMCLK VO-008 - Construction of Viaduct Foundations at Portion N6A</b>														
<b>Viaduct Pile Cap</b>														
<b>Construction</b>														
<b>Pier G1c</b>														
Pile Cap G1c - Preparation for ELS	6	24-Oct-14	30-Oct-14											
Pile Cap G1c - Removal of Existing ground slab	6	31-Oct-14	06-Nov-14											
Pile Cap G1c - Excavation & ELS Installation	12	07-Nov-14	20-Nov-14											
Pile Cap G1c - Blinding Concrete	3	21-Nov-14	24-Nov-14											
Pile Cap G1c - Rebar & Concreting	18	25-Nov-14	15-Dec-14											
Pile Cap G1c - Backfilling & Temp Reinstatement	6	16-Dec-14	22-Dec-14											
<b>Pier H1c</b>														
Pile Cap H1c - Preparation for ELS	6	02-Nov-15	07-Nov-15											
Pile Cap H1c - Removal of Existing ground slab	6	09-Nov-15	14-Nov-15											
Pile Cap H1c - Excavation & ELS Installation	12	16-Nov-15	28-Nov-15											
Pile Cap H1c - Blinding Concrete	3	30-Nov-15	02-Dec-15											
<b>North Approach TBM Tunnelling &amp; Cross Passage</b>														
<b>Construction</b>														
<b>North Approach Tunnel Internal Structure - NB</b>														
NB - North TBM Tunnel - Invert Backfilling (Ch6870 to 6688 - 182m) Stage 1	77	06-Dec-15	24-Feb-16											
NB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m) Stage 1	54	01-Apr-16	26-May-16											
NB - North TBM Tunnel - Invert Precast Gallery Installation (Ch6870 to 6688 - 182m)	77	29-Dec-15	18-Mar-16											
NB - North TBM Tunnel - Invert Precast Gallery Installation (Ch6688 to 6560 - 128m)	54	13-Apr-16	07-Jun-16											
NB - North TBM Tunnel - Invert Backfilling (Ch6925 to 6870 - 55m) Stage 2	14	05-Jan-16	19-Jan-16											
NB - North TBM Tunnel - Invert Backfilling (Ch6870 to 6688 - 182m) Stage 2	77	19-Jan-16	11-Apr-16											
NB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m) Stage 2	54	28-Apr-16	23-Jun-16											
CP55 - Excavation & Lining completion	0		14-Jun-16											
CP53 - Excavation & Lining completion	0		16-Mar-16											
CP52 - Excavation & Lining completion	0		22-Apr-16											
CP50 - Excavation & Lining completion	0		26-Jul-16											
<b>North Approach Tunnel Internal Structure - SB</b>														
SB - North TBM Tunnel - Invert Backfilling (Ch6870 to 6688 - 182m)	77	01-Jan-16	21-Mar-16											
SB - North TBM Tunnel - Invert Backfilling (Ch6688 to 6560 - 128m)	54	21-Mar-16	18-May-16											
<b>North Approach Cross Passage</b>														
<b>CP55 - Traditional Method</b>														
CP Setup	6	21-Mar-16	31-Mar-16											
1st Segment Opening	7	31-Mar-16	09-Apr-16											
CP Excavation	14	09-Apr-16	26-Apr-16											
CP Lining	14	26-Apr-16	13-May-16											
2nd Segment Opening	7	13-May-16	23-May-16											
CP Finishing & Demobilization	18	23-May-16	14-Jun-16											
<b>CP54 - Traditional Method</b>														
CP Setup	6	14-Jun-16	21-Jun-16											
1st Segment Opening	7	21-Jun-16	29-Jun-16											
CP Excavation	14	29-Jun-16	16-Jul-16											
CP Lining	14	16-Jul-16	02-Aug-16											
2nd Segment Opening	7	02-Aug-16	10-Aug-16											
CP Finishing & Demobilization	18	10-Aug-16	31-Aug-16											
<b>CP53 - Pipe Jacking Method</b>														
CP - Pipe Jacking TBM - Delivery, Assembly & Setup	23	05-Jan-16	01-Feb-16											
CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation	9	01-Feb-16	10-Feb-16											
CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal	10	10-Feb-16	20-Feb-16											
CP - Waterproofing, Finishing	21	20-Feb-16	16-Mar-16											
<b>CP52 - Pipe Jacking Method</b>														
CP52 Platform Available from ML03 North Approach Tunnel Backfilling	0	30-Jan-16												

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

**TMCLK - Northern Connection Sub-Sea Tunnel Section**  
Detailed Works Programme (Rev. F)  
Three Months Rolling Programme  
Progress as of 29-May-16



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12-Feb-14	TMCLKDBJGEN-PRG-98507	WYu	SPe
08-Apr-14	TMCLKDBJGEN-PRG-98507 Rev.B	SPe	WYu
28-Aug-14	TMCLKDBJGEN-PRG-98507 Rev.C	CLa	WYu
10-Jun-15	TMCLKDBJGEN-PRG-98507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016						
				Mar	Apr	May	Jun	Jul	Aug	Sep
CP - Pipe Jacking TBM - Delivery, Assembly & Setup	23	01-Feb-16	05-Mar-16	CP - Pipe Jacking TBM - Delivery, Assembly & Setup						
CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation	9	05-Mar-16	14-Mar-16	CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation						
CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal	10	14-Mar-16	24-Mar-16	CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal						
CP Finishing & Demobilization	21	24-Mar-16	22-Apr-16	CP Finishing & Demobilization						
<b>CP51 - Traditional Method</b>										
CP51 Platform Available from ML03 North Approach Tunnel Backfilling	0	31-Mar-16		CP51 Platform Available from ML03 North Approach Tunnel Backfilling						
CP51 Platform Available from ML02 North Approach Tunnel Backfilling	0	10-Mar-16		CP51 Platform Available from ML02 North Approach Tunnel Backfilling						
CP Excavation	14	14-Sep-16	28-Sep-16	CP Excavation						
CP Lining	14	28-Sep-16	12-Oct-16	CP Lining						
<b>CP50 - Pipe Jacking Method</b>										
CP50 Platform Available from ML03 North Approach Tunnel Backfilling	0	16-May-16		CP50 Platform Available from ML03 North Approach Tunnel Backfilling						
CP50 Platform Available from ML02 North Approach Tunnel Backfilling	0	09-Apr-16		CP50 Platform Available from ML02 North Approach Tunnel Backfilling						
CP Setup	23	16-May-16	11-Jun-16	CP Setup						
CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation	9	12-Jun-16	21-Jun-16	CP - Pipe Jacking Method - Break-in, Excavation & Lining Installation						
CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal	10	22-Jun-16	01-Jul-16	CP - Pipe Jacking Method - Break out & Pipe Jacking TBM Removal						
CP Finishing & Demobilization	21	02-Jul-16	26-Jul-16	CP Finishing & Demobilization						
<b>North Ventilation Building</b>										
<b>Design Submission</b>										
<b>(A11) Submissions to Design Advisory Panel of ArchSD</b>										
ArchSD's comment	30	10-Jun-14	09-Jul-14							
<b>(I1) DDA for North Vent. Bldgs. GBP &amp; Arch. Submission</b>										
IPs Review	28	21-Aug-14	17-Sep-14							
IP's No Objection Received	0		17-Sep-14							
SO's Review	35	21-Aug-14	24-Sep-14							
SO Approval with Condition Received	0		24-Sep-14							
<b>(I1) DDA for North &amp; South Vent. Bldg. ABWF works</b>										
Preparation of DDA North & South ABWF	18	25-Sep-14	17-Oct-14							
Review & Comment by JV	24	18-Oct-14	14-Nov-14							
Designer prepare DDA	15	15-Nov-14	02-Dec-14							
Formal Submission of DDA to ICE/ IPs	0		02-Dec-14							
Advanced Submission to SO	0		02-Dec-14							
IPs/ SO's Advance Comments/ ICE Comments	28	03-Dec-14	30-Dec-14							
Comments Received	0		30-Dec-14							
Designer to Reply RTC + Update Submission	21	31-Dec-14	24-Jan-15							
<b>(I2) DDA for North Vent. Bldgs. Structural Design incl. Vent. Connections</b>										
ICE Approval & Issue Check Cert	12	24-Dec-14	09-Jan-15							
Submit ICE Check Cert to SO	6	10-Jan-15	16-Jan-15							
IPs Review	28	24-Dec-14	20-Jan-15							
IP's No Objection Received	0		20-Jan-15							
SO's Review	35	24-Dec-14	27-Jan-15							
SO Approval with Condition Received	0		27-Jan-15							
<b>(I3) DDA for North &amp; South Vent. Bldgs. Service and E&amp;M Provision</b>										
Designer to Reply RTC + Update Submission	21	18-Dec-14	14-Jan-15							
Submit Updated DDA to SO/ ICE/ IPs	0	15-Jan-15								
ICE Approval & Issue Check Cert	12	15-Jan-15	28-Jan-15							
Submit ICE Check Cert to SO	6	29-Jan-15	04-Feb-15							
IPs Review	28	15-Jan-15	11-Feb-15							
IP's No Objection Received	0		11-Feb-15							
SO's Review	35	15-Jan-15	18-Feb-15							
SO Approval with Condition Received	0		18-Feb-15							
<b>(C3) DDA for North Vent Shaft &amp; Duct Permanent Structure</b>										
ICE Approval & Issue Check Cert	12	22-Nov-14	05-Dec-14							
Submit ICE Check Cert to SO	6	06-Dec-14	12-Dec-14							
IPs Review	28	22-Nov-14	19-Dec-14							
IP's No Objection Received	0		19-Dec-14							
SO's Review	35	22-Nov-14	26-Dec-14							
SO Approval with Condition Received	0		27-Dec-14							
<b>Construction</b>										
Substructure	120	04-Jul-16	24-Nov-16							
<b>North Surface Roadworks, Utility &amp; Drainage works</b>										
<b>Design Submission</b>										
<b>(A20) DDA for Traffic Sign, Road Marking, Street Furnitures, Sign Gantry &amp; etc</b>										
SO's Review	35	11-Dec-14	14-Jan-15							
SO Approval with Condition Received	0		14-Jan-15							
<b>(C2) DDA for Sewerage, Drainage, Waterworks &amp; Utility works for North Landfall</b>										

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



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12-Feb-14	TMCLKDBJGEN-PRG-08507	WYu	SPe
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10-Jun-15	TMCLKDBJGEN-PRG-08507 Rev. F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016							
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
IPs Review	28	08-Nov-14	05-Dec-14								
IP's No Objection Received	0		05-Dec-14								
SO's Review	35	08-Nov-14	12-Dec-14								
SO Approval with Condition Received	0		12-Dec-14								
<b>Sub-sea Tunnel</b>											
<b>Sub-sea TBM Tunnelling</b>											
<b>Major Procurement</b>											
<b>Precast Segment ID12.40 - Production for Sub-sea TBM Tunnel</b>											
ID12.40 TBM Segment Ring Fabrication - 12 rings per day	300	22-Nov-14	19-Dec-15								
<b>Design Submission</b>											
<b>(B6) Risk Assessment of Submarine Cable - Tunnelling Works</b>											
CLP Review (4 weeks)	28	17-Mar-15	13-Apr-15								
CLP Comment Received	0		13-Apr-15								
SO's Condition Approval	35	12-Mar-15	15-Apr-15								
<b>(G1) DDA for TBM Tunnel Lining Structural Design - Sub-sea tunnel</b>											
Sub-sea TBM Tunnel Segment - Fabrication	265	06-Oct-14	29-Aug-15								
<b>(G3) DDA for TBM Tunnel Internal Structures (Sub-sea)</b>											
Sub-sea Tunnel - Precast Gallery Fabrication	244	22-Jan-15	21-Nov-15								
<b>Construction</b>											
<b>Sub-sea TBM Tunnel - NB ID12.2m - S881</b>											
NB TBM Change diameter at North Ventilation Shaft	87	30-Dec-15	01-Apr-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6522 to 6500 - 22m)	5	01-Apr-16	06-Apr-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6500 to 6430 - 70m)	15	06-Apr-16	21-Apr-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6430 to 6350 - 80m)	17	21-Apr-16	08-May-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6350 to 6300 - 50m)	10	08-May-16	19-May-16								
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6300 to 6260 - 40m)	5	19-May-16	24-May-16								
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6260 to 6240 - 20m)	2	24-May-16	26-May-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6240 to 6175 - 65m)	11	26-May-16	06-Jun-16								
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6175 to 6135 - 40m)	5	06-Jun-16	11-Jun-16								
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6135 to 6100 - 35m)	3	11-Jun-16	14-Jun-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6100 to 6050 - 50m)	9	14-Jun-16	24-Jun-16								
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6050 to 6010 - 40m)	5	24-Jun-16	29-Jun-16								
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6010 to 5830 - 180m)	14	29-Jun-16	13-Jul-16								
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5830 to 5810 - 20m)	2	13-Jul-16	16-Jul-16								
NB - Sub-sea TBM Tunnel - Transition with Saturation (Ch5810 to 5740 - 70m)	12	16-Jul-16	28-Jul-16								
NB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5740 to 5550 - 190m)	22	28-Jul-16	20-Aug-16								
NB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5550 to 5330 - 220m)	18	20-Aug-16	07-Sep-16								
<b>Sub-sea TBM Tunnel - SB ID12.2m - S882</b>											
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6451 to 6371 - 80m)	17	30-Jan-16	19-Feb-16								
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6371 to 6321 - 50m)	10	19-Feb-16	29-Feb-16								
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6321 to 6281 - 40m)	5	29-Feb-16	05-Mar-16								
SB - Sub-sea TBM Tunnel - Steel Bell dismantling & Reconnect for NVS supply	27	05-Mar-16	04-Apr-16								
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6281 to 6261 - 20m)	2	04-Apr-16	06-Apr-16								
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6261 to 6196 - 65m)	11	06-Apr-16	17-Apr-16								
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6196 to 6156 - 40m)	5	17-Apr-16	22-Apr-16								
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6156 to 6121 - 35m)	3	22-Apr-16	25-Apr-16								
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch6121 to 6071 - 50m)	9	25-Apr-16	04-May-16								
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch6071 to 6031 - 40m)	5	04-May-16	09-May-16								
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch6031 to 5851 - 180m)	14	09-May-16	24-May-16								
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5851 to 5831 - 20m)	2	24-May-16	26-May-16								
SB - Sub-sea TBM Tunnel - Transition with Saturation (Ch5831 to 5761 - 70m)	12	26-May-16	07-Jun-16								
SB - Sub-sea TBM Tunnel - CDG+Boulder with Saturation (Ch5761 to 5571 - 190m)	22	07-Jun-16	30-Jun-16								
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5571 to 5351 - 220m)	18	30-Jun-16	19-Jul-16								
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch5351 to 4971 - 380m)	30	19-Jul-16	19-Aug-16								
SB - Sub-sea TBM Tunnel - CDG with Saturation (Ch4971 to 4891 - 80m)	6	19-Aug-16	25-Aug-16								
SB - Sub-sea TBM Tunnel - ALLUVIUMS silty with Trimix (Ch4891 to 4771 - 120)	8	25-Aug-16	02-Sep-16								
<b>Sub-sea TBM Tunnel - NB - Precast Invert Gallery</b>											
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP48	16	26-May-16	11-Jun-16								
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP47	12	11-Jun-16	24-Jun-16								
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP46	9	24-Jun-16	03-Jul-16								
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP45	10	03-Jul-16	13-Jul-16								
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP44	14	13-Jul-16	28-Jul-16								
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP43	11	28-Jul-16	08-Aug-16								
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP42	11	08-Aug-16	20-Aug-16								

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



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG-08507	WYu	SPe
08-Apr-14	TMCLKDBJGEN-PRG-08507 Rev.B	SPe	WYu
28-Aug-14	TMCLKDBJGEN-PRG-08507 Rev.C	CLa	WYu
10-Jun-15	TMCLKDBJGEN-PRG-08507 Rev.F	WYu	



Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016										
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct			
NB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP41	9	20-Aug-16	29-Aug-16											
<b>Sub-sea TBM Tunnel - SB - Precast Invert Gallery</b>														
SB - ISIG Assembly for Sub-sea TBM Tunnel	7	15-Jan-16	22-Jan-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP48	14	04-Apr-16	18-Apr-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP47	11	18-Apr-16	29-Apr-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP46	11	29-Apr-16	10-May-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP45	8	10-May-16	19-May-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP44	8	19-May-16	27-May-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP43	15	27-May-16	11-Jun-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP42	13	11-Jun-16	25-Jun-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP41	10	25-Jun-16	05-Jul-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP40	8	05-Jul-16	13-Jul-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP39	9	13-Jul-16	23-Jul-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP38	7	23-Jul-16	30-Jul-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP37	8	30-Jul-16	07-Aug-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP36	8	07-Aug-16	16-Aug-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP35	7	16-Aug-16	23-Aug-16											
SB - Sub-sea TBM Tunnel - Precast Invert Gallery - Completion to CP34	7	23-Aug-16	30-Aug-16											
<b>Sub-sea Tunnel Cross Passage &amp; Internal Structure</b>														
<b>Design Submission</b>														
<b>(G4) DDA for Cross Passage - Permanent works - incl. Geotechnical Assessment - Sub-sea tunnel</b>														
IPs/ SO's Advance Comments/ ICE Comments	28	21-Dec-14	17-Jan-15											
Comments Received	0		17-Jan-15											
Designer to Reply RiC + Update Submission	21	19-Jan-15	11-Feb-15											
Submit Updated DDA to SO/ ICE/ IPs	0	12-Feb-15												
ICE Approval & Issue Check Cert	12	12-Feb-15	04-Mar-15											
Submit ICE Check Cert to SO	6	05-Mar-15	11-Mar-15											
IPs Review	28	12-Feb-15	11-Mar-15											
IP's No Objection Received	0		11-Mar-15											
SO's Review	35	12-Feb-15	18-Mar-15											
SO Approval with Condition Received	0		18-Mar-15											
<b>Construction</b>														
<b>Sub-sea Tunnel Cross Passage</b>														
<b>CP48 - ML03 - Ch6489</b>														
CP - Pipe Jacking Method - Setup & Assembly	23	20-Jun-16	18-Jul-16											
CP - Piping Jacking Method - Break-in & Excavation	10	18-Jul-16	28-Jul-16											
CP - Pipe Jacking Method - Break-out & Demobilization	11	28-Jul-16	08-Aug-16											
CP - Remaining Internal Structure & Finishing	21	08-Aug-16	01-Sep-16											
<b>CP47 - ML03 - Ch6390</b>														
CP - Pipe Jacking Method - Setup & Assembly	23	24-Jun-16	22-Jul-16											
CP - Piping Jacking Method - Break-in & Excavation	10	22-Jul-16	01-Aug-16											
CP - Pipe Jacking Method - Break-out & Demobilization	12	01-Aug-16	13-Aug-16											
CP - Remaining Internal Structure & Finishing	21	13-Aug-16	07-Sep-16											
<b>CP46 - ML03 - Ch6292</b>														
CP - Pipe Jacking Method - Setup & Assembly	23	12-Jul-16	08-Aug-16											
CP - Pipe Jacking Method - Break-in & Excavation	10	08-Aug-16	18-Aug-16											
CP - Pipe Jacking Method - Break-out & Demobilization	12	18-Aug-16	30-Aug-16											
<b>CP45 - ML03 - Ch6193</b>														
CP - Pipe Jacking Method - Setup & Assembly	23	18-Jul-16	13-Aug-16											
CP - Pipe Jacking Method - Break-in & Excavation	10	13-Aug-16	23-Aug-16											
CP - Pipe Jacking Method - Break-out & Demobilization	12	23-Aug-16	04-Sep-16											
<b>CP44 - ML03 - Ch6095</b>														
CP - Pipe Jacking Method - Setup & Assembly	23	06-Aug-16	02-Sep-16											
<b>CP43 - ML03 - Ch5996</b>														
CP - Pipe Jacking Method - Setup & Assembly	23	11-Aug-16	07-Sep-16											
<b>Sub-sea TBM Tunnel - NB - Remaining Internal Structure</b>														
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP48	5	08-Aug-16	13-Aug-16											
NB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP47	5	13-Aug-16	19-Aug-16											
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP48	4	13-Aug-16	18-Aug-16											
NB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP47	4	19-Aug-16	23-Aug-16											
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP48	4	18-Aug-16	22-Aug-16											
NB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP47	4	23-Aug-16	27-Aug-16											
<b>Sub-sea TBM Tunnel - SB - Remaining Internal Structure</b>														
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP48	5	08-Aug-16	13-Aug-16											
SB - Sub-sea TBM Tunnel - Corbel & Cable Trough - Completion to CP47	5	13-Aug-16	19-Aug-16											

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



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBUGEN-PRG-08507	WYU	SPB
08-Apr-14	TMCLKDBUGEN-PRG-08507 Rev.B	SPB	WYU
28-Aug-14	TMCLKDBUGEN-PRG-08507 Rev.C	CLa	WYU
10-Jun-15	TMCLKDBUGEN-PRG-08507 Rev.F	WYU	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016									
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct		
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP48	5	13-Aug-16	19-Aug-16										
SB - Sub-sea TBM Tunnel - OHVD Slab installation - Completion to CP47	5	19-Aug-16	24-Aug-16										
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP48	5	19-Aug-16	24-Aug-16										
SB - Sub-sea TBM Tunnel - Fire Proofing - Completion to CP47	5	24-Aug-16	29-Aug-16										
<b>Southern Landfall</b>													
<b>South Cut &amp; Cover Tunnel</b>													
<b>Design Submission</b>													
<b>(E2) DDA for South C&amp;C Box &amp; Approach Ramp</b>													
Review & Comment by JV	18	09-Dec-14	31-Dec-14										
Designer prepare DDA	10	02-Jan-15	13-Jan-15										
Formal Submission of DDA to ICE/ IPs	0		13-Jan-15										
Advanced Submission to SO	0		13-Jan-15										
IPs/SO's Advance Comments/ ICE Comments	28	14-Jan-15	10-Feb-15										
Comments Received	0		10-Feb-15										
Designer to Reply RfC + Update Submission	21	11-Feb-15	13-Mar-15										
Submit Updated DDA to SO/ ICE/ IPs	0	14-Mar-15											
ICE Approval & Issue Check Cert	18	14-Mar-15	08-Apr-15										
Submit ICE Check Cert to SO	6	09-Apr-15	15-Apr-15										
IPs Review	28	14-Mar-15	10-Apr-15										
SO's Review	35	14-Mar-15	17-Apr-15										
<b>Method Statement Submission</b>													
<b>Method Statement of Construction Methodology of C&amp;C Tunnels</b>													
Preparation Method Statement for C&C Tunnels	25	28-Mar-15	30-Apr-15										
Submit Method Statement to SO	0		30-Apr-15										
SO Reviews & Comments	28	01-May-15	28-May-15										
Re-submission	18	29-May-15	18-Jun-15										
SO's Review	28	19-Jun-15	16-Jul-15										
<b>Construction</b>													
South C&C Tunnel - Diaphragm Wall	120	03-Oct-15	02-Mar-16										
C&C Tunnel - 1st 85m - Excavation by ramp	23	03-Mar-16	01-Apr-16										
C&C Tunnel - 1st 85m - Excavation by vertical mean	11	02-Apr-16	15-Apr-16										
C&C Tunnel - 1st 85m - Tunnel Structure	95	16-Apr-16	09-Aug-16										
C&C Tunnel - 1st 85m - Backfilling	4	10-Aug-16	13-Aug-16										
C&C Tunnel - 2nd 85m - Excavation by ramp	17	30-Apr-16	21-May-16										
C&C Tunnel - 2nd 85m - Excavation by vertical mean	18	23-May-16	13-Jun-16										
C&C Tunnel - 2nd 85m - Tunnel Structure	83	14-Jun-16	20-Sep-16										
C&C Tunnel - 3rd 85m - Excavation by ramp	18	23-May-16	13-Jun-16										
C&C Tunnel - 3rd 85m - Excavation by vertical mean	25	14-Jun-16	13-Jul-16										
C&C Tunnel - 3rd 85m - Tunnel Structure	83	26-Jul-16	02-Nov-16										
C&C Tunnel - 4th 85m - Excavation by ramp	21	30-Jun-16	25-Jul-16										
C&C Tunnel - 4th 85m - Excavation by vertical mean	35	26-Jul-16	03-Sep-16										
C&C Tunnel - 5th 85m - Excavation by ramp	23	26-Jul-16	20-Aug-16										
C&C Tunnel - 5th 85m - Excavation by vertical mean	44	22-Aug-16	14-Oct-16										
C&C Tunnel - 6th 85m - Excavation by ramp	27	22-Aug-16	22-Sep-16										
<b>South Retrieval Shaft</b>													
<b>Design Submission</b>													
<b>(F4) Gantry Crane Support/Foundations in Southern Landfall</b>													
Preparation of IFA Gantry Crane / Foundation	18	27-Jul-15	15-Aug-15										
Review & Comment by JV	18	17-Aug-15	05-Sep-15										
Designer prepare IFA	10	07-Sep-15	17-Sep-15										
Formal Submission of IFA to ICE/ IPs	0		17-Sep-15										
Advanced Submission to SO	0		17-Sep-15										
IPs/SO's Advance Comments/ ICE Comments	28	18-Sep-15	15-Oct-15										
<b>Method Statement Submission</b>													
<b>Method Statement of Construction Methodology of Retrieval Shaft</b>													
Preparation Method Statement for Retrieval Shaft	25	24-Aug-15	21-Sep-15										
Submit Method Statement to SO	0		21-Sep-15										
SO Reviews & Comments	28	22-Sep-15	19-Oct-15										
Re-submission	18	20-Oct-15	10-Nov-15										
SO's Review	28	11-Nov-15	08-Dec-15										
<b>Construction</b>													
South Landfall GI Works/DW Setting Up	48	06-Aug-15	02-Oct-15										
South Retrieval Shaft - Diaphragm Wall	98	03-Oct-15	29-Jan-16										
Retrieval Shaft - Excavation - Soft by vertical mean (Fill material)	52	03-Feb-16	14-Apr-16										

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



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12-Feb-14	TMCLKDBJGEN-PRG-98507	WYu	SPe
08-Apr-14	TMCLKDBJGEN-PRG-98507 Rev.B	SPe	WYu
28-Aug-14	TMCLKDBJGEN-PRG-98507 Rev.C	CLa	WYu
10-Jun-15	TMCLKDBJGEN-PRG-98507 Rev.F	WYu	

Activity Name	Orig Dur	DWPF Start	DWPF Finish	2016								
				Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Retrieval Shaft - Excavation - Soft (other than Fill)	140	15-Apr-16	30-Sep-16									Retrieval Sh
<b>South Approach Ramp</b>												
<b>Construction</b>												
Approach Ramp (CH1580-1850) - Pipe Pile/Sheet Piles Wall	126	03-Oct-15	09-Mar-16									
Approach Ramp (CH1580-1850) - Tension Piles	103	03-Oct-15	04-Feb-16									
Approach Ramp (CH1580-1850) - Pile Test	24	05-Feb-16	10-Mar-16									
<b>South Ventilation Building</b>												
<b>Design Submission</b>												
<b>(I1) DDA for South Vent.Bldg. GBP &amp; Arch.Submission</b>												
ICE Approval & Issue Check Cert	18	22-Dec-14	14-Jan-15									
Submit ICE Check Cert to SO	6	15-Jan-15	21-Jan-15									
IPs Review	28	22-Dec-14	18-Jan-15									
IP's No Objection Received	0		18-Jan-15									
SO's Review	35	22-Dec-14	25-Jan-15									
SO Approval with Condition Received	0		26-Jan-15									
<b>(I2) DDA for South Vent.Bldg. Foundation Design</b>												
Review & Comment by JV	18	27-Apr-15	18-May-15									
Designer prepare DDA	10	19-May-15	30-May-15									
Formal Submission of DDA to ICE/ IPs	0		30-May-15									
Advanced Submission to SO	0		30-May-15									
IPs/ SO's Advance Comments/ ICE Comments	28	31-May-15	27-Jun-15									
Comments Received	0		27-Jun-15									
Designer to Reply RTC + Update Submission	21	29-Jun-15	23-Jul-15									
Submit Updated DDA to SO/ ICE/ IPs	0	24-Jul-15										
ICE Approval & Issue Check Cert	18	24-Jul-15	13-Aug-15									
IPs Review	28	24-Jul-15	20-Aug-15									
SO's Review	35	24-Jul-15	27-Aug-15									
<b>(I2) DDA for South Vent.Bldg. Structural Design incl. Vent. Connections</b>												
Review & Comment by JV	18	18-Feb-15	17-Mar-15									
Designer prepare DDA	10	18-Mar-15	28-Mar-15									
Formal Submission of DDA to ICE/ IPs	0		28-Mar-15									
Advanced Submission to SO	0		28-Mar-15									
IPs/ SO's Advance Comments/ ICE Comments	28	29-Mar-15	25-Apr-15									
Comments Received	0		25-Apr-15									
Designer to Reply RTC + Update Submission	21	27-Apr-15	21-May-15									
Submit Updated DDA to SO/ ICE/ IPs	0	22-May-15										
ICE Approval & Issue Check Cert	18	22-May-15	12-Jun-15									
IPs Review	28	22-May-15	18-Jun-15									
SO's Review	35	22-May-15	25-Jun-15									
<b>(J1) DDA Temp. works for Construction of Sth. Vent. Bldg.</b>												
Designer to Reply RTC + Update Submission	21	24-Aug-15	16-Sep-15									
Submit Updated DDA to SO/ ICE/ IPs	0	17-Sep-15										
ICE Approval & Issue Check Cert	12	17-Sep-15	02-Oct-15									
Submit ICE Check Cert to SO	6	03-Oct-15	09-Oct-15									
IPs Review	28	17-Sep-15	14-Oct-15									
IP's No Objection Received	0		14-Oct-15									
SO's Review	35	17-Sep-15	21-Oct-15									
SO Approval with Condition Received	0		22-Oct-15									
<b>Construction</b>												
Mobilization & Setting Up Piling Rigs	64	06-Aug-15	22-Oct-15									
S - Piling (Socket H-piles)	132	23-Oct-15	08-Apr-16									
S - Pile Test	24	09-Apr-16	07-May-16									
S - Sheet Piling	48	23-Oct-15	17-Dec-15									
S - Excavation	100	09-May-16	05-Sep-16									
<b>South Surface Roadworks, Utility &amp; Drainage works</b>												
<b>Design Submission</b>												
<b>(E1) AIP - Southern Landfall Seawall Modification</b>												
SO Review (35 Days)	35	03-Mar-17	06-Apr-17									
SO Approval with Condition Received	0		06-Apr-17									
<b>(E1) DDA - Southern Landfall Seawall Modification</b>												
Preparation of DDA Modification of Seawall at Sth Landfall	18	07-Apr-17	02-May-17									
Review & Comment by JV	18	04-May-17	24-May-17									
Designer prepare DDA	10	25-May-17	06-Jun-17									
Formal Submission of DDA to ICE/ IPs	0		06-Jun-17									

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



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12-Feb-14	TMCLKDBJGEN-PRG-98507	WYu	SPe
08-Apr-14	TMCLKDBJGEN-PRG-98507 Rev.B	SPe	WYu
28-Aug-14	TMCLKDBJGEN-PRG-98507 Rev.C	CLa	WYu
10-Jun-15	TMCLKDBJGEN-PRG-98507 Rev.F	WYu	

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

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



Date	Revision	Checked	Approved
12-Feb-14	TMCLKDBJGEN-PRG-98507	WYu	SPe
08-Apr-14	TMCLKDBJGEN-PRG-98507 Rev. B	SPe	WYu
28-Aug-14	TMCLKDBJGEN-PRG-98507 Rev. C	CLa	WYu
10-Jun-15	TMCLKDBJGEN-PRG-98507 Rev. F	WYu	

Appendix C

Environmental Mitigation  
and Enhancement Measure  
Implementation Schedules

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
<b>Air Quality</b>									
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		✓
<b>WATER QUALITY</b>									
<i>Marine Works (Sequence A)</i>									
6.1	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations:  - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓

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

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

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						D	C	O	
<i>General Marine Works</i>									
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 Guidelines. DASO permit conditions.		Y		✓
6.1	-	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓

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						D	C	O	
6.1	-	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
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		✓

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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	
<i>Land Works</i>									
6.1	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		<>
6.1	-	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	5.8	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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						D	C	O	
6.1	-	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		N/A
6.1	-	The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	All areas/ throughout construction period	Contractor	TM-EIAO Waste Disposal Ordinance		Y		✓
6.1	-	All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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						D	C	O	
6.1	-	Roadside gullies to trap silt and grit shall be provided prior to discharging the stormwater into the marine environment. The sumps will be maintained and cleaned at regular intervals.	Roadside/design and operation	Design Consultant/ Contractor	TM-EIAO	Y		Y	✓
6.1	Section 5	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All areas/ throughout construction period	Contractor	EM&A Manual		Y		✓
<i>Water Quality Monitoring</i>									
6.1	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period.  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	✓
<b>ECOLOGY</b>									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/ during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m <sup>2</sup> in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/towards end of construction period	TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	N/A. To be implemented by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/ during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for dredging and reclamation works	All areas/ Detailed Design/ during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓

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						D	C	O	
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.5	Audit coral translocation success	Post translocation	Contractor	TMEIA		Y		✓
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		N/A
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
<b>LANDSCAPE AND VISUAL</b>									
10.9	7.6	The colour and shape of the toll control buildings, ventilation building and administration building shall adopt a design which could blend it into the vicinity elements, and the details will be developed in detailed design stage (DM2)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓

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Northern Connection Sub-sea Tunnel Section  
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
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
<b>WASTE</b>									
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		✓

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

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



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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	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:  if 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

*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	
		<p>f Having a capacity of &lt;450L unless the specifications have been approved by the EPD; and</p> <p>w Chinese according to the instructions prescribed in Schedule 2 of the Regulations.</p> <p>f Clearly labelled and used solely for the storage of chemical wastes;</p> <p>f Enclosed with at least 3 sides;</p> <p>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;</p> <p>f Adequate ventilation;</p> <p>f Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and</p> <p>f Incompatible materials are adequately separated.</p>							
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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	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		✓
<b>CULTURAL HERITAGE</b>									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		N/A

**\* Remarks:**

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

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

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

Appendix D

## Summary of Action and Limit Levels

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

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

**Table D2 Action and Limit Levels for 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 : 11/04/2016

Sampler

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

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 14 Mar 2016  
 Slope (m) : 2.10326  
 Intercept (b) : -0.06696  
 Correlation Coefficient(r) : 0.99989

Standard Condition

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

Calibration Condition

Pa (hpa) : 1016  
 Ta(K) : 291

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.6	3.411	1.653	53	53.07
2	13 holes	9.2	3.037	1.476	48	48.07
3	10 holes	6.8	2.611	1.273	42	42.06
4	7 holes	4.6	2.148	1.053	36	36.05
5	5 holes	2.8	1.676	0.829	29	29.04

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 28.998 Intercept(b): 5.212 Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan

Date: 16/04/2016



High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR10  
 Calibrated by : P.F. Yeung  
 Date : 11/04/2016

Sampler

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

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 14 Mar 2016  
 Slope (m) : 2.10326  
 Intercept (b) : -0.06696  
 Correlation Coefficient(r) : 0.99989

Standard Condition

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

Calibration Condition

Pa (hpa) : 1009  
 Ta(K) : 296

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.8	3.440	1.667	57	57.08
2	13 holes	9.6	3.103	1.507	51	51.07
3	10 holes	6.8	2.611	1.273	44	44.06
4	7 holes	4.5	2.124	1.042	37	37.05
5	5 holes	2.8	1.676	0.829	30	30.04

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.718 Intercept(b): 3.782 Correlation Coefficient(r): 0.9994

Checked by: Magnum Fan

Date: 16/04/16

High-Volume TSP Sampler  
5-Point Calibration Record

Location : AQMS1  
 Calibrated by : P.F. Yeung  
 Date : 11/04/2016

Sampler

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

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 14 Mar 2016  
 Slope (m) : 2.10326  
 Intercept (b) : -0.06696  
 Correlation Coefficient(r) : 0.99989

Standard Condition

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

Calibration Condition

Pa (hpa) : 1009  
 Ta(K) : 296

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.0	3.469	1.681	53	53.07
2	13 holes	9.2	3.037	1.476	48	48.07
3	10 holes	6.6	2.573	1.255	41	41.06
4	7 holes	4.3	2.077	1.019	35	35.05
5	5 holes	2.6	1.615	0.800	29	29.04

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.383 Intercept(b): 3.340 Correlation Coefficient(r): 0.9996

Checked by: Magnum Fan

Date: 16/04/2016

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR 1  
 Calibrated by : P.F.Yeung  
 Date : 11/04/2016

Sampler

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

Calibration Office and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 14 Mar 2016  
 Slope (m) : 2.10326  
 Intercept (b) : -0.06696  
 Correlation Coefficient(r) : 0.99989

Standard Condition

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

Calibration Condition

Pa (hpa) : 1009  
 Ta(K) : 296

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1   18 holes	11.5	3.396	1.646	55	55.08
2   13 holes	9.5	3.086	1.499	50	50.07
3   10 holes	7.0	2.649	1.292	44	44.06
4   7 holes	4.4	2.101	1.031	36	36.05
5   5 holes	2.8	1.676	0.829	29	29.04

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 27.517      Intercept(b): 6.967      Correlation Coefficient(r): 0.9994

Checked by: Magnum Fan

Date: 16/04/2016

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR 6  
 Calibrated by : P.F. Yeung  
 Date : 11/04/2016

Sampler

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

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 14 Mar 2016  
 Slope (m) : 2.10326  
 Intercept (b) : -0.06696  
 Correlation Coefficient(r) : 0.99989

Standard Condition

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

Calibration Condition

Pa (hpa) : 1009  
 Ta(K) : 296

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.0	3.469	1.681	55	55.08
2	13 holes	9.5	3.086	1.499	49	49.07
3	10 holes	6.8	2.611	1.273	42	42.06
4	7 holes	4.4	2.101	1.031	34	34.05
5	5 holes	2.6	1.615	0.800	26	26.04

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 32.763      Intercept(b): 0.081      Correlation Coefficient(r): 0.9998

Checked by: Magnum Fan

Date: 16/04/2016

**ENVIROTECH SERVICES CO.**

**Calibration Report of Wind Meter**

Date of Calibration : 02 May 2016

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)	Anemomete (m/s)
1.4	1.5
2.4	2.3
2.6	2.8

Wind Direction Test

Davis (o)	Marine Compass (o)
270	270
1	0
89	90
181	180

Calibrated by: *Ho*  
Yeung Ping Fai  
(Technical Officer)

Checked by : *Fat*  
Ho Kam Fat  
(Senior Technical Officer)



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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 14, 2016 Rootsmeter S/N 0438320 Ta (K) - 295  
 Operator Tisch Orifice I.D. - 2454 Pa (mm) - 745.49

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	1.4020	3.2	2.00
2	NA	NA	1.00	1.0060	6.4	4.00
3	NA	NA	1.00	0.9010	7.9	5.00
4	NA	NA	1.00	0.8590	8.8	5.50
5	NA	NA	1.00	0.7090	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9866	0.7037	1.4078	0.9957	0.7102	0.8896
0.9824	0.9765	1.9909	0.9914	0.9855	1.2581
0.9803	1.0880	2.2259	0.9893	1.0980	1.4066
0.9792	1.1399	2.3345	0.9882	1.1504	1.4753
0.9738	1.3735	2.8155	0.9828	1.3862	1.7792
Qstd slope (m) = 2.10326			Qa slope (m) = 1.31703		
intercept (b) = -0.06696			intercept (b) = -0.04232		
coefficient (r) = 0.99989			coefficient (r) = 0.99989		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

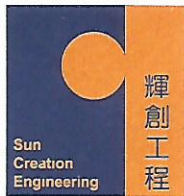
CALCULATIONS

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}



# Certificate of Calibration 校正證書

Certificate No. : C160461  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0158)      Date of Receipt / 收件日期 : 19 January 2016

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 :  $(23 \pm 2)^{\circ}\text{C}$       Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$   
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範


Calibration check

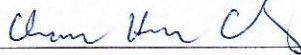
DATE OF TEST / 測試日期 : 27 January 2016

## 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  
M T Leung  
Assistant Technical Officer

Certified By :   
核證  
H C Chan  
Engineer

Date of Issue : 27 January 2016  
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.  
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C160461

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 :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL386	Multi-function Measuring Instrument	S12109

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
2.0	1.8	+0.2	0.2	2.0
4.1	3.9	+0.2	0.3	2.0
6.0	5.9	+0.1	0.3	2.0
8.0	8.0	0.0	0.3	2.0
10.0	10.2	-0.2	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 :

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.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。



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 - May 2016**

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

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

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

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-Jun	2-Jun	3-Jun	4-Jun
			1-hour TSP - 3 times 24-hour TSP - 1 time  Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time  Impact AQM
5-Jun	6-Jun	7-Jun	8-Jun	public holiday 9-Jun	10-Jun	11-Jun
		1-hour TSP - 3 times 24-hour TSP - 1 time  Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time  Impact AQM	
12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun	18-Jun
1-hour TSP - 3 times 24-hour TSP - 1 time  Impact AQM				1-hour TSP - 3 times 24-hour TSP - 1 time  Impact AQM		
19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun
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
26-Jun	27-Jun	28-Jun	29-Jun	30-Jun		
		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 - May 2016**

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

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Tentative Impact Dolphin Monitoring Survey Monitoring Schedule - June 2016**

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

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

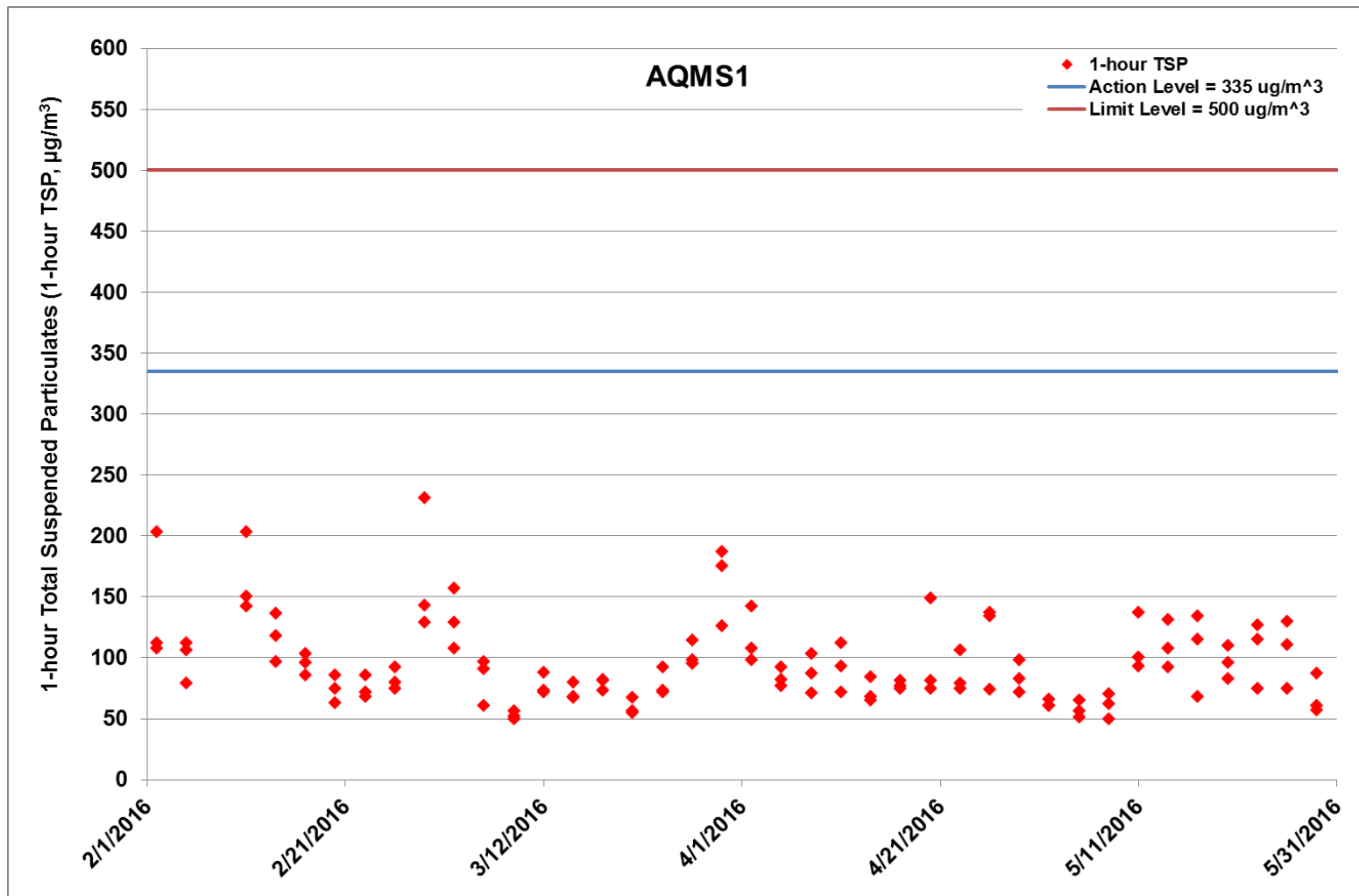


Figure G.1 Impact Monitoring – 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at AQMS1 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 – 31/5/2016) and Box Culvert Extension (1/2/2016 – 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



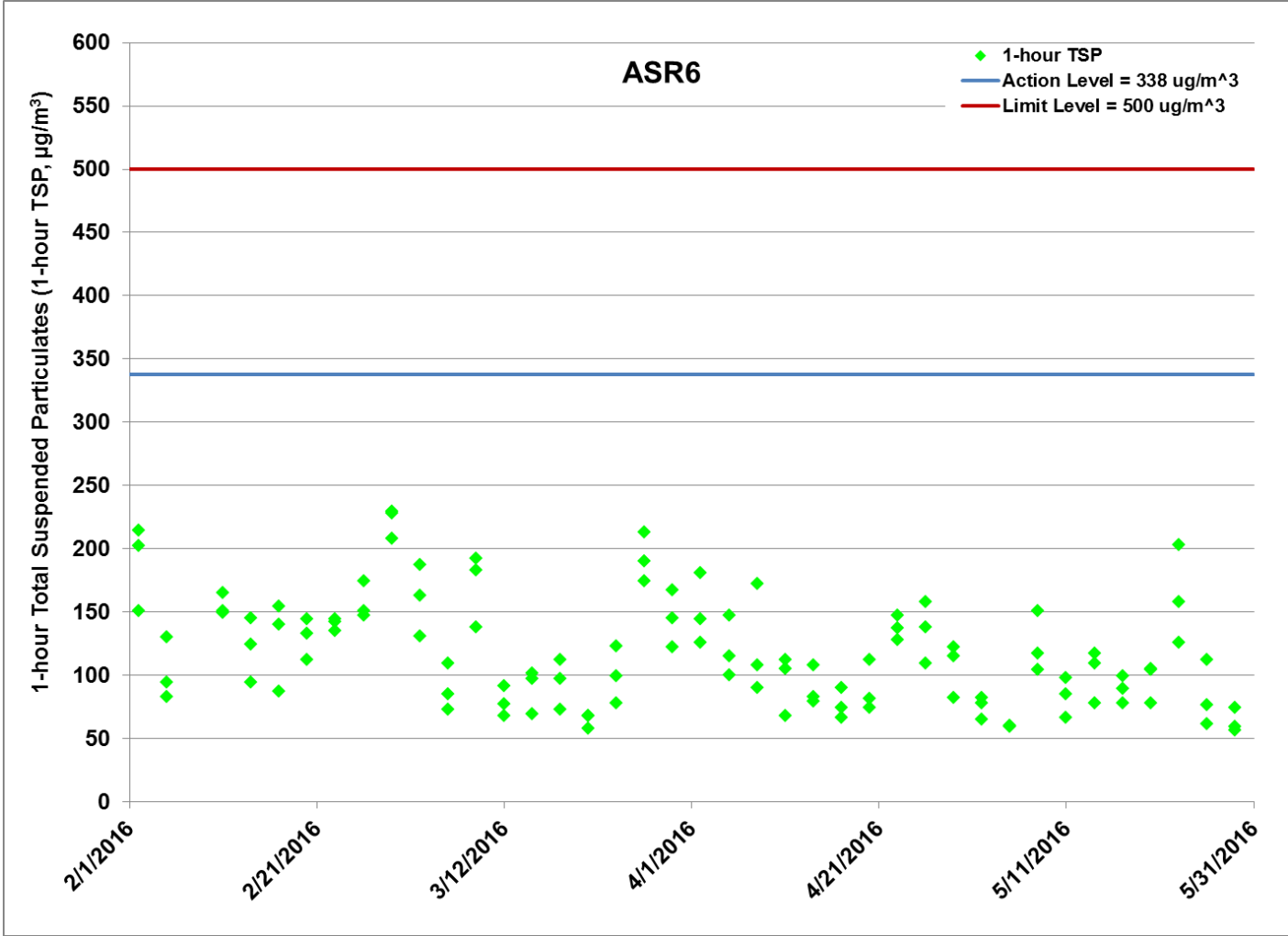


Figure G.2 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR6 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx





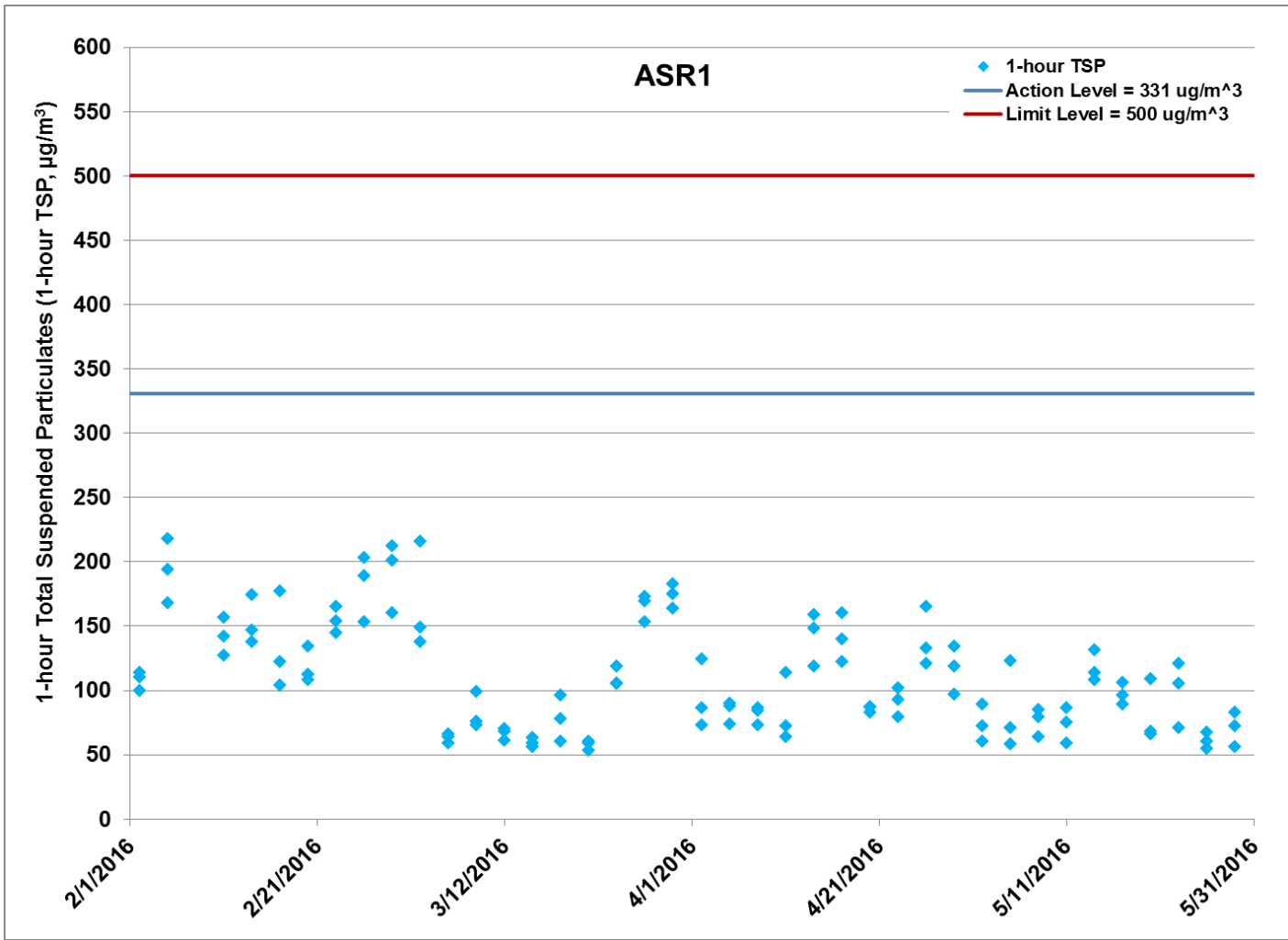


Figure G.3 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR1 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



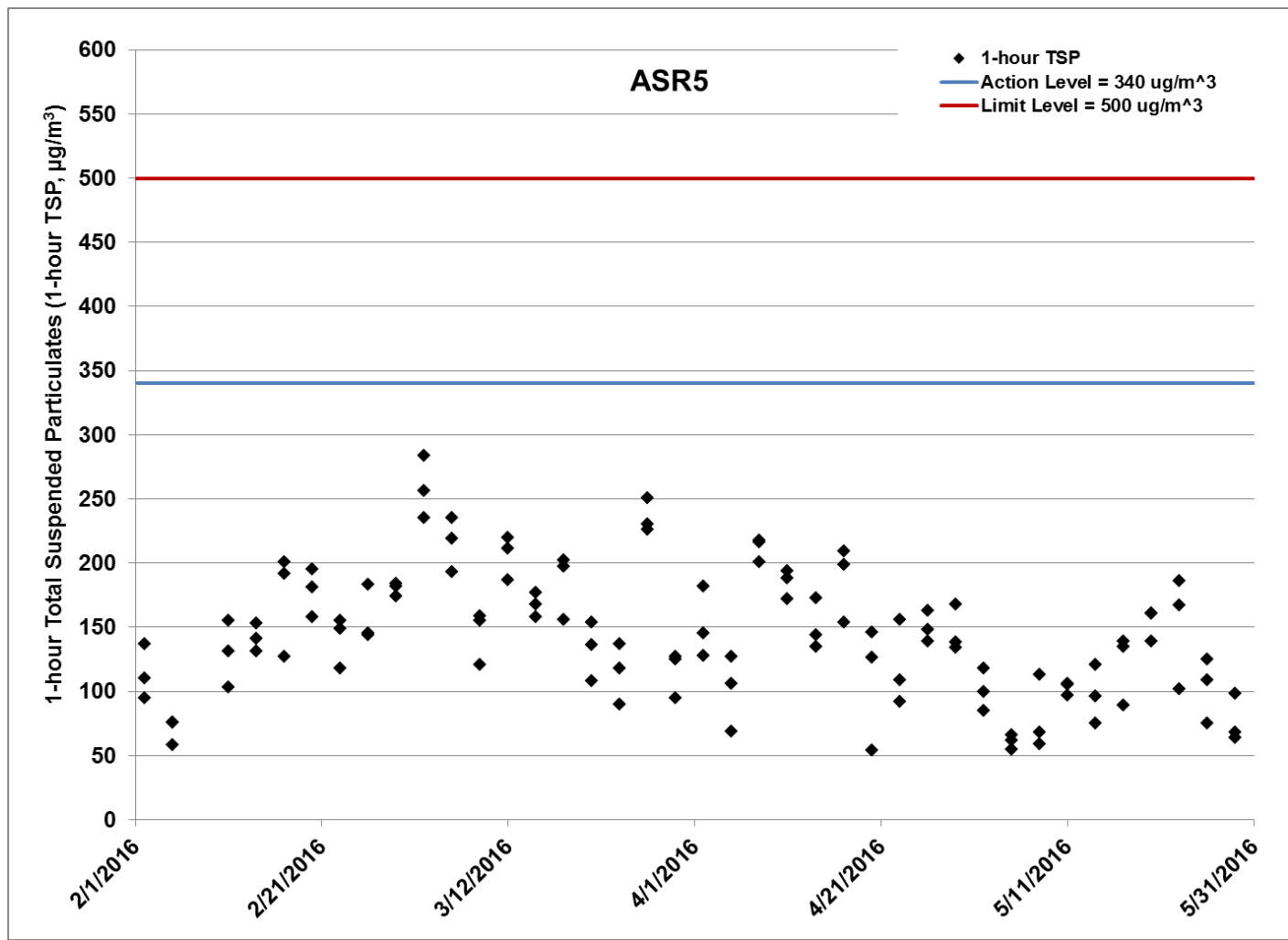


Figure G.4 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR5 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx

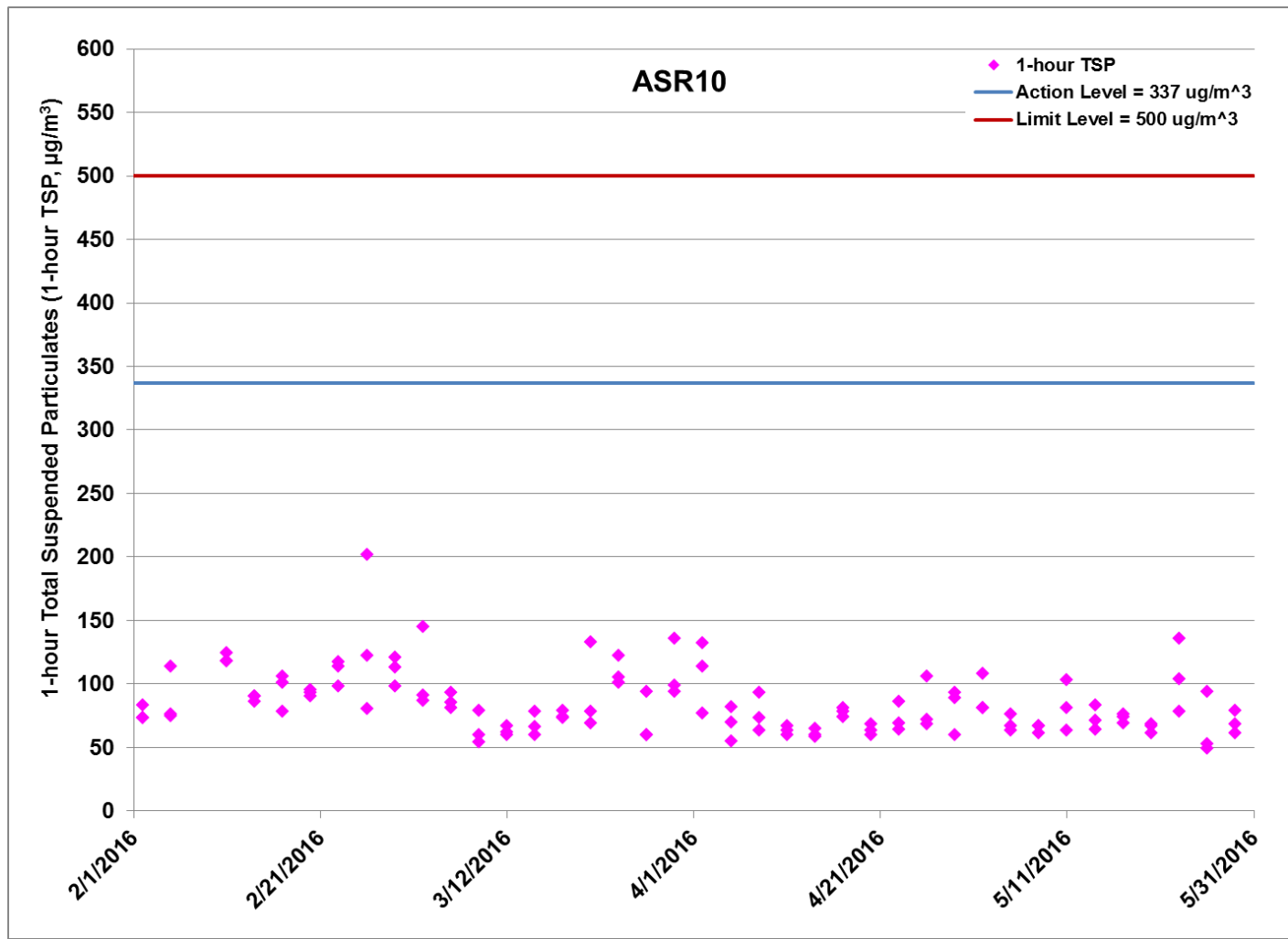


Figure G.5 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR10 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



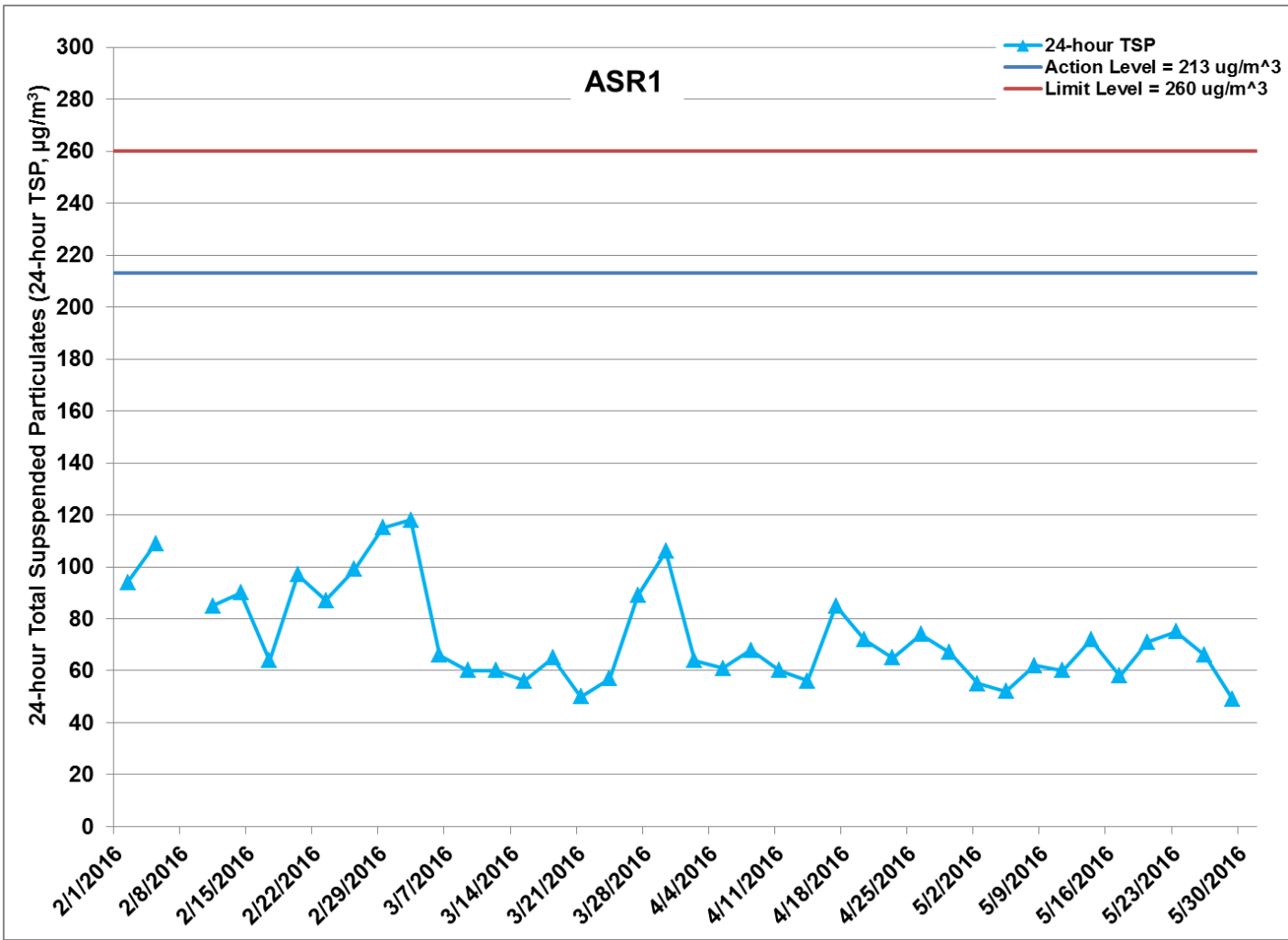


Figure G.6 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR1 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



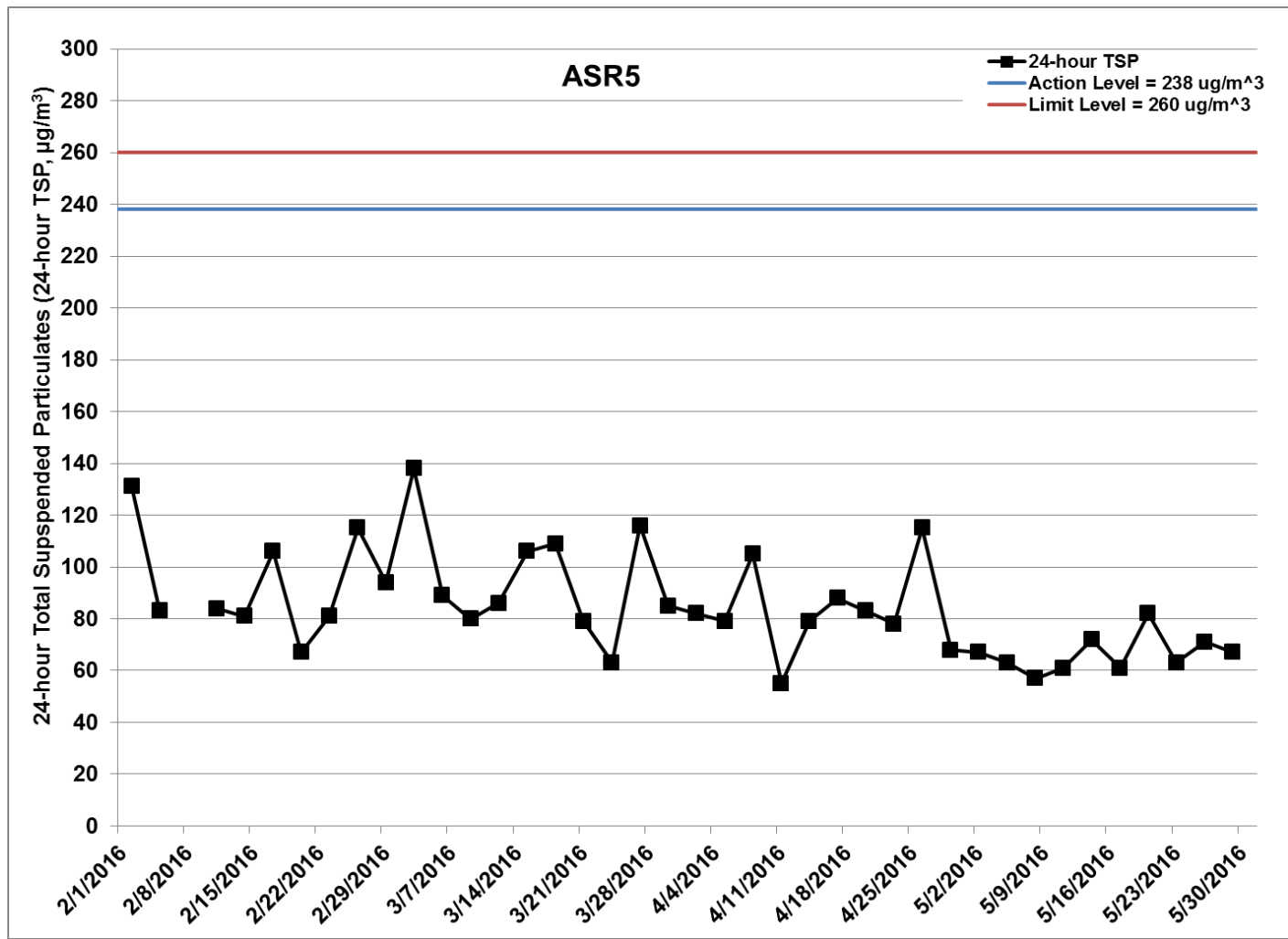


Figure G.7 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR5 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



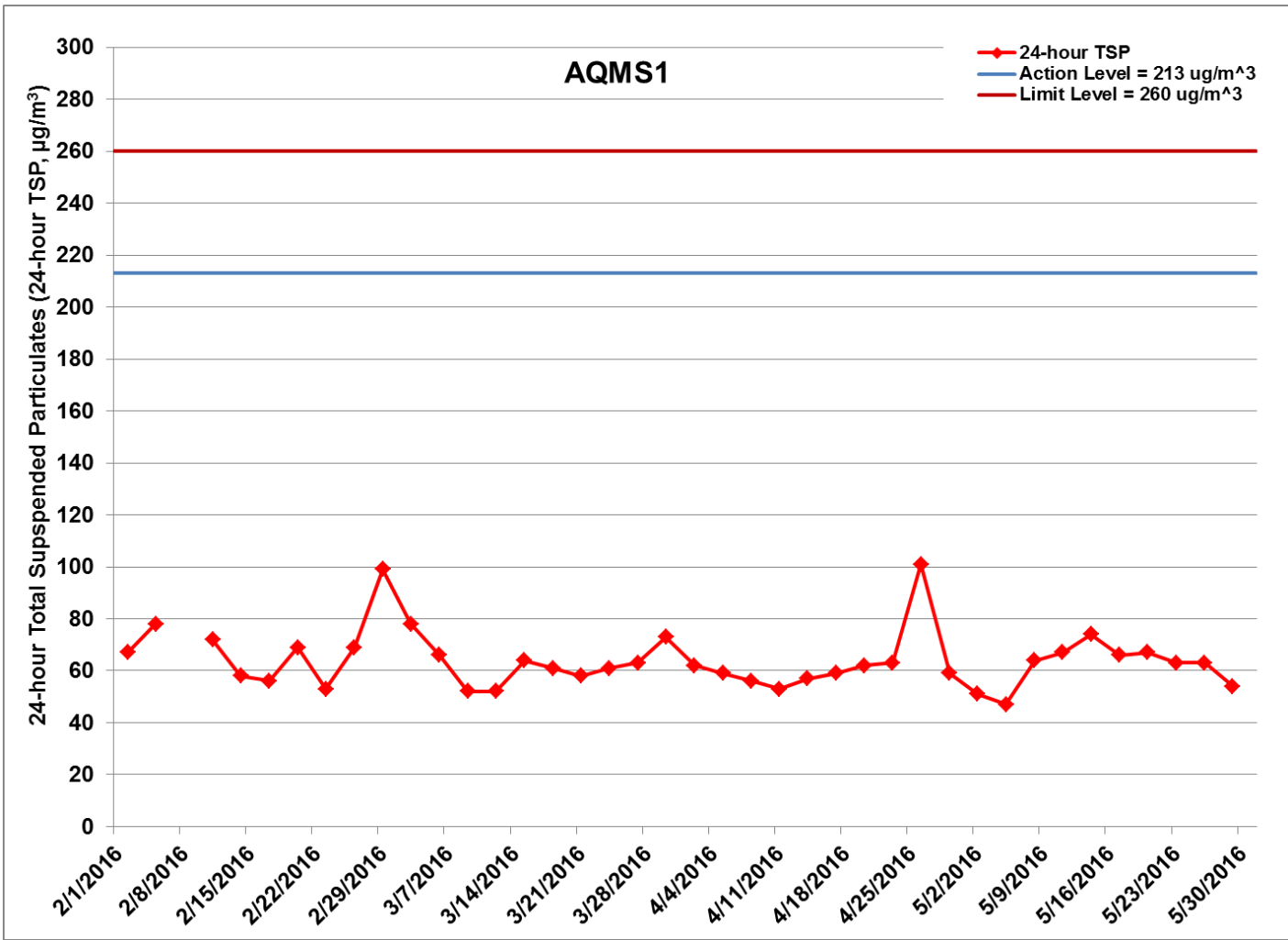


Figure G.8 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at AQMS1 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



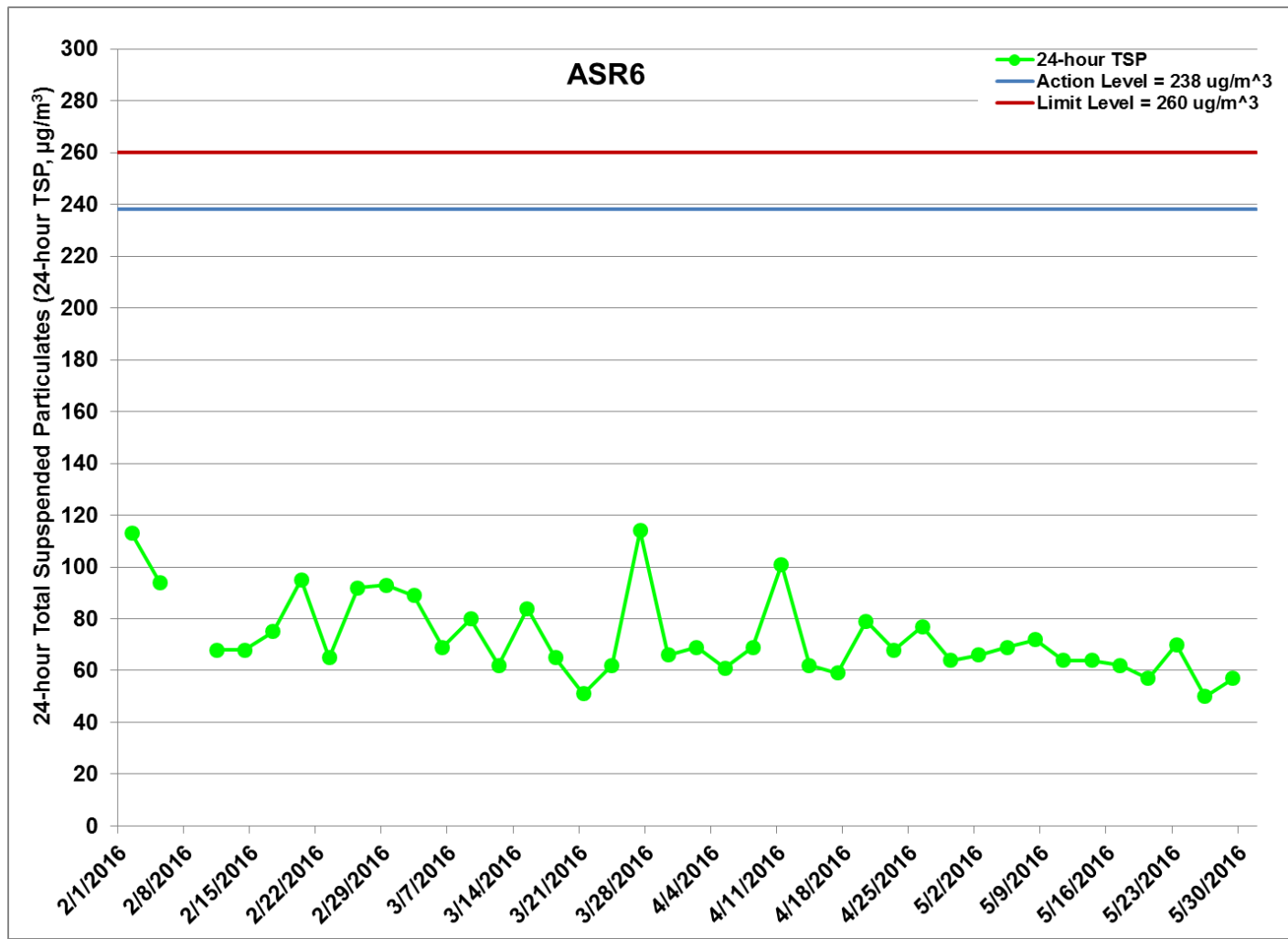


Figure G.9 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR6 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 - 31/5/2016) and Box Culvert Extension (1/2/2016 - 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx



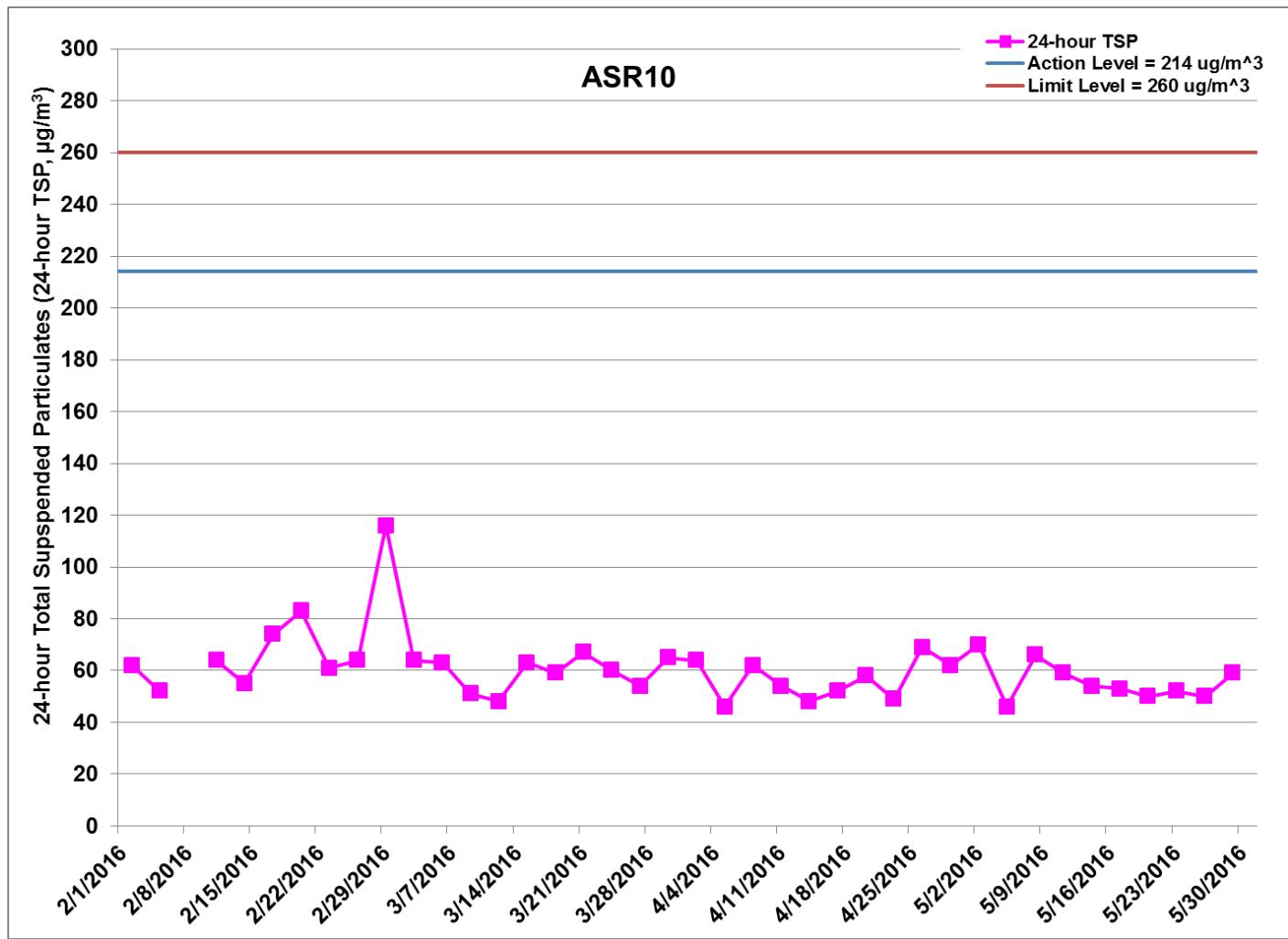


Figure G.10 Impact Monitoring – 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR10 between 1 February 2016 and 31 May 2016 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: CSM Ground Treatment and Diaphragm Wall Construction (1/4/2016 – 31/5/2016) and Box Culvert Extension (1/2/2016 – 31/5/2016). Ref: 0212330\_Impact AQM graphs\_ May 2016\_REV a.xlsx





Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-02	AQMS1	Sunny	13:48	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-02	AQMS1	Sunny	14:50	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-02	AQMS1	Sunny	15:52	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR1	Sunny	13:37	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR1	Sunny	14:39	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR1	Sunny	15:41	1-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR10	Sunny	13:05	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR10	Sunny	14:07	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR10	Sunny	15:09	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR5	Sunny	13:26	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR5	Sunny	14:28	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR5	Sunny	15:30	1-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR6	Sunny	13:15	1-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR6	Sunny	14:17	1-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR6	Sunny	15:19	1-hour TSP	82	ug/m3
TMCLKL	HY/2012/08	2016-05-05	AQMS1	Sunny	13:26	1-hour TSP	51	ug/m3
TMCLKL	HY/2012/08	2016-05-05	AQMS1	Sunny	14:28	1-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2016-05-05	AQMS1	Sunny	15:30	1-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR1	Sunny	13:15	1-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR1	Sunny	14:17	1-hour TSP	123	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR1	Sunny	15:19	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR10	Sunny	12:43	1-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR10	Sunny	13:45	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR10	Sunny	14:47	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR5	Sunny	13:05	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR5	Sunny	14:07	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR5	Sunny	15:09	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR6	Sunny	12:54	1-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR6	Sunny	13:56	1-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR6	Sunny	14:58	1-hour TSP	60	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-08	AQMS1	Sunny	10:34	1-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2016-05-08	AQMS1	Sunny	11:36	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2016-05-08	AQMS1	Sunny	12:38	1-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR1	Sunny	10:32	1-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR1	Sunny	11:34	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR1	Sunny	12:36	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR10	Sunny	10:00	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR10	Sunny	11:02	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR10	Sunny	12:04	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR5	Sunny	10:20	1-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR5	Sunny	11:22	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR5	Sunny	12:24	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR6	Sunny	10:10	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR6	Sunny	11:12	1-hour TSP	151	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR6	Sunny	12:14	1-hour TSP	104	ug/m3
TMCLKL	HY/2012/08	2016-05-11	AQMS1	Sunny	13:47	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2016-05-11	AQMS1	Sunny	14:49	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2016-05-11	AQMS1	Sunny	15:51	1-hour TSP	137	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR1	Sunny	13:35	1-hour TSP	86	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR1	Sunny	14:37	1-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR1	Sunny	15:39	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR10	Sunny	13:02	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR10	Sunny	14:04	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR10	Sunny	15:06	1-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR5	Sunny	13:24	1-hour TSP	106	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR5	Sunny	14:26	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR5	Sunny	15:28	1-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR6	Sunny	13:13	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR6	Sunny	14:15	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR6	Sunny	15:17	1-hour TSP	98	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-14	AQMS1	Sunny	09:53	1-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	2016-05-14	AQMS1	Sunny	10:55	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2016-05-14	AQMS1	Sunny	11:57	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR1	Sunny	09:42	1-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR1	Sunny	10:44	1-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR1	Sunny	11:46	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR10	Sunny	09:10	1-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR10	Sunny	10:12	1-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR10	Sunny	11:14	1-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR5	Sunny	09:31	1-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR5	Sunny	10:33	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR5	Sunny	11:35	1-hour TSP	121	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR6	Sunny	09:20	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR6	Sunny	10:22	1-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR6	Sunny	11:24	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2016-05-17	AQMS1	Cloudy	13:32	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2016-05-17	AQMS1	Cloudy	14:34	1-hour TSP	115	ug/m3
TMCLKL	HY/2012/08	2016-05-17	AQMS1	Cloudy	15:36	1-hour TSP	134	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR1	Cloudy	13:20	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR1	Cloudy	14:22	1-hour TSP	106	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR1	Cloudy	15:24	1-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR10	Cloudy	12:48	1-hour TSP	69	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR10	Cloudy	13:50	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR10	Cloudy	14:52	1-hour TSP	74	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR5	Cloudy	13:09	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR5	Cloudy	14:11	1-hour TSP	135	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR5	Cloudy	15:13	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR6	Cloudy	12:58	1-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR6	Cloudy	14:00	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR6	Cloudy	15:02	1-hour TSP	89	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-20	AQMS1	Cloudy	09:47	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2016-05-20	AQMS1	Cloudy	10:49	1-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2016-05-20	AQMS1	Cloudy	11:51	1-hour TSP	96	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR1	Cloudy	09:35	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR1	Cloudy	10:37	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR1	Cloudy	11:39	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR10	Cloudy	09:03	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR10	Cloudy	10:05	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR10	Cloudy	11:07	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR5	Cloudy	09:24	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR5	Cloudy	10:26	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR5	Cloudy	11:28	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR6	Cloudy	09:13	1-hour TSP	104	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR6	Cloudy	10:15	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR6	Cloudy	11:17	1-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	2016-05-23	AQMS1	Sunny	13:50	1-hour TSP	127	ug/m3
TMCLKL	HY/2012/08	2016-05-23	AQMS1	Sunny	14:52	1-hour TSP	115	ug/m3
TMCLKL	HY/2012/08	2016-05-23	AQMS1	Sunny	15:54	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR1	Sunny	13:39	1-hour TSP	121	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR1	Sunny	14:41	1-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR1	Sunny	15:43	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR10	Sunny	13:07	1-hour TSP	104	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR10	Sunny	14:09	1-hour TSP	136	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR10	Sunny	15:11	1-hour TSP	78	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR5	Sunny	13:28	1-hour TSP	167	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR5	Sunny	14:30	1-hour TSP	186	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR5	Sunny	15:32	1-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR6	Sunny	13:17	1-hour TSP	158	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR6	Sunny	14:19	1-hour TSP	203	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR6	Sunny	15:21	1-hour TSP	126	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-26	AQMS1	Cloudy	13:22	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2016-05-26	AQMS1	Cloudy	14:24	1-hour TSP	130	ug/m3
TMCLKL	HY/2012/08	2016-05-26	AQMS1	Cloudy	15:26	1-hour TSP	111	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR1	Cloudy	13:10	1-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR1	Cloudy	14:12	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR1	Cloudy	15:14	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR10	Cloudy	12:38	1-hour TSP	94	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR10	Cloudy	13:40	1-hour TSP	49	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR10	Cloudy	14:42	1-hour TSP	53	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR5	Cloudy	12:59	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR5	Cloudy	14:01	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR5	Cloudy	15:03	1-hour TSP	125	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR6	Cloudy	12:49	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR6	Cloudy	13:51	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR6	Cloudy	14:53	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2016-05-29	AQMS1	Sunny	10:25	1-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2016-05-29	AQMS1	Sunny	11:27	1-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2016-05-29	AQMS1	Sunny	12:29	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR1	Sunny	10:13	1-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR1	Sunny	11:15	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR1	Sunny	12:17	1-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR10	Sunny	09:40	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR10	Sunny	10:42	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR10	Sunny	11:44	1-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR5	Sunny	10:02	1-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR5	Sunny	11:04	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR5	Sunny	12:06	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR6	Sunny	09:50	1-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR6	Sunny	10:52	1-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR6	Sunny	11:54	1-hour TSP	74	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-02	AQMS1	Sunny	16:54	24-hour TSP	51	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR1	Sunny	16:43	24-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR10	Sunny	16:11	24-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR5	Sunny	16:32	24-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-02	ASR6	Sunny	16:21	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-05	AQMS1	Sunny	16:32	24-hour TSP	47	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR1	Sunny	16:21	24-hour TSP	52	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR10	Sunny	16:36	24-hour TSP	46	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR5	Sunny	16:11	24-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2016-05-05	ASR6	Sunny	16:00	24-hour TSP	69	ug/m3
TMCLKL	HY/2012/08	2016-05-08	AQMS1	Sunny	13:40	24-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR1	Sunny	13:38	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR10	Sunny	13:06	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR5	Sunny	13:26	24-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2016-05-08	ASR6	Sunny	13:16	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2016-05-11	AQMS1	Sunny	16:53	24-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR1	Sunny	16:41	24-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR10	Sunny	16:08	24-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR5	Sunny	16:30	24-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-11	ASR6	Sunny	16:19	24-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2016-05-14	AQMS1	Sunny	12:59	24-hour TSP	74	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR1	Sunny	12:48	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR10	Sunny	12:16	24-hour TSP	54	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR5	Sunny	12:37	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2016-05-14	ASR6	Sunny	12:26	24-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	2016-05-17	AQMS1	Cloudy	16:38	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR1	Cloudy	16:26	24-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR10	Cloudy	15:54	24-hour TSP	53	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR5	Cloudy	16:15	24-hour TSP	61	ug/m3
TMCLKL	HY/2012/08	2016-05-17	ASR6	Cloudy	16:04	24-hour TSP	62	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2016-05-20	AQMS1	Cloudy	12:53	24-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR1	Cloudy	12:41	24-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR10	Cloudy	12:09	24-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR5	Cloudy	12:30	24-hour TSP	82	ug/m3
TMCLKL	HY/2012/08	2016-05-20	ASR6	Cloudy	12:19	24-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2016-05-23	AQMS1	Sunny	16:56	24-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR1	Sunny	16:45	24-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR10	Sunny	16:13	24-hour TSP	52	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR5	Sunny	16:34	24-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2016-05-23	ASR6	Sunny	16:23	24-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2016-05-26	AQMS1	Cloudy	16:28	24-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR1	Cloudy	16:16	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR10	Cloudy	15:44	24-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR5	Cloudy	16:05	24-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2016-05-26	ASR6	Cloudy	15:55	24-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2016-05-29	AQMS1	Sunny	13:31	24-hour TSP	54	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR1	Sunny	13:19	24-hour TSP	49	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR10	Sunny	12:46	24-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR5	Sunny	13:08	24-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2016-05-29	ASR6	Sunny	12:56	24-hour TSP	57	ug/m3

Appendix H

## Meteorological Data



**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/5	0:00	0.5	182
16/5/5	1:00	0.6	174
16/5/5	2:00	0.9	156
16/5/5	3:00	0.4	143
16/5/5	4:00	1.1	177
16/5/5	5:00	0.5	182
16/5/5	6:00	0.6	163
16/5/5	7:00	0.2	103
16/5/5	8:00	1.1	56
16/5/5	9:00	0.5	98
16/5/5	10:00	0.6	103
16/5/5	11:00	0.7	115
16/5/5	12:00	0.4	136
16/5/5	13:00	0.3	145
16/5/5	14:00	0.8	178
16/5/5	15:00	0.2	188
16/5/5	16:00	0.3	196
16/5/5	17:00	0.4	201
16/5/5	18:00	0.5	204
16/5/5	19:00	0.7	138
16/5/5	20:00	0.4	151
16/5/5	21:00	0.3	163
16/5/5	22:00	0.5	177
16/5/5	23:00	0.8	162
16/5/6	0:00	0.6	192
16/5/6	1:00	0.5	203
16/5/6	2:00	0.7	215
16/5/6	3:00	0.9	168
16/5/6	4:00	0.8	171
16/5/6	5:00	0.4	188
16/5/6	6:00	0.2	213
16/5/6	7:00	1.3	225
16/5/6	8:00	1.5	204
16/5/6	9:00	1.2	206
16/5/6	10:00	0.9	215
16/5/6	11:00	0.8	231
16/5/6	12:00	0.4	221
16/5/6	13:00	0.5	215
16/5/6	14:00	0.7	206
16/5/6	15:00	1.1	232
16/5/6	16:00	1.2	220
16/5/6	17:00	0.7	184
16/5/6	18:00	0.4	185
16/5/6	19:00	0.5	177
16/5/6	20:00	0.3	106
16/5/6	21:00	0.5	122
16/5/6	22:00	0.8	103
16/5/6	23:00	0.6	90
16/5/8	0:00	0.3	184
16/5/8	1:00	0.2	192
16/5/8	2:00	0.1	195
16/5/8	3:00	0.5	201
16/5/8	4:00	0.6	223
16/5/8	5:00	0.4	203

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/8	6:00	0.5	211
16/5/8	7:00	0.3	205
16/5/8	8:00	0.4	216
16/5/8	9:00	0.6	184
16/5/8	10:00	0.6	193
16/5/8	11:00	0.2	187
16/5/8	12:00	0.3	169
16/5/8	13:00	0.3	152
16/5/8	14:00	0.5	154
16/5/8	15:00	0.3	174
16/5/8	16:00	0.2	192
16/5/8	17:00	0.1	184
16/5/8	18:00	0.3	177
16/5/8	19:00	0.1	163
16/5/8	20:00	0.1	151
16/5/8	21:00	0.2	152
16/5/8	22:00	0.5	139
16/5/8	23:00	0.6	141
16/5/9	0:00	0.4	183
16/5/9	1:00	0.1	196
16/5/9	2:00	0.3	211
16/5/9	3:00	0.1	174
16/5/9	4:00	0.4	192
16/5/9	5:00	0.2	181
16/5/9	6:00	0.3	188
16/5/9	7:00	0.6	162
16/5/9	8:00	0.5	166
16/5/9	9:00	0.1	157
16/5/9	10:00	0.4	177
16/5/9	11:00	0.3	174
16/5/9	12:00	0.2	182
16/5/9	13:00	0.1	191
16/5/9	14:00	0.3	203
16/5/9	15:00	0.2	215
16/5/9	16:00	0.3	216
16/5/9	17:00	0.4	223
16/5/9	18:00	0.1	245
16/5/9	19:00	0.2	216
16/5/9	20:00	0.3	232
16/5/9	21:00	0.1	200
16/5/9	22:00	0.2	221
16/5/9	23:00	0.5	209
16/5/11	0:00	0.9	85
16/5/11	1:00	1.2	92
16/5/11	2:00	1.5	94
16/5/11	3:00	1.3	77
16/5/11	4:00	2.1	65
16/5/11	5:00	2.2	81
16/5/11	6:00	1.4	96
16/5/11	7:00	1.5	112
16/5/11	8:00	1.6	105
16/5/11	9:00	1.3	103
16/5/11	10:00	1.9	74
16/5/11	11:00	2.5	61

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/11	12:00	2.4	82
16/5/11	13:00	2.1	93
16/5/11	14:00	1.5	91
16/5/11	15:00	1.4	75
16/5/11	16:00	0.9	70
16/5/11	17:00	1.3	32
16/5/11	18:00	1.8	35
16/5/11	19:00	1.1	66
16/5/11	20:00	1.6	84
16/5/11	21:00	1.9	87
16/5/11	22:00	2.2	92
16/5/11	23:00	2	115
16/5/12	0:00	2.3	123
16/5/12	1:00	2.4	105
16/5/12	2:00	3.1	111
16/5/12	3:00	2.4	92
16/5/12	4:00	2.1	84
16/5/12	5:00	1.5	54
16/5/12	6:00	0.8	46
16/5/12	7:00	1.3	68
16/5/12	8:00	1.4	71
16/5/12	9:00	1.6	73
16/5/12	10:00	1.1	70
16/5/12	11:00	1.3	62
16/5/12	12:00	1.7	59
16/5/12	13:00	1.1	51
16/5/12	14:00	1.3	49
16/5/12	15:00	1.1	82
16/5/12	16:00	1.4	36
16/5/12	17:00	1.2	51
16/5/12	18:00	1.3	88
16/5/12	19:00	1.6	96
16/5/12	20:00	1.2	81
16/5/12	21:00	2.3	82
16/5/12	22:00	2.2	65
16/5/12	23:00	2.5	71
16/5/14	0:00	1.3	72
16/5/14	1:00	0.9	63
16/5/14	2:00	1.5	51
16/5/14	3:00	2.3	44
16/5/14	4:00	2.8	105
16/5/14	5:00	2.3	123
16/5/14	6:00	2.1	181
16/5/14	7:00	1.7	63
16/5/14	8:00	1.6	51
16/5/14	9:00	1.2	57
16/5/14	10:00	1.3	44
16/5/14	11:00	0.9	62
16/5/14	12:00	1.4	31
16/5/14	13:00	0.8	15
16/5/14	14:00	0.7	348
16/5/14	15:00	1.2	351
16/5/14	16:00	1.4	6
16/5/14	17:00	1.1	11

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/14	18:00	0.8	23
16/5/14	19:00	0.7	41
16/5/14	20:00	0.6	52
16/5/14	21:00	1.2	55
16/5/14	22:00	1.4	11
16/5/14	23:00	1.1	9
16/5/15	0:00	0.8	18
16/5/15	1:00	0.5	27
16/5/15	2:00	0.6	26
16/5/15	3:00	0.4	34
16/5/15	4:00	0.7	33
16/5/15	5:00	0.6	19
16/5/15	6:00	0.3	25
16/5/15	7:00	0.9	22
16/5/15	8:00	1.1	34
16/5/15	9:00	0.9	56
16/5/15	10:00	0.8	62
16/5/15	11:00	1.5	60
16/5/15	12:00	1.1	54
16/5/15	13:00	0.6	36
16/5/15	14:00	0.7	92
16/5/15	15:00	1.2	99
16/5/15	16:00	0.7	85
16/5/15	17:00	0.8	81
16/5/15	18:00	0.7	92
16/5/15	19:00	0.6	32
16/5/15	20:00	0.5	35
16/5/15	21:00	0.9	16
16/5/15	22:00	1.1	18
16/5/15	23:00	0.5	27
16/5/17	0:00	3.1	66
16/5/17	1:00	2.6	69
16/5/17	2:00	3.3	73
16/5/17	3:00	2.4	51
16/5/17	4:00	1.9	104
16/5/17	5:00	1.8	92
16/5/17	6:00	2.6	113
16/5/17	7:00	3.4	102
16/5/17	8:00	4.1	117
16/5/17	9:00	3.1	114
16/5/17	10:00	2.8	102
16/5/17	11:00	2.6	100
16/5/17	12:00	3.7	92
16/5/17	13:00	4.2	85
16/5/17	14:00	3.5	76
16/5/17	15:00	3.8	68
16/5/17	16:00	2.4	71
16/5/17	17:00	2.2	63
16/5/17	18:00	1.9	52
16/5/17	19:00	1.8	44
16/5/17	20:00	1.6	112
16/5/17	21:00	2.5	103
16/5/17	22:00	2.4	100
16/5/17	23:00	3.5	109

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/18	0:00	3.9	84
16/5/18	1:00	3.2	65
16/5/18	2:00	2.5	81
16/5/18	3:00	2.1	74
16/5/18	4:00	2.6	82
16/5/18	5:00	2.4	69
16/5/18	6:00	1.8	85
16/5/18	7:00	1.5	70
16/5/18	8:00	1.4	48
16/5/18	9:00	1.1	43
16/5/18	10:00	0.9	52
16/5/18	11:00	1.5	71
16/5/18	12:00	1.7	83
16/5/18	13:00	1.2	92
16/5/18	14:00	1.9	88
16/5/18	15:00	2.2	57
16/5/18	16:00	1.5	64
16/5/18	17:00	1.7	92
16/5/18	18:00	1.6	61
16/5/18	19:00	1.8	83
16/5/18	20:00	1.3	77
16/5/18	21:00	1.4	59
16/5/18	22:00	1.2	80
16/5/18	23:00	1.6	59
16/5/20	0:00	2.1	45
16/5/20	1:00	1.4	354
16/5/20	2:00	0.9	338
16/5/20	3:00	1.2	6
16/5/20	4:00	1.3	11
16/5/20	5:00	1.1	15
16/5/20	6:00	1.1	19
16/5/20	7:00	0.3	21
16/5/20	8:00	0.5	36
16/5/20	9:00	0.8	24
16/5/20	10:00	0.7	15
16/5/20	11:00	0.6	28
16/5/20	12:00	0.9	21
16/5/20	13:00	1.1	16
16/5/20	14:00	1.6	13
16/5/20	15:00	1.4	14
16/5/20	16:00	1.3	20
16/5/20	17:00	0.8	21
16/5/20	18:00	0.7	26
16/5/20	19:00	0.4	55
16/5/20	20:00	0.3	123
16/5/20	21:00	0.1	156
16/5/20	22:00	0.5	173
16/5/20	23:00	0.3	182
16/5/21	0:00	0.9	188
16/5/21	1:00	0.7	203
16/5/21	2:00	0.6	215
16/5/21	3:00	0.4	178
16/5/21	4:00	0.9	169
16/5/21	5:00	1.5	145

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/21	6:00	2.3	163
16/5/21	7:00	2.1	152
16/5/21	8:00	1.8	182
16/5/21	9:00	2.6	220
16/5/21	10:00	2.1	235
16/5/21	11:00	1.4	241
16/5/21	12:00	1.8	260
16/5/21	13:00	1.3	251
16/5/21	14:00	1.6	226
16/5/21	15:00	1.1	268
16/5/21	16:00	1.4	274
16/5/21	17:00	1.7	252
16/5/21	18:00	1.3	231
16/5/21	19:00	1.4	216
16/5/21	20:00	1.1	244
16/5/21	21:00	1.6	251
16/5/21	22:00	1.8	263
16/5/21	23:00	1.2	249
16/5/23	0:00	0.5	20
16/5/23	1:00	0.2	5
16/5/23	2:00	0.4	13
16/5/23	3:00	0.6	351
16/5/23	4:00	0.1	346
16/5/23	5:00	0.2	339
16/5/23	6:00	0.2	16
16/5/23	7:00	0.7	15
16/5/23	8:00	0.7	20
16/5/23	9:00	0.3	26
16/5/23	10:00	0.4	24
16/5/23	11:00	0.1	25
16/5/23	12:00	0.5	31
16/5/23	13:00	0.1	39
16/5/23	14:00	0.1	34
16/5/23	15:00	0.1	45
16/5/23	16:00	0.2	62
16/5/23	17:00	0.1	50
16/5/23	18:00	0.1	57
16/5/23	19:00	0.5	43
16/5/23	20:00	0.2	62
16/5/23	21:00	0.3	51
16/5/23	22:00	0.1	44
16/5/23	23:00	0.1	33
16/5/24	0:00	0.5	32
16/5/24	1:00	0.6	15
16/5/24	2:00	0.4	29
16/5/24	3:00	0.5	28
16/5/24	4:00	0.2	24
16/5/24	5:00	0.3	36
16/5/24	6:00	0.5	51
16/5/24	7:00	0.6	25
16/5/24	8:00	0.4	22
16/5/24	9:00	0.4	61
16/5/24	10:00	0.1	34
16/5/24	11:00	0.3	28

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/24	12:00	0.5	46
16/5/24	13:00	0.2	25
16/5/24	14:00	0.4	11
16/5/24	15:00	0.3	23
16/5/24	16:00	0.6	9
16/5/24	17:00	0.2	13
16/5/24	18:00	0.4	21
16/5/24	19:00	0.5	18
16/5/24	20:00	0.7	18
16/5/24	21:00	0.3	21
16/5/24	22:00	0.4	31
16/5/24	23:00	0.5	41
16/5/26	0:00	2.5	72
16/5/26	1:00	2.9	81
16/5/26	2:00	3.1	93
16/5/26	3:00	3.3	62
16/5/26	4:00	3.4	51
16/5/26	5:00	4.1	48
16/5/26	6:00	2.5	50
16/5/26	7:00	1.8	63
16/5/26	8:00	1.1	109
16/5/26	9:00	0.9	65
16/5/26	10:00	1.2	78
16/5/26	11:00	1.5	92
16/5/26	12:00	2.3	101
16/5/26	13:00	2.1	63
16/5/26	14:00	2.6	61
16/5/26	15:00	2.8	69
16/5/26	16:00	2.2	74
16/5/26	17:00	3.5	82
16/5/26	18:00	3.9	95
16/5/26	19:00	3.4	66
16/5/26	20:00	3.1	41
16/5/26	21:00	3.7	38
16/5/26	22:00	3.8	52
16/5/26	23:00	4.3	117
16/5/27	0:00	3.2	103
16/5/27	1:00	3.7	54
16/5/27	2:00	2.9	123
16/5/27	3:00	2.6	115
16/5/27	4:00	2.7	109
16/5/27	5:00	2.4	124
16/5/27	6:00	2.1	117
16/5/27	7:00	2.8	105
16/5/27	8:00	2.5	131
16/5/27	9:00	2.4	149
16/5/27	10:00	3.6	168
16/5/27	11:00	3.3	132
16/5/27	12:00	3.1	151
16/5/27	13:00	3.2	140
16/5/27	14:00	3.4	119
16/5/27	15:00	2.8	124
16/5/27	16:00	2.5	126
16/5/27	17:00	2.1	131

**Meteorological Data for Impact Monitoring in the reporting period**

<b>Date (yy-mm-dd)</b>	<b>Time (24hrs)</b>	<b>Average of Wind Speed (m/s)</b>	<b>Average of Wind Direction(degree)</b>
16/5/27	18:00	2.9	115
16/5/27	19:00	1.5	127
16/5/27	20:00	1.8	104
16/5/27	21:00	2.6	119
16/5/27	22:00	2.1	125
16/5/27	23:00	2.7	166
16/5/29	0:00	1.1	226
16/5/29	1:00	0.9	217
16/5/29	2:00	1.1	203
16/5/29	3:00	0.6	198
16/5/29	4:00	0.8	187
16/5/29	5:00	0.4	231
16/5/29	6:00	1.3	240
16/5/29	7:00	1.5	222
16/5/29	8:00	1.2	262
16/5/29	9:00	1.3	215
16/5/29	10:00	1.1	241
16/5/29	11:00	0.8	232
16/5/29	12:00	0.5	211
16/5/29	13:00	0.4	206
16/5/29	14:00	0.6	214
16/5/29	15:00	0.9	233
16/5/29	16:00	1.1	251
16/5/29	17:00	1.2	249
16/5/29	18:00	1.6	237
16/5/29	19:00	1.4	221
16/5/29	20:00	1.1	256
16/5/29	21:00	0.6	201
16/5/29	22:00	0.7	184
16/5/29	23:00	1.2	171
16/5/30	0:00	1.1	165
16/5/30	1:00	0.4	199
16/5/30	2:00	0.6	212
16/5/30	3:00	0.9	220
16/5/30	4:00	0.7	210
16/5/30	5:00	0.9	204
16/5/30	6:00	1.6	174
16/5/30	7:00	2.1	163
16/5/30	8:00	1.3	157
16/5/30	9:00	1.4	182
16/5/30	10:00	1.1	191
16/5/30	11:00	1.8	183
16/5/30	12:00	0.7	165
16/5/30	13:00	0.6	177
16/5/30	14:00	0.8	195
16/5/30	15:00	0.4	181
16/5/30	16:00	0.4	176
16/5/30	17:00	0.3	185
16/5/30	18:00	0.2	222
16/5/30	19:00	0.4	229
16/5/30	20:00	0.1	211
16/5/30	21:00	0.5	205
16/5/30	22:00	0.6	227
16/5/30	23:00	0.7	218



Appendix I

# Impact Dolphin Monitoring Survey

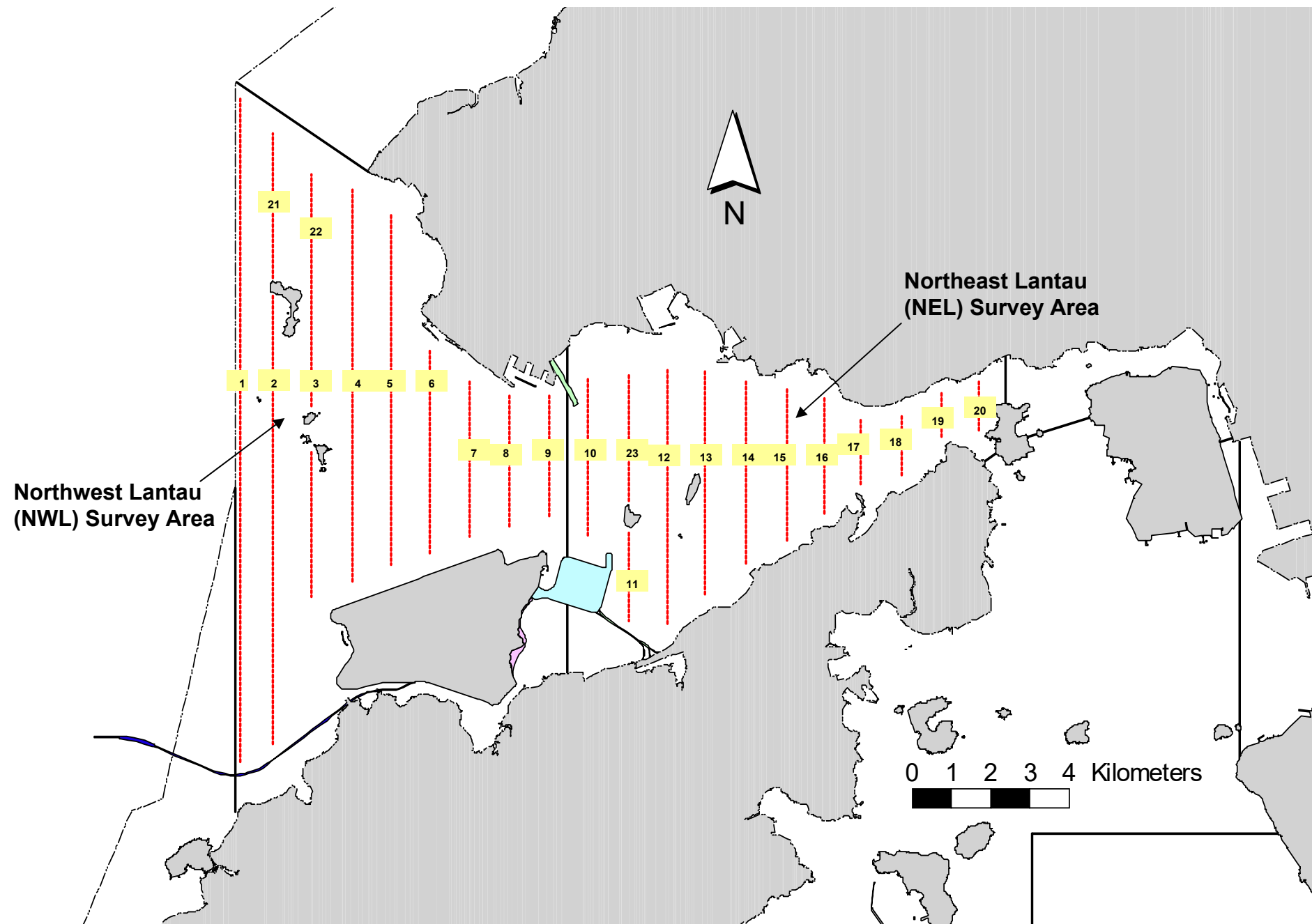


Figure 1. Transect Line Layout in Northwest and Northeast Lantau Survey Areas

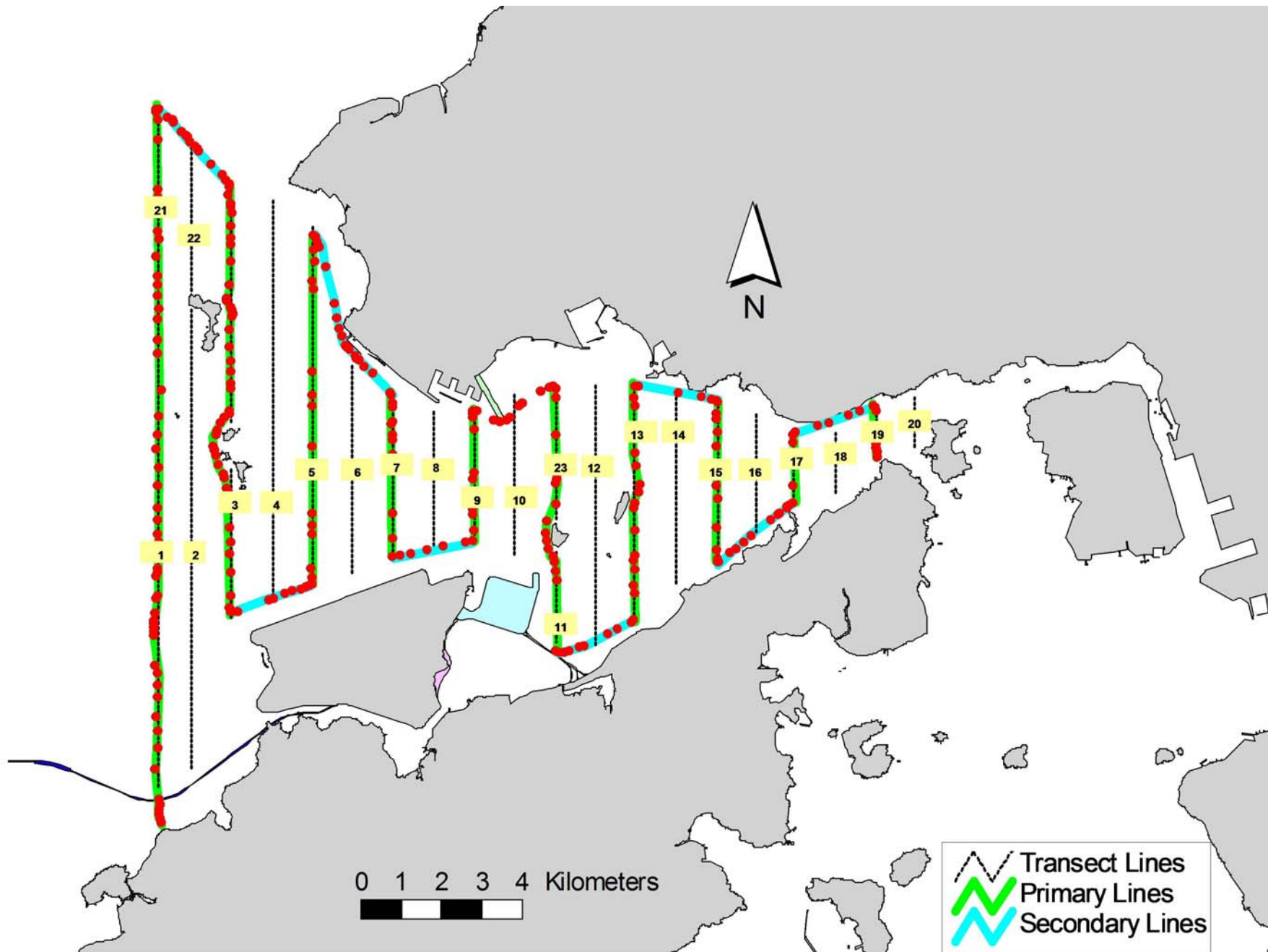


Figure 2. Survey Route on May 3<sup>rd</sup>, 2016 (from HKLR03 project)

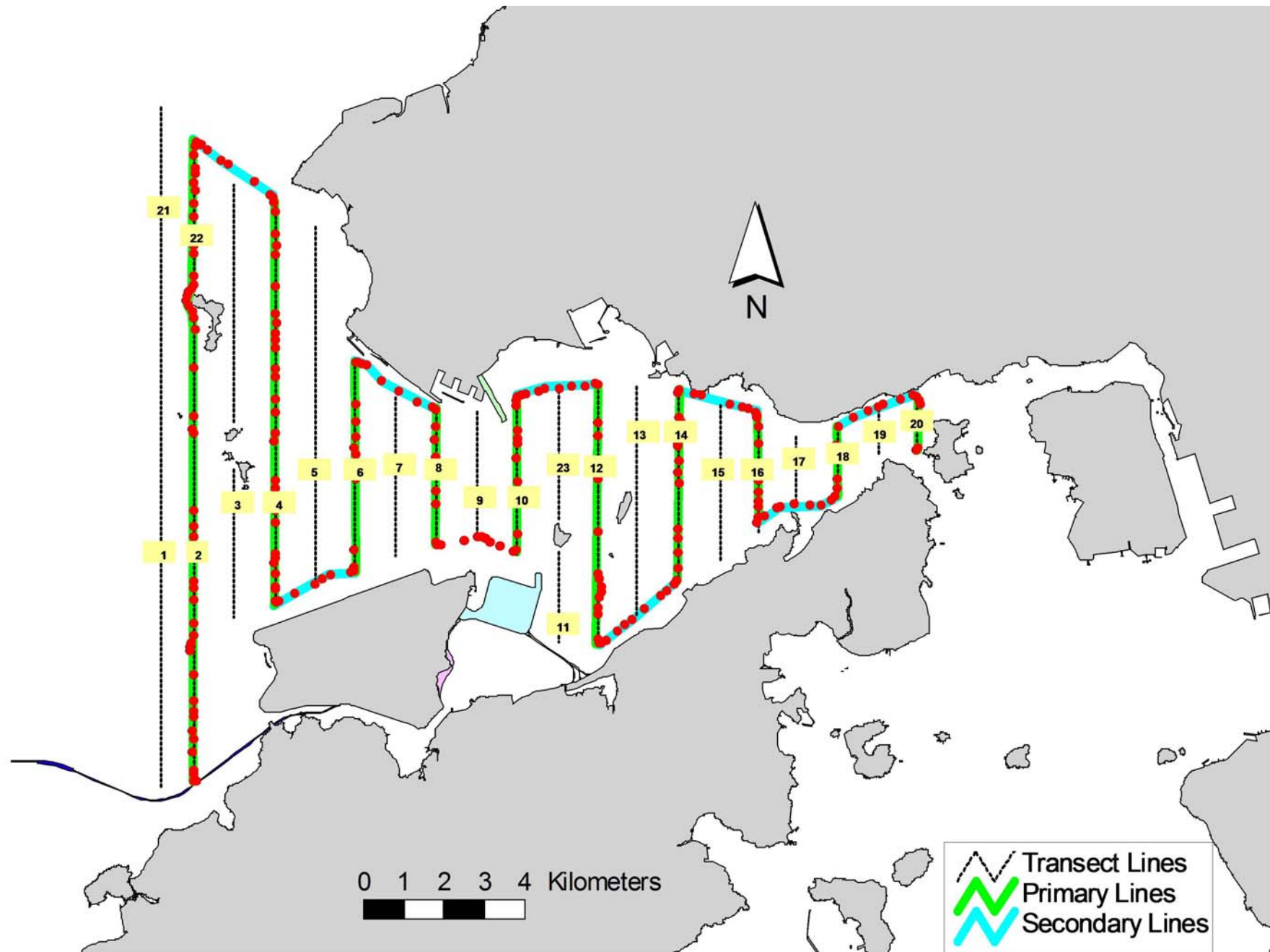


Figure 3. Survey Route on May 12<sup>th</sup>, 2016 (from HKLR03 project)

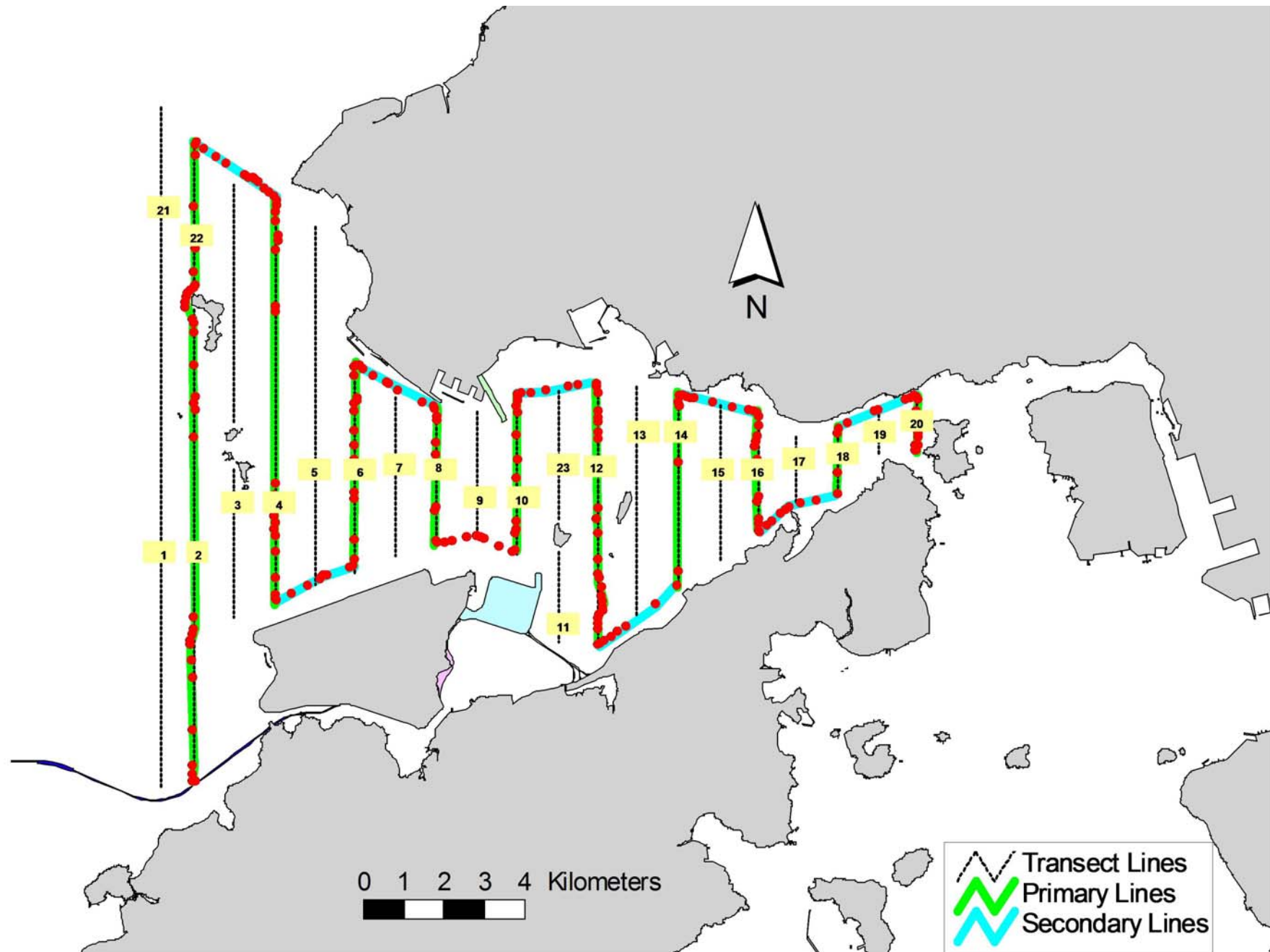


Figure 4. Survey Route on May 17<sup>th</sup>, 2016 (from HKLR03 project)

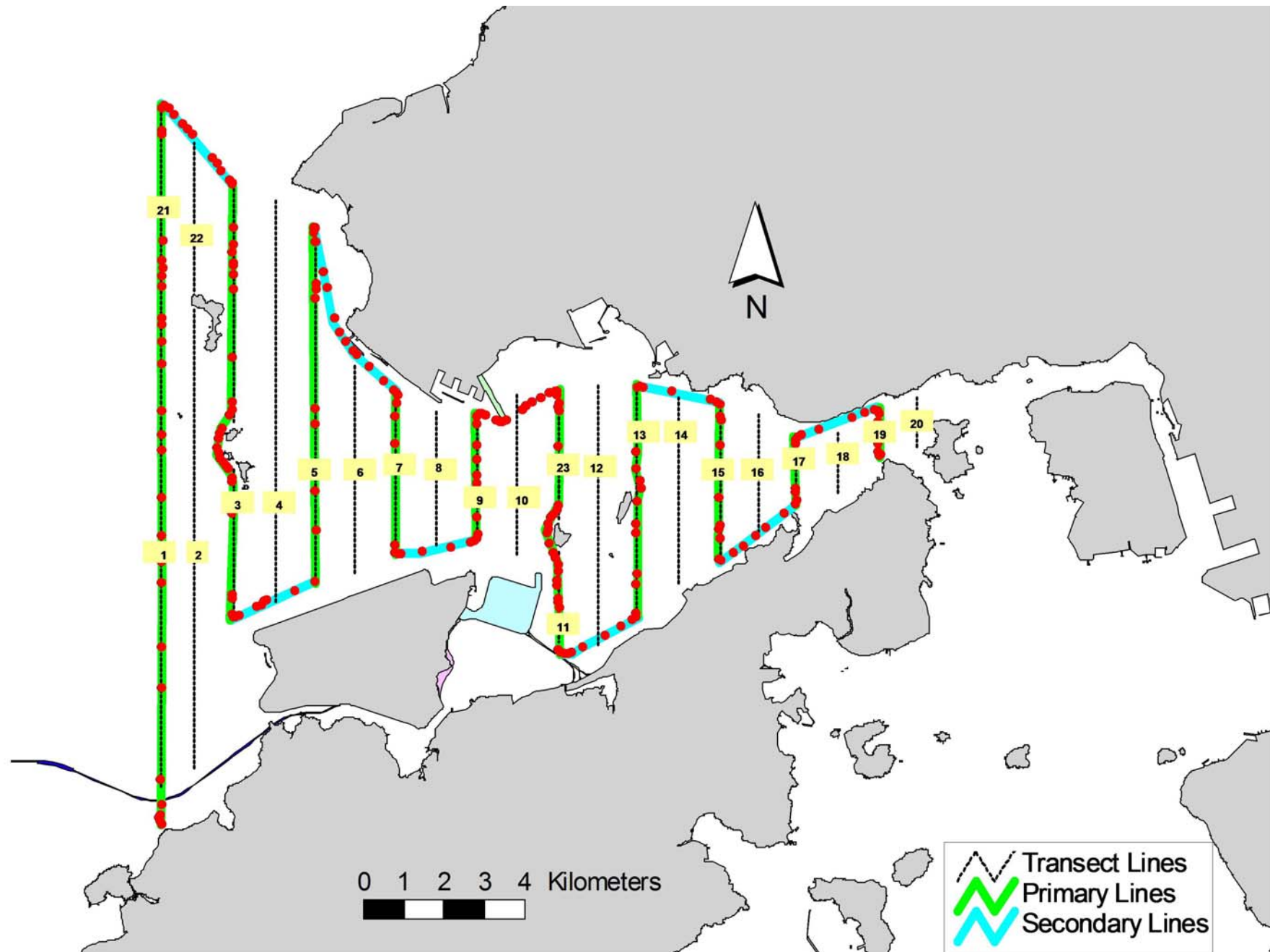


Figure 5. Survey Route on May 26<sup>th</sup>, 2016 (from HKLR03 project)

## Appendix I. HKLR03 Survey Effort Database (May 2016)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
3-May-16	NE LANTAU	2	15.29	SPRING	STANDARD31516	HKLR	P
3-May-16	NE LANTAU	3	1.40	SPRING	STANDARD31516	HKLR	P
3-May-16	NE LANTAU	2	10.01	SPRING	STANDARD31516	HKLR	S
3-May-16	NW LANTAU	2	16.24	SPRING	STANDARD31516	HKLR	P
3-May-16	NW LANTAU	3	23.50	SPRING	STANDARD31516	HKLR	P
3-May-16	NW LANTAU	2	7.16	SPRING	STANDARD31516	HKLR	S
3-May-16	NW LANTAU	3	5.60	SPRING	STANDARD31516	HKLR	S
12-May-16	NW LANTAU	2	15.26	SPRING	STANDARD31516	HKLR	P
12-May-16	NW LANTAU	3	16.74	SPRING	STANDARD31516	HKLR	P
12-May-16	NW LANTAU	2	7.60	SPRING	STANDARD31516	HKLR	S
12-May-16	NE LANTAU	2	6.52	SPRING	STANDARD31516	HKLR	P
12-May-16	NE LANTAU	3	13.33	SPRING	STANDARD31516	HKLR	P
12-May-16	NE LANTAU	2	4.72	SPRING	STANDARD31516	HKLR	S
12-May-16	NE LANTAU	3	6.69	SPRING	STANDARD31516	HKLR	S
17-May-16	NE LANTAU	2	10.20	SPRING	STANDARD31516	HKLR	P
17-May-16	NE LANTAU	3	9.92	SPRING	STANDARD31516	HKLR	P
17-May-16	NE LANTAU	2	6.30	SPRING	STANDARD31516	HKLR	S
17-May-16	NE LANTAU	3	4.38	SPRING	STANDARD31516	HKLR	S
17-May-16	NW LANTAU	2	2.74	SPRING	STANDARD31516	HKLR	P
17-May-16	NW LANTAU	3	28.07	SPRING	STANDARD31516	HKLR	P
17-May-16	NW LANTAU	4	0.79	SPRING	STANDARD31516	HKLR	P
17-May-16	NW LANTAU	3	7.80	SPRING	STANDARD31516	HKLR	S
26-May-16	NW LANTAU	2	14.13	SPRING	STANDARD31516	HKLR	P
26-May-16	NW LANTAU	3	26.67	SPRING	STANDARD31516	HKLR	P
26-May-16	NW LANTAU	2	7.10	SPRING	STANDARD31516	HKLR	S
26-May-16	NW LANTAU	3	6.00	SPRING	STANDARD31516	HKLR	S
26-May-16	NE LANTAU	2	2.62	SPRING	STANDARD31516	HKLR	P
26-May-16	NE LANTAU	3	14.38	SPRING	STANDARD31516	HKLR	P
26-May-16	NE LANTAU	2	3.70	SPRING	STANDARD31516	HKLR	S
26-May-16	NE LANTAU	3	6.10	SPRING	STANDARD31516	HKLR	S

Appendix J

## Event and Action Plan



*Event and Action Plan for Impact Air Monitoring*

	<b>Action</b>			
	ET (a)	IEC (a)	SOR (a)	Contractor(s)
<b>Action Level Exceedance</b>				
	<ol style="list-style-type: none"> <li>1. Identify the source.</li> <li>2. Repeat measurement to confirm finding. If two consecutive measurements exceed Action Level, the exceedance is then confirmed.</li> <li>3. Inform the IEC and the SOR.</li> <li>4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented.</li> <li>5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily.</li> <li>6. Discuss with the IEC and the Contractor on remedial actions required.</li> <li>7. If exceedance continues, arrange meeting with the IEC and the SOR.</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET.</li> <li>2. Check the Contractor's working method.</li> <li>3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures.</li> <li>4. Advise the SOR on the effectiveness of the proposed remedial measures.</li> <li>5. Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice</li> <li>2. Amend working methods if appropriate</li> <li>3. If the exceedance is confirmed to be Project related, submit proposals for remedial actions to IEC within 3 working days of notification</li> <li>4. Implement the agreed proposals</li> <li>5. Amend proposal if appropriate</li> </ol>

	<b>Action</b>			
	ET (a)	IEC (a)	SOR (a)	Contractor(s)
<b>Limit Level Exceedance</b>				
	<ol style="list-style-type: none"> <li>1. Identify the source.</li> <li>2. Repeat measurement to confirm finding. If two consecutive measurements exceed Limit Level, the exceedance is then confirmed.</li> <li>3. Inform the IEC, the SOR, the DEP and the Contractor.</li> <li>4. Investigate the cause of exceedance and check Contractor’s working procedures to determine possible mitigation to be implemented.</li> <li>5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily.</li> <li>6. Carry out analysis of the Contractor’s working procedures to determine possible mitigation to be implemented.</li> <li>7. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken.</li> <li>8. Assess effectiveness of the Contractor’s remedial actions and keep the IEC, the DEP and the SOR informed of the results.</li> <li>9. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET.</li> <li>2. Check Contractor’s working method.</li> <li>3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures.</li> <li>4. Advise the SOR on the effectiveness of the proposed remedial measures.</li> <li>5. Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing.</li> <li>2. Notify the Contractor.</li> <li>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.</li> <li>4. Ensure remedial measures are properly implemented.</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>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.</li> <li>3. Implement the agreed proposals.</li> <li>4. Amend proposal if appropriate.</li> <li>5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.</li> </ol>

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

EVENT	ACTION			
	ET	IEC	SOR	Contractor
	<ol style="list-style-type: none"> <li>3. Identify source(s) of impact;</li> <li>4. Inform the IEC, SOR and Contractor of findings;</li> <li>5. Check monitoring data;</li> <li>6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.</li> <li>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.</li> </ol>	<p>Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.</p> <ol style="list-style-type: none"> <li>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.</li> <li>5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly.</li> </ol>	<p>proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, SOR to signify the agreement in writing on such proposals and any other mitigation measures.</p> <ol style="list-style-type: none"> <li>3. Supervise the implementation of additional monitoring and/or any other mitigation measures.</li> </ol>	<p>potential mitigation measures.</p> <ol style="list-style-type: none"> <li>3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary.</li> <li>4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.</li> </ol>

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

Appendix K

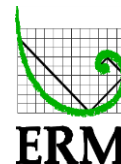
Cumulative Statistics on  
Exceedances, Complaints,  
Notifications of Summons  
and Successful Prosecutions

**Table K1** *Cumulative Statistics on Exceedances*

<b>Parameters</b>	<b>Level of Exceedance</b>	<b>Total No. recorded in this reporting month</b>	<b>Total No. recorded since project commencement</b>
1-hr TSP	Action	0	30
	Limit	0	2
24-hr TSP	Action	0	5
	Limit	0	1
Water Quality	Action	0	6
	Limit	0	1
Impact Dolphin Monitoring	Action	0	9
	Limit	1	5

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

<b>Reporting Period</b>	<b>Cumulative Statistics</b>		
	<b>Complaints</b>	<b>Notifications of Summons</b>	<b>Successful Prosecutions</b>
This Reporting Month (May 2016)	1	0	0
Total No. received since project commencement	5	0	0



**ENVIRONMENTAL COMPLAINT INVESTIGATION REPORT**

*Our Reference: 0212330\_Complaint LOG\_20160519\_04*

***Basic Information of Complaints***

<b>Reference Numbers:</b>	N/A
Date of Complaints Received	19 May 2016
Location of Complaints	Southern Landfall – Barge Area
Nature of Complaints	Dust emission
Complaints Received by	Environmental Protection Department (EPD)
Via	Email
Complainants	Not disclosed

***Details of Complaints***

On 19 May 2016, a complaint case was received by EPD regarding dust emission from the barge area at Southern Landfall. The Contractor and the ET received the complaint notification on 20 May 2016. The ET was informed that the case is categorized as complaint in nature upon the investigation, discussion and agreement between different parties (i.e. the Contractor (DBJV), SOR and ENPO).

***Investigation Report***

Upon receiving the case notification from EPD on 20 May 2016, the Contractor had promptly checked the works summary.

Based on the record of the Contractor’s works summary, dust nuisance was recorded at the barge area of Southern Landfall on 18 May 2016 at around 4:10pm. According to the construction information provided by the Contractor, the majority of works during that period was jet grouting. After dust emission was observed from the barge, the grouting operator has stopped the works within two (2) minutes. Upon thorough investigation, it was found that the pressure of the pipe accidentally increased which caused damage on the pipe and malfunction on the filter, and thus created the dust emission. All related works had stopped. A new filter was added and the damaged pipe was replaced by a new pipe on 19 May 2016. No dust emissions were observed after the replacement.

Also, a joint site inspection was carried out with the Contractor, SOR and EPD on 23 May 2016 to verify the remedial measures (see photo records on Annex A). No further defects were observed and no adverse comments were received.

According to the complaint notification from EPD, the dust nuisance was observed by the complainant in the afternoon of 18 May 2016. After investigation and discussion with the Contractor, it was concluded that the dust nuisance observed by the complainant was the same as the dust nuisance observed by the Contractor.

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

The Contractor has been reminded to adhere strictly to implement all relevant dust mitigation measures recommended or specified in the EP (EP-354/2009/D), the approved EIA and the Updated EM&A Manual of this Project to avoid causing dust nuisance.

The loading, unloading, transfer and handling of cement and PFA shall be carried out in a totally enclosed system, and any vent or exhaust shall be fitted with an effective fabric filter.

In the above case, 24-hour supervision of the grouting process has been recommended in order to prevent accidental dust emission. The Contractor has also been reminded to carry out weekly inspection and maintenance of the facility including pipes, filters and tanks, etc. Contingency plan should be implemented to mitigate the environmental impacts. The Contractor should stop the works immediately if similar incident occur. Verification of the facility by the ET is required before the resumption of works.

The Contractor has been reminded to document the mitigation measures in the method statement of construction activities with same cement transportation/handling procedures. No other additional action is required.

Date of File Closed : 27 May 2016

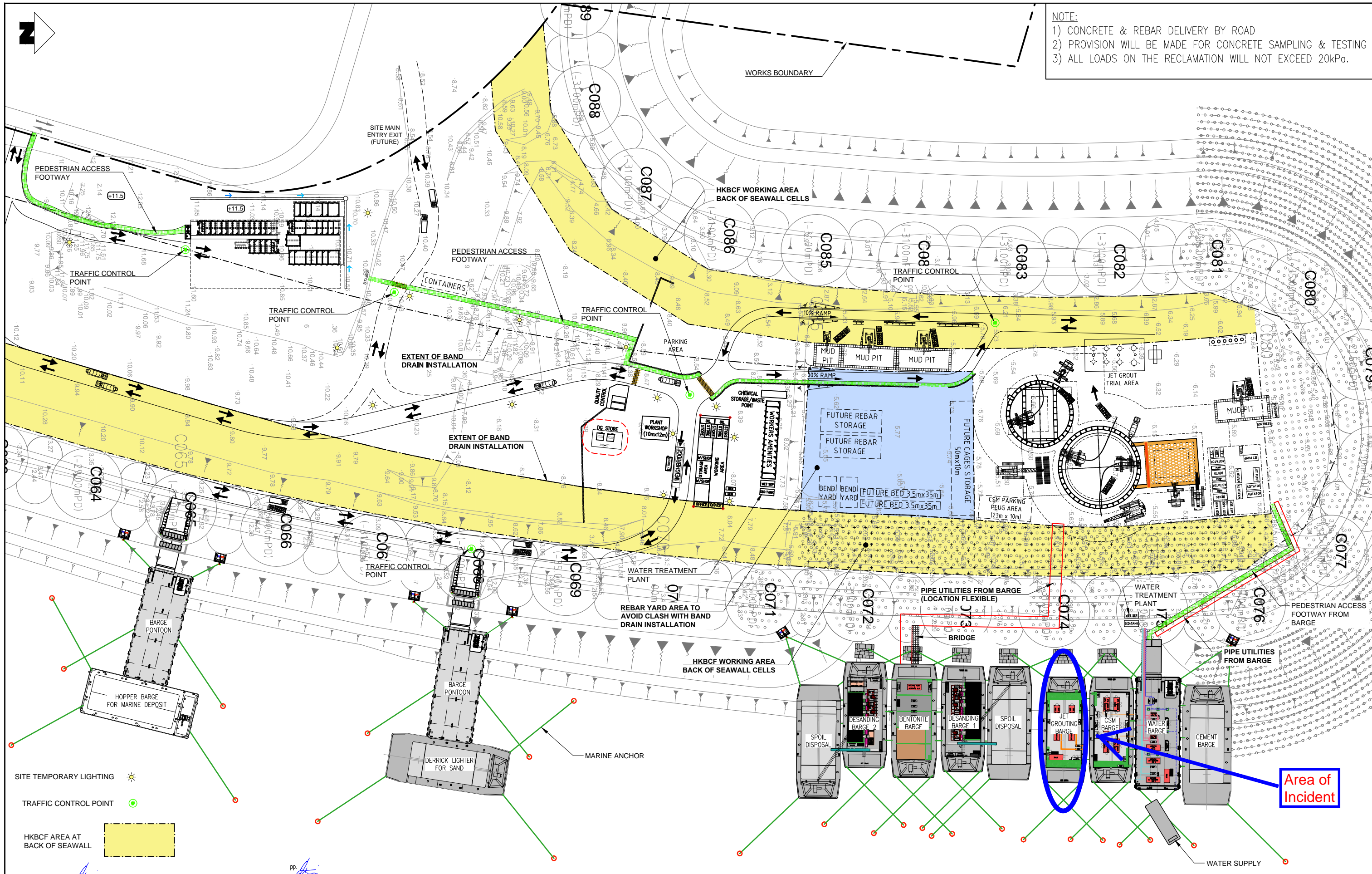
Approved and Filed by:



(Jovy Tam, ET Leader)

Date: 27 May 2016





- NOTE:
- 1) CONCRETE & REBAR DELIVERY BY ROAD
  - 2) PROVISION WILL BE MADE FOR CONCRETE SAMPLING & TESTING
  - 3) ALL LOADS ON THE RECLAMATION WILL NOT EXCEED 20kPa.

Rev.	Date	Drawn	Designed	Verified	Description	Approved
F	06APR16	pkv	pkv	DL	ROAD & PEDESTRIAN ACCESS WAY UPDATED	SPo
E	02APR16	pkv	pkv	DL	SI UPDATED FOR APRIL	SPo
D	23MAR16	pkv	pkv	DL	PIPE UTILITIES FROM BARGE ROUTE REVISED	SPo
C	21MAR16	pkv	pkv	DL	WETSEP, 3 LOCATIONS / CSM & JET SET-UP	SPo
B	11MAR16	pkv	pkv	DL	UPDATE	SPo
A	10MAR16	pkv	pkv	DL	FIRST ISSUE	SPo

Main Contractor

Dragages - Bouygues Joint Venture 宜基 - 布魯格

Client

路政署  
HIGHWAYS DEPARTMENT

Contractor's Designer

ARUP Ove Arup & Partners  
Hong Kong Limited

Project

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

Drawing Title

SOUTHERN LANDFALL  
SITE INSTALLATION LAYOUT - APRIL 16  
SET-UP AFTER SURCHARGE REMOVAL TO +5.5mPD

Drawing no.

TMCLKL8-DBJ-SAA-MSI-06176

Scale

1:1500(A3)

CADD Ref.

SAA-MSI-06176-F-IFA

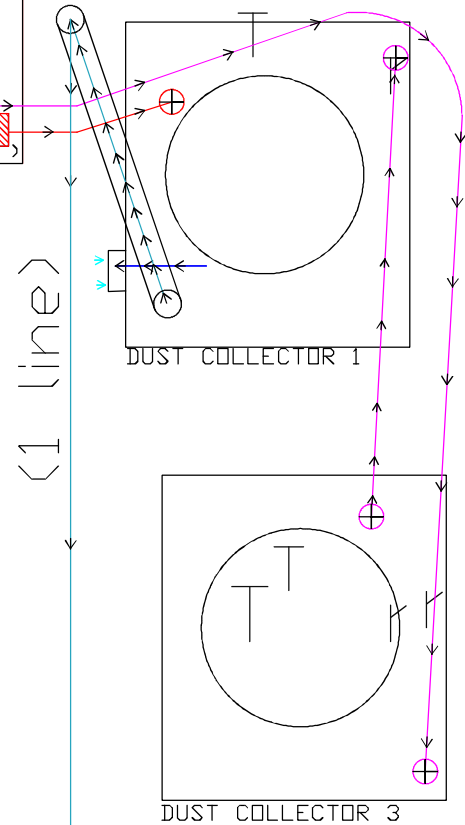
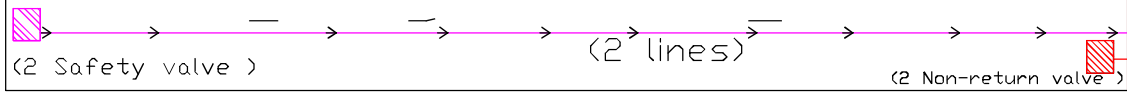
Issue Status

IFA (ISSUE FOR APPROVAL)

Revision

F

# CEMENT SILO + CEMENT SILO



- Non return valve
- Safety Valve
- Air\* circuit in operational pipe line going out from the Non-return valve
- Air\* circuit in safety pipe line going out from the Safety valve

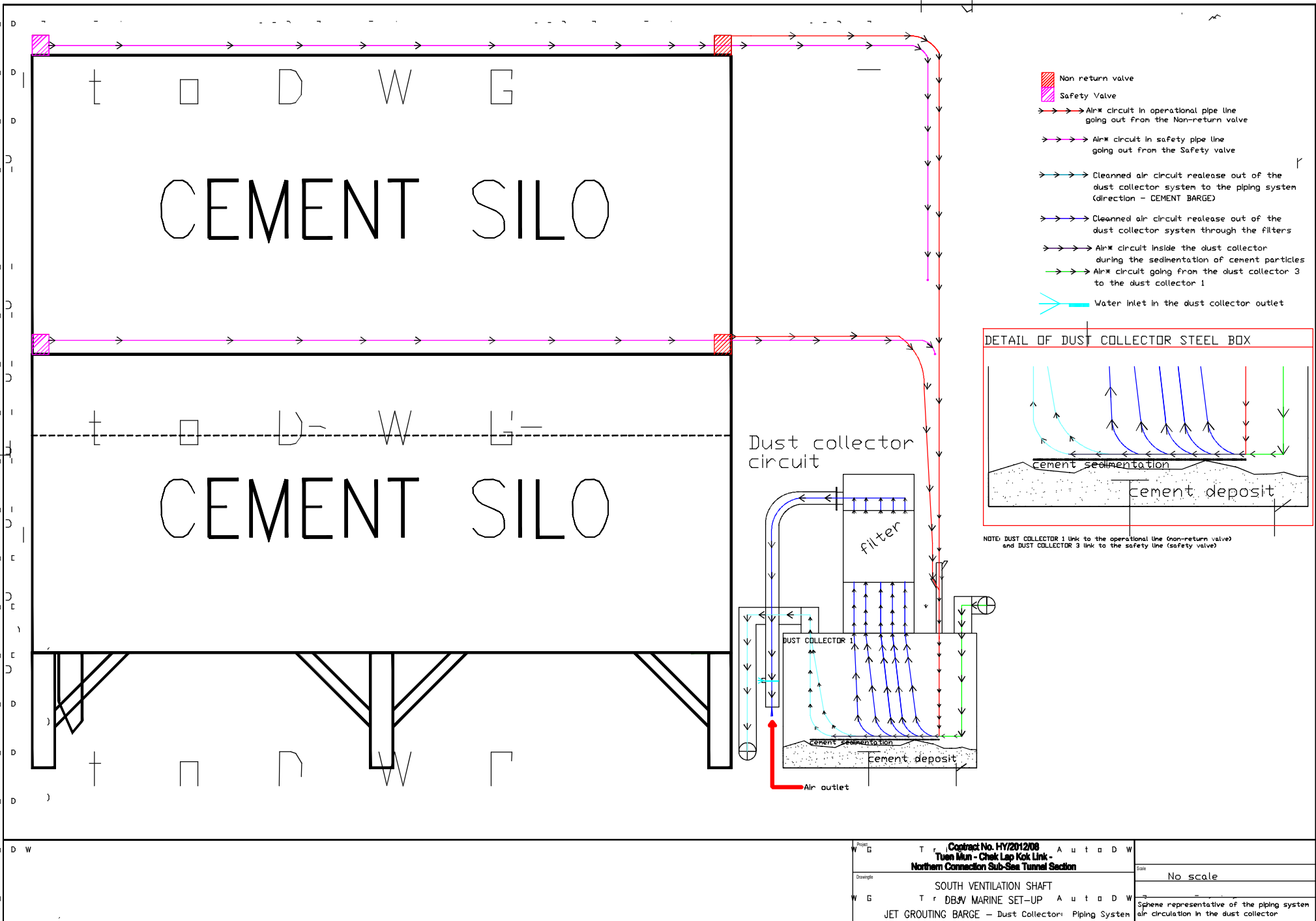
- Cleaned air circuit release out of the dust collector system to the piping system (direction - CEMENT BARGE)
- Cleaned air circuit release out of the dust collector system through the filters
- Air\* circuit inside the dust collector during the sedimentation of cement particles
- Air\* circuit going from the dust collector 3 to the dust collector 1

NOTE: DUST COLLECTOR 1 link to the operational line (non-return valve) and DUST COLLECTOR 3 link to the safety line (safety valve)

\*Air wht small amount of cement particles

Air pipe line going to the Cement Barge

Project	Contract No. HY201208 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section	Scale	No scale
Drawn by	SOUTH VENTILATION SHAFT		
Checked by	DB&W MARINE SET-UP JET GROUTING BARGE - Dust Collector Piping System		



Project	Contract No. HY201208 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section	Scale	No scale
Drawings	SOUTH VENTILATION SHAFT TR DB&W MARINE SET-UP		
W G	JET GROUTING BARGE - Dust Collector Piping System		
		Sphere representative of the piping system air circulation in the dust collector	



## Annex A Photo Records taken during Site Investigation

\*Note: Photos taken on 23/5/2016



New filter was added. (Barge area - Southern Landfall)



The damaged pipe was replaced by a new pipe. (Barge area - Southern Landfall)



## Annex A Photo Records taken during Site Investigation

\*Note: Photos taken on 23/5/2016



A joint site inspection was carried out by the ET, the Contractor, SOR and EPD on 23 May 2016.  
(Barge area - Southern Landfall)

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 May 2016 [to be submitted not later than the 15<sup>th</sup> day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of <u>Inert</u> Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	930.268	0.000	0.000	0.000	930.268
Jan-2016	24.068	0.000	0.000	0.000	24.068
Feb-2016	9.229	0.000	0.000	0.000	9.229
Mar-2016	3.501	0.000	0.000	0.000	3.501
Apr-2016	9.175	0.000	0.000	0.000	9.175
May-2016	2.392	0.000	0.000	0.000	2.392
Jun-2016					
Half Year Sub-total					
Jul-2016					
Aug-2016					
Sep-2016					
Oct-2016					
Nov-2016					
Dec-2016					
Project Total Quantities	978.633	0.000	0.000	0.000	978.633

Month	Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	0.000	0.000	2.150	2.150	6.870	6.870	1.710	1.710	2.217
Jan-2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.113
Feb-2016	1.850	1.850	0.000	0.000	0.000	0.000	4.740	4.740	0.102
Mar-2016	0.000	0.000	0.200	0.200	0.000	0.000	3.000	3.000	0.111
Apr-2016	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.198
May-2016	0.000	0.000	0.200	0.200	0.000	0.000	0.000	0.000	0.202
Jun-2016									
Half Year Sub-total									
Jul-2016									
Aug-2016									
Sep-2016									
Oct-2016									
Nov-2016									
Dec-2016									
Project Total Quantities	1.850	1.850	2.750	2.750	6.870	6.870	9.450	9.450	2.943



Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill
(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
20.000	0.000	0.000	0.000	20.000

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 ton)
0.000	0.000	0.000	0.000	0.100

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