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CHINA HARBOUR ENGINEERING CO. LTD.

CONTRACT NO.: HY/2013/02

HONG KONG – ZHUHAI- MACAO BRIDGE HONG KONG BOUNDARY CROSSING FACILITIES – INFRASTRUCTURE WORKS STAGE I (WESTERN PORTION)

QUARTERLY EM&A REPORT NO. 12

(01 SEPTEMBER – 30 NOVEMBER 2017)

Prepared by: _____
LO, Ting Yi

Certified by: _____
LAU, Chi Leung
Environmental Team Leader

Issued Date: 29 December 2017 *Report No.: ENA77363*

RAMBOLL

Ref.: HYDHZMBEEM00_0_6403L.18

12 April 2018

By Fax (3468 2076) and By Post

AECOM Asia Co. Ltd.
The PRE's Office
5 Ying Hei Road, Tung Chung, Lantau
Hong Kong

Attention: Mr. Ringo Tso

Dear Sir,

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/2013/02 – HZMB HKBCF – Infrastructure Works Stage I (Western Portion)
Quarterly EM&A Report No. 12 for September 2017 to November 2017

Reference is made to the Environmental Team's submission of the Quarterly Environmental Monitoring & Audit Report No. 12 for September 2017 to November 2017 certified by the ET Leader (ET's ref.: "OC/80213/CLL" dated 12 April 2018) and provided to us via e-mail on 12 April 2018.

We are pleased to inform you that we have no adverse comment on the captioned Quarterly Environmental Monitoring & Audit Report for September 2017 to November 2017.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

Yours faithfully,
For and on behalf of
Ramboll Hong Kong Limited

Raymond Dai
Independent Environmental Checker

c.c.	HyD	Mr. Vico Cheung	(By Fax: 3188 6614)
	HyD	Mr. Chee-Kuen Yu	(By Fax: 3188 6614)
	ETS	Mr. C. L. Lau	(By Fax: 2695 3944)
	CHEC	Mr. Kenny Yu	(By Fax: 3915 0300)

Internal: DY, YH, TM, HW, ENPO Site

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Your Ref. : ---
Our Ref. : OC/80213/CLL

12 April 2018

Ramboll Environ Hong Kong Limited
21st Floor, BEA Harbour View Centre,
56 Gloucester Road,
Wan Chai
Hong Kong

By Post and E-mail

Attn: Mr. Raymond Dai

Dear Mr. Dai,

Contract No. HY/2013/02
Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing Facilities – Infrastructure Works Stage I (Western Portion)
Quarterly EM&A Report No. 12 for September 2017 to November 2017

In accordance with the requirement specified in Section 16.4 of the updated Environmental Monitoring and Audit Manual for HKBCF (Version 1.0), we are pleased to submit the certified Quarterly EM&A Report No. 12 revised with the IEC's comment for your onward verification.

Yours faithfully,
ETS-TESTCONSULT LIMITED

Mr. C. L. Lau
Environmental Team Leader

CLL/cklk

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APPENDIX

EXECUTIVE SUMMARY

This Quarterly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract HY/2013/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) – Infrastructure Works Stage I (Western Portion) (hereafter referred to as "the Contract") for the Highways Department of Hong Kong Special Administrative Region (HKSAR). The Contract was awarded to China Harbour Engineering Co., Ltd. (hereafter referred to as "the Contractor") and ETS-Testconsult Limited was appointed as the Environmental Team (ET) by the Contractor.

The Contract is part of Hong Kong – Zhuhai – Macao Bridge HKBCF which is a "Designated Project", under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499) and Environmental Impact Assessment (EIA) Report (Register No. AEIAR-145/2009) was prepared for the Project. The current Environmental Permit (EP) No. EP-353/2009/K for HKBCF was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. Site preparation works of the Contract was started on 25 July 2014 and the construction works of the Contract commenced on 24 November 2014.

ETS-Testconsult Limited has been appointed by the Contractor to implement the Environmental Monitoring & Audit (EM&A) programme for the Contract in accordance with the Updated EM&A Manual for HKBCF (Version 1.0) and provide environmental team services to the Contract.

This is the Twelfth Quarterly Environmental Monitoring and Audit (EM&A) Report for the Contract which summaries findings of the EM&A works conducted during the reporting period from 01 September to 30 November 2017.

Environmental Monitoring and Audit Progress

The EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). It should be noted that the air quality and noise monitoring works for the Contract are covered by Contract No. HY/2013/01 "Hong Kong-Zhuhai-Macao Bridge HKBCF – Passenger Clearance Building" and Contract No. HY/2011/03 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between Scenic Hill and HKBCF". The ET of the Contract or another ET of the HZMB project is required to conduct impact air quality monitoring at AMS6 and AMS7, noise monitoring at NMS2 and NMS3B show in **Figure 1**, water quality monitoring show in **Figure 2** and dolphin monitoring show in **Figure 3** as part of EM&A programme if these monitoring stations are no longer covered under Contract No. HY/2013/01 and HY/2011/03. However, this is subject to ENPO's final decision on which ET should carry out the monitoring works at these stations.

The dates of environmental site inspections during the reporting period are listed below:

Environmental Site Inspection Date		
September 2017	**October 2017**	**November 2017**
07, 14, 21 and 28	06, 12, 19 and 26	02, 09, 16, 23 and 30

Breaches of Action and Limit Levels

Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.

There was no Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level recorded at station AMS7 by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

There was an Action Level exceedance of 24-hr TSP level recorded at station AMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

There was no Action and Limit Level exceedance for noise recorded at station NMS2 and station NMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

For water quality monitoring, there were 144 action level exceedances and 34 limit level exceedances of dissolved oxygen, 5 action level exceedances and 1 limit level exceedance of turbidity, 28 action level

exceedances and 5 limit level exceedances of suspended solid during the reporting period. The following table summarized the number of exceedance on each sampling date:

Sampling Date	No. of Exceedances					
	DO		Turbidity		SS	
	Action	Limit	Action	Limit	Action	Limit
1/9/2017	8	0	0	0	0	0
6/9/2017	4	4	1	0	3	0
8/9/2017	24	4	4	0	2	1
11/9/2017	30	3	0	0	0	0
13/9/2017	13	3	0	0	0	0
15/9/2017	10	2	0	1	0	0
18/9/2017	8	2	0	0	1	0
20/9/2017	3	2	0	0	1	0
22/9/2017	17	4	0	0	0	0
25/9/2017	1	1	0	0	1	0
27/9/2017	6	1	0	0	0	0
29/9/2017	13	0	0	0	0	0
2/10/2017	3	1	0	0	0	0
4/10/2017	3	4	0	0	0	0
6/10/2017	1	2	0	0	0	0
9/10/2017	0	1	0	0	0	0
18/10/2017	0	0	0	0	1	0
20/10/2017	0	0	0	0	3	0
23/10/2017	0	0	0	0	1	0
03/11/2017	0	0	0	0	3	1
06/11/2017	0	0	0	0	5	0
08/11/2017	0	0	0	0	2	2
13/11/2017	0	0	0	0	1	0
15/11/2017	0	0	0	0	1	0
20/11/2017	0	0	0	0	1	0
22/11/2017	0	0	0	0	1	1
24/11/2017	0	0	0	0	1	0
Total:	144	34	5	1	28	5

After investigation, there was concluded that the exceedances were not relevant to this Contract since there was only one marine based activity which is demolition of temporary loading and unloading point of this Contract worked at HKBCF reclamation site near the sea area or area near the monitoring stations. The demolition of temporary loading and unloading point was started from 18 July 2017. The major marine based activity was the removal of marine piling of temporary loading and unloading point. All marine based activities were carried out within the silt curtain and no defect of silt curtain was recorded by Contract No. HY/2010/02 from 18 July 2017 to 31 August 2017. Besides, there was also no DO, turbidity and SS exceedance recorded during 18 July 2017 to 31 August 2017. Therefore, the exceedance was not caused by demolition of temporary loading and unloading point. The Investigation Reports No. 019, 020, 021 and 022 (including the causes of exceedance, action taken and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in **Appendix J**. As confirmed by SRE, removal of temporary loading and unloading point by Contract No. HY/2013/02, which involved marine work, was completed on 10 September 2017 and the area was handed back to Reclamation Contractor on 11 September 2017 for subsequent seawall construction. Hence, specific investigation shall be referred to other ET's report(s) under the HZMB Projects in which the respective contract(s) with remaining marine works on-going for the exceedances recorded in water quality monitoring during this reporting period. There was no Action and Limit Level exceedance recorded on other monitoring date at the monitoring stations showed at **Table 4.1** by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

Impact dolphin monitoring results at all transects were reported in the EM&A Report prepared for Contract No. HY/2013/01.

Implementation of Environmental Measures

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. Potential environmental impacts due to the construction activities were monitored and reviewed.

Complaint Log

There were two complaints received during the reporting period.

1. One complaint received by *Environmental Protection Department* on 27 October 2017 and referred to the ENPO. Then the ENPO forwarded the complaint by email to the R.E. (AECOM), the Contractor (China Harbour) and the ET (ETS-Testconsult Ltd.) of Contract No. HY/2013/02 at 19:57 on 27 October 2017. The complaint detail was "*珠澳大橋人工島地盤投訴黃泥水落海，情況持續了一個星期，詳細發生地點是人工島的C3位置，他要求跟進及回覆。*"

After received the details of the complaint from the ENPO, the ET of Contract No. HY/2013/02 had performed a related follow-up inspection on 02 November 2017 to investigate this event. The inspection was concentrated to check if appropriate water pollution mitigation measures were launched by the Contractor of Contract No. HY/2013/02.

According to the investigation, de-silting pits with geotextile were provided and wastewater was collected by the wetsep for proper treatment prior to disposal. Besides, effluent water sample was sampled for testing the total suspended solids. According to the latest test report with sample sampled on 25 September 2017, the parameter complied with the discharge license requirement. Hence, the complaint was found non-related to Contract No. HY/2013/02. The complaint investigation report (Log No. 015) was provided in **Appendix K**.

2. One complaint received by *Environmental Protection Department* on 23 November 2017 and referred to the ENPO. Then the ENPO forwarded the complaint by email to the R.E. (AECOM), the Contractor (China Harbour) and the ET (ETS-Testconsult Ltd.) of Contract No. HY/2013/02 17:58 on 23 November 2017. The complaint detail was "*港珠澳大橋人工島地盤，由於不是每處都灑水，引致大量塵埃，近收費亭最嚴重*"

After received the details of the complaint from the ENPO, the ET of Contract No. HY/2013/02 had performed a related follow-up inspection on 24 November 2017 to investigate this event. The inspection was concentrated to check if regular watering launched inside the construction site by the Contractor of Contract No. HY/2013/02.

After checked with the Contractor of Contract No. HY/2013/02 during 15:00 to 16:00 on 24 November 2017, the worksite was wetted with water (see attached photo and location plan of watering photo) near 收費亭 and spraying with water by watering cars were observed on the worksite during the follow-up inspection. Besides, 收費亭 *was not managed by* Contract No. HY/2013/02. Hence, the complaint was found non-related to Contract No. HY/2013/02. The complaint investigation report (Log No. 016) was provided in **Appendix K**.

Notifications of Summons and Successful Prosecutions

There were no notification of summon or prosecution received during the reporting period.

Reporting Change

From 01 September 2017, the implementation of environmental monitoring for Contract No. HY/2010/02 (covering air quality, noise, water quality and marine ecology) was suspended and the same implementation were conducted by the ET for Contract No. HY/2013/01 of which the noise monitoring station (NMS3B) and the meteorological station had been slightly re-located to AECOM PRE's Office.

Also, since the disposal of excavated marine sediments has been completed with the last batch disposal on 30 August 2017 as confirmed by RSS, no excavated marine sediment was still remained and stored on site awaiting disposal during this reporting period under Contract No. HY/2013/02.

1 INTRODUCTION

1.1 Basic Project Information

1.1.1 This Quarterly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract HY/2013/02 Hong Kong–Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) – Infrastructure Works Stage I (Western Portion) (hereafter referred to as "the Contract") for the Highways Department of Hong Kong Special Administrative Region (HKSAR). The Contract was awarded to China Harbour Engineering Co., Ltd. (hereafter referred to as "the Contractor") and ETS-Testconsult Limited was appointed as the Environmental Team (ET) by the Contractor.

1.1.2 The Contract is part of Hong Kong – Zhuhai – Macao Bridge HKBCF which is a "Designated Project", under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499) and an Environmental Impact Assessment (EIA) Report (Register No. AEIAR-145/2009) was prepared for the Project. The current Environmental Permit (EP) No. EP-353/2009/K for HKBCF was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. Site preparation works of the Contract started on 25 July 2014 and the construction works of the Contract commenced on 24 November 2014. The works area of the Contract is shown in **Appendix A.**

1.1.3 This is the Twelfth Quarterly Environmental Monitoring and Audit (EM&A) Report for the Contract which summaries the audit findings of the EM&A programme during the reporting period from 01 September to 30 November 2017.

1.2 Project Organization

1.2.1 The project organisation structure and lines of communication with respect to the on-site environmental management structure is shown in **Appendix B**. The key personnel contact names and numbers are summarized in **Table 1.1.**

Table 1.1 Contact Information of Key Personnel

Party	Position	Name of Key Staff	Tel. No.	Fax No.
Engineer or Engineer's Representative (AECOM Asia Co. Ltd.)	*Resident Engineer*	*Mr. Winston Wong*	*6330 8293*	*3152 5116*
Environmental Project Office / Independent Environmental Checker (Ramboll Environ Hong Kong Limited)	*Environmental Project Office Leader*	*Mr. Y. H. Hui*	*3465 2888*	*3465 2899*
	Independent Environmental Checker	*Mr. Raymond Dai*	*3465 2888*	*3465 2899*
	Environmental Site Supervisor	*Mr. Ray Yan*	*5181 8165*	*3465 2899*
Contractor (China Harbour Engineering Co., Ltd.)	*Environmental Officer*	*Mr. Richard Ng*	*5977 0593*	*3915 0300*
	Environmental Officer	*Mr. Paper Chan*	*6486 8967*	*3915 0300*
	Environmental Supervisor	*Mr. Endy Tse*	*5512 2662*	*3915 0300*
Environmental Team (ETS-Testconsult Ltd.)	*Environmental Team Leader*	*Mr. C. L. Lau*	*2946 7791*	*2695 3944*

1.3 Construction Programme

1.3.1 A copy of the Contractor's construction programme is provided in **Appendix C**.

1.4 Construction Works Undertaken During the Reporting Period

1.4.1 A summary of the construction activities undertaken during this reporting period is shown below:

- *Road and Bituminous works;*
- *Storm, sewer drainage and water main construction;*
- *Retaining wall, slop and earth works;*
- *Construction of signs gantries, cable trench and ducting;*
- *Demolition of temporary loading and unloading point (Marine-based activity);*
- *Construction of bridge deck in Portion D, A, E, C & F*
- *Construction of parapet & barrier*

2 EM&A Requirement

2.1 Summary of EM&A Requirements

2.1.1 The monthly EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). It should be noted that the air quality and noise monitoring works for the Contract are covered by Contract No. HY/2013/01 "Hong Kong-Zhuhai-Macao Bridge HKBCF – Passenger Clearance Building" and Contract No. HY/2011/03 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between Scenic Hill and HKBCF". The ET of the Contract or another ET of the HZMB project is required to conduct impact air quality monitoring at AMS6 and AMS7, noise monitoring at NMS2 and NMS3B show at **Figure 1** and **Table 2.1**, water quality monitoring stations show at **Figure 2** and **Table 2.2** and dolphin monitoring show at **Figure 3** as part of EM&A programme if these monitoring stations are no longer covered under Contract No. HY/2013/01 and HY/2011/03. However, this is subject to ENPO's final decision on which ET should carry out the monitoring works at these stations.

The ET of the Contract or another ET of the HZMB project is required to conduct dolphin monitoring at 24 transects as part of EM&A programme if these transects are no longer covered under Contract No. HY/2013/01. The dolphin monitoring should adopt line-transect vessel survey method. The survey follows pre-set and fixed transect lines in the two areas defined by AFCD as: Northeast Lantau survey area; and Northwest Lantau survey area. **Figure 3** shows the co-ordinates for the transect lines and layout map.

2.1.2 A summary of air and noise monitoring locations are presented in **Table 2.1**. The location of air quality and noise monitoring stations are shown as in **Figure 1.**

Table 2.1 Air Quality and Noise Monitoring Locations

Environmental Monitoring	Identification No.	Location Description
Air Quality	AMS6[(1)]	Dragonair / CNAC (Group) Building
	AMS7[(1)(2)]	Hong Kong SkyCity Marriott Hotel
Noise	NMS2[(3)]	Seaview Crescent
	NMS3B[(3)(4)]	Site Boundary of Site Office Area at Works Area WA2

Remarks:
(1) The ET of this Contract should conduct impact air quality monitoring at the AMS listed in the table as part of EM&A programme according to latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project.
(2) The air quality monitoring location AMS7A was relocated back to the original monitoring location AMS7 of the updated EM&A Manual started from January 2016.
(3) ET of this Contract should conduct impact noise monitoring at the NMS listed in the table as part of EM&A programme according to latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project.
(4) The Action and Limit Levels for schools will be applied for this alternative monitoring location.

2.1.3 The water monitoring works for the Contract are covered by Contract No. HY/2013/01 Hong Kong-Zhuhai-Macao Bridge HKBCF – Passenger Clearance Building. The ET of the Contract or another ET of the HZMB project is required to conduct water quality monitoring at twenty one stations (9 Impact Stations, 7 Sensitive Receiver Stations and 5 Control/Far Field Stations). **Table 2.2** and **Figure 2** shows the locations of water quality monitoring stations.

Table 2.2 Water Quality Monitoring Stations (construction phases)

Station	Description	East	North
IS5	Impact Station (Close to HKBCF construction site)	811579	817106

IS(Mf)6	Impact Station (Close to HKBCF construction site)	812101	817873
IS7	Impact Station (Close to HKBCF construction site)	812244	818777
IS8	Impact Station (Close to HKBCF construction site)	814251	818412
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850
IS10(N)	Impact Station (Close to HKBCF construction site)	812942	820881
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497
IS17	Impact Station (Close to HKBCF construction site)	814539	820391
SR3	Sensitive receivers (San Tau SSSI)	810525	816456
SR4(N)	Sensitive receivers (Tai Ho)	814705	817859
SR5(N)	Sensitive receiver (Artificial Reef in NE Airport)	812569	821475
SR6	Sensitive receivers (Sha Chau and Lung Kwu Chau Marine Park)	805837	821818
SR7	Sensitive receivers (Tai Mo Do)	814293	821431
SR10A[1]	Sensitive receivers (Ma Wan FCZ)1	823741	823495
SR10B(N)[1]	Sensitive receivers (Ma Wan FCZ)2	823683	823187
CS(Mf)3(N)	Control Station	808814	822355
CS(Mf)5	Control Station	817990	821129
CS4	Control Station	810025	824004
CS6	Control Station	817028	823992
CSA[2]	Control Station	818103	823064

Note:
(1) Additional monitoring station for Ma Wan FCZ.
(2) Additional control monitoring station for Ma Wan FCZ

Remarks:
The ET of this Contract should conduct impact water quality monitoring at the WQMS listed in the table as part of EM&A programme according to latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project. The ET of the Contract shall communicate and share the monitoring data to the ET(s) of other works contracts if the water quality monitoring station(s) is/are as part of EM&A programme.

2.1.4 The dolphin monitoring works for the Contract are covered by Contract No. HY/2013/01 Hong Kong-Zhuhai-Macao Bridge HKBCF – Passenger Clearance Building. **Figure 3** shown the layout map for the vessel-based transect lines.

2.2 Monitoring Requirements

2.2.1 The monitoring requirements, monitoring equipment, monitoring parameters, frequency and duration, monitoring methodology, monitoring schedule, meteorological information are detailed in the monthly EM&A Reports prepared for Contract Nos. HY/2013/01 and HY/2011/03.

2.3 Action and Limit Levels

2.3.1 The Action and Limit Levels for 1-hr TSP and 24-hr TSP are provided in **Table 2.3** and **Table 2.4** respectively.

Table 2.3 Action and Limit Levels for 1-hour TSP

Monitoring Station	Action Level,μg/m³	Limit Level,μg/m³
AMS6 – Dragnair / SNAC (Group) Building (HKIA)	360	500
AMS7 – Hong Kong SkyCity Marriott Hotel	370	500

Table 2.4 Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level, μg/m³	Limit Level,μg/m³
AMS6 – Dragnair / SNAC (Group) Building (HKIA)	173	260
AMS7 – Hong Kong SkyCity Marriott Hotel	183	260

2.3.2 If exceedance(s) at these station(s) is/are recorded by the ET of the Contract or referred by the other ET under the HZMB project to the Contract, the ET of the Contract will carry out an investigation and findings will be reported in the quarterly EM&A Report.

2.3.3 The Action and Limit Levels for construction noise are provided in **Table 2.5**

Table 2.5 Action and Limit Levels for Construction Noise

Parameter	Action Level	Limit Level
07:00 – 19:00 hours on normal weekdays	When one documented complaint is received	75 dB(A)*

Notes:
If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.
* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination period.

2.3.4 If exceedance(s) at these station(s) is/are recorded by the ET of the Contract or referred by the other ET under the HZMB project to the Contract, the ET of the Contract will carry out an investigation and findings will be reported in the quarterly EM&A Report.

2.3.5 The Action and Limit Levels for Water Quality are provided in **Table 2.6**

Table 2.6 Action and Limit Levels for Water Quality

Parameters	Action	Limit
DO in mg/L (Surface, Middle & Bottom)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6
SS in mg/L (depth-averaged) at all monitoring stations and control stations	23.5 and 120% of upstream control station's SS at the same tide of the same day*	34.4 and 130% of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater
Turbidity in NTU (depth-averaged)	27.5 and 120% of upstream control station's turbidity at the same tide of the same day*	47.0 and 130% of upstream control station's turbidity at the same tide of the same day*

*Remarks: Reference is made to EPD approval of adjustment of water quality assessment criteria issued and became effective on 18 February 2013.

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

2.3.6 If exceedance(s) at these station(s) is/are recorded by the ET of the Contract or referred by the other ET under the HZMB project to the Contract, the ET of the Contract will carry out an investigation and findings will be reported in the quarterly EM&A Report.

2.3.7 The Action and Limit Levels for Chinese White Dolphin Monitoring are provided in **Table 2.7** & **Table 2.8**

Table 2.7 Action and Limit Levels for Chinese White Dolphin Monitoring – Approach to Define Action Level (AL) and Limit Level (LL)

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

For North Lantau Social Cluster, action level will be trigger if either NEL or NWL fall below the criteria; limit level will be triggered if both NEL and NWL fall below the criteria.

Table 2.8 Derived Value of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

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

The ET of this Contract should conduct impact dolphin monitoring as part of EM&A programme according to latest notification from ENPO when the monitoring transect(s) is/are no longer covered by another ET of the HZMB project.

2.3.8 If exceedance(s) at these transect(s) is/are recorded by the ET of the Contract or referred by the other ET under the HZMB project to the Contract, the ET of the Contract will carry out an investigation and findings will be reported in the quarterly EM&A Report.

2.4 Event Action Plans

2.4.1 The event and action plan is provided in **Appendix D**.

2.5 Mitigation Measures

2.5.1 Environmental mitigation measures for the Contract were recommended in the Approved EIA Report. **Appendix E** lists the recommended mitigation measures and the implementation status.

3 ENVIRONMENTAL MONITORING AND AUDIT

3.1 Air Quality Monitoring Results

3.1.1 The monitoring results for AMS6 and AMS7 were reported in the monthly EM&A Reports (September 2017, October 2017 and November 2017) prepared for Contract Nos. HY/2011/03 and HY/2013/01 respectively.

3.1.2 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.

3.1.3 There was no Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level recorded at station AMS7 by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

3.1.4 There was an Action Level exceedance of 24-hr TSP level recorded at station AMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period. The Investigation Reports No. 023 (including the causes of exceedance, action taken and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in **Appendix J**.

3.2 Noise Monitoring Results

3.2.1 The monitoring results for NMS2 and NMS3B were reported in the monthly EM&A Reports (September 2017, October 2017 and November 2017) prepared by Contract No. HY/2013/01.

3.2.2 There was no exceedance of noise recorded at station NMS2 and station NMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

3.3 Water Quality Monitoring Result

3.3.1 The monitoring results for the monitoring stations showed in **Table 2.2** were reported in the monthly EM&A Reports (September 2017, October 2017 and November 2017) prepared for Contract No. HY/2013/01. There were 144 action level exceedances and 34 limit level exceedances of dissolved oxygen, 5 action level exceedances and 1 limit level exceedance of turbidity, 28 action level exceedances and 5 limit level exceedances of suspended solid during the reporting period. The following table summarized the number of exceedance on each sampling date:

Sampling Date	No. of Exceedances					
	DO		Turbidity		SS	
	Action	Limit	Action	Limit	Action	Limit
1/9/2017	8	0	0	0	0	0
6/9/2017	4	4	1	0	3	0
8/9/2017	24	4	4	0	2	1
11/9/2017	30	3	0	0	0	0
13/9/2017	13	3	0	0	0	0
15/9/2017	10	2	0	1	0	0
18/9/2017	8	2	0	0	1	0
20/9/2017	3	2	0	0	1	0
22/9/2017	17	4	0	0	0	0
25/9/2017	1	1	0	0	1	0
27/9/2017	6	1	0	0	0	0
29/9/2017	13	0	0	0	0	0
2/10/2017	3	1	0	0	0	0
4/10/2017	3	4	0	0	0	0
6/10/2017	1	2	0	0	0	0
9/10/2017	0	1	0	0	0	0
18/10/2017	0	0	0	0	1	0
20/10/2017	0	0	0	0	3	0
23/10/2017	0	0	0	0	1	0
03/11/2017	0	0	0	0	3	1
06/11/2017	0	0	0	0	5	0
08/11/2017	0	0	0	0	2	2
13/11/2017	0	0	0	0	1	0
15/11/2017	0	0	0	0	1	0
20/11/2017	0	0	0	0	1	0
22/11/2017	0	0	0	0	1	1
24/11/2017	0	0	0	0	1	0
Total:	144	34	5	1	28	5

3.3.2. After investigation, there was concluded that the exceedances were not relevant to this Contract since there was only one marine based activity which is demolition of temporary loading and unloading point of this Contract worked at HKBCF reclamation site near the sea area or area near the monitoring stations. The demolition of temporary loading and unloading point was started from 18 July 2017. The major marine based activity was the removal of marine piling of temporary loading

and unloading point. All marine based activities were carried out within the silt curtain and no defect of silt curtain was recorded by Contract No. HY/2010/02 from 18 July 2017 to 31 August 2017. Besides, there was also no DO, turbidity and SS exceedance recorded during 18 July 2017 to 31 August 2017. Therefore, the exceedance was not caused by demolition of temporary loading and unloading point. The Investigation Reports No. 019, 020, 021 and 022 (including the causes of exceedance, action taken and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in **Appendix J**. As confirmed by SRE, removal of temporary loading and unloading point by Contract No. HY/2013/02, which involved marine work, was completed on 10 September 2017 and the area was handed back to Reclamation Contractor on 11 September 2017 for subsequent seawall construction. Hence, specific investigation shall be referred to other ET's report(s) under the HZMB Projects in which the respective contract(s) with remaining marine works on-going for the exceedances recorded in water quality monitoring during this reporting period. There was no Action and Limit Level exceedance recorded on other monitoring date at the monitoring stations showed at **Table 4.1** by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

3.3.3 Although the exceedances were not relevant to this Contract, the Contractor was reminded to provide appropriate water pollution mitigation measures, such as ensure all construction activities that would deteriorate the water quality was collected by sedimentation tanks or package treatment systems for proper treatment prior to disposal.

3.4 Dolphin monitoring Result

3.4.1 Impact dolphin monitoring results at all transects were reported in the EM&A Report prepared for Contract No. HY/2013/01. One limit level exceedance was recorded in the monitoring period (September 2017 – November 2017).

3.4.2 During this reporting period, only one marine based activity which is demolition of temporary loading and unloading point worked by Contract No. HY/2013/02. The demolition of temporary loading and unloading point was completed on 10 September 2017 and the area was handed back to Reclamation Contractor on 11 September 2017 for subsequent seawall construction. Besides, the marine delivery of precast segments was completed in July 2017 by Contract No. HY/2013/02, no marine traffic records and geographical plots of the vessels tracks were recorded during the reporting period.

3.4.3 The exceedance is still under investigation by Contract No. HY/2013/01. The Investigation Report (including the causes of exceedance, action taken and recommendation for mitigation) for Action or Limit Level Non-compliance will be prepared by the ET of Contract No. HY/2013/01 and detailed in the quarterly EM&A Report prepared for Contract No. HY/2013/01.

3.4.4 Although the exceedances were not relevant to this Contract, the Contractor was reminded to provide appropriate water pollution mitigation measures, such as ensure all marine based activities were carried out within the silt curtain.

3.5 Implementation of Environmental Measures

3.5.1 In response to the site audit findings, the Contractor carried out corrective actions. Details of site audit findings and the corrective actions during the reporting period are presented in **Appendix F.**

3.5.2 The Contractor waters 8 times per day on all exposed soil within the project site and associated works areas when construction activities are being undertaken.

3.5.3 The Contractor was reminded to resolve the potential conflicts between the proposed landscape measures and any other works of the project. The landscape works with mitigation code G1, G2 and G4 were mainly conducted in Portion D under construction stage. The other mitigation measures with mitigation code G5, G6, G7 & G9 were not yet started. The implementation status of Landscape and Visual Mitigation Measures is presented in **Appendix E**.

3.5.4 The Contractor was reminded to provide well-maintained plant operated on-site and plant served regularly;

3.5.5 The Contractor was reminded to switch off vehicles and equipment while not in use;

3.5.6 The Contractor was reminded to schedule the construction works to minimize noise nuisance etc.

3.5.7 The Contractor was reminded to ensure all construction activities that generate wastewater with high concentrations of suspended solid (SS) should be collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.

3.5.7 The implementation status of Regular Marine Travel Route Plan (RMTRP) was checked by ET. Training material of Regular Marine Travel Route Plan was prepared and given to relevant staff. Those records were kept properly. Since the marine delivery of precast segments was completed in July 2017 and the removal of temporary loading and unloading point by Contract No. HY/2013/02, which involved marine work, was completed on 10 September 2017 and the area was handed back to Reclamation Contractor on 11 September 2017 for subsequent seawall construction, no marine traffic records and geographical plots of the vessels tracks to demonstrate the conformance of the vessel to the proposed route in September 2017, October 2017 and November 2017 would be provided to ER, ETL, IEC/ENPO for checking within the reporting period.

3.5.8 The tool box training of dolphin was carried out in Dec 2015. According to the action plan and communication flow chart of dolphin instruction, if any dolphin intruded BCF perimeter silt curtain, ETL should be informed. There was no notification received on any dolphin intrusion the site area of Contract No. HY/2013/02 during the reporting period.

3.5.9 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix E**. Most of the necessary mitigation measures were implemented properly.

3.6 Advice on the Solid and Liquid Waste Management Status

3.6.1 The Contractor registered as a chemical waste producer for the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

3.6.2 There was no excavated marine sediment generated in this reporting period. Since the disposal of excavated marine sediments has been completed with the last batch disposal on 30 August 2017 as confirmed by RSS, no excavated marine sediment was still remained and stored on site awaiting disposal during this reporting period under Contract No. HY/2013/02.

3.6.3 The summary of waste flow table is detailed in **Appendix G**.

3.7 Environmental Licenses and Permits

3.7.1 The valid environmental licenses and permits during the reporting period are summarized in **Appendix H**.

4 SUMMARY OF EXCEEDANCE, COMPLAINT, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTION

4.1 Summary of Exceedance of the Environmental Quality Performance Limit

4.1.1 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.

4.1.2 There was no Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level recorded at station AMS7 by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

4.1.3 There was an Action Level exceedance of 24-hr TSP level recorded at station AMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period. The Investigation Reports No. 023 (including the causes of exceedance, action taken and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in **Appendix J**.

4.1.4 There was no Action and Limit Level exceedance of noise recorded at station NMS2 and station NMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

4.1.5 For water quality monitoring, there were 144 action level exceedances and 34 limit level exceedances of dissolved oxygen, 5 action level exceedances and 1 limit level exceedance of turbidity, 28 action level exceedances and 5 limit level exceedances of suspended solid during the reporting period. The following table summarized the number of exceedance on each sampling date:

Sampling Date	No. of Exceedances					
	DO		Turbidity		SS	
	Action	Limit	Action	Limit	Action	Limit
1/9/2017	8	0	0	0	0	0
6/9/2017	4	4	1	0	3	0
8/9/2017	24	4	4	0	2	1
11/9/2017	30	3	0	0	0	0
13/9/2017	13	3	0	0	0	0
15/9/2017	10	2	0	1	0	0
18/9/2017	8	2	0	0	1	0
20/9/2017	3	2	0	0	1	0
22/9/2017	17	4	0	0	0	0
25/9/2017	1	1	0	0	1	0
27/9/2017	6	1	0	0	0	0
29/9/2017	13	0	0	0	0	0
2/10/2017	3	1	0	0	0	0
4/10/2017	3	4	0	0	0	0
6/10/2017	1	2	0	0	0	0
9/10/2017	0	1	0	0	0	0
18/10/2017	0	0	0	0	1	0
20/10/2017	0	0	0	0	3	0
23/10/2017	0	0	0	0	1	0
03/11/2017	0	0	0	0	3	1
06/11/2017	0	0	0	0	5	0
08/11/2017	0	0	0	0	2	2
13/11/2017	0	0	0	0	1	0
15/11/2017	0	0	0	0	1	0
20/11/2017	0	0	0	0	1	0
22/11/2017	0	0	0	0	1	1
24/11/2017	0	0	0	0	1	0
Total:	144	34	5	1	28	5

4.1.6 Impact dolphin monitoring results at all transects were reported in the EM&A Report prepared for Contract No. HY/2013/01.

4.2 Summary of Complaints, Notification of Summons and Successful Prosecution

4.2.1 There were two complaints received during the reporting period.

1. One complaint received by *Environmental Protection Department* on 27 October 2017 and referred to the ENPO. Then the ENPO forwarded the complaint by email to the R.E. (AECOM), the Contractor (China Harbour) and the ET (ETS-Testconsult Ltd.) of Contract No. HY/2013/02

at 19:57 on 27 October 2017. The complaint detail was "*珠澳大橋人工島地盤投訴黃泥水落海，情況持續了一個星期，詳細發生地點是人工島的C3位置，他要求跟進及回覆。*"

4.2.2 After received the details of the complaint from the ENPO, the ET of Contract No. HY/2013/02 had performed a related follow-up inspection on 02 November 2017 to investigate this event. The inspection was concentrated to check if appropriate water pollution mitigation measures were launched by the Contractor of Contract No. HY/2013/02.

4.2.3 According to the investigation, de-silting pits with geotextile were provided and wastewater was collected by the wetsep for proper treatment prior to disposal. Besides, effluent water sample was sampled for testing the total suspended solids. According to the latest test report with sample sampled on 25 September 2017, the parameter complied with the discharge license requirement. Hence, the complaint was found non-related to Contract No. HY/2013/02. The complaint investigation report (Log No. 015) was provided in **Appendix K**.

2. One complaint received by *Environmental Protection Department* on 23 November 2017 and referred to the ENPO. Then the ENPO forwarded the complaint by email to the R.E. (AECOM), the Contractor (China Harbour) and the ET (ETS-Testconsult Ltd.) of Contract No. HY/2013/02 17:58 on 23 November 2017. The complaint detail was "*港珠澳大橋人工島地盤，由於不是每處都灑水，引致大量塵埃，近收費亭最嚴重*"

4.2.4 After received the details of the complaint from the ENPO, the ET of Contract No. HY/2013/02 had performed a related follow-up inspection on 24 November 2017 to investigate this event. The inspection was concentrated to check if regular watering launched inside the construction site by the Contractor of Contract No. HY/2013/02.

4.2.5 After checked with the Contractor of Contract No. HY/2013/02 during 15:00 to 16:00 on 24 November 2017, the worksite was wetted with water (see attached photo and location plan of watering photo) near 收費亭 and spraying with water by watering cars were observed on the worksite during the follow-up inspection. Besides, 收費亭 was not managed by Contract No. HY/2013/02. Hence, the complaint was found non-related to Contract No. HY/2013/02. The complaint investigation report (Log No. 016) was provided in **Appendix K**.

4.2.6 Although the complaints were non-related to Contract No. HY/2013/02, the Contractor of Contract No. HY/2013/02 was reminded to provide appropriate mitigation measures such as:

1. Collect wastewater by sedimentation tanks or package treatment systems for proper treatment prior to disposal;
2. Ensure all silt removal facilities, channels and manholes were maintained and any deposited silt and grit were removed regularly;
3. Direct the wheel wash overflow and surface run-off to silt removal facilities before discharging to the storm drain;
4. Wet the worksites with water regularly;
5. Keep the watering record for inspection;
6. Cover the dusty materials with impervious sheeting;
7. Spray water during demolition activities

4.2.7 There were no notifications of summons or prosecutions received during the reporting period.

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

5 COMMENTS, RECOMMENDATIONS AND CONCLUSION

5.1 Comments

5.1.1 According to the environmental site inspection undertaken during the reporting period, the following recommendations were provided:

- The Contractor was reminded to collect the general refuse properly;
- The Contractor was reminded to sort the C & D materials and general refuse;
- The Contractor was reminded to provide drip tray for the chemical containers;
- The Contractor was reminded to provide drip tray for the generators;
- The Contractor was reminded to switch off the equipment while not in use;
- The Contractor was reminded to clear the stagnant water pool;
- The Contractor was reminded to provide appropriate NRMM label for the machines;
- The Contractor was reminded to sheltered on top and 3 sides during cement mixing process;
- The Contractor was reminded to spray the haul road with water regularly.

5.1.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix E**. Most of the necessary mitigation measures were implemented properly.

5.2 Recommendations

5.2.1 With implementation of the recommended environmental mitigation measures, the contract's environmental impacts were considered environmentally acceptable. The weekly environmental site inspections ensured that all the environmental mitigation measures recommended were effectively implemented.

5.2.2 The recommended environmental mitigation measures, as included in the EM&A programme, effectively minimize the potential environmental impacts from the Contract. Also, the EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

5.3 Conclusions

5.3.1 The site preparation work of the Contract was started on 25 July 2014 and the construction works of the Contract commenced on 24 November 2014. This is the Twelfth Quarterly EM&A Report which summaries findings of the EM&A work during the reporting period from 01 September 2017 to 30 November 2017.

5.3.2 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.

5.3.3 There was no Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level recorded at station AMS7 by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

5.3.4 There was an Action Level exceedance of 24-hr TSP level recorded at station AMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period. The Investigation Reports No. 023 (including the causes of exceedance, action taken and recommendation for mitigation) for Action or Limit Level Non-compliance were provided in **Appendix J**.

5.3.5 There was no Action and Limit Level exceedance for noise recorded at station NMS2 and station NMS3B by the Environmental Team of Contract No. HY/2013/01 during the reporting period.

5.3.6 There were 144 action level exceedances and 34 limit level exceedances of dissolved oxygen, 5 action level exceedances and 1 limit level exceedance of turbidity, 28 action level exceedances and 5 limit level exceedances of suspended solid during the reporting period. The following table summarized the number of exceedance on each sampling date:

Sampling Date	No. of Exceedances					
	DO		Turbidity		SS	
	Action	Limit	Action	Limit	Action	Limit

1/9/2017	8	0	0	0	0	0
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13/9/2017	13	3	0	0	0	0
15/9/2017	10	2	0	1	0	0
18/9/2017	8	2	0	0	1	0
20/9/2017	3	2	0	0	1	0
22/9/2017	17	4	0	0	0	0
25/9/2017	1	1	0	0	1	0
27/9/2017	6	1	0	0	0	0
29/9/2017	13	0	0	0	0	0
2/10/2017	3	1	0	0	0	0
4/10/2017	3	4	0	0	0	0
6/10/2017	1	2	0	0	0	0
9/10/2017	0	1	0	0	0	0
18/10/2017	0	0	0	0	1	0
20/10/2017	0	0	0	0	3	0
23/10/2017	0	0	0	0	1	0
03/11/2017	0	0	0	0	3	1
06/11/2017	0	0	0	0	5	0
08/11/2017	0	0	0	0	2	2
13/11/2017	0	0	0	0	1	0
15/11/2017	0	0	0	0	1	0
20/11/2017	0	0	0	0	1	0
22/11/2017	0	0	0	0	1	1
24/11/2017	0	0	0	0	1	0
Total:	144	34	5	1	28	5

5.3.7 Impact dolphin monitoring results at all transects were reported in the EM&A Report prepared for Contract No. HY/2013/01.

5.3.8 Environmental site inspections were carried out on 07, 14, 21 and 28 September 2017, 06, 12, 19 and 26 October 2017 and 02, 09, 16, 23 and 30 November 2017. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site inspections.

5.3.9 There were two complaints received in relation to the environmental impact during the reporting period. The complaints were found non-related to Contract No. HY/2013/02. The complaint investigation reports (Log No. 015 and 016) were provided in **Appendix K**.

5.3.10 There was no notification of summons and successful prosecution received during the reporting period.

- END OF REPORT -

FIGURES

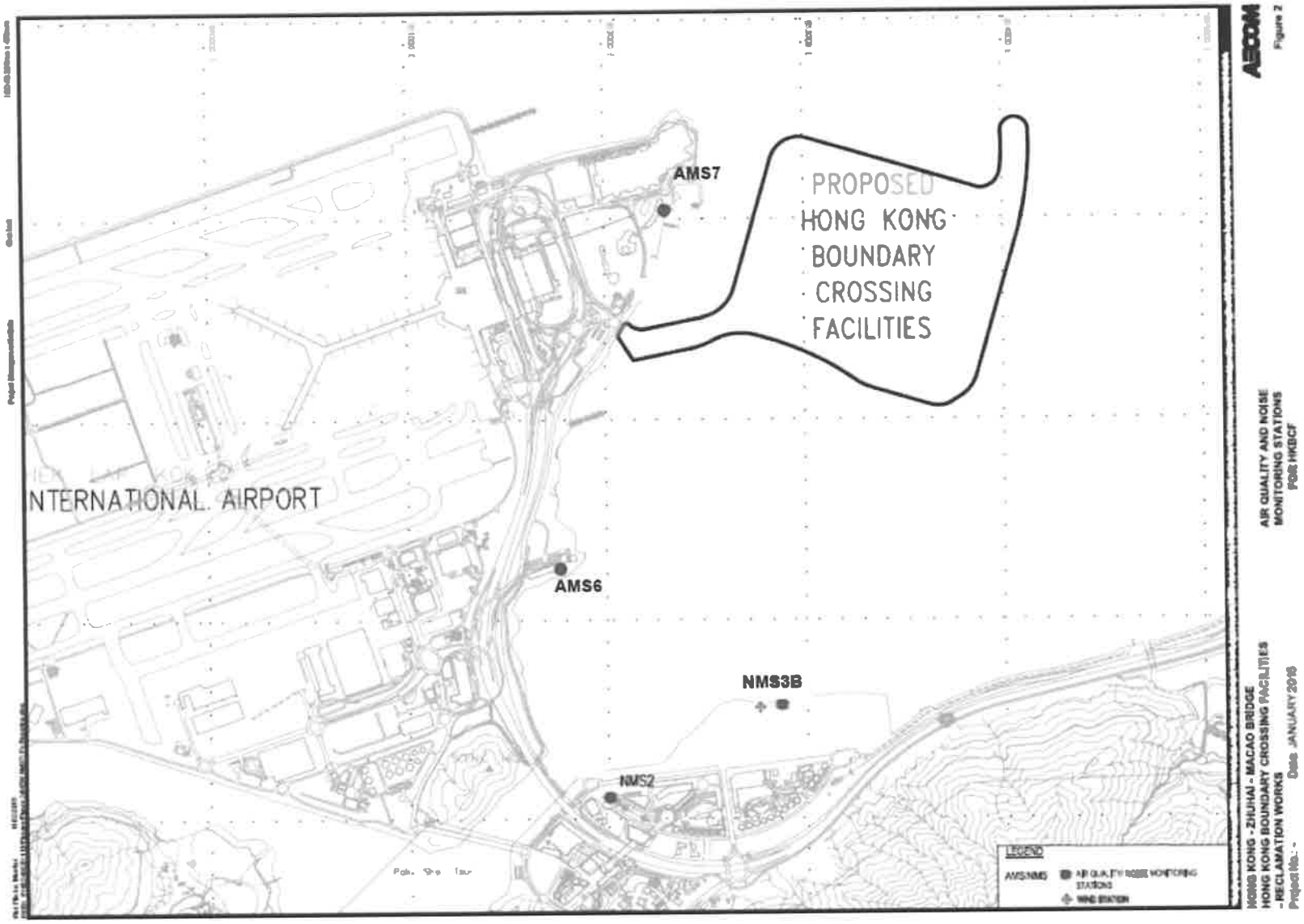
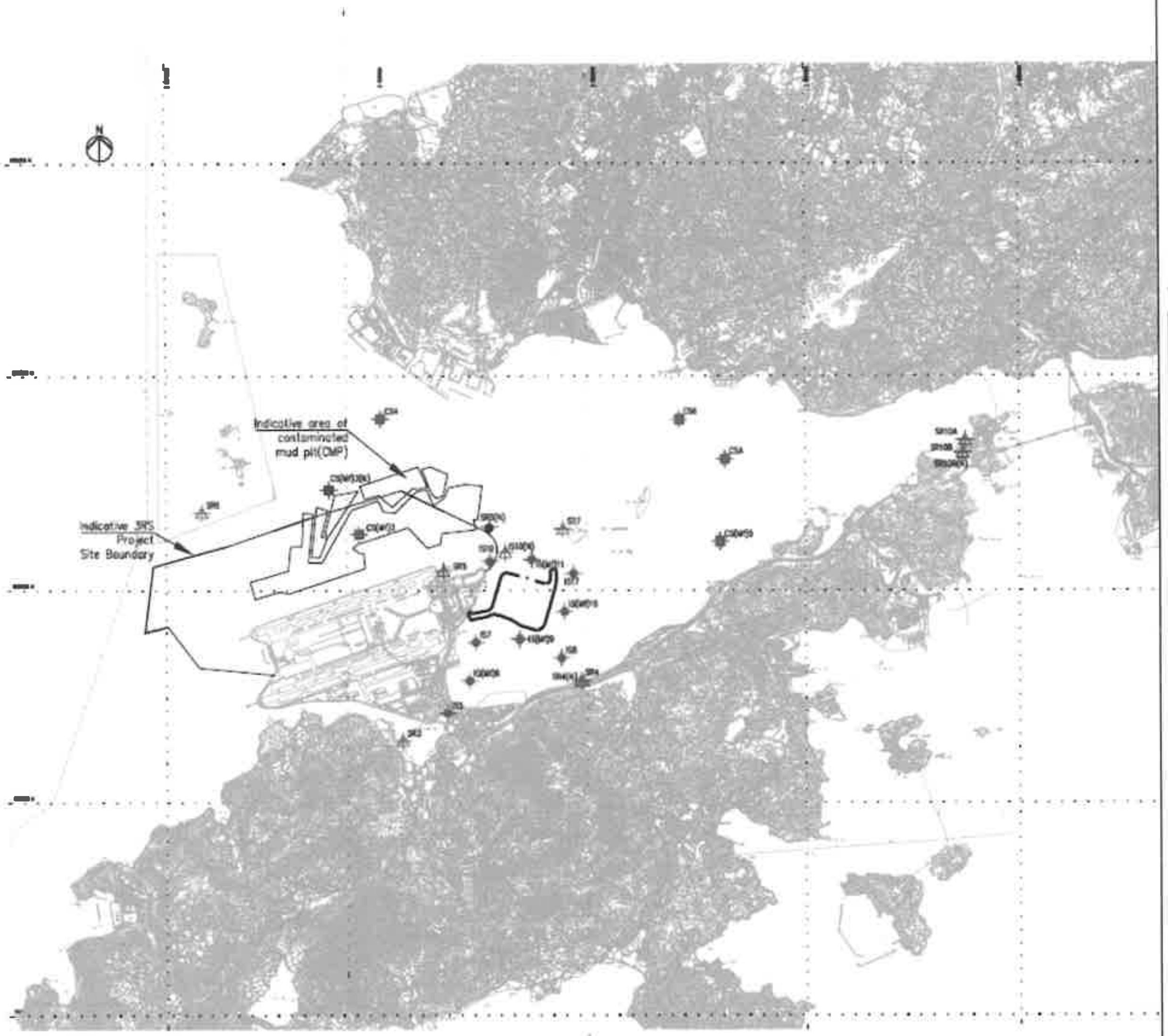


Figure 1 **Air Quality and Noise Monitoring Stations for HKBCF**



LEGEND

- IS — IMPACT STATIONS
- CS — CONTROL / FAR FIELD STATIONS
- SR — SENSITIVE RECEIVERS STATIONS
- IS — IMPACT STATIONS (RELOCATED)
- SR — SENSITIVE RECEIVERS STATIONS (RELOCATED)
- CS — CONTROL / FAR FIELD STATIONS (RELOCATED)

SETTING OUT SCHEDULE

MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817185
IS(Mf)6	812101	817833
IS7	812244	818777
IS8	814251	818412
IS(Mf)9	813273	818853
SR5(N)	812569	816476
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
SR3	810525	816456
SR4(N)	814705	817859
SR4a(N)	813042	820881
SR6	802857	821818
SR7	814280	821433
SR10A	823741	823495
SR10B(N)	823683	823187
CS(Mf)3(N)	808814	822355
CS(Mf)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064
IS10	812577	820070
SR8	811489	820455
CS(Mf)3	809989	821117

Figure 2 Water Quality Monitoring Stations (construction phases)

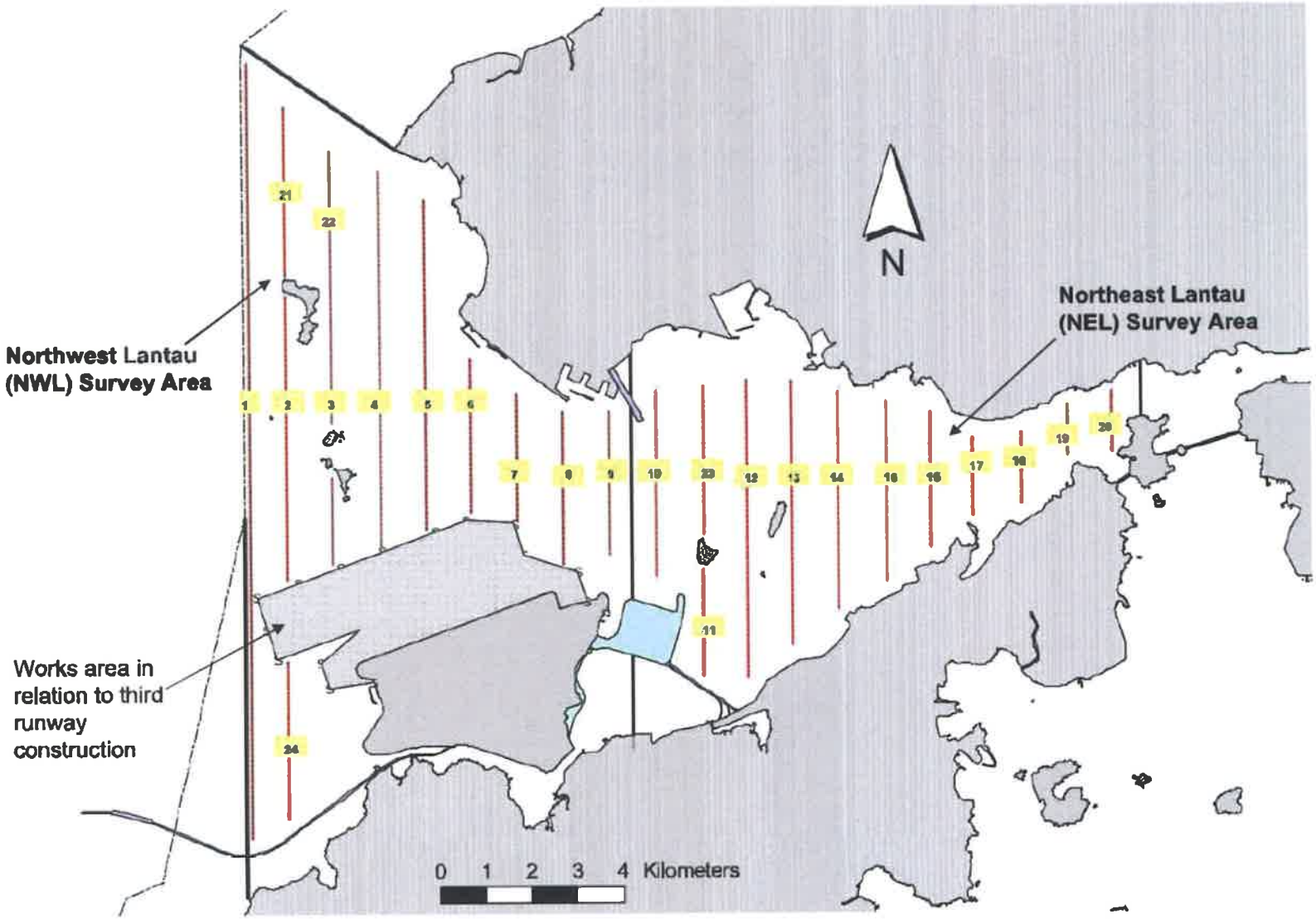
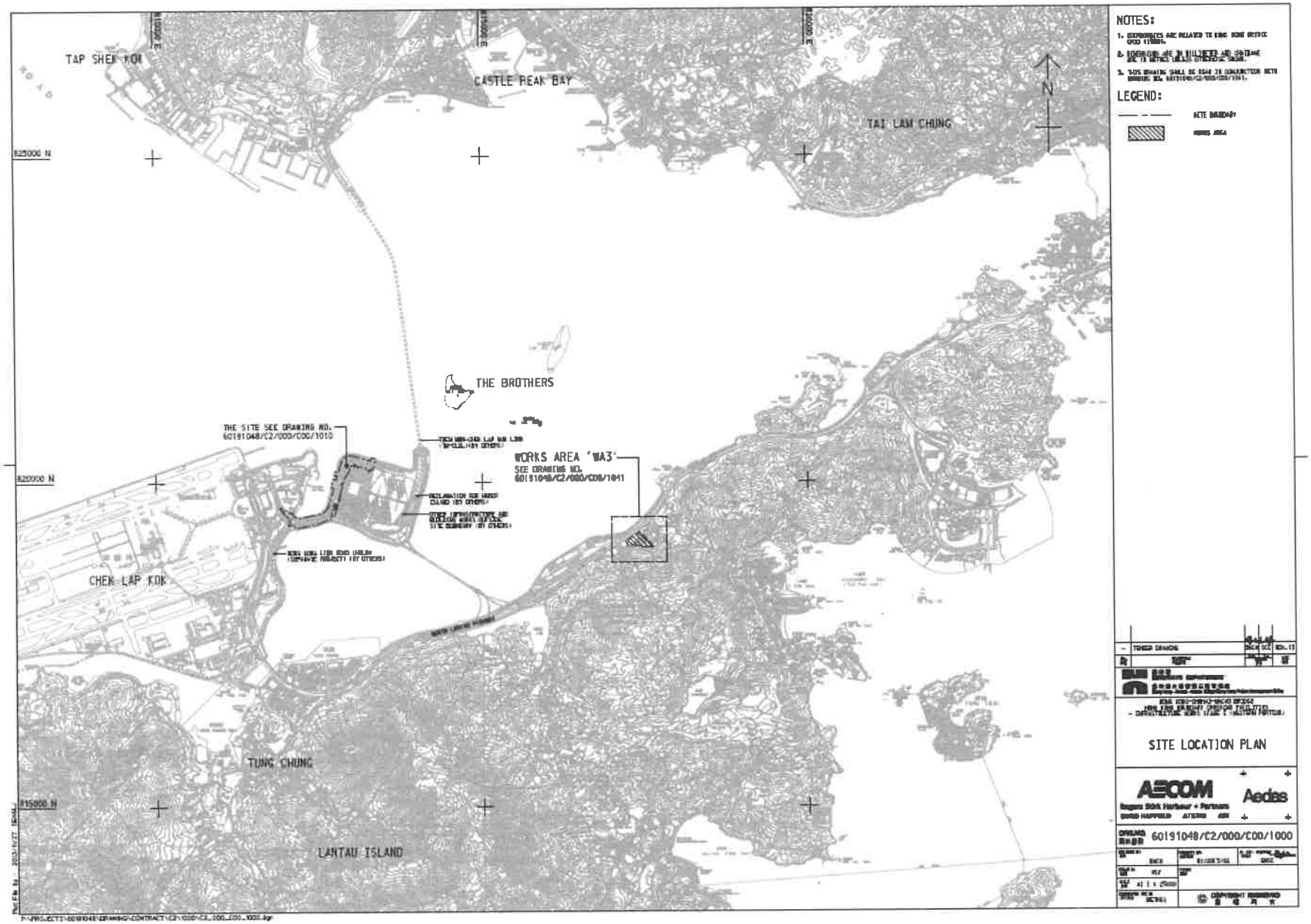


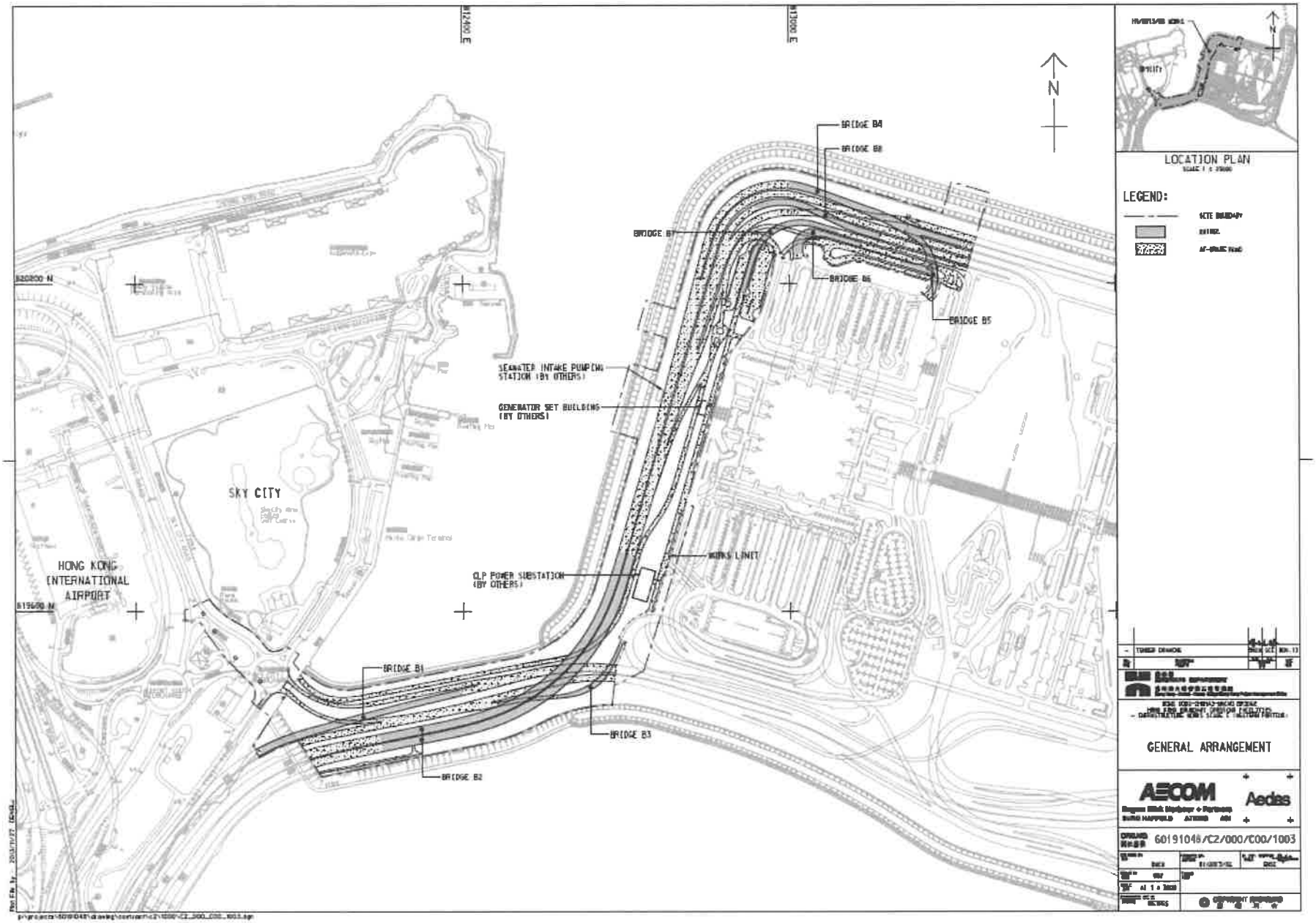
Figure 3 **Dolphin Monitoring Transect Line and Layout Map**

Appendix A

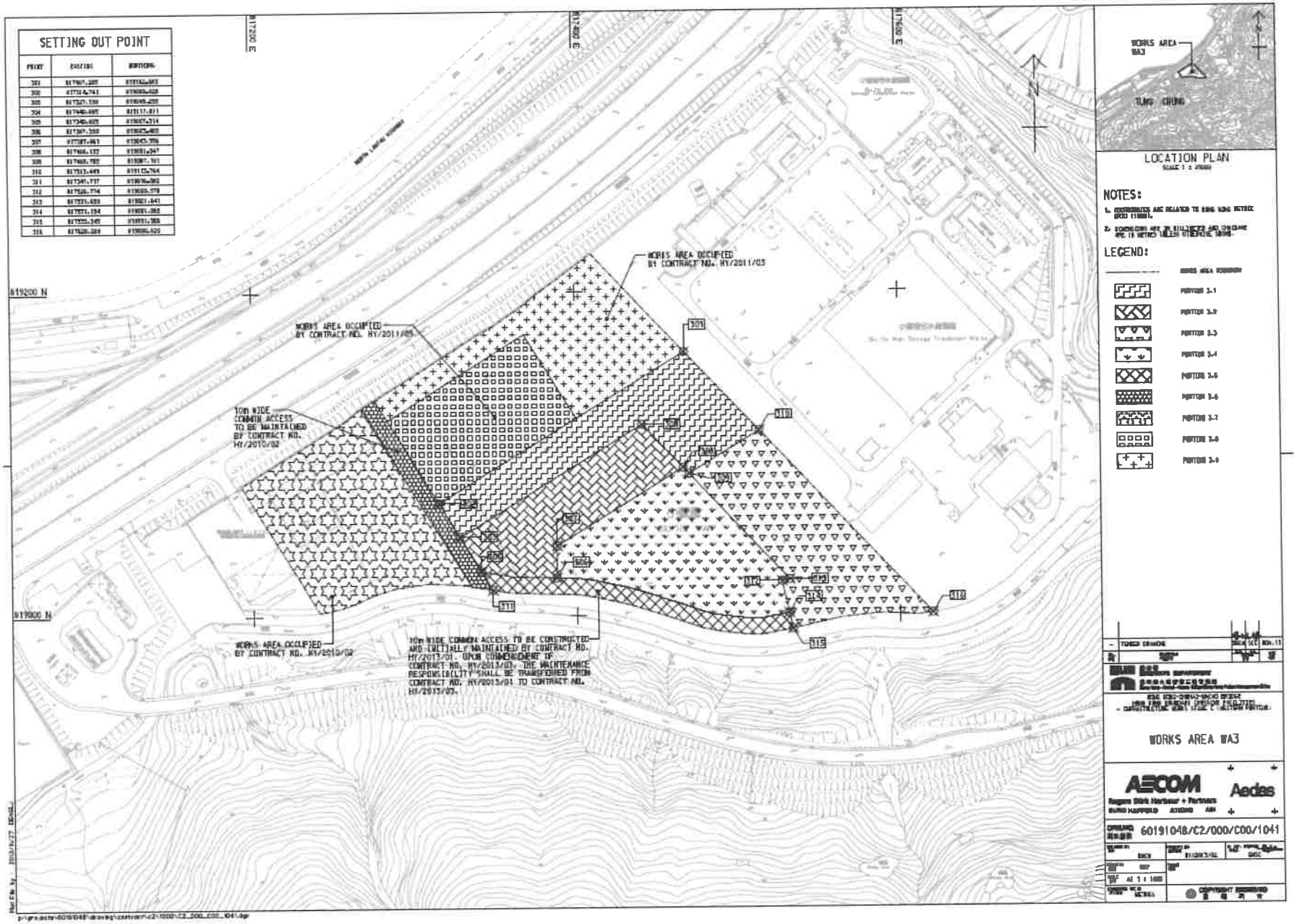
Location of Works Areas



ETS-TESTCONSULT LIMITED



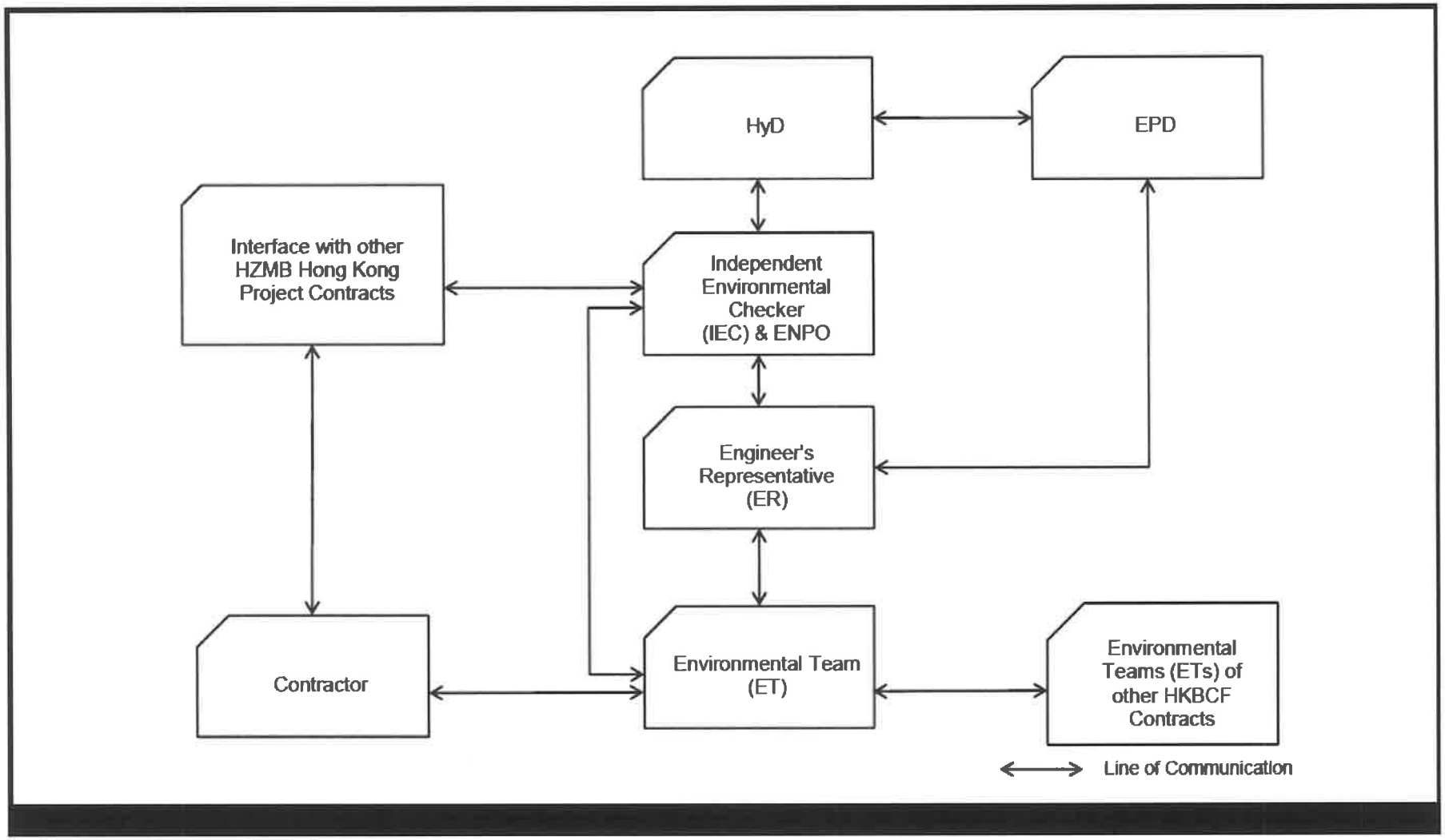
ETS-TESTCONSULT LIMITED



ETS-TESTCONSULT LIMITED

Appendix B

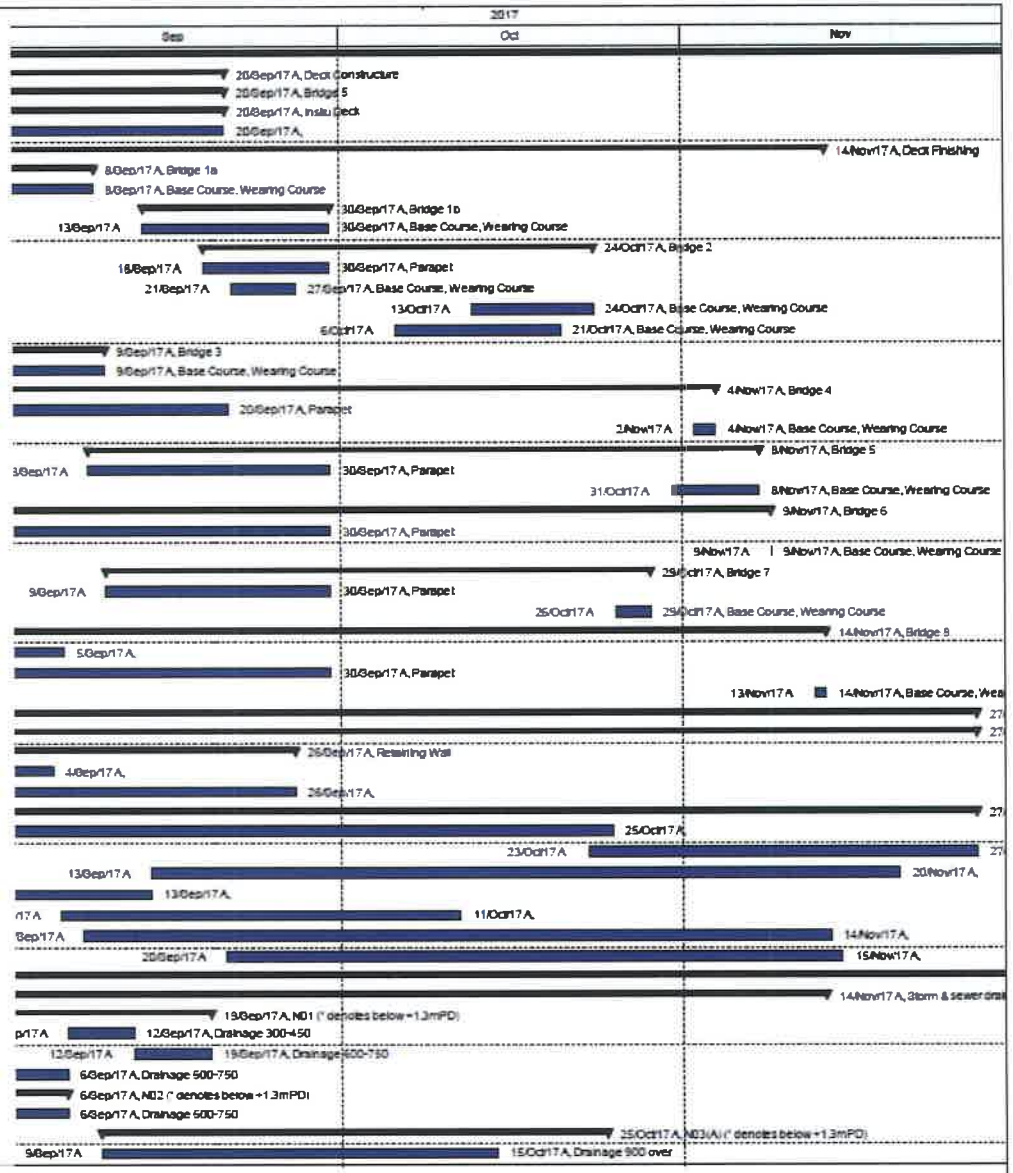
Project Organization for Environmental Works


HyD
EPD
Interface with other HZMB Hong Kong Project Contracts
Independent Environmental Checker (IEC) & ENPO
Engineer's Representative (ER)
Contractor
Environmental Team (ET)
Environmental Teams (ETs) of other HKBCF Contracts
Line of Communication

Appendix C

Construction Programme

Activity ID	Activity Name	Original Duration	% Comp.
Western Portion - Revised Package Programme 161116 (23-12-17)		438	0%
Deck Constructure		55	0%
Bridge 5		55	0%
Insitu Deck		55	0%
B5-1010	Construct Insitu deck between P501 to 502 & P50	55	100%
Deck Finishing		180	0%
Bridge 1a		36	0%
DF_1020	Road Surface & Deck Finishing	36	100%
Bridge 1b		42	0%
DF_1050	Road Surface & Deck Finishing	42	100%
Bridge 2		159	0%
DF_1100	Parapet P212 to P206 (265m)	45	100%
DF_1120	Road Surface & Deck Finishing (A215 to P212)	47	100%
DF_1330	Road Surface & Deck Finishing (P206 to A201)	40	100%
DF_1320	Road Surface & Deck Finishing (P212 to P206)	62	6.45%
Bridge 3		37	0%
DF_1150	Road Surface & Deck Finishing	37	100%
Bridge 4		97	0%
DF_1170	Parapet (226m)	38	100%
DF_1180	Road Surface & Deck Finishing	34	100%
Bridge 5		35	0%
DF_1210	Parapet (300m)	34	100%
DF_1220	Road Surface & Deck Finishing	35	100%
Bridge 6		78	0%
DF_1240	Parapet (148m)	24	100%
DF_1250	Road Surface & Deck Finishing	35	48.57%
Bridge 7		74	0%
DF_1270	Parapet (246m)	41	100%
DF_1280	Road Surface & Deck Finishing	40	100%
Bridge 8		130	0%
DF_1290	External PT	18	100%
DF_1300	Parapet (239m)	39	100%
DF_1310	Road Surface & Deck Finishing	40	27.5%
Earthworks & Retaining Structure		125	0%
Earthwork		125	0%
Retaining Wall		75	0%
EW1120	Retaining Wall W7-2	56	100%
EW1130	Retaining Wall W8-1	56	100%
Backfill		106	0%
EW1060	Backfill W4-1	45	100%
EW1150	Backfill W5-2	30	100%
EW1170	Backfill W6-1	55	100%
EW1180	Backfill W7-1	45	100%
EW1190	Backfill W7-2	30	100%
EW1200	Backfill W8-1	55	100%
EW1210	Backfill W8-2	45	100%
Ground Level Road Works		435	0%
Storm & sewer drainage		367	0%
ND1 (* denotes below +1.3mPD)		21	0%
DR1030	M18E.3 - M18E.2 (37m) 450mm (ND1)	9	100%
DR1050	M18E.4 - M16E.3 (25m) 600mm (ND1)	7	100%
DR1020	M18E.4 - M18E.3 (10m) 600mm (ND1)*	5	100%
ND2 (* denotes below +1.3mPD)		7	0%
DR1110	M20E.6 - M20E.5 (14m) 750mm (ND2)	7	0%
ND3(A) (* denotes below +1.3mPD)		327	0%
DR1180	Box C1.2 - M2SE.A4 (18m) 900mm (ND3)*	30	100%



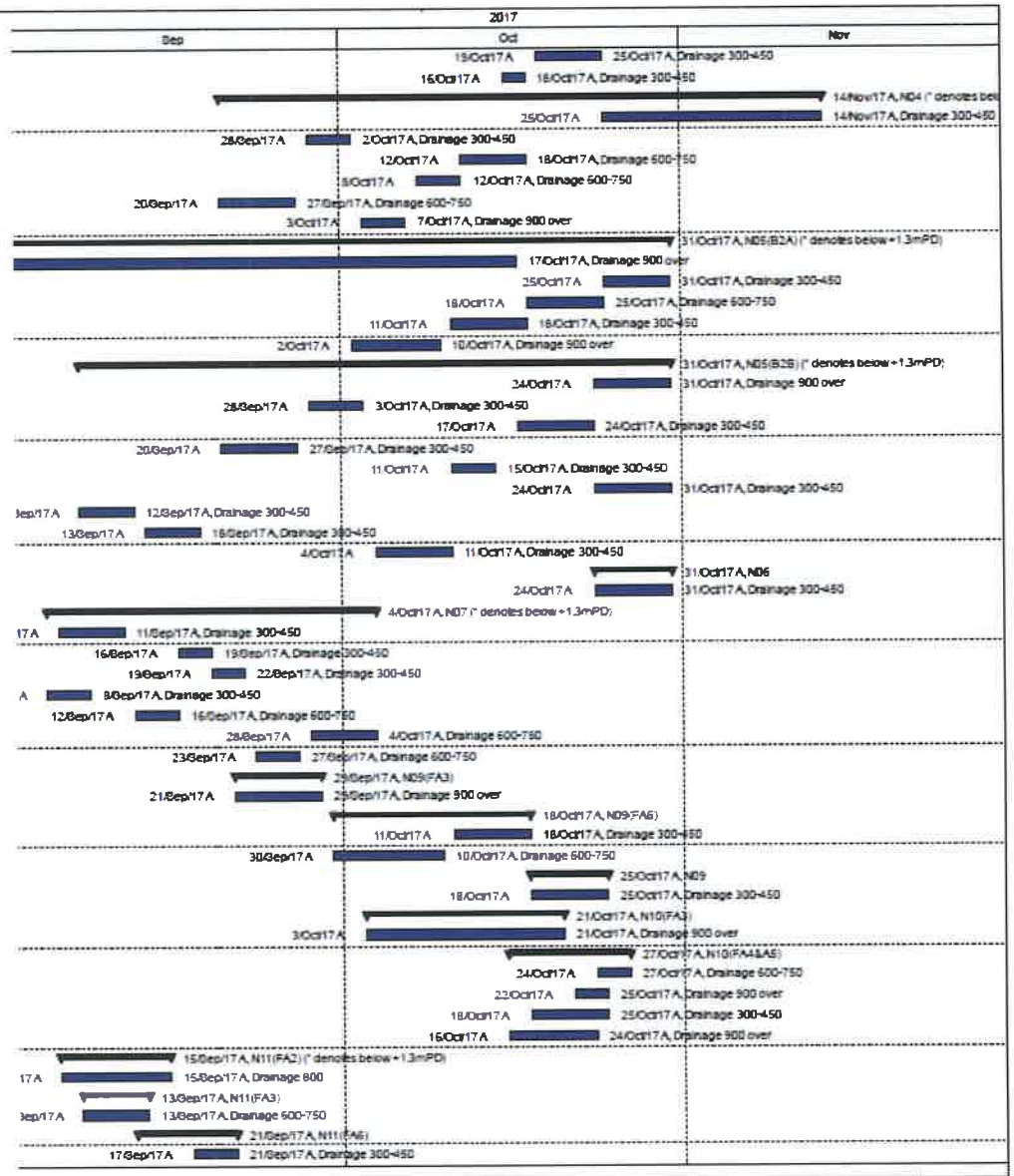
Remaining Level of Effort | Actual Work | Critical Remaining ...
Actual Level of Effort | Remaining Work | Milestone

C02 rolling programme (Sep-Nov17) (Based on DRM161116)

Date	Revision	Checked	Approved

東業檢動測試集團有限公司
ETS-TESTCONSULT LIMITED

Activity ID	Activity Name	Original Duration	% Comp.
DR1200	M24E.4 - M25E.5 (46m) 450mm (ND3)	11	100%
DR1190	M25E.5 - M24E.5 (36m) 450mm (ND3)	9	100%
ND4 (* denotes below +1.3mPD)		51	0%
DR1450	M32E.2 - M32E.1 (32m) 300mm (ND4)	8	0%
DR1350	M33E.2 - M33E.1 (40m) 450mm (ND4)	9	100%
DR1390	M34E.5 - M34E.4 (35m) 750mm (ND4)	8	0%
DR1380	M34E.5 - M34E.5 (34m) 750mm (ND4)	8	0%
DR1340	M34E.8 - M33E.2 (43m) 600mm (ND4)	9	100%
DR1360	M34E.8 - M34E.7 (27m) 1050mm (ND4)	9	90.14%
ND5(B2A) (* denotes below +1.3mPD)		141	0%
DR1530	Box C3.2 - M42E.5 (8m) 1050mm (ND5)	33	100%
DR1600	M36E.2 - M36E.1 (33m) 450mm (ND5)	8	0%
DR1590	M38E.3 - M28E.3 (51m) 750mm (ND5)	11	49.09%
DR1580	M38E.3 - M37E.1 (25m) 300mm (ND5)	7	100%
DR1570	M42E.5 - M38E.3 (25m) 900mm (ND5)	7	100%
ND5(B2B) (* denotes below +1.3mPD)		46	0%
DR1700	Box C4.2 - M12E.15 (6m) 1350mm (ND5)*	0	0%
DR1660	M10E.2 - M7E.3 (39m) 300mm (ND5)	11	100%
DR1690	M12E.17 - M8E.2 (34m) 300m (ND5)	7	0%
DR1650	M38E.1 - M10E.2 (38m) 450mm (ND5)	10	100%
DR1680	M38E.1 - M12E.17 (49m) 450mm (ND5)	0	0%
DR1780	M5E.N6 - M5E.6 (28m) 300mm (ND5)	7	0%
DR1730	M6E.2 - M6E.1 (27m) 300mm (ND5)	7	100%
DR1740	M6E.A2 - M14E.1 (20m) 300mm (ND5)	6	100%
DR1670	M7E.3 - M7E.2 (45m) 300mm (ND5)	10	50%
ND6		5	0%
DR1860	M40C.2 - M40C.A2 (14m) 450mm (ND6)	5	100%
ND7 (* denotes below +1.3mPD)		43	0%
DR1900	M2E.1 - M2E.1A (33m) 300mm (ND7)	8	100%
DR1920	M3E.1 - M3E.A1 (40m) 450mm (ND7)	9	26.67%
DR1930	M3E.A1 - M3E.B1 (21m) 300mm (ND7)	6	0%
DR1890	M4E.11 - M2E.1 (19m) 450mm (ND7)	6	100%
DR1910	M4E.11 - M3E.1 (50m) 600mm (ND7)	12	100%
DR1950	M4E.8 - M4E.2 (217m) 750mm (ND7)	0	0%
DR1940	M4E.9 - M4E.8 (35m) 750mm (ND7)	8	0%
ND9(FA3)		9	0%
DR2070	M68A.6 - M68A.5 (36m) 1050mm (ND9)	9	11.11%
ND9(FA6)		14	0%
DR2110	M68A.4 - STMH011-001 (5m) 300mm (ND9)	5	100%
DR2100	M68A.5 - M68A.4 (36m) 750mm (ND9)	9	100%
ND9		7	0%
DR2180	M77A.A1 - M77A.1 (25m) 300mm (ND9)	7	0%
N10(FA3)		10	0%
DR2220	M67A.5 - M67A.5 (47m) 1050mm (N10)	10	0%
N10(FA4&A5)		44	0%
DR2280	M66A.4 - M66A.3 (70m) 750mm (N10)	13	0%
DR2260	M66A.4 - M67A.3 (27m) 1050mm (N10)	7	28.57%
DR2250	M67A.3 - M67A.2 (36m) 450mm (N10)	9	100%
DR2240	M67A.5 - M67A.3 (56m) 1050mm (N10)	15	100%
N11(FA2) (* denotes below +1.3mPD)		9	0%
DR2370	M76A.A17 - M69A.5 (70m) 800mm (N11)*	9	44.44%
N11(FA3)		9	0%
DR2390	M69A.5 - M69A.4 (37m) 750mm (N11)	5	0%
N11(FA6)		22	0%
DR2420	M69A.2 - M69A.1 (35m) 450mm (N11)	9	100%



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
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Milestone

C02 rolling programme (Sep-Nov'17) (Based on DRM161116)

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東泉運動測試顧問有限公司
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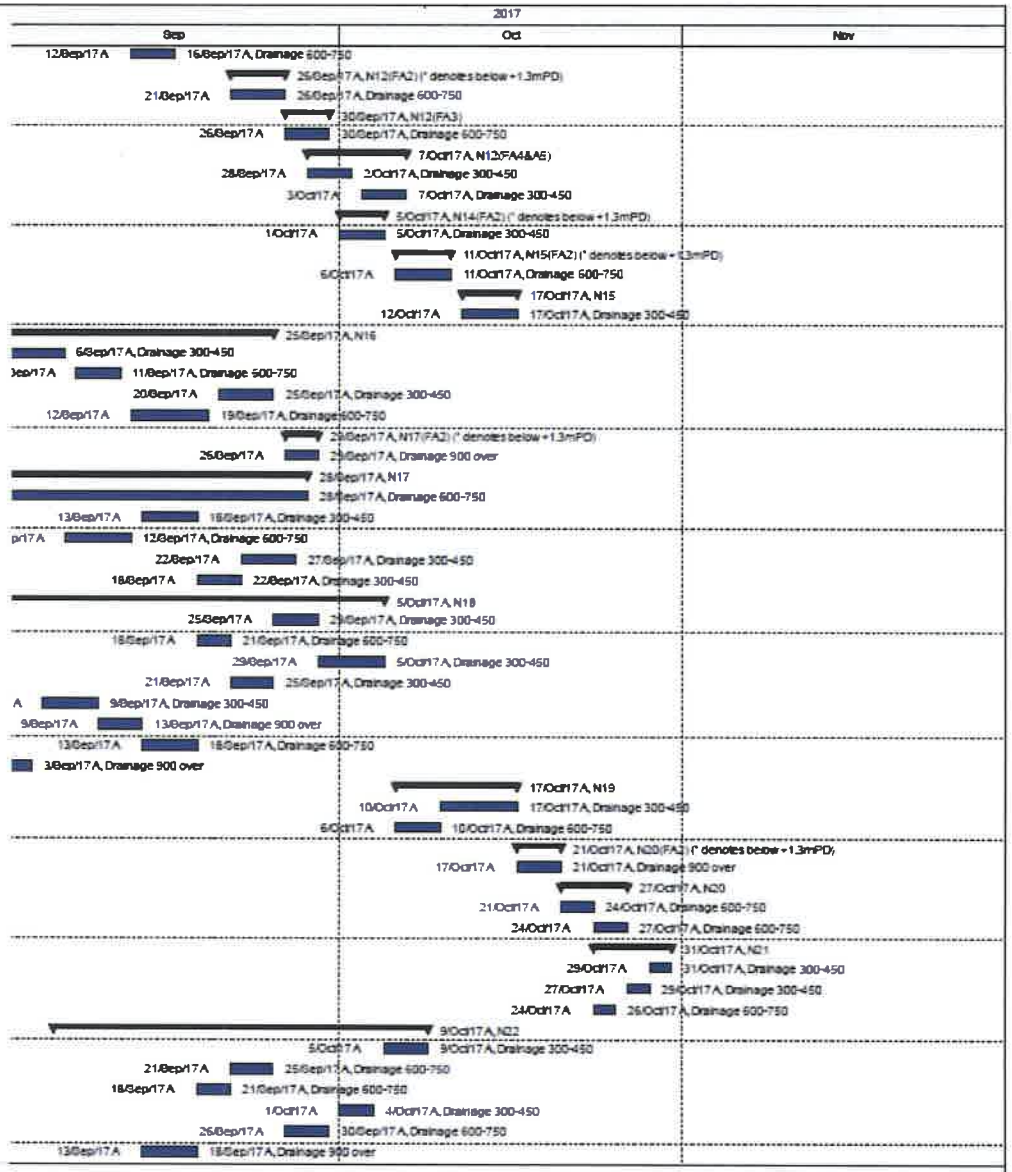
Activity ID	Activity Name	Original Duration	% Comp.
DR2410	M69A.4 - M69A.2 (67m) 600mm (N11)	13	100%
N12(FAZ) (* denotes below +1.3mPD)		30	0%
DR2440	M76A.22 - M66A.6 (12m) 600mm (N12)*	30	86.67%
N12(FA3)		11	0%
DR2460	M66A.6 - M66A.5 (52m) 600mm (N12)	11	0%
N12(FA4&A5)		10	0%
DR2490	M66A.B5 - M66A.B6 (8m) 300mm (N12)	5	0%
DR2500	M66A.B6 - STM#+013-001 (13m) 300mm (N12)	5	0%
N14(FAZ) (* denotes below +1.3mPD)		11	0%
DR2560	M43A.2 - M43A.1 (51m) 300mm (N14)	11	100%
N15(FAZ) (* denotes below +1.3mPD)		30	0%
DR2580	M76A.A18 - M44A.4 (37m) 600mm (N15)*	30	96.67%
N15		8	0%
DR2620	M44A.1 - M44A.A1 (30m) 300mm (N15)	8	0%
N16		34	0%
DR2680	M53A.4 - M53A.3 (57m) 450mm (N16)	12	50%
DR2690	M53A.4 - M53A.B1 (39m) 750mm (N16)	9	0%
DR2710	M53A.8 - M80A.7 (12m) 450mm (N16)	5	0%
DR2700	M53A.B1 - M53A.A1 (34m) 600mm (N16)	8	0%
N17(FAZ) (* denotes below +1.3mPD)		30	0%
DR2750	M76A.18 - M42A.15 (12m) 1200mm (N17)*	30	10%
N17		71	0%
DR2790	M42A.10 - M42A.6 (67m) 750mm (N17)	13	100%
DR2810	M42A.4 - M42A.1 (106m) 450mm (N17)	18	1.67%
DR2800	M42A.6 - M42A.4 (76m) 600mm (N17)	14	100%
DR2830	M42A.7 - M40A.1 (40m) 300mm (N17)	9	0%
DR2820	M42A.A2 - M42A.C2 (23m) 450mm (N17)	7	0%
N18		48	0%
DR2970	M47A.10 - M47A.4 (18m) 450mm (N18)	6	0%
DR2950	M47A.10 - M47A.7 (73m) 600mm (N18)	14	100%
DR2980	M47A.4 - M47A.A4 (53m) 300mm (N18)	12	0%
DR2960	M47A.7 - M47A.6 (42m) 450mm (N18)	9	77.78%
DR2900	M49A.7 - M46A.1 (79m) 300mm (N18)	15	100%
DR2910	M49A.7 - M49A.A4 (156m) 900mm (N18)	26	15.38%
DR2940	M49A.8 - M47A.10 (14m) 750mm (N18)	5	100%
DR2890	M49A.8 - M49A.7 (27m) 1050mm (N18)	7	100%
N19		11	0%
DR3030	M39A.1 - M39A.A1 (13m) 300mm (N19)	5	100%
DR3000	M39A.5 - M39A.5 (18m) 750mm (N19)	6	100%
N20(FAZ) (* denotes below +1.3mPD)		14	0%
DR3050	M76A.A23.2 - M76A.A23.1 (14m) 1050mm (N20)	14	100%
N20		23	0%
DR3100	M62A.2 - M62A.3 (45m) 750mm (N20)	10	10%
DR3110	M62A.3 - M62A.5 (69m) 600mm (N20)	13	0%
N21		8	0%
DR3150	M58A.3 - M58A.2A (47m) 300mm (N21)	0	0%
DR3140	M58A.4 - M58A.3 (35m) 450mm (N21)	8	0%
DR3130	M58A.A6 - M58A.4 (77m) 600mm (N21)	0	0%
N22		56	0%
DR3260	M30A.3 - M30A.1 (50m) 450mm (N22)	11	0%
DR3210	M31A.4 - M31A.3 (34m) 600mm (N22)	8	0%
DR3200	M31A.5 - M31A.4 (28m) 750mm (N22)	7	0%
DR3240	M38A.4 - M38A.3 (36m) 450mm (N22)	9	0%
DR3230	M38A.5 - M38A.4 (31m) 600mm (N22)	8	0%
DR3190	M38A.7 - M31A.5 (67m) 900mm (N22)	14	85.71%



Remaining Level of Effort | Actual Work | Critical Remaining
Actual Level of Effort | Remaining Work | Milestone

C02 rolling programme (Sep-Now/17) (Based on DRM161116)

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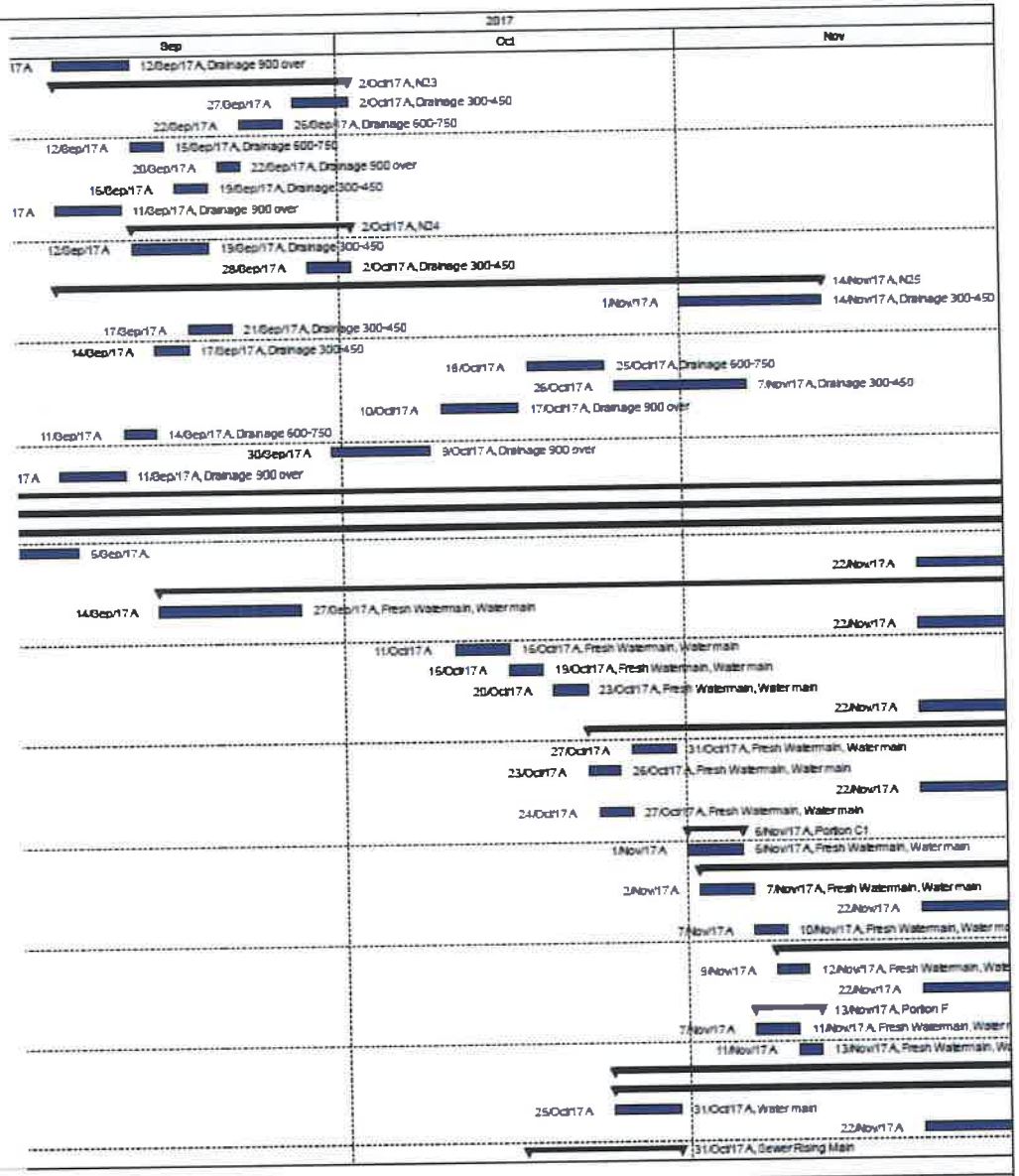
東業偵勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Activity ID	Activity Name	Original Duration	% Comp.
DR3160	M38A.9 - M38A.7 (71m) 1050mm (N23)	14	100%
N23		55	0%
DR3340	M57A.2 - M57A.A1 (51m) 300mm (N23)	12	0%
DR3320	M57A.5 - M57A.5 (19m) 750mm (N23)	6	0%
DR3290	M57A.7 - M31A.A2 (102m) 750mm (N23)	17	100%
DR3310	M57A.7 - M57A.6 (22m) 900mm (N23)	7	0%
DR3300	M57A.8 - M55A.1 (23m) 450mm (N23)	7	42.86%
DR3280	M57A.8 - M57A.7 (17m) 1050mm (N23)	6	100%
N24		15	0%
DR3380	M58A.9 - M58A.7 (27m) 300mm (N24)	7	57.14%
DR3370	M58A.9 - M58A.8 (35m) 450mm (N24)	8	100%
N25		52	0%
DR3490	M28.1 - M28.2 (15m) 300mm (N25)	5	0%
DR3430	M59A.4 - M59A.2 (53m) 300mm (N25)	11	27.27%
DR3420	M59A.5 - M59A.4 (21m) 450mm (N25)	6	100%
DR3470	M62A.6 - M62A.7 (32m) 600mm (N25)	8	0%
DR3480	M62A.6 - M62A.A6 (26m) 300mm (N25)	0	0%
DR3450	M62A.8 - M60A.2 (13m) 900mm (N25)	5	0%
DR3410	M62A.9 - M59A.5 (53m) 600mm (N25)	11	100%
DR3440	M62A.9 - M62A.8 (9m) 1050mm (N25)	5	0%
DR3400	M62A.A9 - M62A.9 (16m) 1200mm (N25)	6	100%
Watermain		142	0%
Fresh watermain		129	0%
Portion D1 (12m/day)		101	0%
PW1450	Fresh main K DN400 (CH-C00-CH-500) - Installation	25	100%
PW1460	Fresh main K DN400 (CH-C00-CH-500) - Testing & I	14	100%
Portion A		42	0%
PW1030	Fresh main H DN300 (CH-700-CH-1200) - Installatic	42	61.9%
PW1040	Fresh main H DN300 (CH-700-CH-1200) - Testing &	14	100%
PW1050	Fresh main J DN400 (CH-500-CH-602) - Installation	14	100%
PW1070	Fresh main K DN400 (CH-500-CH-615) - Installation	15	100%
PW1090	Fresh main P N3250 (CH-C17-CH-50) - Installation	14	100%
PW1100	Fresh main P N3250 (CH-C17-CH-50) - Testing & bi	14	100%
Portion F (near PCB)		38	0%
PW1190	Fresh main G DN300 (CH0-CH-450) - Installation	38	68.42%
PW1130	Fresh main H N3315 (CH1200-CH1500) - Installat	21	100%
PW1140	Fresh main H N3315 (CH1200-CH1500) - Testing	14	100%
PW1170	Fresh main P N3250 (CH0-CH-50) - Installation	10	0%
Portion C1		13	0%
PW1210	Fresh main G1 N3315 (CH0-CH200) - Installation	13	100%
Portion C2		36	0%
PW1230	Fresh main G DN300 & N3315 (CH450-CH875) -	36	72.22%
PW1240	Fresh main G DN300 & N3315 (CH450-CH875) -	14	100%
PW1250	Fresh main H N3315 (CH1500-CH1688) - Installa	20	60%
Portion E		24	0%
PW1270	Fresh main G1 N3315 (CH200-CH400) - Installati	24	100%
PW1280	Fresh main G1 N3315 (CH200-CH400) - Testing &	14	100%
Portion F		10	0%
PW1290	Fresh main G N3315 (CH875-CH946) - Installatior	7	100%
PW1310	Fresh main G1 N3315 (CH400-CH545) - Installati	10	100%
Flushing watermain		55	0%
Portion F (PCB inlet)		55	0%
FG1580	Flushing main G N3250 (CH300-CH380) - Installa	7	0%
FG1090	Flushing main G N3250 (CH300-CH380) - Testing	14	100%
Sewer Rising Main		14	0%



Remaining Level of Effort | Actual Work | Critical Remaining ...
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C02 rolling programme (Sep-Nov17) (Based on DRM161116)

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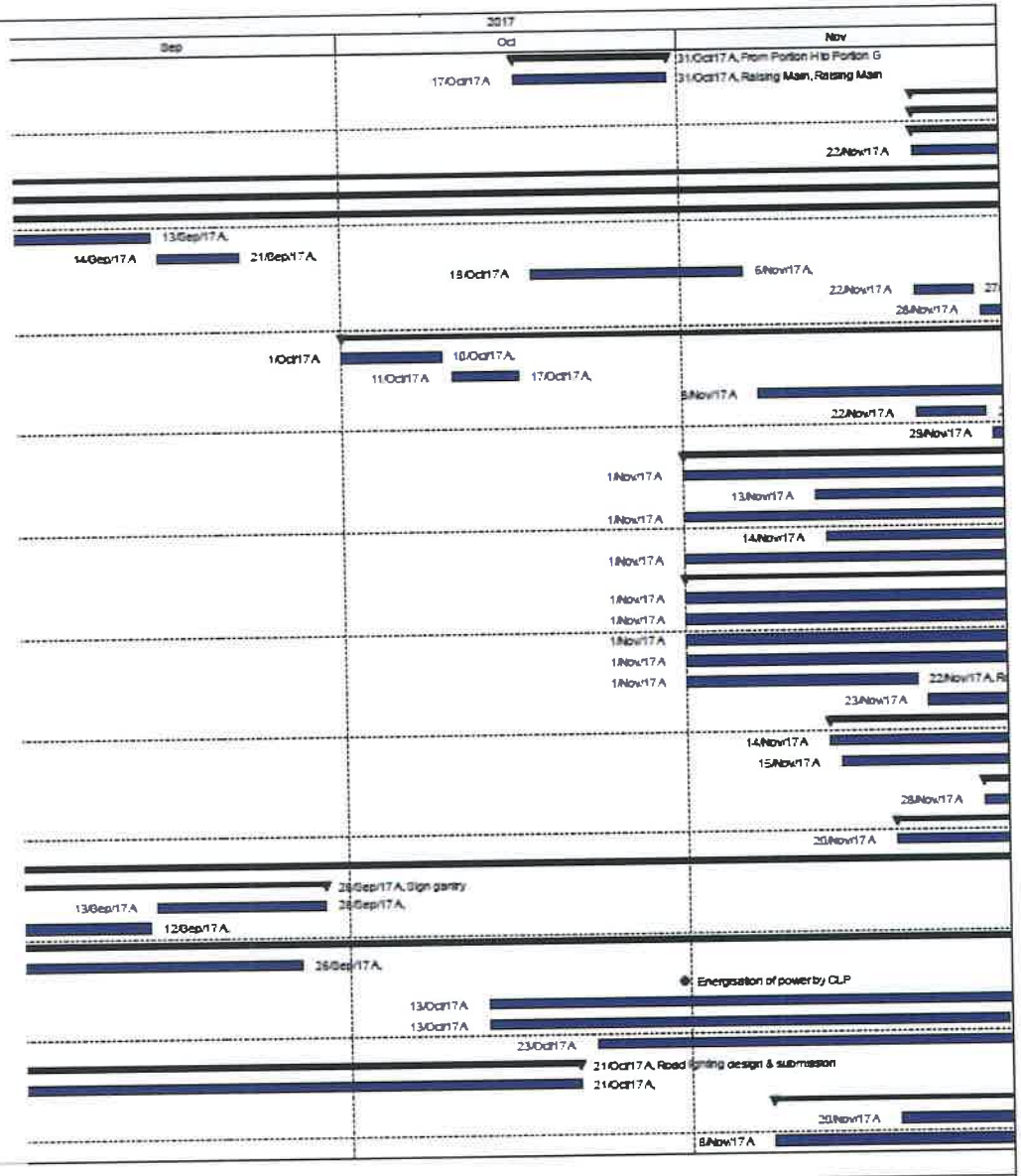
東康振動測試顧問有限公司
ETS-TESTCONSULT LIMITED

Activity ID	Activity Name	Original Duration	% Comp.
From Portion H to Portion G		14	0%
WM-0020	Raising main C&D (CH4-CH100) - Testing & backf	14	0%
Utilities		21	0%
Cable duct (TCSS, ELV & LV)		21	0%
Portion F		21	0%
TCS31100	Cable duct for TCS S, ELV, LV & other department	21	100%
Road works		162	0%
Bituminous works		162	0%
Portion D2 (site entrance)		91	0%
BT1070	SOL200 (CH16212-CH16350) road base & base	17	100%
BT1080	SOL200R (CH16212-CH16350) connector drain	7	100%
BT1090	SOL200R (CH16212-CH16350) road base & bas	16	100%
BT1020	SOL209 (CH100-CH344) connector drain & gully	5	100%
BT1030	SOL209 (CH100-CH344) road base & base cour	13	100%
Portion D2 & D1		49	0%
BT1620	SOL101 (CH1735-CH1900) connector drain & gu	7	0%
BT1630	SOL101 (CH1735-CH1900) road base & base co	16	0%
BT1660	SOL103 (CH163-CH295) connector drain & gully	5	0%
BT1680	SOL208 (CH300-CH525) connector drain & gully	6	100%
BT1690	SOL208 (CH300-CH525) road base & base cour	16	100%
Portion A & B		36	0%
BT1100	SOL200 (CH16963-CH17200) connector drain &	24	0%
BT1110	SOL200 (CH16963-CH17200) road base & base	29	0%
BT1120	SOL200R (CH16963-CH17200) connector drain	22	0%
BT1130	SOL200R (CH16963-CH17200) road base & bas	28	0%
BT1140	SOL311 (CH2238-CH2000) connector drain & gu	14	0%
Portion F (next to PCB)		59	0%
BT1180	SOL200 (CH17200-CH17487) connector drain &	36	0%
BT1190	SOL200 (CH17200-CH17487) road base & base	45	0%
BT1200	SOL200R (CH17200-CH17487) connector drain	30	0%
BT1210	SOL200R (CH17200-CH17487) road base & bas	37	0%
BT1160	SOL311 (CH2000-CH1623) connector drain & gu	20	0%
BT1170	SOL311 (CH2000-CH1623) road base & base co	16	0%
Portion C1 & E		17	0%
BT1240	SOL205 (CH250-CH481) connector drain & gully	14	0%
BT1250	SOL205 (CH250-CH481) road base & base cour	16	0%
Portion C2		38	0%
BT1400	SOL201 (CH100-CH500) connector drain & gully	38	0%
Car Park		63	0%
RW3010	Formation & sub-base - 6300m2	63	17.46%
Road furniture & Misc		273	0%
Sign gantry		28	0%
RF1230	Sign gantry structure DG23 (Portion F with TCSS)	14	100%
RF1220	Sign gantry structure DG305 (Portion F with TCSS)	14	100%
Lighting & power		153	0%
RF1260	E&M work for sign gantry	50	100%
RF1300	Energisation of power by CLP	0	100%
RF1290	Lighting & power to at grade road	90	65%
RF1270	Lighting & power to bridge area	80	73.13%
RF1280	Lightning protection work for sign gantry	35	100%
Road lighting design & submission		120	0%
RF1140	Order & delivery of lighting material for remaining	120	100%
Road furniture		140	0%
BT2020	Wearing & friction course for road works (Remain	60	0%
BT2000	Wearing & friction course for road works (Substan	140	27.14%



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Appendix D

Event and Action Plan

Event/Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurement s to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Construction Noise Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5 Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event and Action Plan for Water Quality

Event	ET Leader	IEC	ER	Contractor
Action level being exceeded by one sampling day	1. Repeat in situ measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods;	1. Confirm receipt of notification of noncompliance in writing; 2. Notify Contractor	1. Confirm receipt of notification of noncompliance in writing; 2. Notify Contractor	1. Inform the ER and confirm notification of the noncompliance in writing; 2. Rectify unacceptable practice; 3. Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	1. Repeat in situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level; 8. Repeat measurement on next day of exceedance to confirm findings.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of noncompliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Engineer and confirm notification of the noncompliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER within 3 working days of notification; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.
Limit level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level.	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the noncompliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.
Limit level being	1. Repeat in-situ measurement to confirm findings;	1. Check monitoring data submitted by ET and	1. Confirm receipt of notification of failure in writing;	1. Inform the ER and confirm notification of the noncompliance in writing;

exceeded by two or more consecutive sampling days	2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days	Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the ER accordingly.	2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Make agreement on the mitigation measures to be implemented; 5. Ensure mitigation measures are properly implemented; 6. Assess the effectiveness of the implemented mitigation measures; 7. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	2. Take immediate action to avoid further exceedance; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 6. Implement the agreed mitigation measures; 7. Resubmit proposals of mitigation measures if problem still not under control; 8. As directed by the engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

Event / Action Plan for Dolphin Monitoring

Event	ET Leader	IEC	ER / SOR	Contractor
Action Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor.	1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR; 3. Implement the agreed measures.
Limit Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/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.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise ER/SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If ER/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, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures. 3. Supervise the implementation of additional monitoring and/or any other mitigation measures.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

Appendix E

Implementation Schedule for Environmental Mitigation Measures (EMIS)

Environmental Mitigation Implementation Schedule – Hong Kong Boundary Crossing Facilities (Superstructures and Infrastructures)

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
Air Quality								
S5.5.6.1 of HKBCFEIA	A1	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria(Ref. 1-hr and 24 hr TSP levels are 500μgm^{-3} and 260μgm^{-3}, respectively)	V
S5.5.6.2 of HKBCFEIA and S4.8.1 of TKCLKLEIA	A2	Proper watering of exposed spoil should be undertaken throughout the construction phase: - Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; - Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; - A stockpile of dusty material should not be extended beyond the pedestrian barriers, fencing or traffic cones. - Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; - When there are open excavation and	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria(Ref. 1-hr and 24 hr TSP levels are 500μgm^{-3} and 260μgm^{-3}, respectively)	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; - The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; - Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; - Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; - Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; - Any skip hoist for material transport should be totally enclosed by impervious sheeting; - Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered						

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		on the top and the 3 sides; - Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; - Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and - Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.						
S5.5.6.3 of HKBCFEIA and S4.8.1 of TKCLKLEIA	A3	The Contractor should undertake proper watering on all exposed spoil and associated work areas (with at least 8 times per day) throughout the construction phase.	Control construction dust	Contractor	All construction sites	Construction stage	To control the dust impact	V
S5.5.6.4 of HKBCFEIA	A4	Engineer to incorporate the controlled measures into the Particular Specification (PS) for the civil work. The PS should also draw the contractor's attention to relevant latest Practice notes issued by EPD.	Control construction dust	Engineer	All construction sites	Design Stage	Air pollution Control (Construction Dust) Regulation	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S5.5.6.4 of HKBCFEIA and S4.11 of TKCLKLEIA	A5	Implement regular dust monitoring under EM&A programme during the construction stage.	Monitor the 24hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor of Contract No. HY/2013/01 and Contractor of Contract No. HY/2011/03	Selected representative dust monitoring station	Construction stage	- Air Pollution Control (Construction Dust) Regulation - To control the dust impact to within the HKAQO and TM-EIA criteria(Ref. 1-hr and 24 hr TSP levels are 500μgm^{-3} and 260μgm^{-3}, respectively)	V
S5.5.7.1 of HKBCFEIA	A6	The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant: Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; Vents for all silos and cement/ pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; The materials which may generate airborne dusty emissions should be wetted by water spray system; All receiving hoppers should be enclosed on three sides up to 3m above unloading point; All conveyor transfer points should be totally enclosed; All access and route roads within the premises should be paved and wetted; and Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body.	Monitor the 24hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	Air Pollution Control (Construction Dust) Regulation - To control the dust impact to within the HKAQO and TM-EIA criteria(Ref. 1-hr and 24 hr TSP levels are 500μgm^{-3} and 260μgm^{-3}, respectively)	N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S5.5.2.7 of HKBCFEIA	A7	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: All road surface within the barging facilities will be paved; Dust enclosures will be provided for the loading ramp; Vehicles will be required to pass through designated wheels wash facilities; and Continuous water spray at the loading points.	Control construction dust	Contractor	All construction sites	Construction stage	Air Pollution Control (Construction Dust) Regulation	N/A (Construction in process)
Construction Noise (Air borne)								
S6.4.10 of HKBCFEIA	N1	Use of good site practices to limit noise emissions by considering the following: - only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; - machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; - plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; - silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; - mobile plant should be sited as far away from NSRs as possible and practicable; - material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	Control construction airborne noise by means of good site practices	Contractor	All construction sites	Construction stage	Noise Control Ordinance	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S6.4.11 of HKBCFEIA	N2	Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening	Contractor	All construction sites	Construction stage	- Noise Control Ordinance - Annex 5, TM_EIA	V
S6.4.12 of HKBCFEIA	N3	Install movable noise barriers (typically density 14kg/m^2), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Screen the noisy plant items to be used at all construction sites	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	- Noise Control Ordinance - Annex 5, TM_EIA - 75dB(A) for residential premises - The movable barrier should achieve at least 5 dB(A) and the full enclosure should be designed to achieve 10dB(A)	N/A
S6.4.13 of HKBCFEIA	N4	Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards.	Reduce the noise levels of plant items	Contractor	For plant items listed In Appendix 6D of the EIA report at all construction sites	Construction stage	- Noise Control Ordinance - Annex 5, TM_EIA	V
S6.4.14 of HKBCFEIA	N5	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	- Noise Control Ordinance - Annex 5, TM_EIA	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S5.1 of TMCLKLEIA	N6	Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at selected representative locations	Contractor of Contract No. HY/2013/01	Selected representative noise monitoring station	Construction stage	- Noise Control Ordinance - Annex 5, TM_EIA - 75dB(A) for residential premises	V
Sediment								
	S1	All dredged marine mud, which required Type 2 Confined Marine Disposal under Environment, Transport and Works Bureau Technical Circular (Works) No. 34/2002 Management of Dredged/Excavated Sediment, from the Project shall be disposed of inside the sheet pile cellular structures within the Project boundary.	Re-deposition of Contaminated Sediment	Contractor	Dredged Contaminated Sediment		- Waste Disposal Ordinance - ETWB TC 34/2002	V
	S2	Before re-deposition the contaminated sediment, a layer of geotextile shall be placed at the bottom of the sheet pile cellular structures to avoid direct contact of the contaminated sediment and the bottom sediment.	Re-deposition of Contaminated Sediment	Contractor	Dredged Contaminated Sediment	Construction stage	- Waste Disposal Ordinance - ETWB TC 34/2002	V
	S3	A minimum of 2m thick sand fill or public fill shall be placed on top of the contaminated sediment to protect and cover the sediment after redeposition.	Re-deposition of Contaminated Sediment	Contractor	Dredged Contaminated Sediment	Construction stage	- Waste Disposal Ordinance - ETWB TC 34/2002	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
	S4	The contaminated sediment shall not be disturbed after re-deposition. No piling works or deep foundation which may disturb the contaminated sediment is allowed within the cellular structures.	Re-deposition of Contaminated Sediment	Contractor	Dredged Contaminated Sediment	Construction stage	- Waste Disposal Ordinance - ETWB TC 34/2002	V
Waste management (Construction Waste)								
S12.6 of TMCLKLEIA	WM1	The Contractor shall identify a coordinator for the management of waste.	Proper implementation of WMP	Contractor	Contractor All construction sites	Construction stage		V
S12.6 of TMCLKLEIA	WM2	The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Proper control of wastes disposal in accordance to relevant ordinances	Contractor	All construction sites	Construction Stage	- Land (Miscellaneous Provisions) Ordinance (Cap28); - Waste Disposal Ordinance (Cap 354); - Dumping at Sea Ordinance (Cap 466); - Water Pollution Control Ordinance.	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S12.6 of TMCLKLEIA	WM3	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	Ensure proper implementation mitigation measures stated in WMP	Contractor	All construction sites		Construction stage	V
S8.3.8 of HKBCFEIA and S12.6 of TMCLKLEIA	WM4	*Construction and Demolition Material* The following mitigation measures should be implemented in handling the waste: - Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; - Carry out on-site sorting; - Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; - Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; - Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; - Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction; - In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should	Good site practice to minimize and recycle the C&D material as far as practicable so as to reduce the amount for final disposal	Contractor	All construction site areas	Construction stage	- Land (Miscellaneous Provisions) Ordinance - Waste Disposal Ordinance - ETWB TC 19/2005	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation; - The surplus surcharge should be transferred to a fill bank.						
S8.3.9 - S8.3.11 of HKBCFEIA and S12.6 of TMCLKLEIA	WM5	*C&D Waste* - Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. - Metal hoarding and falsework should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. - The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.	Good site practice to minimize and recycle the C&D material as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	- Land (Miscellaneous Provisions) Ordinance - Waste Disposal Ordinance - ETWB TC 19/2005	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S8.2.12 - S8.3.15 of HKBCFEIA and S12.6 of TMCLKLEIA	WM6	*Chemical Waste* - Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. - Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 litres unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. - The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. - Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction stage	- Waste Disposal(Chemical Waste) General Regulation - Code of Practice on the Packaging, Labelling and Storage of Chemical Waste	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		necessary storage containers; or be to a reuser of the waste, under approval from the EPD.						
S8.3.16 of HKBCFEIA and S12.6 of TMCLKLEIA	WM7	*Sewage* Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly.	Proper handling of sewage from worker to avoid odour, pest and litter impacts.	Contractor	All construction sites	Construction stage	Waste Disposal Ordinance	V
S8.3.17 of HKBCFEIA and S12.6 of TMCLKLEIA	WM8	*General Refuse* - The site and surroundings shall be kept tidy and litter free. General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. - A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. - Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. - Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection	Minimize production of the general refuse and avoid odour, pest and litter impacts.	Contractor	All construction sites	Construction stage	Waste Disposal Ordinance	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminium cans, plastic bottles etc., should be provided. - Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of 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. - All waste containers shall be in a secure area on hardstanding.						
Water Quality (Construction Phase)								
	W1	Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of dredging/backfilling, as well as protection measures. Details of the measures are provided below: - No dredging works of marine sediment shall be carried out the Project except for the construction of box culverts and seawalls at Portion D. - Reclamation filling for the Project shall not proceed until at least 200m of leading seawall at the reclamation area formed above +2.2mPD, unless otherwise agreement was obtained from EPD, except for the 300m gaps for	To control construction water quality	Contractor of Contract No. HY/2013/01	During dredging and filling	Construction stage	TM-EIAO	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		marine access. All underwater filling works shall be carried out behind seawalls to avoid dispersion of suspended solids outside the Project limit; - Except for the filling of the cellular structures, not more than 15% public fill shall be used for reclamation filling below +2.5mPD during construction of the seawall; - After the seawall is completed except for the 300m marine access as indicated in the EPs, not more than 30% public fill shall be used for reclamation filling below +2.5mPD, unless otherwise agreement from EPD was obtained; - No more than 2 grab dredgers with a maximum daily dredging rate of 12,000m^3 shall be employed for dredging operation at Portion D of the Project; - Upon completion of 200m leading seawall, no more than a total of 60 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 60,000 m^3 for HKBCF and TMCLKL southern landfall reclamation during the filling operation; and - Upon completion of the whole section of seawall except for the 300m marine access as indicated in the EPs, no more than a total of 190 filling barge trips per day shall be made with a cumulative maximum daily filling rate of 190,000 m^3 for the remaining filling operations for HKBCF and TMCLKL southern landfall reclamation. - Closed grabs should be used for sediment dredging to reduce sediment						

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		loss when lifting the grabs to the barges. Only grab dredgers shall be used for dredging works of the Project; - All mechanical grabs shall be designed and maintained to avoid spillage; - The moving speed of construction vessels in the dredging area should be reduced to prevent disturbance to the seabed generating sediment plumes; - Floating type silt curtains shall be installed enclosing the entire reclamation site at all time. Staggered layers of silt curtain shall be provided to prevent sediment loss at navigation accesses. The length of each staggered layers shall be at least 200m; - The cage-type silt-curtain with steel enclosure is proposed to be installed to enclose local pollution caused by the grab dredging. The grab dredging work should be carried out within the cage-type silt curtain; - Single layer silt curtain to be applied around the North-east airport water intake; - The silt-curtains should be maintained in good condition to ensure the sediment plume generated from dredging and filling be confined effectively within the site boundary; - The dredging and filling works shall be scheduled to spread the works evenly over a working day; - Cellular structure shall be used for seawall construction; - A layer of geotextile shall be placed on top of the seabed before any filling activities take place inside the cellular structures to form the seawall;					

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		- The conveyor belts shall be fitted with windboards and conveyor release points shall be covered with curtain to prevent any spillage of filling materials onto the surrounding waters; - An additional layer of slit curtain shall be installed near the active stone column installation points. A layer of geotextile with stone blanket on top shall be placed on the seabed prior to stone column installation works. Stone blanket -> with silt curtain.						
S9.11.1 - S9.11.1.2 of HKBCFEIA and S6.10 of TMCLKLEIA	W1	- In addition, dredging operations should be undertaken in such a manner as to minimize resuspension of sediments. Standard good dredging practice measures should, therefore, be implemented including the following requirements which should be written into the dredging and filling contract. 1. Trailer suction hopper dredgers shall not allow mud to overflow; 2. Use of Lean Material Overboard (LMOB) systems shall be prohibited; 3. Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted; 4. Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material; 5. Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes; 6. 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;	To control construction water quality	Contractor of Contract No. HY/2013/01	During dredging and filling	Construction Stage	- TM-EIAO - Marine Fill Committee Guidelines - DASO Permits Conditions	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		7. Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved; 8. Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action; 9. 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; 10. 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.						

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S9.11.1.3 of HKBCFEIA and S6.10 of TMCLKLEIA	W2	<u>Land Works</u> General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include: - wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; - 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; - 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; - 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; - temporary access roads should be surfaced with crushed stone or gravel; - rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; - measures should be taken to prevent	To control construction water quality	Contractor	All land-based construction sites	Construction stage	TM-EIAO	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		the washout of construction materials, soil, silt or debris into any drainage system; - open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; - 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; - discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; - 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; - wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; - the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; - wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; - vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered						

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		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; - the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; - waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; - 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; and - surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.						
S9.14 of HKBCFEIA and S6.10 of TMCLKLEIA	W3	Implement a water quality monitoring programme	Control water quality	Contractor of Contract No. HY/2013/01	At identified monitoring location	During Construction stage	- TM-water - Water Pollution Control Ordinance	V
Ecology (construction Phase)								
S10.7 of HKBCFEIA and S8.14 of TMCLKLE IA	E1	- Use closed grab in dredging works. - Install silt curtain during the construction. - Limit dredging and works fronts. - Construct seawall prior to reclamation filling where practicable. - Good site practices	Minimize marine water quality impacts	Contractor	Seawall, reclamation area	During construction	TM-Water	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		- Strict enforcement of no marine dumping. - Site runoff control - Spill response plan						
S10.7 of HKBCFEIA	E2	Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater.	Prevent Sedimentation from Land-based works areas	Contractor	Land-based works areas	During construction	TM-Water	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E3	Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time.	Prevent disturbance to terrestrial fauna and habitats	Contractor	Land-based works areas	During construction		V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E4	- Dolphin Exclusion Zone - Dolphin watching plan	Minimize temporary marine habitat loss impact to dolphins	Contractor of Contract No. HY/2013/01	Marine works	During marine works	TM-EIAO	V
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E5	- Decouple compressors and other equipment on working vessels - Proposal on design and implementation of acoustic decoupling - measures applied during dredging and reclamation works - Avoidance of percussive piling	Minimize marine noise impacts on dolphins	Contractor	Marine works	During marine works	- TM-EIAO - Marine Park Regulations	
S10.7 of HKBCFEIA and S8.14 of TMCLKLEIA	E6	- Control vessel speed - Skipper training - Predefined and regular routes for working vessels; avoid Brothers Islands	Minimize marine traffic disturbance on dolphins	Contractor	Marine traffic	During marine works		V
S10.10 of HKBCFEIA and S8.14 of TMCLKLEIA	E7	Vessel based dolphin monitoring	Minimize marine traffic disturbance on dolphins	Contractor of Contract No. HY/2013/01	Northeast and Northwest Lantau	During marine works		V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
Fisheries								
S11.7 of HKBCFEIA	F1	- Reduce re-suspension of sediments - Limit dredging and works fronts. - Good site practices	Minimize marine water quality Impacts	Contractor	Seawall, reclamation area	During construction	TM-Water	V
S11.7 of HKBCFEIA	F2	Install silt-grease trap in the drainage system collecting surface runoff	Minimize impacts on marine water quality impacts	Designer	Reclamation area	During construction	TM-Water	V
Landscape & Visual (Detailed Design Phase)								
S14.3.3.1 of HKBCFEIA	LV1	General design measures include: - Roadside planting and planting along the edge of the reclamation is proposed; - Transplanting of mature trees in good health and amenity value where appropriate and reinstatement of areas disturbed during construction by compensatory hydro-seeding and planting; - Protection measures for the trees to be retained during construction activities; - Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed; - Providing planting area around peripheral of HKBCF for tree planting screening effect; and - Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline.	Minimize visual & landscape impacts	Contractor	HKBCF	Design Stage		V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
Landscape & Visual (Construction Phase)								
S14.3.3.3 of HKBCFEIA and S10.9 of TMCLKLEIA	LV2	*Mitigate Landscape Impacts* G1. Grass-hydroseed or sheeting bare soil surface and stock pile areas.	Minimize visual & landscape impacts	Contractor	Portion D	Construction stage		V (Construction) (started on 04 November 2017)
		G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic.			Portion D			V (Construction) (started on 04 November 2017)
		G3. For HKLR, providing aesthetic design on the viaduct, tunnel portals, at-grade roads and reclamation (e.g. subtle colour tone and slim form for viaduct, aesthetic design of the bridge form and its structural elements including the parapet, soffit, columns and so on and decorative urban design elements and lightings for the HKLR; featured form of tunnel portals, roadside planting along at-grade roads and landscape berm on & planting along edge of reclamation area) to beautify the HKLR alignment.			N/A			N/A
		G4. For HKBCF, providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonic atmosphere of the HKBCF			Portion D			V (Construction) (started on 04 November 2017)
		G5. Vegetation reinstatement and upgrading to disturbed areas.			Pending			Not Yet Started

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed.			Pending			Not Yet Started
		G7. Provide planting area around peripheral of and within HKBCF and HKLR for tree screening buffer effect.			Pending			Not Yet Started
		G8. Plant salt tolerant native tree and shrubs etc along the planter strip at affected seawall.		Shatin to Central Link (SCL) and Central Kowloon Route (CKR) projects	N/A			N/A
		G9. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt "natural-look" by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of the new coastline		Contractor	Pending			Not Yet Started
S10.9 of TMCLKLEIA	LV3	*Mitigate Landscape Impacts* CM1. Existing trees on boundary of the Project Area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at Tree Removal Application stage).	Minimize landscape impact	Contractor	All construction site areas	Construction stage		N/A

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
		CM2. Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme. CM7. Ensure no run-off into water body adjacent to the Project Area. CM9. Recycle/Reuse all felled trees and vegetation, e.g. mulching.						
S14.3.3.3 of HKBCFEIA	LV4	Mitigate Visual Impacts V1. Minimize time for construction activities during construction period.	Minimize visual & landscape impacts	Contractor	All construction site areas	Construction stage		V
		Mitigate Visual Impacts V2. Provide screen hoarding at the portion of the project site/ works areas storage areas near VSRs who have close low-level views to the Project during HKBCF construction.						N/A
S10.9 of TMCLKLEIA	LV5	Mitigate Visual Impacts CM5. Screening of construction works by hoardings around works area in visually unobtrusive colors, to screen works. CM6. Control night-time lighting and glare by hooding all lights. CM8. Avoidance of excessive height and bulk of buildings and structures.	Minimize visual impact	Contractor	All construction site areas	Construction stage		N/A
EM&A								
S15.2.2 of HKBCFEIA	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Project Proponent	All construction site areas	Construction stage	- EIAO Guidance Note No. 4/2002 - TM_EIAO	V

EIA Ref.	EM&A Log Ref	Environmental Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location	When to implement the measures?	What requirements or standards for the measure to achieve?	Implementation Status
S15.5 - S15.6 of HKBCFEIA	EM2	An Environmental Team needs to be employed as per the EM&A Manual. Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Contractor	All construction site areas	Construction stage	- EIAO Guidance Note No. 4/2002 - TM_EIAO	V

Legend: V = implemented; x = not implemented; N/A = not applicable

Appendix F

Site Audit Findings and Corrective Actions

Appendix F - Site Audit Findings and Corrective Actions

Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the project. During the reporting period, thirteen site inspections were carried out on 07, 14, 21 & 28 September 2017, 06, 12, 19 & 26 October 2017 and 02, 09, 16, 23 & 30 November 2017.

As confirmed by RSS on 16 January 2018, the landscape construction works including planting (Shrubs & Grass), installation of irrigation pipe and soiling (Sub & Top soil) for Contract No. HY/2013/02 were commended on 04 November 2017. The landscape inspections were conducted on 16 and 30 November 2017 on a bi-weekly basis during the weekly environmental site inspection. The weekly site inspection checklists including the landscape inspection items would be submitted to IEC for checking within the reporting period.

During the site inspections on November 2017, there was no conflict occurred regarding to the Landscape & Visual mitigation measures stated in Contract Specific EM&A Manual. The work site was found to be confined within site boundaries and grass-hydroseed was provided for bare soil surface and stock pile areas. Landscape & Visual mitigate Measures during construction would be checked to ensure compliance with the intended aims of the measures.

Particular observations during the site inspections are described below:

31 August 2017

(a) Improper disposal of general refuse was observed at Portion D. The general refuse was collected at Portion D. The observation was closed on 07 September 2017.
(b) Oil container without drip tray was observed at Portion F. The oil container was removed at Portion F. The observation was closed on 07 September 2017.
(c) Improper disposal of general refuse was observed at Portion F. The general refuse was collected at Portion F. The observation was closed on 07 September 2017.

07 September 2017

(a) Improper disposal of general refuse was observed at Portion C. General refuse was collected at Portion C. The observation was closed on 14 September 2017.

14 September 2017

(a) Damaged NRMM label was observed on a generator at Portion C. Appropriate NMRR label was provided on a generator at Portion C. The observation was closed on 21 September 2017.
(b) Oil container without drip tray was observed at Portion F. Oil container was removed at Portion F. The observation was closed on 21 September 2017.

21 September 2017

(a) Oil container without drip tray was observed at Portion C. Drip tray was provided for the oil container at Portion C. The observation was closed on 28 September 2017.
(b) C & D waste was observed at Portion C & D waste was sorted and stored at a designated area at Portion C. The observation was closed on 28 September 2017.
(c) Substandard NRMM label was observed on a generator at Portion F. Appropriate NRMM label was provided at Portion F. The observation was closed on 28 September 2017.
(d) Sand was found accumulated in the drip tray at Portion F. Accumulated sand was removed at Portion F. The observation was closed on 28 September 2017.

28 September 2017

(a) Missing of NRMM label was observed on an excavator at Portion D. Appropriate NRMM label was provided on an excavator at Portion D. The observation was closed on 06 October 2017.
(b) Cement mixing process without sheltered on top and 3 sides was observed at Portion D. Cement mixing process was sheltered on top and 3 sides at Portion D. The observation was closed on 06 October 2017.
(c) Substandard NRMM label was observed on a generator at Portion D. The generator was removed at Portion D. The observation was closed on 06 October 2017.

06 October 2017

(a) C&D wastes with general refuse without separation was observed at Portion F. C&D wastes was removed from the general refuse at Portion F. The observation was closed on 12 October 2017.
(b) Oil containers without drip tray was observed at Portion F. Oil containers was removed at Portion F. The observation was closed on 12 October 2017.

12 October 2017

(a) Fugitive dust generation on the haul road was observed at Portion C. Watering was arranged at Portion C. The observation was closed on 19 October 2017.

(b) Substandard NRMM labels were observed on multiple excavator at Portion C. Appropriate NRMM labels were provided on multiple excavators at Portion C. The observation was closed on 19 October 2017.

(c) Damaged NRMM label was observed on a generator at Portion C. Appropriate NRMM label was provided on a generator at Portion C. The observation was closed on 19 October 2017.

(d) Improper disposal of general refuse was observed at Portion C. General refuse was collected at Portion C. The observation was closed on 19 October 2017.

(e) Stagnant water with general refuse was observed at Portion D. Stagnant water and general refuse was cleaned at Portion D. The observation was closed on 19 October 2017.

19 October 2017

(a) Improper disposal of C&D wastes was observed at Portion D. C&D wastes was collected at Portion D. The observation was closed on 26 October 2017.

(b) Inappropriate NRMM label was observed on a generator at Portion D. Appropriate NRMM label was provided on a generator at Portion D. The observation was closed on 26 October 2017.

26 October 2017

(a) Improper disposal of general refuse was observed at Portion C. General refuse was collected at Portion C. The observation was closed on 02 November 2017.

(b) One roller was not switched off while not in use at Portion C. Training was provided to the operator of the roller for switching off the plant while not in use at Portion C. The observation was closed on 02 November 2017.

(c) Stagnant water was observed in a trench at Portion D. Biolavicide was applied into the trench at Portion D. The observation was closed on 02 November 2017.

02 November 2017

(a) Mobile generator without drip tray was observed at Portion A. Drip tray was provided for the mobile generator at Portion A. The observation was closed on 09 November 2017.

(b) Oil containers without drip tray were observed at Portion A. Oil containers were removed at Portion A. The observation was closed on 09 November 2017.

(c) Overflowed general refuse container was observed at Portion A. General refuse was collected at Portion A. The observation was closed on 09 November 2017.

09 November 2017

(a) A generator and chemical containers without drip tray were observed at Portion C. Drip tray was provided for the generator and chemical containers were removed at Portion C. The observation was closed on 16 November 2017.

16 November 2017

(a) Improper discard of general refuse was observed at Portion D. General refuse was collected at Portion D. The observation was closed on 23 November 2017.

(b) Improper storage of chemical container was observed at Portion D. Chemical container was removed at Portion D. The observation was closed on 23 November 2017.

23 November 2017

(a) Overflowed general refuse container was observed at Portion D. General refuse was collected at Portion D. The observation was closed on 30 November 2017.

(b) Missing of NRMM label was observed on two excavators at Portion C. NRMM labels were provided on two excavators at Portion C. The observation was closed on 30 November 2017.

(c) Mobile generator without drip tray was observed at Portion C. Drip tray was provided at Portion C. The observation was closed on 30 November 2017.

30 November 2017

(a) Stagnant water was observed at Portion D. Follow-actions for outstanding observation will be inspected during the next site inspection.

(b) Oil containers without drip tray were observed at Portion C and Portion D. Follow-actions for outstanding observation will be inspected during the next site inspection.

(c) Improper disposal of general refuse was observed at Portion D. Follow-actions for outstanding observation will be inspected during the next site inspection.

(d) Mobile generator without drip tray was observed at Portion D. Follow-actions for outstanding observation will be inspected during the next site inspection.

Appendix G

Waste Flow Table

China Harbour Engineering Company Limited

Monthly Summary Waste Flow Table for 2017 (year)

Name of Person completing the record: Paper CHAN / EO

Project : Hong Kong – Zhuhai – Macao Bridge, Hong Kong Crossing Boundary Facilities – Infrastructure Works Stage I (Western Portion)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete (see Note 3)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill (see Note 1)	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan	0	0	0	0	0	0	0	0.0950	0	0	0.1755
Feb	0.4950	0	0	0	0.4950	5.4450	0	0.1800	0.0248	0	0.1105
Mar	0.0400	0	0	0	0.0400	0	0	0	0	0	0.2145
Apr	0	0	0	0	0	0	52.090	0.1800	0	0	0.2535
May	0	0	0	0	0	0	0	0	0.5880	0	0.3445
Jun	0	0	0	0	0	0	187.510	0.1600	1.6800	0	0.3380
Sub-total	0.5350	0	0	0	0.5350	5.4450	239.600	0.6150	2.2928	0	1.4365
Jul	4.8111	0	0	0	4.8111	0	274.710	0	2.1000	0	0.6955
Aug	3.0550	0	0	0	3.0550	1.8950	172.000	0.2200	3.6400	0	0.8580
Sep	4.6600	0	0	0	4.6600	7.1980	0	0.2200	2.6400	0	1.2025
Oct	2.0502	0	0	0	2.0502	9.1970	216.720	0	2.6040	0	0.5070
Nov	10.1628	0	0	0	10.1628	27.1957	1265.52	0.1600	0.0217	0	0.6175
Dec											
Total	25.2741	0	0	0	25.2741	50.9307	2168.550	1.2150	13.2985	0	5.3170

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(2) Plastics refer to plastic bottles/containers, plastic sheets/ foam from packaging materials.

(3) Broken concrete for recycling into aggregates.

Appendix H

Environmental Licenses and Permits

Environmental Licenses and Permits

Item No.	Type of Permit / Licence	Reference No.	Application Date	Date of Issue	Date of Expiry	Remark
1	Environmental Permit under EIAO	EP-353/2009/K	24 Mar 2016	11 Apr 2016	NA	Issued
2	Construction Dust Notification (Western Portion)	Acknowledge Receipt: 377883	5 Aug 2014	11 Aug 2014	NA	Notified
3	Construction Dust Notification (Works Area WA3)	Acknowledge Receipt: 377884	5 Aug 2014	18 Aug 2014	NA	Notified
4	Construction Waste Disposal Account	Billing Account No.: 7020516	5 Aug 2014	15 Aug 2014	NA	Account approved
5	Registration as a Chemical Waste Producer (Works Area WA3)	Waste Producer Number (WPN): 5213-961-C1186-23	1 Sep 2014	17 Oct 2014	NA	Registration completed
6	Discharge License under WPCO (Works Area WA3)	License No.: WT00020194-2014	21 Aug 2014	27 Oct 2014	31 Oct 2019	License approved
7	Registration as a Chemical Waste Producer (Western Portion)	Waste Producer Number (WPN): 5213-961-C1186-27	20 Oct 2014	24 Nov 2014	NA	Registration completed
8	Discharge License under WPCO (Western Portion)	License No.: WT00020597-2014	25 Sep 2014	16 Mar 2015	31 Mar 2020	License approved
9	Construction Noise Permit under NCO for HKBCF (Western Portion)	License No.: GW-RS0624-17	5 Jul 2017	20 Jul 2017	21 Dec 2017	Permit superseded by GW-RS0742-17
10	Construction Noise Permit under NCO for HKBCF (Western Portion)	License No.: GW-RS0742-17	11 Aug 2017	25 Aug 2017	28 Dec 2017	Permit superseded by GW-RS0959-17
11	Construction Noise Permit under NCO for HKBCF(Western Portion)	License No.: GW-RS0959-17	18 Oct 2017	1 Nov 2017	28 Feb 2018	Permit Approved

Appendix I

Statistics on Environmental Complaints, Notification of Summons and Successful Prosecutions

Statistics on Environmental Complaints, Notification of Summons and Successful Prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of summons	Successful prosecutions
This reporting period	2	0	0
From commencement date of construction to end of reporting month	16	0	0

Appendix J

Investigation Reports on Action and Limit Level Non-compliance

Report No. 019

Contract No. HY/2013/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities –Infrastructure Works Stage I (Western Portion)
Investigation Report on Action Level or Limit Level Non-compliance

Report No. **019**

Monitoring Date **01-Sep-17**

The Action and Limit Levels of dissolved oxygen determined from baseline monitoring data is reproduced below:

Monitoring Parameter	Action Level (AL)	Limit Level (LL)
Depth averaged dissolved oxygen (in mg/L)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6

Mid-Ebb tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS5	Bottom	4.4	Action
IS10(N)	Bottom	4.5	Action
IS(Mf)11	Bottom	4.6	Action
IS17	Bottom	4.6	Action
SR5(N)	Bottom	4.6	Action

Mid-Flood tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS5	Bottom	4.4	Action
IS10(N)	Bottom	4.5	Action
IS(Mf)11	Bottom	4.5	Action

*Monitoring was undertaken by the E.T. of Contract No. HY/2013/01

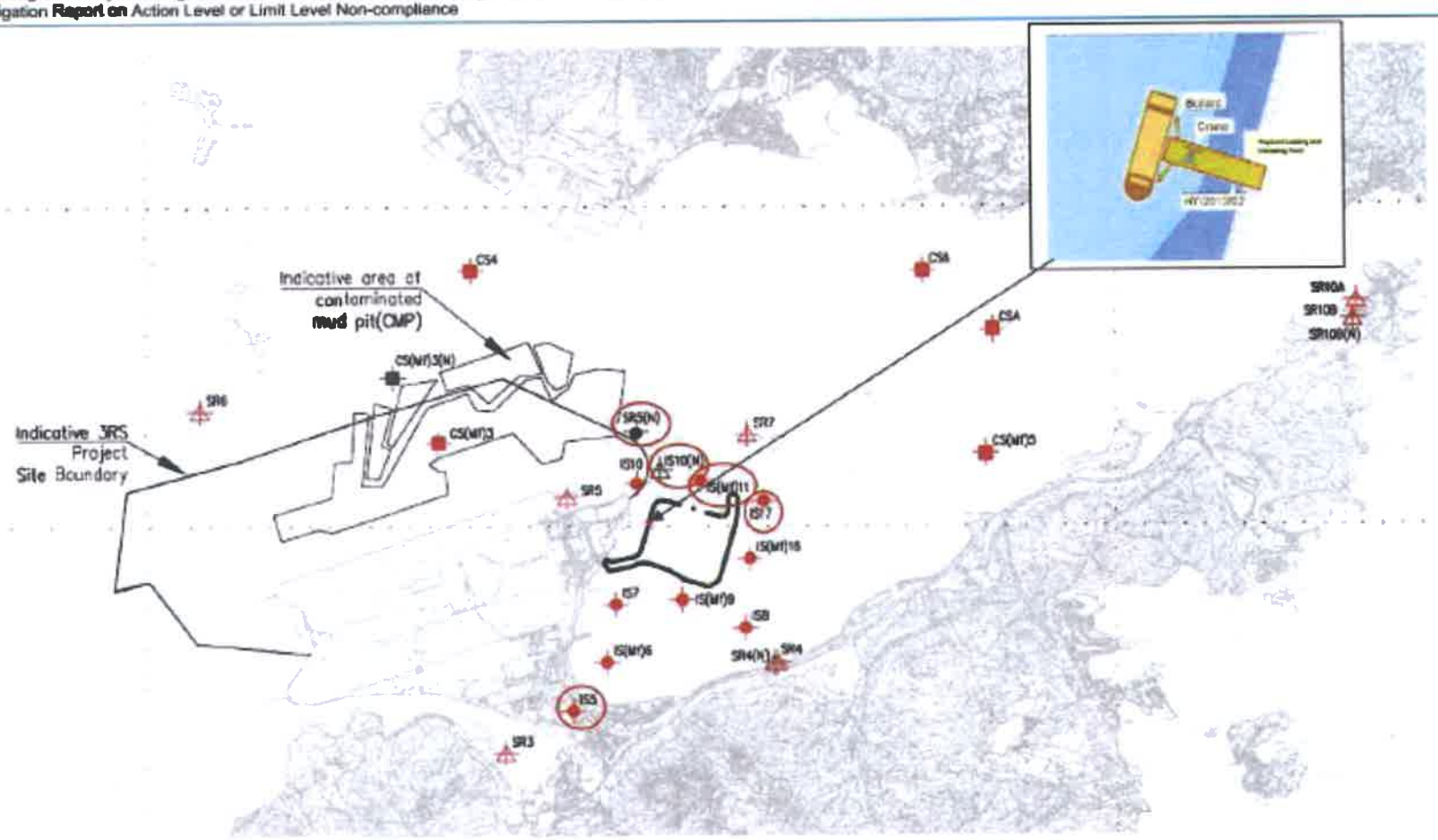


Figure 1 Location of Water Quality Monitoring Stations

Investigation Results:

a) Causes of exceedances

Exceedances were not due to operation of the works under Contract No. HY/2013/02 because:

- It was confirmed that there was only one marine based activity which is demolition of temporary loading and unloading point of this Contract worked at HKBCF reclamation site near the sea area or area near the monitoring station IS5, IS10(N), IS(Mf)11, IS17 and SR5(N) on 01 September 2017 under Contract No. HY/2013/02. Figure 1 showing the locations of the Water Quality Monitoring Stations where the exceedances of DO were recorded and all relevant WQM stations.
- The demolition of temporary loading and unloading point was started from 18 July 2017. The major marine based activity was the removal of marine piling of temporary loading and unloading point which was shown in the following photo. All marine based activities were carried out within the silt curtain and no defect of silt curtain was recorded by Contract No. HY/2010/02 from 18 July 2017 to 01 September 2017. Besides, there was also no DO exceedance recorded during 18 July 2017 to 31 August 2017. Therefore, the low DO marine water was not caused by demolition of temporary loading and unloading point.

- The water quality mitigation measures as mentioned in EM&A Manual and EP was fully implemented in this Contract which including maintenance of the silt curtain on a daily basis by Contract No. HY/2010/02 etc. The exceedances were considered as non-Project related.

b) Action required under the action plan

Refer to Table 9.4 of the updated EM&A Manual for HKBCF.

c) Action taken under the action plan

1. DO was monitored and confirmed by Contract No. HY/2013/01;
2. After considered the above mentioned investigation results, it appears that it was unlikely that the DO exceedances were attributed to the above mentioned work site of this Contract;

3. The exceedances were informed IEC/ENPO and ER by ET of Contract No. HY/2013/01;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;

d) ET's conclusions and recommendations for mitigation

- All relevant water quality mitigation measurement was checked to be fully implemented.
- The Contractor was reminded to ensure all construction activities that would deteriorate the water quality should be collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- The Contractor was reminded to ensure the silt curtain was maintained properly before conducting of any marine-based activities such as demolition of temporary loading and unloading point.
- The Contractor was reminded to ensure that all silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly.

e) Contractor's actions to implement the mitigation

- All construction activities that deteriorate the water quality were collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- All marine-based activities were conducted within the well-maintained silt curtain.
- All silt removal facilities, channels and manholes was maintained and any deposited silt and grit was removed regularly.

ET Leader Signature & Date 03-Oct-17

Report No. 020

Report No. 020

Monitoring Date 06-Sep-17

The Action and Limit Levels of dissolved oxygen, turbidity and suspended solid determined from baseline monitoring data is reproduced below:

Monitoring Parameter	Action Level (AL)	Limit Level (LL)
Dissolved oxygen (in mg/L)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6
Turbidity (in NTU)	27.5 and 120% of upstream control station's turbidity at the same tide of the same day	47.0 and 130% of upstream control station's turbidity at the same tide of the same day
Suspended Solid (in mg/L)	23.5 and 120% (i.e. 11.3 for mid-ebb/ 14.1 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 12.3 for mid-ebb/ 15.3 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes

Mid-Ebb tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS17	Bottom	4.6	Action
SR10A	Surface and Middle	4.9	Limit
SR10B(N)	Surface and Middle	4.8	Limit

Mid-Flood tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
SR6	Surface and Middle	4.8	Action
SR10A	Surface and Middle	4.8	Limit
SR10A	Bottom	4.5	Action
SR10B(N)	Surface and Middle	4.8	Limit
SR10B(N)	Bottom	4.5	Action

Turbidity (in NTU)

Monitoring Station	Depth	Measured Turbidity	Level Exceeded
IS(Mf)11	Depth-Average	27.9	Action

Suspended Solid (in mg/L)

Monitoring Station	Depth	Measured SS	Level Exceeded
IS8	Depth-Average	26.4	Action
SR4(N)	Depth-Average	25.3	Action
SR6	Depth-Average	23.6	Action

*Monitoring was undertaken by the E.T. of Contract No. HY/2013/01

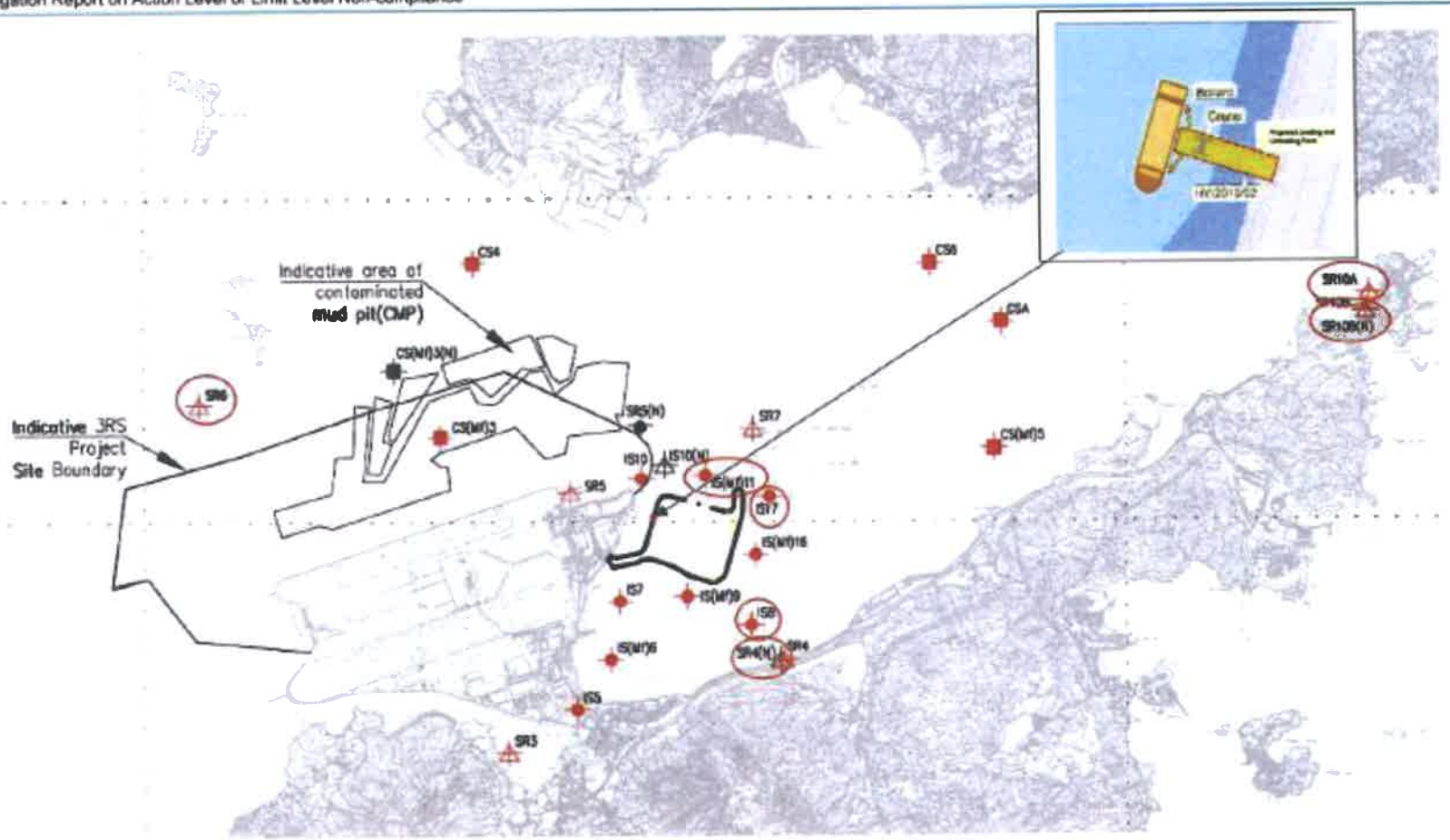


Figure 1 Location of Water Quality Monitoring Stations

Investigation Results:

a) Causes of exceedances

Exceedances were not due to operation of the works under Contract No. HY/2013/02 because

- It was confirmed that there was only one marine based activity which is demolition of temporary loading and unloading point of this Contract worked at HKBCF reclamation site near the sea area or area near the monitoring station IS8, SR4(N), IS17, SR6, IS(Mf)11, SR10A and SR10B(N) during the monitoring period on 06 September 2017 under Contract No. HY/2013/02. Figure 1 showing the locations of the Water Quality Monitoring Stations where the exceedances of DO, turbidity and SS were recorded and all relevant WQM stations.
- The demolition of temporary loading and unloading point was started from 18 July 2017. The major marine based activity was the removal of marine piling of temporary loading and unloading point. All marine based activities were carried out within the silt curtain and no defect of silt curtain was recorded by Contract No. HY/2010/02 from 18 July 2017 to 06 September 2017. Besides, there was also no DO exceedance recorded during 18 July 2017 to 31 August 2017. Therefore, the low DO marine water were not caused by demolition of temporary loading and unloading point.
- On 06 September 2017, there was also no turbidity and SS exceedance recorded at IS10(N) and SR5(N) which were closer to the temporary loading and unloading point than the IS(Mf)11, IS8, SR4(N) and SR6. Therefore, the high turbidity and SS marine water were not caused by demolition of temporary loading and unloading point.
- The water quality mitigation measures as mentioned in EM&A Manual and EP was fully implemented in this Contract which including maintenance of the silt curtain on a daily basis by Contract No. HY/2010/02 etc. The exceedances were considered as non-Project related.

b) Action required under the action plan

Refer to Table 9.4 of the updated EM&A Manual for HKBCF.

c) Action taken under the action plan

1. DO, turbidity and SS was monitored and confirmed by Contract No. HY/2013/01;
2. After considered the above mentioned investigation results, it appears that it was unlikely that the DO, turbidity and SS exceedances were attributed to the above mentioned work site of this Contract;
3. The exceedances were informed IEC/ENPO and ER by ET of Contract No. HY/2013/01;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;

d) ET's conclusions and recommendations for mitigation

- All relevant water quality mitigation measurement was checked to be fully implemented.
- The Contractor was reminded to ensure all construction activities that would deteriorate the water quality should be collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.

- The Contractor was reminded to ensure the silt curtain was maintained properly before conducting of any marine-based activities such as demolition of temporary loading and unloading point.
- The Contractor was reminded to ensure that all silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly.

e) Contractor's actions to implement the mitigation

- All construction activities that deteriorate the water quality were collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- All marine-based activities were conducted within the well-maintained silt curtain.
- All silt removal facilities, channels and manholes was maintained and any deposited silt and grit was removed regularly.

ET Leader Signature & Date 11-Oct-17

Report No. 021

Contract No. HY/2013/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities –Infrastructure Works Stage I (Western Portion)
Investigation Report on Action Level or Limit Level Non-compliance

Report No. 021
Monitoring Date 08-Sep-17

The Action and Limit Levels of dissolved oxygen, turbidity and suspended solid determined from baseline monitoring data is reproduced below:

Monitoring Parameter	Action Level (AL)	Limit Level (LL)
Dissolved oxygen (in mg/L)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6
Turbidity (in NTU)	27.5 and 120% of upstream control station's turbidity at the same tide of the same day	47.0 and 130% of upstream control station's turbidity at the same tide of the same day
Suspended Solid (in mg/L)	23.5 and 120% (i.e. 20.4 for mid-ebb/ 10.5 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 22.1 for mid-ebb/ 11.4 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes

Mid-Ebb tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS7	Surface and Middle	4.8	Action
IS7	Bottom	4.8	Action
IS10(N)	Surface and Middle	4.9	Action
IS(Mf)16	Surface and Middle	4.6	Action
IS(Mf)16	Bottom	4.3	Action
IS17	Surface and Middle	4.9	Action
IS17	Bottom	4.3	Action
SR3	Surface and Middle	4.7	Action
SR6	Surface and Middle	4.9	Action
SR10A	Surface and Middle	4.9	Limit
SR10B(N)	Surface and Middle	4.8	Limit

Turbidity (in NTU)

Monitoring Station	Depth	Measured Turbidity	Level Exceeded
IS5	Depth-Average	34.4	Action

Suspended Solid (in mg/L)

Monitoring Station	Depth	Measured SS	Level Exceeded
IS5	Depth-Average	28.4	Action

Mid-Flood tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS5	Surface and Middle	4.9	Action
IS8	Surface and Middle	4.9	Action
IS(Mf)9	Surface and Middle	4.8	Action
IS10(N)	Surface and Middle	4.7	Action
IS(Mf)11	Surface and Middle	4.7	Action
IS(Mf)11	Bottom	4.6	Action
IS(Mf)16	Surface and Middle	4.9	Action
IS17	Surface and Middle	4.7	Action
IS17	Bottom	4.5	Action
SR3	Surface and Middle	4.9	Action
SR4(N)	Surface and Middle	4.9	Action
SR5(N)	Surface and Middle	4.8	Action
SR6	Surface and Middle	4.9	Action
SR7	Surface and Middle	4.9	Action
SR10A	Surface and Middle	4.3	Limit
SR10A	Bottom	4.3	Action
SR10B(N)	Surface and Middle	4.7	Limit

Turbidity (in NTU)

Monitoring Station	Depth	Measured Turbidity	Level Exceeded
IS10(N)	Depth-Average	31.6	Action
IS(Mf)11	Depth-Average	29.0	Action
SR6	Depth-Average	35.3	Action

Suspended Solid (in mg/L)

Monitoring Station	Depth	Measured SS	Level Exceeded
IS10(N)	Depth-Average	36.5	Limit
IS(Mf)11	Depth-Average	33.2	Action

*Monitoring was undertaken by the E.T. of Contract No. HY/2013/01

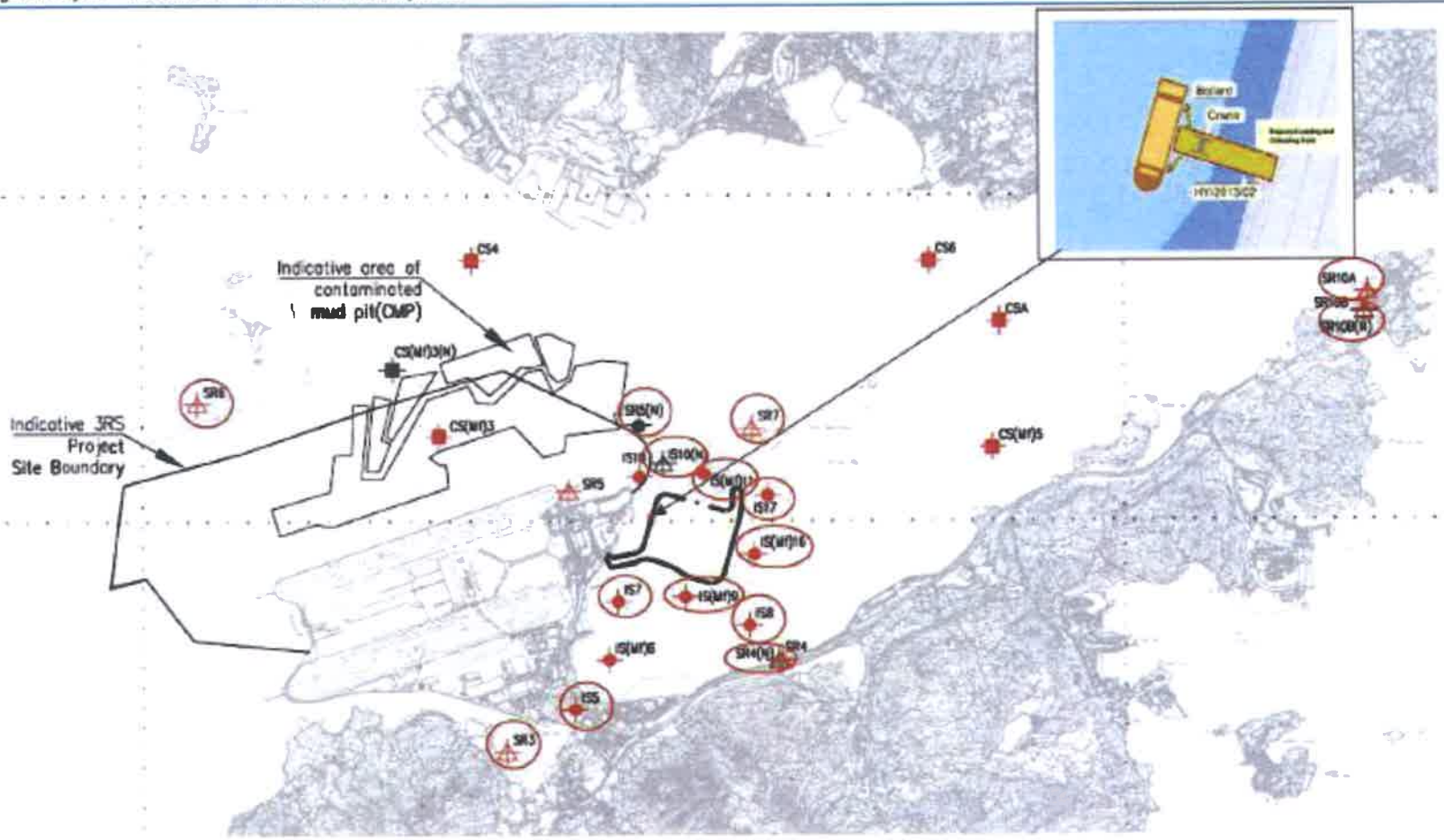


Figure 1 Location of Water Quality Monitoring Stations

Investigation Results:

a) Causes of exceedances

Exceedances were not due to operation of the works under Contract No. HY/2013/02 because:

- It was confirmed that there was only one marine based activity which is demolition of temporary loading and unloading point of this Contract worked at HKBCF reclamation site near the sea area or area near the monitoring station IS5, IS7, IS8, IS(Mf)9, IS10(N), IS(Mf)11, IS(Mf)16, IS17, SR3, SR4(N), SR5(N), SR6, SR7, SR10A and SR10B(N) during the monitoring period on 06 September 2017 under Contract No. HY/2013/02. Figure 1 showing the location of the Water Quality Monitoring Station where recorded exceedance and all relevant WQM stations.
- The demolition of temporary loading and unloading point was started from 18 July 2017. The major marine based activity was the removal of marine piling of temporary loading and unloading point. All marine based activities were carried out within the silt curtain and no defect of silt curtain was recorded by Contract No. HY/2010/02 from 18 July 2017 to 06 September 2017. Besides, there was also no DO exceedance recorded during 18 July 2017 to 31 August 2017. Therefore, the low DO marine water was not caused by demolition of temporary loading and unloading point.
- During mid-ebb tide, there was also no turbidity and SS exceedance recorded during mid-ebb tide on 06 September 2017 at monitoring stations IS7 and IS10(N) which were closer to the temporary loading and unloading point than the IS5.
- During mid-flood tide, IS10(N) and IS(Mf)11 were located upstream of the temporary loading and unloading point. For station SR6, SR5(N) was closer to the temporary loading and unloading point while no turbidity exceedance was recorded. Therefore, the high turbidity and SS marine water were not caused by demolition of temporary loading and unloading point.
- The water quality mitigation measures as mentioned in EM&A Manual and EP was fully implemented in this Contract which including maintenance of the silt curtain on a daily basis by Contract No. HY/2010/02 etc. The exceedances were considered as non-Project related.

b) Action required under the action plan

Refer to Table 9.4 of the updated EM&A Manual for HKBCF.

c) Action taken under the action plan

1. DO, turbidity and SS was monitored and confirmed by Contract No. HY/2013/01;
2. After considered the above mentioned investigation results, it appears that it was unlikely that the DO, turbidity and SS exceedances were attributed to the above mentioned work site of this Contract;
3. The exceedances were informed IEC/ENPO and ER by ET of Contract No. HY/2013/01;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;

d) ET's conclusions and recommendations for mitigation

- All relevant water quality mitigation measurement was checked to be fully implemented.
- The Contractor was reminded to ensure all construction activities that would deteriorate the water quality should be collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- The Contractor was reminded to ensure the silt curtain was maintained properly before conducting of any marine-based activities such as demolition of temporary loading and unloading point.
- The Contractor was reminded to ensure that all silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly.

e) Contractor's actions to implement the mitigation

- All construction activities that deteriorate the water quality were collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- All marine-based activities were conducted within the well-maintained silt curtain.
- All silt removal facilities, channels and manholes was maintained and any deposited silt and grit was removed regularly.

ET Leader Signature & Date 11-Oct-17

Report No. 022

Contract No. HY/2013/02
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities –Infrastructure Works Stage I (Western Portion)
Investigation Report on Action Level or Limit Level Non-compliance

Report No. **022**

Monitoring Date **11-Sep-17**

The Action and Limit Levels of dissolved oxygen determined from baseline monitoring data is reproduced below:

Monitoring Parameter	Action Level (AL)	Limit Level (LL)
Dissolved oxygen (in mg/L)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6

Mid-Ebb tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS10(N)	Surface and Middle	4.9	Action
IS(Mf)11	Surface and Middle	4.9	Action
IS(Mf)11	Bottom	4.6	Action
IS(Mf)16	Bottom	4.3	Action
IS17	Surface and Middle	4.8	Action
IS17	Bottom	4.2	Action
SR5(N)	Surface and Middle	4.7	Action
SR5(N)	Bottom	4.6	Action
SR6	Surface and Middle	4.7	Action
SR7	Surface and Middle	4.9	Action
SR10B(N)	Surface and Middle	4.8	Limit
SR10B(N)	Bottom	4.6	Action

Mid-Flood tide

Dissolved Oxygen (in mg/L)

Monitoring Station	Depth	Measured DO	Level Exceeded
IS8	Surface and Middle	4.8	Action
IS8	Bottom	4.6	Action
IS(Mf)9	Surface and Middle	4.8	Action
IS10(N)	Surface and Middle	4.6	Action
IS10(N)	Bottom	4.4	Action
IS(Mf)11	Surface and Middle	4.6	Action
IS(Mf)11	Bottom	4.5	Action
IS(Mf)16	Surface and Middle	4.7	Action
IS(Mf)16	Bottom	4.6	Action
IS17	Surface and Middle	4.5	Action
IS17	Bottom	4.2	Action

SR4(N)	Surface and Middle	4.8	Action
SR5(N)	Surface and Middle	4.6	Action
SR5(N)	Bottom	4.6	Action
SR6	Surface and Middle	4.7	Action
SR6	Bottom	4.6	Action
SR7	Surface and Middle	4.7	Action
SR10A	Surface and Middle	4.5	Limit
SR10A	Bottom	4.1	Action
SR10B(N)	Surface and Middle	4.2	Limit
SR10B(N)	Bottom	4.0	Action

*Monitoring was undertaken by the E.T. of Contract No. HY/2013/01

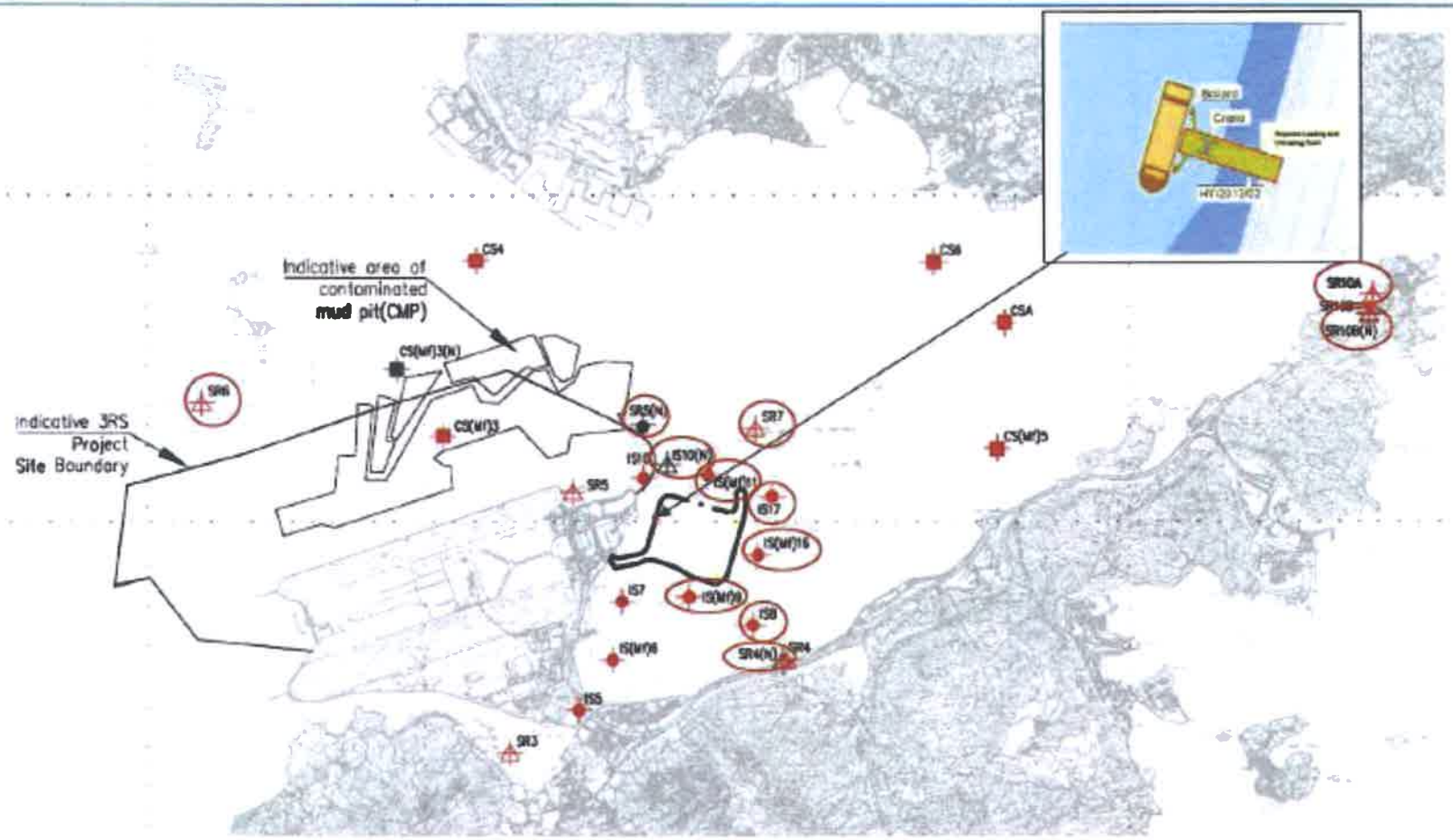


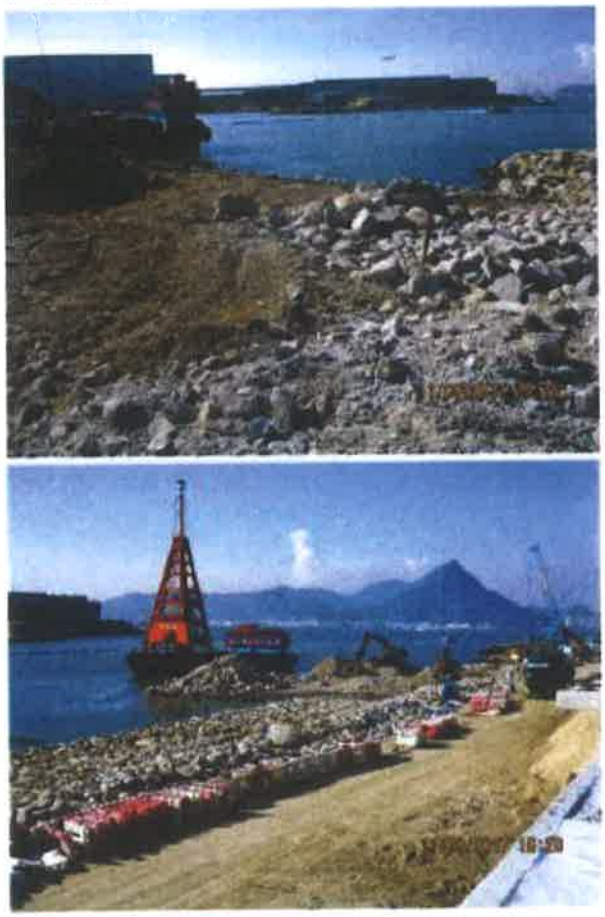
Figure 1 Location of Water Quality Monitoring Stations

Investigation Results:

a) Causes of exceedances

Exceedances were not due to operation of the works under Contract No. HY/2013/02 because:

- As confirmed by SRE, removal of temporary loading and unloading point by Contract No. HY/2013/02, which involved marine work, was completed on 10 September and the area was handed back to Reclamation Contractor on 11 September 2017 for subsequent seawall construction. The following photo was taken on 11 September 2017 showing that all the marine piling of temporary loading and unloading point was removed.



- Hence, it was confirmed that there was no marine works or barge of this Contract worked at HKBCF reclamation site near the sea area or area near the above mentioned monitoring stations during the monitoring period on 11 September 2017 so it was unlikely to deteriorate the water quality in the marine water to cause the DO exceedances recorded at the monitoring station IS6, IS(Mf)9, IS10(N), IS(Mf)11, IS(Mf)16, IS17, SR4(N), SR5(N), SR6, SR7, SR10A and SR10B(N) during the monitoring

period on 11 September 2017 under Contract No. HY/2013/02. Figure 1 showing the location of the Water Quality Monitoring Station where recorded exceedance and all relevant WQM stations.

- The water quality mitigation measures as mentioned in EM&A Manual and EP was fully implemented in this Contract which including maintenance of the silt curtain on a daily basis by Contract No. HY/2010/02 etc. The exceedances were considered as non-Project related.

b) Action required under the action plan

Refer to Table 9.4 of the updated EM&A Manual for HKBCF.

c) Action taken under the action plan

1. DO was monitored and confirmed by Contract No. HY/2013/01;
2. After considered the above mentioned investigation results, it appears that it was unlikely that the DO exceedances were attributed to the above mentioned work site of this Contract;
3. The exceedances were informed IEC/ENPO and ER by ET of Contract No. HY/2013/01;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;

d) ET's conclusions and recommendations for mitigation

- All relevant water quality mitigation measurement was checked to be fully implemented.
- The Contractor was reminded to ensure all construction activities that would deteriorate the water quality should be collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- The Contractor was reminded to ensure the silt curtain was maintained properly before conducting of any marine-based activities such as demolition of temporary loading and unloading point.
- The Contractor was reminded to ensure that all silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly.

e) Contractor's actions to implement the mitigation

- All construction activities that deteriorate the water quality were collected to sedimentation tanks or package treatment systems for proper treatment prior to disposal.
- All marine-based activities were conducted within the well-maintained silt curtain.
- All silt removal facilities, channels and manholes was maintained and any deposited silt and grit was removed regularly.

ET Leader Signature & Date 10-Oct-17

Report No. 023

Report No. 023

Monitoring Date 28-Nov-17

The Action and Limit Levels for 24-hour TSP determined from baseline monitoring data is reproduced below:

Monitoring Parameter	Station	Action Level (AL) ($\mu g/m^3$)	Limit Level (LL) ($\mu g/m^3$)
24-hour TSP	AMS3B – Site Boundary of Site Office Area at Works Area WA2	167	260

24-hour TSP (In $\mu g/m^3$)

Monitoring Station	Measured Level	Level Exceeded
AMS3B	168	Action

*Monitoring was undertaken by the E.T. of Contract No. HY/2013/01

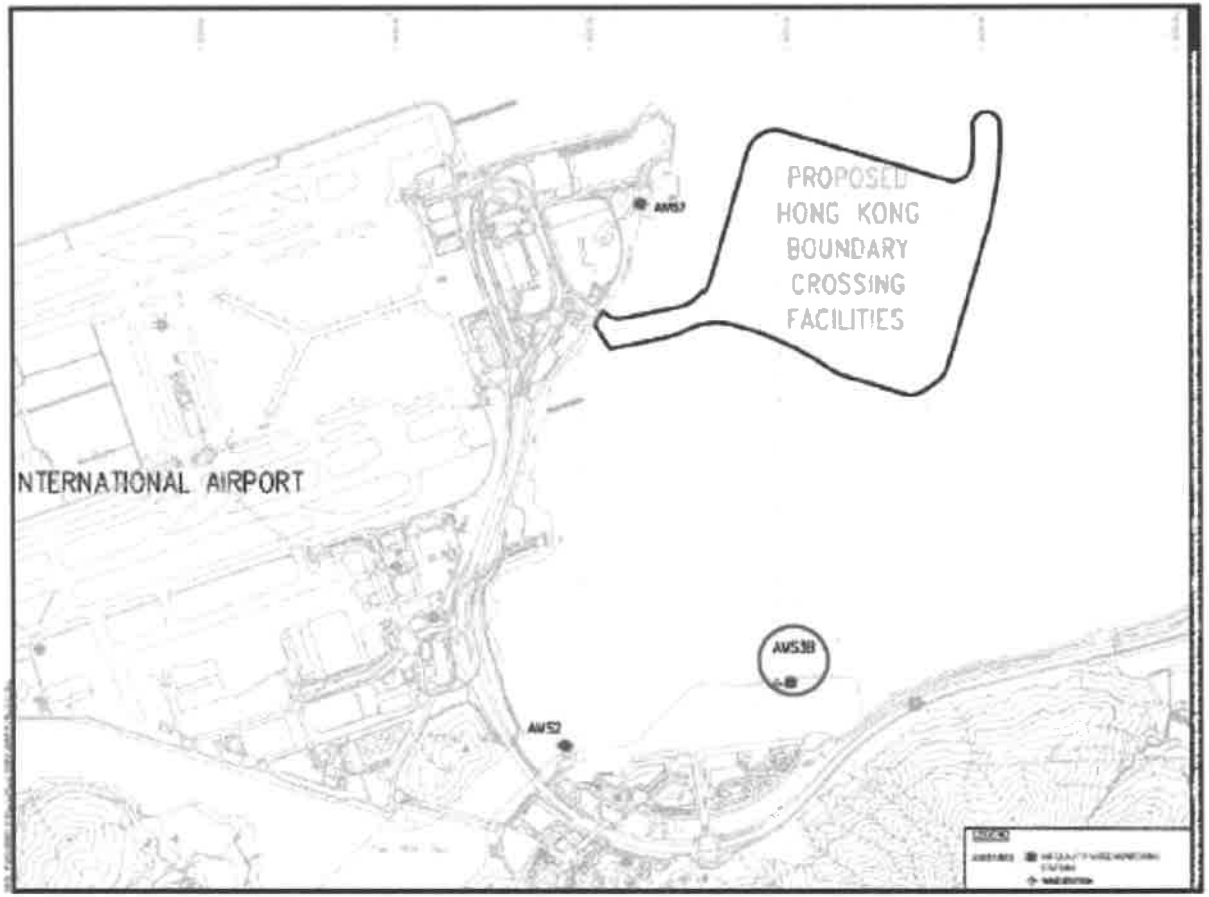


Figure 1 Location of Air Quality Monitoring Stations

Investigation Results:

a) Causes of exceedance

Exceedance was not due to operation of the works under Contract No. HY/2013/02 because:

- According to Hong Kong Observatory, the Prevailing Wind Direction (degrees) for 28 November 2017 was 050 (northeast). Since the air quality monitoring station AMS3B was located in the south of the construction site, the northeast wind was unlikely to bring the dust and suspended particles from the worksite to the area near AMS3B and thus deteriorated the air quality around AMS3B. Beside, the wind speed from 28 November 2017 to 29 November 2017 was lower than 1m/s. The very low wind speed was unlikely to blow the air particulates from the site to AMS3B. The wind data provided by the ET of Contract No. HY/2013/01 was attached below. Figure 1 showing the location of the Air Quality Monitoring Station where recorded exceedance.
- In addition, referring to the Air Quality Health Index (AQHI) provided by Environmental Protection Department, the AQHI was mainly 3-6 (low to very high) during 08:00 on 28 November 2017 to 08:00 on 29 November 2017 recorded at Tung Chung Station.
- The air quality mitigation measures as mentioned in EM&A Manual and EP was fully implemented in this Contract which including wet the worksite with water at least 8 times/day, cover the dusty materials with impervious sheeting. The exceedance was considered as non-Project related.

b) Action required under the action plan

Refer to Table 5.3 of the updated EM&A Manual for HKBCF

c) Action taken under the action plan

1. After considered the above mentioned investigation results, it appears that it was unlikely that the 24-hour TSP exceedance was attributed to the above mentioned work site of this Contract;
2. The exceedance was informed IEC/ENPO and ER by ET of Contract No. HY/2013/01;
3. 24-hour TSP was monitored and confirmed by Contract No. HY/2013/01;

d) ET's conclusions and recommendations for mitigation

- All relevant air quality mitigation measurement was checked to be fully implemented.
- The Contractor was reminded to spray the worksites with water at least 8 times/day.
- The Contractor was reminded to keep the watering record for inspection.
- The Contractor was reminded to cover the dusty materials with impervious sheeting.

e) Contractor's actions to implement the mitigation

- The worksite was wetted with water regularly at least 8 times/day and kept the records for inspection.
- All dusty materials were covered by impervious sheeting.
- All demolition activities were conducted during water spraying.

ET Leader Signature & Date 14-Dec-17

Wind Data

Date	Time	Average Wind Speed (m/s)	Average Wind Direction
28/11/2017	08:00	0	---
28/11/2017	09:00	0	---
28/11/2017	10:00	0	---
28/11/2017	11:00	0	---
28/11/2017	12:00	0	E
28/11/2017	13:00	0	---
28/11/2017	14:00	0	---
28/11/2017	15:00	0	---
28/11/2017	16:00	0	WNW
28/11/2017	17:00	0	---
28/11/2017	18:00	0	---
28/11/2017	19:00	0	---
28/11/2017	20:00	0	E
28/11/2017	21:00	0	---
28/11/2017	22:00	0	---
28/11/2017	23:00	0	---
29/11/2017	00:00	0	---
29/11/2017	01:00	0	---
29/11/2017	02:00	0	---
29/11/2017	03:00	0	---
29/11/2017	04:00	0	---
29/11/2017	05:00	0	---
29/11/2017	06:00	0	SSE
29/11/2017	07:00	0	SSE
29/11/2017	08:00	0.4	ENE

* Wind data was provided by the ET of Contract No. HY/2013/01

Appendix K

Complaint Investigation Report

Log No. 015

東展德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

ETS-Testconsult Ltd – Environmental Team (ET)			
Complaint Investigation Report			
Contract No. HY/2013/02 - Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities – Infrastructure Works Stage I (Western Portion)			
Details of the Complaint			**Log No. : 015**
Date	27 October 2017	**Time**	---
Location:			
Construction Sites of HKBCF			
Circumstances:			
One complaint was received by Environmental Protection Department on 27 October 2017 and referred to the ENPO. Then the ENPO forwarded the complaint by email to the R.E. (AECOM), the Contractor (China Harbour) and the ET (ETS-Testconsult Ltd.) of Contract No. HY/2013/02 at 19:57 on 27 October 2017. The complaint detail was "*珠澳大橋人工島地盤投訴黃泥水落海，情況持續了一個星期，詳細發生地點是人工島的C3 位置，他要求跟進及回覆。*"			
Follow action(s)			
Follow up by	Environmental Team of Contract No. HY/2013/02	**Date**	30 October 2017
Details of Follow up action(s)			
A weekly environmental site inspection was performed on 26 October 2017. During this inspection with the R.E. (AECOM) and the Contractor (China Harbour) of Contract No. HY/2013/02, no muddy water was observed to discharge into the sea directly. After received the details of the complaint from the ENPO, the ET of Contract No. HY/2013/02 have performed a related follow-up inspection on 02 November 2017 to investigate this event. The inspection was concentrated to check if appropriate water pollution mitigation measures were launched by the Contractor of Contract No. HY/2013/02. After checked with the Contractor of Contract No. HY/2013/02 on 02 November 2017, de-silting pits with geotextile were provided and wastewater was collected by the wetsep for proper treatment prior to disposal (see attached photos). Besides, effluent water sample was sampled for testing the total suspended solids. According to the latest test report with sample sampled on 25 September 2017, the parameter complied with the discharge license requirement. Hence, the complaint was found non-related to Contract No. HY/2013/02. Although this complaint was non-related to Contract No. HY/2013/02, the Contractor of Contract No. HY/2013/02 was reminded to provide appropriate water pollution mitigation measures, such as ensure all construction activities that would deteriorate the water quality was collected by sedimentation tanks or package treatment systems for proper treatment prior to disposal, ensure all silt removal facilities, channels and manholes were maintained and any deposited silt and grit was removed regularly and direct the wheel wash overflow and surface run-off to silt removal facilities before discharging to the storm drain.			
Details of Action(s) Taken by the Contactor of Contract No. HY/2013/02			
1. Collect wastewater by sedimentation tanks or package treatment systems for proper treatment prior to disposal; 2. Ensure all silt removal facilities, channels and manholes were maintained and any deposited silt and grit were removed regularly 3. Direct the wheel wash overflow and surface run-off to silt removal facilities before discharging to the storm drain			

東展環動測試顧問有限公司
ETS-TESTCONSULT LIMITED

Conclusion			
Refer to the above mentioned inspection, since providing of appropriate water pollution mitigation measures were launched, the complaint was found non-related to Contract No. HY/2013/02. Although this complaint was non-related to Contract No. HY/2013/02, the Contractor of Contract No. HY/2013/02 was reminded to provide appropriate mitigation measures to prevent water pollution.			
Issued by:	C. L. Lau	Date:	06 November 2017
Designation:	Environmental Team Leader	Signature:	

Photos

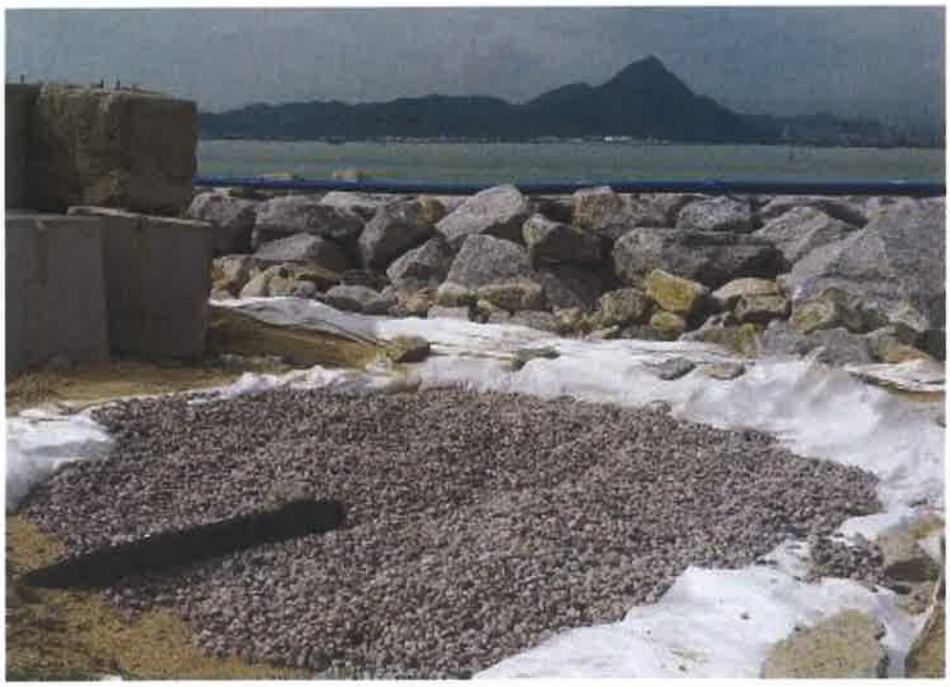


Photo 171030_001 – De-silting pit with geotextile

Photo 171030_002 – Wetsep

Log No. 016

東泉檢驗測試顧問有限公司
ETS-TESTCONSULT LIMITED

ETS-Testconsult Ltd – Environmental Team (ET)			
Complaint Investigation Report			
Contract No. HY/2013/02 - Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities – Infrastructure Works Stage I (Western Portion)			
Details of the Complaint			**Log No. : 016**
Date	23 November 2017	**Time**	—
Location:			
Construction Sites of HKBCF			
Circumstances:			
One complaint was received by Environmental Protection Department on 23 November 2017 and referred to the ENPO. Then the ENPO forwarded the complaint by email to the R.E. (AECOM), the Contractor (China Harbour) and the ET (ETS-Testconsult Ltd.) of Contract No. HY/2013/02 at 17:58 on 23 November 2017. The complaint detail was "*港珠澳大橋人工島地盤，由於不足每處都灑水，引致大量塵埃，近收費亭最嚴重*"			
Follow action(s)			
Follow up by	Environmental Team of Contract No. HY/2013/02	**Date**	24 November 2017
Details of Follow up action(s)			
After received the details of the complaint from the ENPO, the ET of Contract No. HY/2013/02 have performed a related follow-up inspection on 24 November 2017 to investigate this event. The inspection was concentrated to check if regular watering launched inside the construction site by the Contractor of Contract No. HY/2013/02. After checked with the Contractor of Contract No. HY/2013/02 during 15:00 to 16:00 on 24 November 2017, the worksite was wetted with water (see attached photo and location plan of watering photo) near 收費亭 and spraying with water by watering cars were observed on the worksite during the follow-up inspection. Besides, 收費亭 was not managed by Contract No. HY/2013/02. Hence, the complaint was found non-related to Contract No. HY/2013/02. Although this complaint was non-related to Contract No. HY/2013/02, the Contractor of Contract No. HY/2013/02 was reminded to provide appropriate mitigation measures, such as spray the worksites with water at least 8 times/day, keep the watering record for inspection, cover the dusty materials with impervious sheeting and spray water during demolition activities.			
Details of Action(s) Taken by the Contactor of Contract No. HY/2013/02			
1. Wet the worksites with water regularly; 2. Keep the watering record for inspection; 3. Cover the dusty materials with impervious sheeting; 4. Spray water during demolition activities;			
Conclusion			
Refer to the above mentioned inspection, since watering was carried out during the site inspection on 24 November 2017 and 收費亭 was belonged to other contract, the complaint was found non-related to Contract No. HY/2013/02. Although this complaint was non-related to Contract No. HY/2013/02, the Contractor of Contract No. HY/2013/02 was reminded to provide appropriate mitigation measures to minimize dust generation.			

東星檢驗測試顧問有限公司
ETS-TESTCONSULT LIMITED

Issued by:	C. L. Lau	Date:	28 November 2017
Designation:	Environmental Team Leader	Signature:	

Photos

Photo 171124_001 – Environment near 收費亭

Photo 171124_002 – Environment near 收費亭

Photo 171124_003 – Watering on the worksite

Photo 171124_004 – Watering on the worksite

Photo 171124_005 – Watering on the worksite

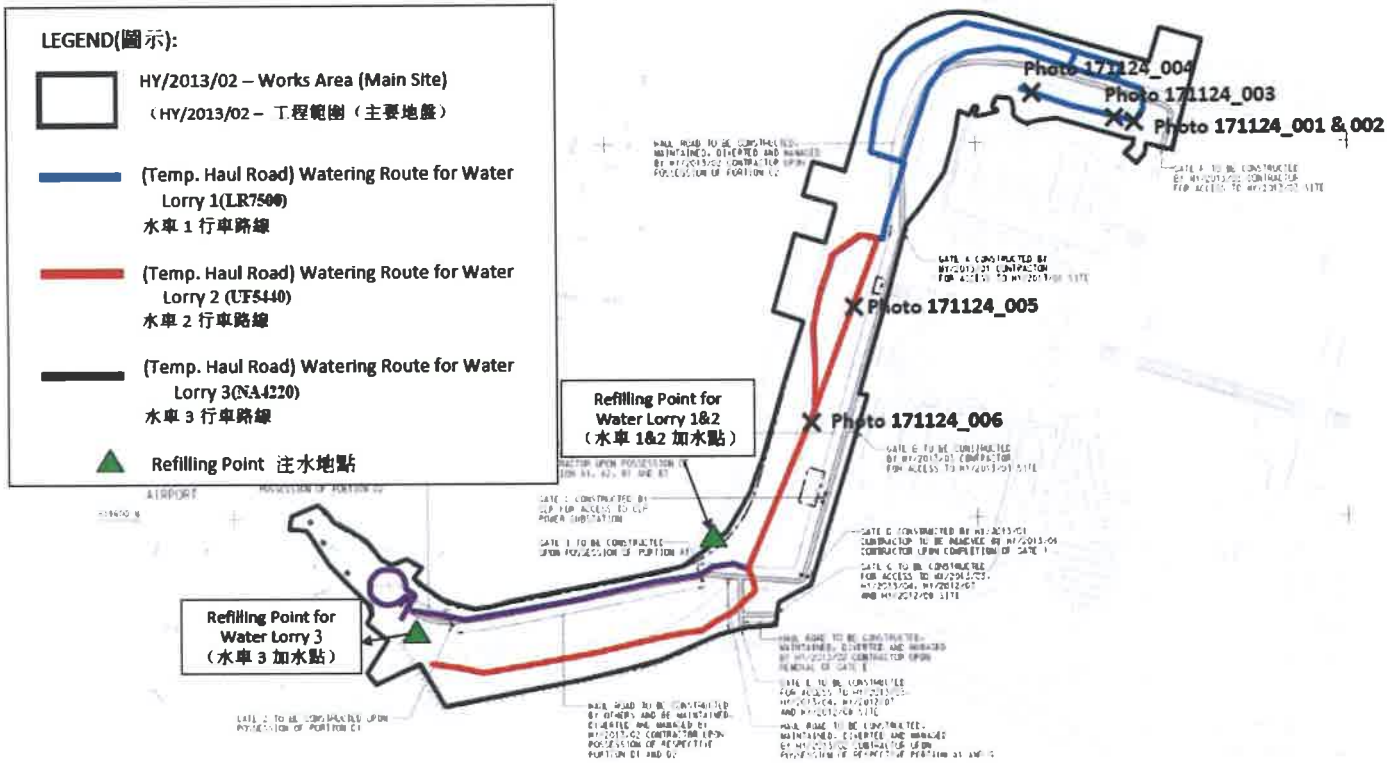
Photo 171124_006 – Watering on the worksite

中國港灣工程有限責任公司
CHINA HARBOUR ENGINEERING COMPANY LIMITED

HY / 2013 / 02
港珠澳大橋香港口岸-基礎設施工程第1期（西面部分）(C2)
HZMB-HKBCF-Infrastructure Works Stage I (Western Portion) (C2)

主要行車道路及通道灑水圖

The watering route of main haul road and access



Updated date(更新日期):
06/11/2017

環境許可證(EP-353/2009/K)3.23 條款要求每日至少進行八次灑水
Sub-clause 3.23 of EP-353/2009/K: Watering at least 8 times per day

Watering schedule

Time	Water Lorry 3 (Vehicle Plate: NA4220)*	Water Lorry 1&2 (Vehicle Plate: UF5440 & LR7500)*
08:00-09:00	3 Water Refilling & 2.5 rounds of watering	2 Water Refilling & 2 rounds of watering
09:00-10:00		
10:00-11:00	3 Water Refilling & 2.5 rounds of watering	2 Water Refilling & 2 rounds of watering
11:00-12:00		
13:00-14:00	3 Water Refilling & 2.5 rounds of watering	2 Water Refilling & 2 rounds of watering
14:00-15:00		
15:00-16:00	3 Water Refilling & 2.5 rounds of watering	2 Water Refilling & 2 rounds of watering
16:00-17:00		
17:00-18:00	1 Water Refilling & 1 round of watering	1 Water Refilling & 1 round of watering

*Remarks: For UF5440 & LR7500 (Water Refilling time:30mins/注水時間:30 分鐘) (Watering duration: 30min per round/灑水時間:30 分鐘)
For NA4220 (Water Refilling time:15mins/注水時間:15 分鐘) (Watering duration: 30 min per round/灑水時間:30 分鐘)