

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

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

05 January 2021

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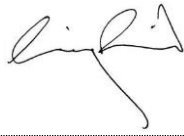
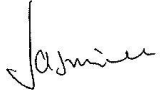


# Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

**Environmental Resources  
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*Twenty-seventh Quarterly Environmental Monitoring &  
Audit (EM&A) Report*

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|  |  |  |         |  |          |
|--|--|--|---------|--|----------|
| Client:<br><br>DBJV  |  | Project No:<br><br>0212330   |         |  |          |
| Summary:<br><br>This document presents the Twenty-seventh Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.   |  | Date:<br>05 January 2021   |         |  |          |
|  |  | Approved by:<br>   |         |  |          |
|  |  | <i>Mr Craig Reid<br/>Partner</i>   |         |  |          |
|  |  | Certified by:<br>                                       |         |  |          |
|  |  | <i>Dr Jasmine Ng<br/>ET Leader</i>   |         |  |          |
|  | 27 <sup>th</sup> Quarterly EM&A Report | VAR  | JN      | CAR  | 05/01/21 |
| 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> <input type="checkbox"/> Internal<br><input checked="" type="checkbox"/> Public<br><input type="checkbox"/> Confidential |         | <br> |          |

Ref.: HYDHZMBEEM00\_0\_8328L.21.docx

5 January 2021

By Fax (2293 6300) and By Post

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

Attention: Mr. Roger Man

Dear Mr. Man,

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

**Contract No. HY/2012/08  
TM-CLKL – Northern Connection Sub-sea Tunnel Section  
27<sup>th</sup> Quarterly EM&A Summary Report for June 2020 to August 2020**

Reference is made to the ET's submission of 27<sup>th</sup> Quarterly EM&A Summary Report for June 2020 to August 2020 (ET's ref.: "0212330\_27th Quarterly EM&A\_20210105.doc" dated 5 January 2021) certified by the ET Leader.

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

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

Yours sincerely,



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

c.c.

|       |                  |                     |
|-------|------------------|---------------------|
| HyD   | Mr. Patrick Ng   | (By Fax: 3188 6614) |
| HyD   | Mr. Francis Chan | (By Fax: 3188 6614) |
| AECOM | Mr. Conrad Ng    | (By Fax: 3922 9797) |
| ERM   | Dr. Jasmine Ng   | (By Fax: 2723 5660) |
| DBJV  | Mr. Bryan Lee    | (By Fax: 2293 7499) |

Internal: DY, YH, ENPO Site

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## TABLE OF CONTENTS

|            |   |           |
|------------|---|-----------|
|            | <i>EXECUTIVE SUMMARY</i>  | <i>I</i>  |
| <i>1</i>   | <i>INTRODUCTION</i>   | <i>1</i>  |
| <i>1.1</i> | <i>BACKGROUND</i>   | <i>1</i>  |
| <i>1.2</i> | <i>SCOPE OF REPORT</i>  | <i>2</i>  |
| <i>1.3</i> | <i>ORGANIZATION STRUCTURE</i>   | <i>2</i>  |
| <i>1.4</i> | <i>SUMMARY OF CONSTRUCTION WORKS</i>  | <i>2</i>  |
| <i>2</i>   | <i>EM&amp;A RESULTS</i>   | <i>5</i>  |
| <i>2.1</i> | <i>AIR QUALITY</i>  | <i>5</i>  |
| <i>2.2</i> | <i>WATER QUALITY MONITORING</i>   | <i>7</i>  |
| <i>2.3</i> | <i>DOLPHIN MONITORING</i>   | <i>9</i>  |
| <i>2.4</i> | <i>EM&amp;A SITE INSPECTION</i>   | <i>12</i> |
| <i>2.5</i> | <i>WASTE MANAGEMENT STATUS</i>  | <i>14</i> |
| <i>2.6</i> | <i>ENVIRONMENTAL LICENSES AND PERMITS</i>   | <i>14</i> |
| <i>2.7</i> | <i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i>                     | <i>16</i> |
| <i>2.8</i> | <i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE<br/>LIMIT</i>      | <i>16</i> |
| <i>2.9</i> | <i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL<br/>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 QUARTER</i>                                 | <i>18</i> |
| <i>3.2</i> | <i>KEY ISSUES FOR THE COMING QUARTER</i>  | <i>18</i> |
| <i>3.3</i> | <i>MONITORING SCHEDULE FOR THE COMING QUARTER</i>                                     | <i>18</i> |
| <i>4</i>   | <i>CONCLUSIONS</i>  | <i>19</i> |



|                   |   |
|-------------------|---|
| <i>APPENDIX A</i> | <i>PROJECT ORGANIZATION</i>   |
| <i>APPENDIX B</i> | <i>CONSTRUCTION PROGRAMME</i>   |
| <i>APPENDIX C</i> | <i>ENVIRONMENTAL MITIGATION AND<br/>ENHANCEMENT MEASURE IMPLEMENTATION<br/>SCHEDULES (EMIS)</i> |
| <i>APPENDIX D</i> | <i>ACTION AND LIMIT LEVELS</i>  |
| <i>APPENDIX E</i> | <i>MONITORING SCHEDULE</i>  |
| <i>APPENDIX F</i> | <i>AIR QUALITY MONITORING RESULTS</i>   |
| <i>APPENDIX G</i> | <i>OPERATIONAL PHASE WATER QUALITY<br/>MONITORING RESULTS</i>                                   |
| <i>APPENDIX H</i> | <i>POST CONSTRUCTION (OPERATIONAL) DOLPHIN<br/>MONITORING SURVEY</i>                            |
| <i>APPENDIX I</i> | <i>EVENT AND ACTION PLAN</i>  |
| <i>APPENDIX J</i> | <i>CUMULATIVE STATISTICS ON EXCEEDANCE AND<br/>COMPLAINT</i>                                    |
| <i>APPENDIX K</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 Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO). Subsequent applications for variation of environmental permits (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in 2020. The impact monitoring of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

This is the Twenty-seventh Quarterly EM&A report presenting the EM&A works carried out during the period from 1 June to 31 August 2020 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the “Contract”) in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, the major activities in the reporting quarter included:

### *Land-based Works*

- Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall;
- UU installation - Portion S-A, S-B & S-C and Northern Landfall;
- Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall; and
- Hard paving and footpath - Pump Sump Area at Northern Landfall.

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

|  |             |
|--|-------------|
| 24-hour TSP Monitoring                     | 31 sessions |
| 1-hour TSP Monitoring                      | 31 sessions |
| Operational Phase Water Quality Monitoring | 3 sessions  |
| Operational Phase Dolphin Monitoring       | 6 sessions  |
| Joint Environmental Site Inspection        | 12 sessions |

### *Implementation of Marine Mammal Exclusion Zone*

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

### Summary of Breaches of Action/Limit Levels

#### *Breaches of Action and Limit Levels for Air Quality*

Two (2) Action Level exceedances of 1-hour TSP were recorded in this reporting period. Investigation reports are provided in Appendix J.

#### *Dolphin Monitoring*

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between June and August 2020.

### Environmental Complaints, Non-compliance & Summons

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

### Reporting Change

Proposal for operational phase dolphin monitoring and operational phase water quality monitoring was approved by EPD on 19 May 2020. Operational phase dolphin monitoring and operational phase water quality monitoring commenced in June 2020.

### Upcoming Works for the Next Reporting Period

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

#### *Land-based Works*

- Carpark canopies installation - Portion S-A, S-B & S-C;
- Hard paving and footpath - Pump Sump Area at Northern Landfall;
- Installation of green roof system - South Ventilation Building; and
- Chain fence and reinstatement at Box culvert.

### Future Key Issues

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

## 1.1

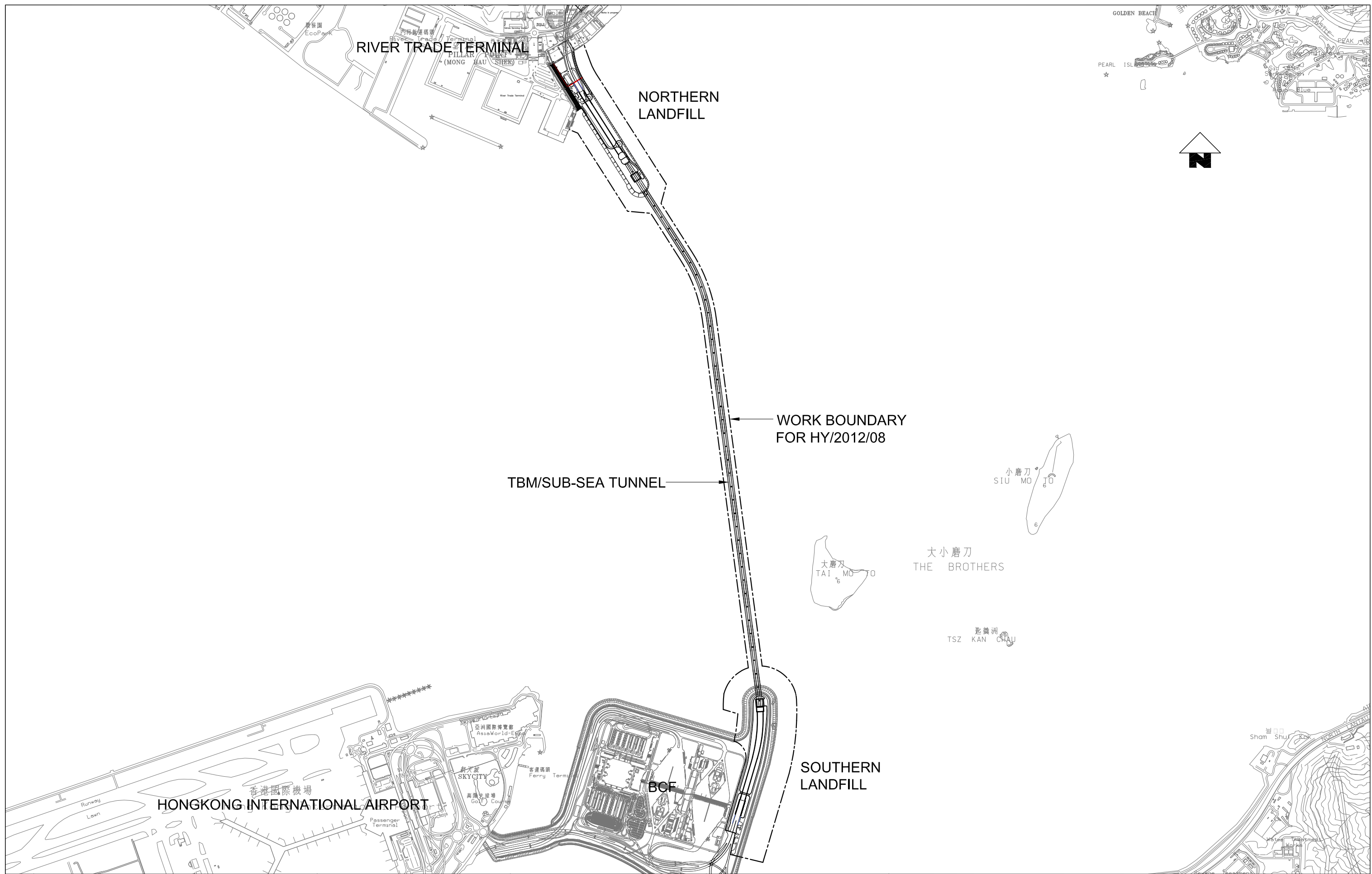
## BACKGROUND

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

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

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of TM-CLKL while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with Environmental Permit No. EP-354/2009/A. Ramboll Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO).

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



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

Main Contractor

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

HIGHWAYS DEPARTMENT

Contractor's Designer

Arup & Partners  
Hong Kong Limited

Project

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

Drawing Title

**Figure 1.1**

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



The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in 2020. The impact monitoring phase of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

## 1.2 SCOPE OF REPORT

This is the Twenty-seventh Quarterly EM&A Report under the *Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section*. This report presents a summary of the environmental monitoring and audit works from 1 June 2020 to 31 August 2020.

## 1.3 ORGANIZATION STRUCTURE

The organization structure of the Contract is shown in *Appendix A*. The key personnel contact names and contact details are summarized in *Table 1.1* below.

**Table 1.1** *Contact Information of Key Personnel*

| Party   | Position                     | Name           | Telephone | Fax       |
|---|------------------------------|----------------|-----------|-----------|
| Highways Department                               | Engr 24/SD                   | Ken T.M. Cheng | 2762 4062 | 3188 6614 |
| SOR<br>(AECOM Asia Company Limited)               | Chief Resident Engineer      | Roger Man      | 2293 6388 | 2293 6300 |
| ENPO / IEC<br>(Ramboll Hong Kong Ltd.)            | ENPO Leader                  | Y.H. Hui       | 3465 2850 | 3465 2899 |
|   | IEC                          | Manson Yeung   | 9700 6767 | 3465 2899 |
| Contractor<br>(Dragages – Bouygues Joint Venture) | Deputy Environmental Manager | Bryan Lee      | 2293 7323 | 2293 7499 |
|   | 24-hour hotline              |                | 2293 7330 |           |
| ET (ERM-HK)                                       | ET Leader                    | Jasmine Ng     | 2271 3311 | 2723 5660 |

## 1.4 SUMMARY OF CONSTRUCTION WORKS

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

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

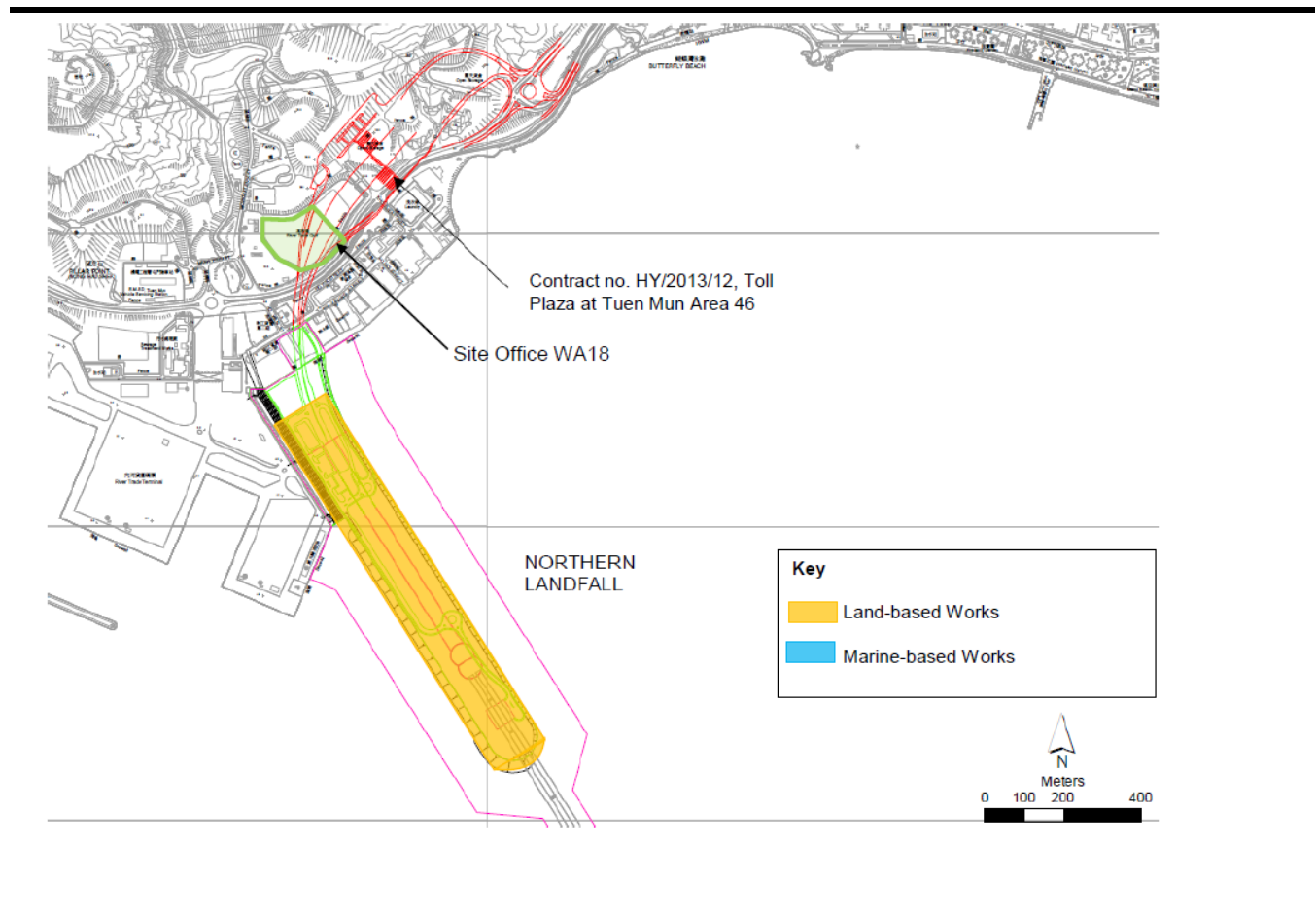
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Contract are shown in *Figure 1.3*.

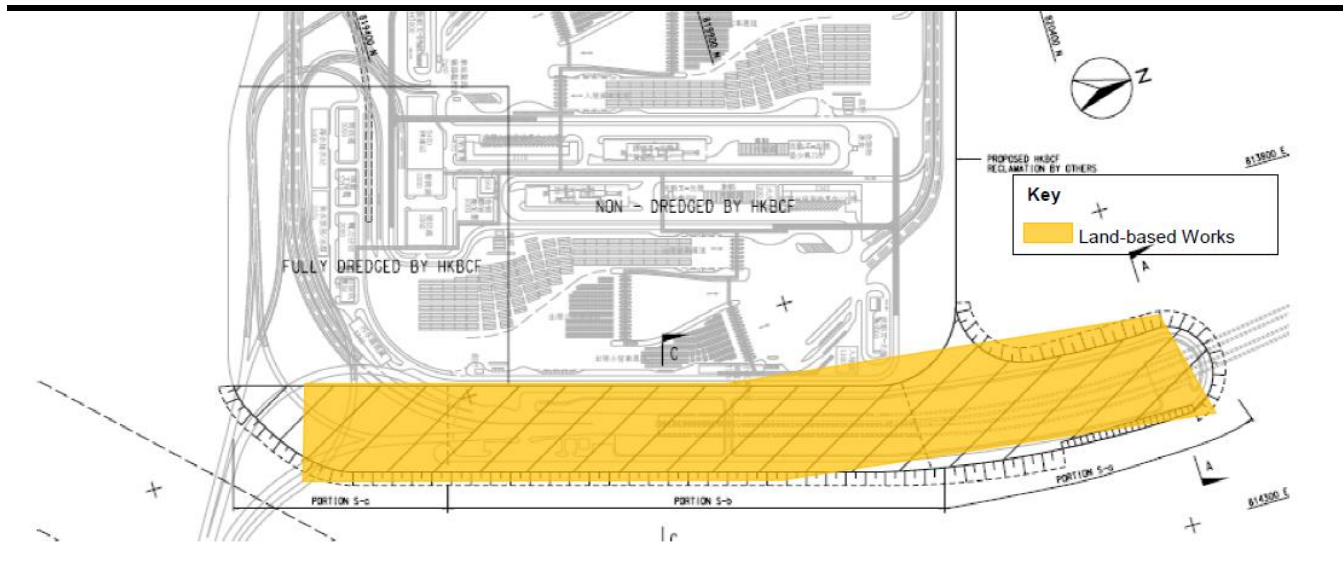
The implementation schedule of environmental mitigation measures is presented in *Appendix C*.

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

| Construction Activities Undertaken   |
|--|
| <i>Land-based Works</i>  |
| <ul style="list-style-type: none"> <li>• Road &amp; Drainage works - Portion S-A, S-B &amp; S-C and Northern Landfall;</li> <li>• UU installation - Portion S-A, S-B &amp; S-C and Northern Landfall;</li> <li>• Carpark Formation - Portion S-A, S-B &amp; S-C and Northern Landfall; and</li> <li>• Hard paving and footpath - Pump Sump Area at Northern Landfall.</li> </ul> |

**Figure 1.2** *Locations of Construction Activities - June to August 2020*





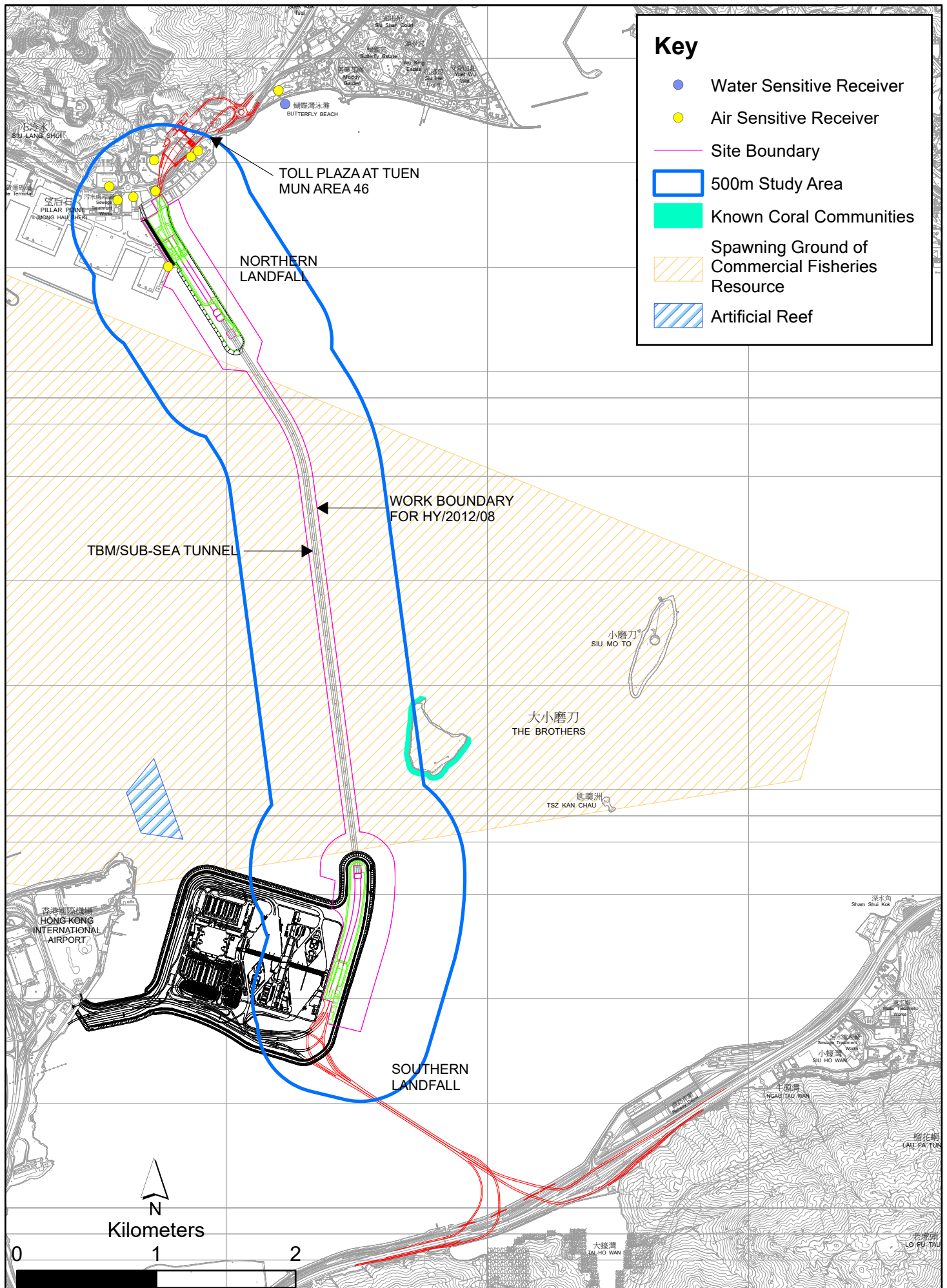


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

File: T:\GIS\CONTRACT\0212330\I\mxd\0212330\_EMnA\_Env\_Sensitive\_Receiver.mxd  
Date: 15/4/2014

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

## 2.1 AIR QUALITY

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

### 2.1.1 Monitoring Requirements and Equipment

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

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

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

| Monitoring Station | Monitoring Dates                                     | Location                  | Description | Parameters & Frequency   |
|--------------------|--|---------------------------|-------------|--|
| ASR1               | 1, 4, 7, 10, 13, 16, 19, 22, 25 and 28 June 2020     | Tuen Mun Fireboat Station | Office      | TSP monitoring<br>• 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$ ), 3 times in every 6 days |
| ASR5               | 1, 4, 7, 10, 13, 16, 19, 22, 25, 28 and 31 July 2020 | Pillar Point Fire Station | Office      | • 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$ ), daily for 24-hour in every 6 days       |
| AQMS1              | 3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 August 2020   | Previous River Trade Golf | Bare ground | Enhanced TSP monitoring (commenced on 24 October 2014)   |
| ASR6               |  | Butterfly Beach Laundry   | Office      | • 1-hour Total Suspended Particulates (1-hour TSP,   |

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



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

**Table 2.2** *Air Quality Monitoring Equipment*

| Equipment  | Brand and Model  |
|--|--|
| High Volume Sampler (1-hour TSP and 24-hour TSP) | Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Sampler (Model No. TE-5170) |
| Wind Meter                                       | Davis (Model: Vantage Pro 2 (S/N: AS160104014))  |
| Wind Anemometer for calibration                  | Lutron (Model No. AM-4201)   |

### 2.1.2 *Action & Limit Levels*

The Action and Limit Levels of the air quality monitoring is provided in *Appendix D*. The Event and Action plan is presented in *Appendix H*.

### 2.1.3 *Monitoring Schedule for the Reporting Quarter*

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

### 2.1.4 *Results and Observations*

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

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3* and *2.4*, respectively. Monitoring results are presented graphically in *Appendix G* and detailed impact air quality monitoring data were reported in the *Seventy-seventh* to *Seventy-ninth* *Monthly EM&A Reports*.

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

| Month/Year          | Station | Average ( $\mu\text{g}/\text{m}^3$ ) | Range ( $\mu\text{g}/\text{m}^3$ ) | Action Level ( $\mu\text{g}/\text{m}^3$ ) | Limit Level ( $\mu\text{g}/\text{m}^3$ ) |
|---------------------|---------|--------------------------------------|------------------------------------|---|--|
| June to August 2020 | ASR 1   | 79                                   | 14 - 352                           | 331                                       | 500                                      |
|                     | ASR 5   | 110                                  | 13 - 265                           | 340                                       | 500                                      |
|                     | AQMS1   | 72                                   | 13 - 225                           | 335                                       | 500                                      |
|                     | ASR6    | 87                                   | 14 - 357                           | 338                                       | 500                                      |
|                     | ASR10   | 50                                   | 14 - 126                           | 337                                       | 500                                      |

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

| Month/Year     | Station | Average ( $\mu\text{g}/\text{m}^3$ ) | Range ( $\mu\text{g}/\text{m}^3$ ) | Action Level ( $\mu\text{g}/\text{m}^3$ ) | Limit Level ( $\mu\text{g}/\text{m}^3$ ) |
|----------------|---------|--------------------------------------|------------------------------------|---|--|
| June to August | ASR 1   | 46                                   | 26 - 100                           | 213                                       | 260                                      |

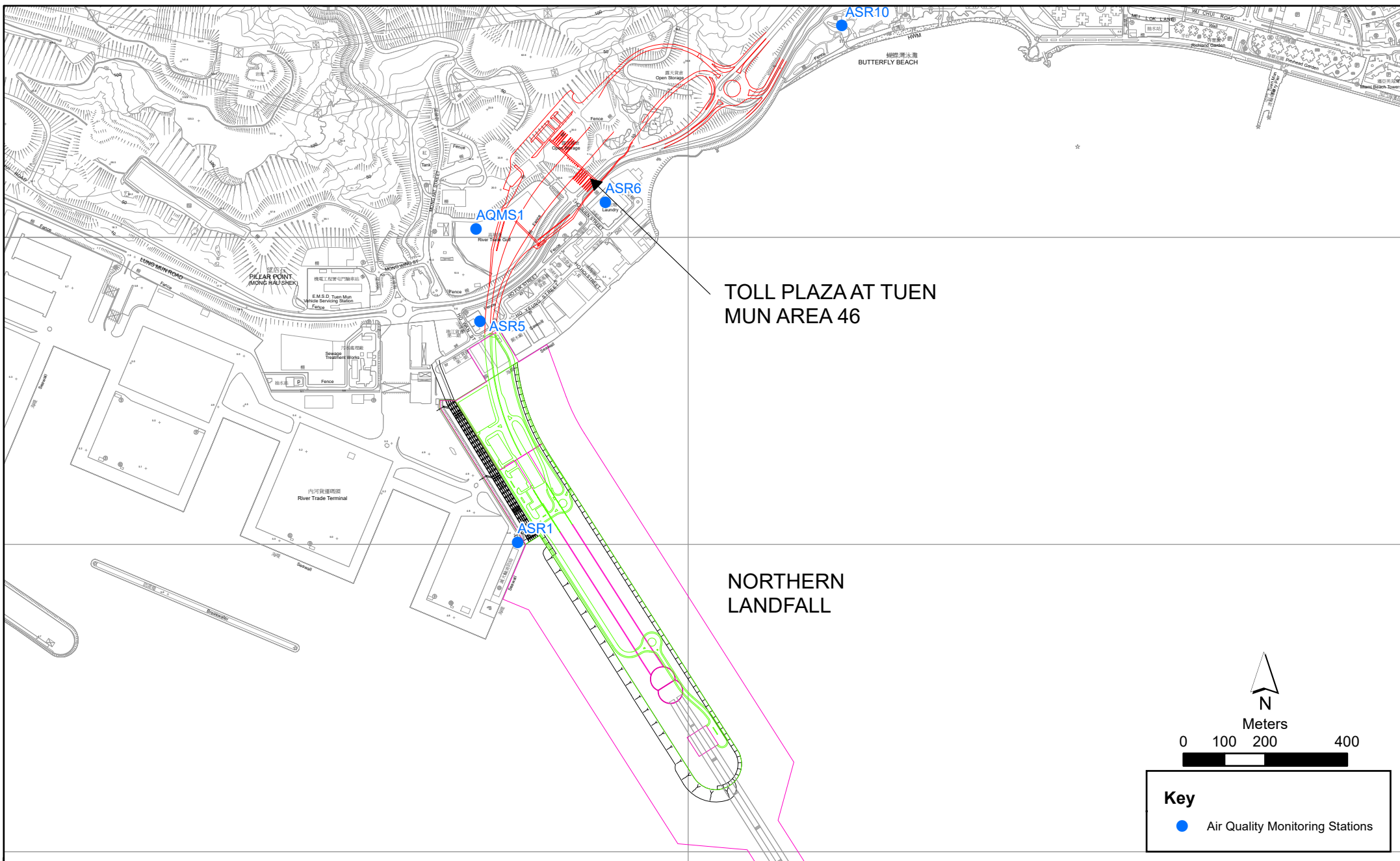


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

| Month/Year | Station | Average ( $\mu\text{g}/\text{m}^3$ ) | Range ( $\mu\text{g}/\text{m}^3$ ) | Action Level ( $\mu\text{g}/\text{m}^3$ ) | Limit Level ( $\mu\text{g}/\text{m}^3$ ) |
|------------|---------|--------------------------------------|------------------------------------|---|--|
| 2020       | ASR 5   | 60                                   | 30 - 91                            | 238                                       | 260                                      |
|            | AQMS1   | 43                                   | 24 - 89                            | 213                                       | 260                                      |
|            | ASR6    | 48                                   | 20 - 92                            | 238                                       | 260                                      |
|            | ASR10   | 31                                   | 18 - 60                            | 214                                       | 260                                      |

Two (2) Action Level exceedances of 1-hour TSP Monitoring were recorded in this reporting period. Investigation reports are provided in Appendix J. Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter is detailed in *Table 2.15*.

## 2.2 WATER QUALITY MONITORING

### 2.2.1 Monitoring Requirements & Equipment

According to the Updated EM&A Manual, an operational phase water quality monitoring shall be performed monthly during the first year of Project operation at all designated monitoring stations including control stations. The operation phase water quality monitoring shall be ceased after the first year of operation of the Project subject to the first year review. Operational phase water quality monitoring commenced in June 2020. Locations of water quality monitoring stations presented in *Figure 2.2* and in *Table 2.5*.

**Table 2.5** *Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements*

| Station ID | Type   | Coordinates |          | *Parameters, unit   | Depth   | Frequency   |
|------------|--|-------------|----------|---|---|---|
|            |  | Easting     | Northing |   |   |   |
| IS(Mf)11   | Impact Station<br>(Close to HKBCF construction site) | 813562      | 820716   | <ul style="list-style-type: none"> <li>• Temperature(<math>^{\circ}\text{C}</math>)</li> <li>• pH(pH unit)</li> <li>• Turbidity (NTU)</li> <li>• Water depth (m)</li> <li>• Salinity (ppt)</li> </ul> | 3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. | Monthly at each station, at mid-flood and mid-ebb tides during the construction period of the Contract. |
| SR4(N2)    | Sensitive receiver (Tai Ho Inlet)                    | 814688      | 817996   | <ul style="list-style-type: none"> <li>• DO (mg/L and % of saturation)</li> </ul>   |   |   |
| CS2(A)     | Control Station                                      | 805232      | 818606   | <ul style="list-style-type: none"> <li>• SS (mg/L)</li> </ul>   |   |   |

| Station ID | Type            | Coordinates |        | *Parameters, unit | Depth  | Frequency |
|------------|-----------------|-------------|--------|-------------------|--|-----------|
| CS(Mf)5    | Control Station | 817990      | 821129 |                   | If the water depth is less than 3m, mid-depth sampling only. If water depth is less than 6m, mid-depth may be omitted. |           |

**\*Notes:**

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

With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station SR3 was relocated to SR3(N) since 1 September 2017.

With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station SR4 was relocated to SR4(N) since 1 January 2018.

With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station SR4(N) was relocated to SR4(N2) since 21 August 2019.

With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station CS2 was relocated to CS2(A) since 23 August 2017.

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

**Table 2.6 Water Quality Monitoring Equipment**

| Equipment             | Model                               |
|-----------------------|-------------------------------------|
| Multi-Parameters      | YSI ProDss 16H104234                |
| Positioning Equipment | Furuno GP-170                       |
| Water Depth Detector  | Lowrance Mark 5x / Garmin Striker 4 |

**2.2.2 Monitoring Schedule for the Reporting Period**

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

**2.2.3 Results and Observations**

In total of 3 monitoring events for operational phase water quality monitoring were conducted at all designated monitoring stations in the reporting period. Results and graphical presentations of impact water quality monitoring are presented in *Appendix G*. Detailed operational phase water quality monitoring results were reported in the *Eightieth* and *Eighty-Second Monthly EM&A Reports*.

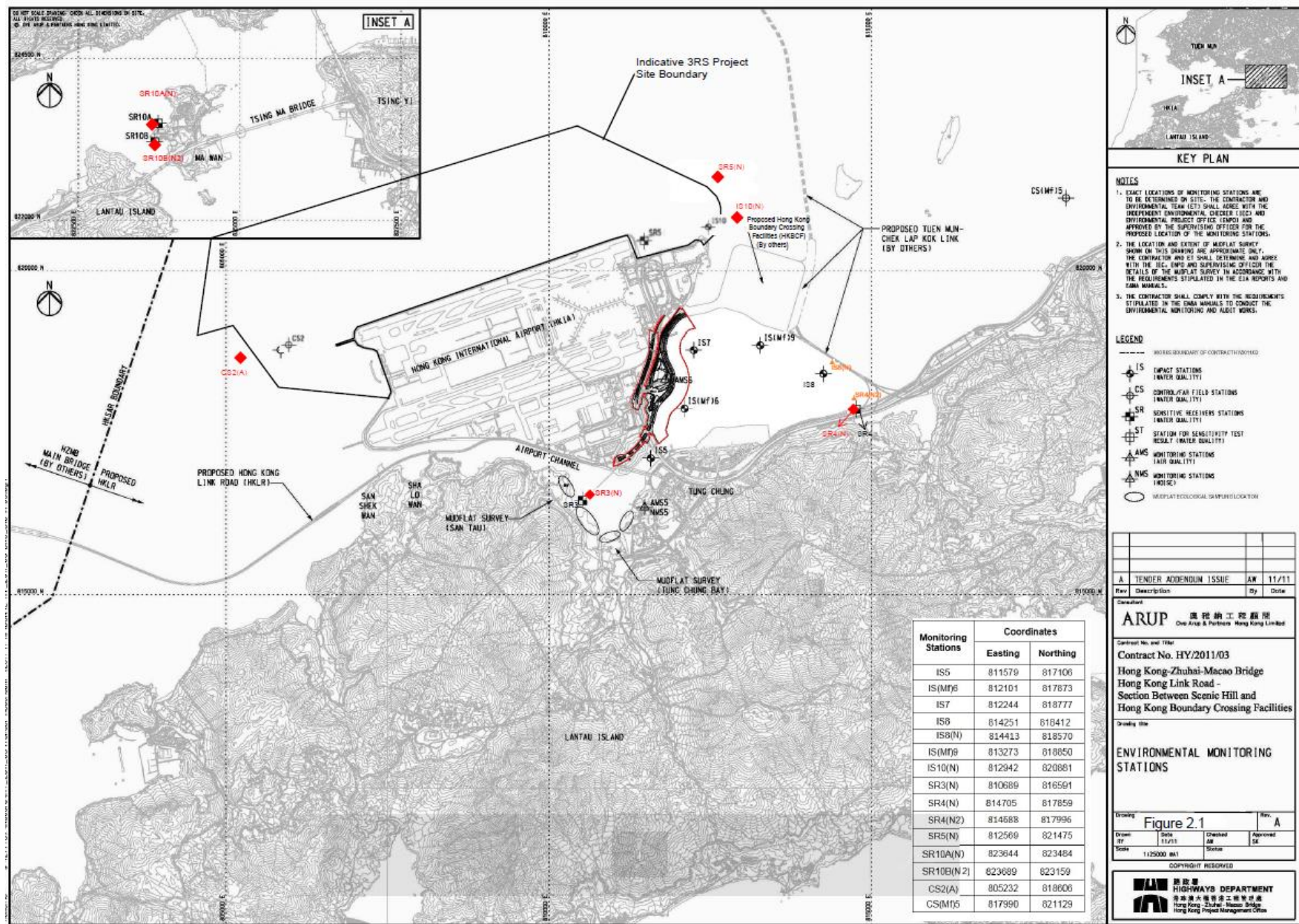


Figure 2.2

Operational Phase Water Quality Monitoring Stations SR3(N), CS2(A), SR4(N2) & CS(Mf)5

(Source from Contract No. HY/2011/03 EM&A Report)

Environmental Resources Management





## 2.3 DOLPHIN MONITORING

### 2.3.1 Monitoring Requirements

Post construction (operational) phase dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins. In order to fulfil the EM&A requirements and make good use of available resources, Contract No. HY/2012/08 has taken over the responsibility for implementation of dolphin monitoring from HZMB HKLR Contract No. HY/2011/03 since October 2019.

### 2.3.2 Monitoring Equipment

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

Table 2.7 *Dolphin Monitoring Equipment*

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

### 2.3.3 Monitoring Parameter, Frequencies & Duration

Dolphin monitoring should cover all transect lines in Northeast Lantau (NEL) and the Northwest Lantau (NWL) survey areas twice per month throughout the entire construction period and operational phase. 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 and operational phase dolphin monitoring.

### 2.3.4 Monitoring Location

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

Table 2.8 *Operational Phase Dolphin Monitoring Line Transect Co-ordinates*

| Line No. | Easting     | Northing | Line No. | Easting | Northing    |        |        |
|----------|-------------|----------|----------|---------|-------------|--------|--------|
| 1        | Start Point | 804671   | 815456   | 13      | Start Point | 816506 | 819480 |
| 1        | End Point   | 804671   | 831404   | 13      | End Point   | 816506 | 824859 |
| 2        | Start Point | 805476   | 820800*  | 14      | Start Point | 817537 | 820220 |

| Line No. | Easting     | Northing | Line No. | Easting     | Northing |         |
|----------|-------------|----------|----------|-------------|----------|---------|
| 2        | End Point   | 805476   | 14       | End Point   | 817537   | 824613  |
| 3        | Start Point | 806464   | 15       | Start Point | 818568   | 820735  |
| 3        | End Point   | 806464   | 15       | End Point   | 818568   | 824433  |
| 4        | Start Point | 807518   | 16       | Start Point | 819532   | 821420  |
| 4        | End Point   | 807518   | 16       | End Point   | 819532   | 824209  |
| 5        | Start Point | 808504   | 17       | Start Point | 820451   | 822125  |
| 5        | End Point   | 808504   | 17       | End Point   | 820451   | 823671  |
| 6        | Start Point | 809490   | 18       | Start Point | 821504   | 822371  |
| 6        | End Point   | 809490   | 18       | End Point   | 821504   | 823761  |
| 7        | Start Point | 810499   | 19       | Start Point | 822513   | 823268  |
| 7        | End Point   | 810499   | 19       | End Point   | 822513   | 824321  |
| 8        | Start Point | 811508   | 20       | Start Point | 823477   | 823402  |
| 8        | End Point   | 811508   | 20       | End Point   | 823477   | 824613  |
| 9        | Start Point | 812516   | 21       | Start Point | 805476   | 827081  |
| 9        | End Point   | 812516   | 21       | End Point   | 805476   | 830562  |
| 10       | Start Point | 813525   | 22       | Start Point | 806464   | 824033  |
| 10       | End Point   | 813525   | 22       | End Point   | 806464   | 829598  |
| 11       | Start Point | 814556   | 23       | Start Point | 814559   | 821739  |
| 11       | End Point   | 814556   | 23       | End Point   | 814559   | 824768  |
| 12       | Start Point | 815542   | 24*      | Start Point | 805476*  | 815900* |
| 12       | End Point   | 815542   | 24*      | End Point   | 805476*  | 819100* |

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

### 2.3.5 **Action & Limit Levels**

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

### 2.3.6 **Monitoring Schedule for the Reporting Period**

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

### 2.3.7 **Results & Observations**

A total of 772.31 km of survey effort was conducted, with 99.4% of the total survey effort being conducted under favourable weather conditions (ie Beaufort Sea State 3 or below with good visibility) in this reporting quarter. Amongst the two areas, 283.00 km and 489.31 km of survey effort were

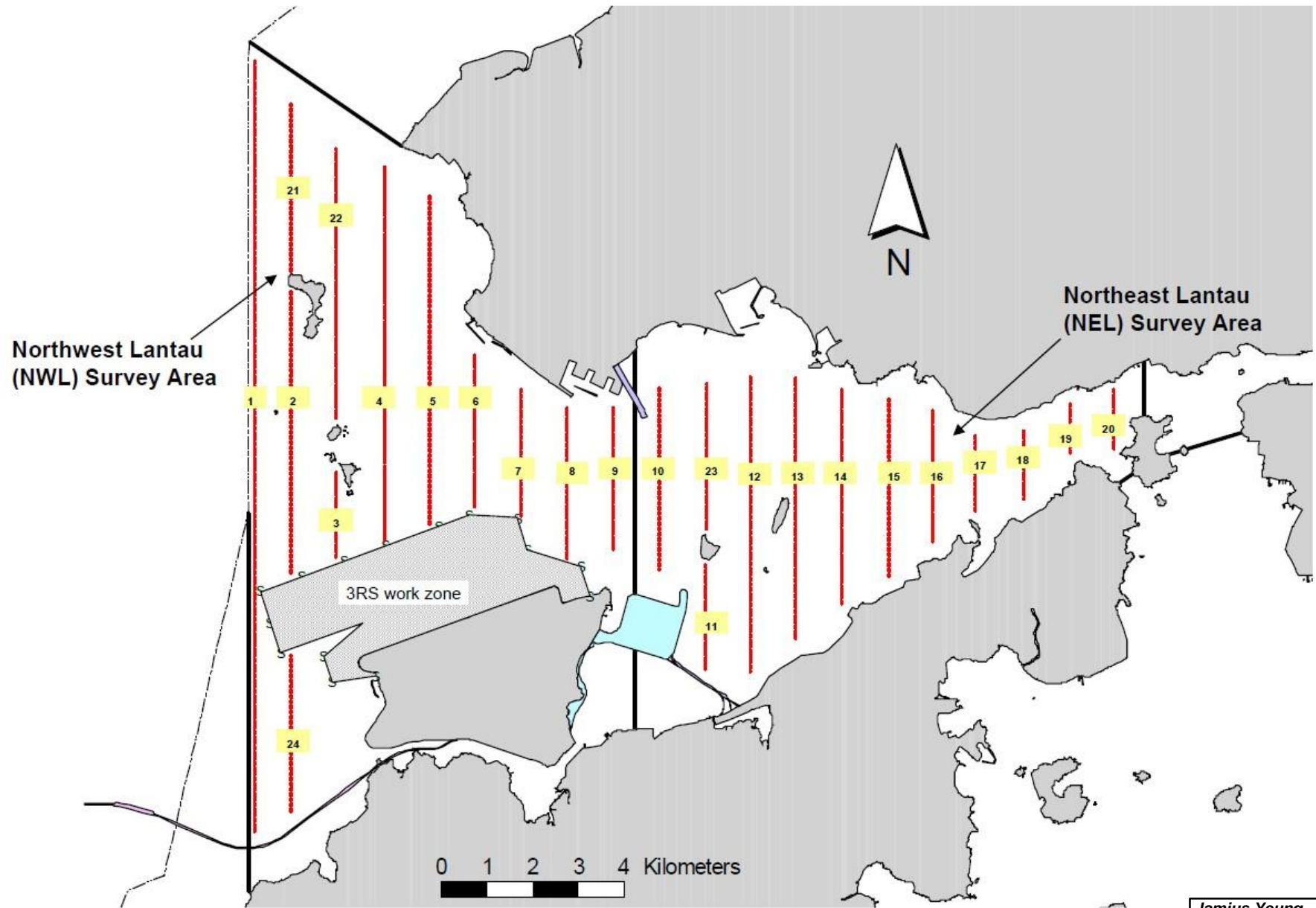


Figure 2.3

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

conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 572.77 km and 199.54 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 2 groups of 2 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All dolphin sightings were made during on-effort search and were made on primary lines. During this reporting quarter, all dolphin groups were sighted in NWL, while no dolphin was sighted in NEL.

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

**Table 2.9 Individual Survey Event Encounter Rates**

|     |                          | Encounter rate (STG)<br>(no. of on-effort dolphin sightings per 100 km of survey effort) | Encounter rate (ANI)<br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |
|-----|--------------------------|--|--|
|     |                          | Primary Lines Only   | Primary Lines Only   |
| NEL | Set 1 (4 & 9 Jun 2020)   | 0.00   | 0.00   |
|     | Set 2 (11 & 16 Jun 2020) | 0.00   | 0.00   |
|     | Set 3 (2 & 7 Jul 2020)   | 0.00   | 0.00   |
|     | Set 4 (9 & 20 Jul 2020)  | 0.00   | 0.00   |
|     | Set 5 (4 & 14 Aug 2020)  | 0.00   | 0.00   |
|     | Set 6 (18 & 21 Aug 2020) | 0.00   | 0.00   |
| NWL | Set 1 (4 & 9 Jun 2020)   | 0.00   | 0.00   |
|     | Set 2 (11 & 16 Jun 2020) | 0.00   | 0.00   |
|     | Set 3 (2 & 7 Jul 2020)   | 0.00   | 0.00   |
|     | Set 4 (9 & 20 Jul 2020)  | 1.79   | 1.79   |
|     | Set 5 (4 & 14 Aug 2020)  | 0.00   | 0.00   |
|     | Set 6 (18 & 21 Aug 2020) | 1.64   | 1.64   |

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

**Table 2.10 Quarterly Average Encounter Rates**

|                  | Encounter rate (STG)<br>(no. of on-effort dolphin sightings per 100 km of survey effort) |                           | Encounter rate (ANI)<br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |                           |
|------------------|--|---------------------------|--|---------------------------|
|                  | June - August 2020   | September - November 2011 | June - August 2020   | September - November 2011 |
| Northeast Lantau | 0.0  | 6.00 ± 5.05               | 0.0  | 22.19 ± 26.81             |

|                         |             |             |             |               |
|-------------------------|-------------|-------------|-------------|---------------|
| <b>Northwest Lantau</b> | 0.57 ± 0.86 | 9.85 ± 5.85 | 0.57 ± 0.86 | 44.66 ± 29.85 |
|-------------------------|-------------|-------------|-------------|---------------|

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

Group size of Chinese White Dolphins were singletons in North Lantau region during June to August 2020. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in *Table 2.11*.

**Table 2.11** *Average Dolphin Group Size*

|                         | Average Dolphin Group Size |                           |
|-------------------------|----------------------------|---------------------------|
|                         | June - August 2020         | September - November 2011 |
| <b>Overall</b>          | 1.00 ± 0.00 (n = 2)        | 3.72 ± 3.13 (n = 66)      |
| <b>Northeast Lantau</b> | ---                        | 3.18 ± 2.16 (n = 17)      |
| <b>Northwest Lantau</b> | 1.00 ± 0.00 (n = 2)        | 3.92 ± 3.40 (n = 49)      |

One limit level exceedance was observed for the quarterly dolphin monitoring data between June and August 2020.

### 2.3.8 *Implementation of Marine Mammal Exclusion Zone*

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

## 2.4 *EM&A SITE INSPECTION*

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Twelve (12) site inspections were carried out in the reporting quarter on 3, 10, 17 and 24 June 2020; 2, 10, 15 and 29 July 2020 and 5, 12, 20 and 26 August 2020.

Key observations during the site inspections in this reporting period are summarized in *Table 2.12*.

**Table 2.12** *Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Period*

| Inspection Date | Environmental Observations   | Recommendations/ Remarks   |
|-----------------|--|--|
| 3 June 2020     | Near South Ventilation Building <ul style="list-style-type: none"> <li>Chemicals were observed not placed in drip tray.</li> </ul> | Near South Ventilation Building <ul style="list-style-type: none"> <li>The Contractor was reminded to place the chemicals in drip tray.</li> </ul> |
| 10 June 2020    | Northern Landfall <ul style="list-style-type: none"> <li>Stagnant water in the drip tray should be cleared.</li> </ul>             | Northern Landfall <ul style="list-style-type: none"> <li>The Contractor was reminded to clean the stagnant water.</li> </ul>                       |



| Inspection Date | Environmental Observations   | Recommendations/ Remarks   |
|-----------------|--|--|
| 17 June 2020    | Southern Landfall <ul style="list-style-type: none"> <li>A clear NRMM label should be displayed.</li> <li>Chemicals should be placed in drip tray.</li> <li>Accumulated general refuse should be placed in skip and disposed of regularly.</li> </ul>  | Southern Landfall <ul style="list-style-type: none"> <li>The Contractor was reminded to display a clear NRMM label.</li> <li>The Contractor was reminded to place the chemicals in drip tray.</li> <li>The Contractor was reminded to clear accumulated general refuse.</li> </ul>   |
| 24 June 2020    | Box Culvert <ul style="list-style-type: none"> <li>The colour of a NRMM label faded.</li> <li>The NRMM label of a machine was missing.</li> </ul>  | Box Culvert <ul style="list-style-type: none"> <li>The Contractor was reminded to replace the NRMM label.</li> <li>The Contractor was reminded to replenish the NRMM label.</li> </ul>   |
| 2 July 2020     | Tunnel (ML03) <ul style="list-style-type: none"> <li>Bags of cement were not covered properly.</li> </ul> Entrance of Southern Landfall (South Approach Ramp) <ul style="list-style-type: none"> <li>Chemicals were not placed on drip tray.</li> </ul>  | Tunnel (ML03) <ul style="list-style-type: none"> <li>The Contractor was reminded to cover the cement properly.</li> </ul> Entrance of Southern Landfall (South Approach Ramp) <ul style="list-style-type: none"> <li>The Contractor was reminded to place the chemicals on drip tray.</li> </ul>   |
| 10 July 2020    | Tunnel <ul style="list-style-type: none"> <li>Effluent was observed leaking from the pipe.</li> </ul>  | Tunnel <ul style="list-style-type: none"> <li>The Contractor was reminded to carry out inspection and maintenance.</li> </ul>  |
| 15 July 2020    | Southern Landfall (carpark) <ul style="list-style-type: none"> <li>A few faded NRMM labels were observed on site.</li> <li>Accumulated general refuse should be placed in skip and disposed of regularly</li> <li>Chemicals should be placed in drip tray.</li> <li>Chemicals were not placed on drip tray.</li> </ul> | Southern Landfall (carpark) <ul style="list-style-type: none"> <li>The Contractor was reminded to replace the NRMM labels.</li> <li>The Contractor was reminded to clear accumulated general refuse.</li> <li>The Contractor was reminded to place the chemicals on drip tray.</li> </ul>  |
| 29 July 2020    | Southern Landfall (carpark) <ul style="list-style-type: none"> <li>A broken NRMM label was observed on site.</li> <li>Accumulated general refuse was observed on site.</li> <li>Chemicals were not placed on drip tray.</li> </ul>   | Southern Landfall (carpark) <ul style="list-style-type: none"> <li>The Contractor was reminded to replace the NRMM label.</li> <li>The Contractor was reminded to maintain better housekeeping.</li> <li>The Contractor was reminded to place the chemicals on drip tray.</li> </ul>   |
| 5 August 2020   | Northern Landfall (Pump Sump) <ul style="list-style-type: none"> <li>Deposited silt and grit in the channel should be removed and measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.</li> </ul>   | Northern Landfall (Pump Sump) <ul style="list-style-type: none"> <li>The Contractor was reminded to take measure to prevent washout of construction materials, soil, silt or debris into any drainage system.</li> </ul>   |
| 12 August 2020  | Satellite Control Building <ul style="list-style-type: none"> <li>A faded NRMM label was observed on site.</li> <li>Accumulated residuals were observed on site.</li> </ul><br>Southern Ventilation Building <ul style="list-style-type: none"> <li>A chemical was not placed on drip tray.</li> </ul>                 | Satellite Control Building <ul style="list-style-type: none"> <li>The contractor was reminded to replace the faded NRMM label.</li> <li>The contractor was reminded to keep better housekeeping.</li> </ul><br>Southern Ventilation Building <ul style="list-style-type: none"> <li>The contractor was reminded to place the chemical on drip tray.</li> </ul> |
| 20 August 2020  | FLF carpark <ul style="list-style-type: none"> <li>A faded NRMM label was observed on site.</li> <li>A chemical container was not placed on drip tray.</li> </ul>  | FLF carpark <ul style="list-style-type: none"> <li>The contractor was reminded to replace the NRMM label.</li> <li>The contractor was reminded to place the chemicals on drip tray.</li> </ul>   |

| Inspection Date | Environmental Observations  | Recommendations/ Remarks  |
|-----------------|---|---|
| 26 August 2020  | Satellite Control Building Carpark <ul style="list-style-type: none"> <li>Nil.</li> </ul> | Satellite Control Building Carpark <ul style="list-style-type: none"> <li>Nil.</li> </ul> |

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

## 2.5 WASTE MANAGEMENT STATUS

The Contractor had submitted application form for registration as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

Wastes generated during this reporting period include mainly construction wastes (inert and non-inert). Reference has been made to the waste flow table prepared by the Contractor (*Appendix K*). The quantities of different types of wastes are summarized in *Table 2.13*.

**Table 2.13 Quantities of Different Waste Generated in the Reporting Period**

| Month/Year  | Inert Construction Waste <sup>(a)</sup> (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> ) | Mixed (L+M) |
| June 2020   | 2,670  | 0   | 303 <sup>(d)</sup>                                   | 740 <sup>(d)</sup>                       | 1,000                | 0                                 | 0   | 0           |
| July 2020   | 1,440 <sup>(d)</sup>                             | 0   | 140  | 0  | 0                    | 0                                 | 0   | 0           |
| August 2020 | 1,159  | 0   | 110  | 1,060 <sup>(d)</sup>                     | 0                    | 0                                 | 0   | 0           |

**Notes:**

- (a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
- (b) Non-inert construction wastes include general refuse disposed at landfill.
- (c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.
- (d) Updated figure and waste flow table is presented in this quarterly report.

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

For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

## 2.6 ENVIRONMENTAL LICENSES AND PERMITS

The status of environmental licensing and permit is summarized in *Table 2.14* below.

**Table 2.14 Summary of Environmental Licensing and Permit Status**

| License/ Permit                     | License or Permit No. | Date of Issue    | Date of Expiry          | License/ Permit Holder | Remarks  |
|-------------------------------------|-----------------------|------------------|-------------------------|------------------------|--|
| Environmental Permit                | EP-354/2009/D         | 13 March 2015    | Throughout the Contract | HyD                    | Application for VEP on 3 March 2015 to supersede EP-354/2009/C |
| Construction Dust Notification      | 363510                | 19 August 2013   | Throughout the Contract | DBJV                   | Northern Landfall  |
| Construction Dust Notification      | 403620                | 10 June 2016     | Throughout the Contract | DBJV                   | Southern Landfall  |
| Chemical Waste Registration         | 5213-422-D2516-02     | 18 January 2017  | Throughout the Contract | DBJV                   | Northern Landfall  |
| Chemical Waste Registration         | 5213-951-D2591-01     | 25 May 2016      | Throughout the Contract | DBJV                   | Southern Landfall  |
| Construction Waste Disposal Account | 7018108               | 28 August 2013   | Throughout the Contract | DBJV                   | Waste disposal in Contract No. HY/2012/08                      |
| Waste Water Discharge License       | WT00031435-2018       | 2 August 2018    | 31 August 2023          | DBJV                   | Southern Landfall  |
| Waste Water Discharge License       | WT00034060-2019       | 25 July 2019     | 30 June 2024            | DBJV                   | Northern Landfall (4 Discharge Point)                          |
| Construction Noise Permit           | GW-RW0181-20          | 29 April 2020    | 14 October 2020         | DBJV                   | Urmston Road in front of Pillar Point                          |
| Construction Noise Permit           | GW-RS1137-19          | 26 December 2019 | 5 June 2020             | DBJV                   | Southern Landfall  |
| Construction Noise Permit           | GW-RS0418-20          | 22 June 2020     | 21 December 2020        | DBJV                   | Southern Landfall  |
| Construction Noise Permit           | GW-RW0144-20          | 14 April 2020    | 31 August 2020          | DBJV                   | WA23 Tsing Yi Storage Area                                     |

**Notes:**

HyD = Highways Department

DBJV = Dragages – Bouygues Joint Venture

VEP = Variation of Environmental Permit

**IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES**

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

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

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

For air quality impact monitoring, a total of thirty-one monitoring events for both 1-hour TSP and 24-hour TSP were undertaken in which two (2) Action Level exceedances of 1-hour TSP were recorded (*Table 2.15*).

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

| Station  | Exceedance Level | Date of Exceedances |           | Number of Exceedances |           |
|--|------------------|---------------------|-----------|-----------------------|-----------|
|  |                  | 1-hr TSP            | 24-hr TSP | 1-hr TSP              | 24-hr TSP |
| AQMS1  | Action Level     | -                   | -         | -                     | -         |
|  | Limit Level      | -                   | -         | -                     | -         |
| ASR1   | Action Level     | 2020-08-12          | -         | 1                     | -         |
|  | Limit Level      | -                   | -         | -                     | -         |
| ASR5   | Action Level     | -                   | -         | -                     | -         |
|  | Limit Level      | -                   | -         | -                     | -         |
| ASR6   | Action Level     | 2020-06-13          | -         | 1                     | -         |
|  | Limit Level      | -                   | -         | -                     | -         |
| ASR10  | Action Level     | -                   | -         | -                     | -         |
|  | Limit Level      | -                   | -         | -                     | -         |
| <b>Total number of Action level Exceedances:</b> |                  |                     |           | <b>2</b>              | <b>0</b>  |
| <b>Total number of Limit level Exceedances:</b>  |                  |                     |           | <b>0</b>              | <b>0</b>  |

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between June and August 2020.

Cumulative statistics are provided in *Appendix J*.

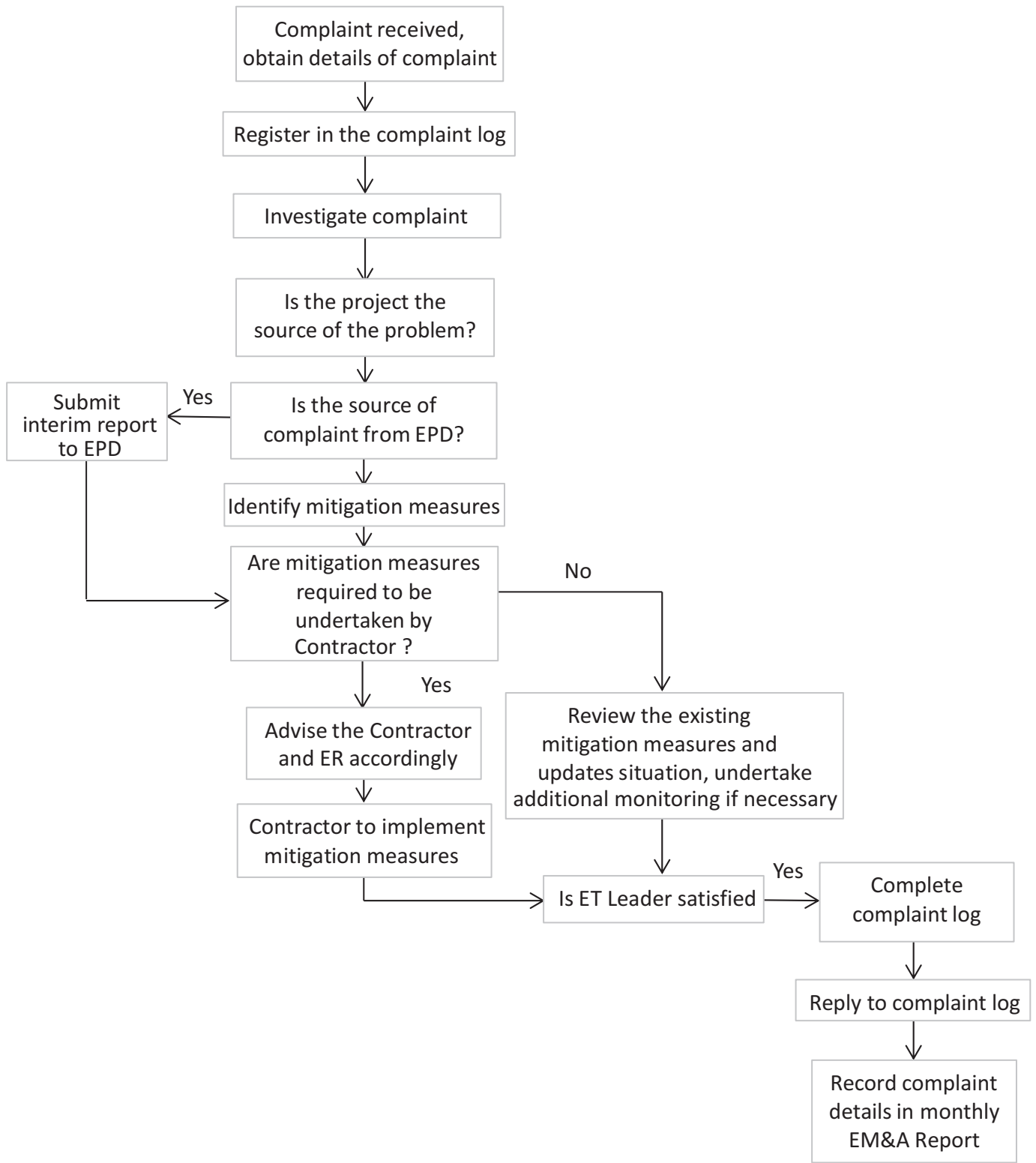
## 2.8 ***SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS***

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

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



Environmental Complaint Handling Procedure

Figure 2.4

FILE: 0215660n2.cdr  
DATE: 06/12/2013

Environmental Resources Management





### 3 FUTURE KEY ISSUES

#### 3.1 CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER

As informed by the Contractor, the major works for the Contract in the coming quarter are summarized in *Table 3.1*.

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

| <b>Works to be undertaken</b>   |
|---|
| <i>Land-based Works</i>   |
| <ul style="list-style-type: none"><li>• Carpark canopies installation - Portion S-A, S-B &amp; S-C;</li><li>• Hard paving and footpath - Pump Sump Area at Northern Landfall;</li><li>• Installation of green roof system - South Ventilation Building; and</li><li>• Chain fence and reinstatement at Box culvert.</li></ul> |

#### 3.2 KEY ISSUES FOR THE COMING QUARTER

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

#### 3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality, operational phase water quality monitoring and post construction (operational) phase dolphin monitoring are scheduled to continue for the next reporting period.

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

## CONCLUSIONS

This Twenty-seventh Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 June to 31 August 2020, in accordance with the Updated EM&A Manual and the requirements of *EP-354/2009/D*.

Air quality (including 1-hour TSP and 24-hour TSP), operational phase water quality monitoring and post construction (operational) phase dolphin monitoring were carried out in the reporting period. Two (2) Action level exceedances of 1-hour TSP were recorded in this reporting period.

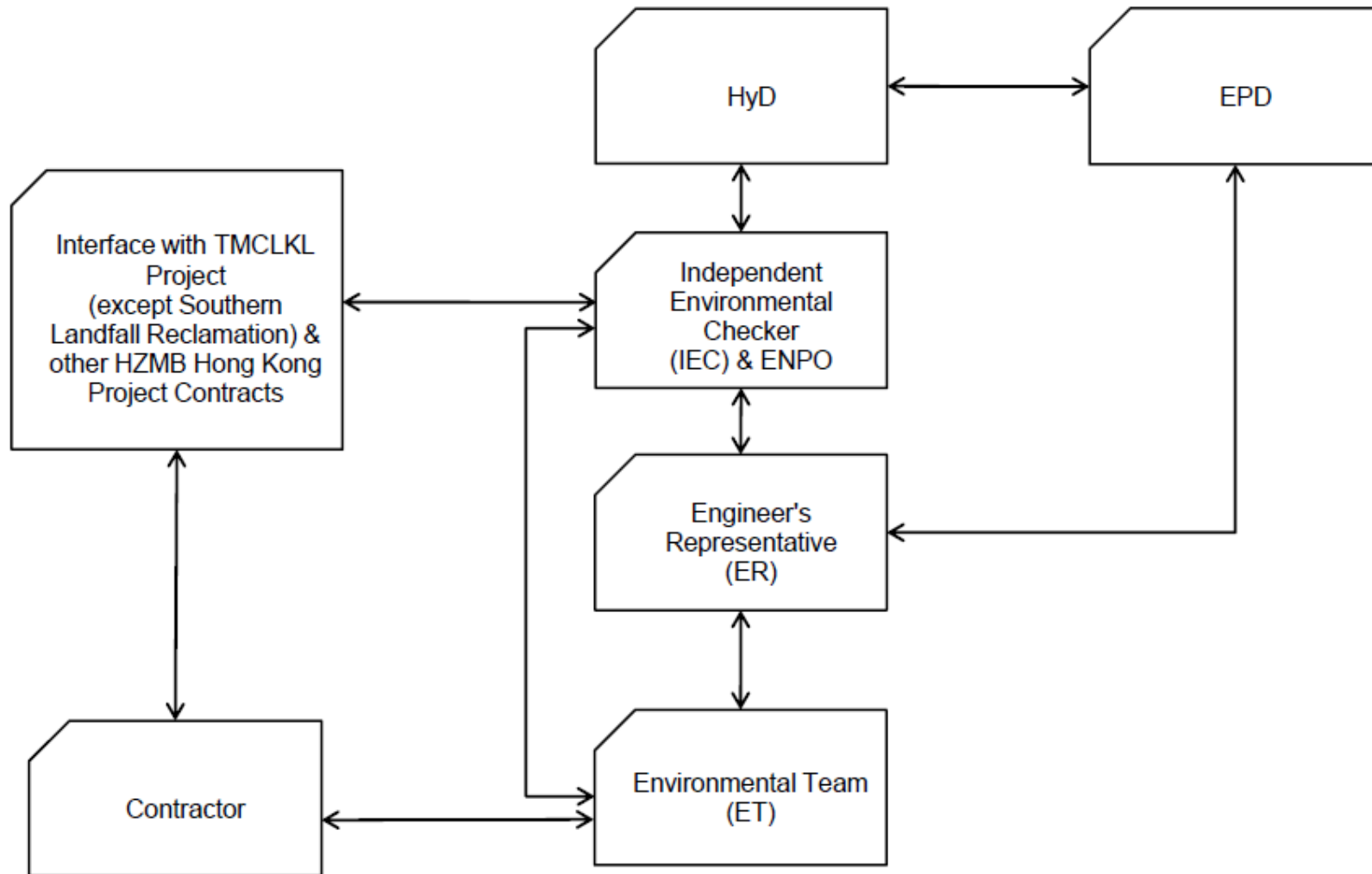
A total of 2 groups of 2 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All dolphin sightings were made during on-effort search and were made on primary lines. One limit level exceedance was observed for the quarterly dolphin monitoring data between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

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

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

Appendix A

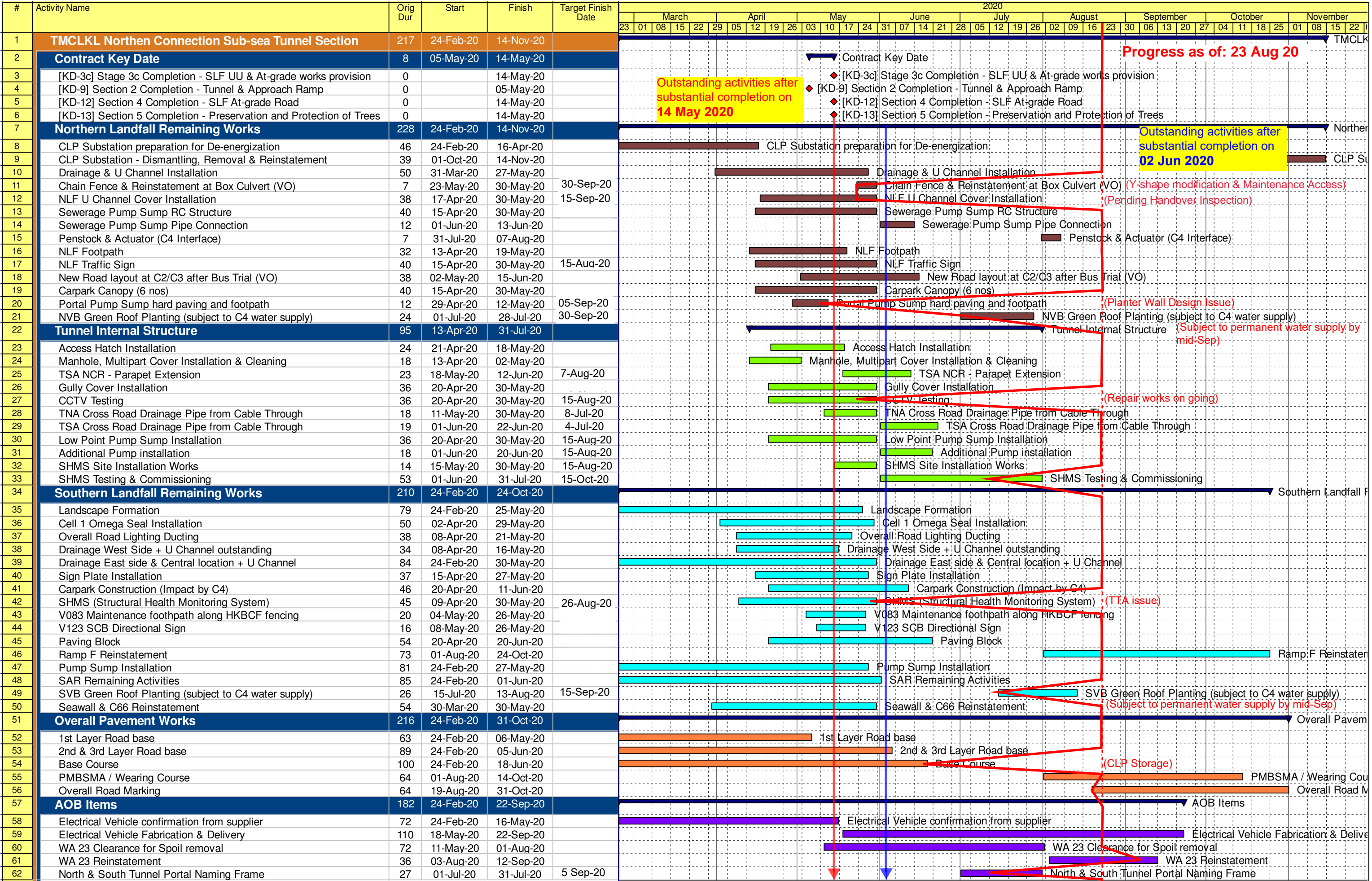
## Project Organization for Environmental Works



↔ Line of Communication

Appendix B

## Construction Programme



◆ Milestone  
 ■ Northern Landfall  
 ■ Internal Structure  
 ■ Southern Landfall  
 ■ Pavement  
 ■ AOB  
 ▼ Summary

**TMCLK Northern Connection Sub-sea Tunnel Section**  
 Programme of Remaining Works  
 Forecast as of: 24 February 2020

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

| Date      | Revision       | Checked | Approved |
|-----------|----------------|---------|----------|
| 09-May-20 | For Monitoring | SPa     | DLo      |



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 |   | ✓        |
| 4.8.1              | 3.8                   | Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards. | All areas / throughout construction period   | Contractor           | TMEIA Avoid dust generation               |                       | Y |   | ✓        |
| 4.8.1              | 3.8                   | No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.  | All site exits / throughout construction period                                      | Contractor           | TMEIA Avoid dust                          |                       | Y |   | ✓        |
| 4.8.1              | 3.8                   | Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.   | All exposed surfaces / throughout construction period                                | Contractor           | TMEIA Avoid dust generation               |                       | Y |   | ✓        |

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**Tuen Mun – Chek Lap Kok Link**  
**Northern Connection Sub-sea Tunnel Section**  
**Environmental Mitigation and Enhancement Measure Implementation Schedule**

| EIA Reference                    | EM&A Manual Reference | Environmental Protection Measures   | Location/Timing   | Implementation Agent | Relevant Standard or Requirement                          | Implementation Stages |   |   | Status * |
|----------------------------------|-----------------------|---|---|----------------------|---|-----------------------|---|---|----------|
|                                  |                       |   |   |                      |   | D                     | C | O |          |
| 4.8.1                            | 3.8                   | 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:<br><br>- TM-CLKL northern reclamation; | All areas/ prior to dredging and backfilling works                | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1                              | -                     | a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.  | TM-CLKL seawall filling   | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1                              | -                     | a maximum of 30% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL southern landfall   | TM-CLKL southern landfall reclamation filling                     | Contractor           | TM-EIAO   |                       | Y |   | N/A      |
| 6.1                              | -                     | a maximum of 100% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL northern landfall  | TM-CLKL northern landfall reclamation filling                     | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1                              | -                     | Use of cage type silt curtains round allgrab dredgers during the HKBCF, HKLR and TM-CLKL southern reclamation works.  | All areas dredging works  | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
|                                  | Figure 1.1 of Annex C | A layer of floating type silt curtain will be applied when dredging and reclamation works are being undertaken at Portion N-a as shown in Figure 1.1 of Annex C of the EM&A Manual.   | All areas/ through out marine works                               | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1                              | -                     | Trailer suction hopper dredgers shall not allow mud to overflow.  | All areas/ throughout construction period                         | Contractor           | Marine Fill Committee Guidelines. DASO permit conditions. |                       | Y |   | ✓        |

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

| EIA Reference                          | EM&A Manual Reference | Environmental Protection Measures  | Location/Timing  | Implementation Agent | Relevant Standard or Requirement                          | Implementation Stages |   |   | Status * |
|--|-----------------------|--|--|----------------------|---|-----------------------|---|---|----------|
|  |                       |  |  |                      |   | D                     | C | O |          |
| 6.1                                    | -                     | The use of Lean Material Overboard (LMOB) systems shall be prohibited.   | All areas/ throughout construction period              | Contractor           | Marine Fill Committee Guidelines. DASO permit conditions. |                       | Y |   | ✓        |
| 6.1<br><br>Figure 6.2b<br>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:<br><br>- TM-CLKL northern reclamation;<br><br>- Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and<br>- 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:<br>- Reclamation filling shall not proceed until at least 200m section of leading seawall at both the east and west sides of the reclamation are formed above +2.5 mPD, except for 100m gaps for marine access;   | All areas/ through out marine works                    | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| <i>General Marine Works</i>            |                       |  |  |                      |   |                       |   |   |          |
| 6.1                                    | -                     | Use of TMB for the construction of the submarine tunnel.   | Tunnel works / Construction phase                      | Contractor           | TM-EIAO   |                       | Y |   | N/A      |
| 6.1                                    | -                     | Export dredged spoils from NWWCZ.  | All areas as much as possible /                        | Contractor           | DASO Permit conditions                                    |                       | 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 |          |
|               |                       |  | dredging activities                       |                      |   |                       |   |   |          |
| 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 |   | ✓        |
| 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      |

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| EIA Reference     | EM&A Manual Reference | Environmental Protection Measures  | Location/Timing                           | Implementation Agent | Relevant Standard or Requirement                          | Implementation Stages |   |   | Status * |
|-------------------|-----------------------|--|---|----------------------|---|-----------------------|---|---|----------|
|                   |                       |  |   |                      |   | D                     | C | O |          |
| 6.1               | -                     | The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.  | All areas/ throughout construction period | Contractor           | Marine Fill Committee Guidelines. DASO permit conditions. |                       | Y |   | ✓        |
| 6.1               | 5.2                   | Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.   | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1               | -                     | The daily maximum production rates shall not exceed those assumed in the water quality assessment.   | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1               | -                     | The dredging and filling works shall be scheduled to spread the works evenly over a working day.   | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| <i>Land Works</i> |                       |  |   |                      |   |                       |   |   |          |
| 6.1               | -                     | Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.  | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1               | -                     | Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.  | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 6.1               | -                     | Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks. | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | <>       |
| 6.1               | -                     | Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.  | All areas/ throughout construction period | Contractor           | TM-EIAO   |                       | Y |   | ✓        |
| 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 |   | ✓        |

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Tuen Mun – Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Environmental Mitigation and Enhancement Measure Implementation Schedule*

| EIA Reference | EM&A Manual Reference | Environmental Protection Measures   | Location/Timing                           | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   | Status * |
|---------------|-----------------------|---|---|----------------------|----------------------------------|-----------------------|---|---|----------|
|               |                       |   |   |                      |                                  | D                     | C | O |          |
| 6.1           | 5.8                   | Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. | All areas/ throughout construction period | Contractor           | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.   | All areas/ throughout construction period | Contractor           | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.   | All areas/ throughout construction period | Contractor           | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.  | All areas/ throughout construction period | Contractor           | TM-EIAO                          |                       | Y |   | ✓        |

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| EIA Reference | EM&A Manual Reference | Environmental Protection Measures   | Location/Timing                           | Implementation Agent             | Relevant Standard or Requirement | Implementation Stages |   |   | Status * |
|---------------|-----------------------|---|---|----------------------------------|----------------------------------|-----------------------|---|---|----------|
|               |                       |   |   |                                  |                                  | D                     | C | O |          |
| 6.1           | -                     | Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.  | All areas/ throughout construction period | Contractor                       | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.   | All areas/ throughout construction period | Contractor                       | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal. | All areas/ throughout construction period | Contractor                       | TM-EIAO                          |                       | Y |   | N/A      |
| 6.1           | -                     | The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.   | All areas/ throughout construction period | Contractor                       | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.  | All areas/ throughout construction period | Contractor                       | TM-EIAO Waste Disposal Ordinance |                       | Y |   | ✓        |
| 6.1           | -                     | All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.  | All areas/ throughout construction period | Contractor                       | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.   | All areas/ throughout construction period | Contractor                       | TM-EIAO                          |                       | Y |   | ✓        |
| 6.1           | -                     | Roadside gullies to trap silt and grit shall be provided prior to discharging the stormwater into the marine environment. The sumps will be maintained and cleaned at regular intervals.  | Roadside/design and operation             | Design Consultant/<br>Contractor | TM-EIAO                          | Y                     |   | Y | ✓        |
| 6.1           | Section 5             | All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.   | All areas/ throughout construction period | Contractor                       | EM&A Manual                      |                       | Y |   | ✓        |

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|---------------------------------|-----------------------|---|--|--|----------------------------------|-----------------------|---|---|--|
|                                 |                       |   |  |  |                                  | D                     | C | O |  |
| <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.<br><br>One year operation phase water quality monitoring at designated stations. | Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, throughout marine construction period, post construction and monthly operational phase water quality monitoring for a year. | Contractor   | EM&A Manual                      |                       | Y | Y | <b>Operational phase water quality monitoring commenced in June 2020</b> |
| <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 3,600m2 in an area where fishing activities are prohibited.  | Area of prohibited fishing activities/Detailed Design/towards end of construction period   | TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor | TMEIA                            | Y                     |   | Y | N/A. To be implemented by AFCD.  |
| 8.14                            | 6.3, 6.5              | Specification and implementation of marine vessel control specifications  | All areas/Detailed Design/ during construction works   | Design Consultant/ Contractor                              | TMEIA                            | Y                     | Y |   | ✓  |
| 8.14                            | 6.3, 6.5              | Design and implementation of acoustic decoupling methods for dredging and reclamation works   | All areas/ Detailed Design/ during dredging and reclamation works  | Design Consultant/ Contractor                              | TMEIA                            | Y                     | Y |   | ✓  |

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| EIA Reference               | EM&A Manual Reference | Environmental Protection Measures   | Location/Timing   | Implementation Agent          | Relevant Standard or Requirement | Implementation Stages |   |   | Status * |
|-----------------------------|-----------------------|---|---|-------------------------------|----------------------------------|-----------------------|---|---|----------|
|                             |                       |   |   |                               |                                  | 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 |   | ✓        |
| 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>                |                       |   |   |                               |                                  |                       |   |   |          |

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

| EIA Reference | EM&A Manual Reference | Environmental Protection Measures   | Location/Timing                            | Implementation Agent | Relevant Standard or Requirement  | Implementation Stages |   |   | Status * |
|---------------|-----------------------|---|--|----------------------|---|-----------------------|---|---|----------|
|               |                       |   |  |                      |   | D                     | C | O |          |
| 12.6          |                       | The Contractor shall identify a coordinator for the management of waste.  | Contract mobilisation                      | Contractor           | TMEIA   |                       | Y |   | ✓        |
| 12.6          |                       | The Contractor shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. A recording system for the amount of waste generated, recycled and disposed (locations) should be established. | Contract mobilisation                      | Contractor           | TMEIA, Works Branch Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material                                       |                       | Y |   | ✓        |
| 12.6          |                       | The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.   | Contract mobilisation                      | Contractor           | TMEIA, Land (Miscellaneous Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance. |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.  | Contract Mobilisation                      | Contractor           | TMEIA   |                       | Y |   | ✓        |
| 12.6          | 8.1                   | The extent of cutting operation should be optimised where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.   | All areas / throughout construction period | Contractor           | TMEIA   |                       | Y |   | ✓        |
| 12.6          | 8.1                   | The surplus surcharge should be transferred to a fill bank  | Reclamation areas / after surcharge works  | Contractor           | TMEIA   |                       | Y |   | N/A      |
| 12.6          | 8.1                   | Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible  | All areas / throughout construction period | Contractor           | TMEIA   |                       | Y |   | ✓        |
| 12.6          | 8.1                   | The site and surroundings shall be kept tidy and litter free.   | All areas / throughout construction period | Contractor           | TMEIA   |                       | Y |   | <>       |
| 12.6          | 8.1                   | No waste shall be burnt on site.  | All areas / throughout construction period | Contractor           | TMEIA   |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.  | Detailed Design                            | Design Consultant    | TMEIA   | Y                     |   |   | ✓        |
| 12.6          | 8.1                   | The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.  | All areas / throughout construction period | Contractor           | TMEIA   |                       | Y |   | ✓        |

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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                   | Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.  | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.   | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.   | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.   | Reclamation areas / throughout dredging works | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.   | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.               | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | All falsework will be steel instead of wood.  | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows:<br>f suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed;<br>f Having a capacity of <450L unless the specifications have been approved by the EPD; and<br>f Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. | All areas / throughout construction period    | Contractor           | TMEIA                            |                       | Y |   | <>       |

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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 |          |
|               |                       | <ul style="list-style-type: none"> <li>f Clearly labelled and used solely for the storage of chemical wastes;</li> <li>f Enclosed with at least 3 sides;</li> <li>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;</li> <li>f Adequate ventilation;</li> <li>f Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and</li> <li>f Incompatible materials are adequately separated.</li> </ul> |  |                      |                                  |                       |   |   |          |
| 12.6          | 8.1                   | Waste oils, chemicals or solvents shall not be disposed of to drain,   | All areas / throughout construction period   | Contractor           | TMEIA                            |                       | Y |   | <>       |
| 12.6          | 8.1                   | Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.   | All areas / throughout construction period   | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Night soil should be regularly collected by licensed collectors.   | All areas / throughout construction period   | Contractor           | TMEIA                            |                       | Y |   | N/A      |
| 12.6          | 8.1                   | General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.   | All areas / throughout construction period   | Contractor           | TMEIA                            |                       | Y |   | <>       |
| 12.6          | 8.1                   | All waste containers shall be in a secure area on hardstanding;  | All areas / throughout construction period   | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.   | All areas / throughout construction period   | Contractor           | TMEIA                            |                       | Y |   | ✓        |
| 12.6          | 8.1                   | Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.   | Site Offices/ throughout construction period | Contractor           | TMEIA                            |                       | Y |   | ✓        |

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Tuen Mun – Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Environmental Mitigation and Enhancement Measure Implementation Schedule*

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

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Appendix D

## Summary of Action and Limit Levels

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

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

**Table D2 Action and Limit Levels for Post-Construction Dolphin Monitoring**

|              | North Lantau Social Cluster   |  |
|--------------|---|--|
|              | NEL   | NWL  |
| Action Level | STG < 70% of baseline &<br>ANI < 70% of baseline  | STG < 70% of baseline &<br>ANI < 70% of baseline |
| Limit Level  | [STG < 40% of baseline & ANI < 40% of baseline]<br>and<br>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]<br>and<br>NWL = [STG < 3.9 & ANI < 17.9] |                        |

Appendix E

## EM&A Monitoring Schedules

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Air Quality Impact Monitoring Schedule - June 2020**

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

| Sunday   | Monday   | Tuesday  | Wednesday  | Thursday   | Friday   | Saturday   |
|--|--|--|--|--|--|--|
|  | 01-Jun   | 02-Jun   | 03-Jun   | 04-Jun   | 05-Jun   | 06-Jun   |
|  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |
| 07-Jun   | 08-Jun   | 09-Jun   | 10-Jun   | 11-Jun   | 12-Jun   | 13-Jun   |
| 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |
| 14-Jun   | 15-Jun   | 16-Jun   | 17-Jun   | 18-Jun   | 19-Jun   | 20-Jun   |
|  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |
| 21-Jun   | 22-Jun   | 23-Jun   | 24-Jun   | 25-Jun   | 26-Jun   | 27-Jun   |
| 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |
| 28-Jun   | 29-Jun   | 30-Jun   |  |  |  |  |
| 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |  |  |  |  |

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Air Quality Impact Monitoring Schedule - July 2020**

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

| Sunday   | Monday   | Tuesday  | Wednesday  | Thursday   | Friday   | Saturday   |
|--|--|--|--|--|--|--|
|  |  |  | 01-Jul   | 02-Jul   | 03-Jul   | 04-Jul   |
|  |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |
| 05-Jul   | 06-Jul   | 07-Jul   | 08-Jul   | 09-Jul   | 10-Jul   | 11-Jul   |
|  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |
| 12-Jul   | 13-Jul   | 14-Jul   | 15-Jul   | 16-Jul   | 17-Jul   | 18-Jul   |
|  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |
| 19-Jul   | 20-Jul   | 21-Jul   | 22-Jul   | 23-Jul   | 24-Jul   | 25-Jul   |
| 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |
| 26-Jul   | 27-Jul   | 28-Jul   | 29-Jul   | 30-Jul   | 31-Jul   |  |
|  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |



**HY/2012/08 - Tuen Mun - Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Air Quality Impact Monitoring Schedule - August 2020**

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

| Sunday   | Monday   | Tuesday  | Wednesday  | Thursday   | Friday   | Saturday   |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  | 01-Aug   |
|  |  |  |  |  |  |  |
| 02-Aug   | 03-Aug   | 04-Aug   | 05-Aug   | 06-Aug   | 07-Aug   | 08-Aug   |
|  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |
| 09-Aug   | 10-Aug   | 11-Aug   | 12-Aug   | 13-Aug   | 14-Aug   | 15-Aug   |
| 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |
| 16-Aug   | 17-Aug   | 18-Aug   | 19-Aug   | 20-Aug   | 21-Aug   | 22-Aug   |
|  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |
| 23-Aug   | 24-Aug   | 25-Aug   | 26-Aug   | 27-Aug   | 28-Aug   | 29-Aug   |
|  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  | 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |
| 30-Aug   | 31-Aug   |  |  |  |  |  |
| 1-hour TSP - 3 times<br>24-hour TSP - 1 time<br><br>Impact AQM |  |  |  |  |  |  |

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall  
Operational Phase Marine Water Quality Monitoring (WQM) Schedule (June 2020)**

| Sunday | Monday | Tuesday | Wednesday   | Thursday | Friday | Saturday |
|--------|--------|---------|---|----------|--------|----------|
|        | 1-Jun  | 2-Jun   | 3-Jun   | 4-Jun    | 5-Jun  | 6-Jun    |
|        |        |         |   |          |        |          |
| 7-Jun  | 8-Jun  | 9-Jun   | 10-Jun  | 11-Jun   | 12-Jun | 13-Jun   |
|        |        |         |   |          |        |          |
| 14-Jun | 15-Jun | 16-Jun  | 17-Jun  | 18-Jun   | 19-Jun | 20-Jun   |
|        |        |         |   |          |        |          |
| 21-Jun | 22-Jun | 23-Jun  | 24-Jun  | 25-Jun   | 26-Jun | 27-Jun   |
|        |        |         | ebb tide 13:26 - 16:56<br>flood tide 20:59 - 0:29 |          |        |          |
| 28-Jun | 29-Jun | 30-Jun  |   |          |        |          |
|        |        |         |   |          |        |          |

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall  
Operational Phase Marine Water Quality Monitoring (WQM) Schedule (July 2020)**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday  | Saturday |
|--------|--------|---------|-----------|----------|---|----------|
|        |        |         | 1-Jul     | 2-Jul    | 3-Jul   | 4-Jul    |
|        |        |         |           |          |   |          |
| 5-Jul  | 6-Jul  | 7-Jul   | 8-Jul     | 9-Jul    | 10-Jul  | 11-Jul   |
|        |        |         |           |          |   |          |
| 12-Jul | 13-Jul | 14-Jul  | 15-Jul    | 16-Jul   | 17-Jul  | 18-Jul   |
|        |        |         |           |          |   |          |
| 19-Jul | 20-Jul | 21-Jul  | 22-Jul    | 23-Jul   | 24-Jul  | 25-Jul   |
|        |        |         |           |          | ebb tide 13:58 - 17:28<br>flood tide 7:02 - 10:32 |          |
| 26-Jul | 27-Jul | 28-Jul  | 29-Jul    | 30-Jul   | 31-Jul  |          |
|        |        |         |           |          |   |          |

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall  
Operational Phase Marine Water Quality Monitoring (WQM) Schedule (August 2020)**

| Sunday | Monday  | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|---|---------|-----------|----------|--------|----------|
|        |   |         |           |          |        | 1-Aug    |
| 2-Aug  | 3-Aug   | 4-Aug   | 5-Aug     | 6-Aug    | 7-Aug  | 8-Aug    |
|        |   |         |           |          |        |          |
| 9-Aug  | 10-Aug  | 11-Aug  | 12-Aug    | 13-Aug   | 14-Aug | 15-Aug   |
|        |   |         |           |          |        |          |
| 16-Aug | 17-Aug  | 18-Aug  | 19-Aug    | 20-Aug   | 21-Aug | 22-Aug   |
|        |   |         |           |          |        |          |
| 23-Aug | 24-Aug  | 25-Aug  | 26-Aug    | 27-Aug   | 28-Aug | 29-Aug   |
|        | ebb tide 2:50 - 6:20<br>flood tide 8:59 - 12:29 |         |           |          |        |          |
| 30-Aug | 31-Aug  |         |           |          |        |          |
|        |   |         |           |          |        |          |

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Operational Phase Dolphin Monitoring Survey Monitoring Schedule - June 2020**

| Sunday | Monday | Tuesday   | Wednesday | Thursday  | Friday | Saturday |
|--------|--------|---|-----------|---|--------|----------|
|        | 01-Jun | 02-Jun  | 03-Jun    | 04-Jun  | 05-Jun | 06-Jun   |
|        |        |   |           | <b>Operational Phase<br/>Dolphin Monitoring</b> |        |          |
| 07-Jun | 08-Jun | 09-Jun  | 10-Jun    | 11-Jun  | 12-Jun | 13-Jun   |
|        |        | <b>Operational Phase<br/>Dolphin Monitoring</b> |           | <b>Operational Phase<br/>Dolphin Monitoring</b> |        |          |
| 14-Jun | 15-Jun | 16-Jun  | 17-Jun    | 18-Jun  | 19-Jun | 20-Jun   |
|        |        | <b>Operational Phase<br/>Dolphin Monitoring</b> |           |   |        |          |
| 21-Jun | 22-Jun | 23-Jun  | 24-Jun    | 25-Jun  | 26-Jun | 27-Jun   |
|        |        |   |           |   |        |          |
| 28-Jun | 29-Jun | 30-Jun  |           |   |        |          |
|        |        |   |           |   |        |          |

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link  
Northern Connection Sub-sea Tunnel Section  
Operational Phase Dolphin Monitoring Survey Monitoring Schedule - July 2020**

| Sunday | Monday  | Tuesday   | Wednesday | Thursday  | Friday | Saturday |
|--------|---|---|-----------|---|--------|----------|
|        |   |   | 01-Jul    | 02-Jul  | 03-Jul | 04-Jul   |
|        |   |   |           | <b>Operational Phase<br/>Dolphin Monitoring</b> |        |          |
| 05-Jul | 06-Jul  | 07-Jul  | 08-Jul    | 09-Jul  | 10-Jul | 11-Jul   |
|        |   | <b>Operational Phase<br/>Dolphin Monitoring</b> |           | <b>Operational Phase<br/>Dolphin Monitoring</b> |        |          |
| 12-Jul | 13-Jul  | 14-Jul  | 15-Jul    | 16-Jul  | 17-Jul | 18-Jul   |
|        |   |   |           |   |        |          |
| 19-Jul | 20-Jul  | 21-Jul  | 22-Jul    | 23-Jul  | 24-Jul | 25-Jul   |
|        | <b>Operational Phase<br/>Dolphin Monitoring</b> |   |           |   |        |          |
| 26-Jul | 27-Jul  | 28-Jul  | 29-Jul    | 30-Jul  | 31-Jul |          |
|        |   |   |           |   |        |          |

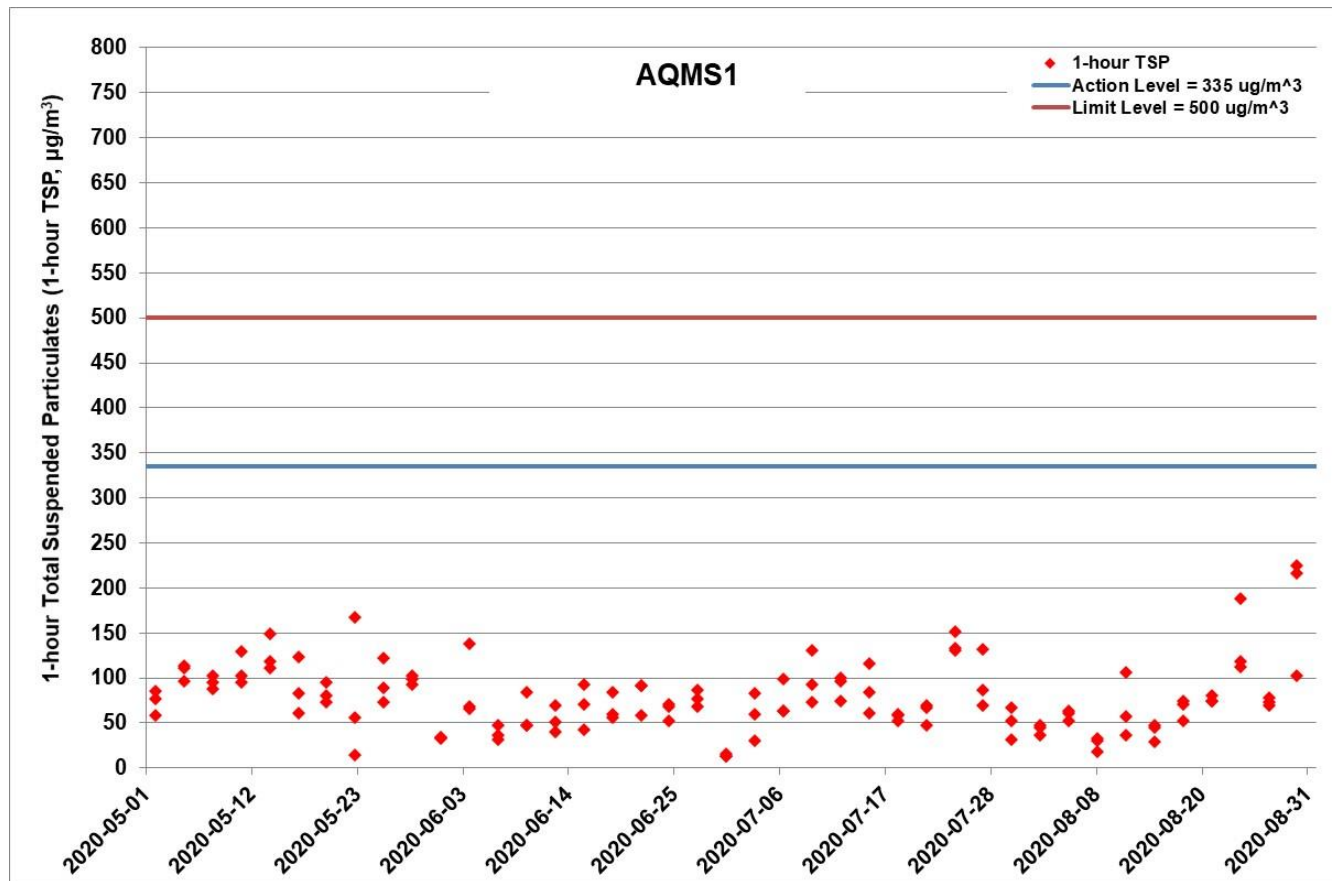
**HY/2012/08 - Tuen Mun - Chek Lap Kok Link**  
**Northern Connection Sub-sea Tunnel Section**  
**Operational Phase Dolphin Monitoring Survey Monitoring Schedule - August 2020**

| Sunday | Monday | Tuesday   | Wednesday | Thursday | Friday  | Saturday |
|--------|--------|---|-----------|----------|---|----------|
|        |        |   |           |          |   | 01-Aug   |
|        |        |   |           |          |   |          |
| 02-Aug | 03-Aug | 04-Aug  | 05-Aug    | 06-Aug   | 07-Aug  | 08-Aug   |
|        |        | <b>Operational Phase<br/>Dolphin Monitoring</b> |           |          |   |          |
| 09-Aug | 10-Aug | 11-Aug  | 12-Aug    | 13-Aug   | 14-Aug  | 15-Aug   |
|        |        |   |           |          | <b>Operational Phase<br/>Dolphin Monitoring</b> |          |
| 16-Aug | 17-Aug | 18-Aug  | 19-Aug    | 20-Aug   | 21-Aug  | 22-Aug   |
|        |        | <b>Operational Phase<br/>Dolphin Monitoring</b> |           |          | <b>Operational Phase<br/>Dolphin Monitoring</b> |          |
| 23-Aug | 24-Aug | 25-Aug  | 26-Aug    | 27-Aug   | 28-Aug  | 29-Aug   |
|        |        |   |           |          |   |          |
| 30-Aug | 31-Aug |   |           |          |   |          |
|        |        |   |           |          |   |          |

Appendix F

## Impact Air Quality Monitoring Results





- Figure F.1 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at AQMS1 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



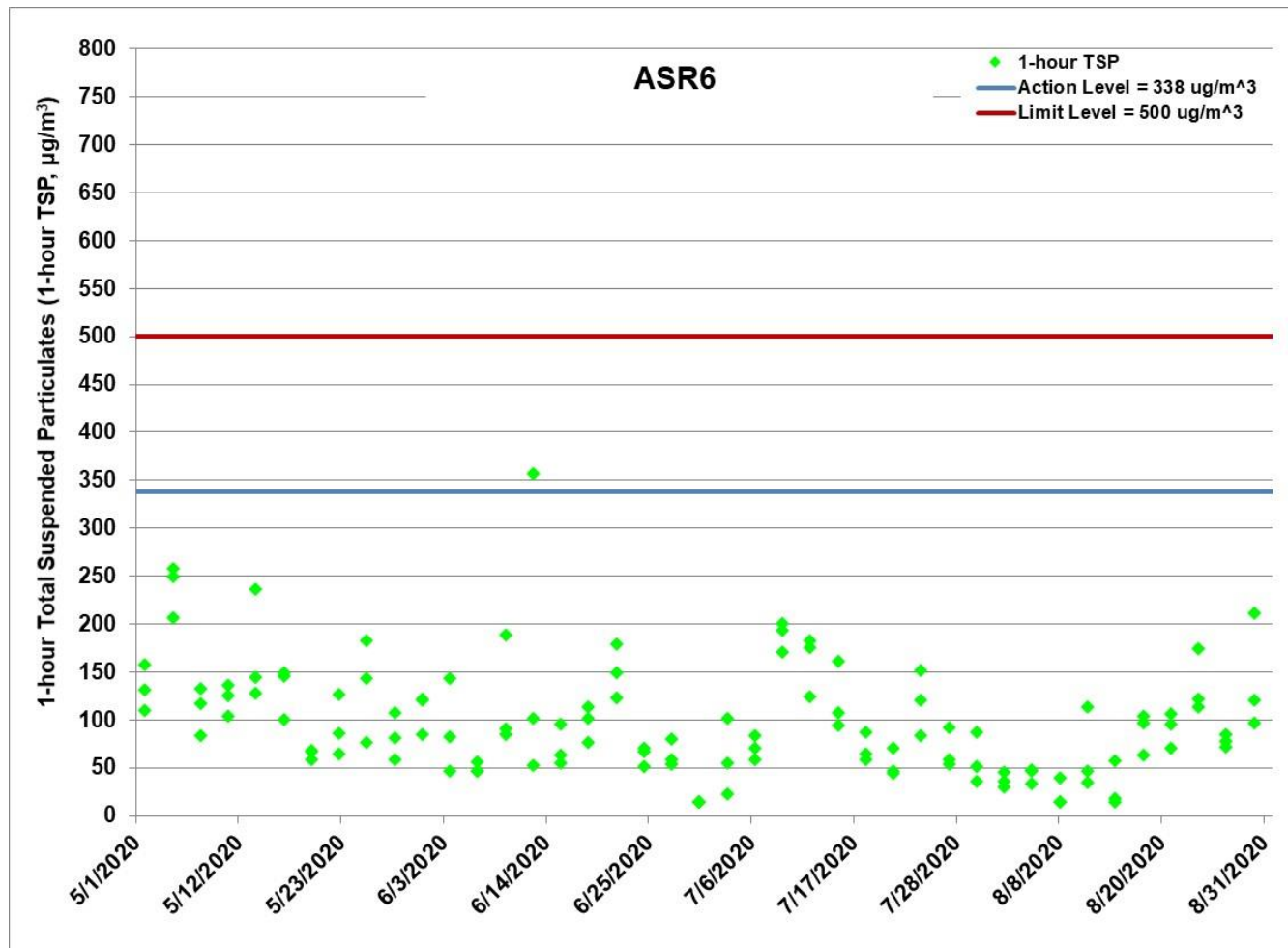


Figure F.2 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR6 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



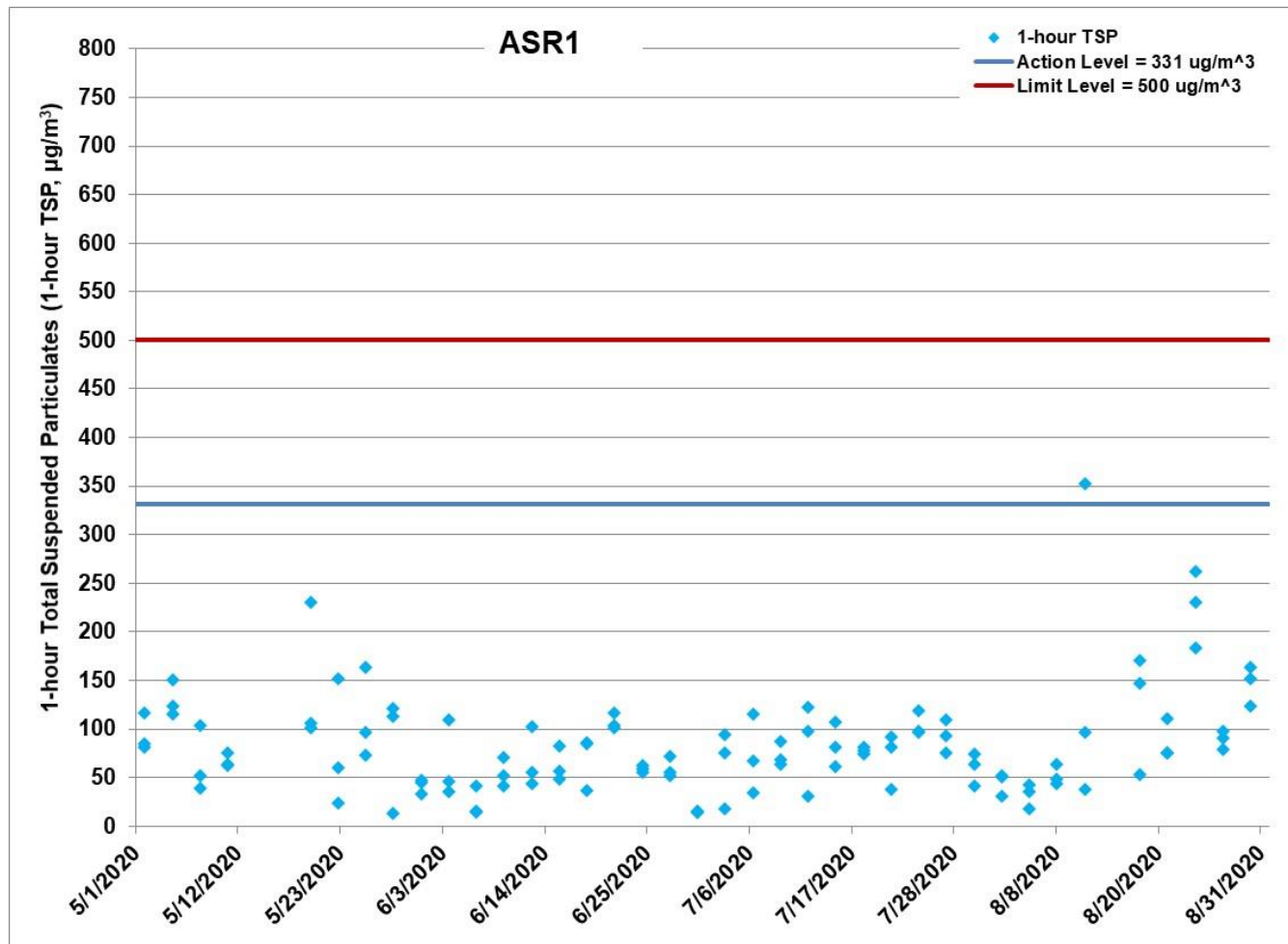


Figure F.3 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR1 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



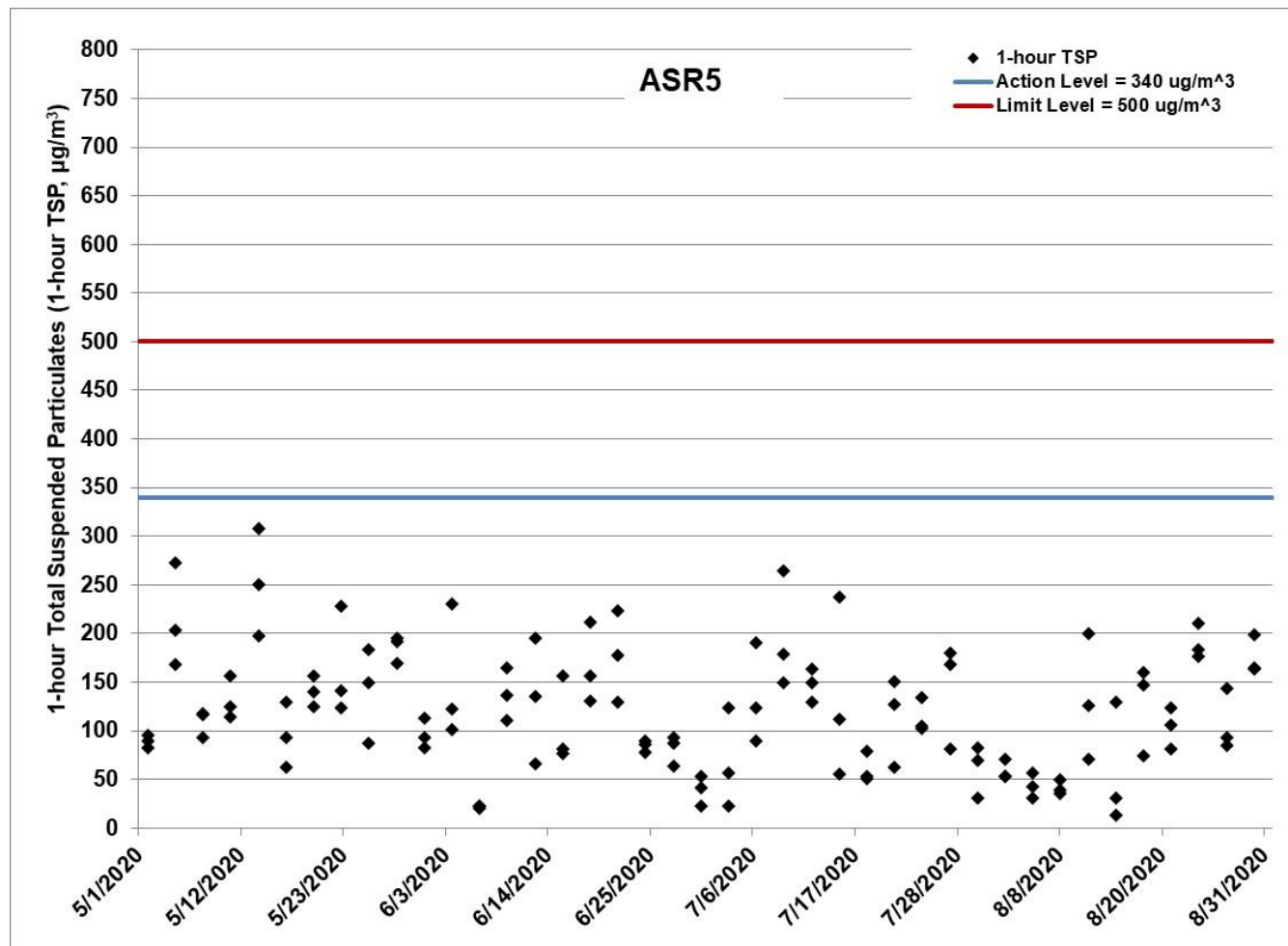


Figure F.4 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR5 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



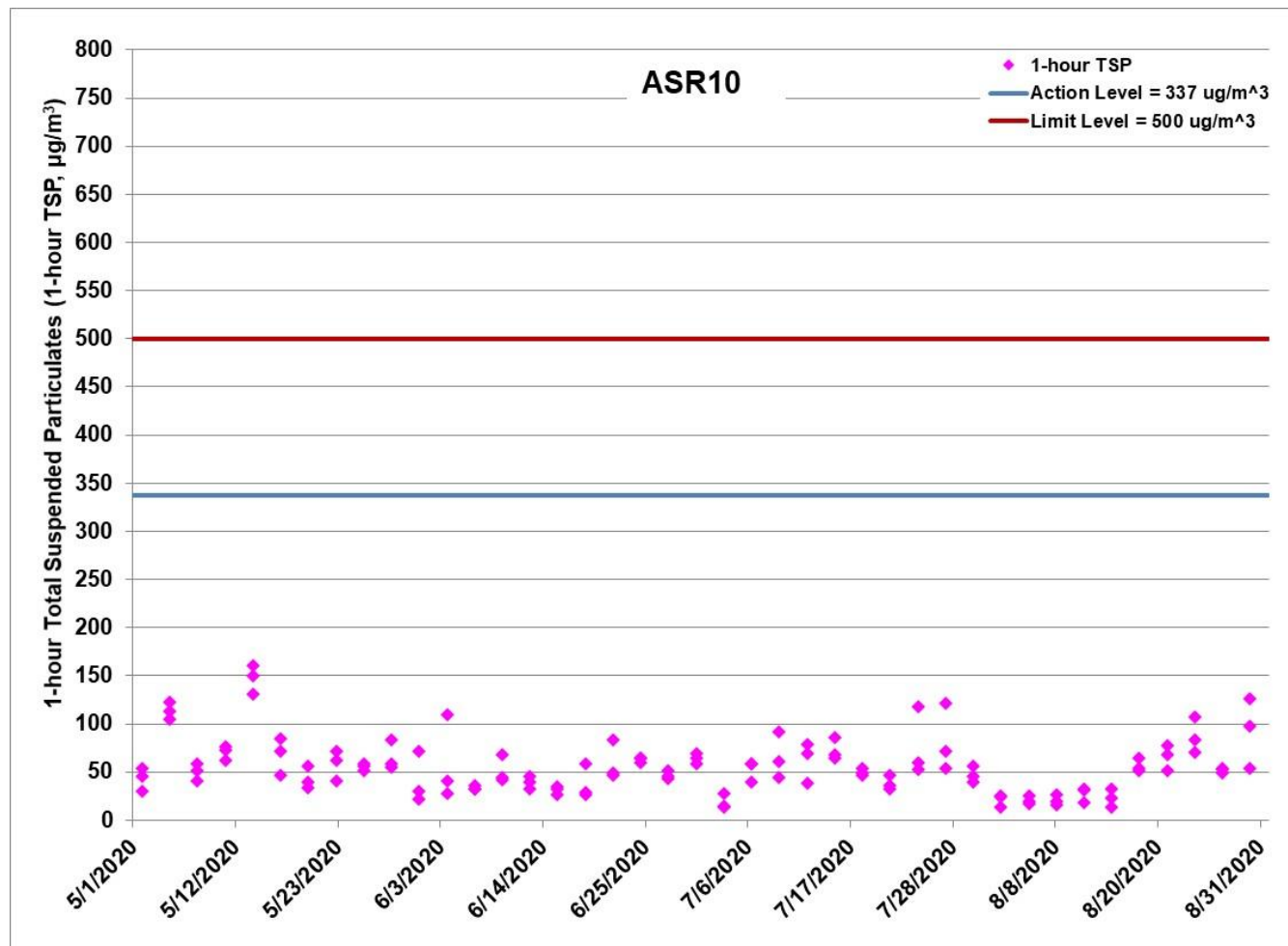


Figure F.5 Impact Monitoring - 1-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR10 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



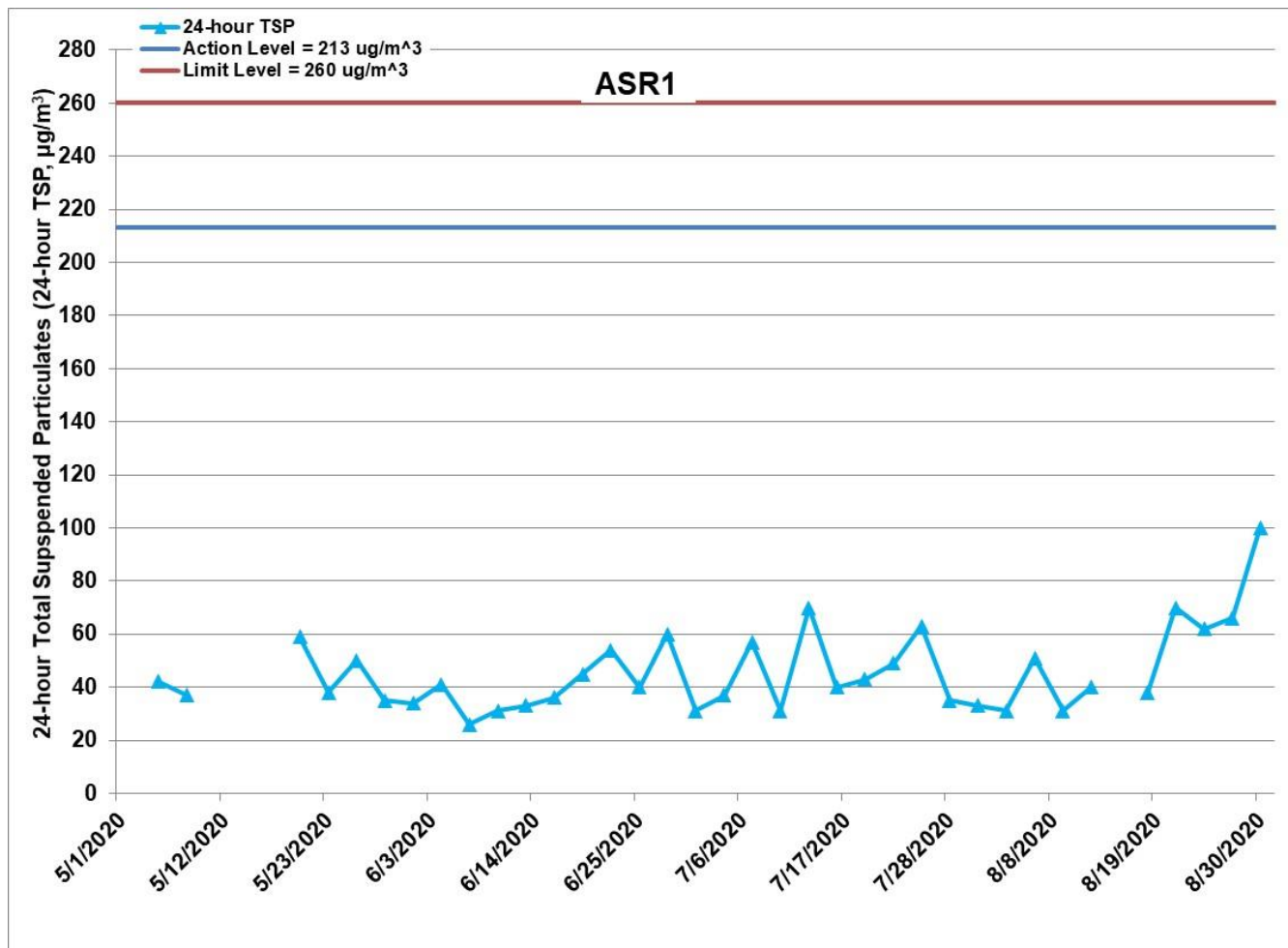


Figure F.6 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR1 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



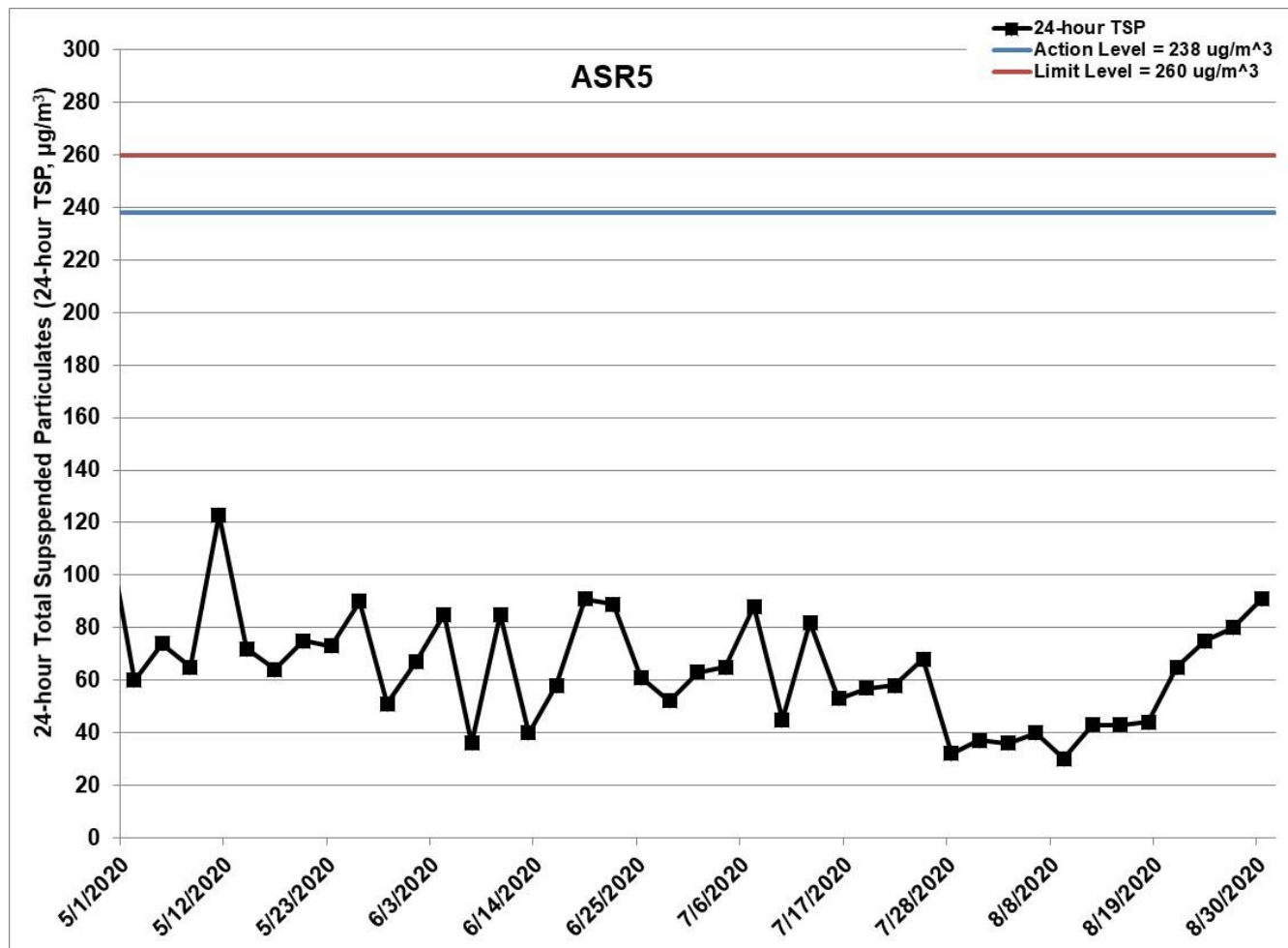


Figure F.7 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR5 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



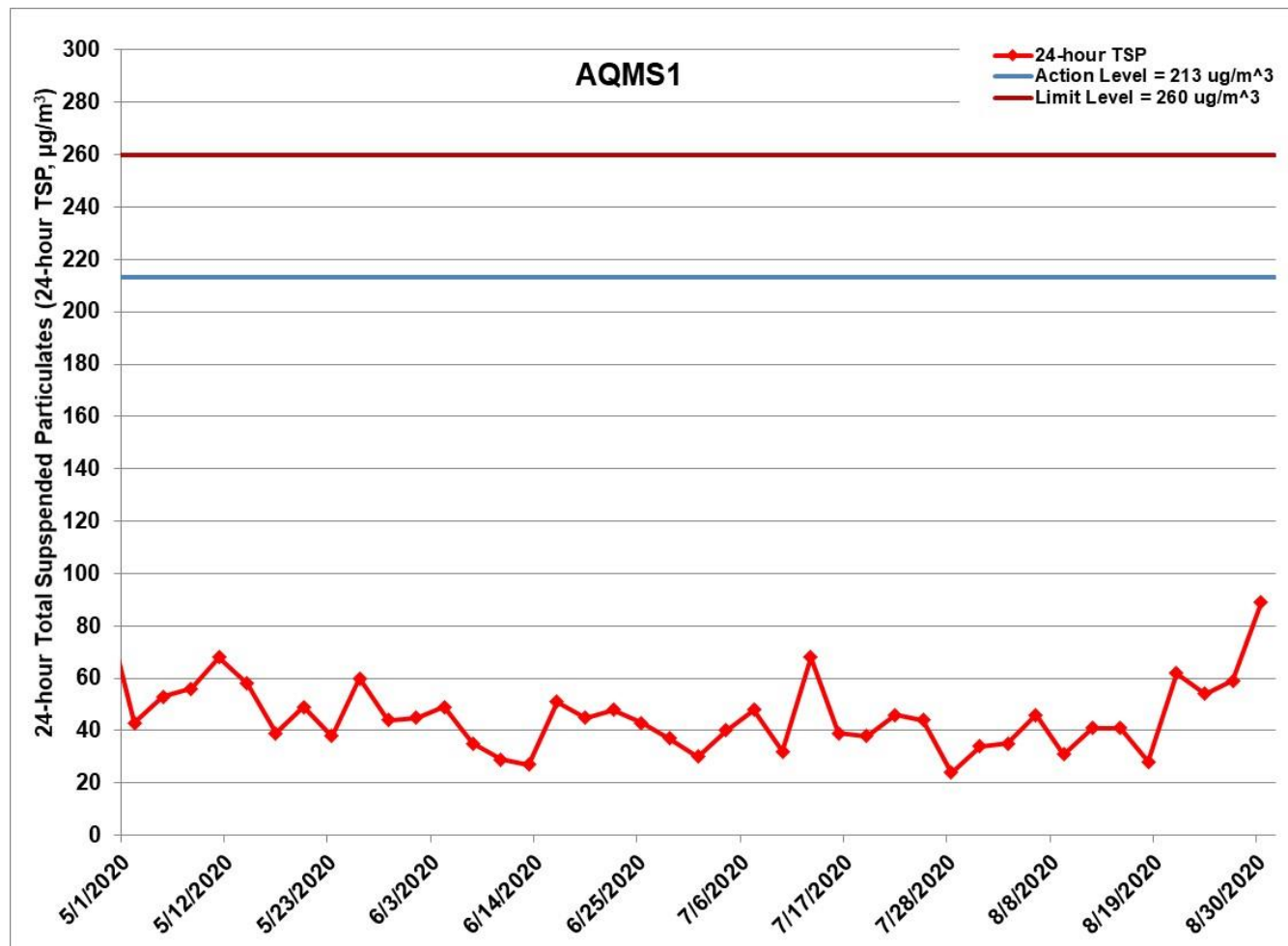


Figure F.8 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at AQMS1 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)





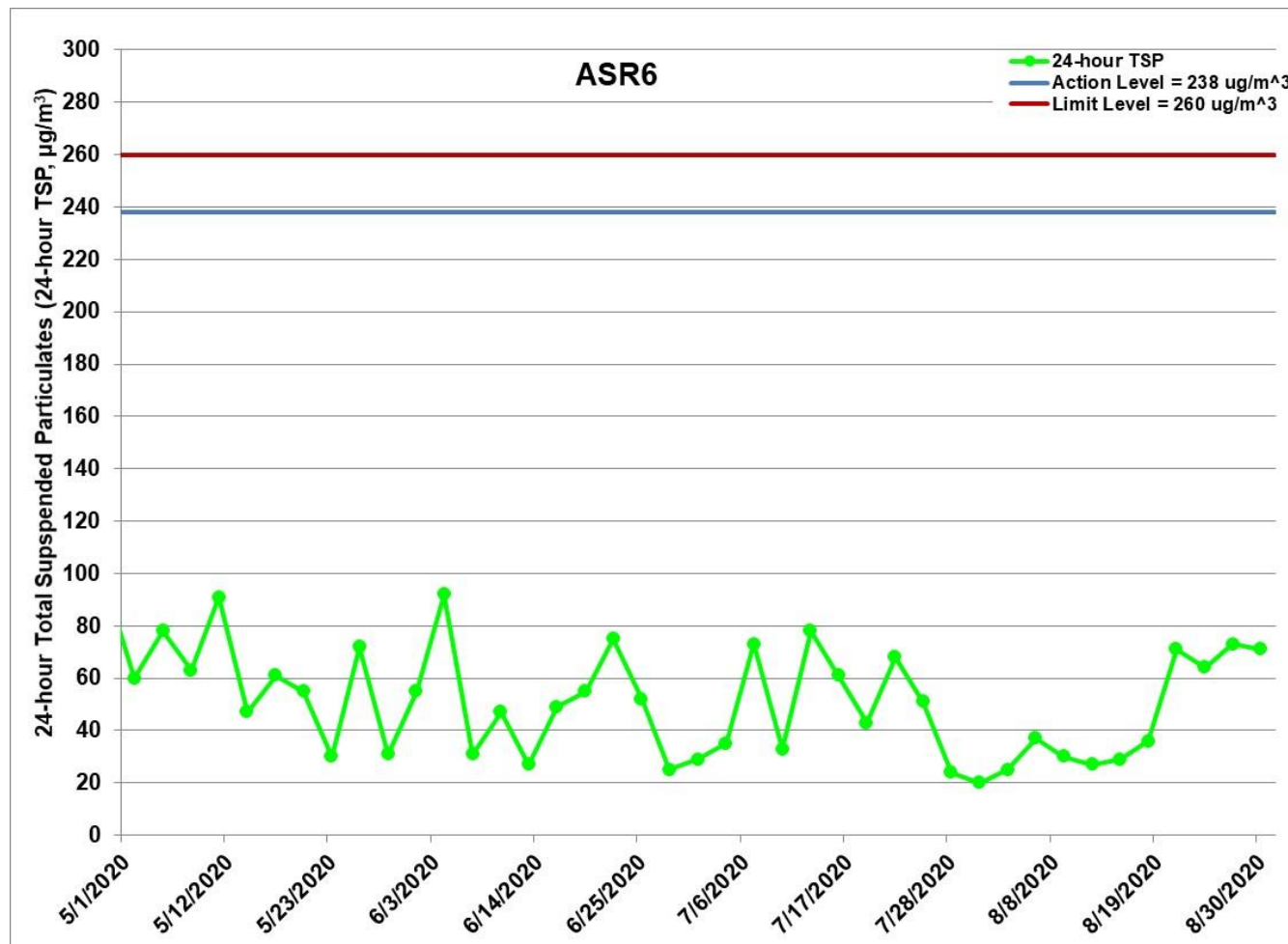


Figure F.9 Impact Monitoring - 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR6 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works - Portion S-A, S-B & S-C and Northern Landfall; UU installation - Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation - Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath - Pump Sump Area at Northern Landfall (1/5/2020 - 31/8/2020)



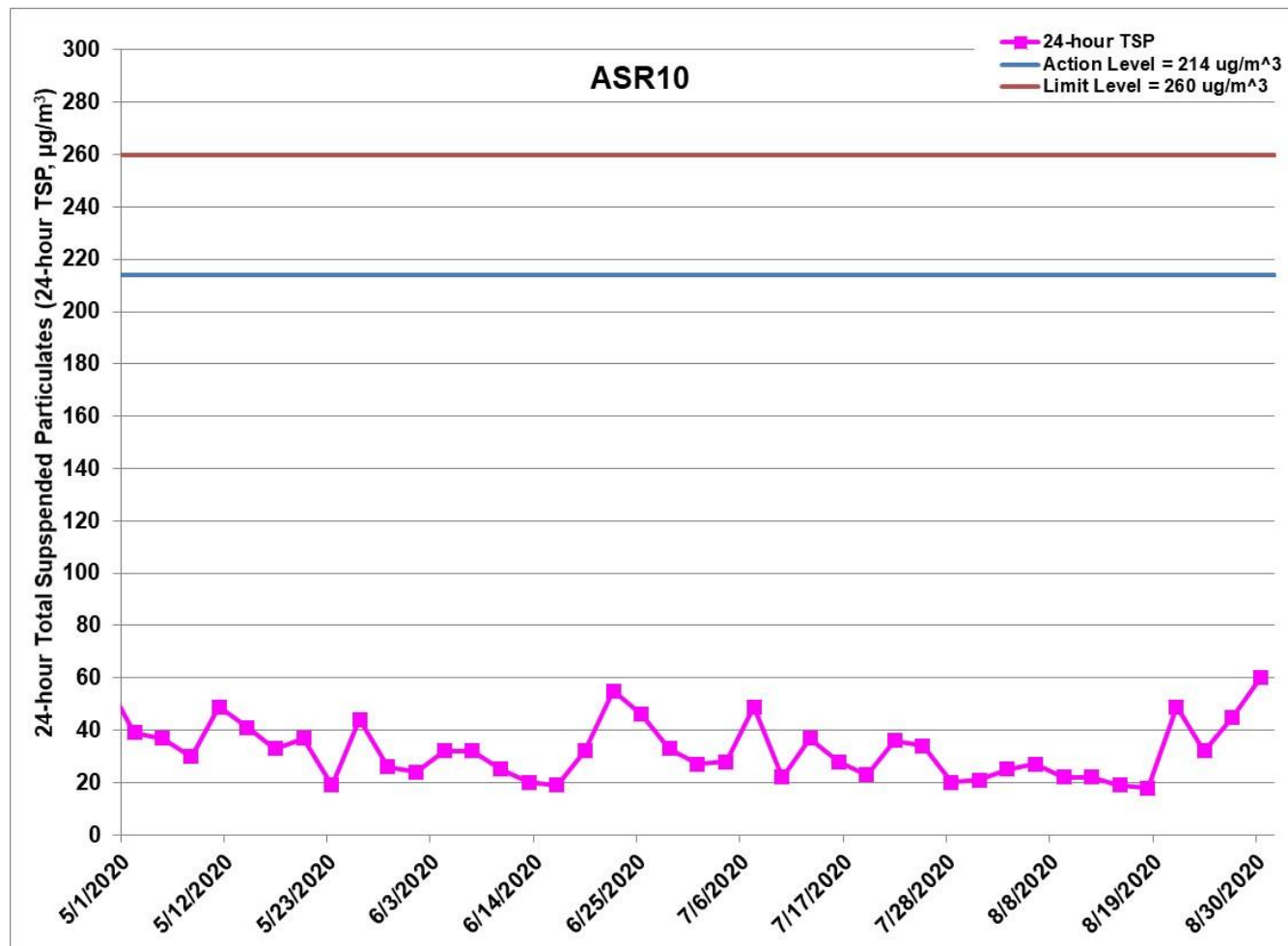
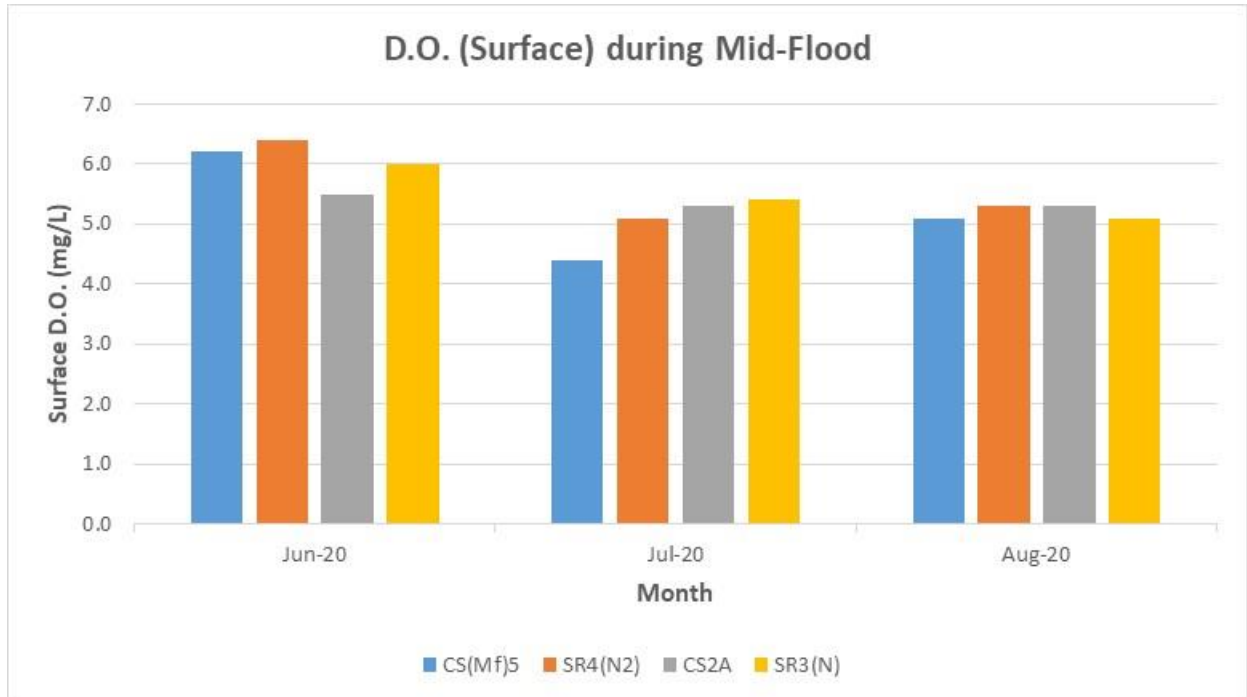
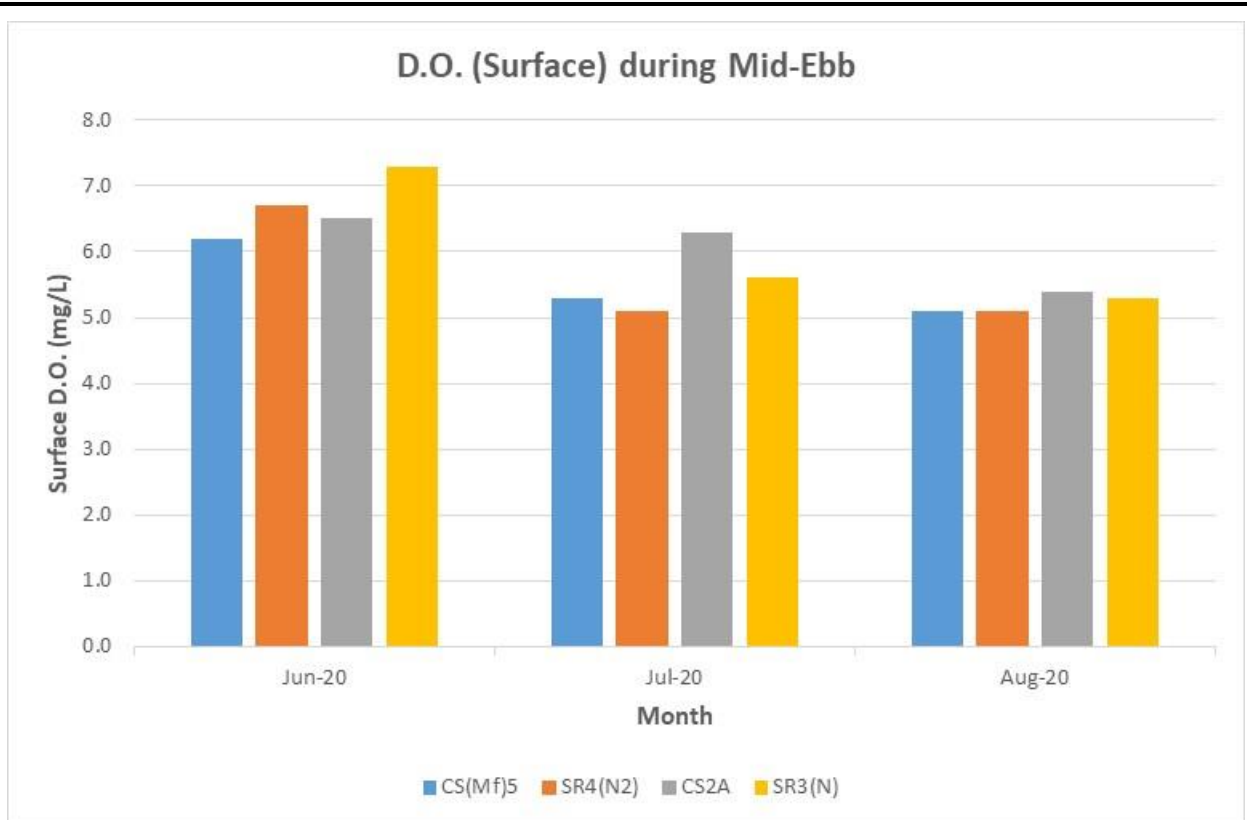


Figure F.10 Impact Monitoring – 24-hour Total Suspended Particulates ( $\mu\text{g}/\text{m}^3$ ) at ASR10 between 1 May 2020 and 31 August 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included Road & Drainage works – Portion S-A, S-B & S-C and Northern Landfall; UU installation – Portion S-A, S-B & S-C and Northern Landfall; and Carpark Formation – Portion S-A, S-B & S-C and Northern Landfall and Hard Paving and Footpath – Pump Sump Area at Northern Landfall (1/5/2020 – 31/8/2020)



Appendix G

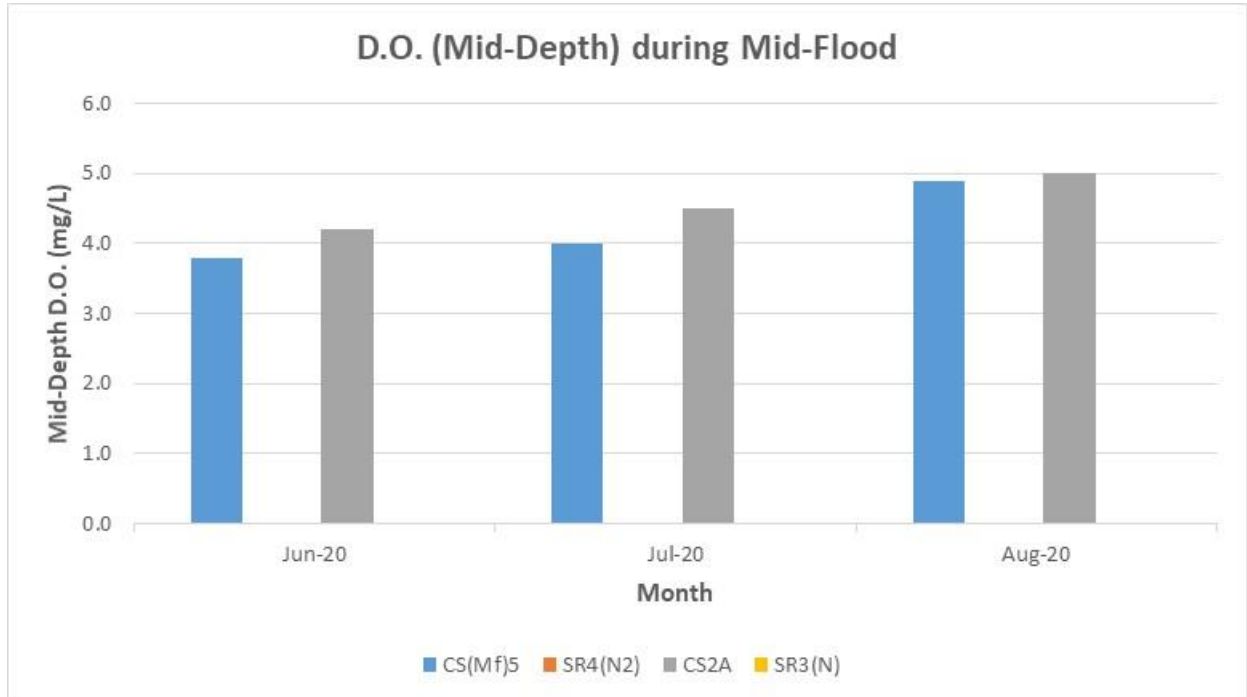
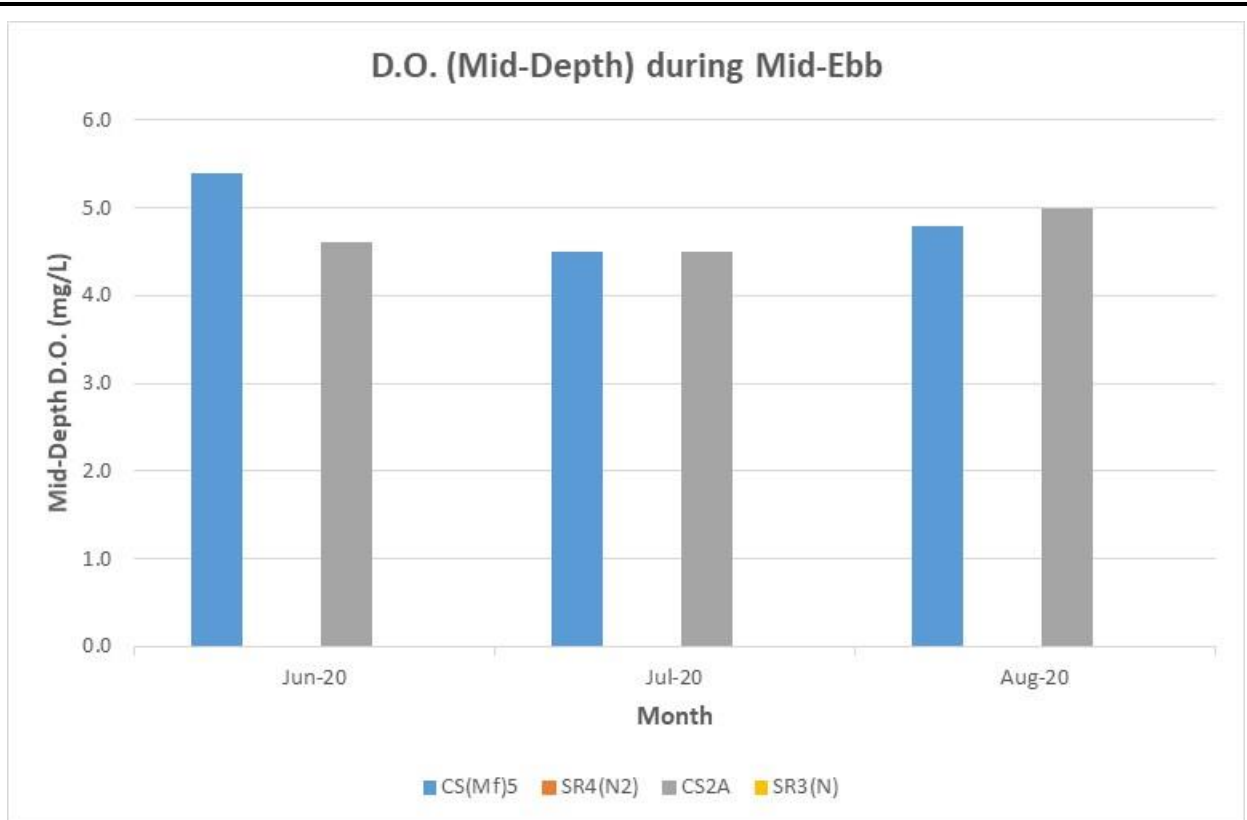
Operational Phase Water  
Quality Monitoring Results



**Figure G1 Operational Phase Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 June 2020 and 31 August 2020. The weather conditions during the monitoring period varied mostly from sunny to cloudy.**

Ref: 0212330\_Impact-WQM\_August2020\_graphs\_Rev a.xls

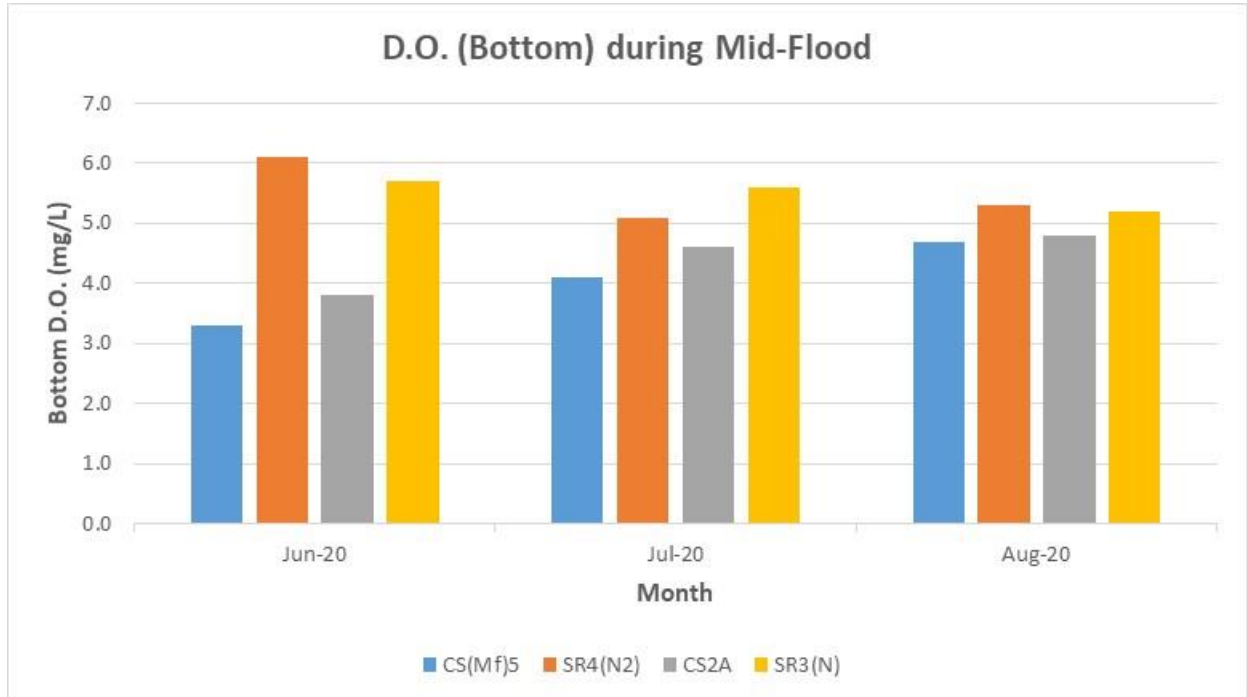
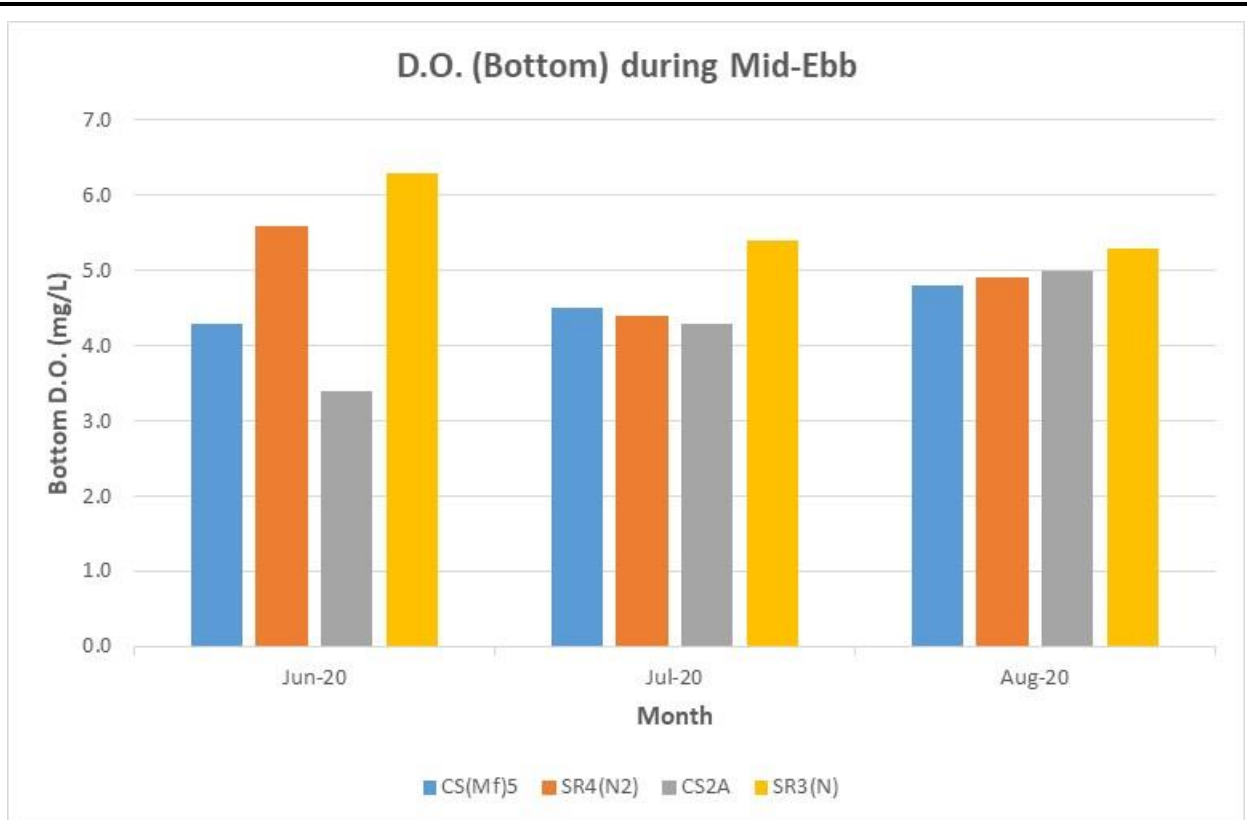




**Figure G2 Operational Phase Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 June 2020 and 31 August 2020. The weather conditions during the monitoring period varied mostly from sunny to cloudy.**



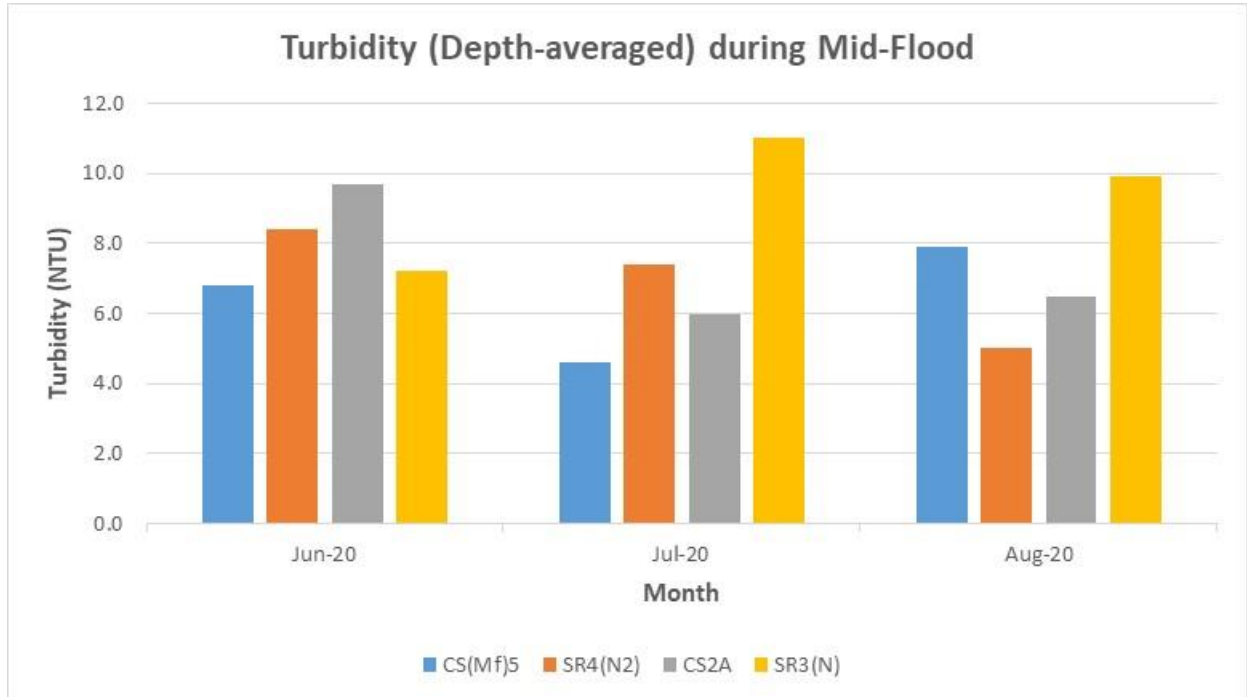
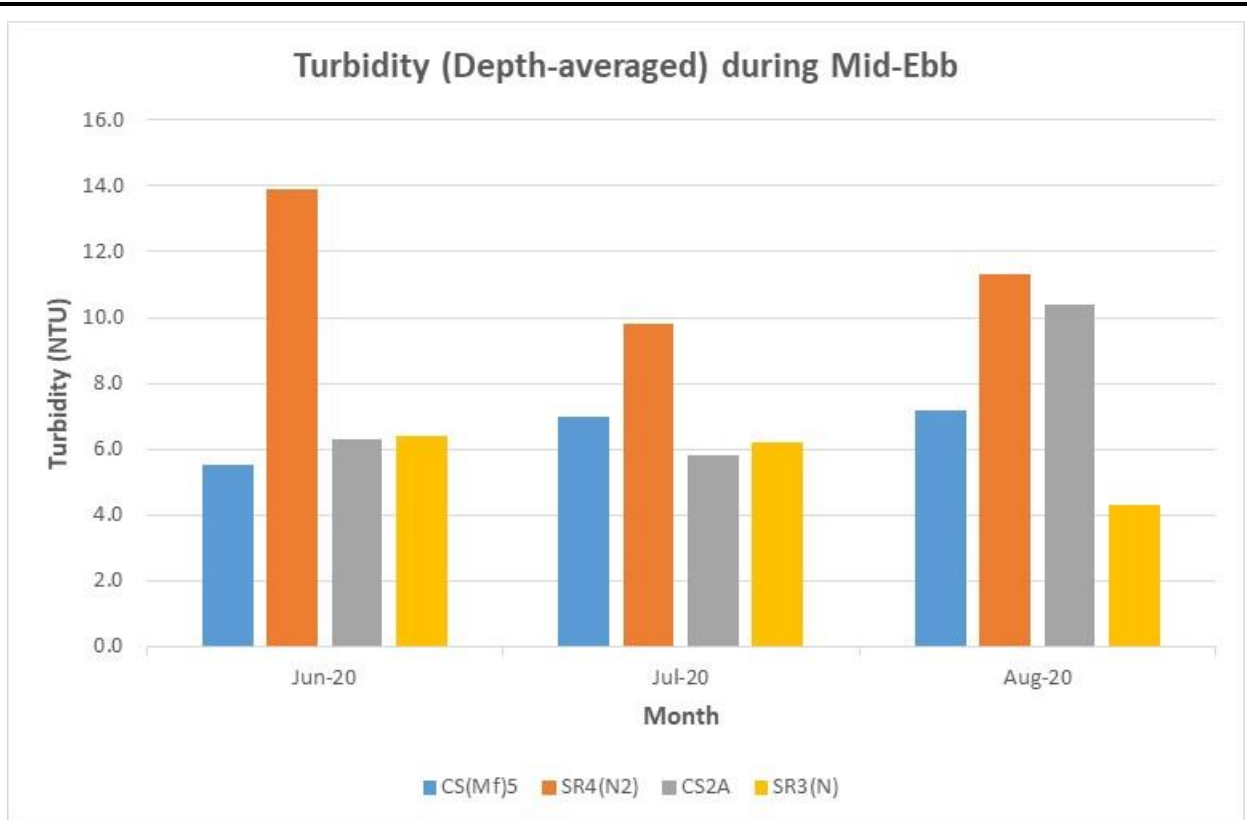
Ref: 0212330\_Impact-WQM\_August2020\_graphs\_Rev a.xls



**Figure G3 Operational Phase Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters between 1 June 2020 and 31 August 2020. The weather conditions during the monitoring period varied mostly from sunny to cloudy.**

Ref: 0212330\_Impact-WQM\_August2020\_graphs\_Rev a.xls

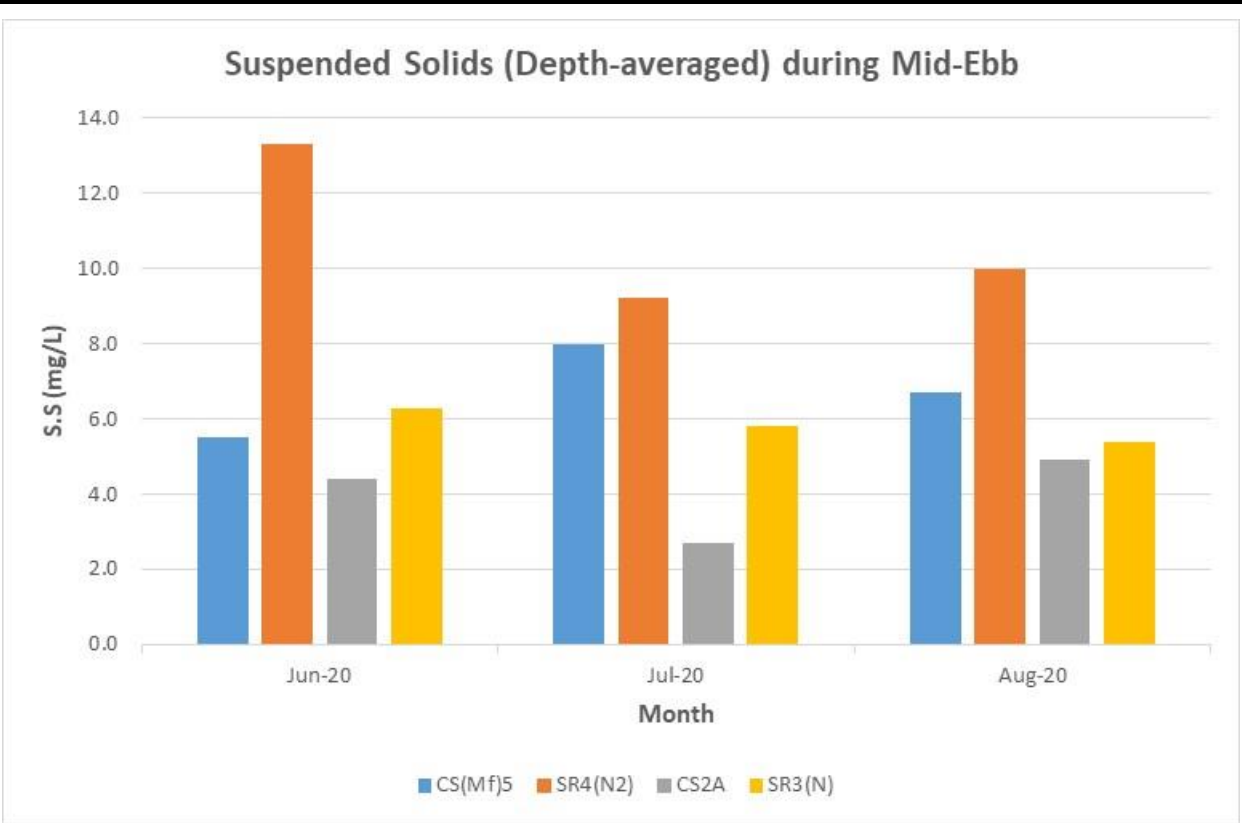




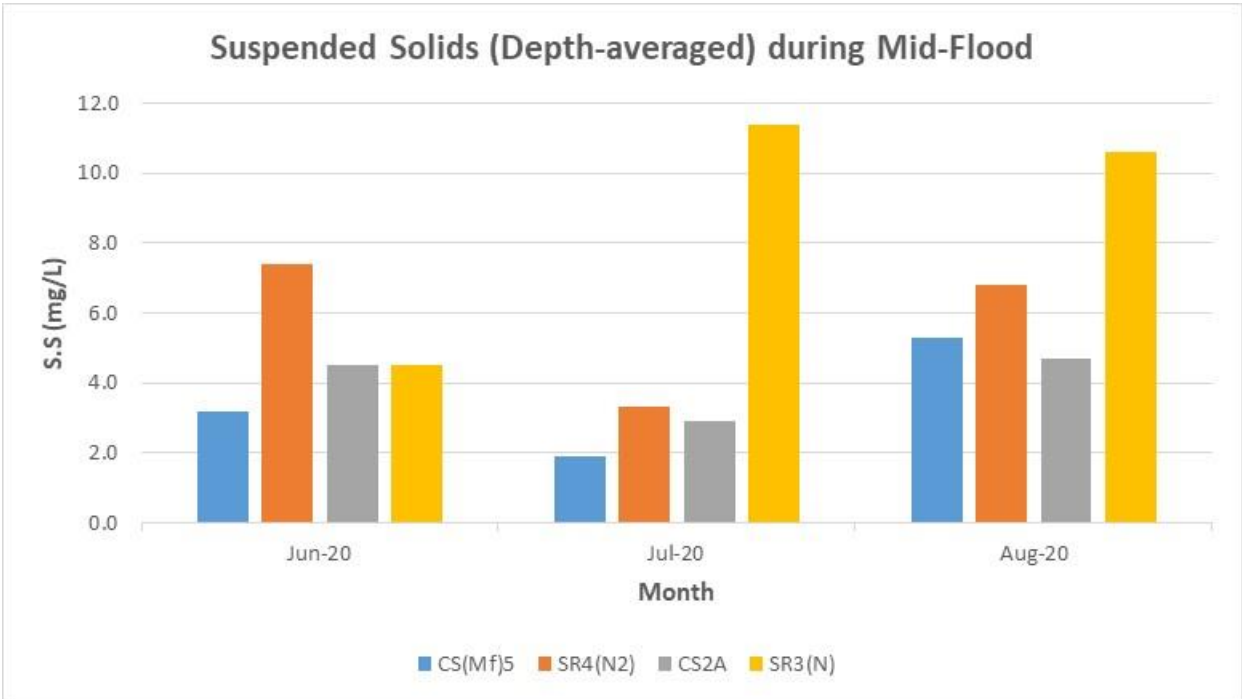
**Figure G4 Operational Phase Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 June 2020 and 31 August 2020. The weather conditions during the monitoring period varied mostly from sunny to cloudy.**

Ref: 0212330\_Impact-WQM\_August2020\_graphs\_Rev a.xls





v



**Figure G5 Operational Phase Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 June 2020 and 31 August 2020. The weather conditions during the monitoring period varied mostly from sunny to cloudy.**

Ref: 0212330\_Impact-WQM\_August2020\_graphs\_Rev a.xls





Appendix H

Post Construction  
(Operational) Dolphin  
Monitoring Survey

**CONTRACT NO. HY/2012/08**

**Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link  
(Northern Connection Sub-sea Tunnel Section)  
Post-Construction Dolphin Monitoring**

*1st Quarterly Progress Report (June-August 2020)*

*submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

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

31 August 2020

**1. Introduction**

- 1.1. As part of the Hong Kong-Zhuhai-Macao Bridge, the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Northern Connection Sub-sea Tunnel Section (Contract no. HY/2012/08) comprises the sub-sea TBM tunnels (two tubes with cross passages) across the Urmston Road to connect Tuen Area 40 and Hong Kong Boundary Crossing Facilities (HKBCF) of approximately 4 km in length with dual 2-lane carriageway, the tunnels at both the southern landfall and the northern landfall for construction of approach roads to the sub-sea TBM tunnels of approximately 1.5 km in length, as well as the northern landfall reclamation of approximately 16.5 hectares and about 20.km long seawalls. Dragages – Bouygues Joint Venture (hereinafter called the “Contractor”) was awarded as the main contractor for the Northern Connection Sub-sea Tunnel Section, and ERM Hong Kong Limited would serve as the Environmental Team to implement the Environmental Monitoring and Audit (EM&A) programme.
- 1.2. According to the updated EM&A Manual (for TM-CLKL), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas as in AFCD annual marine mammal monitoring programme. Between 2013 and 2019, as such surveys have already been undertaken by the HKLR03 and HKBCF projects in the survey same areas of NEL and NWL, a combined monitoring approach was recommended by the Highways Department, that the TM-CLKL EM&A project can utilize the monitoring data collected by HKLR03 or HKBCF project to avoid any redundancy in monitoring effort. Such exemption for the dolphin monitoring has ended in September 2019 as the dolphin monitoring works carried out by HKLR03 and HKBCF contract have been completed. Starting in October 2019, TMCLKL08 contract takes over the dolphin monitoring works by conducting the regular vessel-based line-transect surveys during the construction phase. And as the construction works for the TMCLKL08 contract has also been completed in May 2020, the post-construction dolphin monitoring works have subsequently commenced in June 2020.

- 1.3. Since November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by ERM Hong Kong Limited as the dolphin specialist for the TMCLKL Northern Connection Sub-sea Tunnel Section EM&A project. He is responsible for the dolphin monitoring study, including the data collection on Chinese White Dolphins during the construction phase (i.e. impact period) as well as the post-construction phase of the TMCLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas. During both phases, the dolphin specialist is responsible to utilize the collected monitoring data in order to examine any potential impacts on the dolphins during and after the TMCLKL construction works.
- 1.4. This report is the first quarterly progress report under the TM-CLKL post-construction phase dolphin monitoring programme submitted to the Contractor, which summarizes the results of the survey findings during the period of June to August 2020.

## 2. Monitoring Methodology

### 2.1. Vessel-based Line-transect Survey

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

Table 1 Co-ordinates of transect lines conducted by TMCLKL08 project

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

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

- 2.1.2. The TMCLKL08 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2020). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

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

## 2.2. Photo-identification Work

- 2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the TMCLKL08 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 2.2.2. A professional digital camera (*Canon EOS 7D* model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

## 2.3. Data Analysis

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

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

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

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

2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly monitoring period were plotted onto 1-km<sup>2</sup> grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km<sup>2</sup>) and dolphin densities (total number of dolphins from on-effort sightings per km<sup>2</sup>) were then calculated for each 1 km by 1 km grid with the aid of GIS.

Sighting density grids and dolphin density grids were then further normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid was calculated by examining the survey coverage on each line-transect survey to determine how many times the grid was surveyed during the study period. For example, when the survey boat traversed through a specific grid 50 times, 50 units of survey effort were counted for that grid. With the amount of survey effort calculated for each grid, the sighting density and dolphin density of each grid were then normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort sightings per 100 units of survey effort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of dolphins per 100 units of survey effort. Among the 1-km<sup>2</sup> grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and DPSE in each 1-km<sup>2</sup> grid within the study area:



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

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

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

### 3. Monitoring Results

#### 3.1. Summary of survey effort and dolphin sightings

- 3.1.1. During the period of June to August 2020, six sets of systematic line-transect vessel surveys were conducted under the TMCLKL08 post-construction dolphin monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.2. From these TMCLKL08 surveys, a total of 772.31 km of survey effort was collected, with 99.4% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). Among the two areas, 283.00 km and 489.31 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.1.3. The total survey effort conducted on primary lines was 572.77 km, while the effort on secondary lines was 199.54 km. Survey effort conducted on both primary and secondary lines were considered to be on-effort survey data. A summary table of the survey effort is shown in Appendix I.
- 3.1.4. During the six sets of TMCLKL08 monitoring surveys from June to August 2020, only two groups of two Chinese White Dolphins were sighted (i.e. both were single

individuals). Both dolphin sightings were made on primary lines during on-effort search in this quarter. A summary table of dolphin sightings is shown in Appendix II.

3.1.5. In this quarterly period, both dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during the HKLR03/TMCLKL08 monitoring surveys.

### 3.2. *Distribution*

3.2.1. Distribution of dolphin sightings made during the TMCLKL08 monitoring surveys from June to August 2020 is shown in Figure 1. The two sightings were made to the northeast of Lung Kwu Chau and to the west of the airport platform respectively (Figure 1). As consistently recorded in previous monitoring quarters in recent years, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).

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

3.2.3. Sighting distribution of dolphins during the present post-construction monitoring period was drastically different from the one during the baseline monitoring period (Figure 1). In the present quarter, dolphins have disappeared from the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past seven years of HKLR03/TMCLKL08 dolphin monitoring, which has resulted in zero to extremely low encounter rates in this area.

3.2.4. In NWL survey area, dolphin occurrences were also drastically different between the baseline and the present post-construction monitoring periods. During the present quarter, dolphins were rarely sighted here, and only at the western end of the North Lantau region. This was in contrary to their frequent occurrences throughout the area during the baseline period (Figure 1).

3.2.5. Another comparison in dolphin distribution was made between the six quarterly periods of summer months in 2015-20 (Figure 2). Dolphins were sighted mostly around the Sha Chau and Lung Kwu Chau Marine Park and near the HKLR09 alignment in NWL waters during the first three summer quarters, and their occurrence has progressively diminished further in the past three summer quarters in 2018-20 (Figure 2). Notably, they were consistently absent from the NEL survey area throughout the six quarterly periods.

### 3.3. *Encounter rate*

3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) for each set of the TMCLKL08 surveys in NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of surveys were also compared with the ones deduced from the baseline



monitoring period (September-November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during June-August 2020

| SURVEY AREA      | DOLPHIN MONITORING DATES | Encounter rate (STG)<br>(no. of on-effort dolphin sightings per 100 km of survey effort) | Encounter rate (ANI)<br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |
|------------------|--------------------------|--|--|
|                  |                          | Primary Lines Only   | Primary Lines Only   |
| Northeast Lantau | Set 1 (4 & 9 Jun 2020)   | 0.00   | 0.00   |
|                  | Set 2 (11 & 16 Jun 2020) | 0.00   | 0.00   |
|                  | Set 3 (2 & 7 Jul 2020)   | 0.00   | 0.00   |
|                  | Set 4 (9 & 20 Jul 2020)  | 0.00   | 0.00   |
|                  | Set 5 (4 & 14 Aug 2020)  | 0.00   | 0.00   |
|                  | Set 6 (18 & 21 Aug 2020) | 0.00   | 0.00   |
| Northwest Lantau | Set 1 (4 & 9 Jun 2020)   | 0.00   | 0.00   |
|                  | Set 2 (11 & 16 Jun 2020) | 0.00   | 0.00   |
|                  | Set 3 (2 & 7 Jul 2020)   | 0.00   | 0.00   |
|                  | Set 4 (9 & 20 Jul 2020)  | 1.79   | 1.79   |
|                  | Set 5 (4 & 14 Aug 2020)  | 0.00   | 0.00   |
|                  | Set 6 (18 & 21 Aug 2020) | 1.64   | 1.64   |

Table 3. Comparison of average dolphin encounter rates from the present post-construction monitoring period (June-August 2020) and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions;  $\pm$  denotes the standard deviation of the average encounter rates)

|                  | Encounter rate (STG)<br>(no. of on-effort dolphin sightings per 100 km of survey effort) |                           | Encounter rate (ANI)<br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |                           |
|------------------|--|---------------------------|--|---------------------------|
|                  | June – August 2020   | September – November 2011 | June – August 2020   | September – November 2011 |
| Northeast Lantau | 0.0  | 6.00 $\pm$ 5.05           | 0.0  | 22.19 $\pm$ 26.81         |
| Northwest Lantau | 0.57 $\pm$ 0.89  | 9.85 $\pm$ 5.85           | 0.57 $\pm$ 0.89  | 44.66 $\pm$ 29.85         |

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 0.41 sightings and 0.41 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

3.3.3 In NEL, the average dolphin encounter rates (both STG and ANI) in the present quarterly post-construction monitoring period were both zero with no on-effort sighting being made,

and such extremely low occurrence of dolphins in NEL have been consistently recorded during the same summer quarters throughout the HKLR03/TMCLKL08 dolphin monitoring in the past seven consecutive years (Table 4).

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from the same summer quarters of HKLR03/TMCLKL08 impact and post-construction monitoring periods since 2012 and the baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions;  $\pm$  denotes the standard deviation of the average encounter rates)

|   | <b>Encounter rate (STG)</b><br>(no. of on-effort dolphin sightings per 100 km of survey effort) | <b>Encounter rate (ANI)</b><br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |
|---|---|---|
| <b>September-November 2011 (Baseline)</b>   | 6.00 $\pm$ 5.05   | 22.19 $\pm$ 26.81   |
| <b>June-August 2013 (Impact)</b>            | 0.88 $\pm$ 1.36   | 3.91 $\pm$ 8.36   |
| <b>June-August 2014 (Impact)</b>            | 0.42 $\pm$ 1.04   | 1.69 $\pm$ 4.15   |
| <b>June-August 2015 (Impact)</b>            | 0.44 $\pm$ 1.08   | 0.44 $\pm$ 1.08   |
| <b>June-August 2016 (Impact)</b>            | 0.00  | 0.00  |
| <b>June-August 2017 (Impact)</b>            | 0.00  | 0.00  |
| <b>June-August 2018 (Impact)</b>            | 0.00  | 0.00  |
| <b>June-August 2019 (Impact)</b>            | 0.00  | 0.00  |
| <b>June-August 2020 (Post-Construction)</b> | 0.00  | 0.00  |

- 3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present quarterly period were only tiny fractions of the ones recorded during the three-month baseline period (with reductions of 94.2% and 98.7% respectively), indicating a dramatic decline in dolphin usage of this survey area during the present quarterly period as compared to the baseline period in 2011 (Table 5).
- 3.3.5. When comparing to the past seven summer quarters in 2013-19, the quarterly encounter rates in 2020 continued to plummet to the lowest level among all summer quarters during the HKLR03/TMCLKL08 monitoring period (Table 5). Such dramatic drop in dolphin occurrence in NWL raises serious concerns, and the temporal trend should be closely monitored in the upcoming monitoring quarters while all construction activities of HZMB works has already been completed.

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from the same summer quarters of HKLR03/TMCLKL08 impact and post-construction monitoring periods since 2012 and the baseline monitoring period (September- November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions;  $\pm$  denotes the standard deviation of the average encounter rates)

|   | <b>Encounter rate (STG)</b><br>(no. of on-effort dolphin sightings per 100 km of survey effort) | <b>Encounter rate (ANI)</b><br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |
|---|---|---|
| <b>September-November 2011 (Baseline)</b>   | 9.85 $\pm$ 5.85   | 44.66 $\pm$ 29.85   |
| <b>June-August 2013 (Impact)</b>            | 6.56 $\pm$ 3.68   | 27.00 $\pm$ 18.71   |
| <b>June-August 2014 (Impact)</b>            | 4.74 $\pm$ 3.84   | 17.52 $\pm$ 15.12   |
| <b>June-August 2015 (Impact)</b>            | 2.53 $\pm$ 3.20   | 9.21 $\pm$ 11.57  |
| <b>June-August 2016 (Impact)</b>            | 1.72 $\pm$ 2.17   | 7.48 $\pm$ 10.98  |
| <b>June-August 2017 (Impact)</b>            | 2.20 $\pm$ 2.88   | 6.58 $\pm$ 8.12   |
| <b>June-August 2018 (Impact)</b>            | 1.16 $\pm$ 1.39   | 2.87 $\pm$ 3.32   |
| <b>June-August 2019 (Impact)</b>            | 0.62 $\pm$ 1.52   | 1.55 $\pm$ 3.80   |
| <b>June-August 2020 (Post-Construction)</b> | 0.57 $\pm$ 0.89   | 0.57 $\pm$ 0.89   |

- 3.3.6. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and HKLR03/TMCLKL08 monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.3.7. For the comparison between the baseline period and the present quarter (the first quarter of the TMCLKL08 post-construction monitoring period being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0016 and 0.0119 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline period and present quarter in both the average dolphin encounter rates of STG and ANI.
- 3.3.8. For the comparison between the baseline period and the cumulative quarters of the HKLR03/TMCLKL08 monitoring period (i.e. the first 31 quarters of the impact and post-construction phases being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were both 0.000000. Even if the alpha value is set at 0.00001, significant differences were still detected in both the average dolphin encounter rates of STG and ANI (i.e. between the cumulative periods and the locations).
- 3.3.9. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly and dramatically reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented throughout the HKLR03/TMCLKL08 monitoring period.

3.3.10. Even though all marine works associated with the HZMB construction have already been completed, and the Brothers Marine Park has been established as a compensation measure for the permanent habitat loss in association with the HZMB reclamation works since late 2016, apparently there has been no sign of recovery of dolphin usage in North Lantau waters at all, while such usage has continued to diminish to the lowest ever level.

### 3.4. *Group size*

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

Table 6. Comparison of average dolphin group sizes from the present post-construction monitoring period (June – August 2020) and baseline monitoring period (September – November 2011) (Note:  $\pm$  denotes the standard deviation of the average group size)

|                         | Average Dolphin Group Size |                           |
|-------------------------|----------------------------|---------------------------|
|                         | June – August 2020         | September – November 2011 |
| <b>Overall</b>          | 1.00 $\pm$ 0.00 (n = 2)    | 3.72 $\pm$ 3.13 (n = 66)  |
| <b>Northeast Lantau</b> | ---                        | 3.18 $\pm$ 2.16 (n = 17)  |
| <b>Northwest Lantau</b> | 1.00 $\pm$ 0.00 (n = 2)    | 3.92 $\pm$ 3.40 (n = 49)  |

3.4.2. The average dolphin group size in NWL waters during the present quarter was much lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of only two dolphin groups in the present quarter was only a tiny fraction of the 66 dolphin groups sighted during the baseline period (Table 6).

### 3.5. *Habitat use*

3.5.1. From June to August 2020, only two grids in North Lantau waters have recorded dolphin occurrences, and both of them recorded very low dolphin densities (Figures 3a and 3b). Notably, all grids near TMCLKL alignment did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 3a and 3b).

3.5.2. It should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution.

3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present post-construction monitoring period (Figure 4). During the baseline period, many grids between Siu Mo To and Shum Shui Kok in NEL recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins there during the present quarter (Figure 4).

- 3.5.4. The density patterns were also very different in NWL between the baseline and present post-construction monitoring periods, with high dolphin usage throughout the area, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. In contrast, both grids with dolphin records were distributed at the western end of the NWL survey area in very low densities during the present quarter (Figure 4).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the present quarterly period, no mother-calf pair was sighted.
- 3.7. *Activities and associations with fishing boats*
- 3.7.1. From June to August 2020, neither of the two dolphin groups was engaged in any activities, and both groups were not associated with any operating fishing vessel during this post-construction monitoring period.
- 3.8. *Summary of photo-identification works*
- 3.8.1. About 100 digital photographs of Chinese White Dolphins were taken during the present post-construction monitoring period for the photo-identification work. In total, two individuals sighted twice were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). Both re-sightings were made in NWL.
- 3.8.2. Notably, one of the two individuals (NL202) was also sighted in WL waters during the HKLR09 monitoring surveys under the same three-month monitoring period of June-August 2020.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the two individuals identified during the present quarterly period were determined by fixed kernel method, and are shown in Appendix V.
- 3.9.2. Both identified dolphins sighted in the present quarter were utilizing NWL waters only, but have completely avoided NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as the baseline period.

#### 4. References

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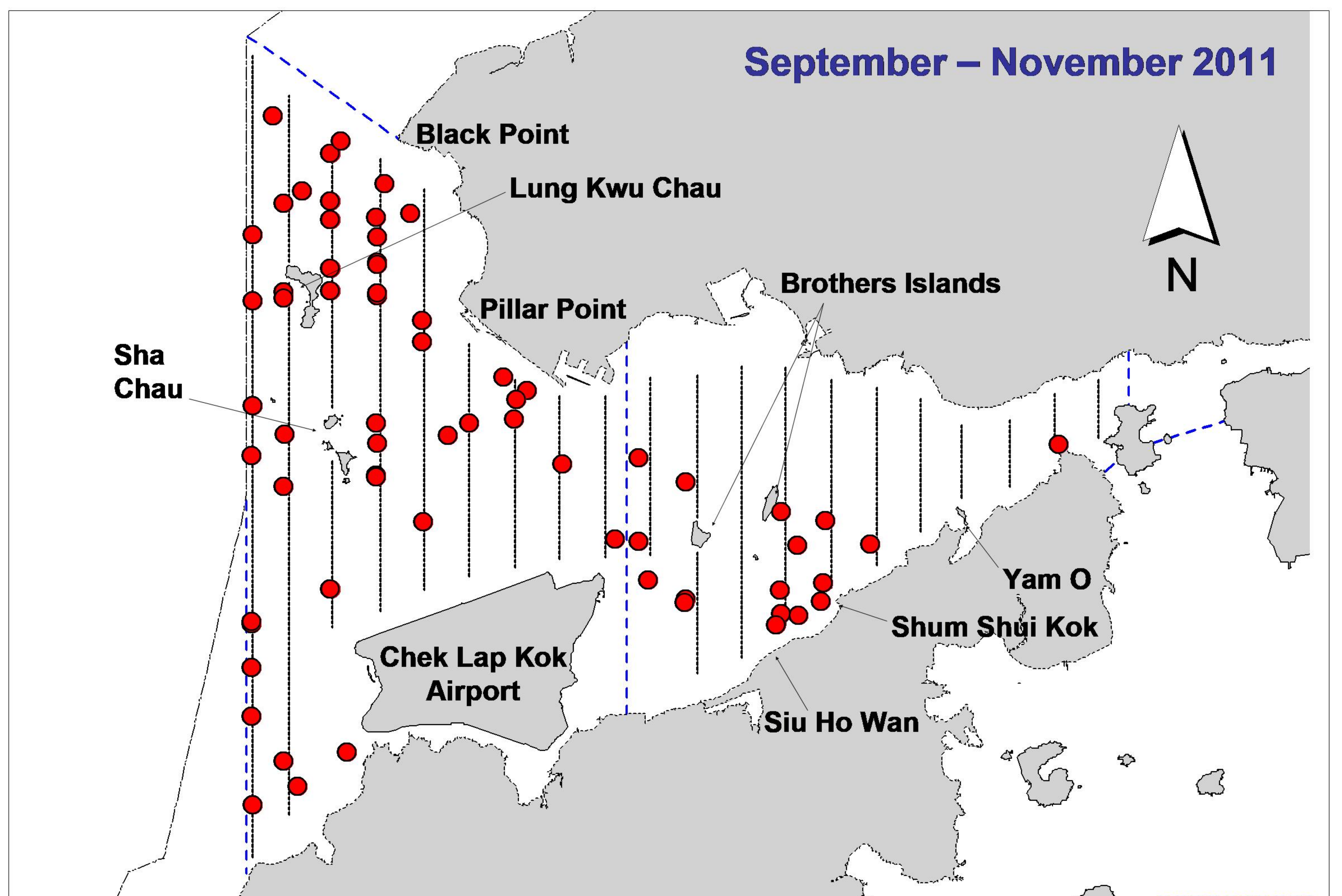
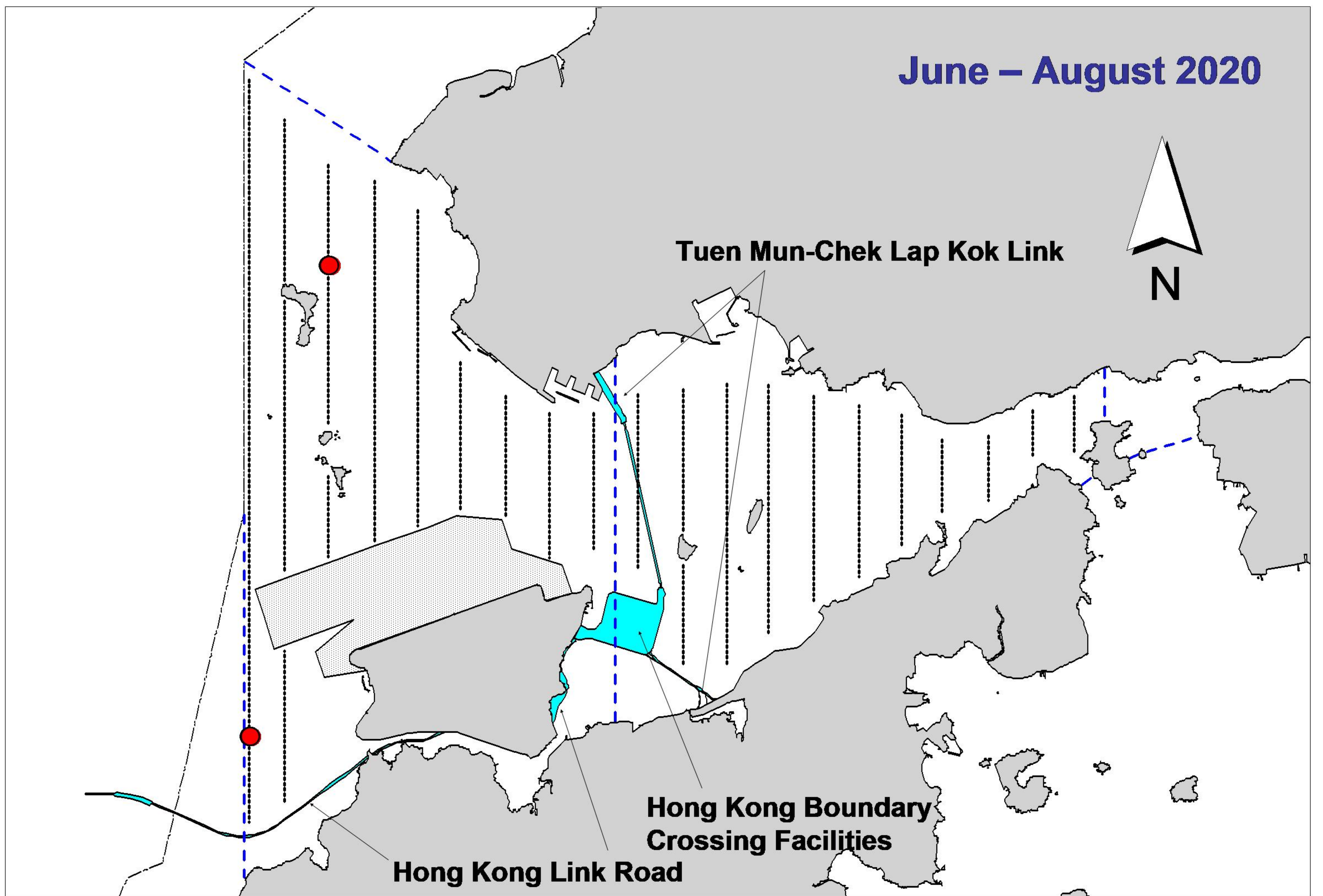


Figure 1. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the present TMCLKL08 monitoring period (top) and the baseline period in 2011 (bottom)



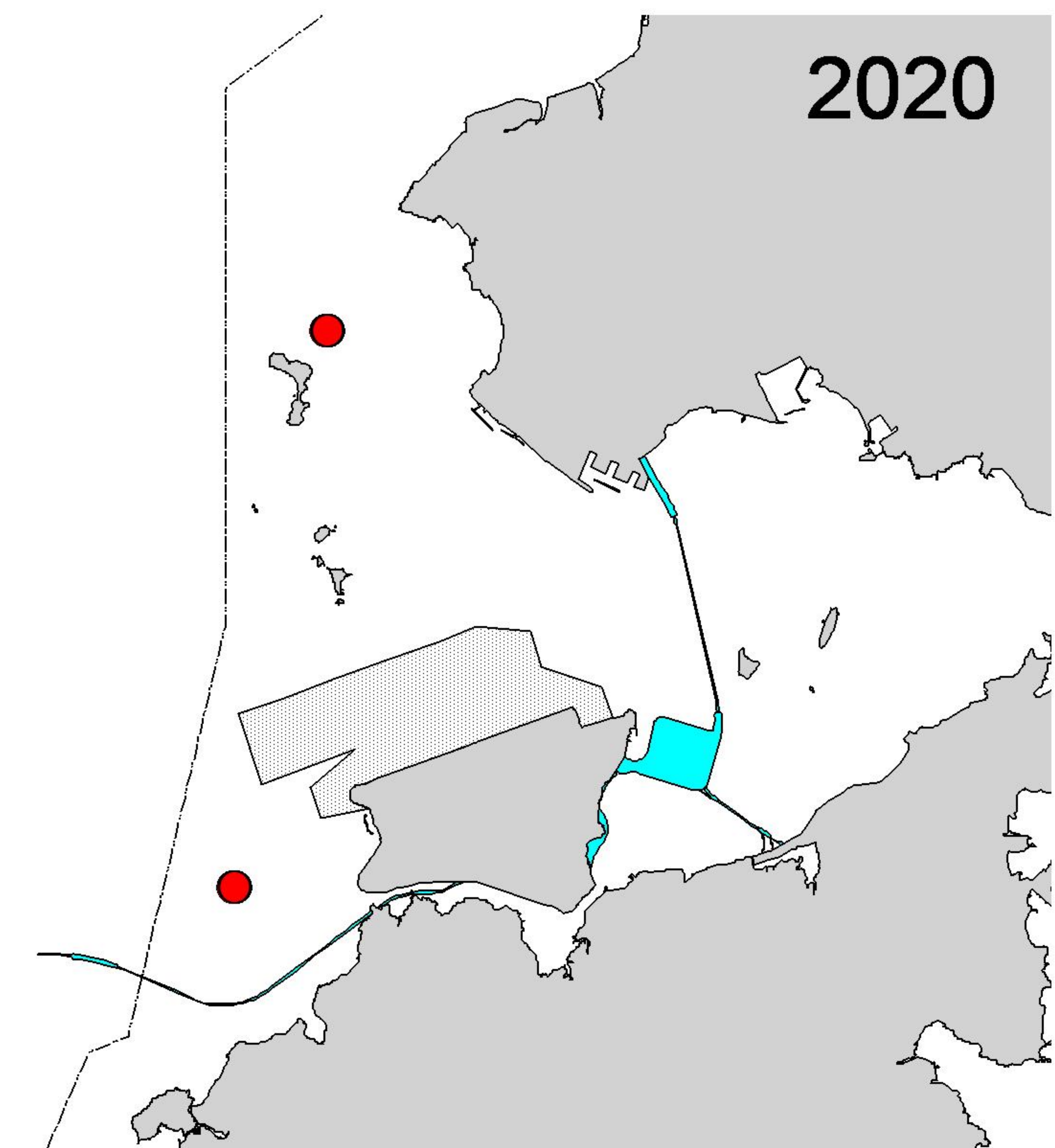
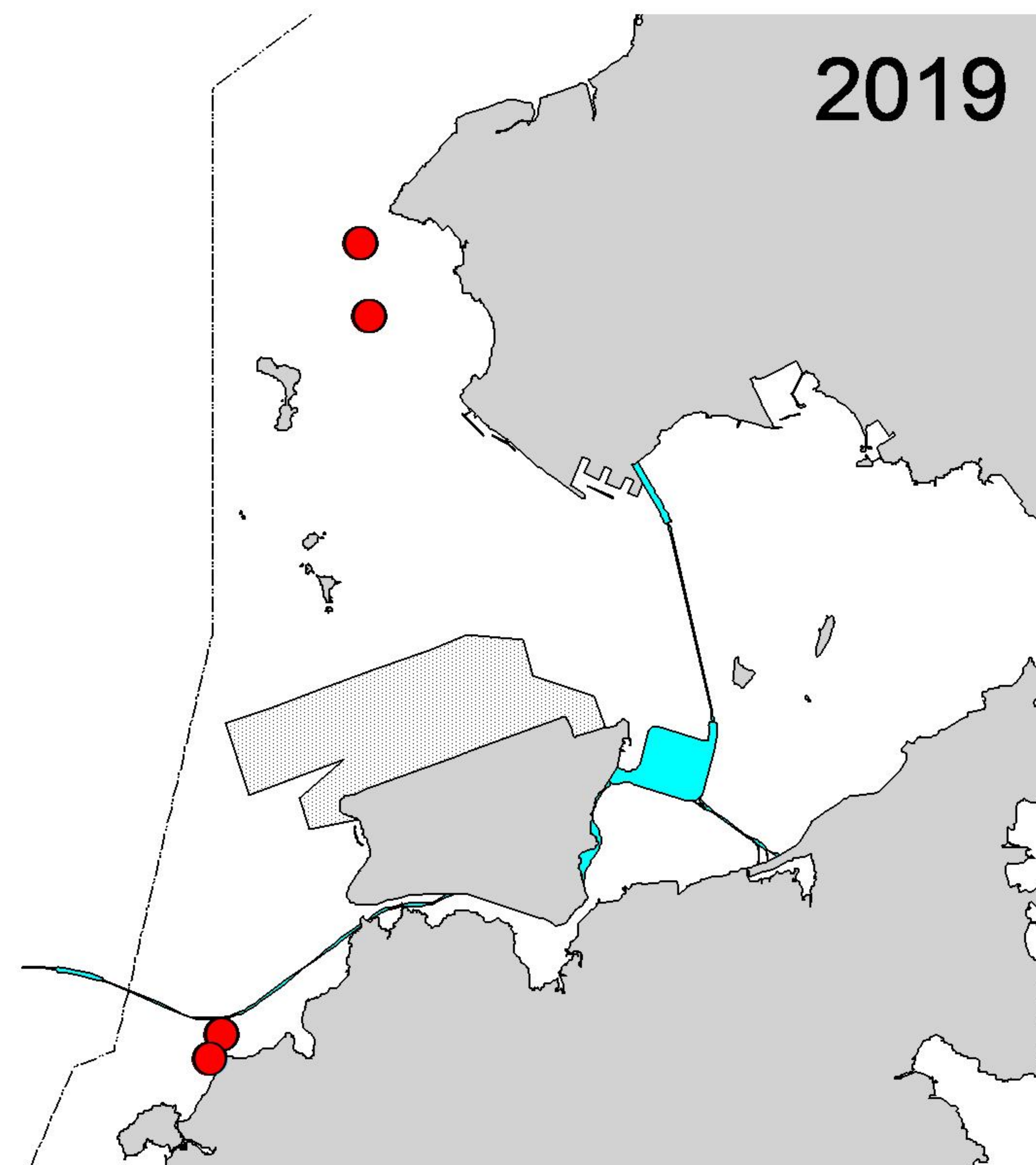
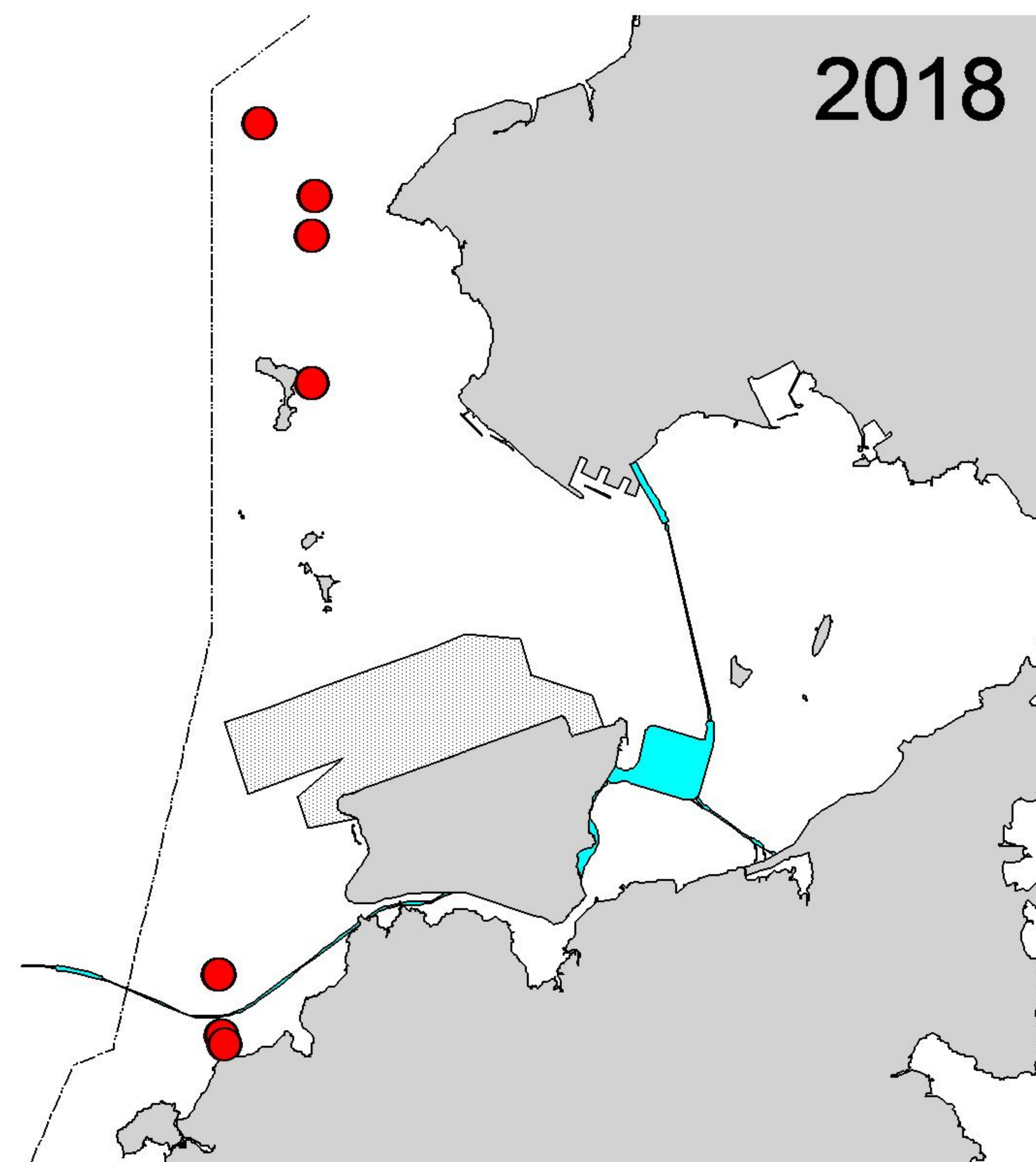
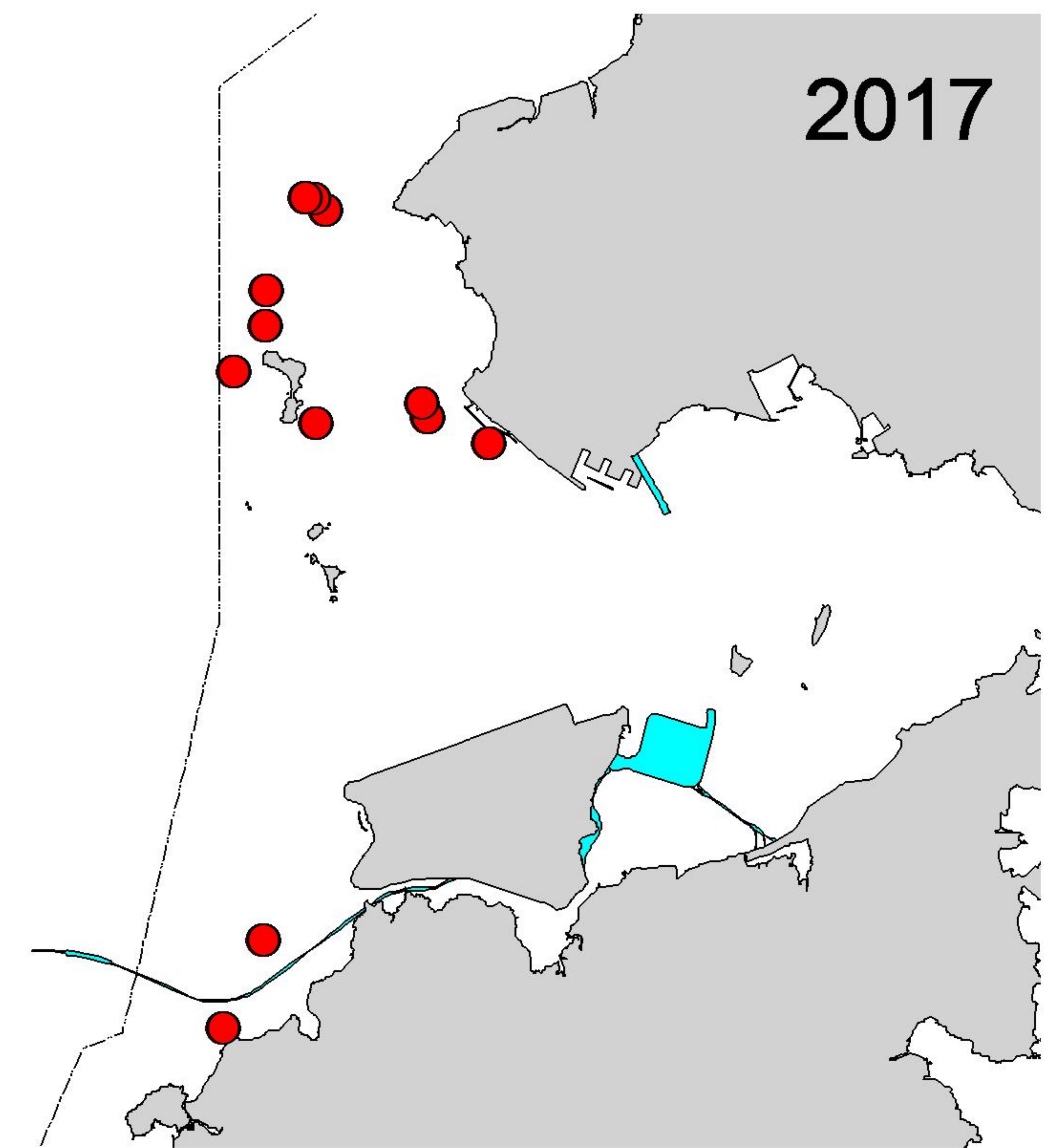
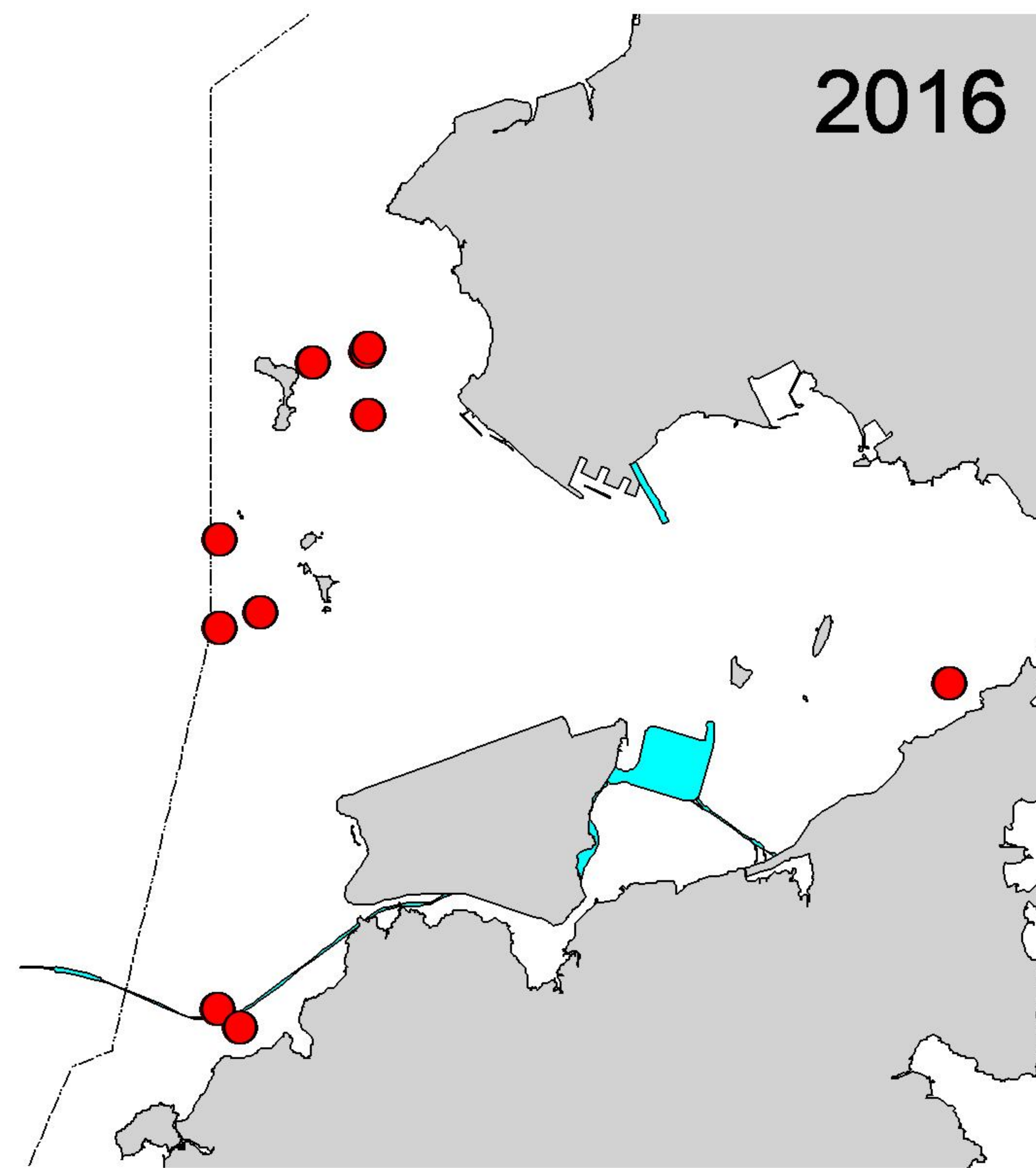
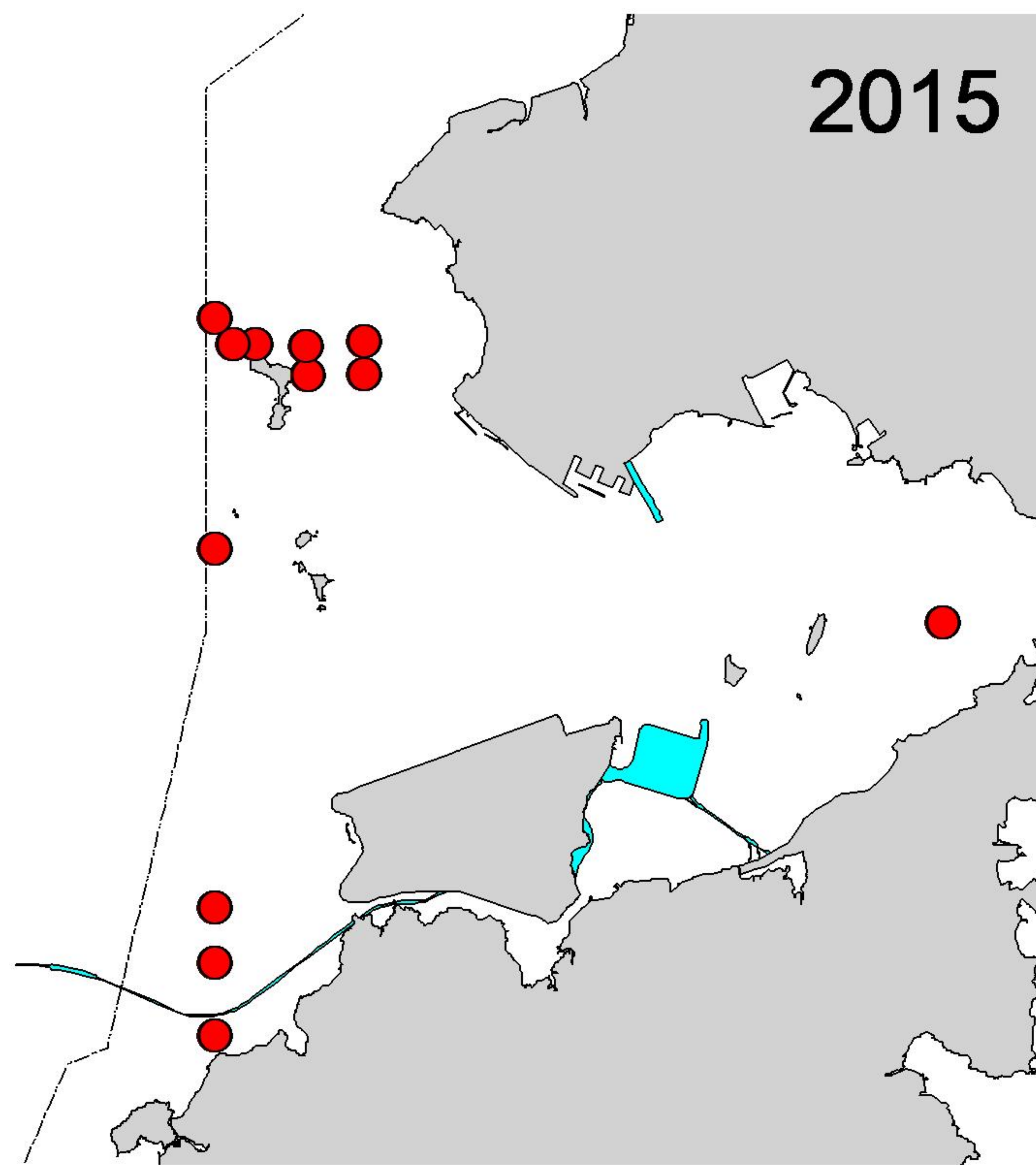


Figure 2. Distribution of Chinese White Dolphin sightings in Northwest and Northeast Lantau during the past six summer quarters (June-August) of HKLR03/TMCLKL08 monitoring period in 2015-20



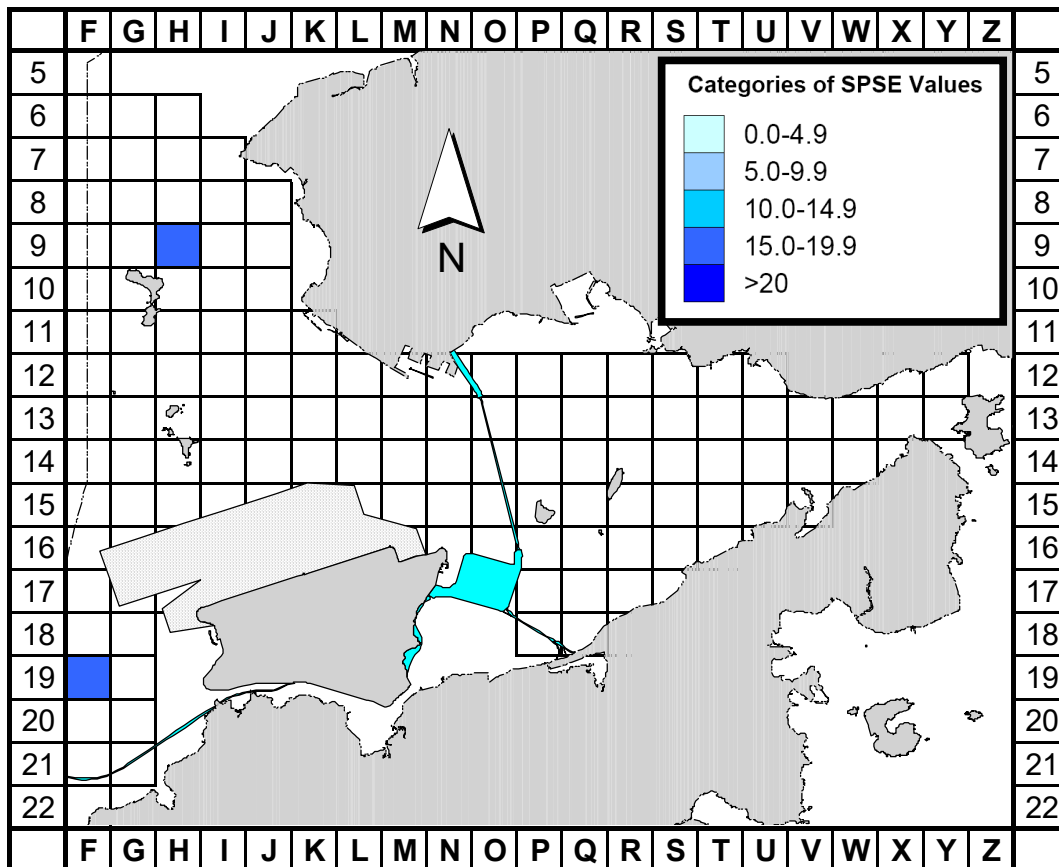


Figure 3a. Sighting density of Chinese White Dolphins with corrected survey effort per km<sup>2</sup> in Northeast and Northwest Lantau survey areas, using data collected during the TMCLKL08 monitoring period in June-August 2020 (SPSE = no. of on-effort sightings per 100 units of survey effort)

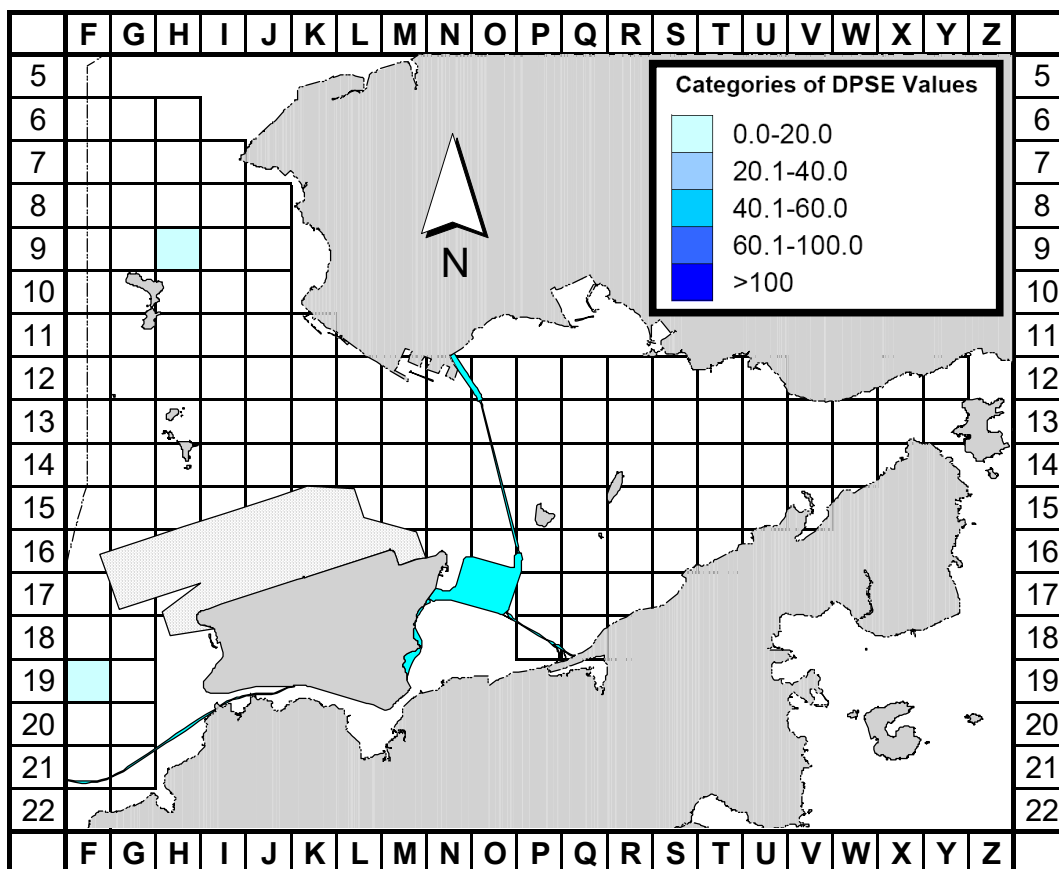


Figure 3b. Density of Chinese White Dolphins with corrected survey effort per km<sup>2</sup> in Northeast and Northwest Lantau survey areas, using data collected during the TMCLKL08 monitoring period in June-August 2020 (DPSE = no. of dolphins per 100 units of survey effort)

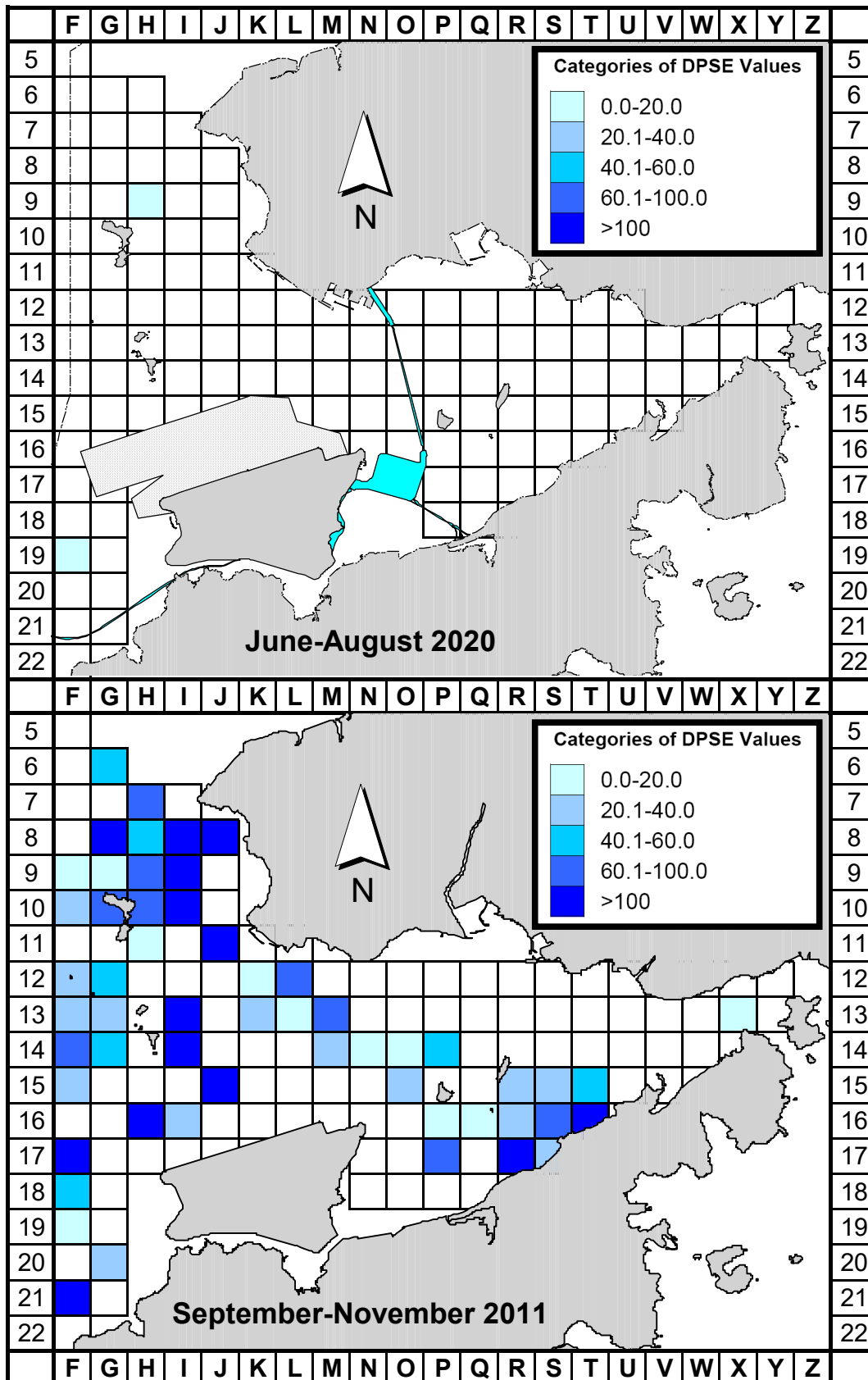


Figure 4. Comparison of density of Chinese White Dolphins with corrected survey effort per km<sup>2</sup> in Northwest and Northeast Lantau survey areas between the present TMCLKL08 monitoring period (June-August 2020) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

## Appendix I. TMCLKL08 Survey Effort Database (June-August 2020)

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

| DATE      | AREA      | BEAU | EFFORT | SEASON | VESSEL        | TYPE   | P/S |
|-----------|-----------|------|--------|--------|---------------|--------|-----|
| 4-Jun-20  | NW LANTAU | 2    | 8.70   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Jun-20  | NW LANTAU | 3    | 17.62  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Jun-20  | NW LANTAU | 2    | 3.50   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Jun-20  | NW LANTAU | 3    | 9.58   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Jun-20  | NE LANTAU | 2    | 25.33  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Jun-20  | NE LANTAU | 3    | 8.60   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Jun-20  | NE LANTAU | 2    | 11.57  | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Jun-20  | NE LANTAU | 3    | 1.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 9-Jun-20  | NW LANTAU | 2    | 27.60  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 9-Jun-20  | NW LANTAU | ] ]  | 5.50   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 9-Jun-20  | NW LANTAU | 2    | 9.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 9-Jun-20  | NW LANTAU | 3    | 2.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 11-Jun-20 | NW LANTAU | 2    | 20.23  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 11-Jun-20 | NW LANTAU | 3    | 5.70   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 11-Jun-20 | NW LANTAU | 2    | 9.87   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 11-Jun-20 | NE LANTAU | 2    | 27.09  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 11-Jun-20 | NE LANTAU | 3    | 8.40   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 11-Jun-20 | NE LANTAU | 2    | 8.71   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 11-Jun-20 | NE LANTAU | 3    | 2.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 16-Jun-20 | NW LANTAU | 2    | 23.10  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 16-Jun-20 | NW LANTAU | 3    | 12.79  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 16-Jun-20 | NW LANTAU | 2    | 10.11  | SUMMER | STANDARD36826 | TMCLKL | S   |
| 16-Jun-20 | NW LANTAU | 3    | 0.50   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 2-Jul-20  | NW LANTAU | 2    | 13.11  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 2-Jul-20  | NW LANTAU | 3    | 15.06  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 2-Jul-20  | NW LANTAU | 2    | 7.43   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 2-Jul-20  | NW LANTAU | 3    | 2.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 2-Jul-20  | NE LANTAU | 1    | 2.38   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 2-Jul-20  | NE LANTAU | 2    | 31.42  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 2-Jul-20  | NE LANTAU | 2    | 11.80  | SUMMER | STANDARD36826 | TMCLKL | S   |
| 7-Jul-20  | NW LANTAU | 2    | 21.74  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 7-Jul-20  | NW LANTAU | 3    | 9.90   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 7-Jul-20  | NW LANTAU | 2    | 2.01   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 7-Jul-20  | NW LANTAU | 3    | 6.60   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 9-Jul-20  | NW LANTAU | 3    | 24.11  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 9-Jul-20  | NW LANTAU | 4    | 4.60   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 9-Jul-20  | NW LANTAU | 3    | 10.69  | SUMMER | STANDARD36826 | TMCLKL | S   |
| 9-Jul-20  | NE LANTAU | 2    | 26.80  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 9-Jul-20  | NE LANTAU | 3    | 8.75   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 9-Jul-20  | NE LANTAU | 2    | 11.35  | SUMMER | STANDARD36826 | TMCLKL | S   |
| 9-Jul-20  | NE LANTAU | 3    | 1.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 20-Jul-20 | NW LANTAU | 2    | 23.18  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 20-Jul-20 | NW LANTAU | 3    | 8.71   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 20-Jul-20 | NW LANTAU | 2    | 11.11  | SUMMER | STANDARD36826 | TMCLKL | S   |
| 20-Jul-20 | NW LANTAU | 3    | 1.00   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Aug-20  | NW LANTAU | 1    | 20.77  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Aug-20  | NW LANTAU | 2    | 7.90   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Aug-20  | NW LANTAU | 1    | 7.33   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Aug-20  | NW LANTAU | 2    | 3.50   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Aug-20  | NE LANTAU | 2    | 18.34  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 4-Aug-20  | NE LANTAU | 3    | 16.56  | SUMMER | STANDARD36826 | TMCLKL | P   |

## Appendix I. (cont'd)

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

| DATE      | AREA      | BEAU | EFFORT | SEASON | VESSEL        | TYPE   | P/S |
|-----------|-----------|------|--------|--------|---------------|--------|-----|
| 4-Aug-20  | NE LANTAU | 2    | 8.60   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 4-Aug-20  | NE LANTAU | 3    | 4.60   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 14-Aug-20 | NW LANTAU | 1    | 7.35   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 14-Aug-20 | NW LANTAU | 2    | 23.38  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 14-Aug-20 | NW LANTAU | 3    | 1.15   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 14-Aug-20 | NW LANTAU | 2    | 6.42   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 14-Aug-20 | NW LANTAU | 3    | 2.40   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 18-Aug-20 | NW LANTAU | 1    | 3.24   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 18-Aug-20 | NW LANTAU | 2    | 21.53  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 18-Aug-20 | NW LANTAU | 3    | 3.40   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 18-Aug-20 | NW LANTAU | 1    | 4.16   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 18-Aug-20 | NW LANTAU | 2    | 3.67   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 18-Aug-20 | NW LANTAU | 3    | 2.40   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 18-Aug-20 | NE LANTAU | 1    | 10.37  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 18-Aug-20 | NE LANTAU | 2    | 5.19   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 18-Aug-20 | NE LANTAU | 1    | 3.03   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 18-Aug-20 | NE LANTAU | 2    | 1.71   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 21-Aug-20 | NW LANTAU | 1    | 2.56   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 21-Aug-20 | NW LANTAU | 2    | 30.10  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 21-Aug-20 | NW LANTAU | 1    | 2.80   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 21-Aug-20 | NW LANTAU | 2    | 7.90   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 21-Aug-20 | NE LANTAU | 1    | 9.62   | SUMMER | STANDARD36826 | TMCLKL | P   |
| 21-Aug-20 | NE LANTAU | 2    | 10.89  | SUMMER | STANDARD36826 | TMCLKL | P   |
| 21-Aug-20 | NE LANTAU | 1    | 1.10   | SUMMER | STANDARD36826 | TMCLKL | S   |
| 21-Aug-20 | NE LANTAU | 2    | 6.49   | SUMMER | STANDARD36826 | TMCLKL | S   |

**Appendix II. TMCLKL08 Chinese White Dolphin Sighting Database (June-August 2020)**

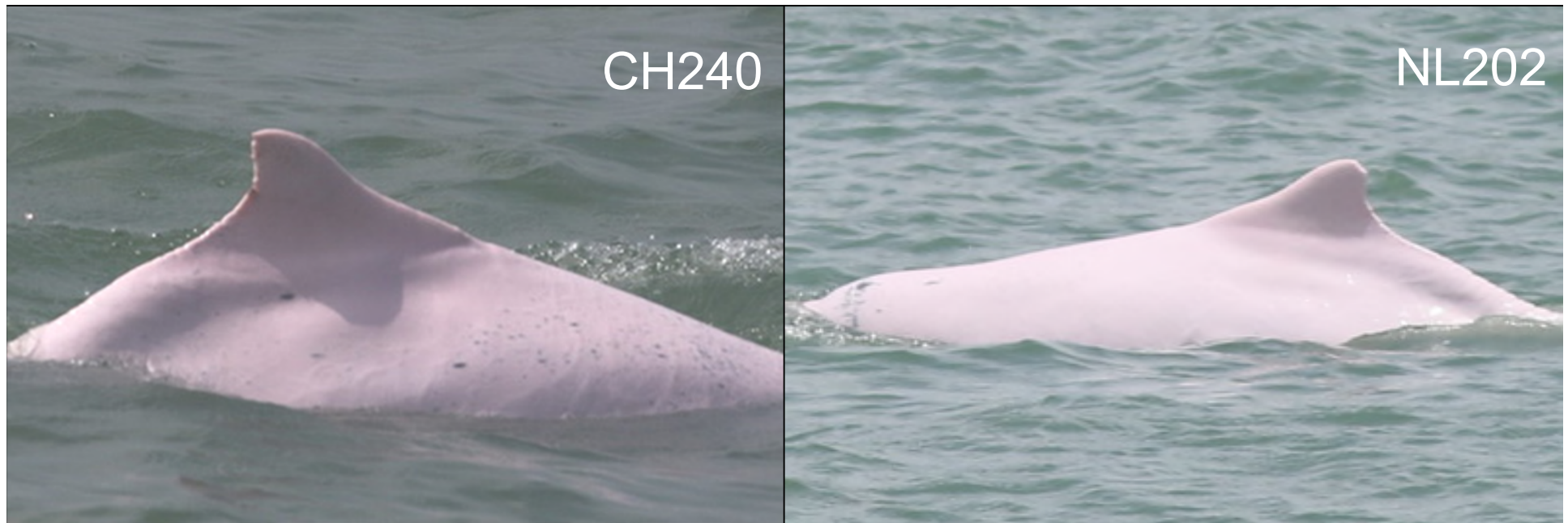
(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

| DATE      | STG # | TIME | HRD SZ | AREA      | BEAU | PSD | EFFORT | TYPE   | NORTHING | EASTING | SEASON | BOAT ASSOC. | P/S |
|-----------|-------|------|--------|-----------|------|-----|--------|--------|----------|---------|--------|-------------|-----|
| 20-Jul-20 | 1     | 1201 | 1      | NW LANTAU | 2    | 208 | ON     | TMCLKL | 827414   | 806478  | SUMMER | NONE        | P   |
| 21-Aug-20 | 1     | 1022 | 1      | NW LANTAU | 1    | 337 | ON     | TMCLKL | 817308   | 804686  | SUMMER | NONE        | P   |

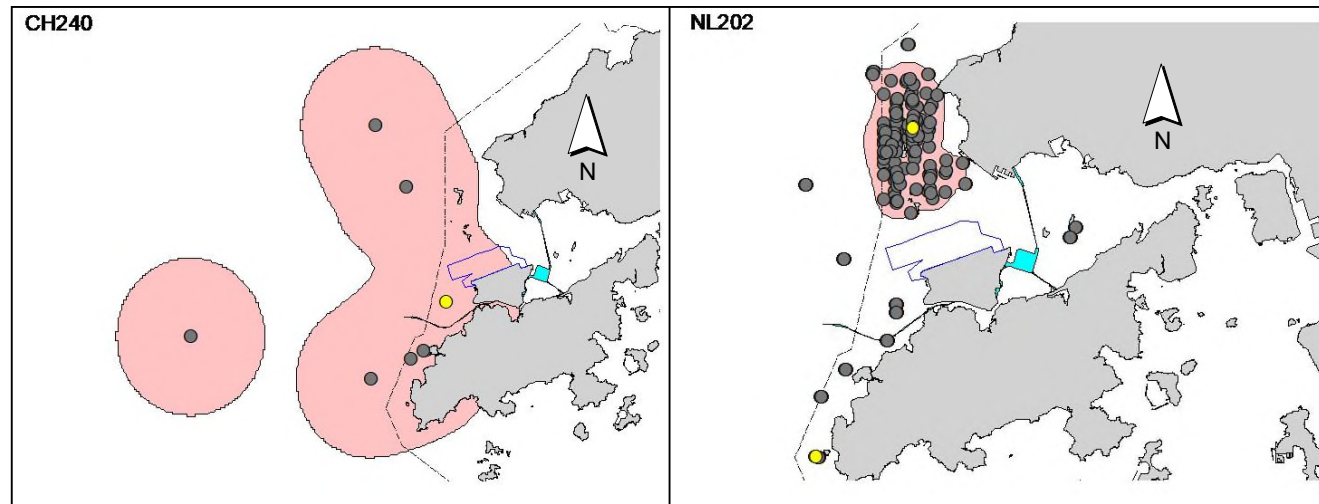
**Appendix III. Individual dolphins identified during TMCLKL08 monitoring surveys in June-August 2020**

| <b>ID#</b> | <b>DATE</b> | <b>STG#</b> | <b>AREA</b> |
|------------|-------------|-------------|-------------|
| CH240      | 21/08/20    | 1           | NW LANTAU   |
| NL202      | 20/07/20    | 1           | NW LANTAU   |

Appendix IV. Two individual dolphins that were identified between June-August 2020 during the TMCLKL08 monitoring surveys



Appendix V. Ranging patterns (95% kernel ranges) of two individual dolphins that were sighted during the present TMCLKL08 monitoring period  
(note: yellow dots indicate sightings made in June-August 2020 during TMCLKL08 monitoring surveys)





Appendix I

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

|                               | <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 Post Construction 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</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</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> </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</li> </ol>                                  |

| EVENT | ACTION   |  |  |  |
|-------|--|--|--|--|
|       | ET   | IEC  | SOR  | Contractor   |
|       | <p>seasonal differences;</p> <p>3. Identify source(s) of impact;</p> <p>4. Inform the IEC, SOR and Contractor of findings;</p> <p>5. Check monitoring data;</p> <p>6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.</p> <p>7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.</p> | <p>discuss with ET, SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.</p> <p>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.</p> <p>5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly.</p> | <p>2. If SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, SOR to signify the agreement in writing on such proposals and any other mitigation measures.</p> <p>3. Supervise the implementation of additional monitoring and/or any other mitigation measures.</p> | <p>monitoring and any other potential mitigation measures.</p> <p>3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary.</p> <p>4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.</p> |

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

Appendix J

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

**Table J1** *Cumulative Statistics on Exceedances*

| <b>Monitoring Parameters</b> | <b>Action/Limit Level</b> | <b>Total No. recorded in this reporting quarter</b> | <b>Total No. recorded since Contract commencement</b> |
|------------------------------|---------------------------|---|---|
| 1-Hr TSP                     | Action                    | 2   | 111   |
|                              | Limit                     | 0   | 13  |
| 24-Hr TSP                    | Action                    | 0   | 10  |
|                              | Limit                     | 0   | 4   |
| Water Quality                | Action                    | 0   | 167   |
|                              | Limit                     | 0   | 19  |
| Impact Dolphin Monitoring    | Action                    | 0   | 11  |
|                              | Limit                     | 1   | 20  |

**Table J2** *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 Period (June 2020 to August 2020) | 0                            | 0                               | 0                              |
| Total No. received since Contract commencement   | 17                           | 1                               | 0                              |

Email  
message

**Environmental  
Resources  
Management**

**To** Ramboll Hong Kong, Limited (ENPO)

**From** ERM- Hong Kong, Limited

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

**Subject** Notification of Exceedance for Air Quality  
Impact Monitoring

**Date** 26 June 2020

2507, 25/F One Harbourfront  
18 Tak Fung Street  
Hunghom, Kowloon  
Hong Kong  
Telephone: (852) 2271 3000  
Facsimile: (852) 2723 5660



**ERM**

---

Dear Sir or Madam,

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

0212330\_13June2020\_1hrTSP\_Station ASR6

One Action Level Exceedance was recorded on 13 June 2020.

Regards,



Dr Jasmine Ng  
Environmental Team Leader

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

Air Quality Impact Monitoring  
 Notification of Exceedance

|   |   |  |
|---|---|--|
| Log No.   | <u>Action Level Exceedance</u><br>0212330_13June2020_1hrTSP_Station ASR6  |  |
|   | [Total No. of Exceedances = 1]  |  |
| Date  | 13 June 2020 (Measured)<br>22 June 2020 (Laboratory results received by ERM)  |  |
| Monitoring Station                                      | ASR6  |  |
| Parameter(s) with Exceedance(s)                         | 1-hr TSP  |  |
| Action Levels   | 24-hr TSP ( $\mu\text{g}/\text{m}^3$ )  | ASR1 = 213<br>ASR5 = 238<br>AQMS1 = 213<br>ASR6 = 238<br>ASR10 = 214 |
|   | 1-hr TSP ( $\mu\text{g}/\text{m}^3$ )   | ASR1 = 331<br>ASR5 = 340<br>AQMS1 = 335<br>ASR6 = 338<br>ASR10 = 337 |
| Limit Levels  | 1-hr TSP ( $\mu\text{g}/\text{m}^3$ )   | 500  |
|   | 24-hr TSP ( $\mu\text{g}/\text{m}^3$ )  | 260  |
| Measured Levels   | Action Level Exceedance for 1-hr TSP is observed at ASR6 ( $357 \mu\text{g}/\text{m}^3$ ) during 1030 – 1130.   |  |
| Works Undertaken (at the time of monitoring event)      | On 13 June 2020, Carpark Formation works were carried out on site (refer to <i>Figure 2</i> ).  |  |
| Possible Reason for Action or Limit Level Exceedance(s) | <p>The exceedance is unlikely to be due to this Contract, in view of the following:</p> <ul style="list-style-type: none"> <li>• According to the construction information provided by the Contractor, only Carpark formation works were carried out on site on 13 June 2020.</li> <li>• With reference to the recorded wind direction (ranged between <math>32^\circ</math> and <math>95^\circ</math>), blowing from a north-easterly/easterly direction) and wind speed (ranged between 0.9 and 1.8 m/s) during the works period. Station ASR6 is located upstream to the construction works. Carpark Formation works were carried out with the implementation of dust mitigation measures.</li> <li>• Dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Contract site and associated works areas (refer to <i>Watering Record</i>).</li> </ul> <p>Based on the above, the exceedance is unlikely to be due to this Contract.</p> |  |

|                                   |   |
|-----------------------------------|---|
| <b>Actions Taken/ To Be Taken</b> | The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period. |
| <b>Remarks</b>                    | The monitoring results, wind data and the locations of air quality monitoring stations are attached.  |

| Air quality monitoring results on 13/6/2020 |            |            |         |         |            |             |         |       |
|---|------------|------------|---------|---------|------------|-------------|---------|-------|
| Project                                     | Contract   | Date       | Station | Weather | Start time | Parameters  | Results | Unit  |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR10   | Sunny   | 8:15:00    | 1-hour TSP  | 46      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR10   | Sunny   | 9:17:00    | 1-hour TSP  | 33      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR10   | Sunny   | 10:19:00   | 1-hour TSP  | 40      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR6    | Sunny   | 8:26:00    | 1-hour TSP  | 101     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR6    | Sunny   | 9:28:00    | 1-hour TSP  | 52      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR6    | Sunny   | 10:30:00   | 1-hour TSP  | 357     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR5    | Sunny   | 8:38:00    | 1-hour TSP  | 195     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR5    | Sunny   | 9:40:00    | 1-hour TSP  | 66      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR5    | Sunny   | 10:42:00   | 1-hour TSP  | 135     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR1    | Sunny   | 8:50:00    | 1-hour TSP  | 102     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR1    | Sunny   | 9:52:00    | 1-hour TSP  | 56      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR1    | Sunny   | 10:54:00   | 1-hour TSP  | 44      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | AQMS1   | Sunny   | 9:01:00    | 1-hour TSP  | 69      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | AQMS1   | Sunny   | 10:03:00   | 1-hour TSP  | 40      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | AQMS1   | Sunny   | 11:05:00   | 1-hour TSP  | 51      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR10   | Sunny   | 11:21:00   | 24-hour TSP | 20      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR6    | Sunny   | 11:32:00   | 24-hour TSP | 27      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR5    | Sunny   | 11:44:00   | 24-hour TSP | 40      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | ASR1    | Sunny   | 11:56:00   | 24-hour TSP | 33      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-06-13 | AQMS1   | Sunny   | 12:07:00   | 24-hour TSP | 27      | ug/m3 |

Action level exceedance

Limit level exceedance

**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> |
|------------------------|---------------------|------------------------------------|--|
| 20/06/13               | 0:00                | 0.9                                | 57                                       |
| 20/06/13               | 1:00                | 0                                  | 64                                       |
| 20/06/13               | 2:00                | 0                                  | 79                                       |
| 20/06/13               | 3:00                | 0                                  | 311                                      |
| 20/06/13               | 4:00                | 0.9                                | 355                                      |
| 20/06/13               | 5:00                | 0                                  | 271                                      |
| 20/06/13               | 6:00                | 0                                  | 303                                      |
| 20/06/13               | 7:00                | 0                                  | 145                                      |
| 20/06/13               | 8:00                | 0.9                                | 132                                      |
| 20/06/13               | 9:00                | 0.9                                | 138                                      |
| 20/06/13               | 10:00               | 1.8                                | 32                                       |
| 20/06/13               | 11:00               | 0.9                                | 95                                       |
| 20/06/13               | 12:00               | 0.4                                | 3  |
| 20/06/13               | 13:00               | 0.9                                | 159                                      |
| 20/06/13               | 14:00               | 0.9                                | 125                                      |
| 20/06/13               | 15:00               | 1.3                                | 118                                      |
| 20/06/13               | 16:00               | 2.2                                | 101                                      |
| 20/06/13               | 17:00               | 2.7                                | 63                                       |
| 20/06/13               | 18:00               | 2.2                                | 45                                       |
| 20/06/13               | 19:00               | 2.2                                | 19                                       |
| 20/06/13               | 20:00               | 2.2                                | 12                                       |
| 20/06/13               | 21:00               | 1.8                                | 50                                       |
| 20/06/13               | 22:00               | 1.8                                | 41                                       |
| 20/06/13               | 23:00               | 2.2                                | 54                                       |

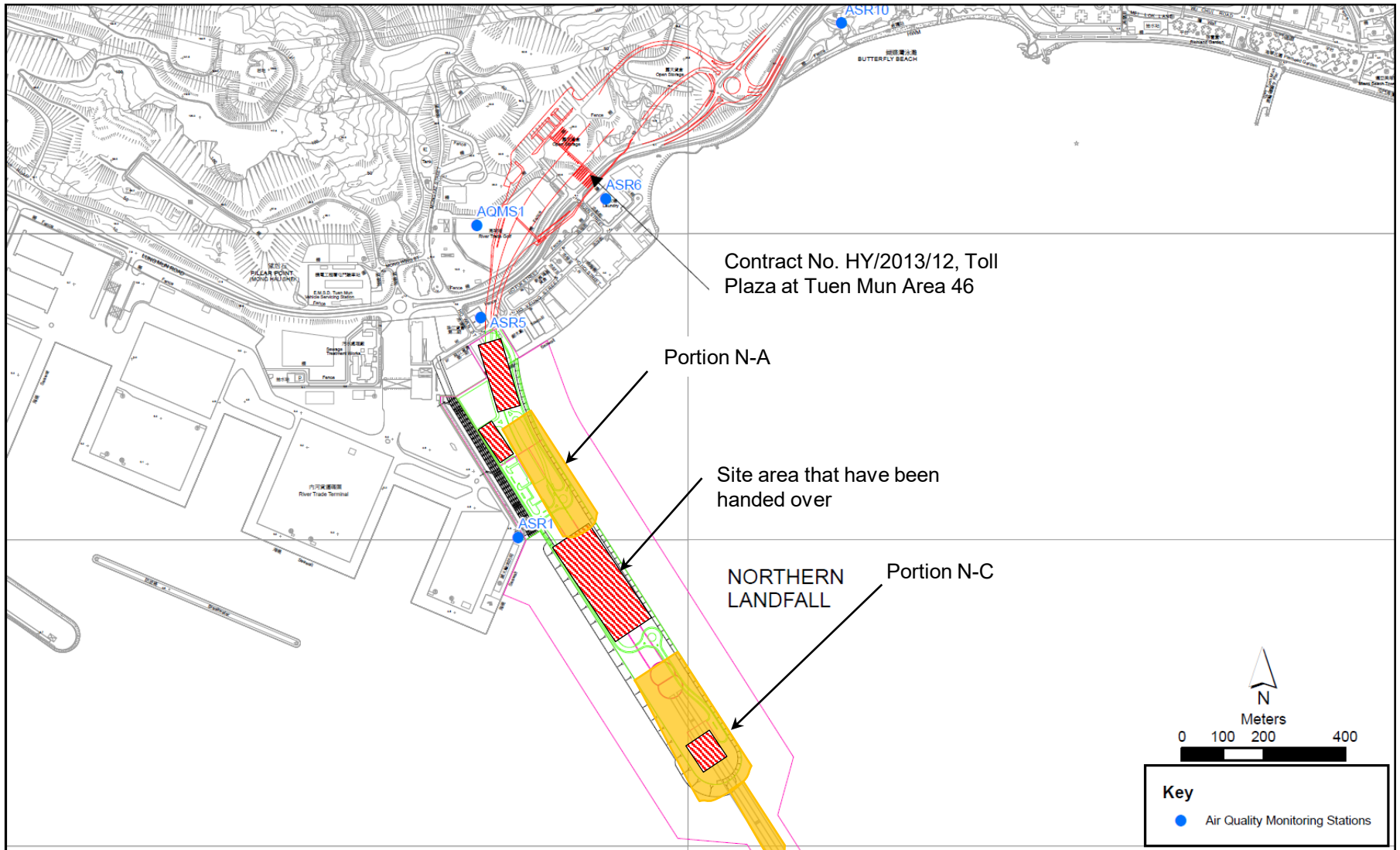


Figure 1

Locations of air quality monitoring stations

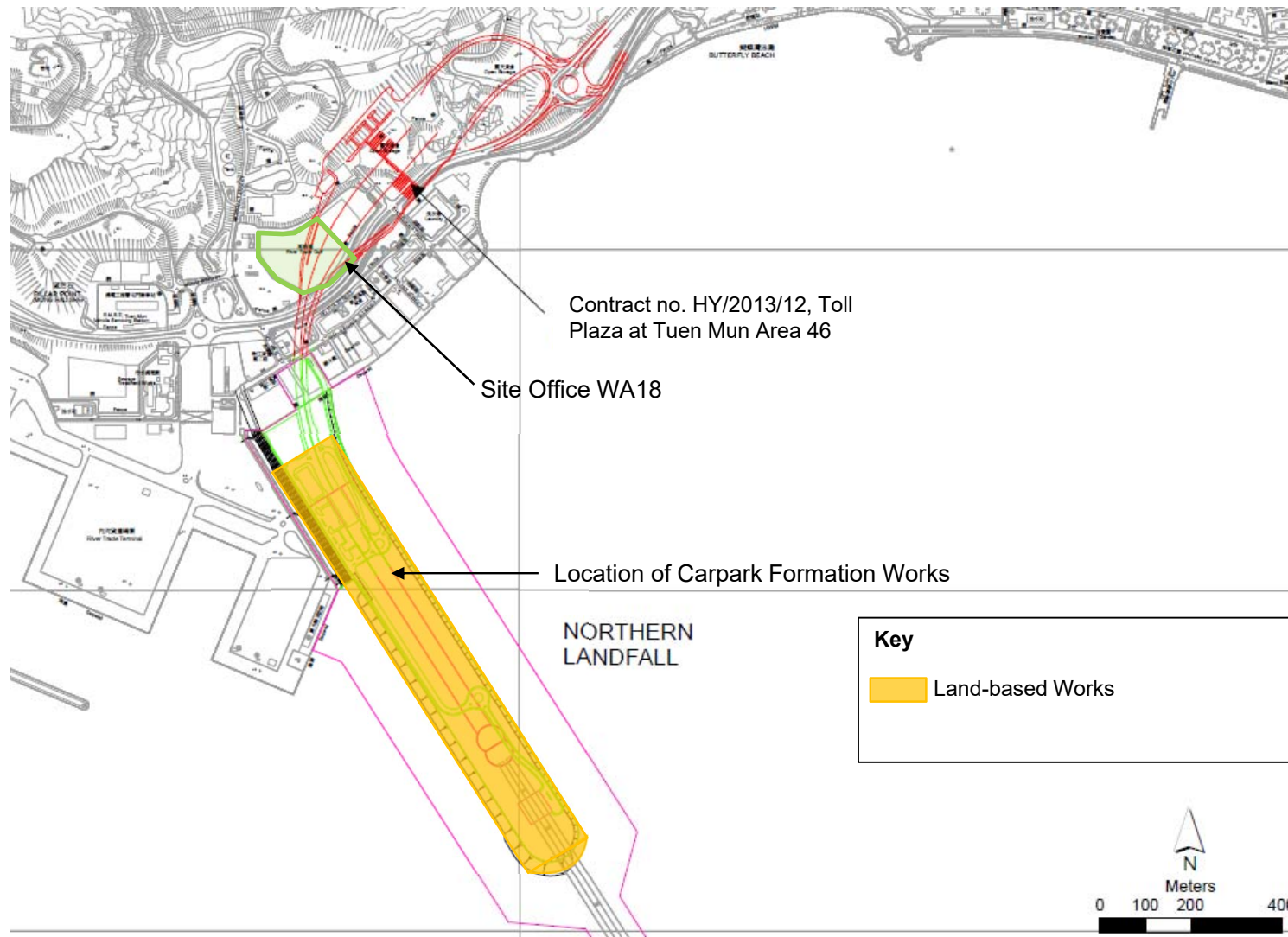


Figure 2

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

Environmental  
 Resources  
 Management



**Site Location** 地盤位置: Northern Landfall  
**Date** 日期: 8 Jun 2020 to 至 14 Jun 2020

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

**Night shift 夜間工作 (if necessary 如需要)**

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

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

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

**Remarks:**

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

**備註:**

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

Email  
message

**Environmental  
Resources  
Management**

**To** Ramboll Hong Kong, Limited (ENPO)

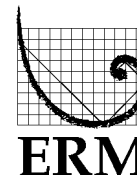
**From** ERM- Hong Kong, Limited

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

**Subject** Notification of Exceedance for Air Quality  
Impact Monitoring

**Date** 19 August 2020

2507, 25/F One Harbourfront  
18 Tak Fung Street  
Hung Hom, Kowloon  
Hong Kong  
Telephone: (852) 2271 3000  
Facsimile: (852) 2723 5660



---

Dear Sir or Madam,

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

**0212330\_12August2020\_1hrTSP\_Station ASR1**

One Action Level Exceedance was recorded on 12 August 2020.

Regards,



Dr Jasmine Ng  
Environmental Team Leader

---

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ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring  
 Notification of Exceedance

|   |  |  |
|---|--|--|
| Log No.   | <u>Action Level Exceedance</u><br>0212330_12August2020_1hrTSP_Station ASR1   |  |
|   | [Total No. of Exceedances = 1]   |  |
| Date  | 12 August 2020 (Measured)<br>19 August 2020 (Laboratory results received by ERM)   |  |
| Monitoring Station                                      | ASR1   |  |
| Parameter(s) with Exceedance(s)                         | 1-hr TSP   |  |
| Action Levels   | 24-hr TSP ( $\mu\text{g}/\text{m}^3$ )   | ASR1 = 213<br>ASR5 = 238<br>AQMS1 = 213<br>ASR6 = 238<br>ASR10 = 214 |
|   | 1-hr TSP ( $\mu\text{g}/\text{m}^3$ )  | ASR1 = 331<br>ASR5 = 340<br>AQMS1 = 335<br>ASR6 = 338<br>ASR10 = 337 |
| Limit Levels  | 1-hr TSP ( $\mu\text{g}/\text{m}^3$ )  | 500  |
|   | 24-hr TSP ( $\mu\text{g}/\text{m}^3$ )   | 260  |
| Measured Levels   | Action Level Exceedance for 1-hr TSP is observed at ASR1 ( $352 \mu\text{g}/\text{m}^3$ ) during 0840 – 0940.  |  |
| Works Undertaken (at the time of monitoring event)      | On 12 August 2020, drainage works and excavation works were carried out at Pump Sump area (refer to <i>Annex A</i> ).  |  |
| Possible Reason for Action or Limit Level Exceedance(s) | <p>The exceedance is unlikely to be due to this Contract, in view of the following:</p> <ul style="list-style-type: none"> <li>• With reference to the recorded wind direction (ranged between <math>44^\circ</math> and <math>322^\circ</math>), blowing from a north-easterly/north-westerly direction) and wind speed (ranged between 0 and 0.9 m/s) during the works period. Although the work area is nearby the monitoring station ASR1, drainage works and excavation were carried out in small scale and dust mitigation measures were implemented during the works.</li> <li>• Dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Contract site and associated works areas (refer to <i>Annex B</i>).</li> </ul> <p>Based on the above, the exceedance is unlikely to be due to this Contract.</p> |  |
| Actions Taken / To Be Taken                             | The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.  |  |

|                |   |
|----------------|---|
| <b>Remarks</b> | The monitoring results, wind data and the locations of air quality monitoring stations are attached ( <i>Annex C</i> ). |
|----------------|---|

Annex A

## Works Location

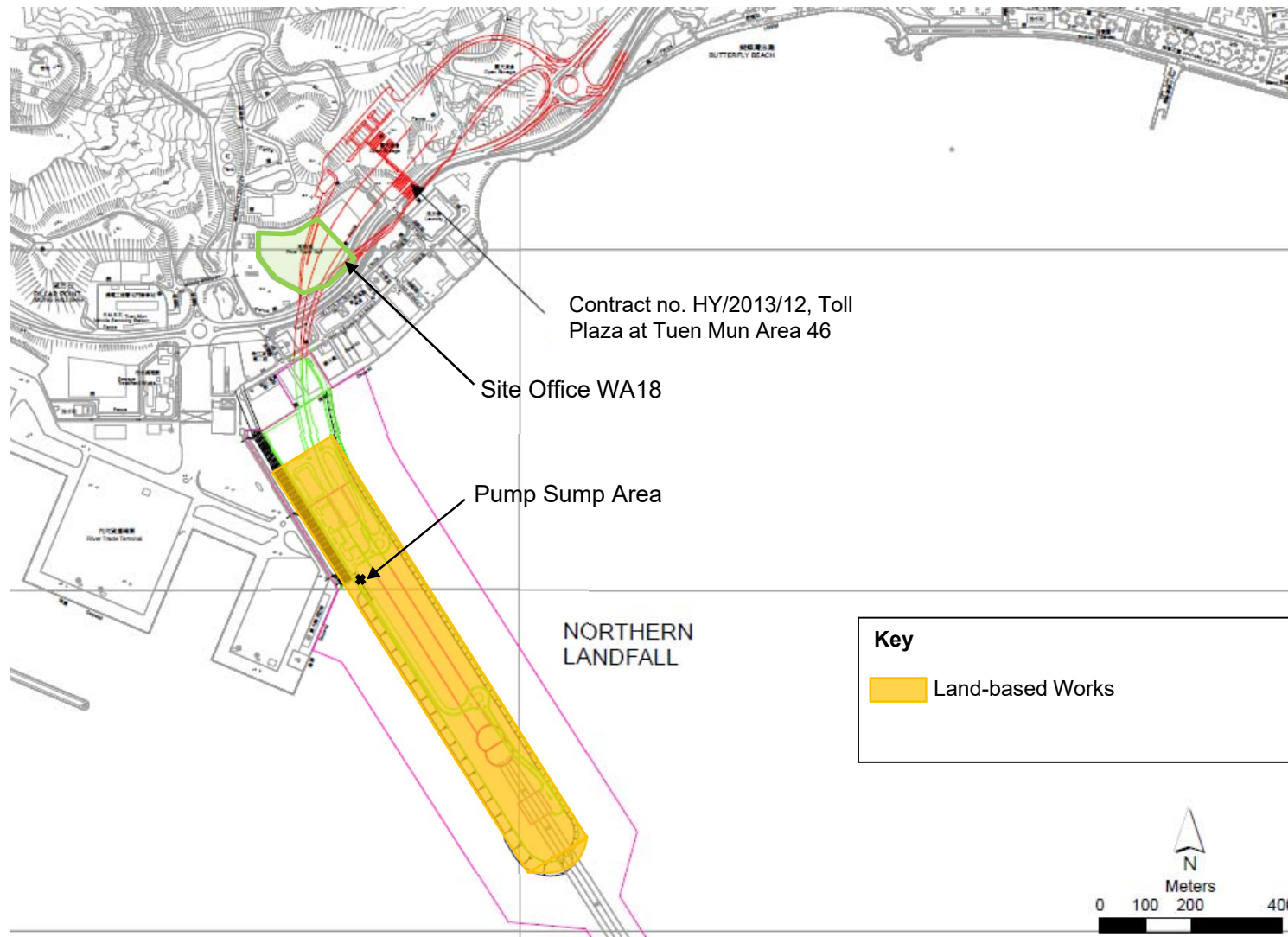




Photo 1&2 - Pump Sump Area

Annex B

## Watering Record

**Site Location 地盤位置:** Northern Landfall

**Date 日期:** 10 Aug 2020 to 至 16 Aug 2020

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

**Night shift 夜間工作 (if necessary 如需要)**

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

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

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

Remarks:

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

備註:

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

Annex C

Results of Air Quality  
Monitoring, Wind Data &  
Locations of Air Quality  
Monitoring Stations



| Air quality monitoring results on 12/8/2020 |            |            |         |         |            |             |         |       |
|---|------------|------------|---------|---------|------------|-------------|---------|-------|
| Project                                     | Contract   | Date       | Station | Weather | Start time | Parameters  | Results | Unit  |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR10   | Sunny   | 8:00:00    | 1-hour TSP  | 31      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR10   | Sunny   | 9:02:00    | 1-hour TSP  | 33      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR10   | Sunny   | 10:04:00   | 1-hour TSP  | 18      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR6    | Sunny   | 8:15:00    | 1-hour TSP  | 113     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR6    | Sunny   | 9:17:00    | 1-hour TSP  | 46      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR6    | Sunny   | 10:19:00   | 1-hour TSP  | 35      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR5    | Sunny   | 8:30:00    | 1-hour TSP  | 200     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR5    | Sunny   | 9:32:00    | 1-hour TSP  | 126     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR5    | Sunny   | 10:34:00   | 1-hour TSP  | 71      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR1    | Sunny   | 8:40:00    | 1-hour TSP  | 352     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR1    | Sunny   | 9:42:00    | 1-hour TSP  | 97      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR1    | Sunny   | 10:44:00   | 1-hour TSP  | 38      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | AQMS1   | Sunny   | 8:50:00    | 1-hour TSP  | 106     | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | AQMS1   | Sunny   | 9:52:00    | 1-hour TSP  | 37      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | AQMS1   | Sunny   | 10:54:00   | 1-hour TSP  | 57      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR10   | Sunny   | 11:06:00   | 24-hour TSP | 22      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR6    | Sunny   | 11:21:00   | 24-hour TSP | 27      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR5    | Sunny   | 11:36:00   | 24-hour TSP | 43      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | ASR1    | Sunny   | 11:46:00   | 24-hour TSP | 40      | ug/m3 |
| TMCLKL                                      | HY/2012/08 | 2020-08-12 | AQMS1   | Sunny   | 11:56:00   | 24-hour TSP | 41      | ug/m3 |

Action level exceedance

Limit level exceedance

**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> |
|------------------------|---------------------|------------------------------------|--|
| 20/08/12               | 0:00                | 2.7                                | 81                                       |
| 20/08/12               | 1:00                | 2.2                                | 90                                       |
| 20/08/12               | 2:00                | 2.7                                | 138                                      |
| 20/08/12               | 3:00                | 1.8                                | 132                                      |
| 20/08/12               | 4:00                | 0.9                                | 49                                       |
| 20/08/12               | 5:00                | 0.9                                | 65                                       |
| 20/08/12               | 6:00                | 1.8                                | 358                                      |
| 20/08/12               | 7:00                | 0                                  | 324                                      |
| 20/08/12               | 8:00                | 0                                  | 322                                      |
| 20/08/12               | 9:00                | 0.9                                | 44                                       |
| 20/08/12               | 10:00               | 0.9                                | 36                                       |
| 20/08/12               | 11:00               | 1.3                                | 65                                       |
| 20/08/12               | 12:00               | 1.8                                | 271                                      |
| 20/08/12               | 13:00               | 1.3                                | 36                                       |
| 20/08/12               | 14:00               | 2.2                                | 87                                       |
| 20/08/12               | 15:00               | 2.7                                | 95                                       |
| 20/08/12               | 16:00               | 3.1                                | 88                                       |
| 20/08/12               | 17:00               | 1.8                                | 93                                       |
| 20/08/12               | 18:00               | 2.2                                | 101                                      |
| 20/08/12               | 19:00               | 1.8                                | 101                                      |
| 20/08/12               | 20:00               | 2.2                                | 92                                       |
| 20/08/12               | 21:00               | 2.2                                | 96                                       |
| 20/08/12               | 22:00               | 1.8                                | 93                                       |
| 20/08/12               | 23:00               | 1.3                                | 100                                      |

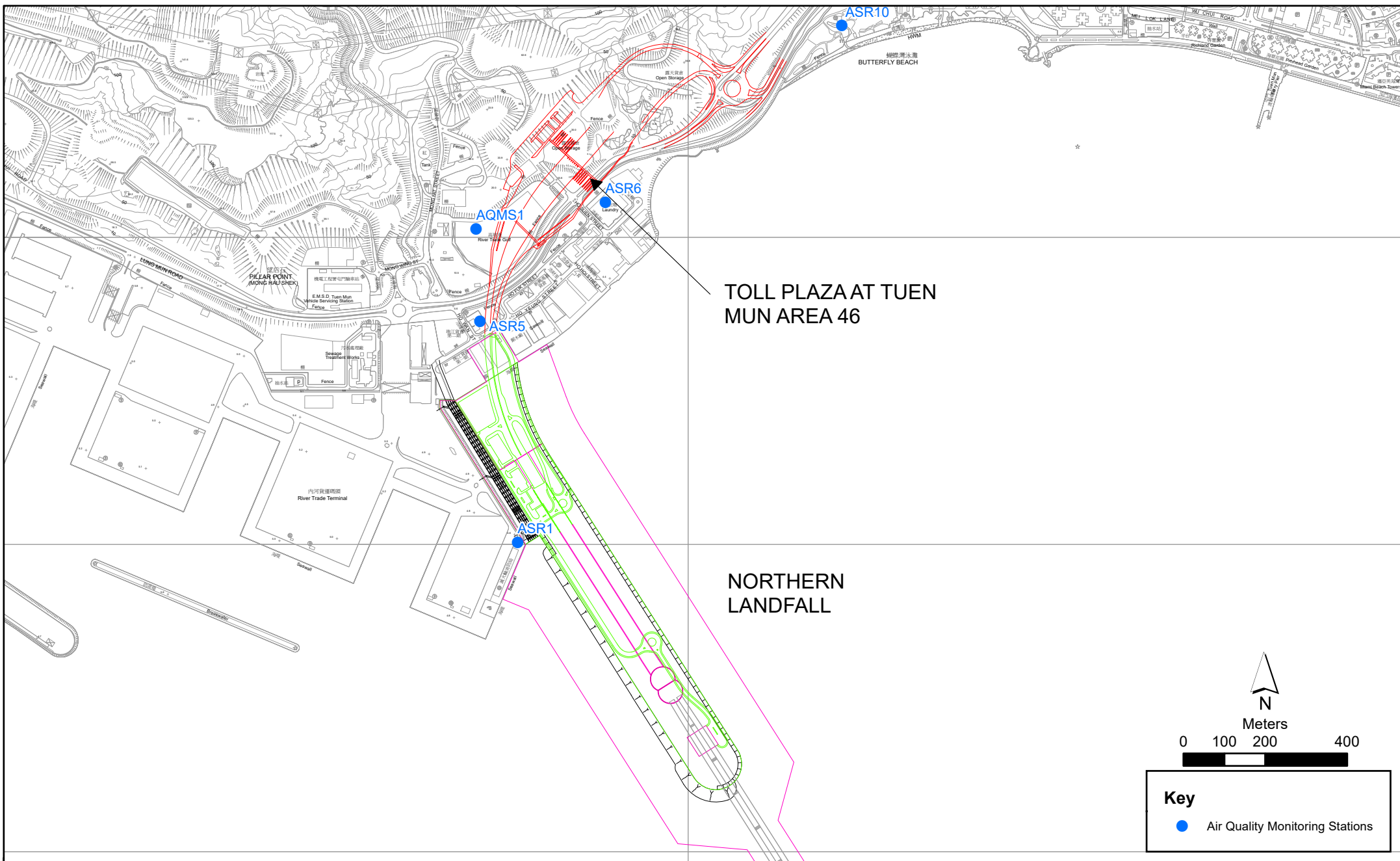


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

**Email  
message**

**Environmental  
Resources  
Management**

**To** Ramboll Hong Kong, Limited (ENPO)

**From** ERM- Hong Kong, Limited

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

**Subject** Notification of Exceedance for Impact Dolphin  
Monitoring

**Date** 21 December 2020

2507, 25/F One Harbourfront  
18 Tak Fung Street  
Hung Hom, Kowloon  
Hong Kong  
Telephone: (852) 2271 3000  
Facsimile: (852) 2723 5660



**ERM**

---


Dear Sir or Madam,

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

0212330\_June2020/August2020\_dolphin\_STG&ANI\_NEL&NWL

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

Regards,



Dr Jasmine Ng  
Environmental Team Leader

---

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**ERM-Hong Kong, Limited**

**CONTRACT NO. HY/2012/08**

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

**Post Construction Dolphin Monitoring  
Notification of Exceedance**

|   |  |  |
|---|--|--|
| <b>Log No.</b>                                      | 0212330_ Jun2020/Aug2020_dolphin_STG&ANI_NEL&NWL<br>[Total No. of Exceedances = 1 Limit Level Exceedance]  |  |
| <b>Date</b>   | June 2020 – August 2020 (monitored)<br>31 August 2020 (results received by ERM)  |  |
| <b>Monitoring Area</b>                              | Northeast Lantau (NEL) and Northwest Lantau (NWL)  |  |
| <b>Parameter(s) with Exceedance(s)</b>              | Quarterly encounter rate of dolphin sightings (STG)<br>Quarterly encounter rate of total number of dolphins (ANI)  |  |
| <b>Action Levels</b>                                | North Lantau Social cluster  | NEL: STG < 4.2 & ANI < 15.5<br>or<br>NWL: STG < 6.9 & ANI < 31.3 |
| <b>Limit Levels</b>                                 |  | NEL: STG < 2.4 & ANI < 8.9<br>and<br>NWL: STG < 3.9 & ANI < 17.9 |
| <b>Recorded Levels</b>                              | NEL  | STG = 0 & ANI = 0  |
|   | NWL  | STG = 0.62 & ANI = 1.55  |
|   | One Limit Level Exceedance was recorded in the quarterly post construction dolphin monitoring at NEL and NWL between June and August 2020.   |  |
| <b>Statistical Analyses</b>                         | <p>Further to the review of the available and relevant dolphin monitoring data for TMCLKL project, statistical analyses were conducted as follows:</p> <ul style="list-style-type: none"> <li>• A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs present post construction quarter, June to August 2020) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and present post construction monitoring quarter. By setting <math>\alpha = 0.01</math> as the significance level in the statistical tests, significant differences in STG (<math>p = 0.0016</math>) and ANI (<math>p = 0.0119</math>) were detected between Periods.</li> <li>• A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: the first 31 quarters of impact and post construction phases) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and cumulative quarters. By setting <math>\alpha = 0.00001</math> as the significance level in the statistical tests, significant difference in STG (<math>p = 0.000000</math>) and in ANI (<math>p = 0.000000</math>) between Cumulative Period and Location were detected.</li> </ul> <p>*Note: The commencement date under <i>Contract No. HY/2012/08</i> is 1 November 2013 and the Proposal for operational phase dolphin monitoring was approved by EPD on 19 May 2020. Operational phase dolphin monitoring commenced in June 2020.</p> |  |
| <b>Works Undertaken (in the monitoring quarter)</b> | <p>No marine works was undertaken in the reporting period under Contract No. HY/2012/08. Operational phase dolphin monitoring commenced in June 2020.</p> <p>No marine works was undertaken in the reporting period under Contract No. HY/2012/07. Termination proposal for construction EM&amp;A programme of Contract No. HY/2012/07 was approved by EPD on 16 March 2020. The construction phase EM&amp;A programme of Contract No. HY/2012/07 has been terminated since 16 March 2020.</p>   |  |

|  |   |
|--|---|
| <b>Possible Reason for Action or Limit Level Exceedance(s)</b> | <p>The exceedance recorded in the quarterly post construction dolphin monitoring is unlikely to be due to TMCLKL project, in view of the following:</p> <ul style="list-style-type: none"> <li>• Blocking of CWD travelling corridor:<br/>The <i>Monitoring of Marine Mammals in Hong Kong Waters (2019 – 20)</i> <sup>(1)</sup> reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to TMCLKL project), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau.</li> <li>• Marine works of TMCLKL project:<br/>Marine works were completed and no marine vessels will be deployed under Contract No. HY/2012/08 as per confirmed by SOR on 17 April 2020. The Proposal for operational phase dolphin monitoring was approved by EPD on 19 May 2020. Operational phase dolphin monitoring commenced in June 2020.<br/>No marine works was undertaken in the reporting period under Contract No. HY/2012/07. Termination proposal for construction EM&amp;A programme of Contract No. HY/2012/07 was approved by EPD on 16 March 2020. The construction phase EM&amp;A programme of Contract No. HY/2012/07 has been terminated since 16 March 2020.<br/>During this quarter of dolphin monitoring, no adverse impact on CWD due to the activities under TMCLKL project was observed.</li> <li>• Impact on water quality:<br/>Marine works were completed and no marine vessels will be deployed under TMCLKL project. The Proposal for operational phase water quality monitoring was approved by EPD on 19 May 2020. Operational phase water quality monitoring commenced in June 2020.</li> <li>• Provision of Marine Park:<br/>The Government has designated the Brothers Islands as a marine park in December 2016, with the aim to help better conserve the Chinese White Dolphins, their habitats and enhance the marine and fisheries resources therein.</li> </ul> <p>In view of the above, no unacceptable impact on CWD or its habitat was associated with TMCLKL project in this quarter.</p> |
| <b>Actions Taken / To Be Taken</b>                             | <p>No marine works and vessels was undertaken/ deployed in the reporting period.<br/>The ET will monitor for future trends in exceedances.</p>  |
| <b>Remarks</b>   | <p>The results of post construction dolphin monitoring are documented in the approved <i>Eightieth to Eighty-Second Monthly EM&amp;A Reports</i>.</p>   |

(1) Hung S K Y (2020). Prepared for AFCD. Available at: [https://www.afcd.gov.hk/english/conservation/con\\_mar/con\\_mar\\_chi/con\\_mar\\_chi\\_chi/files/Final\\_Report\\_2019\\_20.pdf](https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2019_20.pdf)

Appendix K

## Waste Flow Table

**Monthly Summary Waste Flow Table**

Name of Department: HyD

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

Monthly Summary Waste Flow Table for **August 2020** [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)<br>Total Quantity Generated   | (b)<br>Hard Rock and Large Broken Concrete | (c)<br>Reused in the Contract | (d)<br>Reused in other Projects | (e)<br>Disposed of as Public Fill |
|                          | (in '000 ton)   | (in '000 ton)                              | (in '000 ton)                 | (in '000 ton)                   | (in '000 ton)                     |
| Sub-total                | 3008.812  | 0.000                                      | 336.902                       | 889.467                         | 1782.443                          |
| Jan-2020                 | 174.69  | 0.000                                      | 0.000                         | 0.000                           | 174.69                            |
| Feb-2020                 | 1.455   | 0.000                                      | 0.000                         | 0.000                           | 1.455                             |
| Mar-2020                 | 3.252   | 0.000                                      | 0.000                         | 0.000                           | 3.252                             |
| Apr-2020                 | 4.200   | 0.000                                      | 0.000                         | 0.000                           | 4.200                             |
| May-2020                 | 7.015   | 0.000                                      | 0.000                         | 0.000                           | 7.015                             |
| Jun-2020                 | 2.670   | 0.000                                      | 0.000                         | 0.000                           | 2.693                             |
| Half Year Sub-total      | 193.282   | 0.000                                      | 0.000                         | 0.000                           | 193.305                           |
| Jul-2020                 | 1.440   | 0.000                                      | 0.000                         | 0.000                           | 1.440                             |
| Aug-2020                 | 1.159   | 0.000                                      | 0.000                         | 0.000                           | 1.159                             |
| Sep-2020                 |   |  |                               |                                 |                                   |
| Oct-2020                 |   |  |                               |                                 |                                   |
| Nov-2020                 |   |  |                               |                                 |                                   |
| Dec-2020                 |   |  |                               |                                 |                                   |
| Project Total Quantities | 3204.693  | 0.000                                      | 336.902                       | 889.467                         | 1978.347                          |



| Month                    | Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly |          |                            |          |                          |          |                |          |  |
|--------------------------|--|----------|----------------------------|----------|--------------------------|----------|----------------|----------|--|
|                          | Metals   |          | Paper/ cardboard packaging |          | Plastics<br>(see Note 3) |          | Chemical Waste |          | Others, e.g. General<br>Refuse disposed at<br>Landfill |
|                          | (in '000kg)  |          | (in '000kg)                |          | (in '000kg)              |          | (in '000kg)    |          | (in '000ton)   |
|                          | generated  | recycled | generated                  | recycled | generated                | recycled | generated      | Disposed | generated  |
| Sub-total                | 9890.77  | 9890.77  | 14.64                      | 14.64    | 16.84                    | 16.84    | 85.807         | 85.807   | 21.943   |
| Jan-2020                 | 0.00   | 0.00     | 0.00                       | 0.00     | 0.00                     | 0.00     | 0.00           | 0.00     | 2.54   |
| Feb-2020                 | 0.00   | 0.00     | 0.00                       | 0.00     | 0.00                     | 0.00     | 0.00           | 0.00     | 0.349  |
| Mar-2020                 | 0.00   | 0.00     | 0.00                       | 0.00     | 0.00                     | 0.00     | 0.00           | 0.00     | 1.226  |
| Apr-2020                 | 22.14  | 22.14    | 1.30                       | 1.30     | 0.00                     | 0.00     | 6.40           | 6.40     | 0.521  |
| May-2020                 | 6.2  | 6.2      | 0.54                       | 0.54     | 0.00                     | 0.00     | 0.60           | 0.60     | 0.536  |
| Jun-2020                 | 0.00   | 0.00     | 0.74                       | 0.74     | 0.00                     | 0.00     | 1.00           | 1.00     | 0.303  |
| Half Year Sub-total      | 28.34  | 28.34    | 2.58                       | 2.58     | 0.00                     | 0.00     | 8.00           | 8.00     | 5.475  |
| Jul-2020                 | 0.00   | 0.00     | 0.00                       | 0.00     | 0.00                     | 0.00     | 0.00           | 0.00     | 0.140  |
| Aug-2020                 | 0.00   | 0.00     | 1.06                       | 1.06     | 0.00                     | 0.00     | 0.00           | 0.00     | 0.110  |
| Sep-2020                 |  |          |                            |          |                          |          |                |          |  |
| Oct-2020                 |  |          |                            |          |                          |          |                |          |  |
| Nov-2020                 |  |          |                            |          |                          |          |                |          |  |
| Dec-2020                 |  |          |                            |          |                          |          |                |          |  |
| Project Total Quantities | 9919.11  | 9919.11  | 17.22                      | 17.22    | 16.84                    | 16.84    | 93.807         | 93.807   | 27.668   |

| Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract* |                                     |                        |                          |                            |
|--|-------------------------------------|------------------------|--------------------------|----------------------------|
| Total Quantity Generated   | Hard Rock and Large Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed of as Public Fill |
| (in '000 ton)  | (in '000 ton)                       | (in '000 ton)          | (in '000 ton)            | (in '000 ton)              |
| 3200.000   | 0.000                               | 350.000                | 1000.000                 | 2000.000                   |

| Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract* |                            |                          |                |  |
|--|----------------------------|--------------------------|----------------|--|
| Metals   | Paper/ cardboard packaging | Plastics<br>(see Note 3) | Chemical Waste | General Refuse disposed of at Landfill |
| (in '000kg)  | (in '000kg)                | (in '000kg)              | (in '000kg)    | (in '000 ton)                          |
| 10000.00   | 20.00                      | 18.00                    | 120.00         | 30.000                                 |

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