MOTT MACDONALD

Expansion of Hong Kong International Airport into a Three-Runway System

Construction Phase Annual EM&A Report No.3

April 2019

Airport Authority Hong Kong

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This Construction Phase Annual EM&A Report No. 3 has been reviewed and certified by

the Environmental Team Leader (ETL) in accordance with

Section 15.5 of the Updated EM&A Manual

Certified by:

Terence Kong
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date: 18 April 2019

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By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau, Hong Kong

Attn: Mr. Lawrence Tsui, Principal Manager

18 April 2019

Dear Sir,

Contract No. 3102
3RS Independent Environmental Checker Consultancy Services

Submission of Construction Phase Annual EM&A Report No.3

Reference is made to the Environmental Team's submission of the Construction Phase Annual EM&A Report No.3 under Condition 15.5 of the Updated EM&A Manual certified by the ET Leader on 18 April 2019.

We would like to inform you that we have no adverse comment on the captioned submission. Therefore we write to verify the captioned submission in accordance with the requirement stipulated in Condition 2.3 of EP-489/2014.

Should you have any query, please feel free to contact the undersigned at 3922 9376.

Yours faithfully,
AECOM Asia Co. Ltd.

Jackel Law
Independent Environmental Checker

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Abbreviations

3RS	Three-Runway System
AAHK	Airport Authority Hong Kong
AECOM	AECOM Asia Company Limited
AFCD	Agriculture, Fisheries and Conservation Department
AIS	Automatic Information System
ANI	Encounter Rate of Number of Dolphins
APM	Automated People Mover
AW	Airport West
BHS	Baggage Handling System
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CTP	Coral Translocation Plan
CWD	Chinese White Dolphin
DCM	Deep Cement Mixing
DEZ	Dolphin Exclusion Zone
DO	Dissolved Oxygen
DPSE	Number of Dolphins per 100 Units of Survey Effort
EAR	Ecological Acoustic Recorder
EIA	Environmental Impact Assessment
EM&A	Environmental Monitoring & Audit
EP	Environmental Permit
EPD	Environmental Protection Department
ET	Environmental Team
FCZ	Fish Culture Zone
FEF	Fisheries Enhancement Fund
HDD	Horizontal Directional Drilling
HKBCF	Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities
HKIA	Hong Kong International Airport
HSF	High Speed Ferry
IEC	Independent Environmental Checker
LKC	Lung Kwu Chau
MEEF	Marine Ecology Enhancement Fund
MMHK	Mott MacDonald Hong Kong Limited
MMWP	Marine Mammal Watching Plan
MSS	Marine Surveillance System
MTRMP-CAV	Marine Travel Routes and Management Plan for Construction and Associated Vessel
NEL	Northeast Lantau
NWL	Northwest Lantau
PAM	Passive Acoustic Monitoring
PM	Partial Mortality
PVD	Prefabricated Vertical Drain

SC	Sha Chau
SCLKCMP	Sha Chau and Lung Kwu Chau Marine Park
SPSE	Number of On-effort Sightings per 100 Units of Survey Effort
SS	Suspended Solids
SSK	Sham Shui Kok
STG	Encounter Rate of Number of Dolphin Sightings
SWL	Southwest Lantau
The Project	The Expansion of Hong Kong International Airport into a Three-Runway System
The SkyPier Plan	Marine Travel Routes and Management Plan for High Speed Ferries of SkyPier
TMT	Tai Mo To
TSP	Total Suspended Particulates
WL	West Lantau
WMP	Waste Management Plan
YTW	Yam Tsai Wan

Executive Summary

The "Expansion of Hong Kong International Airport into a Three-Runway System" (the Project) serves to meet the future air traffic demands at Hong Kong International Airport (HKIA). On 7 November 2014, the Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-185/2014) for the Project was approved and an Environmental Permit (EP) (Permit No.: EP-489/2014) was issued for the construction and operation of the Project.

Airport Authority Hong Kong (AAHK) commissioned Mott MacDonald Hong Kong Limited (MMHK) to undertake the role of Environmental Team (ET) for carrying out the Environmental Monitoring & Audit (EM&A) works during the construction phase of the Project in accordance with the Updated EM&A Manual (the Manual).

This is the 3rd Construction Phase Annual EM&A Report for the Project which summarizes the monitoring results and audit findings of the EM&A programme during the reporting period from 1 January 2018 to 31 December 2018.

Key Activities in the Reporting Period

Key activities of the Project carried out in the reporting period were related to the following contracts:

Advanced Works:

Contract P560 (R) Aviation Fuel Pipeline Diversion Works

- Horizontal directional drilling (HDD) works;
- Stockpiling of materials from HDD operation;
- Trench backfilling; and
- Shoreline reinstatement next to the new pipe.

Deep Cement Mixing (DCM) Works:

Contracts 3201 to 3205 DCM Works

- DCM works; and
- Seawall construction.

Reclamation Works:

Contract 3206 Main Reclamation Works

- Laying of sand blanket;
- Prefabricated vertical drain (PVD) installation;
- Seawall construction;
- Marine filling; and
- DCM works.

Airfield Works:

Contract 3301 North Runway Crossover Taxiway

- Cable ducting works;
- Subgrade works;
- Operation of aggregate mixing facility; and
- Precast of duct bank and fabrication of steel works.

Terminal 2 Expansion Works:

Contract 3501 Antenna Farm and Sewage Pumping Station

- Excavation and piling works;
- Pipe installation; and
- Builders works of antenna farm.

Contract 3502 Terminal 2 (T2) Automated People Mover (APM) Depot Modification Works

- Removal of existing concrete;
- Fitting out of electrical and mechanical (E&M) works;
- Brick laying works;
- Formwork erection and concreting works; and
- Site clearance.

Contract 3503 Terminal 2 Foundation and Substructure Works

- Site establishment;
- Drainage, utility, and road works;
- Piling and structure works; and
- Demolition of footbridge.

Contract 3505 Terminal 2 Spectrum Lighting Mock-ups

- Assembly of structural frame;
- Floor drilling;
- Installation of lighting fittings and panels; and
- Assembly of lighting mock-ups.

Automated People Mover (APM) Works:

Contract 3602 Existing APM System Modification Works

- Site and site office establishment; and
- Modification works at APM depot.

Baggage Handling System (BHS) Works:

Contract 3603 3RS Baggage Handling System

- Site establishment;
- Drainage, utility, and road works;
- Piling and structure works; and
- Demolition of footbridge.

Airport Support Infrastructure & Logistic Works:

Contract 3801 APM and BHS Tunnels on Existing Airport Island

- Site establishment works;
- Diversion of underground utilities;
- Piling and foundation works;
- Cofferdam and support installation for box culvert;
- Rising main installation; and
- Site clearance.

EM&A Activities Conducted in the Reporting Period

The EM&A programme was undertaken in accordance with the Manual. Summary of monitoring activities during this reporting period is presented as below:

Monitoring/ Audit Activities	Number of Sessions
Air Quality Monitoring	402
Noise Monitoring	243
Water Quality Monitoring	152
Vessel line-transect surveys for Chinese White Dolphin (CWD) monitoring	24
Land-based theodolite tracking survey effort for CWD monitoring	60(1)
Terrestrial Ecological Monitoring (2)	8
Coral post-translocation monitoring (3)	2

Notes

(1) Including 24 monitoring sessions required under the Updated EM&A Manual and 36 sessions of additional monitoring.

(2) Terrestrial ecological monitoring on Sheung Sha Chau Island was conducted monthly when construction works was carried out on Sheung Sha Chau Island outside of ardeid's breeding season from April to July 2018.

(3) Including one set of additional coral post-translocation monitoring (beyond Coral Translocation Plan requirements) conducted in October 2018.

Apart from the regular site inspections, audit of SkyPier High Speed Ferries (HSF), audit of construction and associated vessels, and audit of implementation of Marine Mammal Watching Plan (WWMP) and Dolphin Exclusion Zone (DEZ) Plan were also conducted in the reporting period. Based on the information including ET's observations, records of Marine Surveillance System (MSS), and contractors' site records, the environmental pollution control and mitigation measures were properly implemented and the construction operation of the Project in the reporting period did not introduce adverse impact to the sensitive receivers.

Summary Findings of the EM&A Programme

Monitoring results of construction noise, construction waste, CWD, and coral post-translocation did not trigger the corresponding Action and Limit Levels in the reporting period.

For air quality, one monitoring result triggered the Action Level of 1-hour total suspended particulates (TSP) in the reporting period. Corresponding investigations were conducted accordingly which concluded that the case was not related to the Project.

For water quality, the monitoring results for total alkalinity obtained in the reporting period did not trigger the corresponding Action and Limit Levels stipulated in the EM&A programme. Relevant investigation and follow-up actions will be conducted according to the EM&A programme if the corresponding Action and Limit Levels are triggered. For dissolved oxygen (DO), turbidity, suspended solids (SS), chromium, and nickel, some of the monitoring results triggered the relevant Action or Limit Level in the reporting period, and the corresponding investigations were

conducted accordingly. The investigation findings concluded that all cases were not related to the Project. To conclude, as all cases were considered non-Project related, the construction activities in the monitoring period did not introduce adverse impact to all water quality sensitive receivers.

The monthly terrestrial ecological monitoring on Sheung Sha Chau observed that HDD works were conducted at the daylighting location and there was no encroachment or disturbance to the egretry area.

The key findings of the EM&A programme in the reporting period is summarized as below:

	Yes	No	Details	Analysis / Recommendation / Remedial Actions
Breach of Limit Level^		√	No exceedance of project-related Limit Level was recorded.	Nil
Breach of Action Level^		√	No exceedance of project-related Action Level was recorded.	Nil
Complaints Received	√		Eight complaints were received on 19 Jan, 5 Feb, 16 May, 28 May, 3 Jul, 27 Aug, 21 Sep, and 6 Nov 2018 respectively.	The complaint investigations were carried out in accordance with the Complaint Management Plan. Details are presented in S3.2.1.
Notification of any summons and status of prosecutions		√	No notification of summons or prosecution were received. For the summonses received in Jun 2017 alleging use of powered mechanical equipment by the contractor outside the permitted hours for the aviation fuel pipeline diversion works in Dec 2016, the prosecution formally offered no evidence against the AAHK and all summonses issued to AAHK were dismissed. The contractor pleaded guilty to contravening the Noise Control Ordinance and was fined by the court on 21 May 2018.	Nil
Changes that affect the EM&A	√		Starting from 12 May 2018, some of the water quality impact stations surrounding the land formation footprint were realigned. Starting from 1 Sep 2018, noise monitoring at NM3A was suspended. Starting from 25 Oct 2018, water quality monitoring at SR1A was commenced.	Nil

Remarks: ^ Only triggering of Action or Limit Level found related to Project works is counted as Breach of Action or Limit Level.

1 Introduction

1.1 Background

On 7 November 2014, the Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-185/2014) for the "Expansion of Hong Kong International Airport into a Three-Runway System" (the Project) was approved and an Environmental Permit (EP) (Permit No.: EP-489/2014) was issued for the construction and operation of the Project.

Airport Authority Hong Kong (AAHK) commissioned Mott MacDonald Hong Kong Limited (MMHK) to undertake the role of Environmental Team (ET) for carrying out the Environmental Monitoring & Audit (EM&A) works during the construction phase of the Project in accordance with the Manual submitted under EP Condition 3.1[1]. AECOM Asia Company Limited (AECOM) was employed by AAHK as the Independent Environmental Checker (IEC) for the Project.

The Project covers the expansion of the existing airport into a three-runway system (3RS) with key project components comprising land formation of about 650 hectares and all associated facilities and infrastructure including taxiways, aprons, aircraft stands, a passenger concourse, an expanded Terminal 2, all related airside and landside works and associated ancillary and supporting facilities. The existing submarine aviation fuel pipelines and submarine power cables also require diversion as part of the works.

Construction of the Project is to proceed in the general order of diversion of the submarine aviation fuel pipelines, diversion of the submarine power cables, land formation, and construction of infrastructure, followed by construction of superstructures.

The overall phasing programme of all construction works and contract description is presented in **Appendix A**.

1.2 Scope of this Report

This is the 3rd Construction Phase Annual EM&A Report for the Project which summarizes the key findings of the EM&A programme during the reporting period from 1 January 2018 to 31 December 2018.

1.3 Project Organization

The Project's organization structure and the contact details of the key personnel are provided in **Appendix B** and **Table 1.1** respectively.

[1] The Manual is available on the Project's dedicated website (accessible at: http://env.threerunwaysystem.com/en/index.html).

Table 1.1: Contact Information of Key Personnel

Party	Position	Name	Telephone
Project Manager's Representative (Airport Authority Hong Kong)	Principal Manager, Environment	Lawrence Tsui	2183 2734
Environmental Team (ET) (Mott MacDonald Hong Kong Limited)	Environmental Team Leader	Terence Kong	2828 5919
	Deputy Environmental Team Leader	Heidi Yu	2828 5704
	Deputy Environmental Team Leader	Daniel Sum	2585 8495
Independent Environmental Checker (IEC) (AECOM Asia Company Limited)	Independent Environmental Checker	Jackel Law	3922 9376
	Deputy Independent Environmental Checker	Roy Man	3922 9348

Advanced Works:

Party	Position	Name	Telephone
Contract P560(R) Aviation Fuel Pipeline Diversion Works (Langfang Huayuan Mechanical and Electrical Engineering Co., Ltd.)	Project Manager	Wei Shih	2117 0566
	Environmental Officer	Lyn Liu	5172 6543

DCM Works:

Party	Position	Name	Telephone
Contract 3201 DCM (Package 1) (Penta-Ocean-China State-Dong-Ah Joint Venture)	Project Director	Tsugunari Suzuki	9178 9689
	Environmental Officer	Hiu Yeung Tang	6329 3513
Contract 3202 DCM (Package 2) (Samsung-BuildKing Joint Venture)	Project Manager	Ilkwon Nam	9643 3117
	Environmental Officer	David Man	6421 3238
Contract 3203 DCM (Package 3) (Sambo E&C Co., Ltd.)	Project Manager	Eric Kan	9014 6758
	Environmental Officer	David Hung	9765 6151
Contract 3204 DCM (Package 4) (CRBC-SAMBO Joint Venture)	Project Manager	Kyung-Sik Yoo	9683 8697
	Environmental Officer	Kanny Cho	6799 8226
Contract 3205 DCM (Package 5) (Bachy Soletanche - Sambo Joint Venture)	Deputy Project Director	Min Park	9683 0765
	Environmental Officer	Margaret Chung	9130 3696

Reclamation Works:

Party	Position	Name	Telephone
Contract 3206 (ZHEC-CCCC-CDC Joint Venture)	Project Manager	Kim Chuan Lim	3763 1509
	Environmental Officer	Kwai Fung Wong	3763 1452

Airfield Works:

Party	Position	Name	Telephone
Contract 3301 North Runway Crossover Taxiway (FJT-CHEC-ZHEC Joint Venture)	Project Manager	Kin Hang Chung	9412 1386
	Environmental Officer	Nelson Tam	9721 3942

Terminal 2 Expansion Works:

Party	Position	Name	Telephone
Contract 3501 Antenna Farm and Sewage Pumping Station (Build King Construction Ltd.)	Project Manager	Raymond Au	6985 8860
	Environmental Officer	Edward Tam	9287 8270
Contract 3502 Terminal 2 APM Depot Modification Works (Build King Construction Ltd.)	Project Manager	David Ng	9010 7871
	Environmental Officer	Chun Pong Chan	9187 7118
Contract 3503 Terminal 2 Foundation and Substructure Works (Leighton – Chun Wo Joint Venture)	Construction Manager	Eric Wu	3973 1718
	Environmental Officer	Stephen Tsang	5508 6361
Contract 3505 Terminal 2 Spectrum Lighting Mock-Ups (Union Contractors Ltd.)	Project Manager	Wylar Chan	9107 5920
	Environmental Officer	Kelvin Lam	9379 2446

Automated People Mover (APM) Works:

Party	Position	Name	Telephone
Contract 3602 Existing APM System Modification Works (Niigata Transys Co., Ltd.)	Project Manager	Kunihiro Tatecho	9755 0351
	Environmental Officer	Arthur Wong	9170 3394

Baggage Handling System (BHS) Works:

Party	Position	Name	Telephone
Contract 3603 3RS Baggage Handling System (VISH Consortium)	Project Manager	Andy Ng	9102 2739
	Environmental Officer	Eric Ha	9215 3432

Airport Support Infrastructure & Logistic Works:

Party	Position	Name	Telephone
Contract 3801 APM and BHS Tunnels on Existing Airport Island (China State Construction Engineering (Hong Kong) Ltd.)	Project Manager	Tony Wong	9642 8672
	Environmental Officer	Fredrick Wong	9842 2703

1.4 Contact information for the Project

The contact information for the Project is provided in **Table 1.2**. The public can contact us through the following channels if they have any queries and comments on the environmental monitoring data and project related information.

Table 1.2: Contact Information of the Project

Channels	Contact Information
Hotline	3908 0354
Email	env@3rsproject.com
Fax	3747 6050
Postal Address	Airport Authority Hong Kong HKIA Tower 1 Sky Plaza Road Hong Kong International Airport Lantau Hong Kong Attn: Environmental Team Leader Mr Terence Kong c/o Mr Lawrence Tsui (TRD)

1.5 Summary of Construction Works

The key activities of the Project carried out in the reporting period included reclamation works and land-side works. Reclamation works included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation. Land-side works involved mainly foundation and substructure works for Terminal 2 expansion, modification and tunnel work for APM and BHS, and preparation work for utilities, with activities including site establishment, site office construction, road and drainage works, cable ducting, demolition of existing facilities, piling, and excavation works.

The locations of the works areas are presented in **Figure 1.1** to **Figure 1.2.**

1.6 Summary of EM&A Programme Requirements

The status for all environmental aspects is presented in **Table 1.3**.

Table 1.3: Summary of status for all environmental aspects under the Manual

Parameters	EM&A Requirements	Status
Air Quality		
Baseline Monitoring	At least 14 consecutive days before commencement of construction work	The baseline air quality monitoring results were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.

Parameters	EM&A Requirements	Status
Impact Monitoring	At least 3 times every 6 days	On-going
Noise		
Baseline Monitoring	Daily for a period of at least two weeks prior to the commencement of construction works	The baseline noise monitoring results were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.
Impact Monitoring	Weekly	On-going
Water Quality		
General Baseline Water Quality Monitoring for reclamation, water jetting and field joint works	Three days per week, at mid-flood and mid-ebb tides, for at least four weeks prior to the commencement of marine works.	The baseline water quality monitoring results were reported in Baseline Water Quality Monitoring Report and submitted to EPD under EP Condition 3.4.
General Impact Water Quality Monitoring for reclamation, water jetting and field joint works	Three days per week, at mid-flood and mid-ebb tides.	On-going
Initial Intensive Deep Cement Mixing (DCM) Water Quality Monitoring	At least four weeks	The Initial Intensive DCM Monitoring Report was submitted and approved by EPD in accordance with the Detailed Plan on DCM.
Regular DCM Water Quality Monitoring	Three times per week until completion of DCM works.	On-going
Waste Management		
Waste Monitoring	At least weekly	On-going
Land Contamination		
Supplementary Contamination Assessment Plan (CAP)	At least 3 months before commencement of any soil remediation works.	The Supplementary CAP was submitted and approved by EPD pursuant to EP condition 2.20.
Contamination Assessment Report (CAR) for Golf Course	CAR to be submitted for golf course first; programme for submission of supplementary CAR at the other areas to be agreed.	The CAR for Golf Course was submitted to EPD.
Terrestrial Ecology		
Pre-construction Egretry Survey Plan	Once per month in the breeding season between April and July, prior to the commencement of HDD drilling works.	The revised Egretry Survey Plan was submitted and approved by EPD under EP Condition 2.14.
Ecological Monitoring	Monthly monitoring during the HDD construction works period from August to March.	On-going
Marine Ecology		
Pre-Construction Phase Coral Dive Survey	Prior to marine construction works	The Coral Translocation Plan was submitted and approved by EPD under EP Condition 2.12.
Coral Translocation	-	The coral translocation was completed on 5 January 2017.
Coral Post-translocation Monitoring	As per an enhanced monitoring programme based on the Coral Translocation Plan	The post-translocation monitoring programme according to the Coral Translocation Plan was completed in April 2018. On the other hand, one set of additional monitoring (beyond Coral Translocation Plan requirements) was conducted in October 2018.

Parameters	EM&A Requirements	Status
Chinese White Dolphins (CWD)		
Baseline Monitoring	6 months of baseline surveys before the commencement of land formation related construction works. Vessel surveys: Two full surveys per month; Land-based theodolite tracking: Two days per month at the Sha Chau station and two days per month at the Lung Kwu Chau Station; and Passive Acoustic Monitoring (PAM): For the whole duration of baseline period.	Baseline CWD results were reported in the CWD Baseline Monitoring Report and submitted to EPD in accordance with EP Condition 3.4.
Impact Monitoring	Vessel surveys: Two full surveys per month; Land-based theodolite tracking: One day per month at the Sha Chau station and one day per month at the Lung Kwu Chau Station; and PAM: For the whole duration for land formation related construction works.	On-going since its commencement in August 2016. Land-based theodolite tracking: In addition to the frequency as stipulated in the Manual, supplemental theodolite tracking was ongoing during the first three years' implementation period for the SkyPier Plan, i.e. in total twice per month at the Sha Chau station and three times per month at the Lung Kwu Chau station.
Landscape and Visual		
Landscape and Visual Plan	At least 3 months before the commencement of construction works on the formed land of the Project.	The Landscape & Visual Plan was submitted to EPD under EP Condition 2.18.
Baseline Monitoring	One-off survey within the Project site boundary prior to commencement of any construction works	The baseline landscape & visual monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.
Impact Monitoring	Weekly	On-going
Environmental Auditing		
Regular site inspection	Weekly	On-going
Marine Mammal Watching Plan (MMWP) implementation measures	Monitor and check	On-going
Dolphin Exclusion Zone (DEZ) Plan implementation measures	Monitor and check	On-going
SkyPier High Speed Ferries (HSF) implementation measures	Monitor and check	On-going
Construction and Associated Vessels Implementation measures	Monitor and check	On-going
Complaint Hotline and Email channel	Construction phase	On-going
Environmental Log Book	Construction phase	On-going

Taking into account the construction works in the reporting period, impact monitoring of air quality, noise, water quality, waste management, terrestrial ecology, landscape and visual, and CWD were carried out in the reporting period. Upon completion of coral translocation in January 2017, post-translocation monitoring was also carried out in the reporting period.

The EM&A programme also involved weekly site inspections and related auditing conducted by the ET for checking the implementation of the required environmental mitigation measures as recommended in the approved EIA Report. To promote the environmental awareness and enhance the environmental performance of the contractors, environmental briefings,

environmental trainings, and regular environmental management meetings were conducted during the reporting period which are summarized as below:

- 12 dolphin observer trainings provided by ET;
- 24 skipper trainings provided by ET;
- 1 environmental briefing on EP and EM&A requirements of the 3RS provided by ET;
- 1 training workshop for contractor on construction noise permit requirements provided by ET;
- 1 environmental briefing on environmental compliance and construction waste management provided by EPD and AAHK;
- 3 EPD sharing sessions on key issues of environmental management, waste management, and/or construction dust control; and
- 98 environmental management meetings for EM&A review with works contracts.

The EM&A programme has been undertaken in accordance with the recommendations presented in the approved EIA Report and the Manual. A summary of implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix C**.

2 Environmental Monitoring and Auditing

2.1 Air Quality Monitoring

Impact 1-hour Total Suspended Particulates (TSP) monitoring was conducted three times every six days at two representative monitoring stations during the reporting period. The locations of monitoring stations are described in **Table 2.1** and presented in **Figure 2.1**.

2.1.1 Action and Limit Levels

The Action and Limit Levels of the air quality monitoring stipulated in the EM&A programme for triggering the relevant investigation and follow-up procedures under the programme are provided in **Table 2.1**.

Table 2.1: Impact Air Quality Monitoring Stations

Monitoring Station	Location	Action Level (μg/m^3)	Limit Level (μg/m^3)
AR1A	Man Tung Road Park	306	500
AR2	Village House at Tin Sum	298	

2.1.2 Monitoring Results

The graphical plots of impact air quality monitoring results during the reporting period are presented in **Appendix D**. Percentage of monitoring results within their corresponding Action and Limit Levels in the reporting period are presented in **Table 2.2**.

Table 2.2: Percentage of Air Quality Monitoring Results within Action and Limit Levels

	AR1A	AR2
Jan 2018	100.0%	94.4%
Feb 2018	100.0%	100.0%
Mar 2018	100.0%	100.0%
Apr 2018	100.0%	100.0%
May 2018	100.0%	100.0%
Jun 2018	100.0%	100.0%
Jul 2018	100.0%	100.0%
Aug 2018	100.0%	100.0%
Sep 2018	100.0%	100.0%
Oct 2018	100.0%	100.0%
Nov 2018	100.0%	100.0%
Dec 2018	100.0%	100.0%
Overall	100.0%	99.5%

Note: The percentages are calculated by dividing the number of monitoring results within their corresponding Action and Limit Level by the total number of monitoring results.

All monitoring results at AR1A were within their corresponding Action and Limit Levels.

One monitoring result of 1-hour TSP at AR2 triggered the Action Level on 8 January 2018, and corresponding investigation was conducted accordingly. Details of the investigation findings are presented in the Contruction Phase Monthly EM&A Report No. 25, which concluded that the result was not related to the Project.

General meteorological conditions throughout the impact monitoring period were recorded and summarized in **Table 2.3**.

Table 2.3: General Meteorological Condition During Impact Air Quality Monitoring

	Weather	Wind Direction
Jan – Mar 2018	Sunny to Rainy	North or East
Apr – Jun 2018	Sunny to Rainy	South or Southwest
Jul – Sep 2018	Sunny to Rainy	South or Southwest
Oct – Dec 2018	Sunny to Rainy	North or East

2.1.3 Conclusion

No dust emission source from Project activities was observed during impact air quality monitoring. Major sources of dust observed at the monitoring stations during the monitoring sessions were local air pollution and nearby traffic emissions. It was considered that the dust control measures taken in the project during the reporting period were effective and there was no adverse impact attributable to the works of the Project.

2.2 Noise Monitoring

Impact noise monitoring was conducted at four to five representative monitoring stations once per week during 0700 and 1900 in the reporting period. The locations of monitoring stations are described in **Table 2.4** and presented in **Figure 2.1**.

2.2.1 Action and Limit Levels

The Action and Limit levels of the noise monitoring stipulated in the EM&A programme for triggering the relevant investigation and follow-up procedures under the programme are provided in **Table 2.4**.

Table 2.4: Impact Noise Monitoring Stations

Monitoring Station	Location	Action Level	Limit Level
NM1A	Man Tung Road Park	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)
NM3A [(i)]	Site Office		75 dB(A)
NM4	Ching Chung Hau Po Woon Primary School		65dB(A) / 70 dB(A) [(ii)]
NM5	Village House in Tin Sum		75 dB(A)
NM6	House No. 1, Sha Lo Wan		75 dB(A)

Note:
[(i)] With the commencement of construction works of Tung Chung East Development near NM3A, the monitoring results obtained at NM3A would be affected by other construction project. According to Section 4.3.3 of the Manual, the noise monitoring at NM3A was suspended starting from 1 September 2018 and would be resumed with the completion of the Tung Chung East Development.

[(ii)] Reduced to 70dB(A) for school and 65dB(A) during school examination periods at NM4.

2.2.2 Monitoring Results

The graphical plots of impact noise quality monitoring results during the reporting period are presented in **Appendix D**. Percentage of monitoring results within their corresponding Action and Limit Levels in the reporting period are presented in **Table 2.5**.

Table 2.5: Percentage of Noise Monitoring Results within Action and Limit Levels

	NM1A	NM3A	NM4	NM5	NM6
Jan 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Feb 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Mar 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Apr 2018	100.0%	100.0%	100.0%	100.0%	100.0%
May 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Jun 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Jul 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Aug 2018	100.0%	100.0%	100.0%	100.0%	100.0%
Sep 2018	100.0%	N/A*	100.0%	100.0%	100.0%
Oct 2018	100.0%	N/A*	100.0%	100.0%	100.0%
Nov 2018	100.0%	N/A*	100.0%	100.0%	100.0%
Dec 2018	100.0%	N/A*	100.0%	100.0%	100.0%
Overall	100.0%	100.0%	100.0%	100.0%	100.0%

Note:

The percentages are calculated by dividing the number of monitoring results within their corresponding Action and Limit Level by the total number of monitoring results.

*: Noise monitoring at NM3A was suspended starting from 1 September 2018.

No complaints were received from any sensitive receiver that triggered the Action Level. All monitoring results were also within the corresponding Limit Levels at all monitoring stations in the reporting period.

General weather conditions throughout the impact monitoring period were recorded and summarized in **Table 2.6**.

Table 2.6: General Weather Condition During Impact Noise Monitoring

	Weather
Jan – Mar 2018	Sunny to Cloudy
Apr – Jun 2018	Sunny to Cloudy
Jul – Sep 2018	Sunny to Cloudy
Oct – Dec 2018	Sunny to Cloudy

2.2.3 Conclusion

As the construction activities were far away from the monitoring stations, major sources of noise dominating the monitoring stations observed during the construction noise impact monitoring were road traffic and aircraft noise near NM1A, aircraft and construction vessel noise at NM3A and NM5, school activities at NM4, and noise from aircrafts, helicopters and marine vessels at NM6 during the reporting period. It was considered that the noise control measures taken in the project during the reporting period were effective and there was no adverse impact attributable to the works of the Project.

2.3 Water Quality Monitoring

Impact water quality monitoring of the Project commenced on 4 Aug 2016. During the reporting period, water quality monitoring was conducted three days per week, at mid-ebb and mid-flood tides, at 22 to 23 water quality monitoring stations, comprising 12 impact (IM) stations, 7 to 8 sensitive receiver (SR) stations, and 3 control (C) stations in the vicinity of the water quality sensitive receivers around the airport island in accordance with the Manual. The purpose of water quality monitoring at the IM stations is to promptly capture any potential water quality impacts from the Project before the impacts could become apparent at sensitive receivers (represented by the SR stations). **Table 2.7** describes the details of the monitoring stations. **Figure 2.2a** shows the locations of the monitoring stations.

Starting from 12 May 2018, some of the IM stations surrounding the land formation footprint were realigned to maintain an appropriate buffer distance away from the enhanced silt curtain. The updated monitoring locations are presented in **Figure 2.2b.** With the operation of the Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities, water quality monitoring at SR1A station was also commenced on 25 October 2018. The monitoring locations since 25 October 2018 are shown in **Figure 2.2c**.

Table 2.7: Monitoring Locations and Parameters for Impact Water Quality Monitoring

Monitoring Stations	Description	Coordinates		Parameters
		Easting	Northing	
C1	Control Station	804247	815620	General Parameters: DO, pH, Temperature, Salinity, Turbidity, SS DCM Parameters Total Alkalinity, Heavy Metals [2]
C2	Control Station	806945	825682	
C3[3]	Control Station	817803	822109	
IM1	Impact Station	806458	818351	
		807132 (From 12 May 2018 onwards)	817949	
IM2	Impact Station	806193	818852	
		806166 (From 12 May 2018 onwards)	818163	
IM3	Impact Station	806019	819411	
		805594 (From 12 May 2018 onwards)	818784	
IM4	Impact Station	805039	819570	
		804607 (From 12 May 2018 onwards)	819725	
IM5	Impact Station	804924	820564	
		804867 (From 12 May 2018 onwards)	820735	
IM6	Impact Station	805828	821060	
IM7	Impact Station	806835	821349	
IM8	Impact Station	807838	821695	
		808140 (From 12 May 2018 onwards)	821830	
IM9	Impact Station	808811	822094	
IM10	Impact Station	809838	822240	
		809794 (From 12 May 2018 onwards)	822385	
IM11	Impact Station	810545	821501	
		811460	822057	

Monitoring Stations	Description	Coordinates		Parameters
		Easting	Northing	
		(From 12 May 2018 onwards)		
IM12	Impact Station	811519	821162	
		812046 (From 12 May 2018 onwards)	821459	
SR1A[1]	Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) Seawater Intake for cooling	812586	820069	General Parameters DO, pH, Temperature, Salinity, Turbidity, SS
SR2[3]	Planned marine park / hard corals at The Brothers / Tai Mo To	814166	821463	General Parameters DO, pH, Temperature, Salinity, Turbidity, SS DCM Parameters Total Alkalinity, Heavy Metals [2][4]
SR3	Sha Chau and Lung Kwu Chau Marine Park / fishing and spawning grounds in North Lantau	807571	822147	General Parameters DO, pH, Temperature, Salinity, Turbidity, SS
SR4A	Sha Lo Wan	807810	817189	
SR5A	San Tau Beach SSSI	810696	816593	
SR6	Tai Ho Bay, Near Tai Ho Stream SSSI	814663	817899	
SR7	Ma Wan Fish Culture Zone (FCZ)	823742	823636	
SR8[5]	Seawater Intake for cooling at Hong Kong International Airport (East)	811418	820246	

Notes:

(1) With the operation of HKBCF, water quality monitoring at SR1A was commenced on 25 October 2018.

(2) Details of selection criteria for the two heavy metals for early regular and regular DCM monitoring refer to the Detailed Plan on Deep Cement Mixing available on the dedicated 3RS website (http://env.threerunwaysystem.com/en/ep-submissions.html). DCM specific water quality monitoring parameters (total alkalinity and heavy metals) were only conducted at C1 to C3, SR2, and IM1 to IM12.

(3) According to the baseline water quality monitoring report, C3 station is not adequately representative as a control station of IM / SR stations during the flood tide. The control reference has been changed from C3 to SR2 from 1 September 2016 onwards.

(4) Total alkalinity and heavy metals results are collected at SR2 as a control station for regular DCM monitoring.

(5) The monitoring station for SR8 is subject to future changes due to silt curtain arrangements and the progressive relocation of this seawater intake.

2.3.1 Action and Limit Levels

The Action and Limit Levels for general water quality monitoring and regular DCM monitoring stipulated in the EM&A programme for triggering the relevant investigation and follow-up procedures under the programme are presented in **Table 2.8**. The control and impact stations during flood tide and ebb tide for general water quality monitoring and regular DCM monitoring are presented in **Table 2.9**. The weather and sea conditions during the reporting period are recorded and summarized in **Table 2.10**.

Table 2.8: Action and Limit Levels for General Water Quality Monitoring and Regular DCM Monitoring

Parameters		Action Level (AL)		Limit Level (LL)	
Action and Limit Levels for general water quality monitoring and regular DCM monitoring (excluding SR1& SR8)					
General Water Quality Monitoring	DO in mg/L (Surface, Middle & Bottom)	Surface and Middle 4.5 mg/L		Surface and Middle 4.1 mg/L 5 mg/L for Fish Culture Zone (SR7) only	
		Bottom 3.4 mg/L		Bottom 2.7 mg/L	
	Suspended Solids (SS) in mg/L	23	or 120% of upstream control station at the same tide of the same day, whichever is higher	37	or 130% of upstream control station at the same tide of the same day, whichever is higher
	Turbidity in NTU	22.6		36.1	
Regular DCM Monitoring	Total Alkalinity in ppm	95		99	
	Representative Heavy Metals for regular DCM monitoring (Chromium)	0.2		0.2	
	Representative Heavy Metals for regular DCM monitoring (Nickel)	3.2		3.6	
Action and Limit Levels SR1					
SS (mg/l)		33		42	
Action and Limit Levels SR8					
SS (mg/l)		52		60	

Note:

1. For DO measurement, Action or Limit Level is triggered when the monitoring result is lower than the limits.
2. For parameters other than DO, Action or Limit Level is triggered when monitoring result is higher than the limits.
3. Depth-averaged results are used unless specified otherwise.
4. Details of selection criteria for the two heavy metals for early regular and regular DCM monitoring refer to the Detailed Plan on Deep Cement Mixing available on the dedicated 3RS website http://env.threerunwaysystem.com/en/ep-submissions.html)
5. The Action and Limit Levels for the two representative heavy metals chosen will be the same as that for the intensive DCM monitoring.

Table 2.9: The Control and Impact Stations during Flood Tide and Ebb Tide for General Water Quality Monitoring and Regular DCM Monitoring

Control Station	Impact Stations
Flood Tide	
C1	IM1, IM2, IM3, IM4, IM5, IM6, IM7, IM8, IM13, SR3
SR2 (1)	IM7, IM8, IM9, IM10, IM11, IM12, SR1A, SR3, SR4A, SR5A, SR6, SR8
Ebb Tide	
C1	SR4A, SR5A, SR6
C2	IM1, IM2, IM3, IM4, IM5, IM6, IM7, IM8, IM9, IM10, IM11, IM12, IM13, SR1A(2), SR2, SR3, SR7, SR8

Note (1): As per findings of Baseline Water Quality Report, the control reference has been changed from C3 to SR2 from 1 September 2016 onwards.

(2): With the operation of HKBCF, water quality monitoring at SR1 station was commenced on 25 October 2018.

Table 2.10: General Weather Condition and Sea Condition During Impact Water Quality Monitoring

	Weather	Sea Condition
Jan – Mar 2018	Sunny to Rainy	Calm to Rough
Apr – Jun 2018	Sunny to Rainy	Calm to Rough
Jul – Sep 2018	Sunny to Rainy	Calm to Rough
Oct – Dec 2018	Sunny to Rainy	Calm to Rough

2.3.2 Monitoring Results

Percentage of monitoring results within their corresponding Action and Limit Levels in the reporting period are presented in **Table 2.11**. It should be noted that Hong Kong was under the effect of tropical cyclones from 5 to 8 June, 17 to 24 July, 9 to 15 August, 11 to 13 September, 14 to 17 September, and 31 October to 2 November 2018 respectively, and the water quality monitoring results during the said periods might be affected by the inclement weather.

Table 2.11: Percentage of Water Quality Monitoring Results within Action and Limit Levels

	General Water Quality Monitoring				Regular DCM Monitoring		
	DO (Surface and Middle)	DO (Bottom)	SS	Turbidity	Alkalinity	Chromium	Nickel
Jan 2018	100.0%	100.0%	99.8%	100.0%	100.0%	100.0%	100.0%
Feb 2018	100.0%	100.0%	98.4%	100.0%	100.0%	99.0%	99.7%
Mar 2018	100.0%	100.0%	97.3%	100.0%	100.0%	100.0%	99.7%
Apr 2018	100.0%	100.0%	98.9%	100.0%	100.0%	100.0%	99.3%
May 2018	100.0%	100.0%	99.8%	100.0%	100.0%	99.7%	96.1%
Jun 2018	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	89.4%
Jul 2018	99.5%	100.0%	99.1%	100.0%	100.0%	100.0%	100.0%
Aug 2018	97.6%	98.8%	99.1%	100.0%	100.0%	100.0%	100.0%
Sep 2018	99.5%	100.0%	98.5%	100.0%	100.0%	100.0%	96.0%
Oct 2018	100.0%	100.0%	99.1%	100.0%	100.0%	100.0%	98.3%
Nov 2018	100.0%	100.0%	98.4%	98.6%	100.0%	100.0%	98.0%
Dec 2018	100.0%	100.0%	99.8%	100.0%	100.0%	99.0%	99.4%
Overall	99.7%	99.9%	99.0%	99.9%	100.0%	99.8%	98.1%

Note: The percentages are calculated by dividing the number of depth-averaged results within their corresponding Action and Limit Level by the total number of depth-averaged results.

The monitoring results for total alkalinity obtained in the reporting period were within their corresponding Action and Limit Levels.

For DO, turbidity, SS, chromium and nickel, some of the testing results triggered the corresponding Action or Limit Levels in the reporting period. Investigations were conducted accordingly and the details were presented in the corresponding Construction Phase Monthly EM&A Reports. The status of each water quality parameter collected in the reporting period are presented graphically in **Appendix D**. Some of these cases were recorded at monitoring stations located upstream of the Project based on dominant tidal flow and were considered not affected by the Project. Based on respective investigation findings, cases triggering Action or Limit Level were found not related to the Project.

2.3.3 Conclusions

During the reporting period, it was noted that the vast majority of monitoring results (overall 98.1% for nickel to 100% for alkalinity as presented in **Table 2.11**) were within their corresponding Action and Limit Levels, while only a minor number of results triggered their corresponding Action or Limit Level, and investigations were conducted. Based on the findings of the investigations presented in the Construction Phase Monthly EM&A Reports for 2018, all results that triggered the corresponding Action or Limit Level were not related to the Project. Therefore, the Project did not cause adverse impact at the water quality sensitive receivers. All required actions under the Event and Action Plan were followed. These cases were considered to be due to natural fluctuation or other sources not related to the Project.

Nevertheless, the non-project related triggers have been attended to and have initiated corresponding actions and measures. As part of the EM&A programme, the construction methods and mitigation measures for water quality will continue to be monitored and opportunities for further enhancement will continue to be explored and implemented where possible, to strive for better protection of water quality and the marine environment.

In the meantime, the contractors were reminded to implement and maintain all mitigation measures during weekly site inspection. These include proper maintenance of silt curtains and control the level of sand material stockpile on barges to avoid overflow as recommended in the Manual.

2.4 Waste Monitoring

In accordance with the Manual, the waste generated from construction activities was audited once per week to determine if waste was being managed in accordance with the Waste Management Plan (WMP) prepared for the Project, contract-specific WMP, and any statutory and contractual requirements. All aspects of waste management including waste generation, storage, transportation, and disposal were reviewed during the audits.

2.4.1 Action and Limit Levels

The Action and Limit Levels of the construction waste are provided in **Table 2.12**.

Table 2.12: Action and Limit Levels for Construction Waste

Monitoring Stations	Action Level	Limit Level
Construction Area	When one valid documented complaint is received	Non-compliance of the WMP, contract-specific WMPs, any statutory and contractual requirements

2.4.2 Summary of Monitoring Results

The construction waste generated in the reporting period is summarized in **Table 2.13**.

There were no complaints, non-compliance of the WMP, contract-specific WMPs, statutory and contractual requirements that triggered Action and Limit Levels in the reporting period.

Table 2.13: Statistics of Construction Waste Generated in the Reporting Period

	C&D[(1)] Material Stockpiled for Reuse or Recycle (m^3)	C&D Material Reused in the Project (m^3)	C&D Material Reused in other Projects (m^3)	C&D Material Transferred to Public Fill (m^3)	Chemical Waste (kg)	Chemical Waste (L)	General Refuse (tonne)
Jan 2018	662	4,310	0	601	210	45,200	162
Feb 2018	739	480	0	1,393	225	25,000	146
Mar 2018	1,238	5,563	0	1,741	165	18,000	297
Apr 2018	1,366	3,514	0	996	955	18,600	201
May 2018	3,649	4,350	0	6,419	165	19,400	205
Jun 2018	512	1,452	0	12,498	640	41,980	231
Jul 2018	1,916	1,952	0	15,104	1,870	54,400	408
Aug 2018	2,752	3,488	0	10,365	588	25,400	248
Sep 2018	4,309	3,457	0	5,688	70	24,520	434
Oct 2018	4,146	5,400	0	5,746	285	38,480	445
Nov 2018	3,107	3,719	1,238	9,440	180	9,440	519
Dec 2018	5,965	3,849	0	4,362	300	14,400	354
Total	30,361	41,534	1,238	74,353	5,653	334,820	3,650

Notes:

1. The excavated materials were temporarily stored at stockpiling area and will be reused in the Project.
2. C&D refers to Construction and Demolition.
3. Figures are rounded off to the nearest tonne.
4. Paper, plastics, and metals were recycled in the reporting period.

Weekly monitoring on all works contracts were carried out by the ET to check and monitor the implementation of proper waste management practices during the construction phase.

Recommendations made included provision and maintenance of proper chemical waste storage area, as well as handling, segregation, and regular disposal of general refuse. The contractors had taken actions to implement the recommended measures.

2.5 Chinese White Dolphin Monitoring

According to Sections 10.2.1.2 and 10.2.1.3 of the EM&A Manual, CWD monitoring is required during the baseline, construction, post-construction and operation phases of the project. The aims of CWDs monitoring during construction period are:

- to monitor the effects on the potential shift in the CWD travelling areas and habitat use;
- to monitor the effectiveness of the HSF speed and routing restrictions to the CWDs;
- to provide a dataset that can be compatible with the AFCD long-term monitoring, be stratified in such a way as to allow the calculation of density and abundance for the different phases and to calculate the trends from these estimates; and
- to provide assessment of how the project and cumulative effects may be impacting the CWDs.

This section summarises the results of the CWD construction phase monitoring effort over a 12-month period between 1 January 2018 and 31 December 2018, to gather information on the spatial and temporal distribution patterns as well as calculate density and abundance of the CWD in the western Hong Kong waters. Supplementary information collected focusing on northwestern Lantau waters including the habitat use and behaviours of CWD before and during the construction phase of the Project has also been reviewed.

This reporting period is effectively the second full year of construction phase monitoring of CWDs. The overall monitoring programme commenced in August 2016, although there were no marine construction works in August and September 2016, and only localised sand blanket laying and DCM trial works from October to December 2016. This annual report reviewed the construction phase monitoring data for 2018 and compared with the construction phase monitoring data for 2017, as well as the 6-months baseline survey (Q1 and Q2 2016) supplemented with the initial 6-months of construction phase monitoring data (Q3 and Q4 2016), to increase the analytical precision.

CWD monitoring was conducted by undertaking vessel line-transect surveys, supplemented by land-based theodolite tracking survey and Passive Acoustic Monitoring (PAM). The vessel line transects covered Northeast Lantau (NEL), Northwest Lantau (NWL), Airport West (AW), West Lantau (WL) and Southwest Lantau (SWL) areas at a frequency of two full surveys per month as proposed in Section 10.2.3.2 of the Updated EM&A Manual and are consistent with the AFCD long-term monitoring programme (except AW). The locations of the CWD vessel survey transects are shown in **Figure 2.3**. Additional survey effort was collected on a voluntary basis at the same frequency of two surveys per month from Deep Bay (DB) (refer to **Appendix E** for the location of this additional survey), which is an area that historically had CWD in the outer bay, to establish a full understanding of CWD abundance. All the DB data were considered supplemental and only be used for density and abundance estimation.

Regarding focal follows, CWDs were followed during sightings from vessel surveys and focal follow was attempted as far as practicable, however, information collected during sightings was insufficient for focal follow analysis of any identified dolphin. The travelling pattern in different areas were therefore reviewed by using photo-identification of individuals dolphins and their re-sighting locations, depicting the range use and cross-area movement of re-sighted individuals, where practicable. Travelling of CWDs in the north of Lung Kwu Chau were particularly supplemented with information from land-based theodolite tracking survey findings.

For the land-based theodolite tracking surveys, the monitoring frequency during the construction phase for marine works was one day per month at both the Lung Kwu Chau (LKC) station and Sha Chau (SC) station, as stipulated in Section 10.2.3.4 of the EM&A Manual. Additional theodolite tracking surveys for one day at SC station and two days at LKC station were conducted on a voluntary basis to collect supplementary information for the Project during the implementation for the SkyPier HSF diversion and speed control in this reporting period, such that a total of two tracking days at SC station and three tracking days at LKC station were conducted per month. PAM was also deployed with a duty cycle of 20% for the construction phase with data supplementing the results of both vessel and land-based surveys. For details on CWD monitoring and data analysis methodologies refer to Section 10.2.4 of the EM&A Manual. The locations of land-based survey stations are described in **Table 2.14** and depicted in **Figure 2.4**. The location of the Passive Acoustic Monitoring device at A5 is shown in **Figure 2.5**.

Table 2.14: Land-based Survey Station Details

Stations	Location	Geographical Coordinates	Station Height (m)	Approximate Tracking Distance (km)
D	Sha Chau (SC)	22° 20’ 43.5” N 113° 53’ 24.66” E	45.66	2
E	Lung Kwu Chau (LKC)	22° 22’ 44.83” N 113° 53’ 0.2” E	70.40	3

2.5.1 Action and Limit Levels

The Action Level and Limit Level for CWD monitoring were formulated by an action response approach using the running quarterly dolphin encounter rates (Encounter Rate by Number of Dolphin Sightings 'STG' and Encounter Rate by Number of Dolphins 'ANI') derived from baseline monitoring data covering six months from mid-December 2015 to June 2016, as presented in the CWD Baseline Monitoring Report. The derived values of Action and Limit Levels for CWD monitoring are shown in **Table 2.15**. Running quarterly encounter rates STG and ANI have been determined for each month since August 2016 to compare with the derived Action/Limit levels for construction phase monitoring of CWD. If persisting declines in the CWD running quarterly encounter rate values are determined month on month, an appropriate short term response is then possible if the decline is shown to be related to 3RS construction activity.

Table 2.15: Derived Values of Action Level and Limit Level for Chinese White Dolphin Monitoring

	NEL, NWL, AW, WL and SWL as a Whole
Action Level(1)	Running quarterly STG < 1.86 & ANI < 9.35
Limit Level(1)	Two consecutive running quarterly (3-month) STG < 1.86 & ANI < 9.35

Notes: (1) Action Level and/or Limit Level will be triggered if both STG and ANI fall below the criteria

2.5.2 Summary of Monitoring Results

2.5.2.1 Summary of Vessel Line-transect Survey Monitoring Results

Survey Effort

During the reporting period from January 2018 to December 2018, survey effort was completed in NEL, NWL, AW, WL, and SWL survey areas. Although the frequencies of visiting each survey area per survey month were identical, the survey effort of different survey areas varied and was generally in proportion to the size of each survey area (larger survey areas having longer distance of survey effort). A total of 5,441.1 km survey effort was collected in this reporting period. The percentages of the total survey effort collected in NEL, NWL, AW, WL and SWL survey areas were around 20.8%, 32.8%, 2.1%, 13.5% and 30.8%, respectively.

In total, 91.9% (4,999.7 km) of the survey effort was collected under favourable weather condition (Beaufort 0-3 and visibility of approximately 1200 m or beyond), which can be utilized in analyses of encounter rates, density and abundance. A detailed record of the survey effort data is provided in **Appendix E**.

Sighting Distribution

During the reporting period, a total of 215 groups consisting of 686 CWDs were sighted. Amongst these 215 groups of CWDs, 200 groups with 651 CWDs were sighted during on-effort surveys under favorable weather condition (Beaufort 0-3 and visibility of approximately 1200 m or beyond).

The numbers of sightings by survey areas were: two groups of two CWDs in NEL; 52 groups of 147 CWDs in NWL; six groups of 22 CWDs in AW; 113 groups of 392 CWDs in WL; while there were 42 groups of 123 CWDs seen in SWL.

In NEL, the two sightings were recorded at the western side of the survey area. One group was sighted at the westernmost transect of NEL survey area, off the northwestern corner of the Brothers Marine Park (BMP) whilst the other group was sighted within the BMP, around the southwestern corner of the marine park.

In NWL, CWDs were mostly sighted within or around the Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), particularly in the northwestern part off Lung Kwu Chau. Around one-third of the sightings (including AW sightings) were recorded at the southwestern part of the survey area, with a few of them recorded close to the 3RS works area. Two scattered CWD sightings were recorded at the waters off Castle Peak Power Plant and the waters off the easternmost corner of the 3RS works area respectively.

In WL, CWDs were sighted along the entire coast and offshore waters from Sham Wat to Fan Lau.

In SWL, sightings of CWDs were scattered in the survey area particularly around Fan Lau and Fan Lau Tung Wan, and northern waters around the Soko Islands. However, there were somewhat fewer sightings at the eastern end of the survey area.

The sighting locations of CWDs during this reporting period are depicted in Figure 1 of **Appendix E**.

Encounter Rates

Two types of dolphin encounter rates were calculated based on the data collected during the reporting period. They included the number of dolphin sightings per 100 kilometres survey effort (STG) and total number of dolphins per 100 kilometres survey effort (ANI). The dolphin encounter rates were calculated by using survey data collected under favorable weather condition only (Beaufort Sea State 3 or below with favorable visibility). Encounter rate provides a short to medium term frequency method for monitoring and responding appropriately to changes in CWD abundance as project works progress (referring to Section 10.5.2.3 of the EM&A Manual). The two types of encounter rates provide an overall indication of changes in CWD numbers over time in western Hong Kong waters.

During the reporting period, the overall combined STG and ANI of CWDs from all survey areas in 2018 were 4.00 and 13.02 respectively. Dolphin encounter rates by survey area and a summary of monthly encounter rates are presented respectively in Table 1 and Table 2 of **Appendix E**. Compared by area, WL had the highest STG and ANI amongst the survey areas, followed by AW and NWL. Compared by month, summer months had generally higher STG and ANI, although the monthly STG peaked in February while monthly ANI peaked in January 2018. The lowest STG occurred in December 2018, whilst the lowest ANI occurred in May 2018.

The trends of both monthly STG and ANI are presented in Figure 2 and Figure 3 of **Appendix E**. The temporal trends in 2018 were generally similar to the past year in the way that the period of Jun to Sep was still consistently recorded with higher STG and ANI, notwithstanding the peak summer ANI recorded in 2018 were lower than the previous years, and the spring period was recorded with lower STG and ANI despite the occasional rise in ANI in May 2017 versus the drop in May 2018. Monthly STG and ANI in the winter of 2017-2018 was an exception that the values were consistently high across Dec 2017 to Feb 2018 when compared to the past years, although a rise was recorded in Feb 2017. Another variation in 2018 was observed for the trend across Oct to Dec being a reverse of V-shape which was recorded for 2016 and 2017.

Running quarterly encounter rates using STG and ANI data were determined for each month for comparison with the Action/Limit levels for construction phase monitoring of CWD. No Action Level was triggered in this reporting period. The running quarterly STG and ANI from January to December 2018 are summarized in Table 2 of **Appendix E.** The graphical plots of running quarterly encounter rates of the current reporting year and the past reporting years are presented in Figure 2 and Figure 3 of **Appendix E** respectively.

Density and Abundance Estimation

Line transect analyses to estimate the density and abundance of CWDs in Hong Kong waters during the reporting period were conducted using the same basic methods as in previous analyses (Table 3, **Appendix E**). The detection function of 3RS CWD monitoring data of this reporting period is shown in Figure 4 of **Appendix E**. The overall abundance estimated for this reporting period (incorporating an entire year of data from all four seasons) was 77 CWDs (CV = 18.9%, indicating a good level of precision <20%), which shows a stable trend from last year. For comparison, the 2017 abundance was 71 CWDs (CV = 19.9%). As in analyses of the last reporting year in 2017, the area with the highest abundance and highest density was WL (N=38, this has been consistent over the AFCD long-term records), although NWL also had reasonably high numbers of dolphins (N=22), and registered higher numbers than SWL (N=15), the opposite trend from last year. NEL for the first time in several years registered dolphin sightings, and an abundance of 2 dolphins. Due to the recent completion and operation of the Hong-Kong-Zhuhai-Macao Bridge, there may be some recovery of dolphins in the North Lantau area as a result. However, this will need to be examined with more data over several years, and the cumulative impacts due to 3RS project with other concurrent projects will become more apparent as works progress, and our dataset grows.

In addition to estimating year-round abundance for each of the survey areas, a seasonal analysis was also conducted (the pooled dataset from all survey areas was used, as stratifying by both survey area and season would reduce the sample sizes that result in estimates with unacceptably-low levels of precision) (refer to Table 3 of **Appendix E**). The winter estimate was the lowest (N=61 dolphins), though traditionally spring was generally the low season for dolphin numbers in Hong Kong. The summer estimate showed the highest numbers (N=99 dolphins), which is not unexpected from historical records.

Quantitative Grid Analysis on Habitat Use

Habitat use amongst the survey areas was examined by using quantitative grid analysis, both SPSE (no. of on-effort sightings per 100 units of survey effort) and DPSE (no. of dolphins per 100 units of survey effort) values were calculated in all grids amongst all survey areas for the period from January 2018 to December 2018. SPSE and DPSE of the last reporting year and the current reporting year are depicted in Figure 5 of **Appendix E**.

Compared with last reporting period (i.e. year 2017), the important habitat of CWDs in SCLKCMP of NWL waters with high dolphin densities recorded in 2018 has slightly shifted particularly to the waters off southwestern Lung Kwu Chau. The southwestern part of the NWL survey area (waters between Sham Wat and the 3RS works area) has become more important as increased usage by CWDs in this area was reported last year in 2017 and this trend was continuing in 2018.

The important dolphin habitat in WL survey area in 2018 is largely similar to 2017; grids with high SPSE and/or DPSE value(s) in WL were near Tai O, Peaked Hill and Fan Lau. Yi O has become less important in 2018, as relatively lower SPSE and DPSE values were recorded.

In SWL, the coastal waters around Fan Lau Tung Wan remain as an important habitat of CWDs. However, there was an overall decreasing trend of dolphin usage in the coastal waters from Shek Pik to Lo Kei Wan and Shui Hau, as well as offshore waters around the Soko Islands.

Cumulative SPSE and DPSE values were also calculated by using the 3RS CWD monitoring data since mid-Dec 2015 and are depicted in Figure 6 of **Appendix E**. Grids in western waters of Hong Kong with higher dolphin density are waters off northwestern Lung Kwu Chau, Tai O, Yi O, Peaked Hill and Fan Lau.

Group Size

During the reporting period from January 2018 to December 2018, group size of CWDs ranged from one to 15 dolphins, with an average of 3.19 (from CWD sightings including off-effort sighting, i.e. 215 groups with 686 CWDs). The average group size recorded was the highest in AW (3.67) followed by WL (3.47). Using the four solar seasons, the average group size of CWDs was the highest in winter (3.54) but the lowest in spring (2.80). The summaries of the average group size of CWDs by survey area and by season are presented in Table 4 and Table 5 of **Appendix E**.

Small-sized CWD groups (i.e. 1 to 2 dolphins per group) accounted for more than half of the sightings during the reporting period (about 54.9%) and medium-sized CWD groups (3 to 9 dolphins per group) accounted for around 40.5%. Ten sightings, which accounted for 4.6% of the sightings, contained 10 or more dolphins per group, which is similar to previous years (nine sightings in 2017 and 10 sightings in 2016).

Both small and medium-sized CWD groups were sighted throughout the distribution range of dolphins in NWL, WL and SWL waters. In NEL, both sightings of CWD were comprised of a single dolphin only. There were relatively higher numbers of large-sized CWD groups sighted in WL than in SWL or NWL. In NWL (including AW transects), two large CWD groups were sighted in the southwestern part of the survey area. In WL, the sighting locations of large CWD groups ranged from Tai O to Fan Lau, particularly between Peaked Hill and Fan Lau. In SWL, the only large CWD group was sighted at the east of Fan Lau Tung Wan. The sighting distribution of CWDs with different group sizes is illustrated in Figure 7 of **Appendix E**.

Activities and Association with Fishing Boats

Although vessel surveys do not provide the most unbiased information on the behaviour and activities of dolphins (due to the potentially disturbing presence of the vessel itself, and also the low vantage point of small vessels), nonetheless behaviour and activity data are still useful and are being collected from the vessel surveys.

During the reporting period, a total of 53, 15, 21 and 1 groups of CWDs were observed engaging in feeding, travelling, socializing and resting/milling activities, comprising of 24.7%, 7.0%, 9.8% and 0.5% of all CWD sightings respectively. The sighting locations of CWD groups engaged in different types of activities are depicted in Figure 8 of **Appendix E**.

Feeding activities mainly occurred from north of Lung Kwu Chau in NWL down to Sham Wat and in WL, except the waters within the 3RS works area. Occasional feeding activities were also observed off the northeastern waters of the existing HKIA (including eastern end of NWL and western end of NEL survey areas) and the waters between the northern part of the Soko Islands and coast of southwest Lantau. Considering the sample size of sighting data of different survey areas, AW had the highest percentage of feeding again in 2018 (although the sample size in AW was very small), followed by NWL. A significant increase in feeding activities was observed in NWL from 15% in 2017 to 38% in 2018, which is similar to the percentage recorded in 2016 (i.e. 41%). More feeding activities were recorded within SCLKCMP in NWL compared to 2017.

Socializing activities were mainly sighted around Lung Kwu Chau, the southwestern part of the NWL survey area, Tai O, Fan Lau and Fan Lau Tung Wan. Travelling activities in NWL were mainly sighted near Sha Chau, whilst there was also one record of travelling activities across Hong Kong-Zhuhai-Macau Bridge (HZMB) Hong Kong Link Road (HKLR). In WL, travelling activities frequently occurred in the northernmost waters of the survey area, and coastal waters between Peaked Hill and Fan Lau. There were also two sightings with travelling activities scattered in SWL. Overall, the only sighting with resting/milling activities was recorded in the

waters between the Soko Islands and southern Lantau. The percentages of different activities for each of the survey areas are shown in Table 6 of **Appendix E**.

A total of eight sightings of CWDs were observed associating with operating fishing boats, including gillnetters (four groups), purse-seiners (three groups) and a shrimp trawler (one group), accounted for 3.7% of all sightings in 2018. The percentage is significantly lower than those of 2016 and 2017 (i.e. 7.2% and 6.3% respectively). CWD associations with operating fishing boats were mainly observed in WL, around Tai O and Yi O. In NWL, one observation of boat association with an operating gillnetter was recorded in the waters near Sham Wat, while another observation of boat association with an operating purse-seiner was observed at the waters north of Lung Kwu Chau. In SWL, a boat association with an operating purse-seiner was recorded near Shui Hau. Although a trawling ban was implemented in Hong Kong in December 2012, illegal trawling activities were still observed near the western and southwestern borders of Hong Kong. One group of CWDs was observed feeding in association with trawling activities in WL within the Hong Kong border. The sighting locations of CWD groups associated with operating fishing boats are depicted in Figure 9 of **Appendix E**.

Mother-calf / Mother-unspotted Juvenile Pairs

During the reporting period, 28 sightings were observed that included mother-and-unspotted calf (UC), or mother-and-unspotted juvenile (UJ) (mother-UC/ mother-UJ) pairs, which accounted for about 13.0% of all sightings in 2018. The percentage was slightly lower than in 2017 (14.7%). The percentages of sightings with mother-UC/ mother-UJ pairs in NWL (including AW), WL and SWL were 19.0%, 13.3% and 4.8% respectively. These percentages were calculated by dividing the number of sightings with mother-UC/ mother-UJ pairs of a survey area by the total number of sightings of that survey area. There was an increase in percentage of sightings with mother-UC/ mother-UJ pairs in NWL, but a decline in both WL and SWL compared to 2017. The majority of the sightings with mother-UC/ mother-UJ pairs in NWL was recorded either to the north of Lung Kwu Chau or at the southwestern part of the survey area. In WL, a decreased number of mother-UC/ mother-UJ sighting was recorded around Tai O compared to 2017. The mother-UC/ mother-UJ sightings in WL seemed to shift a bit southward to waters around Fan Lau. While in SWL, the only two mother-UC/ mother-UJ sightings were restricted to waters around Fan Lau and Fan Lau Tung Wan. Overall, mother-UC/ mother-UJ pairs were mainly recorded in waters along the west side of the existing airport to Fan Lau. The sighting distribution of mother-UC/ mother-UJ pairs is depicted in Figure 10 of **Appendix E**.

Photo Identification – Summary

During the reporting period, a total of 36 newly identified CWD individuals were added to the photo-identification catalogues, including nine individuals added to NL catalogue, 24 individuals added to WL catalogue and three individuals added to SL catalogue. Five animals, namely NLMM045, WLMM021, WLMM057, WLMM123, and SLMM047, were confirmed to be re-sighted of identified individuals in earlier period for the 3RS CWD monitoring programme, namely WLMM047, SLMM017, WLMM028, WLMM019 and WLMM18 respectively. Therefore, all records under these five re-sighted individuals were logged to the series of records under WLMM047, SLMM017, WLMM028, WLMM019 and WLMM18 respectively.

A total of 158 CWD individuals were identified for 431 times from all sightings in 2018. Amongst these 158 CWD individuals, 40, 79 and 39 belonged to NL, WL and SWL catalogues respectively. Amongst these 158 identified individuals, 97 individuals (around 61.4%) were sighted for more than once. The number of re-sightings of an identified animal ranged from two to 11 times. The re-sighting rates (number of identified individuals that were re-sighted more than once divided by the total number of the identified individuals in the catalogue) of NL, WL and SWL catalogues

were 21.8%, 37.6% and 32.8% respectively. Thirty-two of these 97 re-sighted individuals were sighted for five times or above.

The most frequently re-sighted animal in 2018 was WLMM001, which has been re-sighted for 11 times, followed by NLMM063, SLMM003 and WLMM071 (re-sighted for 9 times), and it is also the third most-frequently re-sighted animal since the establishment of the photo-identification catalogue, with a total number of 21 re-sighting records. The most and the second most re-sighted individuals since the establishment of the photo-identification catalogue are SLMM014 (26 re-sighting records) and WLMM027 (22 re-sighting records) respectively. Another animal SLMM010 was also re-sighted for 21 times.

In the Annual EM&A Report No.2 for 2017, it was reported that the frequently seen mother-and-spotted juvenile pair NLMM006 and NLMM013 in 2016 had significantly reduced their time spent in NWL in 2017 (re-sighted for only 1 and 2 times in 2017, respectively). There was an increase in sightings of these two individuals in NWL waters in 2018 (re-sighted for 5 and 7 times in 2018, respectively).

Two animals, namely SLMM011 and SLMM015, significantly decreased their use of Hong Kong waters in 2018 compared to previous years. They were regularly seen in 2016 to 2017 having more than five re-sighting records in each year, but not observed in Hong Kong waters during the 3RS CWD monitoring for this reporting year. Nevertheless, there were several individuals, such as NLMM004, NLMM23, SLMM010, SLMM014, SLMM028, SLMM052, WLMM001, WLMM043, WLMM065, WLMM071, WLMM079, frequently observed in Hong Kong waters during these three years of monitoring.

In September 2018, local media reported that AFCD found a severely injured CWD on 25th August 2018 in Lantau waters with three deep cuts on its dorsal ridge and keel that believed to be caused by collision with vessel propeller. On 27th August 2018, this injured animal has received in-situ treatment (i.e. injection of antibiotics) in the wild from a professional team of veterinary from Ocean Park under the coordination of AFCD. We found that this injured animal is SLMM028 under our CWD photo-identification catalogue. In 2018, SLMM028 has been re-sighted for 4 times from January to July 2018 before the injury. The first re-sighting of SLM028 after its injury came in November 2018 and it was then re-sighted again in December 2018. Details of these two re-sighting records after the injury were specifically reported in the relevant Monthly EM&A Reports for November 2018 and December 2018.

Summary of the photo-identification of CWDs is presented in Table 7 of **Appendix E**.

Photo Identification – Range Use of Identified CWD individuals

Similar to previous reporting years, WLMM001 appeared extensively in WL from Tai O to Fan Lau and also occurred in the western waters of SWL survey area. In 2018, WLMM001 showed an increase usage of waters between Peaked Hill and Fan Lau compared to the previous year.

SLMM014 ranged from waters near Yi O in WL to the Soko Islands and Lo Kei Wan in SWL. SLMM014 was not re-sighted as often as in 2017, its range shrank a bit in 2018, which covered from Peaked Hill to Shek Pik. Such a reduction in SLMM014 distribution range is most observable in waters between the Soko Islands and the coast of South Lantau, where it used to occur in previous years.

WLMM027 used to have distribution range from western waters of the existing HKIA to waters near Tai O, and also ranged from Fan Lau to Shui Hau in the past years. It was seldom being recorded in WL waters. In 2018 records, its distribution range extended a bit northward to Tree Island within SCLKCMP and was absent in WL.

SLMM010 distribution range is extensive, which recorded in WL and SWL from Tai O to the Soko Islands, particularly from waters near Yi O to Fan Lau Tung Wan.

NLMM006 and NLMM013 continued to use waters exclusively within and around SCLKCMP in 2018 but there was a re-sighting of NLMM013 alone without NLMM006 in waters near Tai O in WL, which was the first time we encountered it outside NWL survey area.

SLMM028 had a range use covering NWL, WL and SWL. Its distribution range is observed from the southwestern part of NWL survey area to the Soko Islands and Lo Kei Wan in SWL. It greatly reduced the use of SWL waters since 2017 and utilized more often the southwestern corner of NWL survey area. After the severe injury in August 2018, the survey team spotted SLMM028 in waters around Tai O in November 2018. Although it was observed that its surfacing movement was a bit unnatural when compared to other non-injured dolphins, the wounds on its dorsal ridge and keel were observed to be healing well and it was foraging during the sighting period. The injured SLMM028 was then re-sighted again in December 2018 at the southwestern corner of NWL survey area.

The sighting locations of WLMM001, SLMM014, WLMM027, SLMM010, NLMM006, NLMM013 and SLMM028 are depicted in location maps under Figure 11 of **Appendix E**.

Photo Identification – Cross-area Movement

Amongst those 97 re-sighted individuals, 63 individuals showed cross-area movement between different survey areas. This accounted for about 39.9% of all 158 identified animals. Thirty-four (53.97%) out of these 63 animals were re-sighted in both NWL (including AW) and WL, while 31 (49.2%) animals were recorded in both WL and SWL. Seven (11.1%) out of these 63 animals were re-sighted in three main survey areas (WL, SWL and NWL, including AW). These seven animals were SLMM028, WLMM004, WLMM027, WLMM060, WLMM063, WLMM071 and WLMM080. Despite the fact that a number of identified CWD individuals were re-sighted in different survey areas, more than half of the animals re-sighted at least twice in 2018 were not observed crossing between different survey areas and were sighted in only one survey area repeatedly. For instance, 13 individuals occurred repeatedly in NWL, and 21 animals were re-sighted within WL, while two animals occurred repeatedly in SWL.

The sighting locations of these re-sighted individuals having cross-area movements in NWL, WL and SWL are depicted in the location maps of Figure 11 in **Appendix E**, which provide the indicative distribution range use of representative individuals recorded for the 3RS CWD monitoring.

2.5.2.2 Summary of Land-based Theodolite Tracking Monitoring Results

Survey Effort

In this reporting period, the land-based surveys commenced on 15 January 2018, and concluded on 19 December 2018. A total of 60 days and 360:00 (hh:mm) of land-based theodolite survey effort have been accomplished, including 36 days and 216:00 (hh:mm) from LKC and 24 days and 144:00 (hh:mm) from SC (Table 8 of **Appendix E** for summary). A total of 167 CWD groups were tracked from land, all from the LKC station (Table 8, Figure 12 **Appendix E**). No CWDs were observed from SC. On the other hand, PAM by EAR detections of dolphins south of SC (see Section 2.5.2.3) did not overlap with land-based theodolite tracking effort off SC. Four days aligned with theodolite observation effort, but EAR detections were recorded outside of land-based survey hours.

After the raw data were filtered, 65 CWD group focal follows fit criteria for analyses. From these focal follow tracks, 72 10-minute short-track segments were extracted for analyses. CWD group

sighting per survey hour was 0.77 from LKC and 0 from SC. From LKC, sighting per survey hour was less than in 2017 (0.89 groups per survey hour), but more than in 2016 (0.58 groups per survey hour).

Time of Day

The diurnal pattern of CWDs was calculated by dividing the total tracking time of CWD groups (prior to filtering short-track data) by the total effort per hour block, and depicted in Figure 13 of **Appendix E**. Off LKC, higher percentages of CWD groups (per hour of effort) were observed during the 0900 (15%), 1000 (18%), 1100 (17%), and 1300 (15%) hour blocks. This pattern is similar to the diurnal pattern observed in 2017 off LKC. In 2016, the 1000, 1300, and 1400 hour blocks were highest, with fewer sightings during the mid-day 1100 and 1200 hour blocks.

Time of Year

The highest percentage of CWD groups observed from LKC was during March (20%) and the lowest percentages observed were during January, June and August (2% each month) as depicted in Figure 14 of **Appendix E**. Based on solar season, CWDs were observed significantly more than expected by statistical chance (with the *a priori* assumption that dolphins would be observed evenly during solar seasons and months of the year) during the spring (March-May) and autumn (September-November), and less than expected by statistical chance during the winter (December-February) and summer (June-August) (Chi-square test, x^2=32.40, n=167, df=3, P<0.001). This pattern is slightly different than observed in 2017 in which CWDs were observed more frequently from September through December, with a peak in February, and less frequently from March through August. Based on oceanographic season, CWDs were observed more than expected by statistical chance during the dry season (November-May), and less than expected by statistical chance during the wet season (Chi-square test, χ^2=26.89, n=167, df=1, P<0.001).

Group Size

The mean group size of CWD filtered tracks off LKC was 3.26±1.50, ranging from singletons to a maximum group size of eight dolphins (Table 9 of **Appendix E**), similar to the two previous years (3.08±1.81 in 2016 and 3.03±1.58 in 2017). Based on solar season, the mean group size of CWDs was high in spring (3.64±1.54) and autumn (3.41±1.58), and low in summer (2.29±0.68) and winter (2.64±1.08) (Kruskal-Wallis chi-squared=46.55, df=3, p<0.001), similar to vessel-based findings with the highest group sizes in spring and lowest in summer. Based on oceanographic season, the mean group size was significantly higher during the dry season (3.57±1.56) than during the wet season (2.45±0.94) (Kruskal-Wallis chi-squared=50.816, df=1, p<0.001). The Kruskal-Wallis and Dunn post hoc tests showed that group size outside of the SCLKCMP (3.57±1.13), where ferry traffic is routed, was significantly higher than group size inside the SCLKCMP boundary (3.05±1.72) (Kruskal-Wallis chi-squared=19.59, df=2, p<0.001). A similar group size pattern was observed in 2017.

The sighting distribution of CWDs relative to group sizes within the SCLKCMP, crossing the SCLKCMP boundary and outside the SCLKCMP are represented in Figure 15, Figure 16 and Figure 17 of **Appendix E** respectively. Relative to vessel activity, mean group size was higher when high-speed ferries were within 500m of CWD groups than when no boats were present or when non-ferry boats were present, and higher when high-speed ferries under speed restriction were present than when no boats were present (Kruskal-Wallis chi-squared=26.67, df=3, p<0.001). Singletons were only observed inside the boundary near shore. However, this trend may reflect a sighting bias wherein single CWDs may be more difficult to locate farther from the survey platform.

Behavioural State

Excluding the unknown behavioural category from the filtered segments, foraging (52%) and travelling (38%) were observed more frequently than expected by statistical chance off LKC, and resting (2%) and socializing (8%) were observed less frequently (Chi-square test, χ^2=171.07, n=243, df=3, P<0.001) (Figure 18 of **Appendix E**). This statistic is for comparative purposes only, for different years, areas, or other variables, as there is no *a priori* reason to believe that different behaviours would occur in equal percentages "by chance". Milling behaviour was not observed within short-track filtered segments.

Within the boundary of the SCLKCMP, foraging (51%) and travelling (39%) were observed most frequently, followed by socializing (8%) and resting (3%). CWD groups that were crossing the marine park boundary were observed travelling (90%) and foraging (10%) only. CWD groups outside of the marine park were observed foraging (66%), travelling (23%), and socializing (10%), but not resting (Figure 19 of **Appendix E**).

Vessel Activity and Dolphin Movement Analysis

Plots of vessels, including high-speed ferries under speed restriction (lower than or equal to 15 knots) and high-speed ferries (higher than 15 knots), and CWDs show overlap in habitat off LKC throughout the year (Figure 20 of **Appendix E**).

Off LKC in 2018, vessels were recorded within 500 meters of focal CWD groups on 17 occasions (based on filtered 10-minute segments), including high-speed ferries under speed restriction on 8 occasions, high-speed ferries on 2 occasions, and other vessels (e.g., fishing, government, and research vessels) on 7 occasions. Mean speed, reorientation rate and linearity for CWDs in the absence of vessels and in the presence of each vessel category are detailed in Table 10 of **Appendix E**. A basic one-way ANOVA showed no significant difference at the 0.05 alpha level in CWD movement patterns relative to vessel type present, including swimming speed (p=0.1804), reorientation rate (p=0.9188) and linearity (p=0.7625). However, sample size was low for each vessel type present. These findings differ from results in 2017, in which reorientation rate and linearity varied significantly in the presence of different vessel types.

Statistically significant key findings for fine-scale movement patterns of CWDs are:

- Swimming speed: Group size had a significant effect on swimming speed, with speed generally increasing in small groups (<3 individuals) and in larger groups (>6 individuals). Swimming speed was significantly faster in the presence of high-speed ferries under speed restriction and “other” non-ferry boats.
- Reorientation rate & Linearity: the models did not detect significant variation in reorientation rate or linearity based on any terms (group size, behaviour, oceanographic season, and marine park).

Summary of findings for 2018:

- Lung Kwu Chau remains an important foraging habitat, where foraging and travelling were observed more than expected by statistical chance, while resting and socializing were observed less than expected by statistical chance.
- Off Lung Kwu Chau, the peak percentage of CWDs were observed during the spring and autumn. Low percentage of CWDs were observed during the winter and summer. Overall, CWDs were observed more than expected by statistical chance during the dry season (November-May), and less than expected during the wet season.
- Group size was significantly larger in the spring, autumn, outside the SCLKCMP, and in the presence of high-speed ferries and high-speed ferries under speed restriction. Group size was

significantly smaller in summer, winter, inside the SCLKCMP, and when no boats were present.

- Sample sizes for the vessel categories are very small (e.g., all <10 samples), and therefore not robust, and should be interpreted with caution. The small sample sizes may reflect CWD potential avoidance of vessels off LKC.
- Off Sha Chau, where there were no shore-based sightings this past year, underwater recordings (see the next section) and theodolite station observation times did not overlap.

2.5.2.3 Summary of Passive Acoustic Monitoring (PAM) Results

Dolphin Detection Rates Per Day

From 16 December 2017 to 9 January 2019, there were seven deployment periods of Ecological Acoustic Recorder (EAR) at position A5 for PAM. During this period (Deployments 1 through 7), dolphins were detected at site A5 in a total of 286 of 80,246 files (0.36% of files), as summarized in Table 11 of **Appendix E**. Dolphins were detected on 123 of 281 days (44% of days) with recording effort (Figure 21 of **Appendix E**). On 59 of 123 days with dolphin detections (48%), only one file containing dolphin signals was detected, and on the other 64 days, two or more files containing dolphin signals were detected. When categorized by call type, clicks were the predominant type of dolphin signal detected (n = 267 of 289 signals detected, or 92%). Whistles (n = 22) were occasionally detected throughout the monitoring period. Overall, these metrics are remarkably similar to those of the previous year in 2017 (Table 12 of **Appendix E**), indicating that even though there is rather small amount of activity of dolphins in this area south of Sha Chau, the activity has not decreased in this monitoring year.

Acoustic detections of dolphins on the EAR south of SC did not overlap with land-based theodolite tracking effort off SC (see Section 2.5.2.2). Four days aligned with theodolite observation effort, but EAR detections were recorded outside of land-based survey hours.

Dolphin acoustic detection rates were highest in the winter, decreased in spring through early summer, and increased again in late autumn through winter (Figure 21 of **Appendix E**). During the winter (Deployments 1, 2 and 7), dolphins were detected on more than 50% of recording days, and in 0.50%-0.63% of files. During spring and early summer (Deployments 3 and 4), dolphins were detected on 47% and 17% of recording days respectively, and in 0.33% and 0.08% of files, respectively. In autumn (Deployments 5 and 6), dolphins were detected on approximately 40% of recording days and in 0.25% - 0.31% of files (Table 11 of **Appendix E**).

Low detection rates in summer may also be an artefact of low recording effort during summer months. The gap in recording from late June to early September was due to an EAR power supply malfunction during its deployment from mid-July to early September 2018. The issue was addressed by installing new connectors and conducting additional testing of EAR prior to further deployments.

Dolphin Diel Pattern

As in previous years, dolphin detection rates at A5 from 16 Dec 2017 to 09 Jan 2019 were higher at night than during daytime, with peak detection hours from 1800 to 2100 (as indicated in Figure 22 of **Appendix E**). This pattern of detection was similar compared to the diel pattern in dolphin detections observed throughout Hong Kong waters, with higher numbers of detections during night-time and fewest detections at midday (Munger et al. 2016). The diel pattern was not evident in summer, in which the number of detections (and recording effort) was low. In spring and autumn, dolphin detections were higher during the hours 1900-2200, and in winter, detections peaked at 1800 (Figure 23 of **Appendix E**).

Sound Pressure Levels Per Day

Ambient received noise levels (referred to as sound pressure levels or SPL) at the EAR were calculated for each recording within the full effective frequency bandwidth (~0 to 32 kHz) as well as octave bands of 0-2 kHz, 2-4 kHz, 4-8 kHz, 8-16 kHz, and 16-32 kHz. Mean daily sound pressure levels over the full bandwidth ranged from approximately 109 to 119 dB, with a mean of 115 dB rms re 1 µPa (Figure 24 of **Appendix E**). Mean daily sound pressure levels in all frequency bands were lowest in December through February, and increased during the spring months. The low frequency band (0-2 kHz) showed a peak in SPL in April and was also high in November 2018. The SPL in mid- to high frequency bands (above 2 kHz) was greatest in June (Figure 24 of **Appendix E**). In the previous year (2017), peak SPL were observed in a different month of the year (August), which may be related to varying levels of anthropogenic and/or natural sound sources in different months between the two years. However, recording gaps in late March – early May of 2017 and July – August of 2018 preclude direct comparisons of these periods between years.

Daily mean sound pressure levels in the 16-32 kHz band, in which energy from CWD clicks occurs, ranged from approximately 94 to 102 dB with the maximum in summer and minimum in winter (Figure 24 of **Appendix E**). CWD click and whistle frequencies are above 16 kHz and below 10 kHz, respectively (Sims et al. 2012); however, the sounds from dolphins were very rare in the data compared to other sound sources and would not be distinguishable in ambient noise summary plots, although they are distinguishable to an analyst listening specifically for dolphin sounds in the full data files. Because of strong overlap between anthropogenic and/or natural sound sources and whistle sounds, it is possible that some whistles were missed in the data record due to noise masking. The extent to which ambient received sound levels influenced detectability of dolphin signals was not quantified for this data set.

Diel Sound Pressure Level

Mean sound pressure levels plotted by hour indicated a daily peak during the hours 1900-2000, which was mainly due to the contribution from the 0-2 kHz frequency band that is not the high-sensitivity region of CWD hearing (Figure 25 of **Appendix E**). This daily peak was most pronounced in spring (March-April-May) and gradually subsided through summer and autumn, and was not distinctive in winter, although afternoon and evening SPL in winter were greater than early to midmorning hours (Figure 26 of **Appendix E**). This seasonally shifting peak is similar to the diel pattern of sound pressure levels reported during previous Hong Kong PAM efforts (Munger et al. 2016), and is hypothesized to be related to a local fish chorus, probably dominated by croakers (family Sciaenidae). Sound pressure levels in the 16-32 kHz band remained relatively flat and constant (within 2 dB) throughout all hours of the day (Figure 25 of **Appendix E**).

Daily noise levels decreased throughout the night-time hours of 0000 to 0600 and were lowest at 0600, and increased throughout the day beginning at approximately 0700, likely due to the contribution of anthropogenic traffic and activity during daytime as well as the fish chorus in late afternoon hours (Figure 25 of **Appendix E**).

2.5.3 Discussions on CWD Monitoring Results

Each main survey type used in this project (i.e., vessel-based line transect with photo-identification surveys, land-based surveys with theodolite-tracking, and passive acoustic monitoring) provides important data that are complementary to each other, and when analysed together and in parallel, they provide a robust dataset to examine the kinds of issues that need to be considered for proper management and conservation of CWD in Hong Kong.

2.5.3.1 Vessel Line-transect Survey and Photo-identification

From the CWD vessel-based monitoring data, the estimate of overall abundance for 2018 was 77 dolphins with a CV of 18.9% (which indicates a good level of precision) which is somewhat higher than the previous year's estimate (71 dolphins in 2017, CV = 19.9%). It should be noted that there are several major factors being taken into account in the line-transect analysis (conducted using the program Distance), which affect the overall abundance estimates. These major factors include not only the number of sightings, but also the amount of search effort, average group size, and detectability, each of which vary from year to year. Distance analysis techniques have been used for many years, as they provide reliable indications of density and abundance (though with a level of uncertainty indicated by the CV) from all the various factors that affect abundance. The higher abundance estimate this year is partly due to the fact that size-bias corrected average group size (determined by the linear regression method in the program Distance, which accounts for the possibility of missing small groups at long distances) was higher in 2018, and also may be influenced by different behaviours of dolphins that may also affect their sightability (as reflected in the different detection function curves for the two years, 2017 and 2018). It is important to emphasize that abundance fluctuations in one year do not necessarily mean population increased or reflect the long-term trend. Likewise, a lower number of CWD sightings and fewer numbers of CWDs recorded in 2018 compared to 2017 may not mean that the overall abundance estimate will drop as reflected in the 2018 data. There has been a general declining trend from 2002-2015 (see Jefferson 2018) and dolphins move around among the various areas across the Pearl River Estuary region from year to year. A formal trends analysis may be possible at a later point once we have a longer-term dataset.

The seasonal analysis showed that within summer, dolphin numbers are still quite high in Hong Kong waters. The 2018 seasonal range is 61-99 dolphins. The winter estimate was the lowest (61 dolphins), while the summer estimate was the highest (99 dolphins), and this indicates that, despite the overall reduction in the average number of dolphins using Hong Kong waters in recent years, there are nearly 100 dolphins still present in Hong Kong in the summer months.

Within NWL waters, dolphins are mostly found around the Castle Peak and LKC areas. Earlier, concerns had been expressed by some interested stakeholders that dolphin numbers in NWL may have decreased specifically due to potential negative impacts from the re-routing of high-speed ferries (HSFs) to the Speed Control Zone (SCZ) north of Lung Kwu Chau. The analysis covering the entire first year post-SCZ (2016) provided an estimated abundance of 15 dolphins for NWL (refer to the 2016 annual report). The estimate for 2017 for the same area was 14 dolphins. The 2018 estimate was 22 dolphins, and this is substantially higher. Therefore, these preliminary analyses have not supported the hypothesis of a decline.

We need to further examine the effectiveness of the implementation of SkyPier HSF route diversion in alleviating the impacts on travelling areas of CWD using the waters between the project and SCLKCMP, and the areas between the CWD hotspots to the Northwest, Northeast and West Lantau. However, in view of the increased sightings of CWD at NEL area from vessel surveys there may have been some progress, as dolphins would likely have moved from the west to the NEL area. However, the HZMB has been completed, and this may have affected dolphin use of these travelling areas as well. As the dolphin numbers estimated in NWL and WL were generally stable or increasing from 2016-2018, the travel area is apparently still being used.

Regarding the results of photo-identification work, a total number of 158 CWD individuals were identified altogether 431 times from all sightings in 2018, with 97 individuals (around 61.4%) sighted more than once. Sixty-three individuals (around 39.9%) of the 158 identified animals showed cross-area movement between different survey areas. Seven animals (SLMM028, WLMM004, WLMM027, WLMM060, WLMM063, WLMM071 and WLMM080) were resighted in

three main survey areas (WL, SWL and NWL, including AW). Regarding the resighted CWDs, there was an increase in sightings of the mother-and-spotted juvenile pair NLMM006 and NLMM013 in NWL waters in 2018 compared with reported in 2017. There were two animals (SLMM011 and SLMM015) significantly decreased their use of Hong Kong waters in 2018 compared to previous years, nevertheless, there were still some animals, such as NLMM004, NLMM23, SLMM010, SLMM014, SLMM028, SLMM052, WLMM001, WLMM043, WLMM065, WLMM071, WLMM079, which continued to frequent Hong Kong waters in 2018.

One of the major concerns expressed in the EIA was the potential impacts on the travel corridor/area between the existing airport and the SCLKCMP, as well as between the airport and the New Territories coastline (EIA Section 13.9.1.31 refers). During the construction phase, dolphins are still using these travel areas, as movements between WL and NWL/NEL have been documented. Sightings in the travel areas may not be very common, but that is to be expected, as dolphins tend to move through these areas relatively quickly and do not generally spend as much time milling as they do in the main feeding/socializing areas.

2.5.3.2 Land-based Theodolite Tracking

Based on theodolite data, the waters off Lung Kwu Chau remain an important foraging area for CWDs throughout the year. Relative occurrence peaked in spring and autumn and during the dry season. Group sizes of CWDs were larger during the same time periods – during the spring, autumn, and dry season. Group sizes were also larger outside the boundary of the SCLKCMP and when ferries were within 500m of CWDs. This larger grouping pattern indicates a behavioural "clumping" or aggregation effect near low to high-speed vessels, perhaps as social aggregation in times of perceived danger. It is also possible that lone dolphins or those in small groups react more easily to (especially) faster boat travel and move out of the way more often, while those in larger groups – although the above speeds indicate that they do react – may be slightly more inclined to stay in the area, again as a perception of safety in numbers. Since more animals have more capabilities of sensory awareness, such increased tolerance in larger groups makes behavioural sense (and has been witnessed by the authors elsewhere).

CWD swimming speed varied based on endogenous factors (CWD group size and behavioural state) and boat type present. Swimming speed was significantly faster when in smaller groups (<3 individuals) and larger groups (>6 individuals). Swimming speed was also significantly faster in the presence of high-speed ferries under speed restriction and “other” non-ferry boats, indicating potential avoidance of vessels. Foraging behaviour was associated with significantly slower swimming speed than travelling. There was no statistically significant difference in reorientation rate and linearity based on GAM output of various factors, including in the presence of vessels (very possibly due to generally small sample sizes, especially for high-speed ferries going at high speed). Sample size in this category is further indication of general vessel avoidance. As in previous years, dolphins within 500 m of high speed ferries travelling at high speed were so infrequently tracked that distinction in speeds, reorientations, etc. could not be made with statistical significance. However, it is our strong impression that this lack of data indicates that dolphins are diving longer and avoiding such ferries underwater.

There were no CWDs observed off Sha Chau, which is consistent with the low numbers observed in 2016 and 2017 (two groups per year). The primary behaviour observed from this location in 2017 was travelling, suggesting that CWDs are simply moving through the area to more suitable habitat. However, one minute of foraging behaviour was also observed in 2017. This is a sharply-reduced use of the area north of the airport and south of the Sha Chau and Lung Kwu Chau Marine Park from the EIA studies prior to 2016, as expected relative to increasing marine works in this area.

2.5.3.3 Passive Acoustic Monitoring

The PAM data continue to provide useful information, especially on patterns of dolphin vocalization at night, which had previously been unavailable to us in the early years of the long-term study. The diurnal detection of clicks showed a consistent pattern of higher levels in late evening and at night compared with the day, which may be indicative of increased foraging and concomitant use of echolocation by dolphins during hours of darkness. This increase in dolphin acoustic activity at night has been a general trend throughout PAM monitoring in most parts of Hong Kong (Munger et al. 2016). It is also possible that at least a portion of this diel trend is related to dolphins utilizing this area more intensively at night than in daytime, likely because of decreased anthropogenic traffic and activity at night.

The PAM data provide evidence that dolphins are using the area around south of Sha Chau throughout the year. In 2018, dolphins were present with especially high incidence in winter, and less so in other seasons. The per-file detection rates were also highest in winter; taken together, these metrics suggest that dolphins use the area more frequently and intensively in winter than in other seasons. Interestingly, this is a different pattern from that observed from theodolite tracking north of Lung Kwu Chau, where dolphins were generally observed less in winter (and summer and the wet season overall), than in spring and autumn.

2.5.4 Conclusions of CWD Monitoring Results

With reference to the aims of construction phase CWD monitoring described in the EM&A Manual, the key findings of CWD monitoring in 2018 are summarised as follows:

Effects on the Potential Shift in CWD Travelling Areas and Habitat Use

The latest monitoring data indicate that both NL and WL waters were being used more heavily in 2018 than in the past years, possibly due to shifting of dolphins back towards NWL and NEL, which were highly-disturbed habitats during the HZMB construction. Dolphin sightings are again being made by vessel surveys around the Brothers Islands of NEL, and this may be a promising sign of some recovery there.

While shore-based observations and theodolite tracking do not present overall estimates of numbers of dolphins, the 2017 data from LKC showed about 1.5 times as many groups sighted and tracked than in 2016 (an increase of about 0.3 sightings per survey hour), with overall very similar observation effort between the two years. This indicates a higher use of this area in 2017 than 2016, perhaps indicative of more dolphins using the habitat due to construction works of the Project to the south. Observation effort in 2018 was also nearly the same as the previous two years. However, sightings per survey hour fell between the two – higher than 2016 (an increase of about 0.2 sightings per survey hour), but lower than 2017 (a decrease of about 0.1 sightings per survey hour).

Effectiveness of the HSF Speed and Routing Restrictions to the CWDs

Waters around Lung Kwu Chau remain an important year-round habitat, especially for foraging; and there is no evidence of a decline in dolphin use of the HSF SCZ around Lung Kwu Chau since ferries were re-routed to that area with slower speeds at the end of 2015.

Trends in Long Term Monitoring Data

From vessel surveys conducted in 2018, CWD use of Hong Kong waters appears to be slightly up from 2016-2017. West Lantau waters appear relatively stable, and dolphins may be shifting from SWL back into NL waters. It is estimated that 77 dolphins (on average) were found within Hong Kong waters in 2018, which is up slightly from last year (2017). There continues to be no evidence that the implementation of the SCZ is having any negative impacts on dolphin use of

the NWL area. Diverted SkyPier HSFs with speed control measures in place appear to be reducing risks to CWDs using the narrowing waters between south of SCLKCMP and the airport north and at the same time do not appear to be resulting in apparent negative impacts on CWDs along the diverted route.

It is important to note that dolphins shift around within their habitat from year to year, due to both natural and anthropogenic factors. Thus, an apparent increase in numbers from one year to the next should not necessarily be taken as evidence of an overall recovery. Dolphins live for many decades (in some cases, over 50 years), and thus long-term monitoring using consistent methods is needed over an extended period of time in order to evaluate the conservation status of the CWD population and how its use of Hong Kong waters is being affected.

From land-based surveys with theodolite-tracking in 2017 (i.e., the previous year), use of LKC by CWD was highest during mid-day, 10-13 hours; with the overall lowest season of use from March to May; the highest month was February and the lowest was May. In 2018, use of LKC by CWD was also highest during mid-day, but during a slightly expanded time between 9 and 13 hours when compared to 2017. In 2018, the highest month of occurrence off LKC was March, with lows in January, June, August, and December. Overall, the wet season of June-October accounted for a generally low pattern of sightings and tracks. In 2018, mean group size off LKC was about 3.3, with singles up to a maximum of 8 CWDs per group, slightly higher but not significantly so when compared to years 2016 and 2017. As in 2017, group size was largest outside of the SCLKCMP, at about 3.6, compared to inside of the park at about 3.1. Singletons most often occurred inside of the SCLKCMP boundary, closer to shore. It is unknown how much a bias of vision (sighting bias) resulted in this latter low number closer to the observation station, as it is easier to find and track dolphins when they are closer. Group size was largest when HSF's (> 15 knots) were within 500 m of CWDs, indicative that either dolphins aggregate in response to rapidly-approaching vessels, remain near vessels more often when in larger groups, or both. As well, group sizes were larger when high-speed ferries under speed restriction ($\leqslant$ 15 knots) were within 500 m of CWDs than when no boats were present.

Overall, as in previous years, in 2018 the behavioural states of foraging and travelling were by far the most frequent off LKC. In 2018, swim speed increased in small groups with <3 individuals and in larger groups of >6 individuals, a somewhat different situation than in 2017, when swim speed increased only with increasing number of animals, to >5. Foraging and socializing were indicated by slower swim speeds than when dolphins were travelling, and swim speed was significantly faster when high-speed ferries were within 500m and under speed restriction than "other" non-ferry vessels. Swim speeds and high-speed ferries travelling at high speed showed no significant difference this past year, likely due to small sample sizes. However, see group size differences by vessel category (above). Also, unlike in 2017, in 2018 there were no significant indications of reorientation or linearity changing by the parameters of vessel types or speeds.

The CWD construction phase monitoring data so far appear to be consistent with findings of the ecological assessments completed during the EIA, which predicted negative impacts during construction including from the physical loss of habitat due to the reclamation. No unexpected ecological impacts on CWDs have been identified. Construction practices have been modified to avoid negative impacts on dolphins, as much as is feasible. However, it should be noted that some shifting away from North Lantau waters can be expected during reclamation work for the construction of the 3RS; if that occurs it would also be consistent with the EIA predictions. We expect that dolphins will shift away from portions of their home range that are experiencing intense human activity or disturbance (for example the major works activities associated with large scale land formation). The collective scale of the construction works site and cumulative anthropogenic disturbance during 3RS construction was anticipated to lead to the temporary displacement of

CWDs from the area. However, these impacts are usually not permanent and past experience tells us that dolphins will likely recover to some extent, as discussed in the EIA (refers to Sections 13.9.1.5 and 13.9.2.112; Jefferson, 2000; Jefferson and Hung, 2004; Jefferson, 2007), once the construction work is completed (assuming that that the habitat is still of adequate quality). In fact, we may already be seeing this with the HZMB Project. Monitoring for the 3RS will be continued in line with EM&A requirements and with an eye toward evaluating the anticipated 3RS project impacts as well as any 'recovery' in CWD use of North Lantau waters in the future. Adaptive management measures may be considered, as appropriate, should there be any deviation from anticipated impacts. At this stage of 3RS construction, recommended mitigation measures have been implemented in accordance with all requirements and appear to have been effective. Effectiveness of mitigation measures will be kept under review.

2.5.5 Site Audit for CWD-related Mitigation Measures

During the reporting period, silt curtains were in place by the contractors for sand blanket laying and marine filling works, and dolphin observers were deployed by contractors in accordance with the Marine Mammal Watching Plan. Teams of at least two dolphin observers were deployed by contractors for continuous monitoring of the Dolphin Exclusion Zone (DEZ) for DCM works, PVD installation and seawall construction in accordance with the DEZ Plan. Training for the dolphin observers on the implementation of MMWP and DEZ monitoring was provided by the ET prior to the aforementioned works, with the training records kept by the ET. From the contractors' MMWP observation records and DEZ monitoring records, no dolphin or other marine mammals were observed within or around the silt curtains. During the reporting period, the ET was notified on six records of dolphin sightings within the DEZ of DCM works by the contractors. The ET checked the dolphin sighting records and the contractors' site records to audit the implementation of DEZ. Details of the sightings are summarized in Table 13 of **Appendix E**. DCM works within the DEZ were suspended by the contractors, and not resumed until the DEZ was clear of dolphin for a continuous period of at least 30 minutes in accordance with the DEZ Plan.

In May 2018, site audit to the DEZ monitoring for DCM works area were made by dolphin experts Dr. Jefferson and Prof. Würsig, and discussions with on-site dolphin observers conducting DEZ monitoring were made. There were useful interactions between the dolphin experts and dolphin observers, and no issues on the audit of DEZ monitoring.

Audits of acoustic decoupling for construction vessels were carried out during weekly site inspection and summarised in Section 2.6. Summary of audits of SkyPier High Speed Ferries route diversion and speed control and construction vessel management are presented in Section 2.8 and Section 2.9 respectively.

2.6 Environmental Site Inspection

Site inspections of the construction works were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. Bi-weekly site inspections were also conducted by the IEC. Besides, *ad-hoc* site inspections were conducted by ET and IEC if environmental problems were identified, or subsequent to receipt of an environmental complaint, or as part of the investigation work. These site inspections provided a direct means to reinforce the specified environmental protection requirements and pollution control measures in construction sites.

During site inspections, environmental situation, status of implementation of pollution control and mitigation measures were observed both within the site area as well as outside the project sites which was likely to be affected, directly or indirectly, by the site activities. Environmental documents and site records, including waste disposal record, maintenance record of

environmental equipment, and relevant environmental permit and licences, were also checked on site. Observations were recorded in the site inspection checklist and passed to the contractor together with the appropriate recommended mitigation measures where necessary in order to advise contractors on environmental improvement, awareness and on-site enhancement measures. The observations were made with reference to the following information during the site inspections:

- The EIA and EM&A requirements;
- Relevant environmental protection laws, guidelines, and practice notes;
- The EP conditions and other submissions under the EP;
- Monitoring results of EM&A programme;
- Works progress and programme;
- Proposal of individual works;
- Contract specifications on environmental protection; and
- Previous site inspection results.

Good site practices were observed in site inspections during the reporting period. The ET participated in environmental drills organized by the contractor as observer, including chemical spill drills and silt curtain deployment drills. Advices were given when necessary to ensure the construction workforce were familiar with relevant procedures, and to maintain good environmental performance on site. Environmental briefings were provided to the contractors by EPD on various topics including CNP and waste management. Environmental briefings on EP and EM&A requirements were also provided to the new contracts by ET. Regular toolbox talks on environmental issues were organized for the construction workforce by the contractors to ensure understanding and proper implementation of environmental protection and pollution control mitigation measures.

A summary of implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix C**.

2.7 Ecological Monitoring

In accordance with the Manual, during the HDD construction works period from August to March, terrestrial ecological monitoring shall be undertaken monthly at the HDD daylighting location on Sheung Sha Chau Island to identify and evaluate any impacts with appropriate actions taken as required to address and minimise any adverse impact found.

Monthly ecological monitoring was carried out in January, February, March, August, September, October, November and December 2018 on Sheung Sha Chau Island. During these reporting months, the monthly ecological monitoring at the HDD daylighting location on Sheung Sha Chau observed that HDD works were ongoing at the daylighting location, and there was no encroachment of any works upon the egretry area nor any significant disturbance to the ardeids on the island by the works. Sign of early breeding activity of ardeids was observed in March, and sign of a few nursery activities were observed in August on trees located at the previously identified egretry area where it is at the southern side of Sheung Sha Chau Island. At the HDD daylighting location, neither nest nor breeding activity of ardeids were found during the ecological monitoring and site inspections in the reporting period.

2.8 Audit of the SkyPier High Speed Ferries

The Marine Travel Routes and Management Plan for High Speed Ferries of SkyPier (the SkyPier Plan) was submitted to the Advisory Council on the Environment (ACE) for comment and subsequently submitted to and approved by EPD in November 2015 under EP

Condition 2.10. The approved SkyPier Plan is available on the dedicated website of the Project. In the SkyPier Plan, AAHK has committed to implementing the mitigation measure of requiring HSFs of SkyPier travelling between HKIA and Zhuhai / Macau to start diverting the route with associated speed control across the area, i.e. SCZ, with high CWD abundance. The route diversion and speed restriction at the SCZ have been implemented since 28 December 2015. The IEC has also performed audit on the compliance of the requirements as part of the EM&A programme. The latest summary of key audit findings in the reporting period is presented in **Table 2.16**.

According to the approved SkyPier Plan, dolphin habitat index has been reviewed in the reporting period based on findings of the AFCD's marine mammals monitoring report 2017-18 and historical dolphin density records. Grids for dolphin hotspot remained unchanged, thus the HSF route diversion arrangement remained unchanged.

A total of three skipper workshops were held in 2018 with ferry operators and relevant ferry captains to refresh their understanding about the requirements of the SkyPier Plan, such as the routing and speed control requirements, with discussion on deviation cases, experience sharing and recommendations to strengthen the implementation of the SkyPier Plan.

In total, 10,421 ferry movements between HKIA SkyPier and Zhuhai / Macau were audited in the reporting period. The daily movements of all SkyPier HSFs in the reporting period ranged between 12 and 102, which falls within the maximum daily cap number of 125. The annual daily average of all SkyPier HSF movements in 2018 was 91, which falls within the annual daily average cap of 99 SkyPier HSF movements.

Out of the 10,421 ferry movements audited, 10,419 HSFs travelled through the SCZ with average speeds at or below 15 knots, which complied with the SkyPier Plan. For the case of average speed over 15 knots on 6 November and 18 December 2018, ET had conducted investigations and findings were provided in respective Construction Phase Monthly EM&A Reports. All ferry movements that were not strictly following the diverted route have been investigated. All of the route deviation cases were related to strong tidal wave and current or giving way to other vessels due to safety and emergency situations.

Insufficient and no AIS data were received from some HSFs due to interference effect of AIS signal as reported by the ferry operators after checking the condition of the AIS transponders. In such cases, vessel captains were requested to provide radar track photos to indicate that the vessel entered the SCZ though the gate access points and without speeding in the SCZ.

Table 2.16 Summary of Key Audit Findings against the SkyPier Plan

Requirements in the SkyPier Plan	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Total number of ferry movements recorded and audited	886	812	884	853	888	865	887	882	801	894	870	899
Use diverted route and enter / leave SCZ through Gate Access Points	886	806	883	849	888	864	884	880	800	893	870	897
No. of SkyPier HSFs in compliance with Average Speed within 15 knots in SCZ	886	812	884	853	888	865	887	882	801	894	869	898
Range of Daily Movement (including all SkyPier HSFs)	89-91	87-96	84-90	92-94	89-90	87-91	88-90	74-90	12-99 (1)	87-102	86-92	90-92

Source: Excerpted from Monthly and Quarterly EM&A Reports
Note: (1) Due to Super Typhoon Mangkhut, comparatively low daily movement was recorded in September 2018.

2.9 Audit of Construction and Associated Vessels

The audit of construction and associated vessels in accordance with the Marine Travel Route and Management Plan for Construction and Associated Vessel (MTRMP-CAV) has started since August 2016. ET has audited relevant information including AIS data, vessel tracks and other relevant records provided by the contractors to ensure that the contractors were fully complied with the requirements of the MTRMP-CAV. The Marine Surveillance System (MSS) was launched in March 2017. The MSS automatically recorded deviation cases such as speeding, entering no entry zone, and not travelling through designated gates. ET conducted checking to ensure the MSS records all deviation cases accurately. The 3-month rolling programme submitted by contractors for construction vessel activities were also checked every month to ensure the logistic of construction vessels were well planned to achieve a practicable minimum. The IEC has also performed audit on the compliance of the requirements as part of the EM&A programme.

Deviations including speeding in the works area, entry from non-designated gates, not following the designated route and entering no-entry zones were identified. All the concerned contractors were reminded to comply with the requirements of the MTRMP-CAV during the weekly Marine Traffic Control Center (MTCC) audit and such deviations were also reviewed and highlighted during the monthly Environmental Management Meeting.

A total of 24 skipper training workshops were held by ET in 2018 with 138 captains of construction vessels associated with the 3RS contracts to familiarise them with the predefined routes, general education on local cetaceans, guidelines for avoiding adverse water quality impact, the required environmental practices / measures while operating construction and associated vessels under the Project, and guidelines for operating vessels safely in the presence of CWDs. Another 64 skipper training workshops were held with 99 captains by contractor's Environmental Officers and competency tests were conducted subsequently with the trained captains by ET. In addition, ET participated Marine Management Liaison Group meetings to assist and resolve any marine issues which might be encountered under the Project.

2.10 Coral Post-Translocation Monitoring

Two post-translocation monitoring surveys were conducted during the reporting period. The 6th post-translocation monitoring survey, which is also the final round of survey committed in the Coral Translocation Plan (CTP), was conducted on 2 and 3 April 2018, while the 7th post-translocation monitoring survey, which is an additional monitoring surveys proposed in the Detailed Coral Translocation Report, was conducted on 5 and 6 October 2018.

The Action and Limited Levels stipulated in the CTP were not triggered for both the 6th and 7th survey. The similarities in the monitoring results between October 2018 and April 2018 suggested that the conditions of the corals have been stabilized. The results of both surveys are similar in terms of their percentage change in partial mortality (PM). The tagged translocated corals which recorded ≥25% change in PM increased from 94.1% in April and 95.0% in October, while the tagged control corals which recorded ≥25% change in PM decreased from 100% in April to 94% in October. Moreover, the average general health condition remained between the range of 1.5 and 2.5 in both surveys.

Furthermore, despite two control colonies and 25 translocated colonies have been swept away by Typhoon Mangkhut on 16 September 2018, the coral colonies remained at the recipient site have shown similar PM (especially for the translocated corals) compared to the previous survey. The average PM of tagged translocated corals decreased from 76.4% to 74.6% from April to October and that of the tagged control corals decreased from 74.0% to 71.1%, showing that the condition of the remaining colonies has somehow been stabilized.

The next additional post-translocation monitoring survey is scheduled in April 2019 and the results will be reported in the respective Quarterly EM&A Report.

2.11 External Stakeholder Engagement

In accordance with the EP's requirements of setting up Community and Professional Liaison Groups, the AAHK has been continuing to proactively reach out to a wide spectrum of external stakeholders to update them on the environmental aspects of the Project and to seek their insights and views. These incessant exchanges with the local communities, relevant professionals, experts, and other stakeholders. Below are highlights of the engagement activities held in 2018.

2.11.1 Community Liaison Groups

In order to enhance communication with the community in a proactive way, five Community Liaison Groups (CLGs) were set up in 2012 in the neighbouring districts of HKIA, namely Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun. The CLGs are comprehensive platforms for the AA to update the community leaders about the detailed design, progress of construction and operation, and environmental monitoring and audit results of the Project, and listen to their views on various topics related to HKIA and the Project, including environmental matters. The AA also leverages on the CLGs to exchange views with the community on the latest airport developments, hence enhancing airport services and helping to contribute to the betterment of these districts. The CLGs have a total of about 130 members involving district councillors and community leaders.

In the reporting period, two rounds of four meetings were held in July and December 2018. Project information including latest development of the 3RS Project, environmental monitoring and audit results, details on the implementation of environmental enhancement measures and enrichment of airport facilities and services were presented in the meetings.

2.11.2 Professional Liaison Group and Green Non-Governmental Organizations

The Professional Liaison Group, comprising 20 members of relevant professionals and experts, was set up to enhance transparency and communication, as well as enquiries and complaints-handling on all environmental issues related to the Project; and to promote community cooperation and participation and implementation of suitable local environmental enhancement works that are included in the Environmental Permit.

In the reporting period, two PLG meetings were held in July and December 2018. Project information including latest development of the 3RS Project, environmental monitoring and audit results and details on the implementation of environmental enhancement measures were presented in the meetings.

Roundtable meetings with Green Non-Governmental Organizations (NGOs) were proactively arranged to facilitate exchanges on environmental issues related to the Project. Updates of the Project, including environmental monitoring and audit results and details on the implementation of environmental enhancement measures were shared with the participants. Two roundtable meetings were held in July and December 2018.

2.11.3 Fishermen Liaison

In an effort to deepen outreach to the fishermen community, a dedicated Fishermen Liaison Group was set up in November 2016 to share updates on environmental matters and progress of construction and operation with the chairmen and leaders of fishermen groups and associations. Two meetings were held in February and July 2018.

2.11.4 Other Stakeholders

The AAHK attended a Legislative Council Panel on Economic Development meeting in April 2018 to share with members updates regarding environmental, construction and funding aspects; and a Marine Parks Committee meeting in October 2018 regarding Marine Park for the Project. The AAHK also submitted a paper to the Advisory Council on the Environment (ACE) in July 2018 reporting an update on the implementation of the marine ecology mitigation and enhancement measures for the 3RS Project.

A media workshop regarding Aviation Fuel Pipelines Installation by Horizontal Directional Drilling (HDD) was held in April 2018. A visit to the marine work site and MTCC was arranged for the Human Settlements and Environment Commission of Shenzhen Municipality in May 2018 to share about the 3RS Project and the AAHK's marine surveillance measures. To keep the general public abreast on the environmental aspects of the Project, including environmental monitoring and audit results, MEEF and FEF plus an array of topics and materials, a dedicated project website was set up since November 2015. Number of visits to the website in 2018 totalled 105,794, 2.7% higher than the number of visits in 2017.

To encourage two-way communications with stakeholders and the community, a dedicated telephone hotline and email was set up since December 2015. Four enquiries were received via the hotline, and twelve enquiries were received via the dedicated email in 2018.

2.12 Review of the Key Assumptions Adopted in the EIA Report

With reference to Appendix E of the Manual, it is noted that the key assumptions adopted in approved EIA report for the construction phase are still valid and no major changes are involved. The environmental mitigation measures recommended in the approved EIA Report remain applicable and shall be implemented in undertaking construction works for the Project.

2.13 Key Environmental Issues for the Coming Reporting Period

The key environmental issues for the Project in the coming reporting period are expected to be associated with construction activities including marine works such as laying of sand blanket, DCM works, seawall construction, and marine filling, as well as land-based works such as excavation, piling, T2 expansion works, and APM works. Relevant environmental impact mitigation measures will be implemented, including the deployment of enhanced silt curtains, reuse of excavated material and public fill for marine filling, and stockpiling of excavated materials for future reuse.

The implementation of required mitigation measures by the contractors will be monitored by the ET.

3 Report on Non-compliance, Complaints, Notifications of Summons and Prosecutions

3.1 Compliance with Other Statutory Environmental Requirements

During the reporting period, environmental related licenses and permits required for the construction activities were checked. No non-compliance with environmental statutory requirements was recorded.

3.2 Analysis and Interpretation of Complaints, Notification of Summons and Status of Prosecutions

3.2.1 Complaints

Eight environmental complaints were received in the reporting period. All environmental complaints were attended to and investigations were conducted by the ET in accordance with the Manual and the Complaint Management Plan. The summary of the complaints and analysis is presented in **Appendix F**.

3.2.2 Notifications of Summons or Status of Prosecution

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

For the summonses received in June 2017 on the alleged use of powered mechanical equipment by the contractor outside the permitted hours for the aviation fuel pipeline diversion works in December 2016, the prosecution formally offered no evidence against the AAHK and all summonses issued to AAHK were dismissed. The contractor pleaded guilty to contravening the Noise Control Ordinance and was fined by the court in May 2018.

3.3 Cumulative Statistics

Cumulative statistics on exceedance, non-compliance, complaints, notifications of summons and status of prosecutions are summarized in **Appendix F**.

4 Conclusion and Recommendation

In the reporting period from 1 January 2018 to 31 December 2018, the EM&A programme has been implemented in accordance with the Manual of the Project. The EM&A works carried out during the reporting period include construction dust and noise measurements, water quality monitoring, ecological monitoring on Sheung Sha Chau Island, vessel line-transect surveys, land-based theodolite tracking surveys supplemented with passive acoustic monitoring for CWD monitoring, waste monitoring, coral post-translocation monitoring, as well as environmental site inspections and landscape and visual monitoring for the Project's construction works.

For air quality, one monitoring result triggered the Action Level of 1-hour TSP in the reporting period, and the corresponding investigations were conducted accordingly which concluded that the cases were not related to the Project.

For water quality, the monitoring results for total alkalinity obtained in the reporting period complied with the corresponding Action and Limit Levels stipulated in the EM&A programme. Relevant investigation and follow-up procedures were conducted according to the EM&A programme if the corresponding Action and Limit Levels were triggered. For DO, turbidity, SS, chromium, and nickel, some of the monitoring results triggered the relevant Action or Limit Level in the reporting period, and the corresponding investigations were conducted accordingly. The investigation findings concluded that the cases were not related to the Project. To conclude, the construction operation in the reporting period did not introduce adverse impact to all water quality sensitive receivers.

The monitoring results in relation to the construction noise, waste, CWD, and coral post-translocation monitoring did not trigger their corresponding Action or Limit Levels during the reporting period.

All site observations made by the ET were recorded in the site inspection checklists and passed to the contractor together with the recommended follow-up actions. No encroachment or disturbance to the egretry area on Sheung Sha Chau was recorded during monthly ecological monitoring conducted when construction works was carried out on Sheung Sha Chau Island in January to March, August to December 2018, i.e. outside of ardeid's breeding season from April to July 2018.

A total of 5,441.1 km survey effort was conducted for the vessel line-transect monitoring for CWD during the 12-month monitoring period. A total of 215 groups of 686 CWDs were sighted, with two groups of 2 CWDs in NEL, 52 groups of 147 CWDs in NWL, six groups of 22 CWDs in AW, 113 groups of 392 CWDs in WL and 42 groups of 123 CWDs in SWL. The combined encounter rates by number of dolphin sightings and by number of dolphins were 4.00 and 13.02 respectively. No triggering of Action and Limit Level on the encounter rates were recorded during the construction phase during 2018. Average annual abundance of CWD in Hong Kong western waters was estimated at 77 dolphins in 2018 from line-transect analysis. CWD relative occurrence from land-based surveys around Lung Kwu Chau peaked in March, with fewer sightings during the winter (December-February) and summer (June-August), and increased during the spring (March-May) and autumn (September-November). Waters around Lung Kwu Chau remain an important foraging area for CWDs throughout the year. Passive acoustic monitoring provides evidence that dolphins are using the area around south of Sha Chau throughout the year, with

especially high incidence in winter in 2018. The acoustic data also showed consistently higher levels of dolphin clicking activity in late evening and at night compared with daytime, which may be indicative of increased foraging and concomitant use of echolocation by dolphins during hours of darkness.

Ferry movements between HKIA SkyPier and Zhuhai / Macau were audited in the reporting period. In total, 10,421 ferry movements between HKIA SkyPier and Zhuhai / Macau were audited in the reporting period. The daily movements of all SkyPier HSFs in the reporting period ranged between 12 and 102, which falls within the maximum daily cap number of 125. The annual daily average of all the SkyPier HSFs in 2018 was 91 movements, within the annual daily average cap of 99 SkyPier HSF movements. Out of the total 10,421 ferry movements in 2018, only two HSFs were found travelling through the SCZ with average speeds over 15 knots. All ferry movements that did not strictly follow the diverted route were investigated.

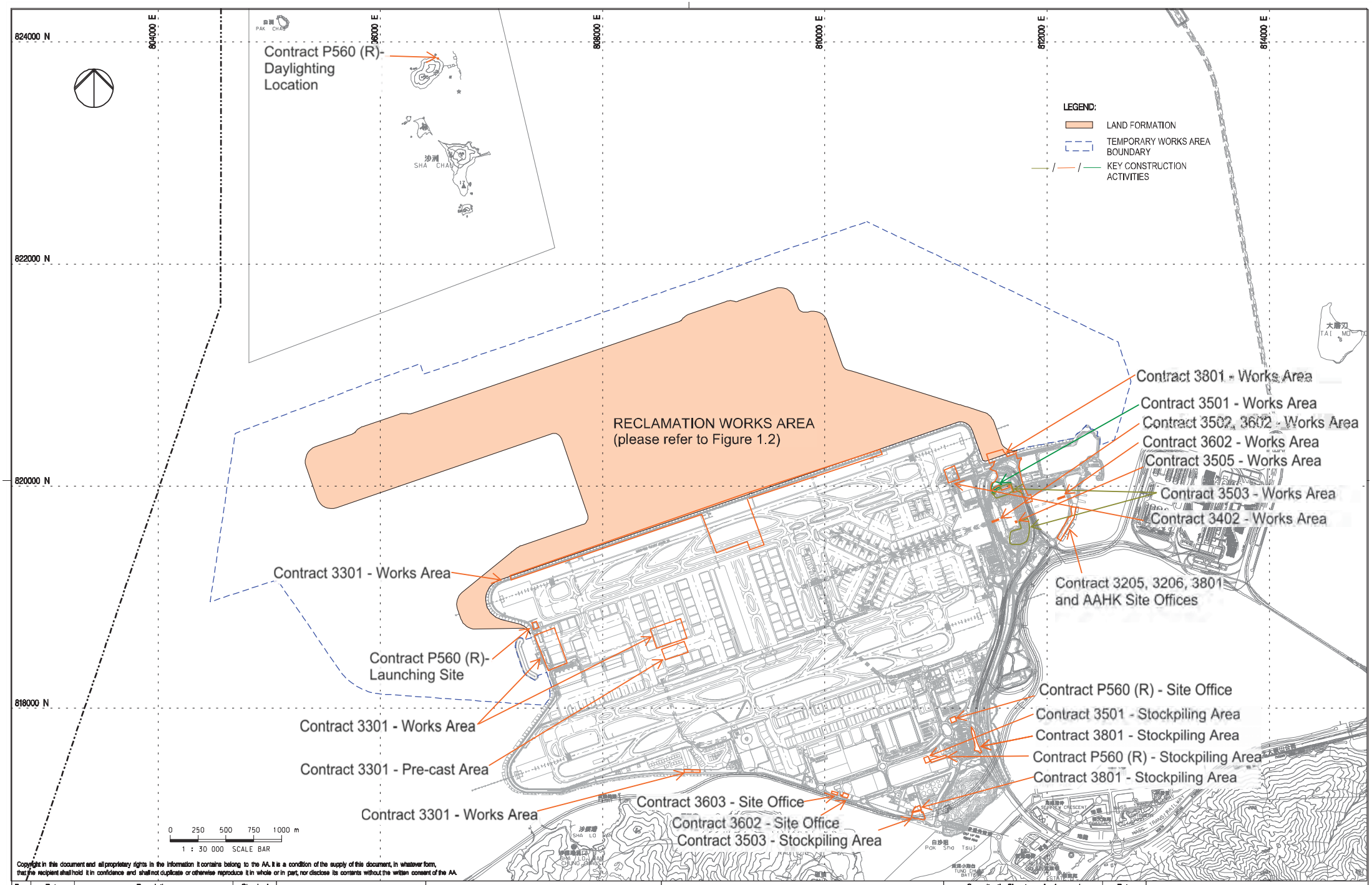
The audit of construction and associate vessels has started since August 2016. ET has conducted audit to ensure that the contractors were fully complied with the requirements of the MTRMP-CAV. The MSS was launched in March 2017. The MSS automatically recorded the deviation case such as speeding, entering no entry zone, not travelling through the designated gate. ET conducted checking to ensure the MSS records all deviation cases accurately. A total of 24 skipper training workshops were conducted by the ET from January to December 2018 with captains of construction vessels associated with 3RS contracts. Another 64 skipper training workshops were held by contractors' Environmental Officers and competency tests were conducted subsequently with the trained captains by ET.

On the implementation of MMWP, silt curtains were in place by the contractors for sand blanket laying and marine filling works, and dolphin observers were deployed in accordance with the MMWP. On the implementation of DEZ Plan, dolphin observers were deployed by the contractors for continuous monitoring of the DEZ for DCM works, PVD installation and seawall construction in accordance with the DEZ Plan. Trainings for the dolphin observers on the implementation of MMWP and DEZ monitoring were provided by the ET prior to the aforementioned works. From the contractors' MMWP observation records and DEZ monitoring records, no dolphin or other marine mammals were observed within or around silt curtains during the reporting period, while there were six records of dolphin sightings within the DEZ of DCM works. Audits of acoustic decoupling for construction vessels were also carried out by the ET during weekly site inspections.

External stakeholder engagement activities ranging from liaison meetings with the local community, relevant professional and green groups, regular meetings with other stakeholders, setting up of a dedicated project website for the general public, organising of media workshop, and visit to the marine work site and MTCC etc., were carried out to update them on the environmental aspects of the Project and ensure transparent and engaging communication.

Overall, the recommended environmental mitigation measures, as included in the EM&A programme, have been effectively implemented during the reporting period. Also, the EM&A programme implemented by the ET has effectively monitored the construction activities and ensure the proper implementation of mitigation measures.

Figures



Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC

HONG KONG INTERNATIONAL AIRPORT

Mott MacDonald

Title: LOCATIONS OF KEY CONSTRUCTION ACTIVITIES

Consultant's Signatures for Approval		Date
Design	DC	31AUG15
Checkers	DC	31AUG15
Design Supervisor	EC	31AUG15
Authorised Representative	JFP	31AUG15

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No. FIGURE 1.1

Scale at A3: 1 : 30000

Rev. A

Filename: J:\365482\REPORT\ENV\CWSLP\FIG 1.dgn

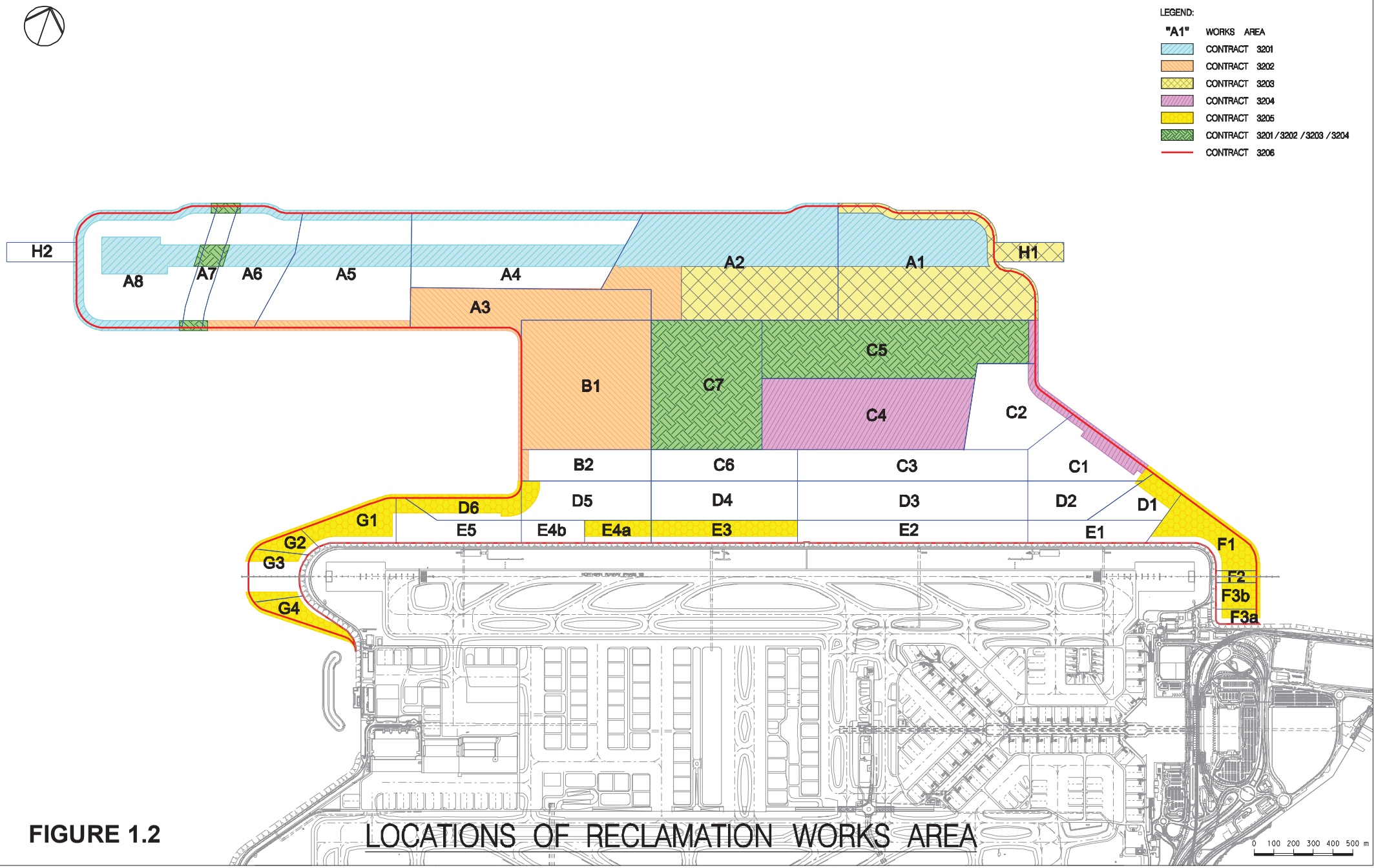
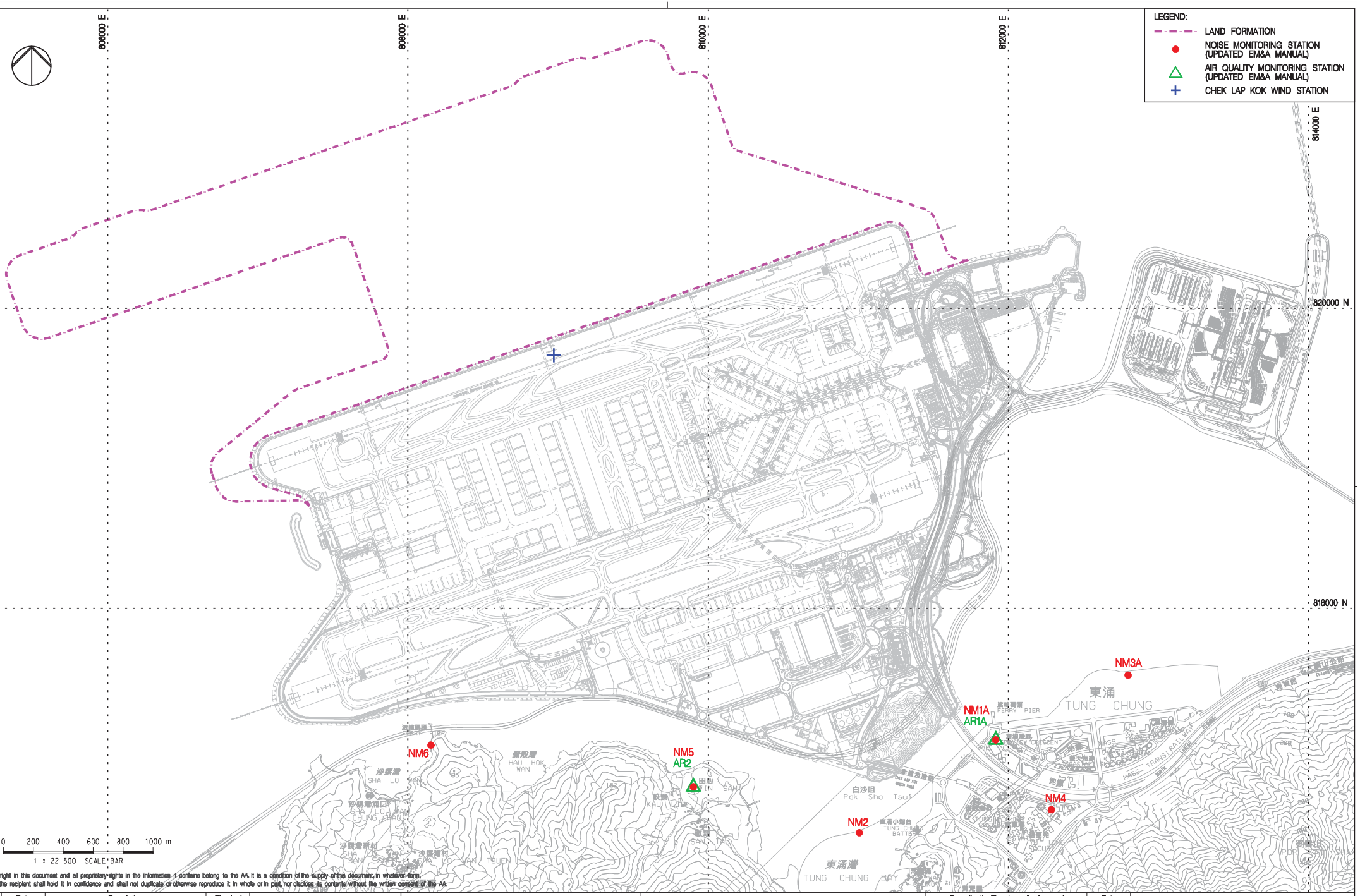


FIGURE 1.2

LOCATIONS OF RECLAMATION WORKS AREA



Rev.	Date	Description	Checked
A	06JAN16	FIRST ISSUE	RO
B	29JAN16	GENERAL REVISION	RO
C	11FEB16	GENERAL REVISION	RO
D	29OCT18	GENERAL REVISION	SH

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

MOTT MACDONALD

Title

LOCATIONS OF AIR AND NOISE MONITORING STATIONS AND CHEK LAP KOK WIND STATION

Consultant's Signatures for Approval		Date
Design	TK	29OCT18
Checkers	TK	29OCT18
Approver	EC	29OCT18

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

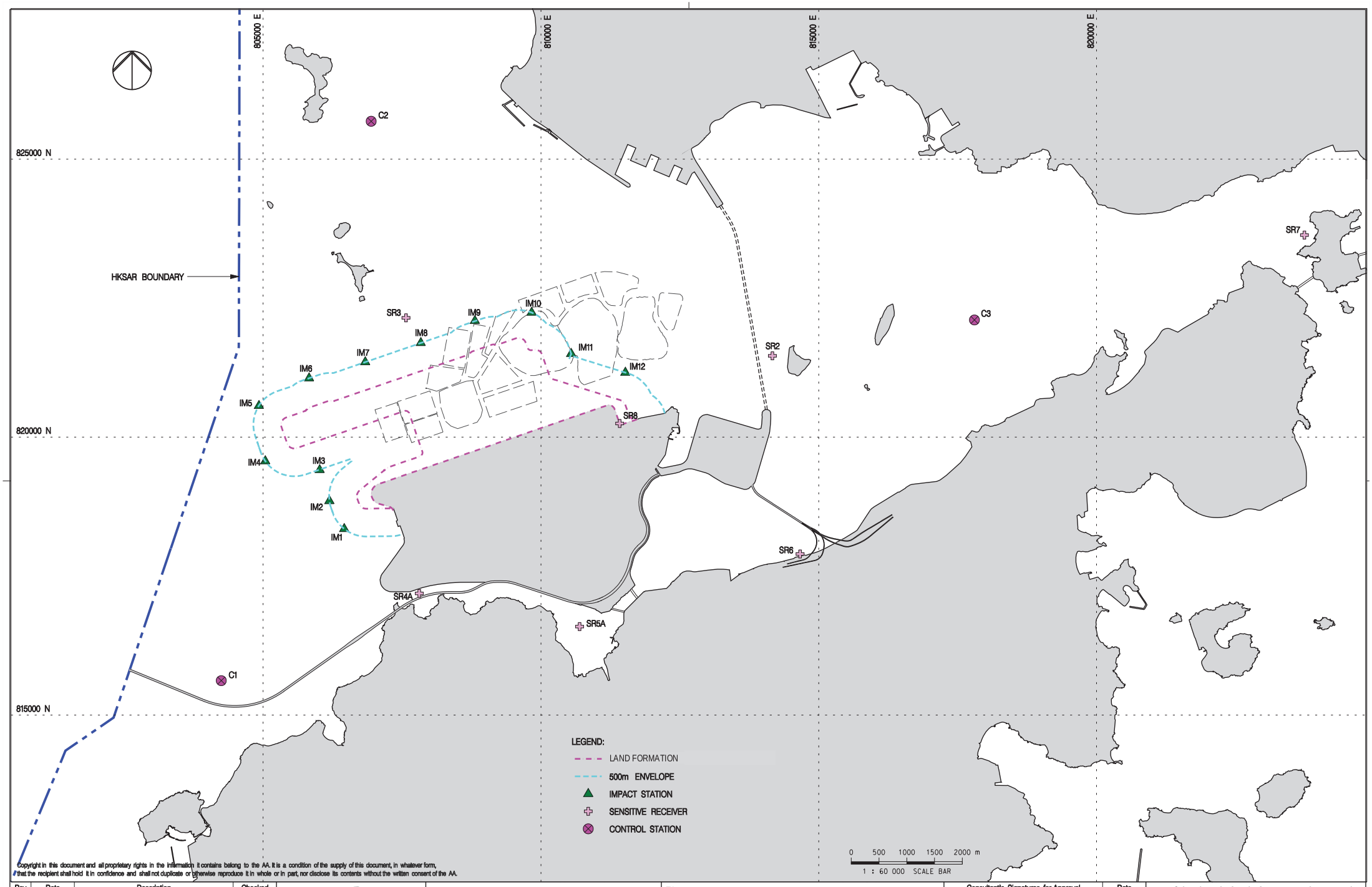
Drawing No.

FIGURE 2.1

Scale at A3 1 : 22500

Rev. D

Filename: J:\355482\REPORT\ENV\EMA\181029\FIG 2.1.dgn



Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	DC
B	04MAY16	GENERAL REVISION	RO
C	06JUN16	GENERAL REVISION	LC
D	02AUG17	GENERAL REVISION	RO

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

Airport Authority Hong Kong Tower, 1 Sky Plaza Road, Hong Kong International Airport, Lantau, Hong Kong
Tel : (852) 2188 7111 Fax : (852) 2384 0777

MOTT MACDONALD

Title

WATER QUALITY MONITORING STATIONS

Consultant's Signatures for Approval		Date
Design	DC	02AUG17
Checkers	DC / TK	02AUG17
Approver	EC	02AUG17

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

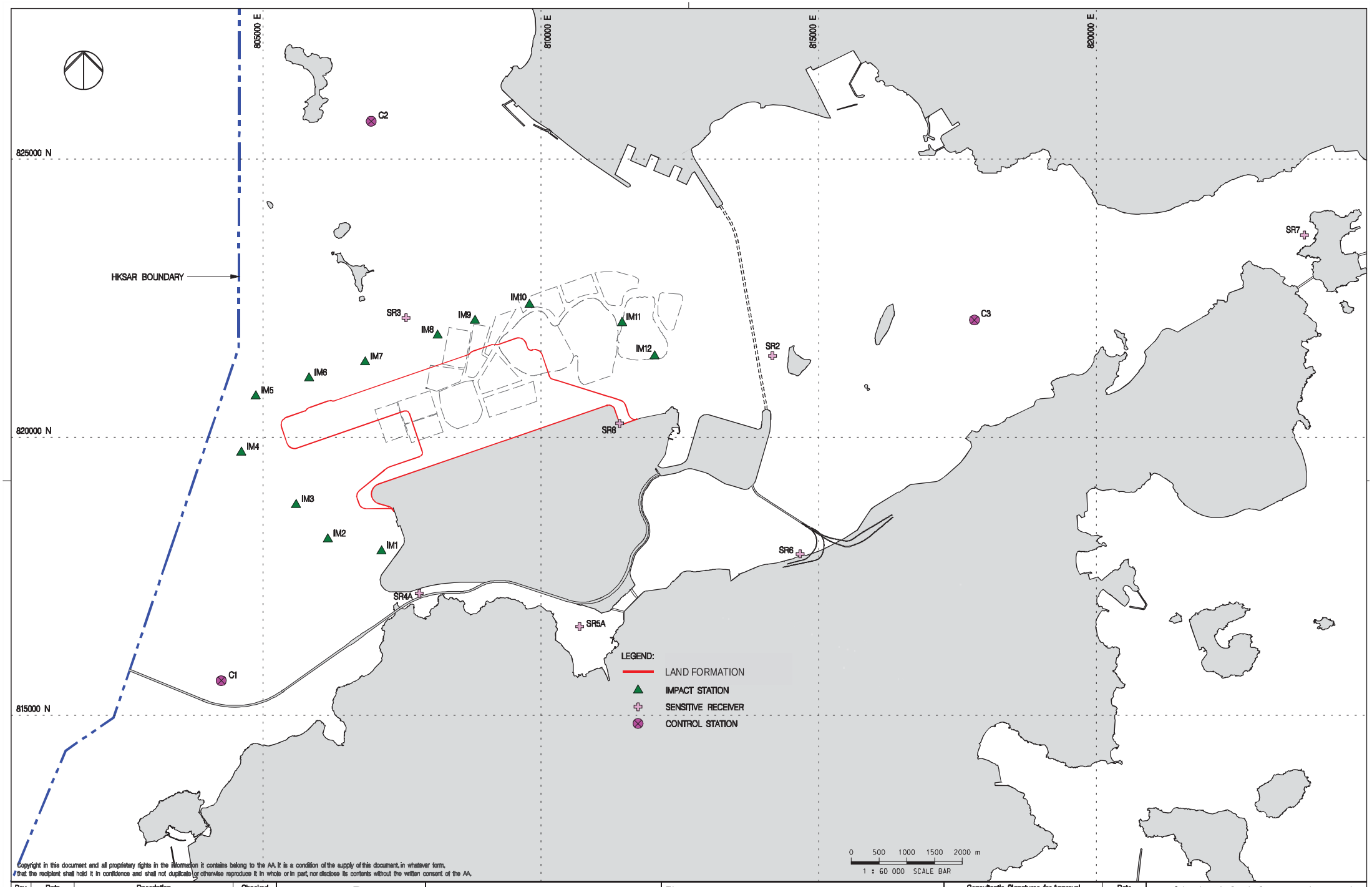
Drawing No.

FIGURE 2.2a

Scale at A3 1 : 60000

Rev. D

Filename: J:\355482\REPORT\ENV\EMA\170802\FIG 3.1.dgn



Rev.	Date	Description	Checked
A	25MAY17	FIRST ISSUE	HY
B	07AUG17	GENERAL REVISION	JL
C	25MAY18	GENERAL REVISION	SH

HONG KONG INTERNATIONAL AIRPORT

MOTT MACDONALD

Title

UPDATED WATER QUALITY MONITORING STATIONS (SINCE 12 MAY 2018)

Consultant's Signatures for Approval		Date
Design	DC	25MAY18
Checkers	DC / TK	25MAY18
Approver	EC	25MAY18

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

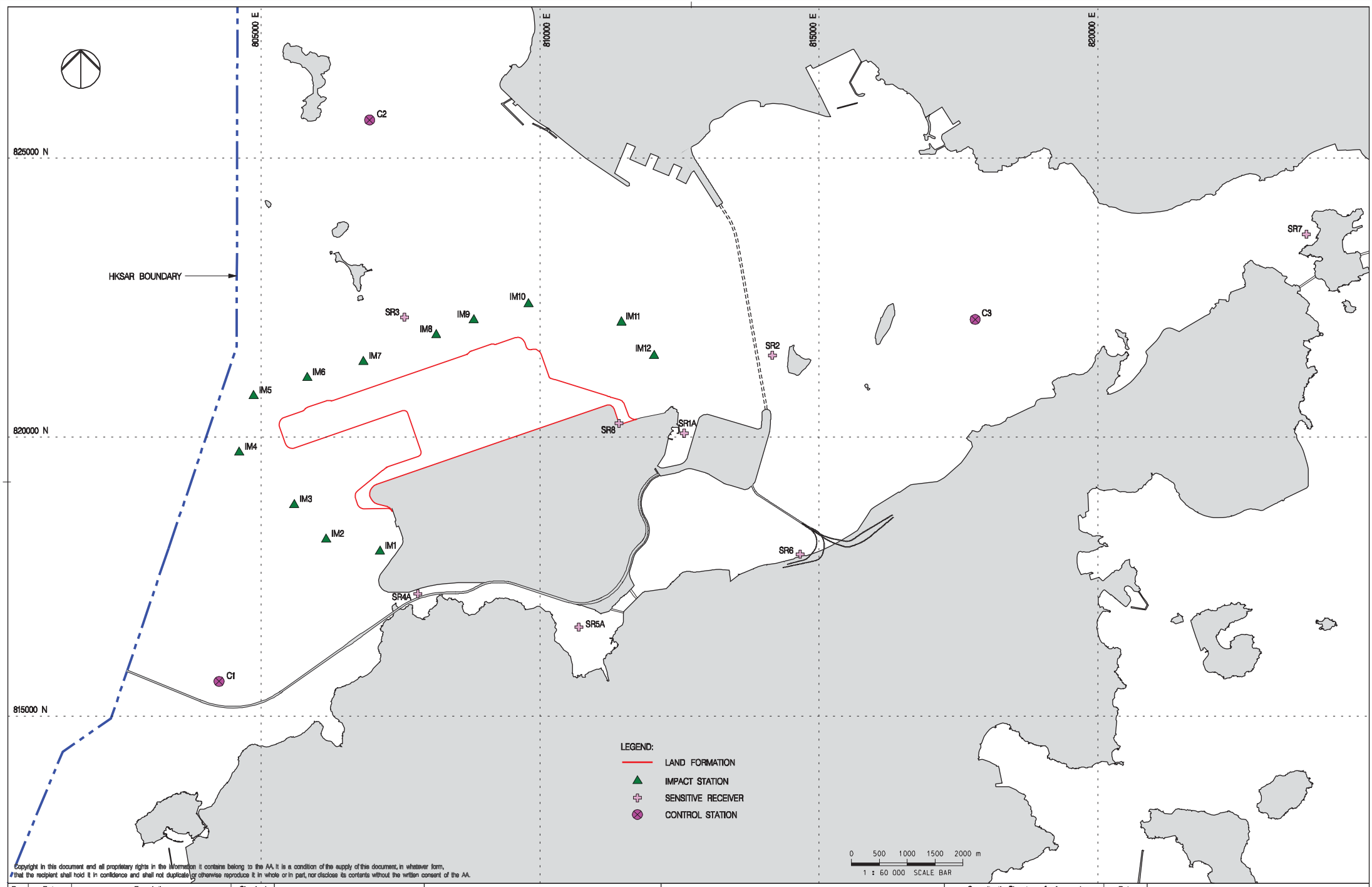
Drawing No.

FIGURE 2.2b

Scale at A3: 1 : 60000

Rev. C

Filename: J:\355482\SKETCH\SK019\SK019_C.dgn



Rev.	Date	Description	Checked
A	25MAY17	FIRST ISSUE	HY
B	07AUG17	GENERAL REVISION	JL
C	25MAY18	GENERAL REVISION	SH
D	29OCT18	GENERAL REVISION	SH

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

MOTT MACDONALD

Title

UPDATED WATER QUALITY MONITORING STATIONS (SINCE 25 OCTOBER 2018)

Consultant's Signatures for Approval		Date
Design	DC	29OCT18
Checkers	DC / TK	29OCT18
Approver	EC	29OCT18

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

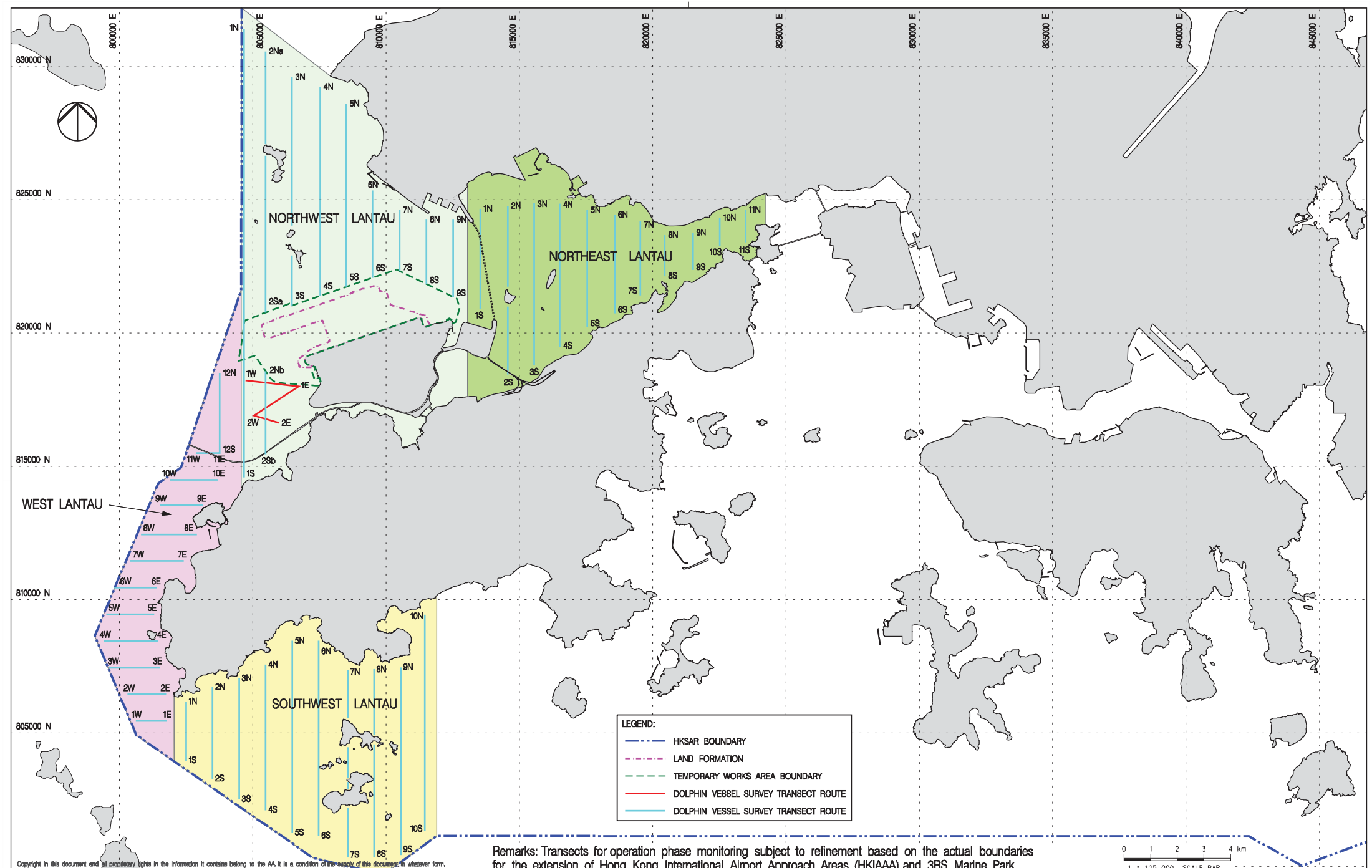
Drawing No.

FIGURE 2.2c

Scale at A3: 1 : 60000

Rev. D

Filename: J:\355482\REPORT\ENV\EMA\181029\FIG 2.2.dgn



Remarks: Transects for operation phase monitoring subject to refinement based on the actual boundaries for the extension of Hong Kong International Airport Approach Areas (HKIAAA) and 3RS Marine Park

Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	JC
B	27JUL16	GENERAL REVISION	JT
C	06FEB17	GENERAL REVISION	JT
D	01MAR17	GENERAL REVISION	JT
E	29OCT18	GENERAL REVISION	SH

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

MOTT MACDONALD

Title

VESSEL BASED DOLPHIN MONITORING TRANSECTS IN CONSTRUCTION, POST-CONSTRUCTION AND OPERATION PHASES

Consultant's Signatures for Approval		Date
Design	JC	29OCT18
Checkers	JC / TK	29OCT18
Approver	EC	29OCT18

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

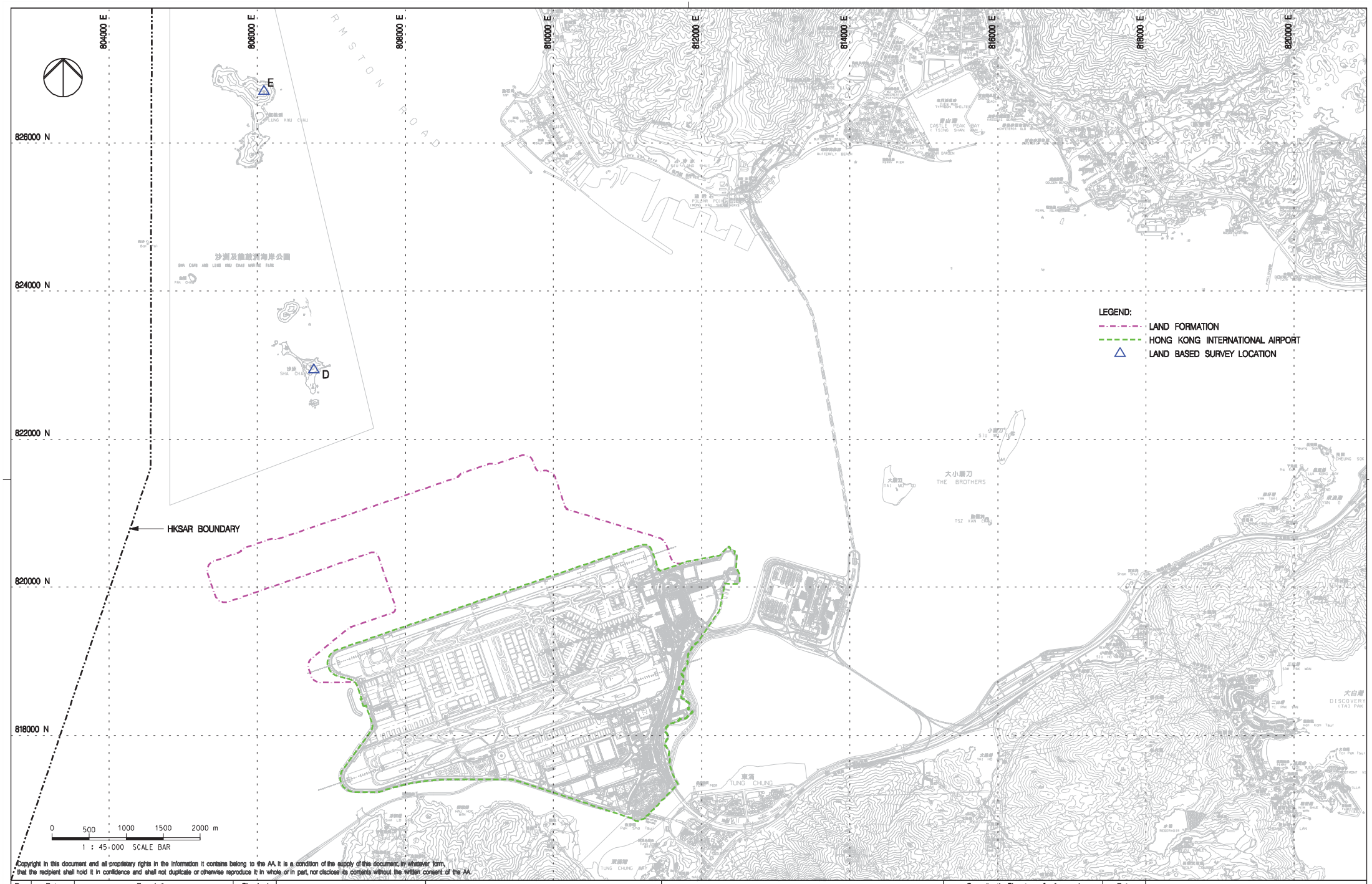
Drawing No.

FIGURE 2.3

Scale at A3 1 : 125000

Rev. E

Filename: J:\355482\REPORT\ENV\EMA\181029\FIG 2.4.dgn



Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	JC
B	08FEB17	GENERAL REVISION	JC
C	29OCT18	GENERAL REVISION	SH

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

MOTT MACDONALD

Title

LAND BASED DOLPHIN MONITORING IN BASELINE AND CONSTRUCTION PHASES

Consultant's Signatures for Approval		Date
Design	JC	29OCT18
Checkers	JC / TK	29OCT18
Approver	EC	29OCT18

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

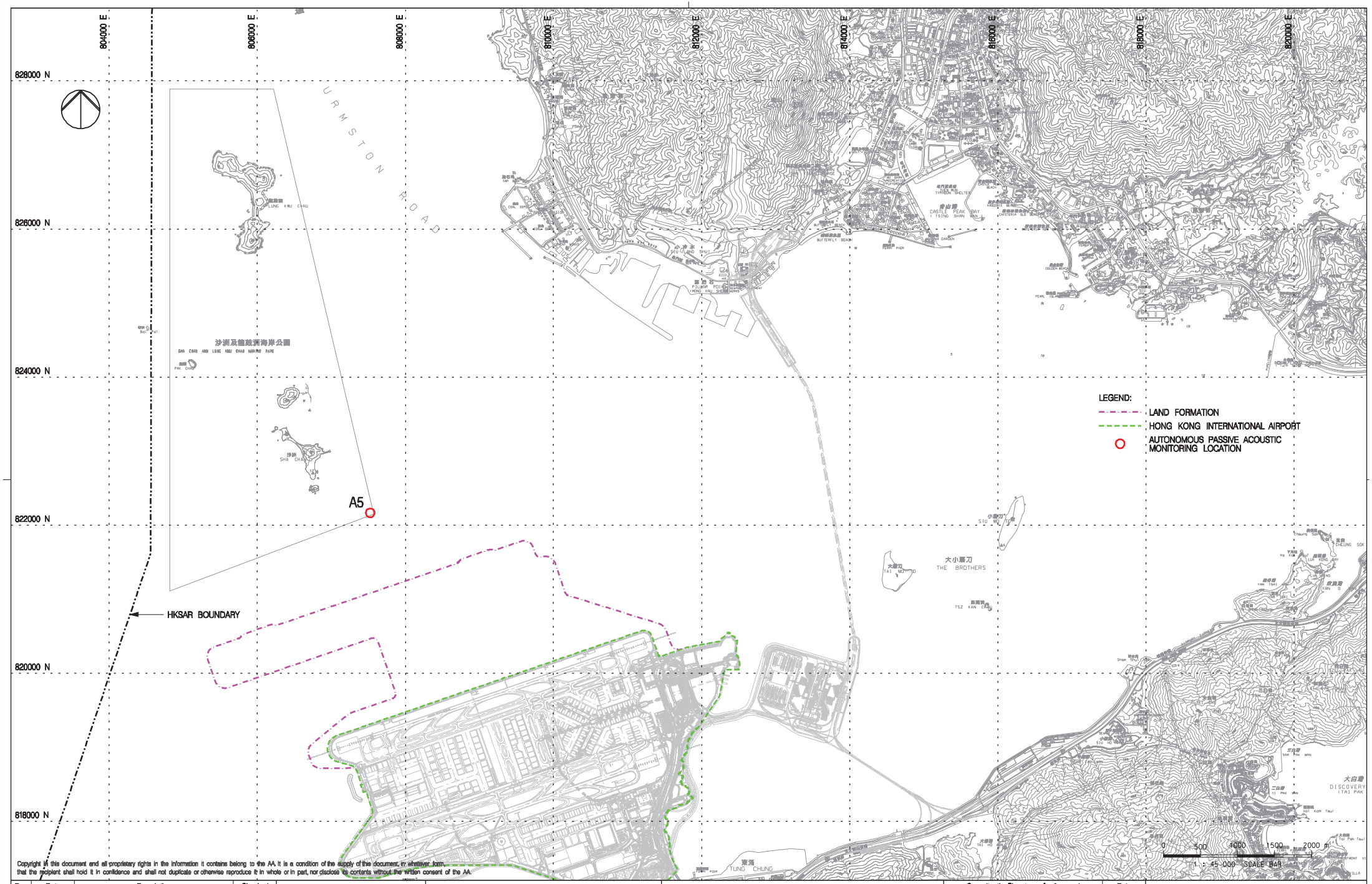
Drawing No.

FIGURE 2.4

Scale at A3 1 : 45000

Rev. C

Filename: J:\355482\REPORT\ENV\EMA\181029\FIG 2.5.dgn



Rev.	Date	Description	Checked
A	29AUG17	FIRST ISSUE	JT
B	10OCT17	GENERAL REVISION	PL
C	29OCT18	GENERAL REVISION	SH

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

MOTT MACDONALD

Title

LOCATION FOR AUTONOMOUS PASSIVE ACOUSTIC MONITORING

Consultant's Signatures for Approval		Date
Design	JC	29OCT18
Checkers	JC / TK	29OCT18
Approver	EC	29OCT18

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No.

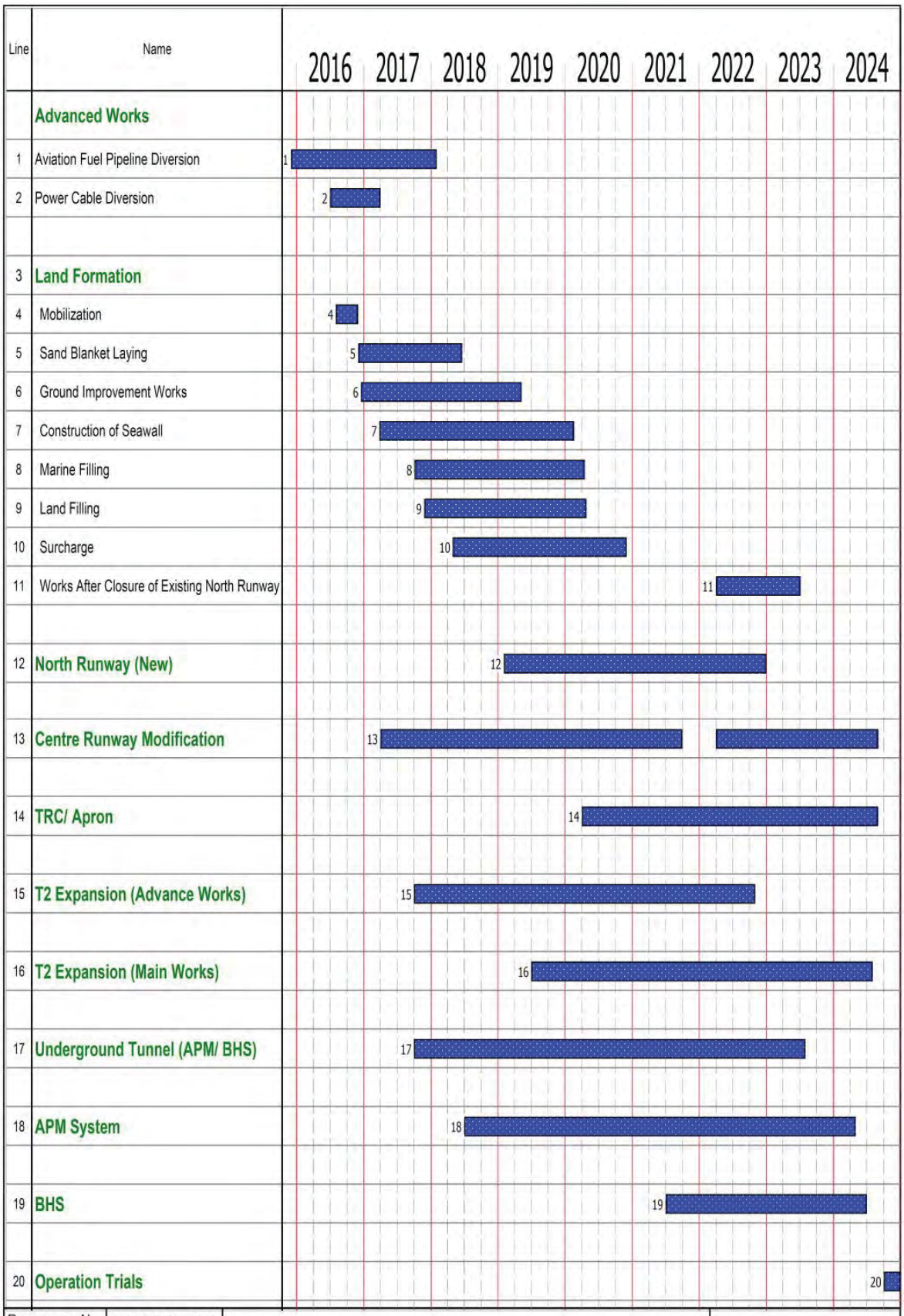
FIGURE 2.5

Scale at A3 1 : 45000

Rev. C

Filename: J:\355482\REPORT\ENV\EMA\181029\FIG 2.11.dgn

Appendix A. Construction Programme and Contract Description



Programme No.	3-AAP-EPP-0-A0
Revision/Date	'A'/(12-Jul-16)
Prepared	VT
Checked	PY

3RS Phasing Programme

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

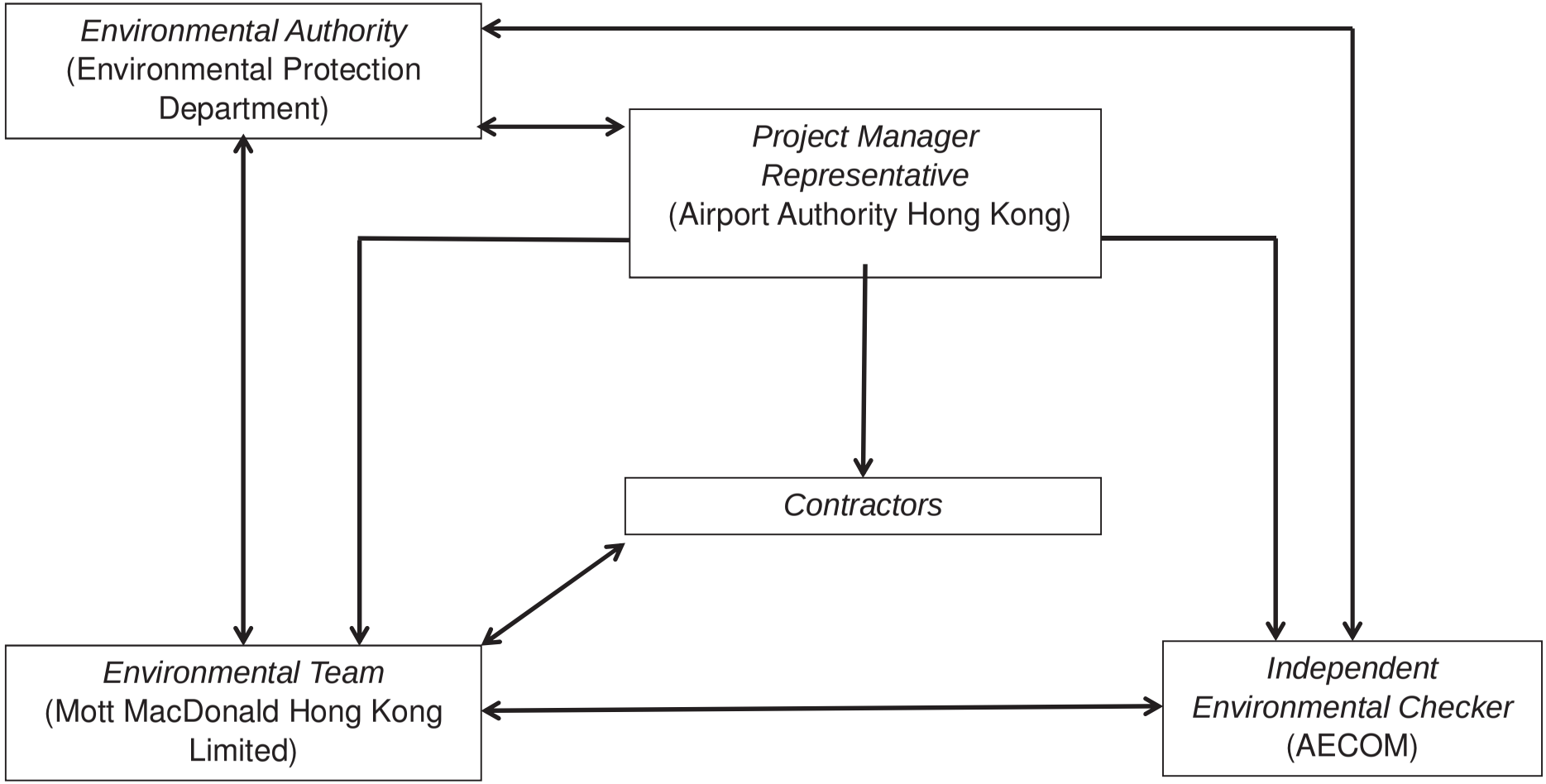
Contract Description

Contract No.	Contract Title	Contractor	Key Construction Activities
P560 (R)	Aviation Fuel Pipeline Diversion Works	Langfang Huayuan Mechanical and Electrical Engineering Co., Ltd.	Diversion of the existing submarine aviation fuel pipelines will use a horizontal directional drilling (HDD) method forming two rock drill holes by drilling through bedrock from a launching site located at the west of the airport island to a daylighting point adjacent to the offshore receiving platform at Sha Chau. Two new pipelines will be installed through the drilled tunnels. The total length is approximately 5 km. Drilling works will proceed from the HDD launching site at the airport island.
3201	Deep Cement Mixing (Package 1)	Penta-Ocean-China State-Dong-Ah Joint Venture	The works covered by the Contract 3201, 3202, 3203, 3204 and 3205 comprise ground improvement of seabed using Deep Cement Mixing (DCM) method, the major construction activities including without limitation the following • Geophysical surveys; • Supply and placing of geotextile and sand blanket under seawalls; • Supply, maintenance, installation and removal of silt curtain systems; • Preliminary construction trails; • Supply and installation of DCM clusters within the works areas; and • Coring, sampling and testing of DCM treated soils and reporting works.
3202	Deep Cement Mixing (Package 2)	Samsung-BuildKing Joint Venture	
3203	Deep Cement Mixing (Package 3)	Sambo E&C Co.,Ltd	
3204	Deep Cement Mixing (Package 4)	CRBC-SAMBO Joint Venture	
3205	Deep Cement Mixing (Package 5)	Bachy Soletanche- Sambo Joint Venture	
3206	Reclamation Contract	ZHEC-CCCC-CDC Joint Venture	The works covered by the Contract 3206 comprise the formation of approximately 650 hectares of land north of the existing airport island for the project, the major construction activities including without limitation the following • Site clearance and demolition; • Geotechnical and ground improvement works;

Contract No.	Contract Title	Contractor	Key Construction Activities
			• Seawall construction; • Marine and land filling works; and • Civil works.
3301	North Runway Crossover Taxiway	FJT-CHEC-ZHEC Joint Venture	The works covered by the Contract 3301 comprise the construction of a new dual taxiway across the existing north runway and utility services and cable ducting systems. The major construction activities include without limitation the following: • Construction of a new dual taxiway; • Cable ducting works; • Extension of existing portable water supply system; and • All associated works.
3501	Antenna Farm and Sewage Pumping Station	Build King Construction Limited	The works covered by the Contract 3501 comprise the construction of antenna farm and sewage pumping station. The major construction activities include without limitation the following: • Civil and structural engineering works; • Building services works; • Architectural builder's works and finishes; • Trenchless excavation for sewage rising mains; and • All associated works.
3502	Terminal 2 APM Depot Modification Works	Build King Construction Limited	The works covered by the Contract 3502 comprise the modification of the existing Automatic People Mover (APM) Depot in the basement of T2, for the APM line running between T1 East Hall, West Hall and Midfield Concourse. The major construction activities include without limitation the following: • Removal of the existing steel guide rails; • Removal of the existing mass concrete fill and re-construction of the reinforced concrete fill; • Construction of separation walls and walkways; • Removal of re-provision of existing building services and airport systems; and • All associated testing and commissioning works.

Contract No.	Contract Title	Contractor	Key Construction Activities
3503	Terminal 2 Foundation and Substructure Works	Leighton - Chun Wo Joint Venture	The works covered by the Contract 3503 comprise the foundations for the new T2 terminal, two annex buildings and associated viaducts, construction of the new T2 basement and south annex building structures, diaphragm walls, utility services and other advance works. The major construction activities include without limitation the following: • Re-configuration and demolition of existing utilities and structures; • Pile foundations for the expanded T2 Terminal Building, South Annex Building, and North Annex Building; • Construction of new South Annex Building; • Diversion and provisions of utilities; and • All associated testing and commissioning works.
3505	Terminal 2 Spectrum Lighting Mock-ups	Union Contractors Ltd.	The works covered by the Contract 3505 comprise the design, supply, manufacture, delivery, and installation of the Spectrum Lighting Mock-ups to demonstrate the lighting effects on various interior elements of the new Terminal 2.
3602	Existing APM System Modification Works	Niigata Transys Co., Ltd.	The works covered by the Contract 3602 comprise the detailed design, supply, manufacture, fabrication, implementation, testing and commissioning of the following modification works of the existing APM systems: • Modification of existing APM depot and APM cars; • Modification of existing T1 & T2 tunnels; and • Preparation of new APM depot.
3603	3RS Baggage Handling System	VISH Consortium	The works covered by the Contract 3603 comprise the design, supply, manufacture, delivery, installation, testing and commissioning of the high-speed baggage handling system.
3801	APM and BHS Tunnels on Existing Airport Island	China State Construction Engineering (HK) Ltd.	The works covered by the Contract 3801 comprise the construction of the APM and Baggage Handling System (BHS) tunnels on existing airport island. The major construction activities include without limitation the following: • Construction of APM and BHS tunnels; • Construction of ventilation building and associated infrastructure; and • Construction, testing and commissioning of sewerage pumping station; and • Civil and structural engineering works.

Appendix B. Project Organization Chart


Environmental Authority
(Environmental Protection Department)
Project Manager Representative
(Airport Authority Hong Kong)
Contractors
Environmental Team
(Mott MacDonald Hong Kong Limited)
Independent Environmental Checker
(AECOM)

Appendix C. Environmental Mitigation Implementation Schedule (EMIS) for Construction Phase

Appendix C Environmental Mitigation Implementation Schedule (EMIS) for Construction Phase

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Air Quality Impact – Construction Phase		
5.2.6.2	2.1	-	**Dust Control Measures** ▪ Water spraying for 12 times a day or once every two hours for 24-hour working at all active works area.	Within construction site / Duration of the construction phase	I
5.2.6.3	2.1	-	▪ Covering of at least 80% of the stockpiling area by impervious sheets. Water spraying of all dusty materials immediately prior to any loading transfer operation so as to keep the dusty material wet during material handling.	Within construction site / Duration of the construction phase	I
5.2.6.4	2.1	-	Dust control practices as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted. These practices include: Good Site Management ▪ Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.	Within construction site / Duration of the construction phase	I
			Disturbed Parts of the Roads ▪ Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or ▪ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.	Within construction site / Duration of the construction phase	I
			Exposed Earth ▪ Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.	Within construction site / Duration of the construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Loading, Unloading or Transfer of Dusty Materials ▪ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.	Within construction site / Duration of the construction phase	I
			Debris Handling ▪ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides; and ▪ Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.	Within construction site / Duration of the construction phase	I
			Transport of Dusty Materials ▪ Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.	Within construction site / Duration of the construction phase	I
			Wheel washing ▪ Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.	Within construction site / Duration of the construction phase	I
			Use of vehicles ▪ The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site; ▪ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels; and ▪ Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.	Within construction site / Duration of the construction phase	I
			Site hoarding ▪ Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.	Within construction site / Duration of the construction phase	I
5.2.6.5	2.1	-	**Best Practices for Concrete Batching Plant** The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Cement Works (Concrete Batching Plant) BPM 3/2 as well as in the future Specified Process licence should be adopted. The best practices are recommended to be applied to both the land based and floating concrete batching plants. Best practices include: Cement and other dusty materials	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ The loading, unloading, handling, transfer or storage of cement, pulverised fuel ash (PFA) and/or other equally dusty materials shall be carried in a totally enclosed system acceptable to EPD. All dust-laden air or waste gas generated by the process operations shall be properly extracted and vented to fabric filtering system to meet the required emission limit; ▪ Cement, PFA and/or other equally dusty materials shall be stored in storage silo fitted with audible high level alarms to warn of over-filling. The high-level alarm indicators shall be interlocked with the material filling line such that in the event of the silo approaching an overfilling condition, an audible alarm will operate, and after 1 minute or less the material filling line will be closed; ▪ Vents of all silos shall be fitted with fabric filtering system to meet the required emission limit; ▪ Vents of cement/PFA weighing scale shall be fitted with fabric filtering system to meet the required emission limit; and ▪ Seating of pressure relief valves of all silos shall be checked, and the valves re-seated if necessary, before each delivery.		
			Other raw materials ▪ The loading, unloading, handling, transfer or storage of other raw materials which may generate airborne dust emissions such as crushed rock, sand, stone aggregate, shall be carried out in such a manner to prevent or minimize dust emissions; ▪ The materials shall be adequately wetted prior to and during the loading, unloading and handling operations. Manual or automatic water spraying system shall be provided at all unloading areas, stock piles and material discharge points; ▪ All receiving hoppers for unloading relevant materials shall be enclosed on three sides up to 3 m above the unloading point. In no case shall these hoppers be used as the material storage devices; ▪ The belt conveyor for handling materials shall be enclosed on top and two sides with a metal board at the bottom to eliminate any dust emission due to wind-whipping effect. Other type of enclosure will also be accepted by EPD if it can be demonstrated that the proposed enclosure can achieve same performance; ▪ All conveyor transfer points shall be totally enclosed. Openings for the passage of conveyors shall be fitted with adequate flexible seals; ▪ Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface; ▪ Conveyors discharged to stockpiles of relevant materials shall be arranged to minimize free fall as far as practicable. All free falling transfer points from conveyors to stockpiles shall be enclosed with chute(s) and water sprayed; ▪ Aggregates with a nominal size less than or equal to 5 mm should be stored in totally enclosed structure such as storage bin and should not be handled in open area. Where there is sufficient buffer area surrounding the concrete batching plant, ground stockpiling may be used;	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ The stockpile shall be enclosed at least on top and three sides and with flexible curtain to cover the entrance side; ▪ Aggregates with a nominal size greater than 5 mm should preferably be stored in a totally enclosed structure. If open stockpiling is used, the stockpile shall be enclosed on three sides with the enclosure wall sufficiently higher than the top of the stockpile to prevent wind whipping; and ▪ The opening between the storage bin and weighing scale of the materials shall be fully enclosed.		
			Loading of materials for batching ▪ Concrete truck shall be loaded in such a way as to minimise airborne dust emissions. The following control measures shall be implemented: (a) Pre-mixing the materials in a totally enclosed concrete mixer before loading the materials into the concrete truck is recommended. All dust-laden air generated by the pre-mixing process as well as the loading process shall be totally vented to fabric filtering system to meet the required emission limit; and (b) If truck mixing batching or other types of batching method is used, effective dust control measures acceptable to EPD shall be adopted. The dust control measures must have been demonstrated to EPD that they are capable to collect and vent all dust-laden air generated by the material loading/mixing to dust arrestment plant to meet the required emission limit. ▪ The loading bay shall be totally enclosed during the loading process.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Vehicles ▪ All practicable measures shall be taken to prevent or minimize the dust emission caused by vehicle movement; and ▪ All access and route roads within the premises shall be paved and adequately wetted.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Housekeeping ▪ A high standard of housekeeping shall be maintained. All spillages or deposits of materials on ground, support structures or roofs shall be cleaned up promptly by a cleaning method acceptable to EPD. Any dumping of materials at open area shall be prohibited.	Within Concrete Batching Plant / Duration of the construction phase	N/A
5.2.6.6	2.1	-	**Best Practices for Asphaltic Concrete Plant** The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Tar and Bitumen Works (Asphaltic Concrete Plant) BPM 15 (94) as well as in the future Specified Process licence should be adopted. These include: Design of Chimney ▪ The chimney shall not be less than 3 metres plus the building height or 8 metres above ground level, whichever is the greater; ▪ The efflux velocity of gases from the main chimney shall not be less than 12 m/s at full load condition;	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ The flue gas exit temperature shall not be less than the acid dew point; and ▪ Release of the chimney shall be directed vertically upwards and not be restricted or deflected.		
			Cold feed side ▪ The aggregates with a nominal size less than or equal to 5 mm shall be stored in totally enclosed structure such as storage bin and shall not be handled in open area; ▪ Where there is sufficient buffer area surrounding the plant, ground stockpiling may be used. The stockpile shall be enclosed at least on top and three sides and with flexible curtain to cover the entrance side. If these aggregates are stored above the feeding hopper, they shall be enclosed at least on top and three sides and be wetted on the surface to prevent wind-whipping; ▪ The aggregates with a nominal size greater than 5 mm should preferably be stored in totally enclosed structure. Aggregates stockpile that is above the feeding hopper shall be enclosed at least on top and three sides. If open stockpiling is used, the stockpiles shall be enclosed on three sides with the enclosure wall sufficiently higher than the top of the stockpile to prevent wind whipping; ▪ Belt conveyors shall be enclosed on top and two sides and provided with a metal board at the bottom to eliminate any dust emission due to the wind-whipping effect. Other type of enclosure will also be accepted by EPD if it can be demonstrated that the proposed enclosure can be achieve the same performance; ▪ Scrapers shall be provided at the turning points of all belt conveyors inside the chute of the transfer points to remove dust adhered to the belt surface; ▪ All conveyor transfer points shall be totally enclosed. Openings for the passages of conveyors shall be fitted with adequate flexible seals; and ▪ All materials returned from dust collection system shall be transferred in enclosed system and shall be stored inside bins or enclosures.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Hot feed side ▪ The inlet and outlet of the rotary dryer shall be enclosed and ducted to a dust extraction and collection system such as a fabric filter. The particulate and gaseous concentration at the exhaust outlet of the dust collector shall not exceed the required limiting values; ▪ The bucket elevator shall be totally enclosed and the air be extracted and ducted to a dust collection system to meet the required particulates limiting value; ▪ All vibratory screens shall be totally enclosed and dust tight with close-fitted access inspection opening. Gaskets shall be installed to seal off any cracks and edges of any inspection openings; ▪ Chutes for carrying hot material shall be rigid and preferably fitted with abrasion resistant plate inside. They shall be inspected daily for leakages;	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ All hot bins shall be totally enclosed and dust tight with close-fitted access inspection opening. Gaskets shall be installed to seal off any cracks and edges of any inspection openings. The air shall be extracted and ducted to a dust collection system to meet the required particulates limiting value; and ▪ Appropriate control measures shall be adopted in order to meet the required bitumen emission limit as well as the ambient odour level (2 odour units).		
			Material transportation ▪ The loading, unloading, handling, transfer or storage of other raw materials which may generate airborne dust emissions such as crushed rocks, sands, stone aggregates, reject fines, shall be carried out in such a manner as to minimize dust emissions; ▪ Roadways from the entrance of the plant to the product loading points and/or any other working areas where there are regular movements of vehicles shall be paved or hard surfaced; and ▪ Haul roads inside the Works shall be adequately wetted with water and/or chemical suppressants by water trucks or water sprayers.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Control of emissions from bitumen decanting ▪ The heating temperature of the particular bitumen type and grade shall not exceed the corresponding temperature limit of the same type listed in Appendix 1 of the Guidance Note; ▪ Tamper-free high temperature cut-off device shall be provided to shut off the fuel supply or electricity in case the upper limit for bitumen temperature is reached; ▪ Proper chimney for the discharge of bitumen fumes shall be provided at high level; ▪ The emission of bitumen fumes shall not exceed the required emission limit; and The air-to-fuel ratio shall be properly controlled to allow complete combustion of the fuel. The fuel burners, if any, shall be maintained properly and free from carbon deposits in the burner nozzles.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Liquid fuel ▪ The receipt, handling and storage of liquid fuel shall be carried out so as to prevent the release of emissions of organic vapours and/or other noxious and offensive emissions to the air.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Housekeeping ▪ A high standard of housekeeping shall be maintained. Waste material, spillage and scattered piles gathered beneath belt conveyors, inside and around enclosures shall be cleared frequently. The minimum clearing frequency is on a weekly basis.	Within Concrete Batching Plant / Duration of the construction phase	N/A
5.2.6.7	2.1	-	**Best Practices for Rock Crushing Plants** The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Mineral Works (Stone Crushing Plant) BPM 11/1 (95) as well as in the future Specified Process licence should be adopted. These include:	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Crushers ▪ The outlet of all primary crushers, and both inlet and outlet of all secondary and tertiary crushers, if not installed inside a reasonably dust tight housing, shall be enclosed and ducted to a dust extraction and collection system such as a fabric filter; ▪ The inlet hopper of the primary crushers shall be enclosed on top and 3 sides to contain the emissions during dumping of rocks from trucks. The rock while still on the trucks shall be wetted before dumping; ▪ Water sprayers shall be installed and operated in strategic locations at the feeding inlet of crushers; and ▪ Crusher enclosures shall be rigid and be fitted with self-closing doors and close-fitting entrances and exits. Where conveyors pass through the crusher enclosures, flexible covers shall be installed at entries and exits of the conveyors to the enclosure.		
			Vibratory screens and grizzlies ▪ All vibratory screens shall be totally enclosed in a housing. Screenhouses shall be rigid and reasonably dust tight with self-closing doors or close-fitted entrances and exits for access. Where conveyors pass through the screenhouse, flexible covers shall be installed at entries and exits of the conveyors to the housing. Where containment of dust within the screenhouse structure is not successful then a dust extraction and collection system shall be provided; and ▪ All grizzlies shall be enclosed on top and 3 sides and sufficient water sprayers shall be installed at their feeding and outlet areas.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Belt conveyors ▪ Except for those conveyors which are placed within a totally enclosed structure such as a screenhouse or those erected at the ground level, all conveyors shall be totally enclosed with windshield on top and 2 sides; ▪ Effective belt scraper such as the pre-cleaner blades made by hard wearing materials and provided with pneumatic tensioner, or equivalent device, shall be installed at the head pulley of designated conveyor as required to dislodge fine dust particles that may adhere to the belt surface and to reduce carry-back of fine materials on the return belt. Bottom plates shall also be provided for the conveyor unless it has been demonstrated that the corresponding belt scraper is effective and well maintained to prevent falling material from the return belt; and ▪ Except for those transfer points which are placed within a totally enclosed structure such as a screenhouse, all transfer points to and from conveyors shall be enclosed. Where containment of dust within the enclosure is not successful, then water sprayers shall be provided. Openings for any enclosed structure for the passage of conveyors shall be fitted with flexible seals.	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Storage piles and bins ▪ Where practicable, free falling transfer points from conveyors to stockpiles shall be fitted with flexible curtains or be enclosed with chutes designed to minimize the drop height. Water sprays shall also be used where required. ▪ The surface of all surge piles and stockpiles of blasted rocks or aggregates shall be kept sufficiently wet by water spraying wherever practicable; ▪ All open stockpiles for aggregates of size in excess of 5 mm shall be kept sufficiently wet by water spraying where practicable; or ▪ The stockpiles of aggregates 5 mm in size or less shall be enclosed on 3 sides or suitably located to minimize wind-whipping. Save for fluctuations in stock or production, the average stockpile shall stay within the enclosure walls and in no case the height of the stockpile shall exceed twice the height of the enclosure walls. ▪ Scattered piles gathered beneath belt conveyors, inside and around enclosures shall be cleared regularly.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Rock drilling equipment ▪ Appropriate dust control equipment such as a dust extraction and collection system shall be used during rock drilling activities.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Hazard to Human Life – Construction Phase		
Table 6.40	3.2	-	▪ Precautionary measures should be established to request barges to move away during typhoons.	Construction Site / Construction Period	I
Table 6.40	3.2	-	▪ An appropriate marine traffic management system should be established to minimize risk of ship collision.	Construction Site / Construction Period	I
Table 6.40	3.2	-	▪ Location of all existing hydrant networks should be clearly identified prior to any construction works.	Construction Site / Construction Period	I
			Noise Impact – Construction Phase		
7.5.6	4.3	-	**Good Site Practice** Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during each phase of construction: ▪ only well-maintained plant to be operated on-site and plant should be serviced regularly during the construction works; ▪ machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum;	Within the Project site / During construction phase / Prior to commencement of operation	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs; ▪ mobile plant should be sited as far away from NSRs as possible; and ▪ material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities.		
7.5.6	4.3	-	**Adoption of QPME** ▪ QPME should be adopted as far as applicable.	Within the Project site / During construction phase / Prior to commencement of operation	I
7.5.6	4.3	-	**Use of Movable Noise Barriers** ▪ Movable noise barriers should be placed along the active works area and mobile plants to block the direct line of sight between PME and the NSRs.	Within the Project site / During construction phase / Prior to commencement of operation	I
7.5.6	4.3	-	**Use of Noise Enclosure/ Acoustic Shed** ▪ Noise enclosure or acoustic shed should be used to cover stationary PME such as air compressor and generator.	Within the Project site / During construction phase / Prior to commencement of operation	I
			Water Quality Impact – Construction Phase		

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
8.8.1.2 and 8.8.1.3	5.1	2.26	**Marine Construction Activities** <u>General Measures to be Applied to All Works Areas</u> ▪ Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation; ▪ Use of Lean Material Overboard (LMOB) systems shall be prohibited; ▪ Excess materials shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessels are moved; ▪ Plants should not be operated with leaking pipes and any pipe leakages shall be repaired quickly; ▪ Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action; ▪ 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; ▪ 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; and ▪ For ground improvement activities including DCM, the wash water from cleaning of the drilling shaft should be appropriately treated before discharge. The Contractor should ensure the waste water meets the WPCO/TM requirements before discharge. No direct discharge of contaminated water is permitted.	Within construction site / Duration of the construction phase	I
			<u>Specific Measures to be Applied to All Works Areas</u> ▪ The daily maximum production rates shall not exceed those assumed in the water quality assessment in the EIA report; ▪ A maximum of 10 % fines content to be adopted for sand blanket and 20 % fines content for marine filling below +2.5 mPD prior to substantial completion of seawall (until end of Year 2017) shall be specified in the works contract document;	Within construction site / Duration of the construction phase	I
			▪ An advance seawall of at least 200m to be constructed (comprising either rows of contiguous permanent steel cells completed above high tide mark or partially completed seawalls with rock core to high tide mark and filter layer on the inner side) prior to commencement of marine filling activities;		I
			▪ Closed grab dredger shall be used to excavate marine sediment; ▪ Silt curtains surrounding the closed grab dredger shall be deployed in accordance with the Silt Curtain Deployment Plan; and		N/A *(The arrangement of silt curtain has been modified. The details can be referred to Silt Curtain Deployment Plan)
			▪ The Silt Curtain Deployment Plan shall be implemented.		I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Specific Measures to be Applied to Land Formation Activities prior to Commencement of Marine Filling Works ▪ Double layer 'Type III' silt curtains to be applied around the active eastern works areas prior to commencement of sand blanket laying activities. The silt curtains shall be configured to minimise SS release during ebb tides. A silt curtain efficiency test shall be conducted to validate the performance of the silt curtains;	Within construction site / Duration of the construction phase	NA *(The arrangement of silt curtain has been modified. The details can be referred to Silt Curtain Deployment Plan)
			▪ Double layer silt curtains to enclose WSRs C7a and silt screens installed at the intake points for both WSR C7a and C8 prior to commencement of construction; and		For C7a, I For C8, I *(The requirement of silt curtain / screen has been modified. The details can be referred to Silt Curtain Deployment Plan)
			▪ The silt curtains and silt screens should be regularly checked and maintained.		I
			Specific Measures to be Applied to Land Formation Activities during Marine Filling Works ▪ Double layer 'Type II' or 'Type III' silt curtains to be applied around the eastern openings between partially completed seawalls prior to commencement of marine filling activities. The silt curtains shall be configured to minimise SS release during ebb tides;	Within construction site / Duration of the construction phase	I *(The arrangement of silt curtain has been modified. The details can be referred to Silt Curtain Deployment Plan)
			▪ Double layer silt curtains to be applied at the south-western opening prior to commencement of marine filling activities;		N/A *(The arrangement of silt curtain has been modified. The details can be referred to Silt Curtain Deployment Plan)
			▪ Double layer silt curtain to enclose WSR C7a and silt screens installed at the intake points for both WSR C7a and C8 prior to commencement of marine filling activities; and		N/A *(The requirement of silt curtain / screen has been modified. The details can be referred to Silt Curtain Deployment Plan)
			▪ The silt curtains and silt screens should be regularly checked and maintained.		I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Specific Measures to be Applied to the Field Joint Excavation Works for the Submarine Cable Diversion ▪ Only closed grabs designed and maintained to avoid spillage shall be used and should seal tightly when operated. Excavated materials shall be disposed at designated marine disposal area in accordance with the Dumping at Sea Ordinance (DASO) permit conditions; and ▪ Silt curtains surrounding the closed grab dredger to be deployed as a precautionary measure.	Within construction site / Duration of the construction phase	N/A
8.8.1.4	5.1	-	**Modification of the Existing Seawall** ▪ Silt curtains shall be deployed around the seawall modification activities to completely enclose the active works areas, and care should be taken to avoid splashing of rockfill / rock armour into the surrounding marine environment. For the connecting sections with the existing outfalls, works for these connection areas should be undertaken during the dry season in order that individual drainage culvert cells may be isolated for interconnection works.	At the existing northern seawall / Duration of the construction phase	N/A
8.8.1.5	5.1	-	**Construction of New Stormwater Outfalls and Modifications to Existing Outfalls** ▪ During operation of the temporary drainage channel, runoff control measures such as bunding or silt fence shall be provided on both sides of the channel to prevent accumulation and release of SS via the temporary channel. Measures should also be taken to minimise the ingress of site drainage into the culvert excavations.	Within construction site / Duration of the construction phase	N/A
8.8.1.6 8.8.1.7	5.1	2.27	**Piling Activities for Construction of New Runway Approach Lights and HKIAAA Marker Beacons** Silt curtains shall be deployed around the piling activities to completely enclose the piling works and care should be taken to avoid spillage of excavated materials into the surrounding marine environment. For construction of the eastern approach lights at the CMPs ▪ Ground improvement via DCM using a close-spaced layout shall be completed prior to commencement of piling works; ▪ Steel casings shall be installed to enclose the excavation area prior to commencement of excavation; ▪ The excavated materials shall be removed using a closed grab within the steel casings; ▪ No discharge of the cement mixed materials into the marine environment will be allowed; and ▪ Excavated materials shall be treated and reused on-site.	Within construction site / Duration of the construction phase	N/A
8.8.1.8	5.1	-	**Construction of Site Runoff and Drainage** The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended: ▪ Install perimeter cut-off drains to direct off-site water around the site and implement internal drainage, erosion and sedimentation control facilities. Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site	Within construction site / Duration of the construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			drainage system should be undertaken by the Contractors prior to the commencement of construction (for works areas located on the existing Airport island) or as soon as the new land is completed (for works areas located on the new landform);		
			▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM-DSS standards under the WPCO. The design of efficient silt removal facilities should make reference to the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractors prior to the commencement of construction;		I
			▪ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly;		I
			▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities;		I
			▪ In the event that contaminated groundwater is identified at excavation areas, this should be treated on-site using a suitable wastewater treatment process. The effluent should be treated according to the requirements of the TM-DSS standards under the WPCO prior to discharge to foul sewers or collected for proper disposal off-site. No direct discharge of contaminated groundwater is permitted; and		N/A
			▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exits. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. All washwater should be treated according to the requirements of the TM-DSS standards under the WPCO prior to discharge.		I
8.8.1.9	5.1	-	**Sewage Effluent from Construction Workforce** ▪ Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.	Within construction site / During construction phase	I
8.8.1.10 8.8.1.11	5.1		**General Construction Activities** ▪ Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials should be kept covered when not being used; and	Within construction site / During construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.		
8.8.1.12 8.8.1.13	5.1	2.28	**Drilling Activities for the Submarine Aviation Fuel Pipelines** To prevent potential water quality impacts at Sha Chau, the following measures shall be applied: ▪ A 'zero-discharge' policy shall be applied for all activities to be conducted at Sha Chau; ▪ No bulk storage of chemicals shall be permitted; and ▪ A containment pit shall be constructed around the drill holes. This containment pit shall be lined with impermeable lining and bunded on the outside to prevent inflow from off-site areas.	Within construction site / During construction phase	I
			At the airport island side of the drilling works, the following measures shall be applied for treatment of wastewater: ▪ During pipe cleaning, appropriate desilting or sedimentation device should be provided on site for treatment before discharge. The Contractor should ensure discharge water from the sedimentation tank meet the WPCO/TM requirements before discharge; and ▪ Drilling fluid used in drilling activities should be reconditioned and reused as far as possible. Temporary enclosed storage locations should be provided on-site for any unused chemicals that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.	Within construction site / During construction phase	I
			Waste Management Implication – Construction Phase		
10.5.1.1	7.1	-	Opportunities to minimise waste generation and maximise the reuse of waste materials generated by the project have been incorporated where possible into the planning, design and construction stages, and the following measures have been recommended: ▪ The relevant construction methods (particularly for the tunnel works) and construction programme have been carefully planned and developed to minimise the extent of excavation and to maximise the on-site reuse of inert C&D materials generated by the project as far as practicable. Temporary stockpiling areas will also be provided to facilitate on-site reuse of inert C&D materials;	Project Site Area / During design and construction phase	I
			▪ Priority should be given to collect and reuse suitable inert C&D materials generated from other concurrent projects and the Government's PFRF as fill materials for the proposed land formation works;		I
			▪ Only non-dredged ground improvement methods should be adopted in order to completely avoid the need for dredging and disposal of marine sediment for the proposed land formation work;		I
			▪ Excavation work for constructing the APM tunnels, BHS tunnels and airside tunnels will not be down to the CMPs beneath the fill materials in order to avoid excavating any sediments; and		N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ For the marine sediments expected to be excavated from the piling works of TRC, APM & BHS tunnels, airside tunnels and other facilities on the proposed land formation area, piling work of marine sections of the approach lights and HKIAAA beacons, basement works for some of T2 expansion area and excavation works for the proposed APM depot should be treated and reused on-site as backfilling materials, although required treatment level / detail and the specific re-use mode are under development.		N/A
10.5.1.1	7.1	-	The following good site practices should be performed during the construction activities include: ▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; ▪ Training of site personnel in proper waste management and chemical waste handling procedures; ▪ Provision of sufficient waste disposal points and regular collection for disposal; ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks by tarpaulin/ similar material or by transporting wastes in enclosed containers. The cover should be extended over the edges of the sides and tailboards; ▪ Stockpiles of C&D materials should be kept wet or covered by impervious sheets to avoid wind-blown dust; ▪ All dusty materials including C&D materials should be sprayed with water immediately prior to any loading transfer operation so as to keep the dusty material wet during material handling at the barging points/ stockpile areas; ▪ C&D materials to be delivered to and from the project site by barges or by trucks should be kept wet or covered to avoid wind-blown dust; ▪ The speed of the trucks including dump trucks carrying C&D or waste materials within the site should be controlled to about 10 km/hour in order to reduce the adverse dust impact and secure the safe movement around the site; and ▪ To avoid or minimise dust emission during transport of C&D or waste materials within the site, each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials. Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.	Project Site Area / Construction Phase	I
10.5.1.3	7.1	-	The following practices should be performed to achieve waste reduction include: ▪ Use of steel or aluminium formworks and falseworks for temporary works as far as practicable; ▪ Adoption of repetitive design to allow reuse of formworks as far as practicable; ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;	Project Site Area / Construction Phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Encourage collection of aluminium cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force; ▪ Any unused chemicals or those with remaining functional capacity should be collected for reused as far as practicable; ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and ▪ Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.		
10.5.1.5	7.1		▪ Inert and non-inert C&D materials should be handled and stored separately to avoid mixing the two types of materials.	Project Site Area / Construction Phase	I
10.5.1.5	7.1	-	▪ Any recyclable materials should be segregated from the non-inert C&D materials for collection by reputable licensed recyclers whereas the non-recyclable waste materials should be disposed of at the designated landfill site by a reputable licensed waste collector.	Project Site Area / Construction Phase	I
10.5.1.6	7.1	-	▪ A trip-ticket system promulgated shall be developed in order to monitor the off-site delivery of surplus inert C&D materials that could not be reused on-site for the proposed land formation work at the PFRF and to control fly tipping.	Project Site Area / Construction Phase	I
10.5.1.6	7.1	2.32	▪ The Contractor should prepare and implement a Waste Management Plan detailing various waste arising and waste management practices.	Construction Phase	I
10.5.1.16	7.1	-	The following mitigation measures are recommended during excavation and treatment of the sediments: ▪ On-site remediation should be carried out in an enclosed area in order to minimise odour/dust emissions;	Project Site Area / Construction Phase	N/A
			▪ The loading, unloading, handling, transfer or storage of treated and untreated sediment should be carried out in such a manner to prevent or minimise dust emissions;		I
			▪ All practical measures, including but not limited to speed control for vehicles, should be taken to minimise dust emission;		I
			▪ Good housekeeping should be maintained at all times at the sediment treatment facility and storage area;		I
			▪ Treated and untreated sediment should be clearly separated and stored separately; and		N/A
			▪ Surface runoff from the enclosed area should be properly collected and stored separately, and then properly treated to levels in compliance with the relevant effluent standards as required by the Water Pollution Control Ordinance before final discharge.		I
10.5.1.18	7.1	-	The marine sediments to be removed from the cable field joint area would be disposed of at the designated disposal sites to be allocated by the MFC. The following mitigation measures should be strictly	Project Site Area / Construction Phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			followed to minimise potential impacts on water quality during transportation of the sediments requiring Type 1 disposal: ▪ Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material; ▪ Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by EPD; and ▪ Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.		
10.5.1.19	7.1	-	Contractor should register with the EPD as a chemical waste producer and to follow the relevant guidelines. The following measures should be implemented: ▪ Good quality containers compatible with the chemical wastes should be used; ▪ Incompatible chemicals should be stored separately; ▪ Appropriate labels must be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.; and ▪ The contractor will use a licensed collector to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Project Site Area / Construction Phase	I
10.5.1.20	7.1	-	▪ General refuse should be stored in enclosed bins or compaction units separated from inert C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site for disposal at designated landfill sites. An enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Project Site Area / Construction Phase	I
10.5.1.21	7.1	-	▪ The construction contractors will be required to regularly check and clean any refuse trapped or accumulated along the newly constructed seawall. Such refuse will then be stored and disposed of together with the general refuse.	Project Site Area / Construction Phase	N/A
			Land Contamination – Construction Phase		
11.10.1.2 to 11.10.1.3	8.1	2.32	For areas inaccessible during site reconnaissance survey ▪ Further site reconnaissance would be conducted once the areas are accessible in order to identify any land contamination concern for the areas.	Project Site Area inaccessible during site reconnaissance / Prior to Construction Phase	I
			▪ Subject to further site reconnaissance findings, a supplementary Contamination Assessment Plan (CAP) for additional site investigation (SI) (if necessary) may be prepared and submitted to EPD for endorsement prior to the commencement of SI at these areas.		I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ After completion of SI, the Contamination Assessment Report (CAR) will be prepared and submitted to EPD for approval prior to start of the proposed construction works at the golf course, the underground and above-ground fuel storage tank areas, emergency power generation units, airside petrol filling station and fuel tank room.		I *(CAR for golf course)
			▪ Should remediation be required, Remediation Action Plan (RAP) and Remediation Report (RR) will be prepared for EPD's approval prior to commencement of the proposed remediation and any construction works respectively.		N/A
11.8.1.2	8.1	-	If contaminated soil is identified, the following mitigation measures are for the excavation and transportation of contaminated materials (if any): ▪ To minimize the incidents of construction workers coming in contact with any contaminated materials, bulk earth-moving excavation equipment should be employed; ▪ Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when working directly with contaminated material), provision of washing facilities and prohibition of smoking and eating on site; ▪ Stockpiling of contaminated excavated materials on site should be avoided as far as possible; ▪ The use of any contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out; ▪ Vehicles containing any excavated materials should be suitably covered to reduce dust emissions and/or release of contaminated wastewater; ▪ Truck bodies and tailgates should be sealed to prevent any discharge; ▪ Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly tipping; ▪ Speed control for trucks carrying contaminated materials should be exercised. 8km/h is the recommended speed limit; ▪ Strictly observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354) and obtain all necessary permits where required; and ▪ Maintain records of waste generation and disposal quantities and disposal arrangements.	Project Site Area / Construction Phase	N/A
			Terrestrial Ecological – Construction Phase		
12.10.1.1	9.2	2.14	**Pre-construction Egretry Survey** ▪ Conduct ecological survey for Sha Chau egretry to update the latest boundary of the egretry.	Breeding season (April - July) prior to commencement of HDD drilling works at HKIA	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
12.7.2.3 and 12.7.2.6	9.1	2.30	**Avoidance and Minimisation of Direct Impact to Egretry** ▪ The daylighting location will avoid direct encroachment to the Sheung Sha Chau egretry. The daylighting location and mooring of flat top barge, if required, will be kept away from the egretry; ▪ In any event, controls such as demarcation of construction site boundary and confining the lighting within the site will be practised to minimise disturbance to off-site habitat at Sheung Sha Chau Island; and ▪ The containment pit at the daylighting location shall be covered or camouflaged.	During construction phase at Sheung Sha Chau Island	I
12.7.2.5	9.1	2.30	**Preservation of Nesting Vegetation** ▪ The proposed daylighting location and the arrangement of connecting pipeline will avoid the need of tree cutting, therefore the trees that are used by ardeids for nesting will be preserved.	During construction phase at Sheung Sha Chau Island	I
12.7.2.4 and 12.7.2.6	9.1	2.30	**Timing the Pipe Connection Works outside Ardeid's Breeding Season** ▪ All HDD and related construction works on Sheung Sha Chau Island will be scheduled outside the ardeids' breeding season (between April and July). No night-time construction work will be allowed on Sheung Sha Chau Island during all seasons.	During construction phase at Sheung Sha Chau Island	I
12.10.1.1	9.3	-	**Ecological Monitoring** ▪ During the HDD construction works period from August to March, ecological monitoring will be undertaken monthly at the HDD daylighting location on Sheung Sha Chau Island to identify and evaluate any impacts with appropriate actions taken as required to address and minimise any adverse impact found.	at Sheung Sha Chau Island	I
			Marine Ecological Impact – Pre-construction Phase		
13.11.4.1	10.2.2	-	▪ Pre-construction phase Coral Dive Survey.	HKIAAA artificial seawall	I
			Marine Ecological Impact – Construction Phase		
13.11.1.3 to 13.11.1.6	-	-	**Minimisation of Land Formation Area** ▪ Minimise the overall size of the land formation needed for the additional facilities to minimise the overall loss of habitat for marine resources, especially the CWD population.	Land formation footprint / during detailed design phase to completion of construction	I
13.11.1.7 to 13.11.1.10	-	2.31	**Use of Construction Methods with Minimal Risk/Disturbance** ▪ Use of non-dredge method for the main land formation and ancillary works including the diversion of the aviation fuel pipeline to the AFRF;	During construction phase at marine works area	I
			▪ Use of Deep Cement Mixing (DCM) method instead of conventional seabed dredging for the land formation works to reduce the risk of negative impacts through the elevation of suspended solids and contaminants on CWDs, fisheries and the marine environment;		I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway;		N/A
			▪ Avoid bored piling during CWD peak calving season (Mar to Jun);		I
			▪ Prohibition of underwater percussive piling; and		I
			▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of submarine cables and pipelines to minimise the disturbance to the CWDs and other marine ecological resources.		I
13.11.2.1 to 13.11.2.7	-	-	**Mitigation for Indirect Disturbance due to Deterioration of Water Quality** ▪ Water quality mitigation measures during construction phases include consideration of alternative construction methods, deployment of silt curtain and good site practices;	All works area during the construction phase	I
			▪ Alternative construction methods including use of non-dredge methods for ground improvement (e.g. Deep Cement Mixing (DCM), prefabricated vertical drains (PVD), sand compaction piles, steel cells, stone columns and vertical sand drains);		I
			▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway; and		N/A
			Use of horizontal directional drilling (HDD) method and water jetting methods for placement of undersea cables and pipelines to minimise the disturbance to the CWDs and other marine ecological resources.		I
13.11.1.12	-	-	**Strict Enforcement of No-Dumping Policy** ▪ A policy prohibiting dumping of wastes, chemicals, oil, trash, plastic, or any other substance that would potentially be harmful to dolphins and/or their habitat in the work area; ▪ Mandatory educational programme of the no-dumpling policy be made available to all construction site personnel for all project-related works; ▪ Fines for infractions should be implemented; and ▪ Unscheduled, on-site audits shall be implemented.	All works area during the construction phase	I
13.11.1.13	-	-	**Good Construction Site Practices** ▪ Regular inspection of the integrity and effectiveness of all silt curtains and monitoring of effluents to ensure that any discharge meets effluent discharge guidelines; ▪ Keep the number of working or stationary vessels present on-site to the minimum anytime; and ▪ Unscheduled, on-site audits for all good site practice restrictions should be conducted, and fines or penalties sufficient to be an effective deterrent need to be levied against violators.	All works area during the construction phase	I
13.11.1.3 to 13.11.1.6	-	-	**Minimisation of Land Formation Area** ▪ Minimise the overall size of the land formation needed for the additional facilities to minimise the overall loss of habitat for marine resources, especially the CWD population.	Land formation footprint / during detailed design phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
				to completion of construction	
13.11.5.4 to 13.11.5.13	10.3.1	-	**SkyPier High Speed Ferries' Speed Restrictions and Route Diversions** ▪ SkyPier HSFs operating to / from Zhuhai and Macau would divert north of SCLKC Marine Park with a 15 knot speed limit to apply for the part-journeys that cross high CWD abundance grid squares as indicatively shown in **Drawing No. MCL/P132/EIA/13-023** of the EIA Report. Both the alignment of the northerly route and the portion of routings to be subject to the speed limit of 15 knots shall be finalised prior to commencement of construction based on the future review of up-to-date CWD abundance and EM&A data and taking reference to changes in total SkyPier HSF numbers; and ▪ A maximum of 10 knots will be enforced through the designated SCLKC Marine Park area at all times.	Area between the footprint and SCLKC Marine Park during construction phase	I
			Other mitigation measures ▪ The ET will audit various parameters including actual daily numbers of HSFs, compliance with the 15-knot speed limit in the speed control zone and diversion compliance for SkyPier HSFs operating to / from Zhuhai and Macau; and ▪ The effectiveness of the CWD mitigation measures after implementation of initial six month SkyPier HSF diversion and speed restriction will be reviewed.	Area between the footprint and SCLKC Marine Park during construction phase	I
13.11.5.14 to 13.11.5.18	10.3.1	2.31	**Dolphin Exclusion Zone** ▪ Establishment of a 24 hr Dolphin Exclusion Zone (DEZ) with a 250 m radius around the land formation works areas;	Marine waters around land formation works area during construction phase	I
			▪ A DEZ would also be implemented during ground improvement works (e.g. DCM), water jetting works for submarine cables diversion, open trench dredging at the field joint locations and seawall construction; and		I
			▪ A DEZ would also be implemented during bored piling work but as a precautionary measure only.		N/A
13.11.5.19	10.4	2.31	**Acoustic Decoupling of Construction Equipment** ▪ Air compressors and other noisy equipment that must be mounted on steel barges should be acoustically-decoupled to the greatest extent feasible, for instance by using rubber or air-filled tyres; and ▪ Specific acoustic decoupling measures shall be specified during the detailed design of the project for use during the land formation works.	Around coastal works area during construction phase	I
13.11.5.20	10.6.1	2.29	**Spill Response Plan** ▪ An oil and hazardous chemical spill response plan is proposed to be established during the construction phase as a precautionary measure so that appropriate actions to prevent or reduce risks to CWDs can be undertaken in the event of an accidental spillage.	Construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
13.11.5.21 to 13.11.5.23	10.6.1	-	**Construction Vessel Speed Limits and Skipper Training** ▪ A speed limit of 10 knots should be strictly observed for construction vessels at areas with the highest CWD densities; and ▪ Vessels traversing through the work areas should be required to use predefined and regular routes (which would presumably become known to resident dolphins) to reduce disturbance to cetaceans due to vessel movements. Specific marine routes shall be specified by the Contractor prior to construction commencing.	All areas north and west of Lantau Island during construction phase	I
			Fisheries Impact – Construction Phase		
14.9.1.2 to 14.9.1.5	-		**Minimisation of Land Formation Area** ▪ Minimise the overall size of the land formation needed for the additional facilities to minimise the overall loss of habitat for fisheries resources.	Land formation footprint / during detailed design phase to completion of construction	I
14.9.1.6	-	-	**Use of Construction Methods with Minimal Risk/Disturbance** ▪ Use of non-dredge method for the main land formation and ancillary works including the diversion of the aviation fuel pipeline to the AFRF;	During construction phase at marine works area	I
			▪ Use of Deep Cement Mixing (DCM) method instead of conventional seabed dredging for the land formation works to reduce the risk of negative impacts through the elevation of suspended solids and contaminants on fisheries and the marine environment;		I
			▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway; and		N/A
			▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of undersea cables and pipelines to minimise the disturbance to fisheries resources.		I
14.9.1.11	-		**Strict Enforcement of No-Dumping Policy** ▪ A policy prohibiting dumping of wastes, chemicals, oil, trash, plastic, or any other substance that would potentially be harmful to dolphins and/or their habitat in the work area; ▪ Mandatory educational programme of the no-dumpling policy be made available to all construction site personnel for all project-related works; ▪ Fines for infractions should be implemented; and ▪ Unscheduled, on-site audits shall be implemented.	All works area during the construction phase	I
14.9.1.12	-		**Good Construction Site Practices** ▪ Regular inspection of the integrity and effectiveness of all silt curtains and monitoring of effluents to ensure that any discharge meets effluent discharge guidelines; ▪ Keep the number of working or stationary vessels present on-site to the minimum anytime; and	All works area during the construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Unscheduled, on-site audits for all good site practice restrictions should be conducted, and fines or penalties sufficient to be an effective deterrent need to be levied against violators.		
14.9.1.13 to 14.9.1.18	-		**Mitigation for Indirect Disturbance due to Deterioration of Water Quality** ▪ Water quality mitigation measures during construction phases include consideration of alternative construction methods, deployment of silt curtain and good site practices;	All works area during the construction phase	I
			▪ Alternative construction methods including use of non-dredge methods for ground improvement (e.g. Deep Cement Mixing (DCM), prefabricated vertical drains (PVD), sand compaction piles, steel cells, stone columns and vertical sand drains);		I
			▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway; and		N/A
			▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of undersea cables and pipelines to minimise the disturbance to fisheries resources.		I
			Landscape and Visual Impact – Construction Phase		
Table 15.6	12.3	-	**CM1 -** The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	All works areas for duration of works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM2 -** Reduction of construction period to practical minimum.	All works areas for duration of works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM3 -** Phasing of the construction stage to reduce visual impacts during the construction phase.	All works areas for duration of works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM4 -** Construction traffic (land and sea) including construction plants, construction vessels and barges should be kept to a practical minimum.	All works areas for duration of works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM5 -** Erection of decorative mesh screens or construction hoardings around works areas in visually unobtrusive colours.	All works areas for duration of works; Upon handover and completion of works. –	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
				may be disassembled in phases	
Table 15.6	12.3	-	**CM6 -** Avoidance of excessive height and bulk of site buildings and structures.	New passenger concourse, terminal 2 expansion and other proposed airport related buildings and structures under the project; Upon handover and completion of works.	N/A
Table 15.6	12.3	-	**CM7** - Control of night-time lighting by hooding all lights and through minimisation of night working periods.	All works areas for duration of works; Upon handover and completion of works. – may be disassembled in phases	I
Table 15.6	12.3	-	**CM8 -** All existing trees 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.	All existing trees to be retained; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM9 -** Trees unavoidably affected by the works shall be transplanted where practical. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.	All existing trees to be affected by the works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM10 -** Land formation works shall be followed with advanced hydroseeding around taxiways and runways as soon as practical.	All affected existing grass areas around runways and verges/Duration of works; Upon handover and completion of works.	N/A
			Cultural Heritage Impact – Construction Phase		
			Not applicable.		

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Health Impact – Aircraft Emissions		
			Not applicable.		
			Health Impact – Aircraft Noise		
			Not applicable.		

Notes:

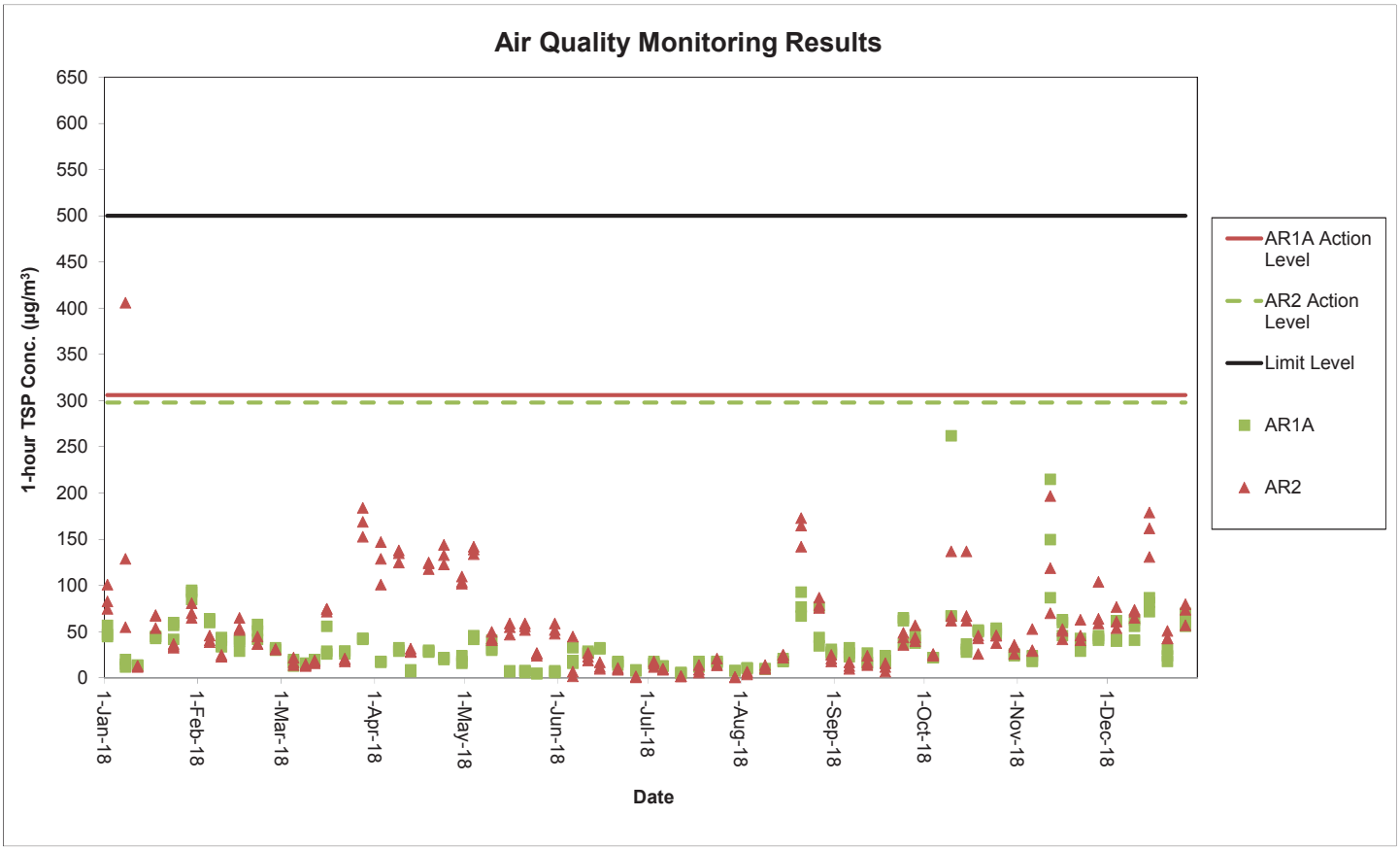
I= implemented where applicable;

N/A= not applicable to the construction works implemented during the reporting month.

^ Checked by ET through site inspection and record provided by the Contractor.

Appendix D. Monitoring Results

Air Quality Monitoring Results



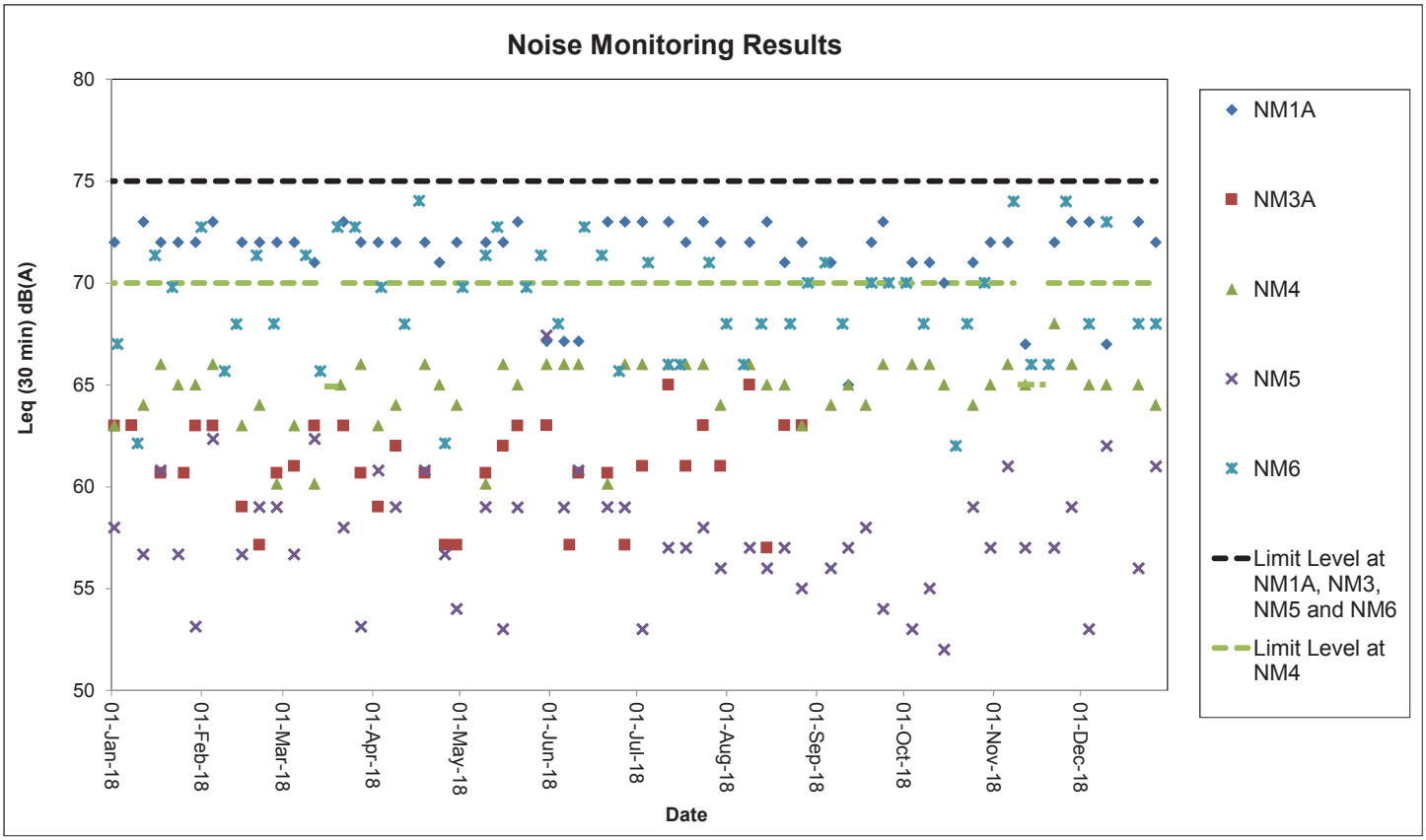
Notes

1. The key activities of the Project during monitoring included reclamation works and land-side works. Reclamation works included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation. Land-side works involved mainly foundation and substructure works for Terminal 2 expansion, modification and tunnel work for APM and BHS, and preparation works for utilities.

2. General weather condition during monitoring ranged from sunny to rainy. Detailed meteorological conditions should be referred to Table 2.3 of this Report and corresponding Monthly EM&A Reports.

3. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

Noise Monitoring Results



Notes

1. The Limit Level is reduced to 70dB(A) for school and 65db(A) during school examination period at NM4. School examination periods in the reporting period were 15/3 to 21/3, 4/6 to 8/6, and 9/11 to 15/11. Monitoring at NM4 on 6 Jun 2018 was conducted after the end of school examination that day. The Limit Level adopted for the monitoring session was 70 dB(A).

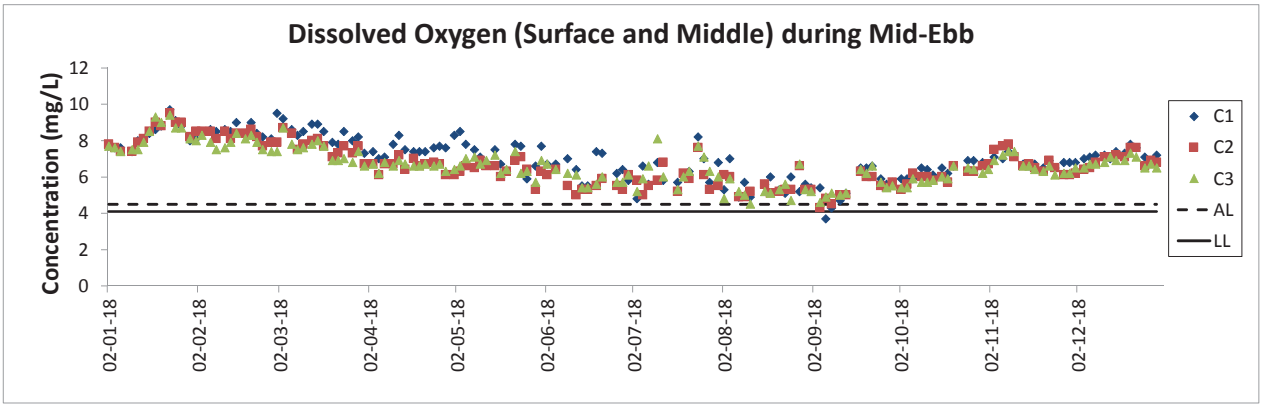
2. Noise monitoring at NM3A was temporarily suspended starting from 1 Sep 2018 and would be resumed with the completion of the Tung Chung East Development.

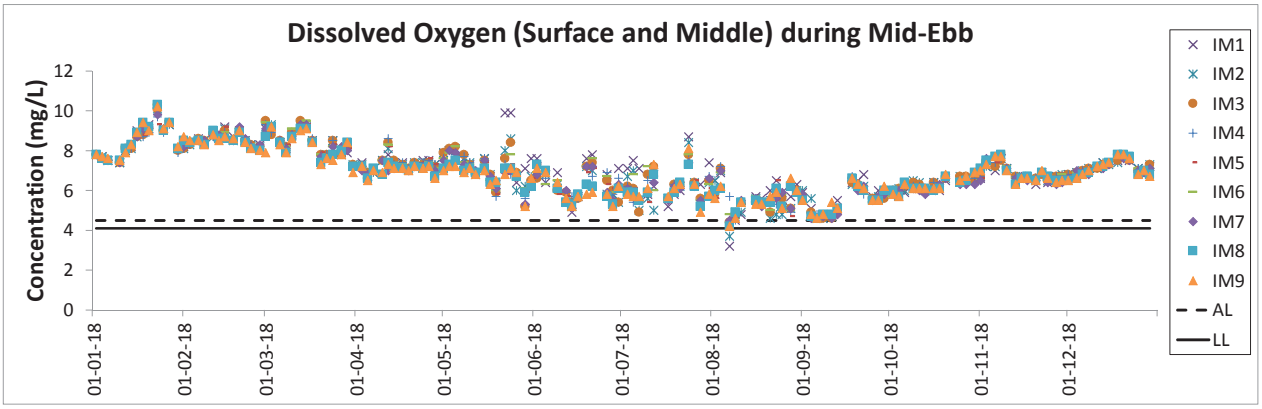
3. The key activities of the Project during monitoring included reclamation works and land-side works. Reclamation works included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation. Land-side works involved mainly foundation and substructure works for Terminal 2 expansion, modification and tunnel work for APM and BHS, and preparation works for utilities.

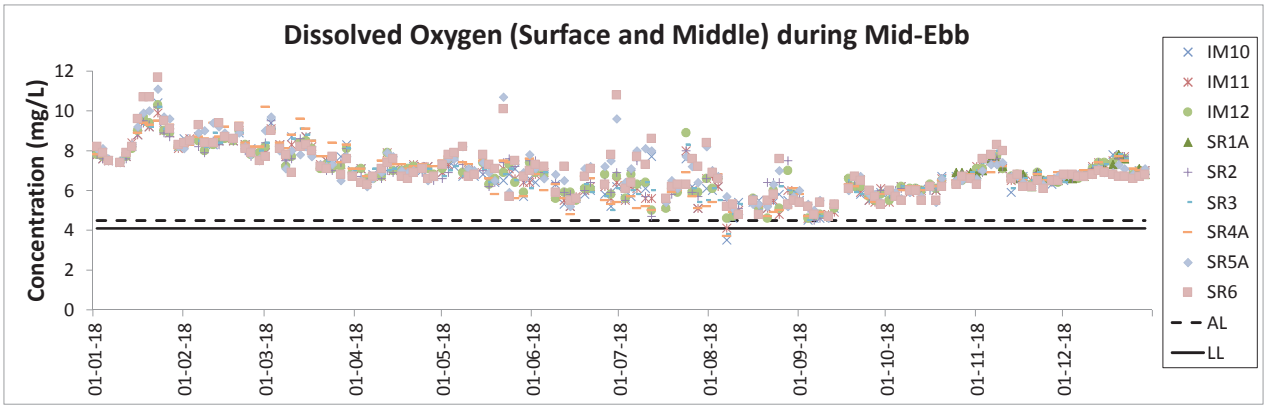
4. General weather condition during monitoring ranged from sunny to cloudy. Detailed meteorological conditions should be referred to Table 2.6 of this Report and corresponding Monthly EM&A Reports.

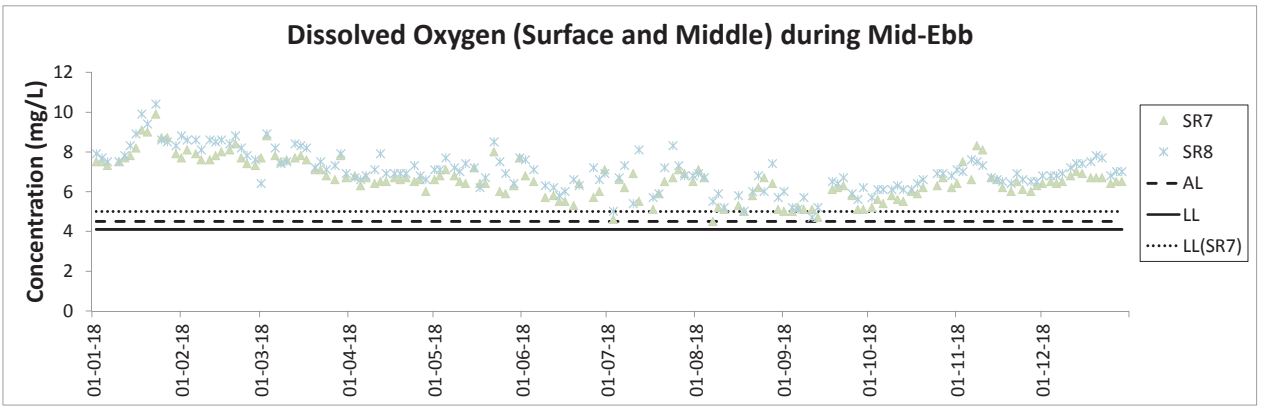
5. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

Water Quality Monitoring Results



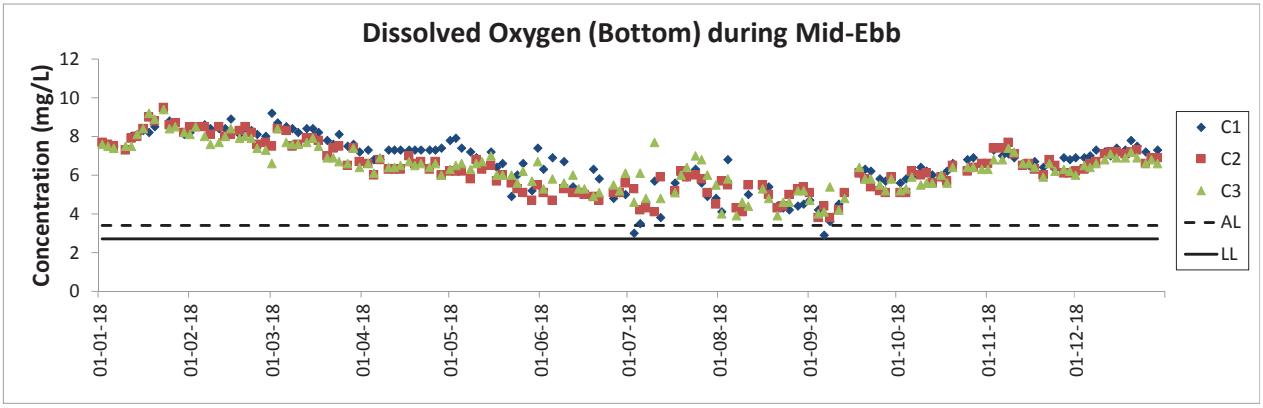


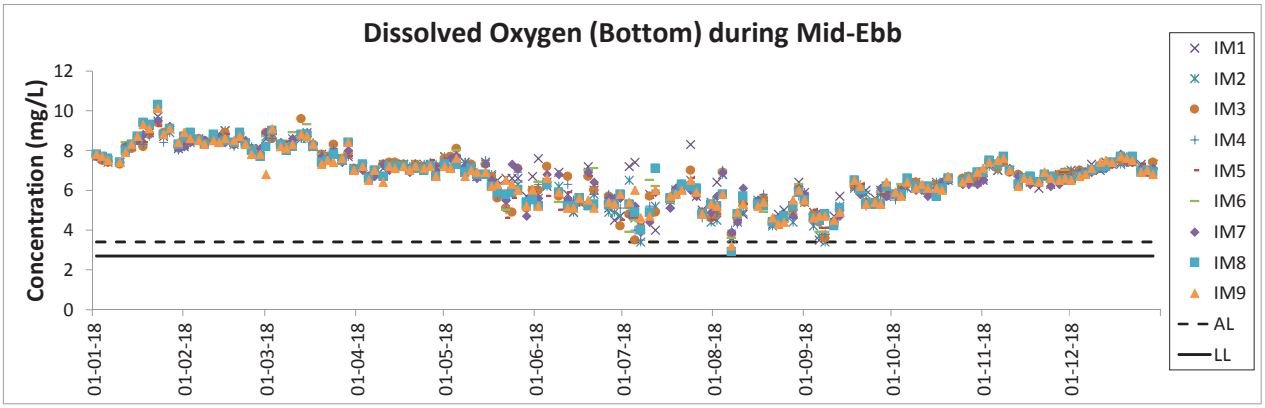


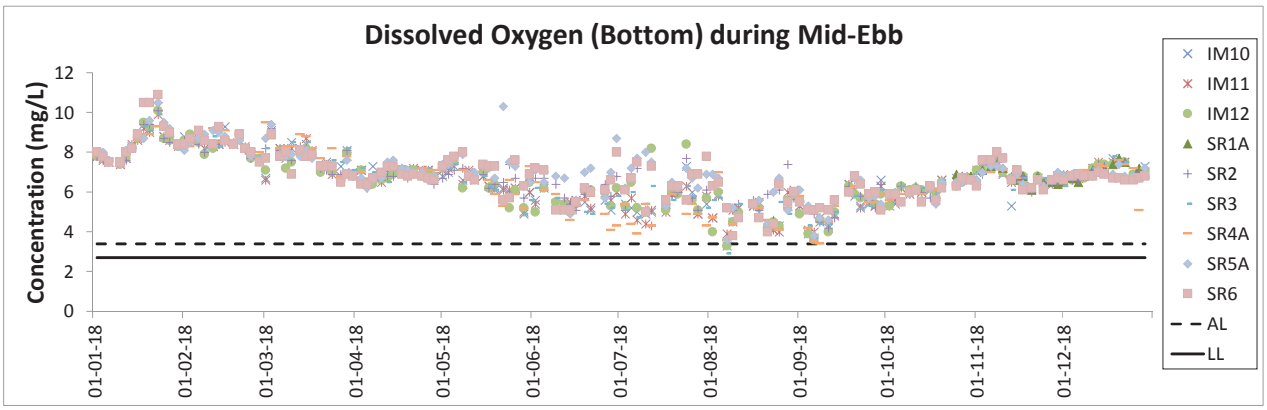


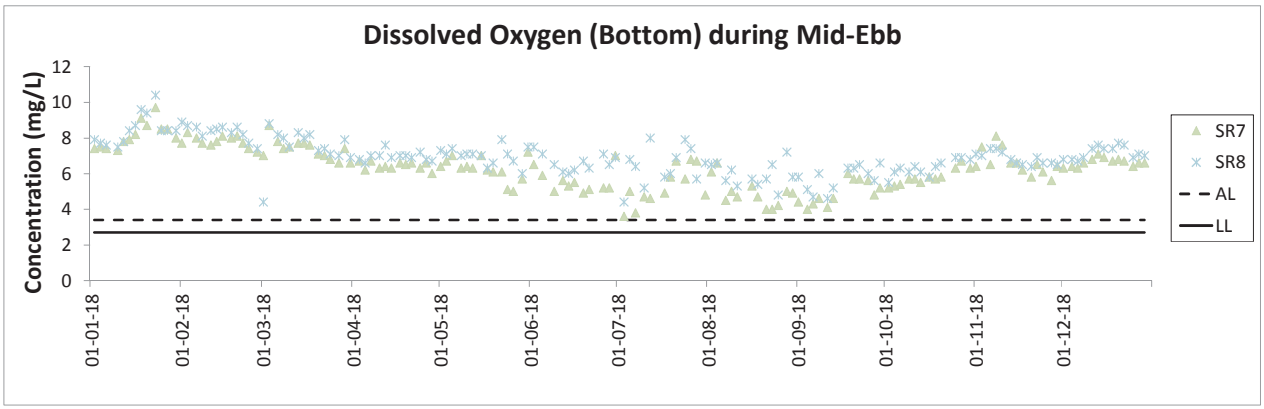
Notes:

1. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
2. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
3. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.









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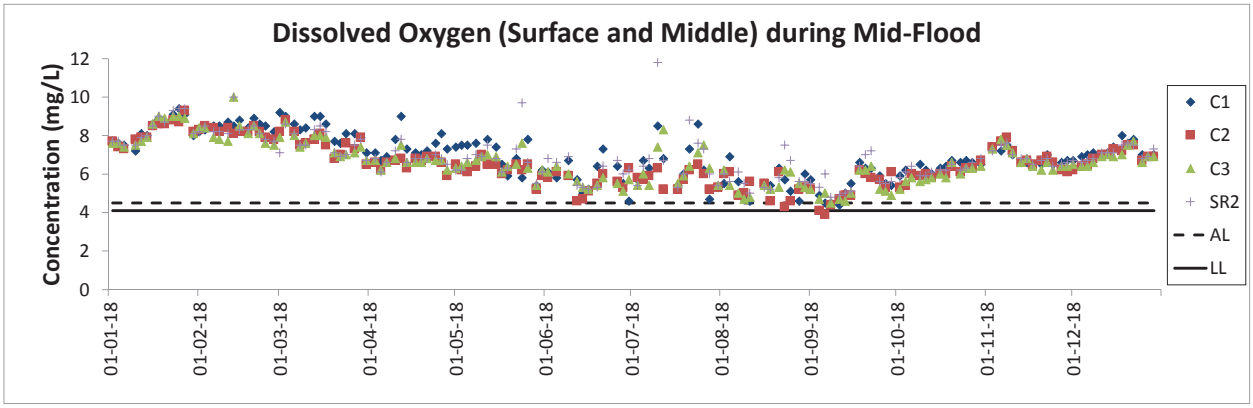
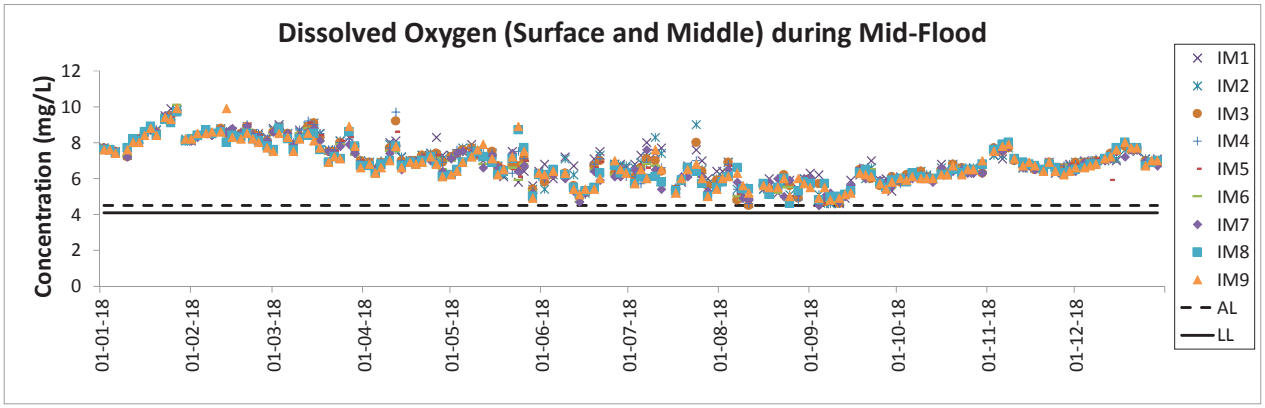
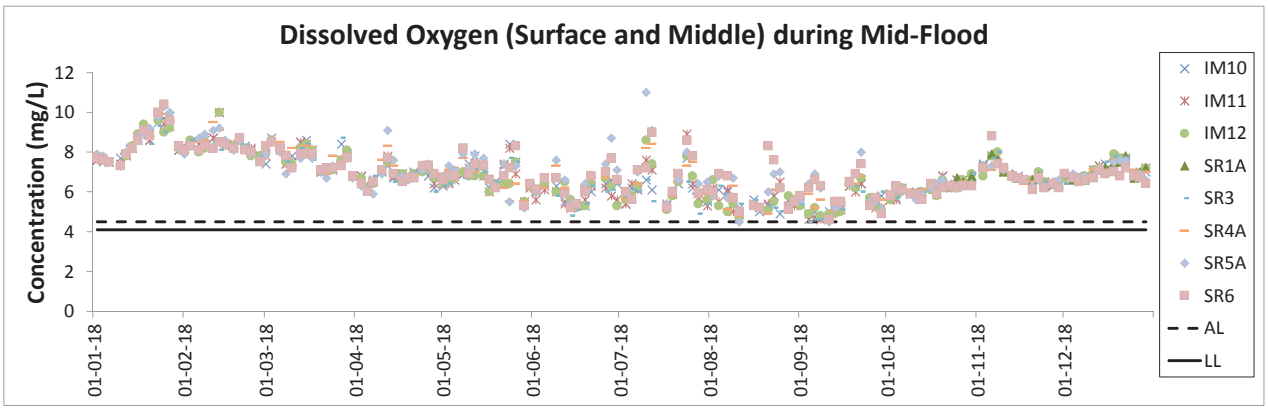
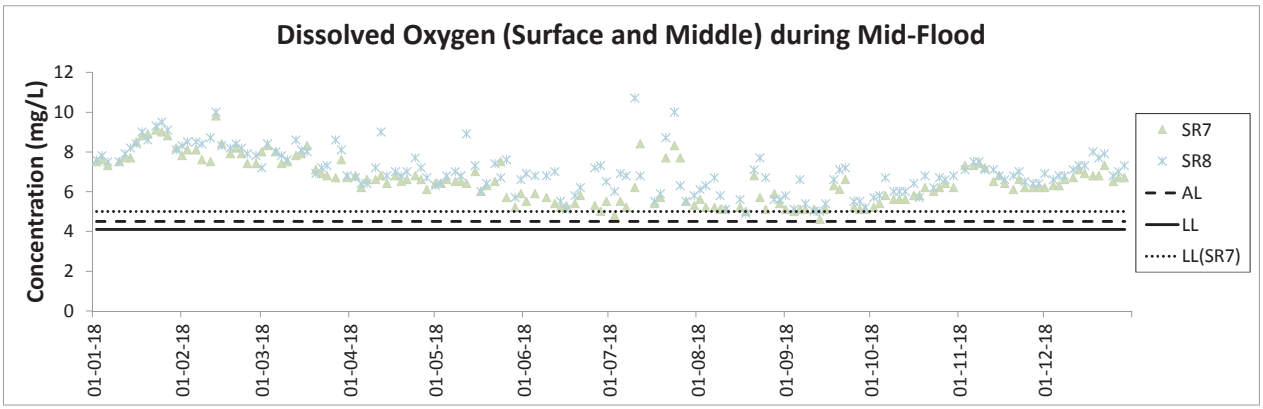
3. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.









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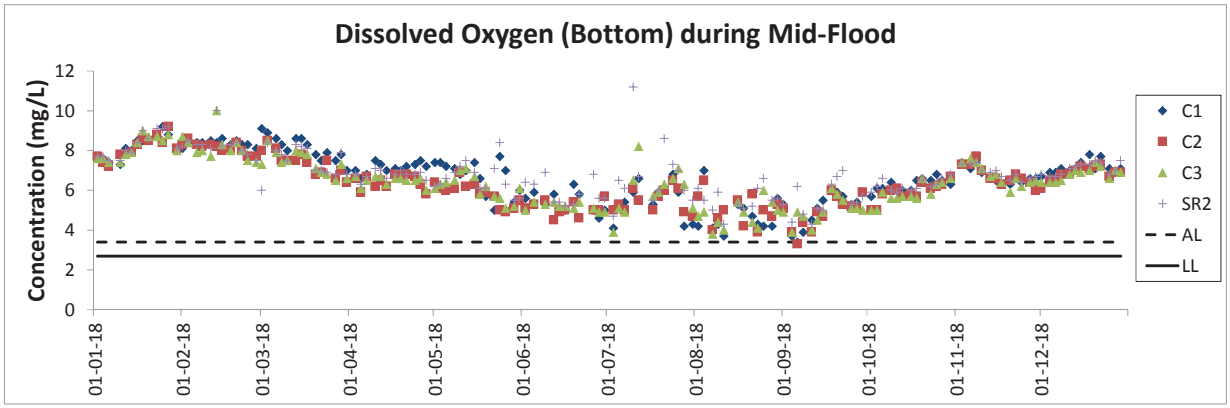
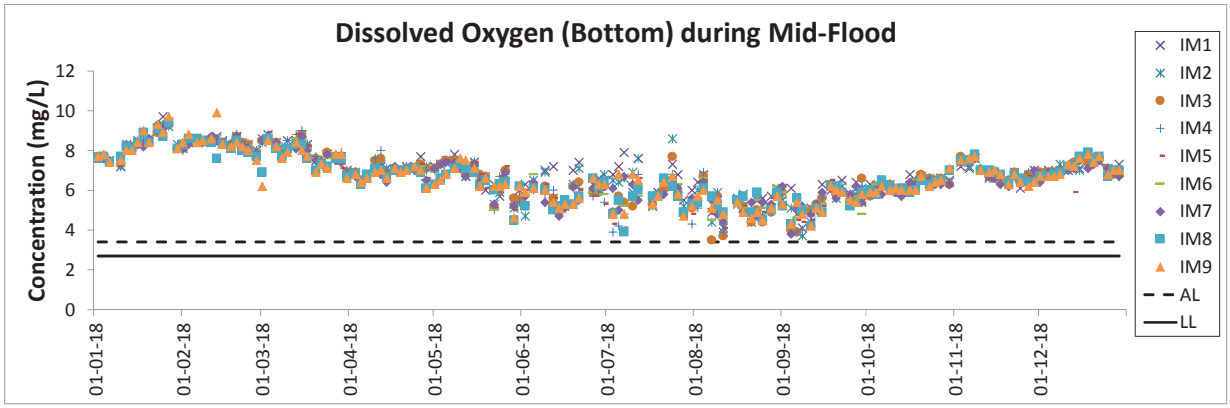
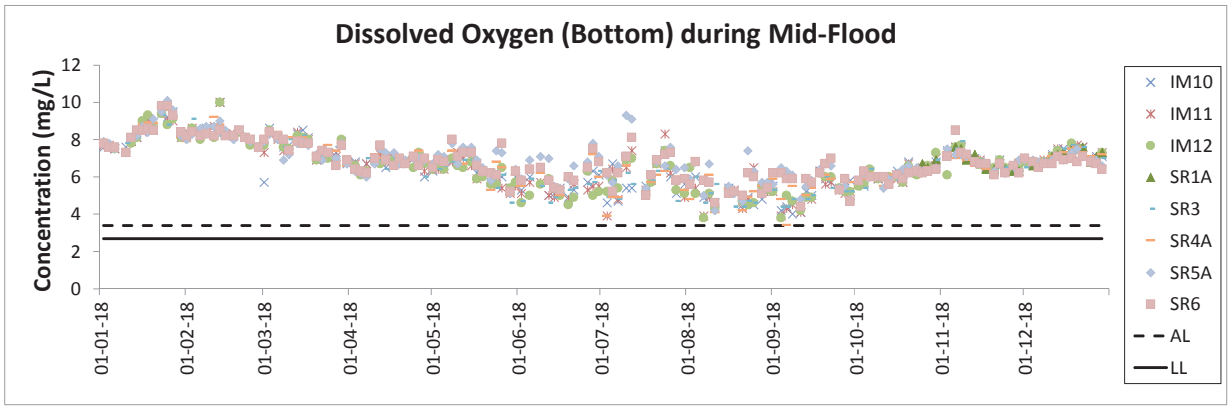
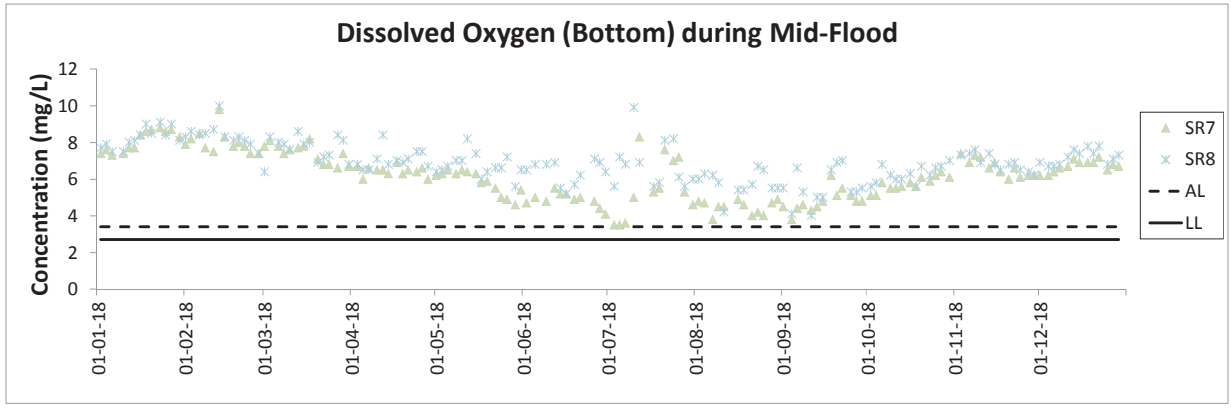
1. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
2. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
3. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.



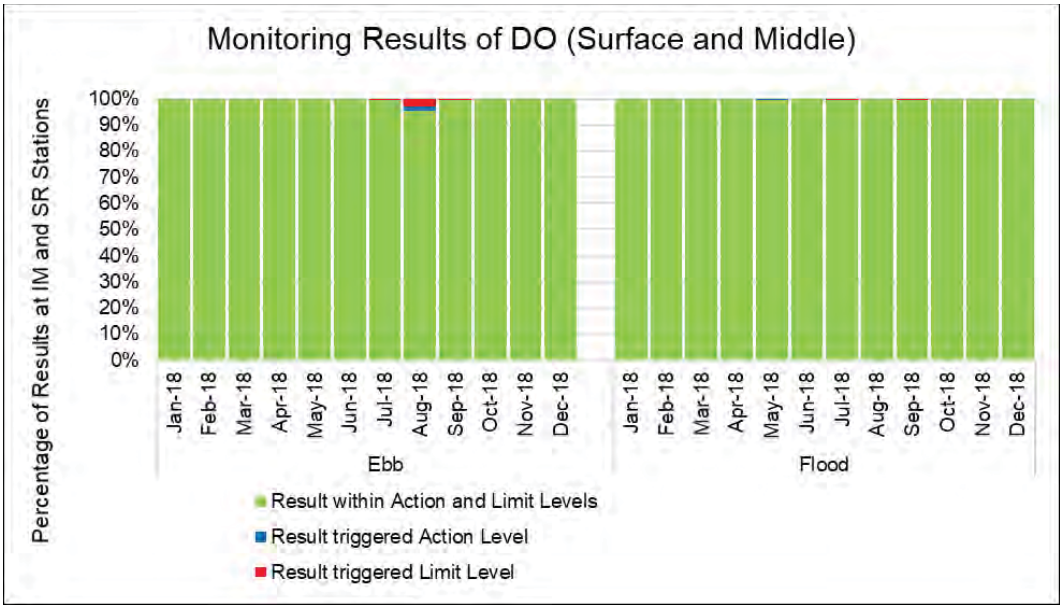


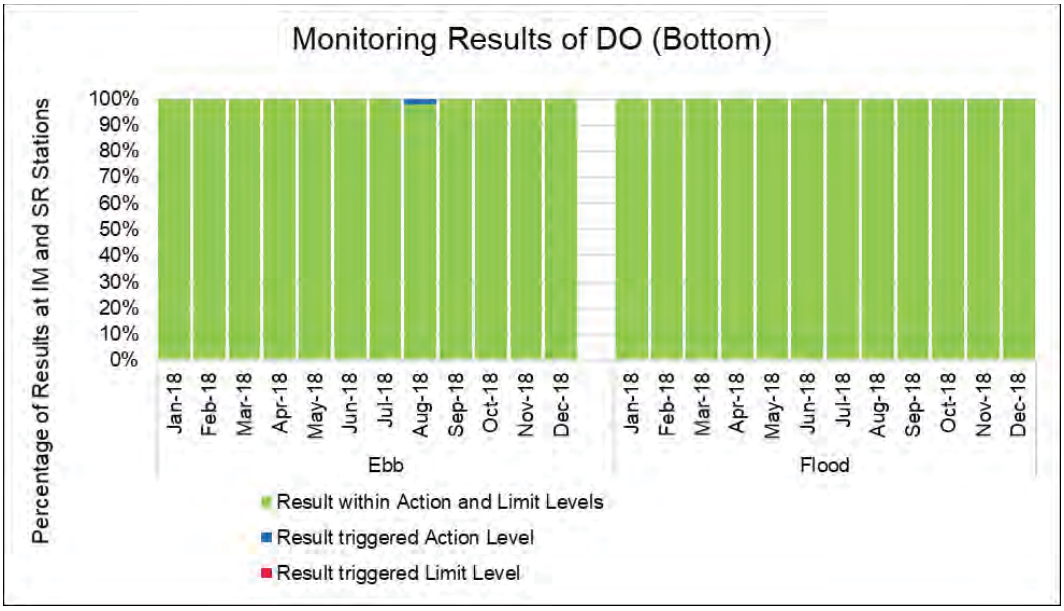




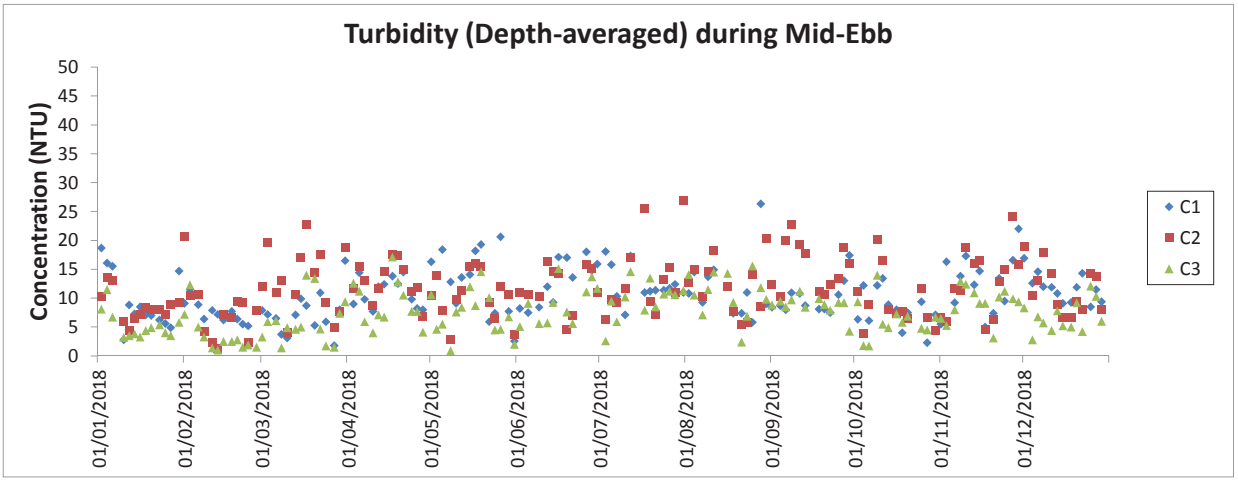
Notes:

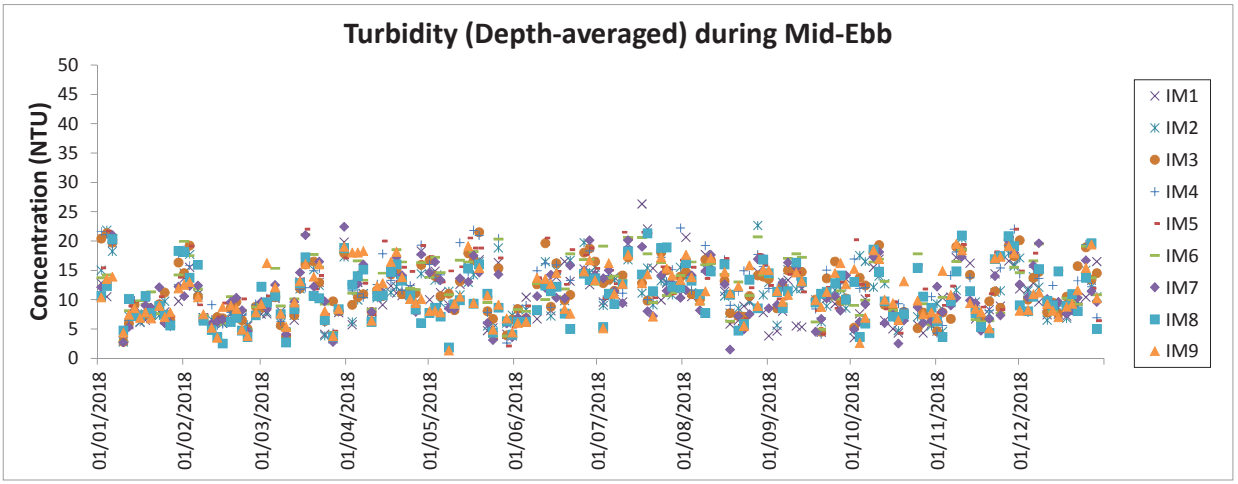
1. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
2. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
3. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

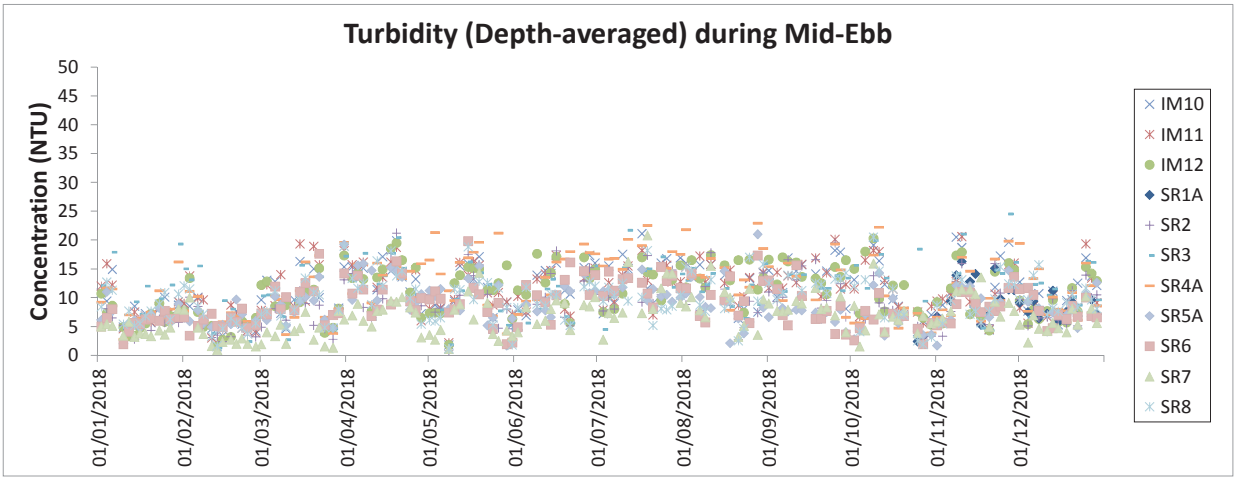




During the reporting period, 0.3% of the DO monitoring results at surface and middle water level and 0.1% of the DO monitoring results at bottom water level triggered the corresponding Action or Limit Level, where both percentages were lower than that recorded in the previous reporting period. All results triggering the corresponding Action or Limit level were collected during the wet season (April to October), particularly in July to September, which suggest the observation of seasonal effect on the DO monitoring results. Based on above observations, as well as the relevant investigation findings presented in the Construction Phase Monthly EM&A Reports, it is considered that the Project did not cause adverse impact on DO level at all water quality sensitive receivers.

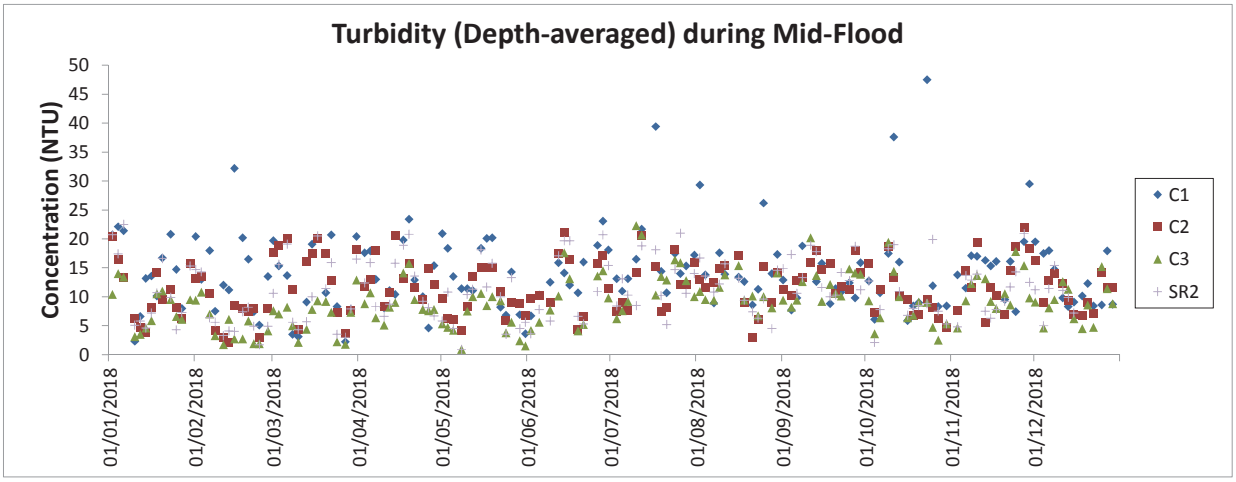


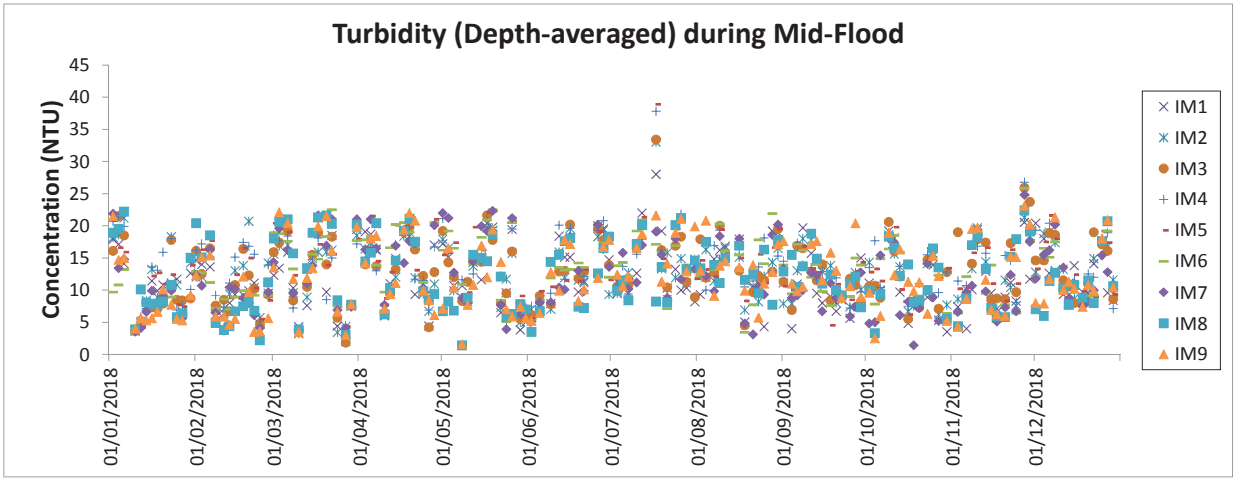


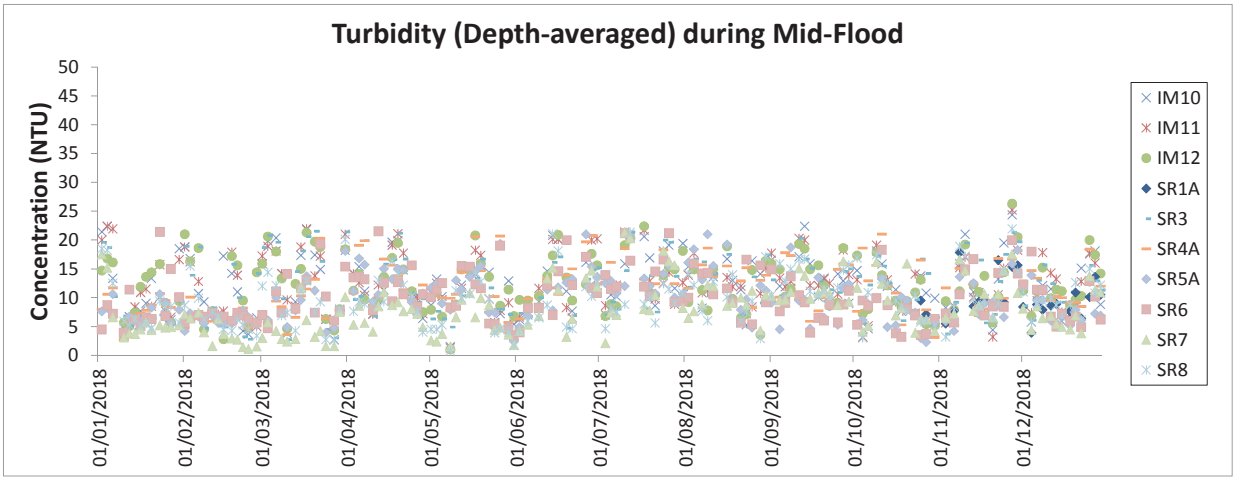


Notes:

1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

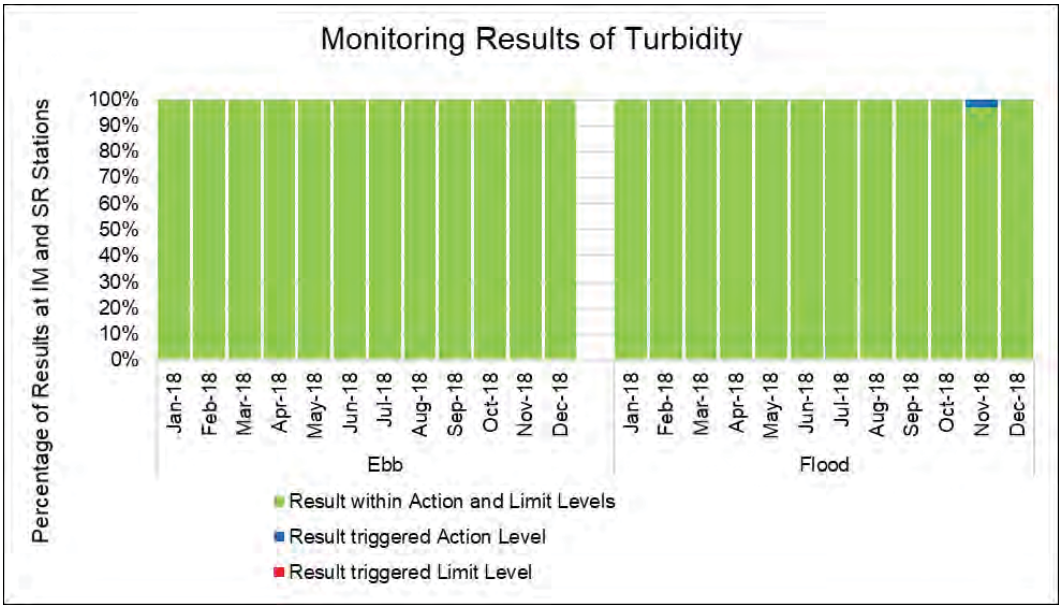




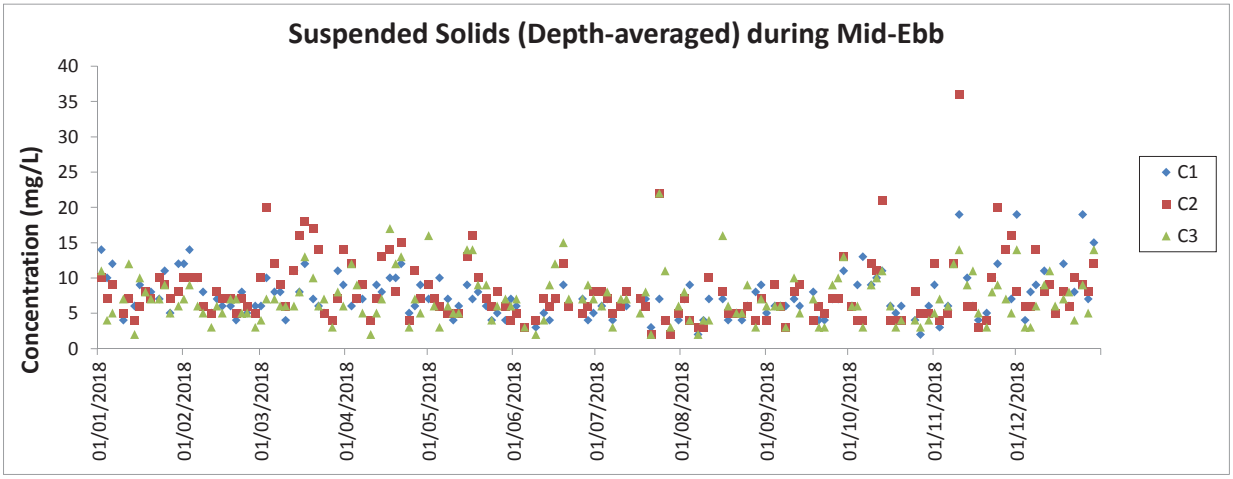


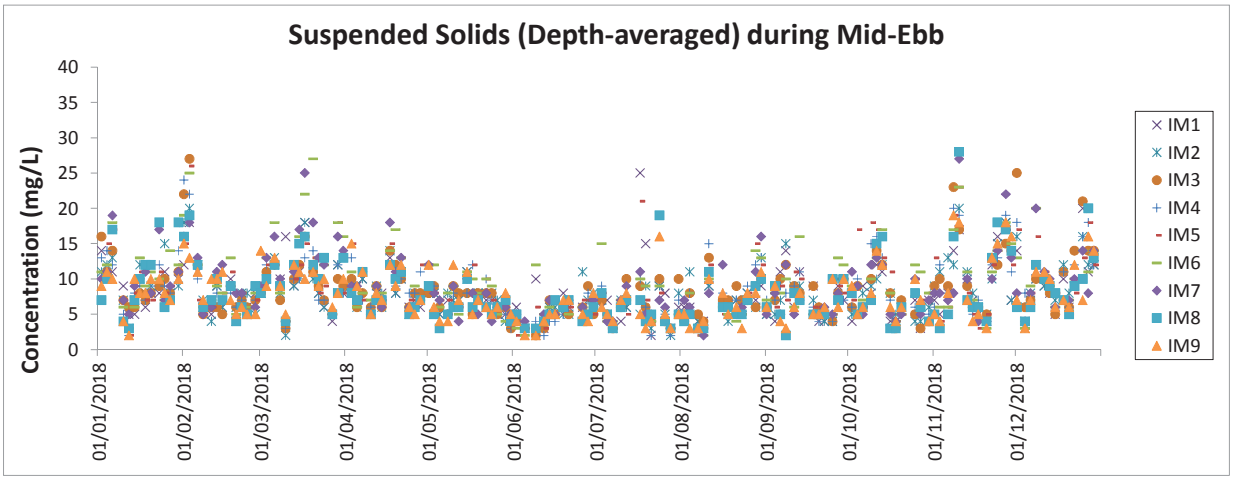
Notes:

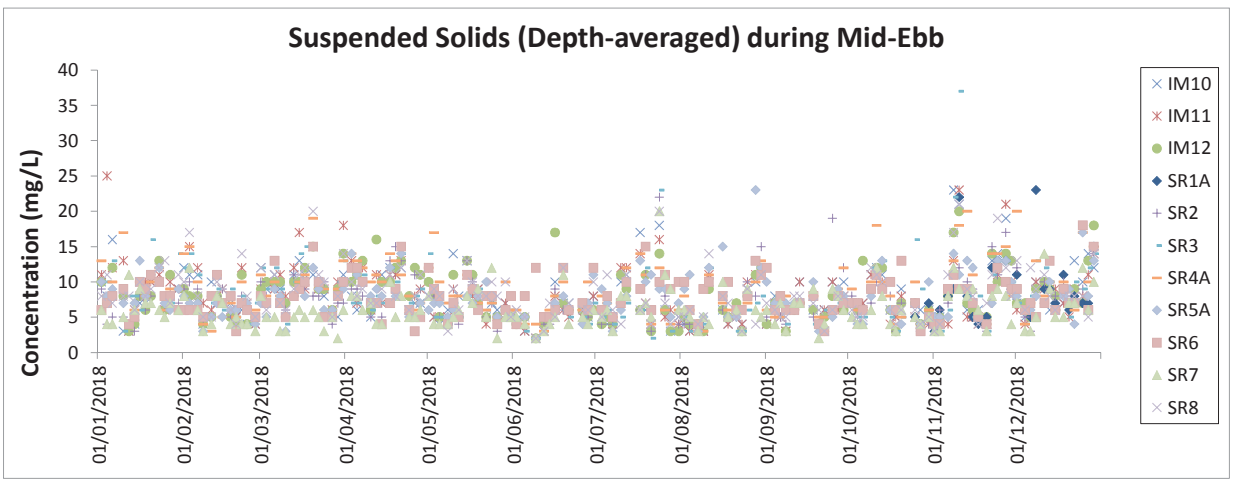
1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.



During the reporting period, 0.1% of the turbidity monitoring results triggered the corresponding Action Level, which was lower than that recorded in the previous reporting period. Due to the small number of results triggering the Action Level, and the relevant investigation findings presented in the Construction Phase Monthly EM&A Reports, it is considered that the Project did not cause adverse impact on turbidity level at all water quality sensitive receivers.

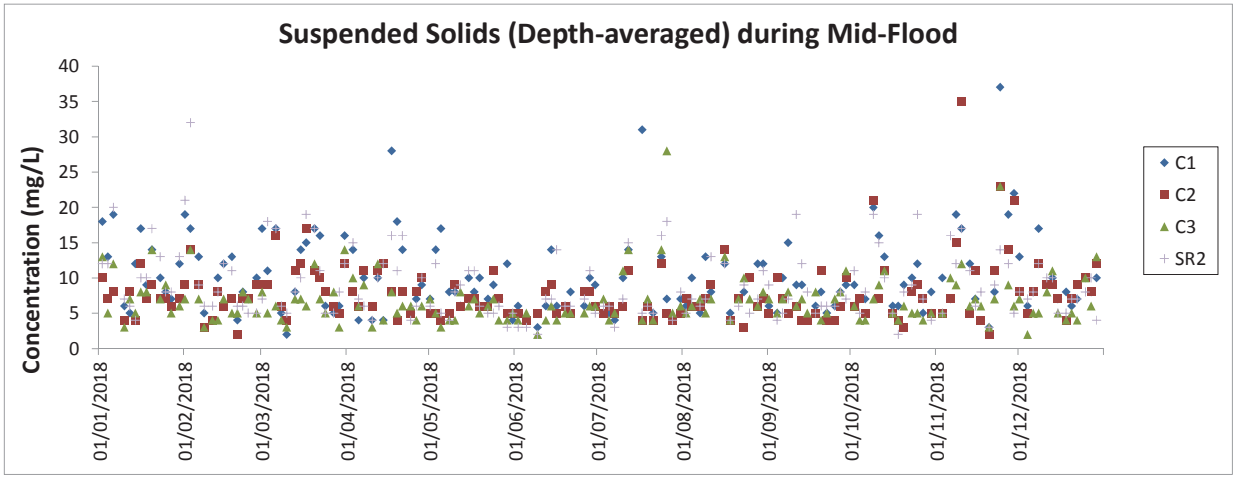


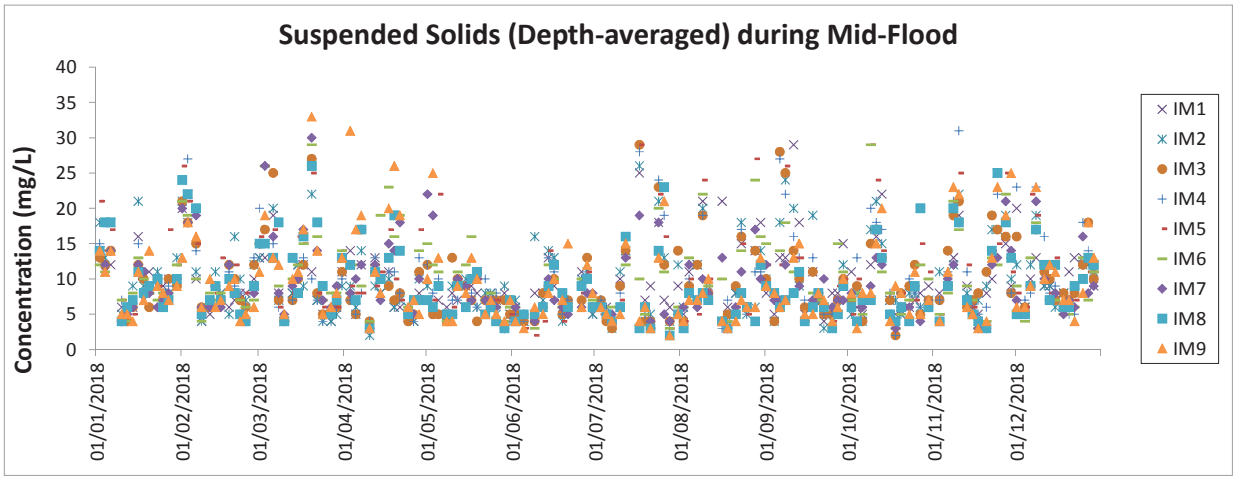


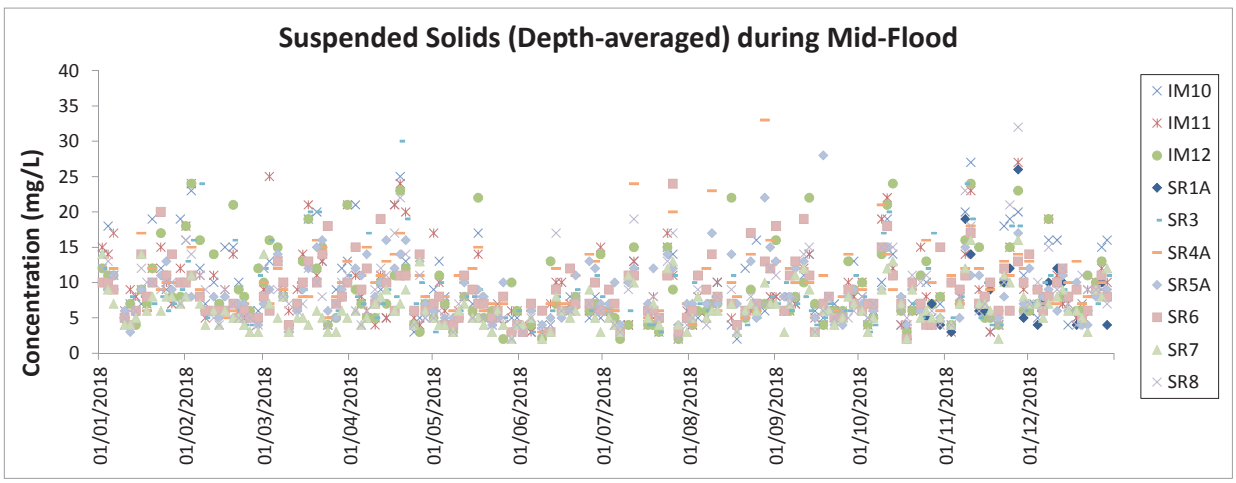


Notes:

1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

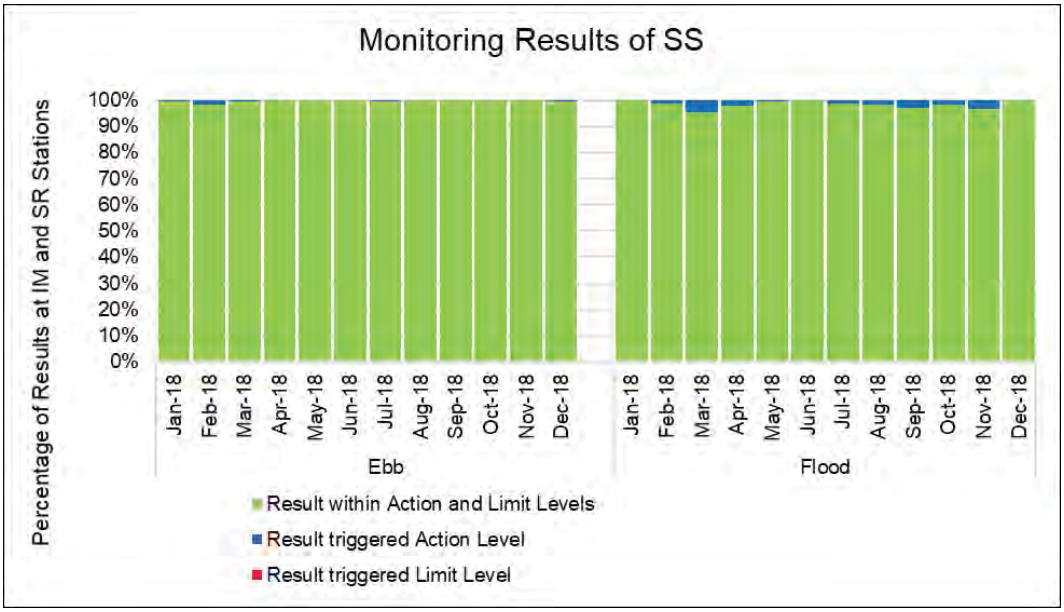




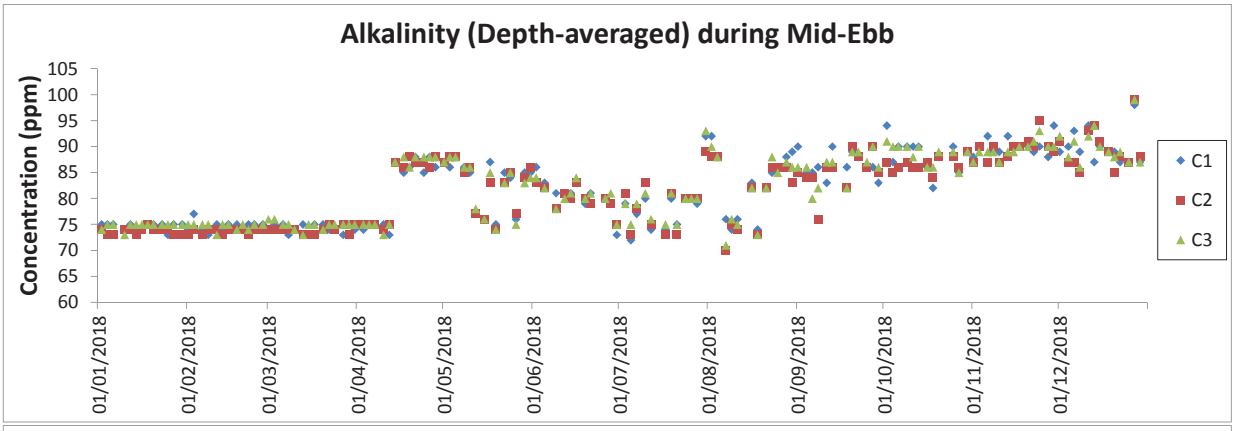


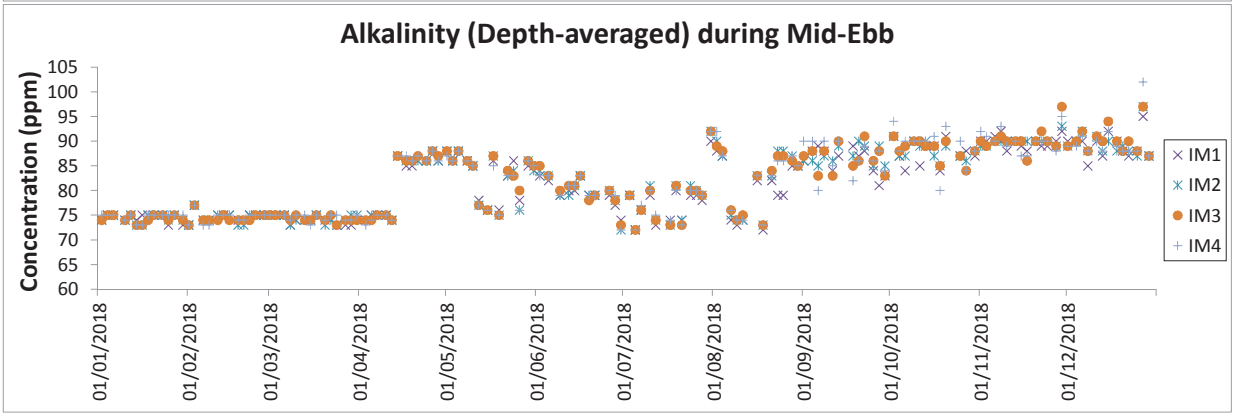
Notes:

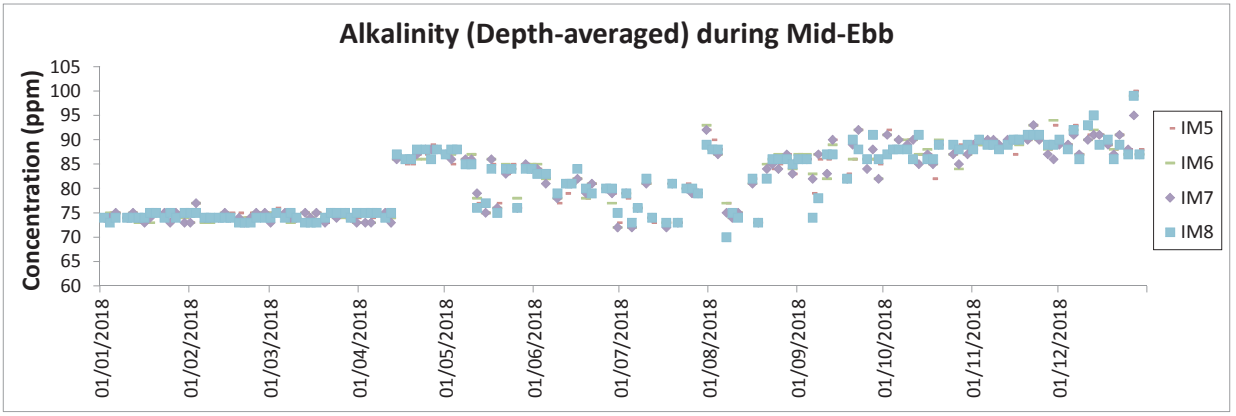
1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

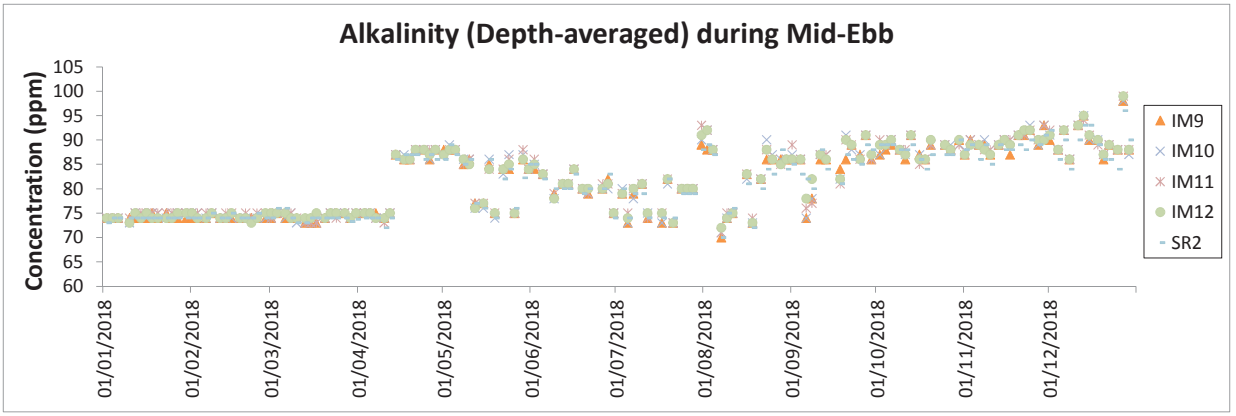


During the reporting period, 1.0% of the SS monitoring results triggered the corresponding Action Level, which was lower than that recorded in the previous reporting period. Due to the small number of results triggering the Action Level, and the relevant investigation findings presented in the Construction Phase Monthly EM&A Reports, it is considered that the Project did not cause adverse impact on SS level at all water quality sensitive receivers.



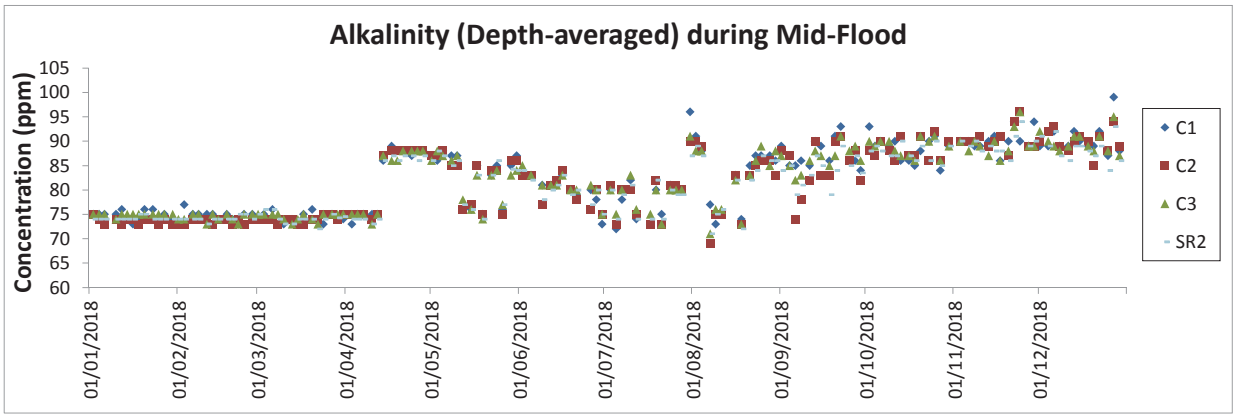


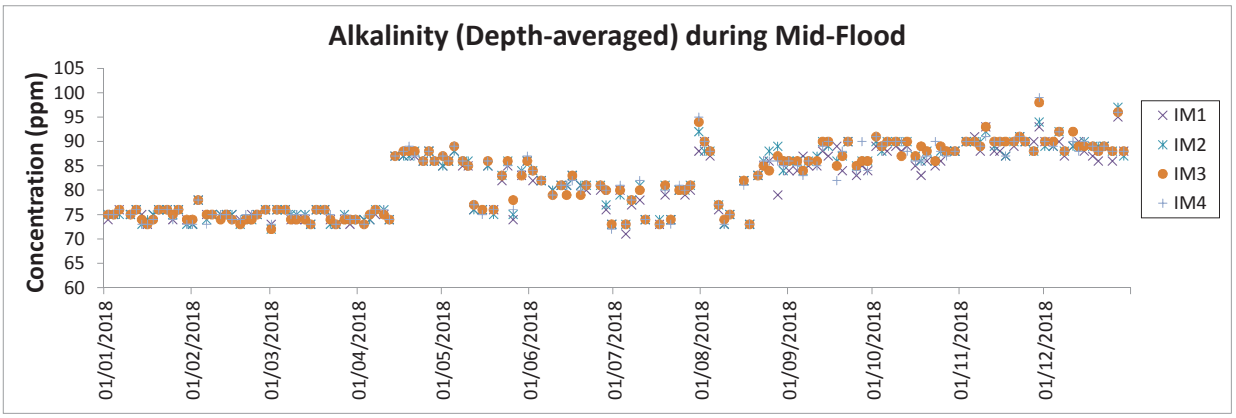


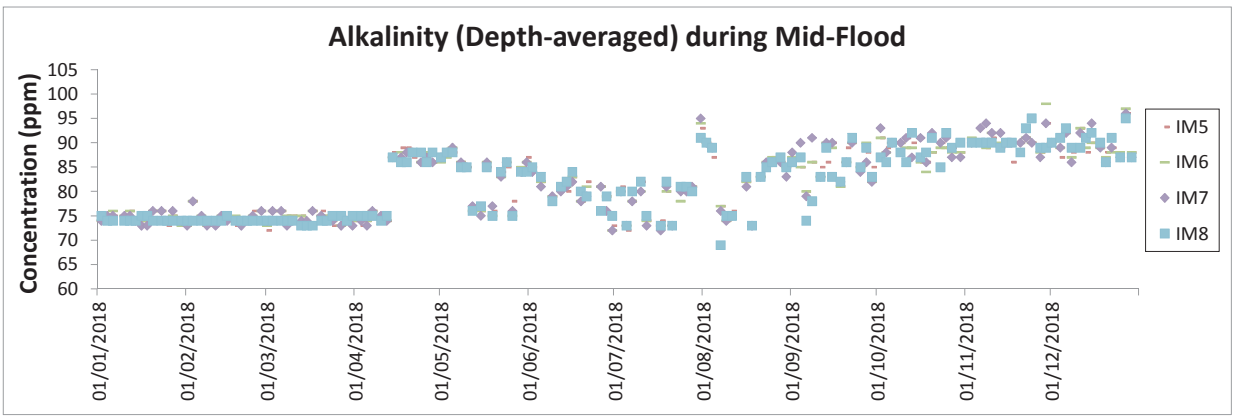


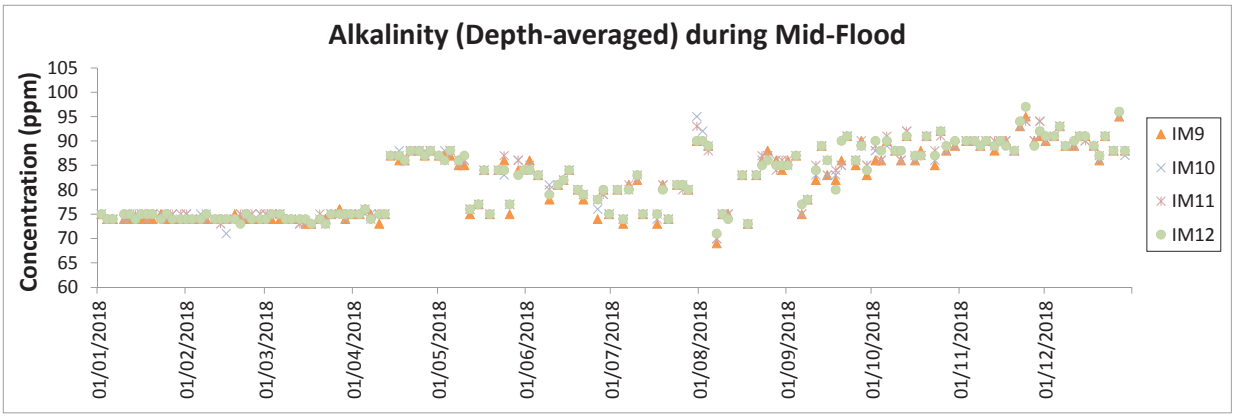
Notes:

1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.



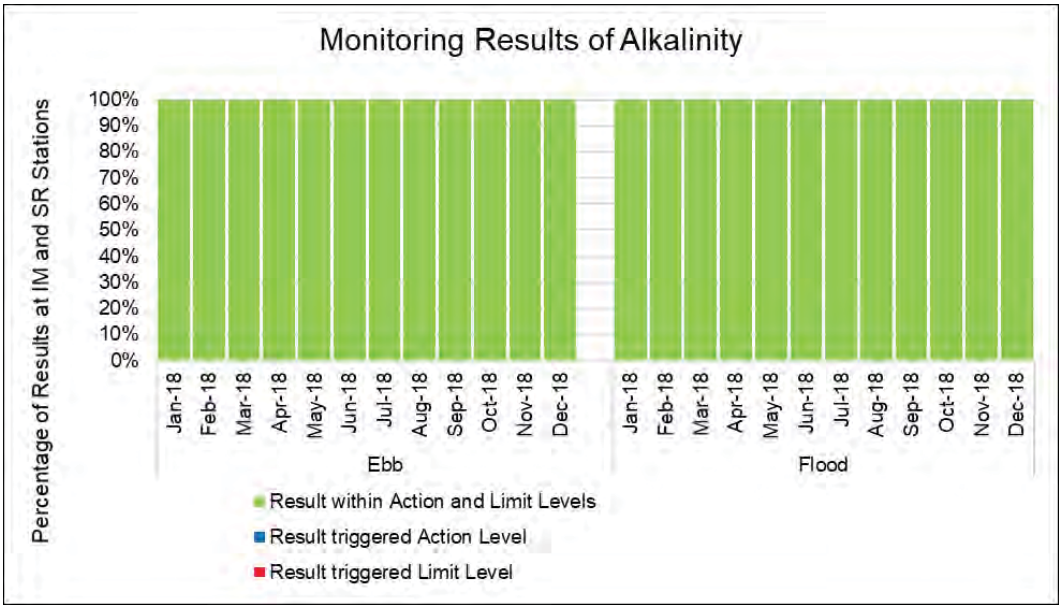




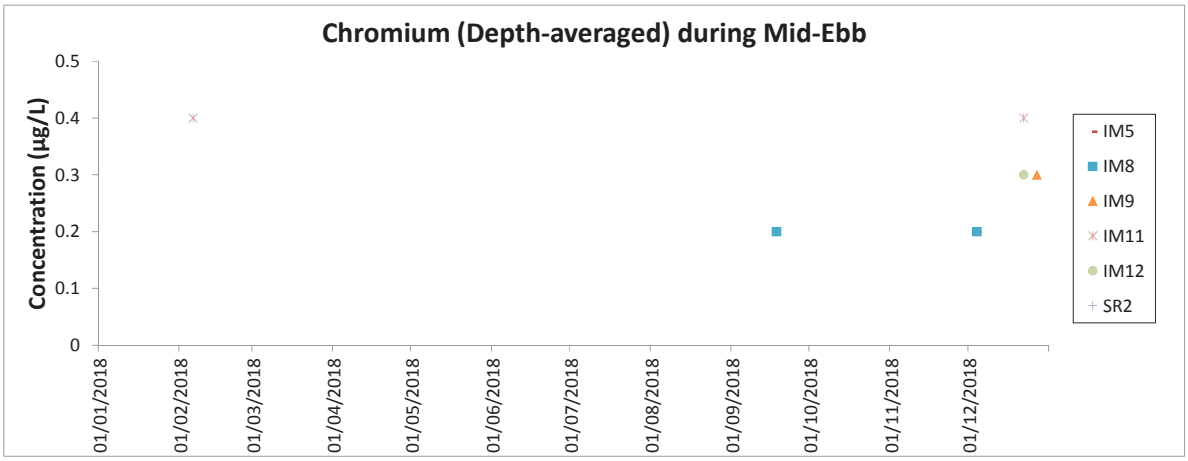


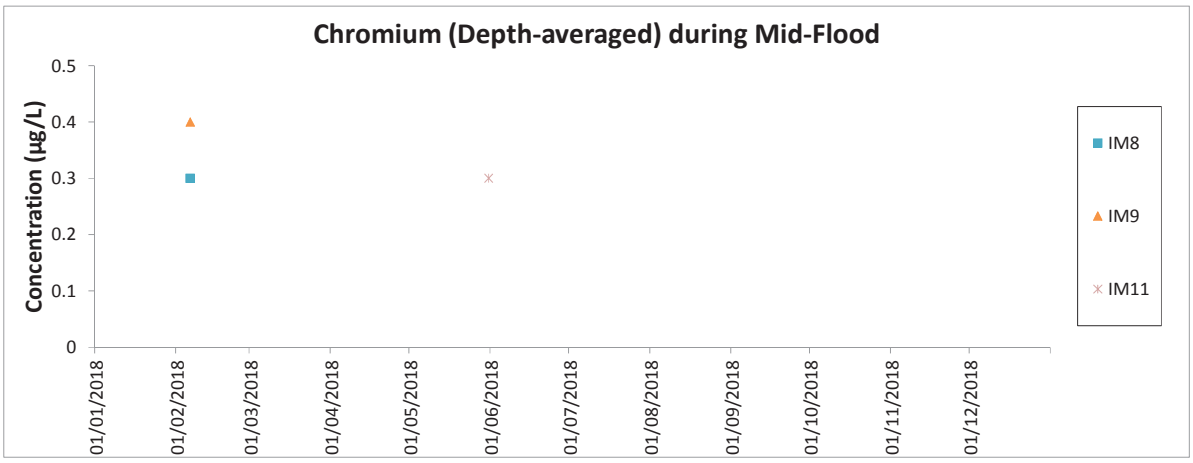
Notes:

1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.



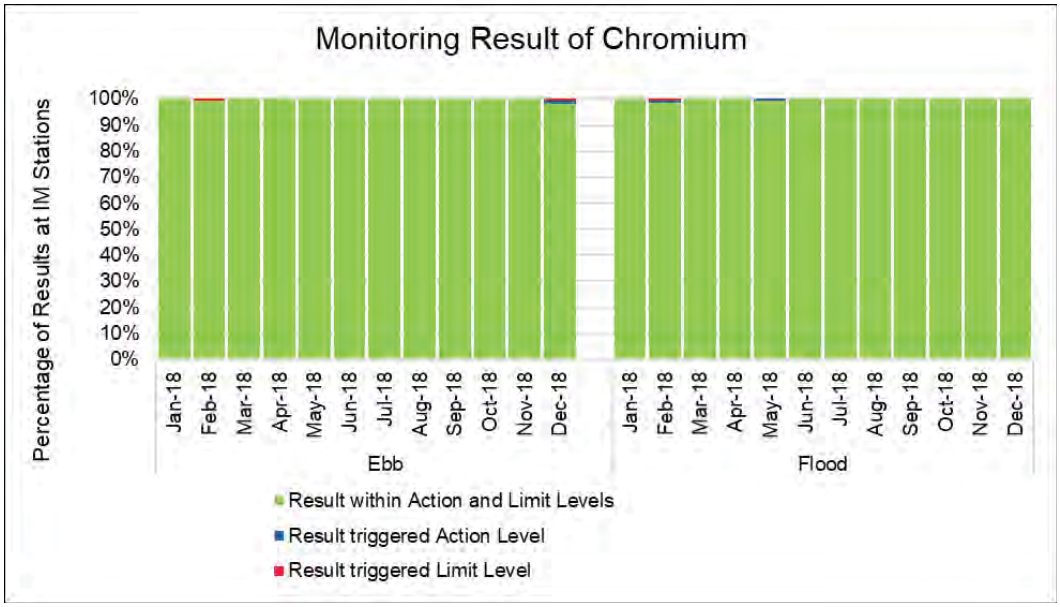
All alkalinity monitoring results in the reporting period were within the corresponding Action and Limit Levels.



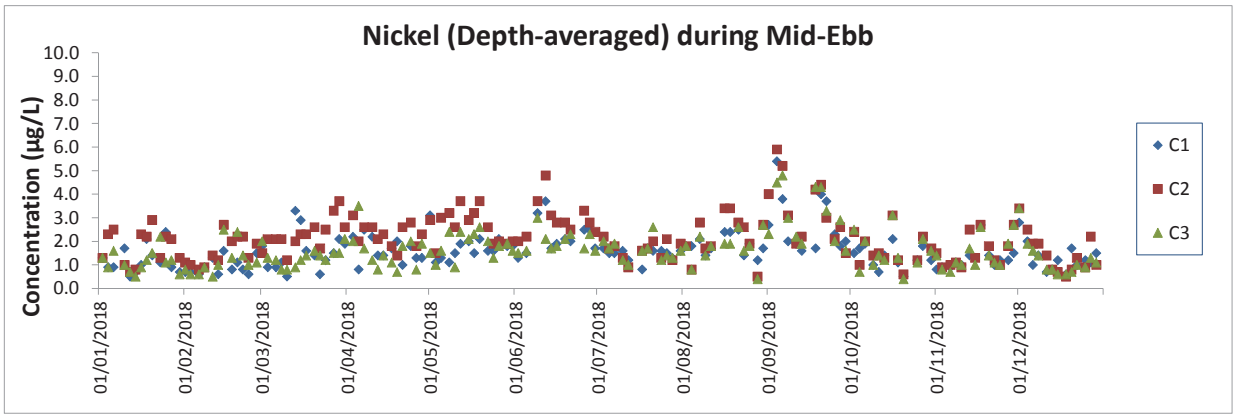


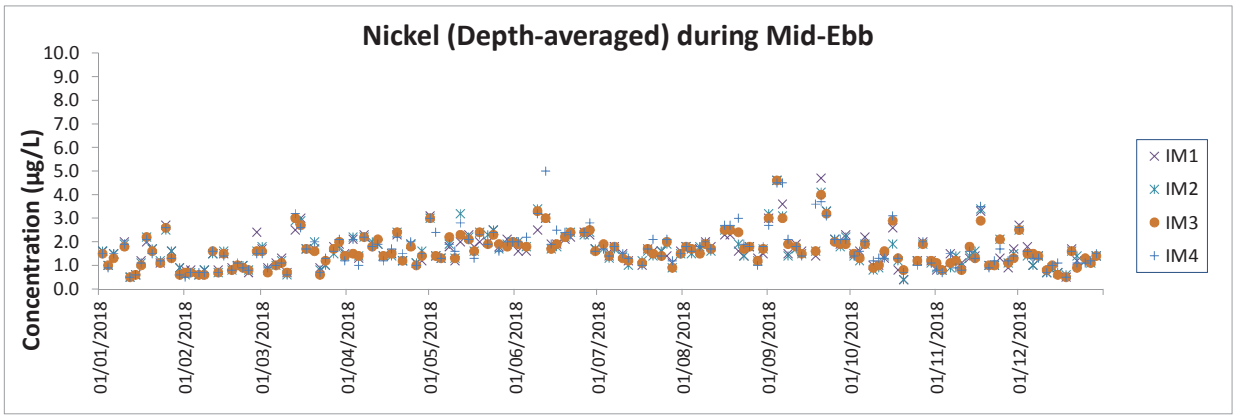
Notes:

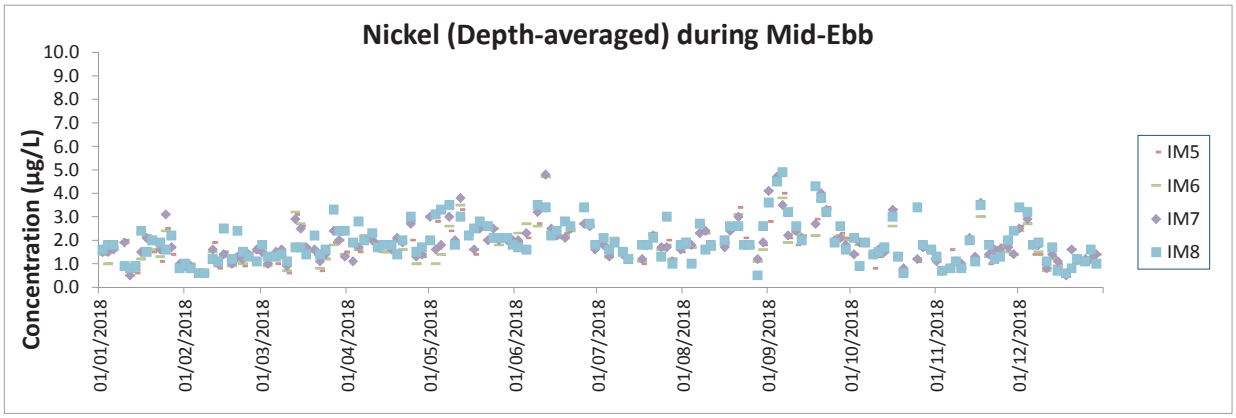
1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The monitoring results of chromium at all other monitoring stations were below the reporting limit of 0.2 µg/L.
3. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
4. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
5. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.

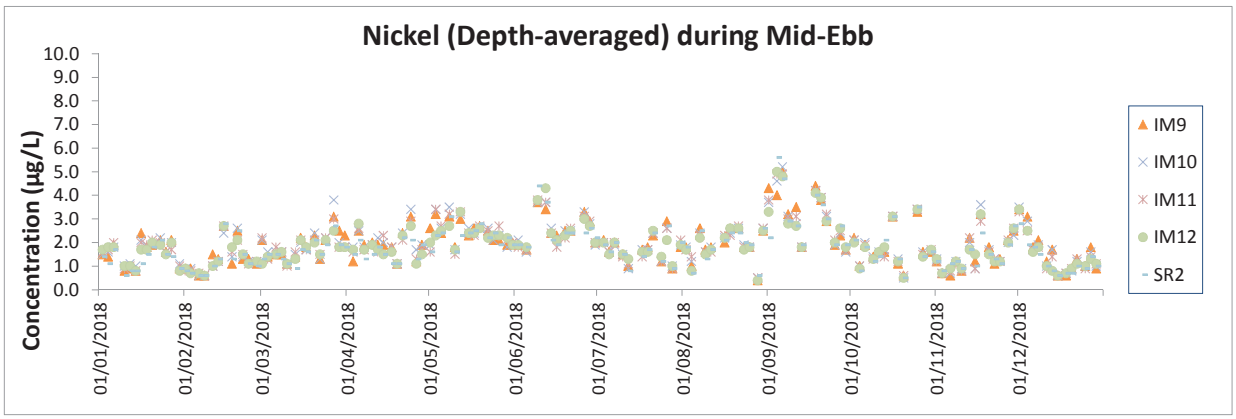


During the reporting period, 0.2% of the chromium monitoring results triggered the corresponding Action or Limit Level, which was higher than that recorded in the previous reporting period. However, it appeared that all cases were isolated with no observable temporal and spatial trend that might be related to Project activities.









Notes:

1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
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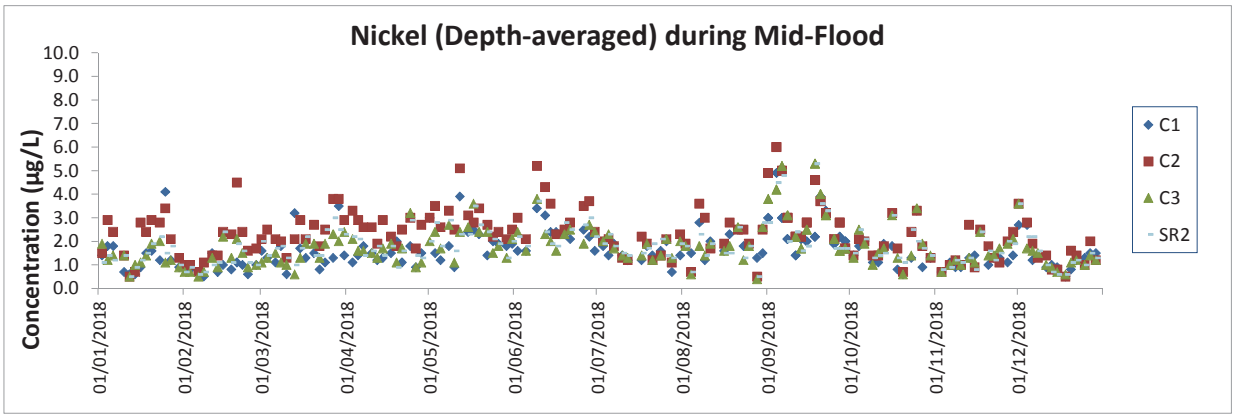
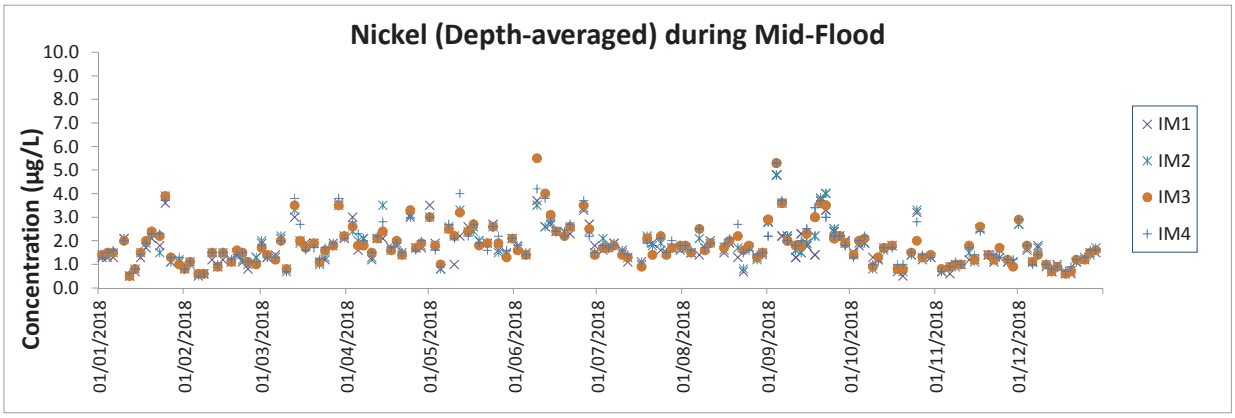
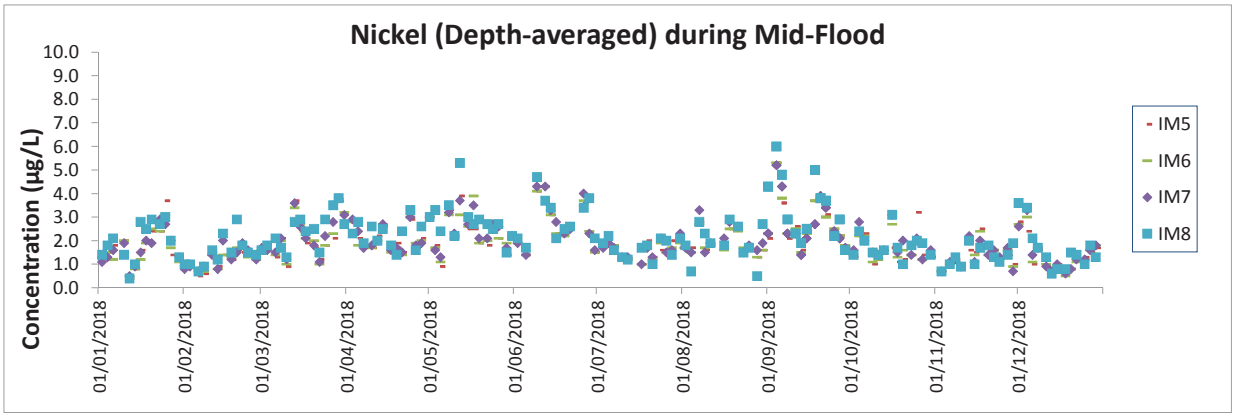
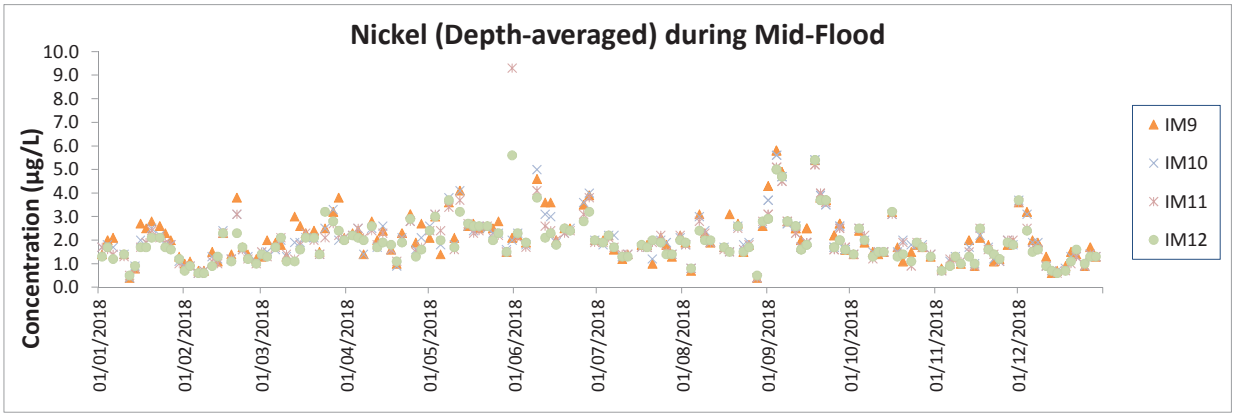


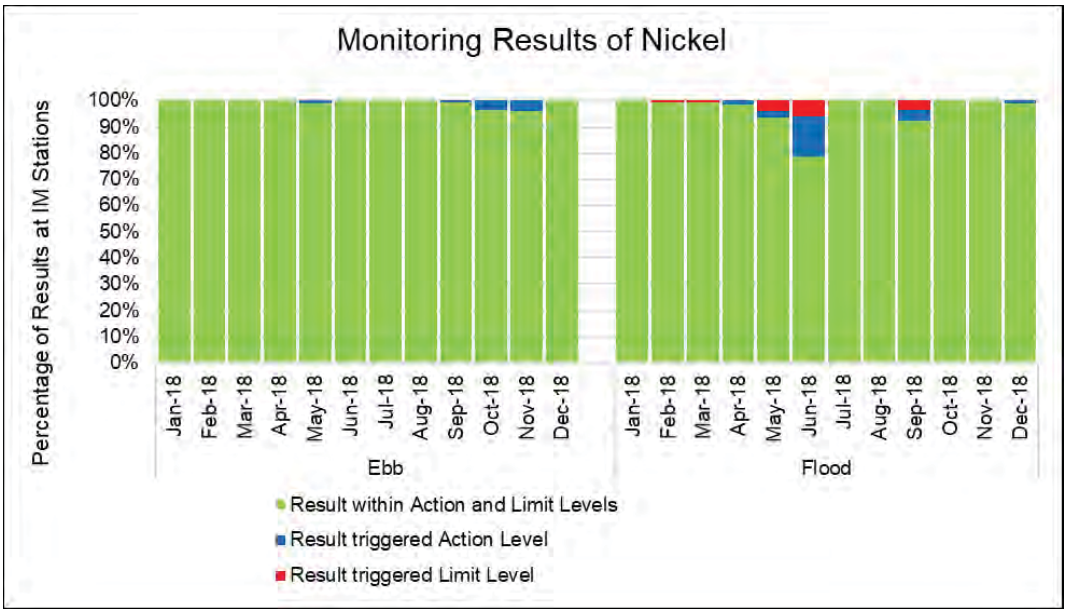






Notes:

1. The Action and Limit Levels can be referred to Table 2.8 of the Annual EM&A Report.
2. The key marine works activities of the Project during monitoring included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
3. General weather condition during monitoring ranged from sunny to rainy, with sea condition ranged from calm to rough. Detailed meteorological conditions should be referred to Table 2.10 of this Report and corresponding Monthly EM&A Reports.
4. QA/ QC requirements as stipulated in the EM&A Manual was carried out during measurement.



During the reporting period, 1.9% of the nickel monitoring results triggered the corresponding Action or Limit Level, which was higher than that recorded in the previous reporting period. From the graph, it is noted that the majority of cases were recorded in the wet season during mid-flood tide, which might suggest the existence of a seasonal, tide-specific effect that could have led to episodes of relatively high nickel concentrations. This observation also concurred with that made in the previous reporting period, and therefore was considered not related to the Project activities.

Combining the observations from the monitoring results of the two representative heavy metals for DCM works (chromium and nickel), the low percentage of results triggering corresponding Action or Limit Level, as well as the investigation findings which concluded that these cases were not related to the Project, this indicates that DCM activities during the reporting period did not cause adverse water quality impact.

Appendix E. Chinese White Dolphin Monitoring Results

Appendix E Chinese White Dolphin Monitoring Results

Figure 1: Sightings Distribution of Chinese White Dolphins in 2018

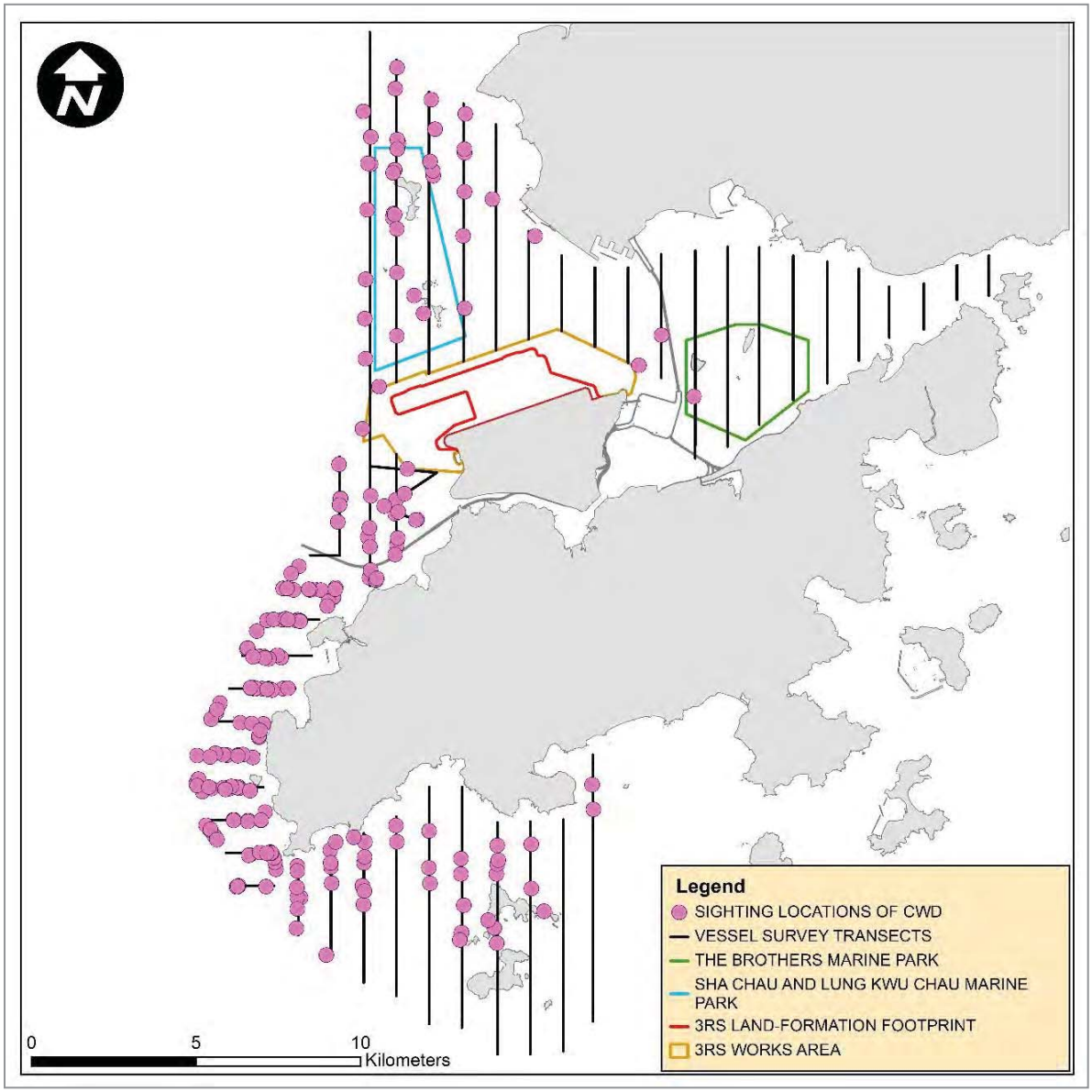
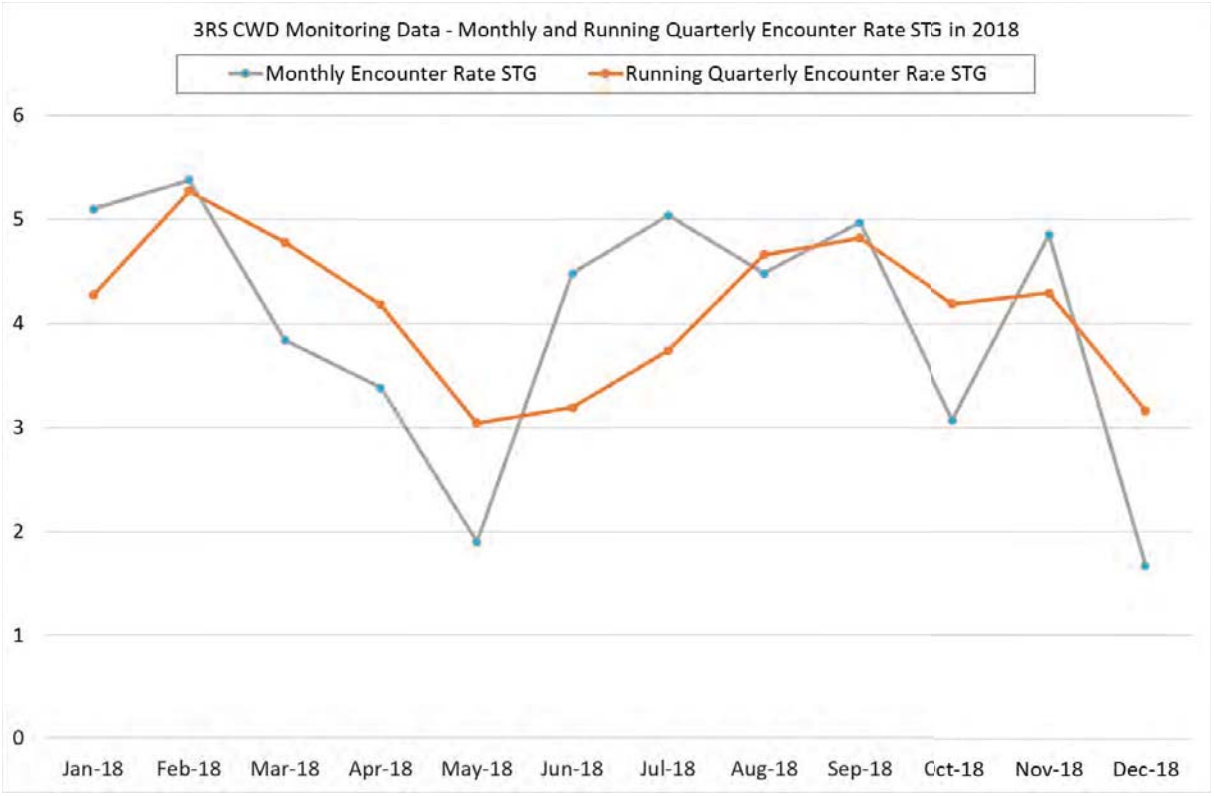
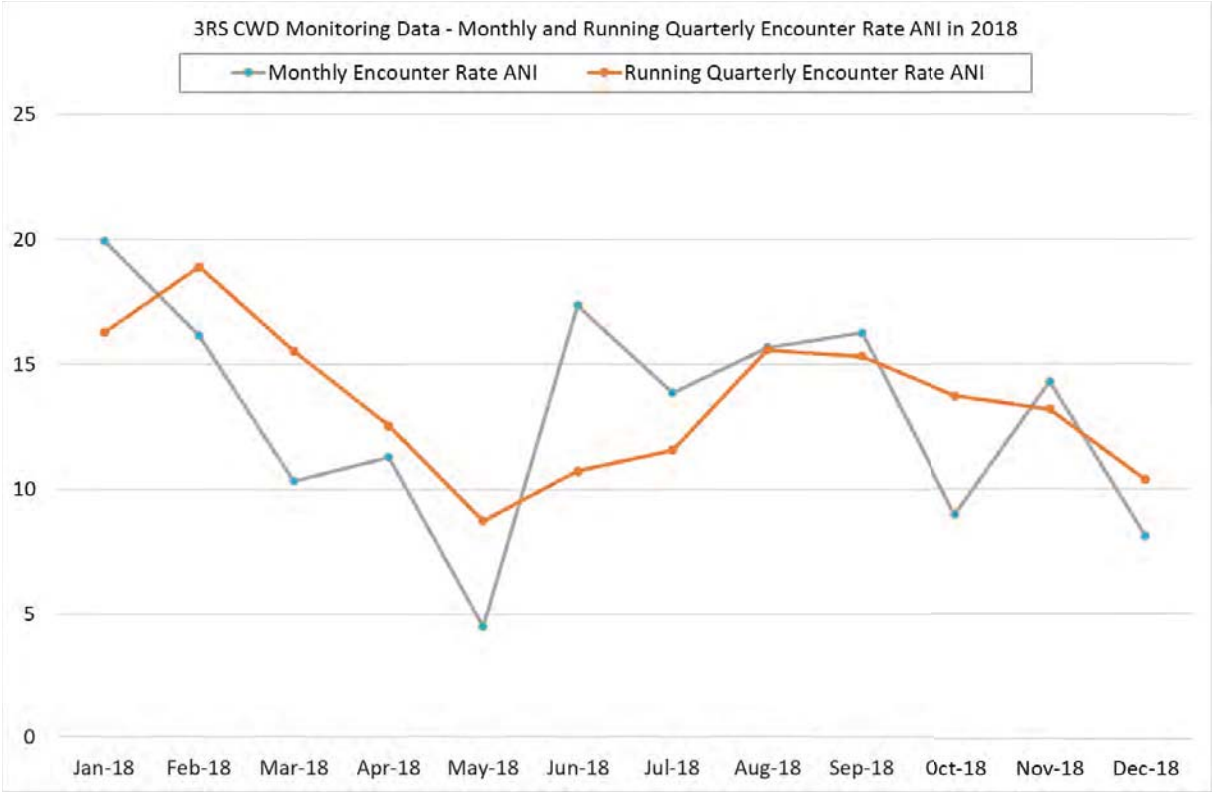


Figure 2: Graphical Presentation of Monthly and Running Quarterly Encounter Rates in the Reporting Period (January to December 2018)

(a) Encounter Rate STG



(b) Encounter Rate ANI

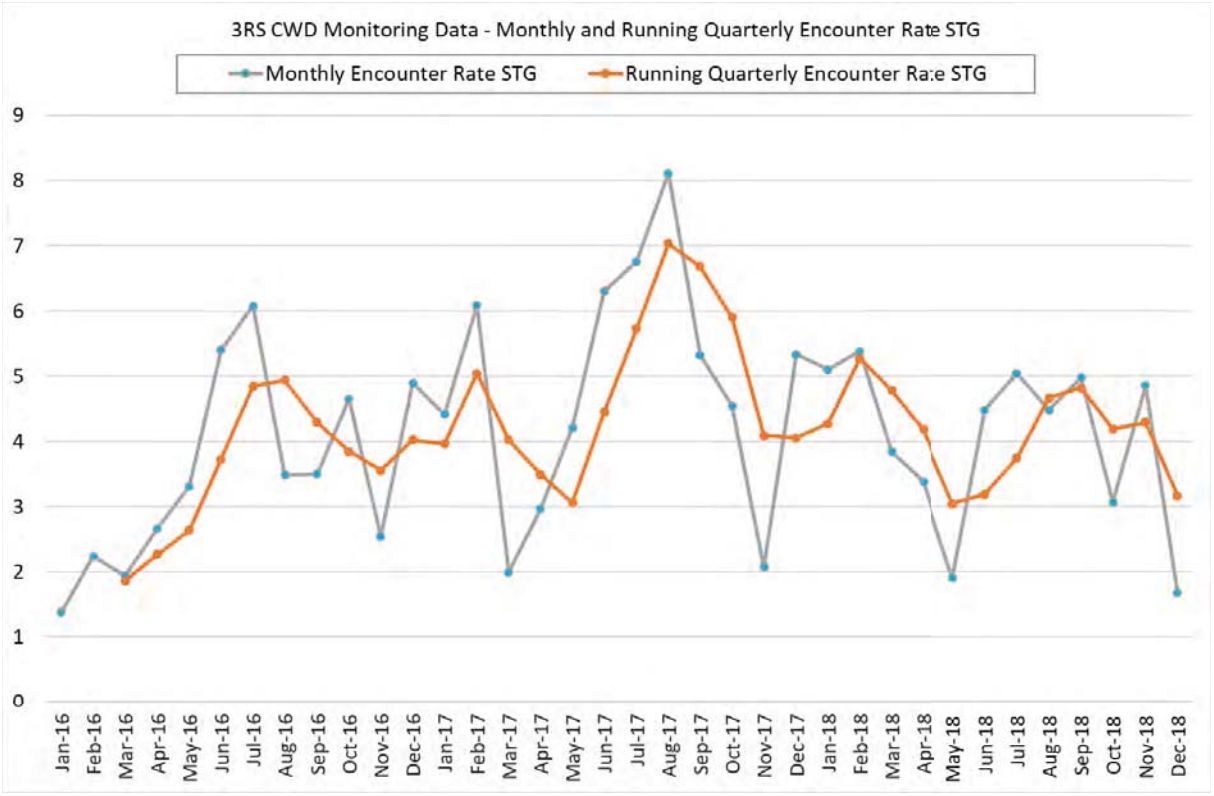


Notes

1. The key marine works activities of the Project carried out in the reporting period included deep cement mixing (DCM) works, marine filling, seawall construction, laying of sand blanket, and prefabricated vertical drain (PVD) installation.
2. Encounter rates were calculated by using survey data collected under favourable weather condition only (Beaufort Sea State 3 or below with favourable visibility).

Figure 3: Graphical Presentation of Monthly and Running Quarterly Encounter Rates from January 2016 to December 2018

(a) Encounter Rate STG



(b) Encounter Rate ANI

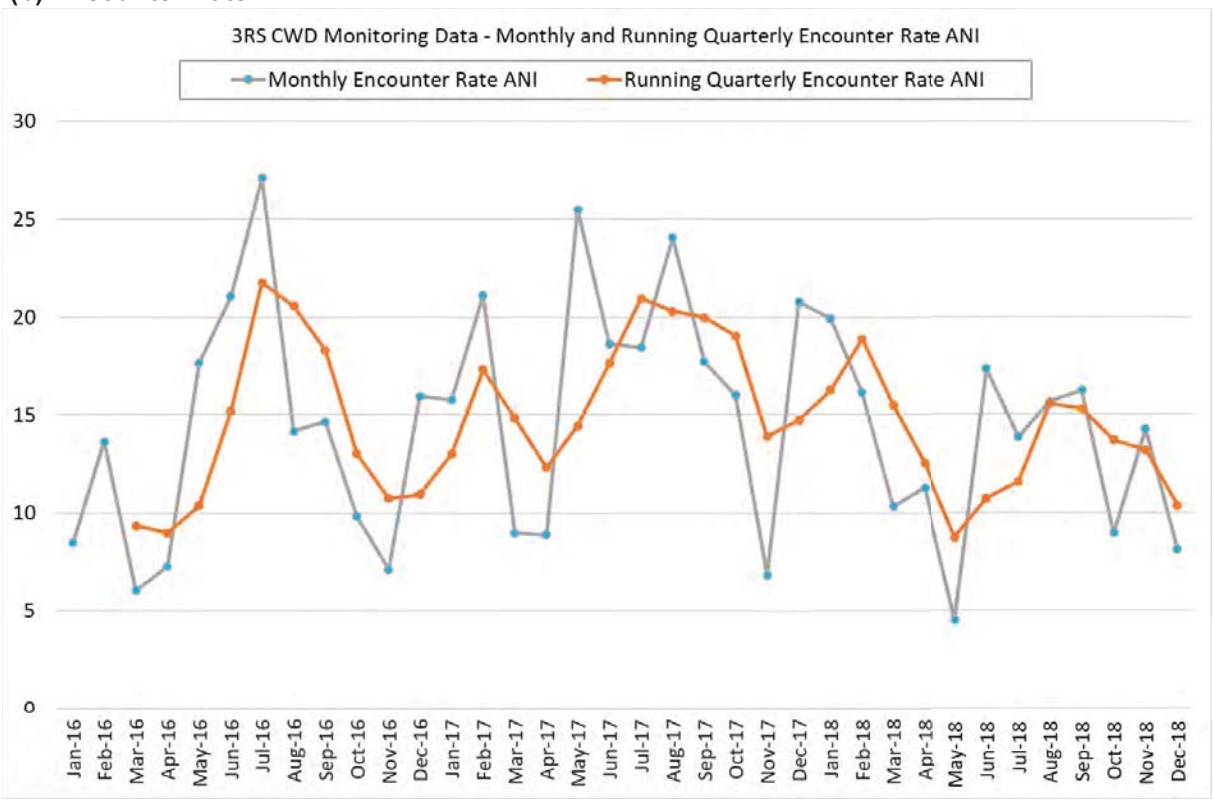
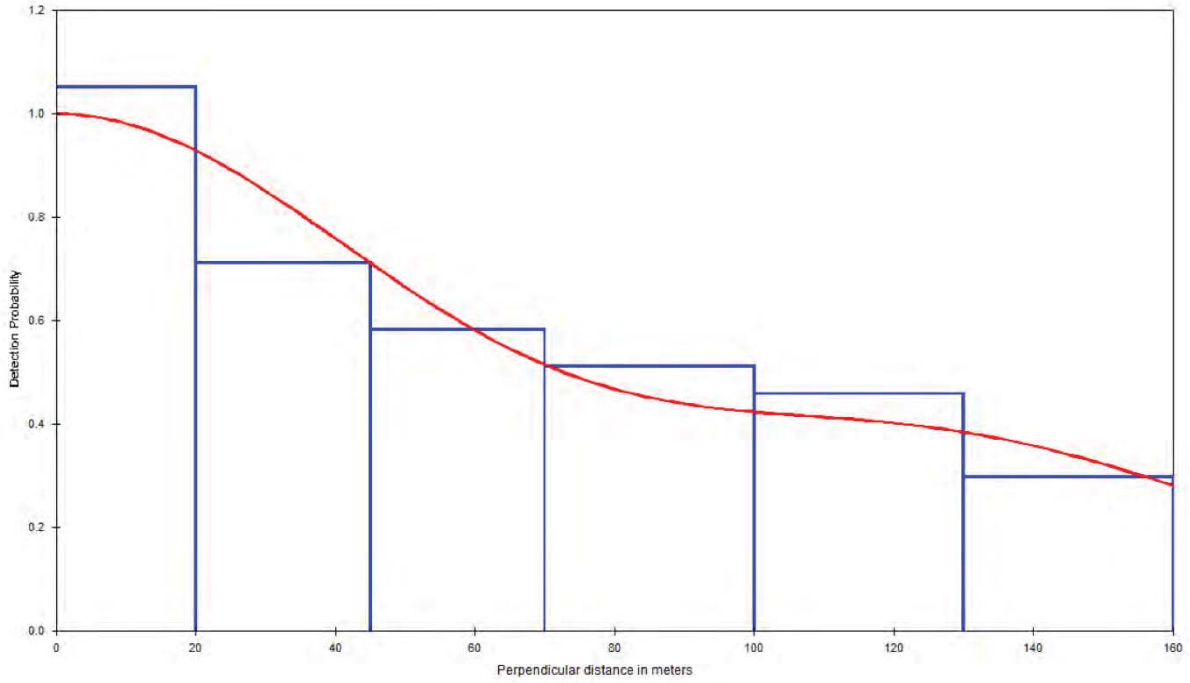


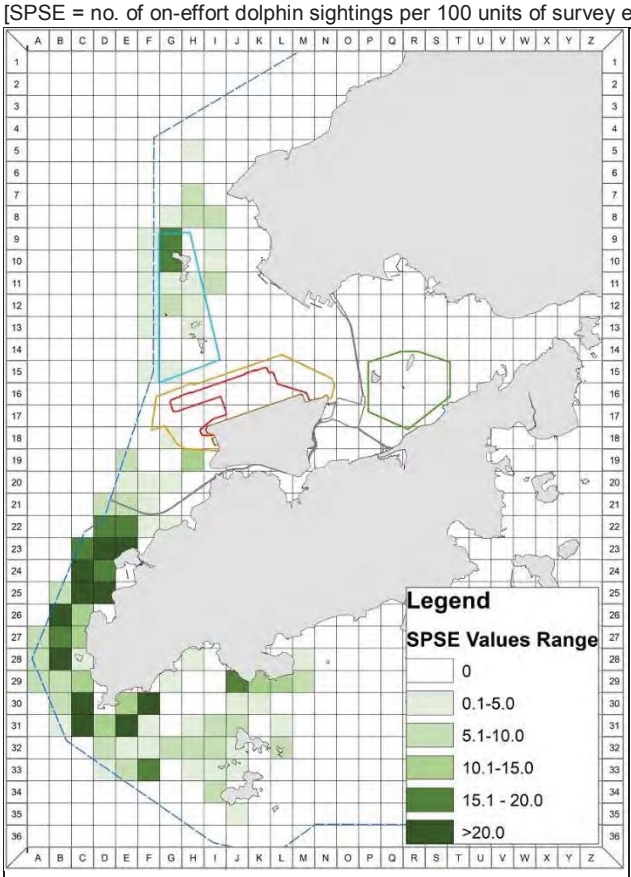
Figure 4: Fitted Detection Function of the 2018 CWD Sightings, Pooled from All Western Hong Kong Survey Areas



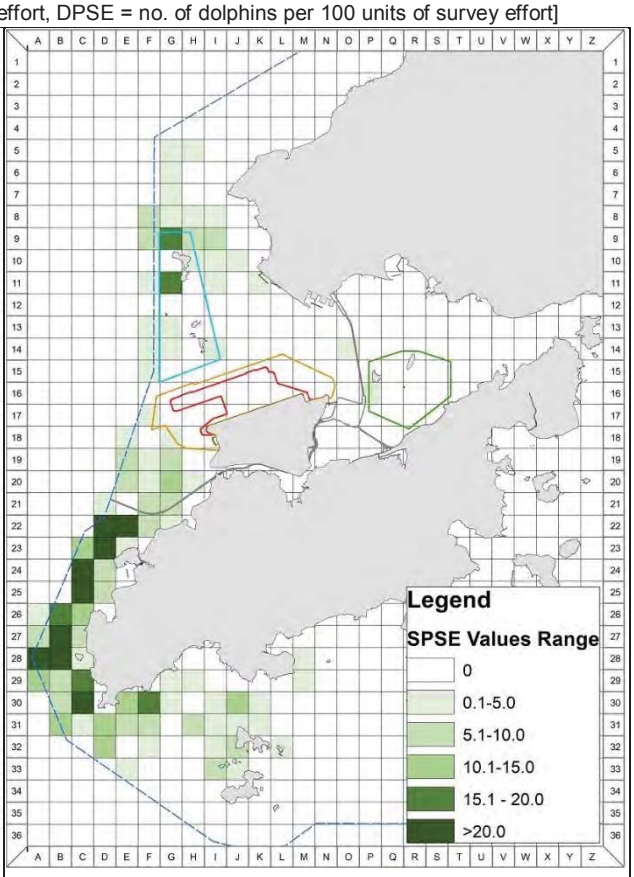
[Note: Detection function used a Half Normal model with a cosine adjustment.]

Figure 5: Quantitative Grid Analysis – SPSE and DPSE of CWDs with Corrected Survey Effort per km^2 of Year 2017 and Year 2018

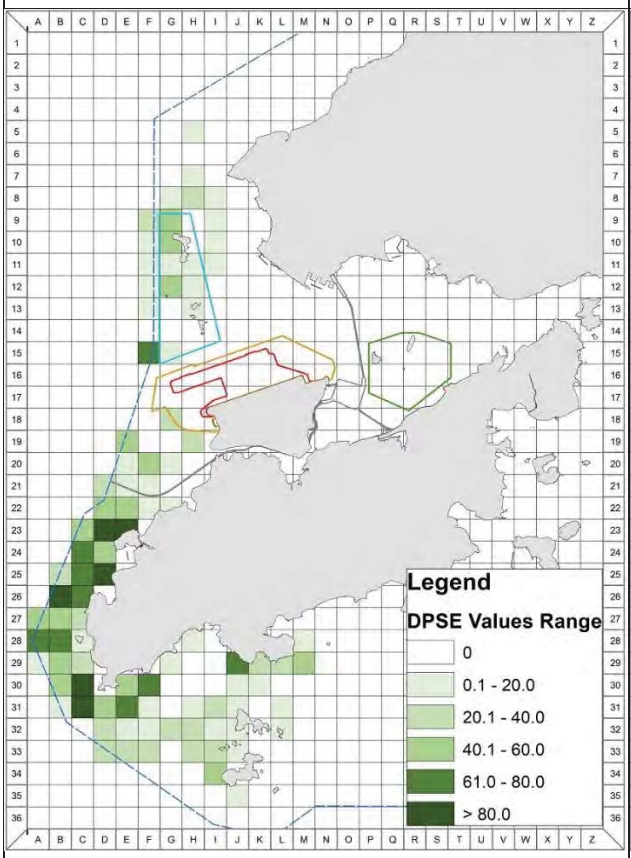
[SPSE = no. of on-effort dolphin sightings per 100 units of survey effort, DPSE = no. of dolphins per 100 units of survey effort]



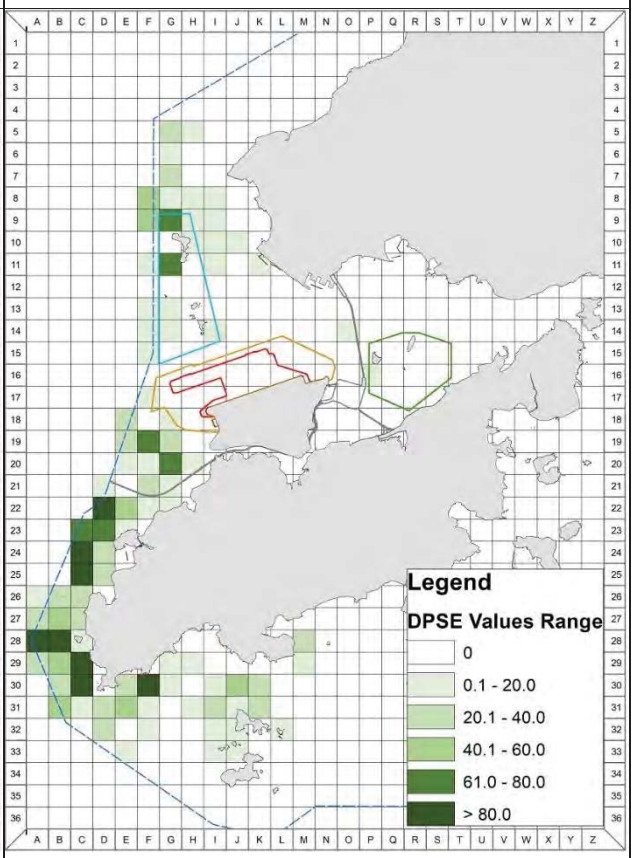
SPSE of 2017



SPSE of 2018



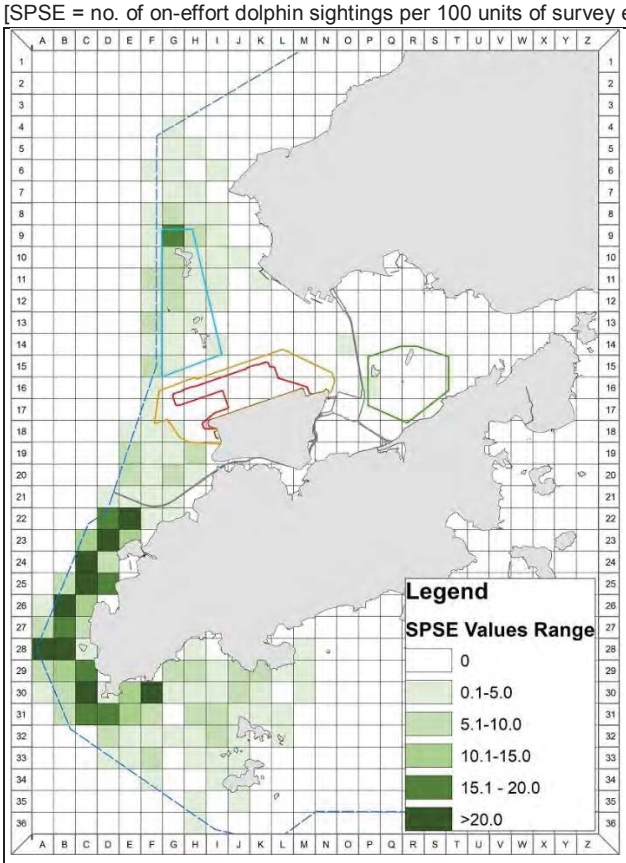
DPSE of 2017



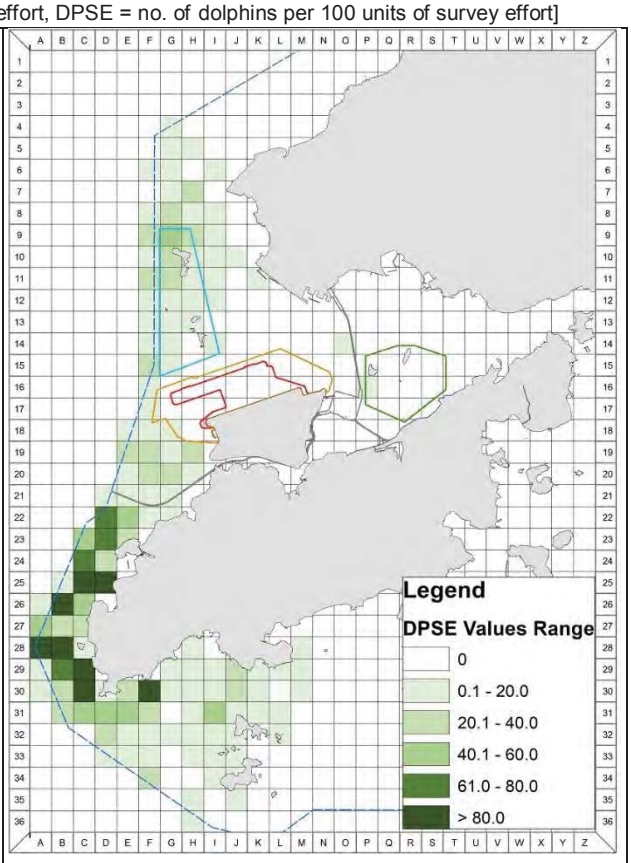
DPSE of 2018

Figure 6: Cumulative SPSE and DPSE of CWDs with Corrected Survey Effort per km^2 from Dec 2015 to Dec 2018

[SPSE = no. of on-effort dolphin sightings per 100 units of survey effort, DPSE = no. of dolphins per 100 units of survey effort]

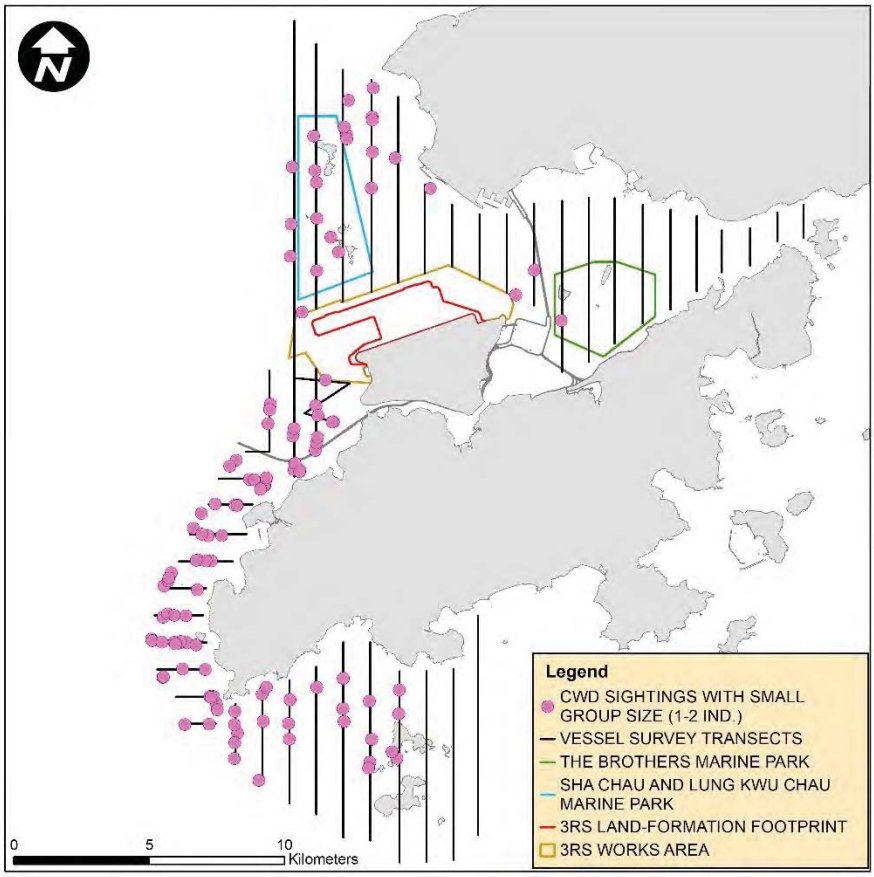


Cumulative SPSE from Mid-Dec 2015 to Dec 2018



Cumulative DPSE from Mid-Dec 2015 to Dec 2018

Figure 7: Sightings Distribution of Chinese White Dolphins with Different Group Sizes in 2018
(a) Small Group Size (1 to 2 dolphins)



(b) Medium Group Size (3 to 9 dolphins) and Large Group Size (10 or more dolphins)

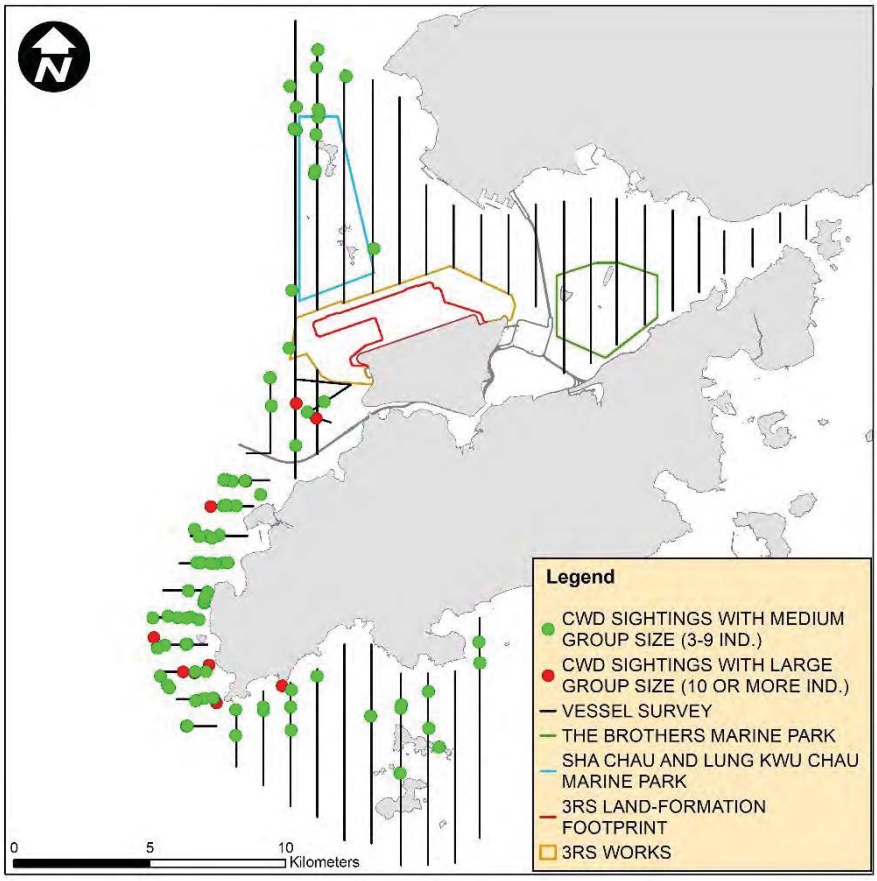


Figure 8: Sighting Locations of CWD Groups Engaged in Different Activities in 2018

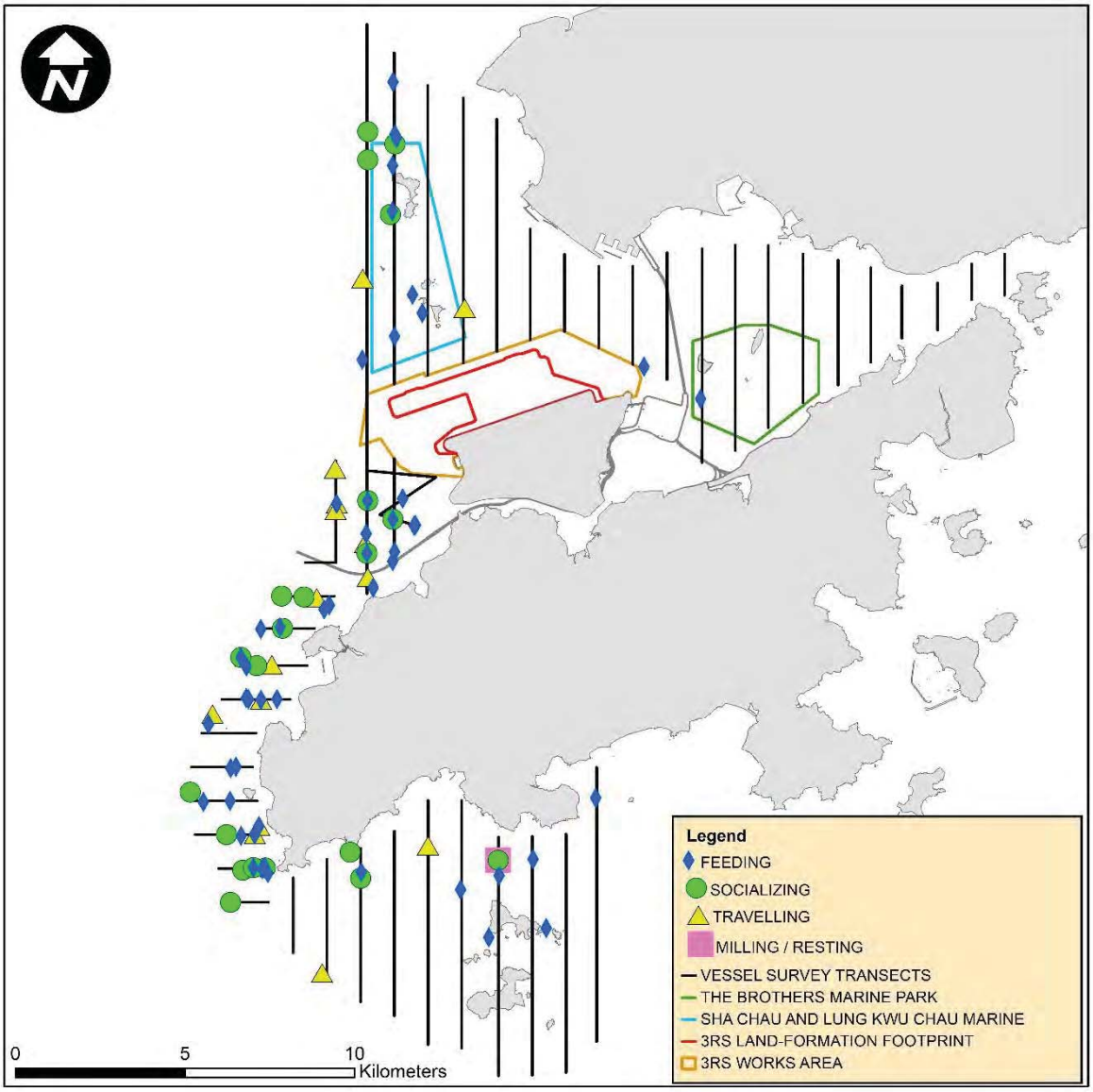


Figure 9: Sighting Locations of CWD Groups in Association with Fishing Boat in 2018

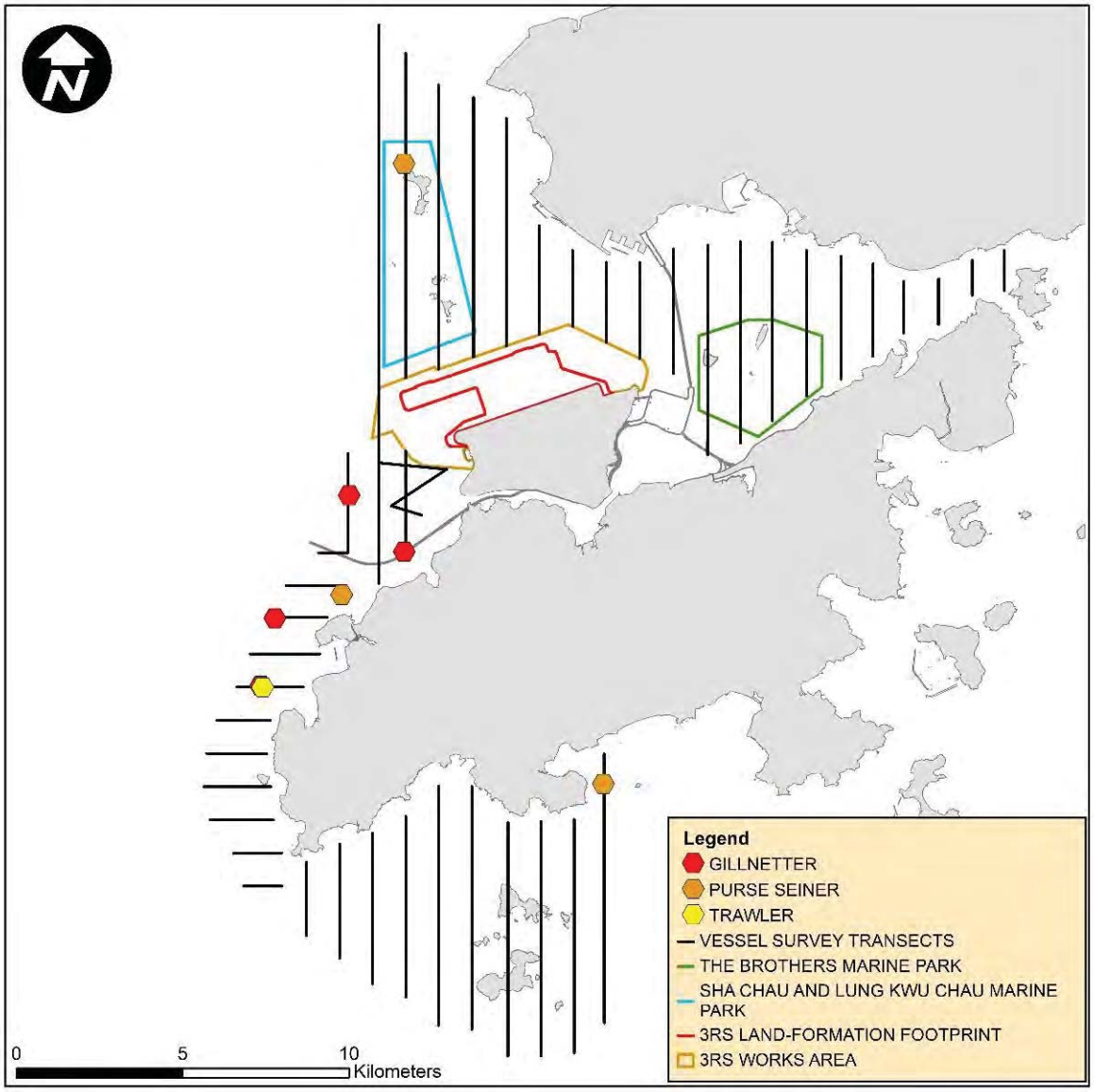


Figure 10: Sighting Locations of Mother-calf / Mother-unspotted Juvenile Pairs in 2018

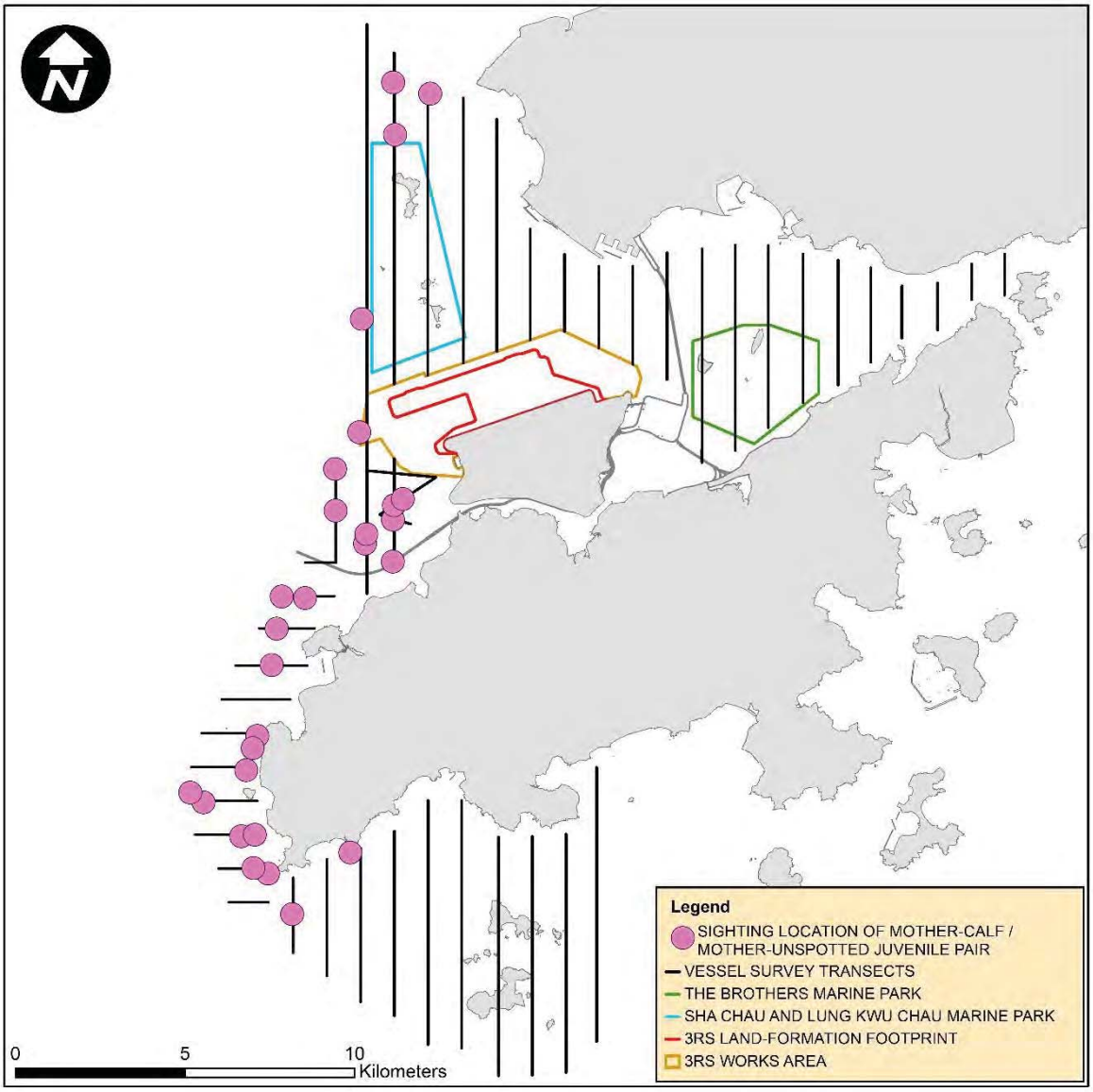
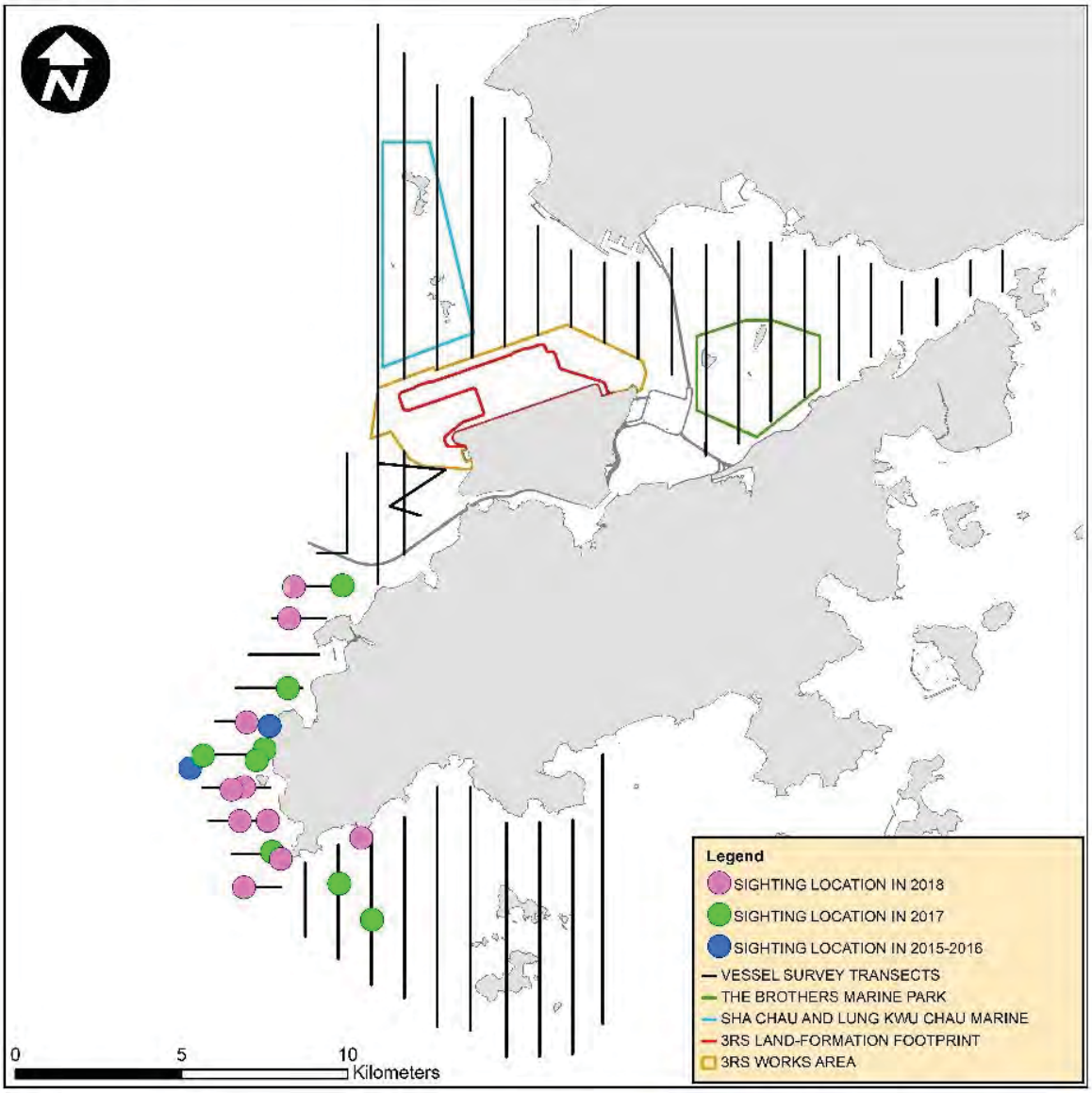
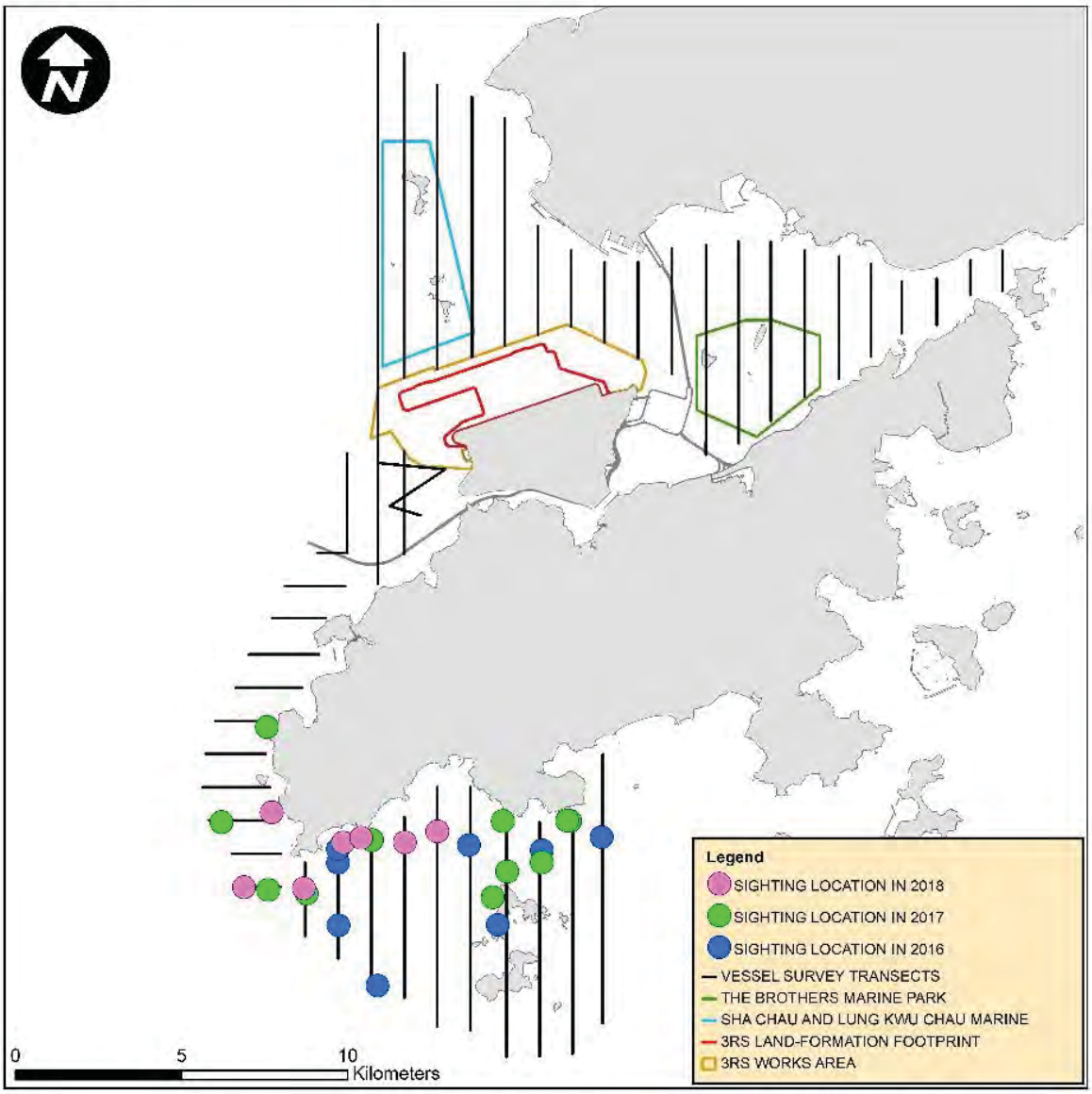


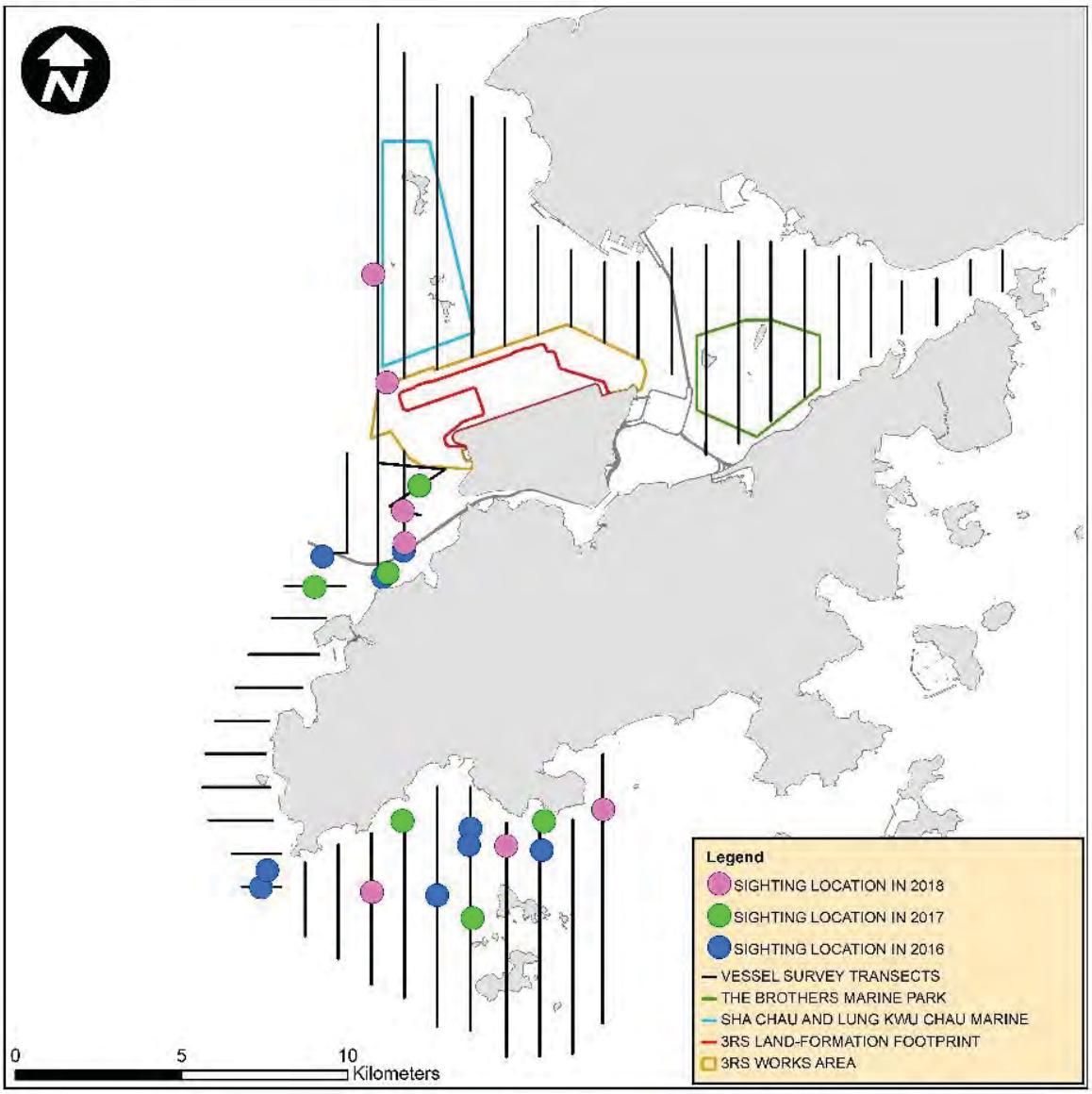
Figure 11 (batch): Photo Identification – Re-sighting Locations
WLMM001 – the most frequently re-sighted animal in 2018



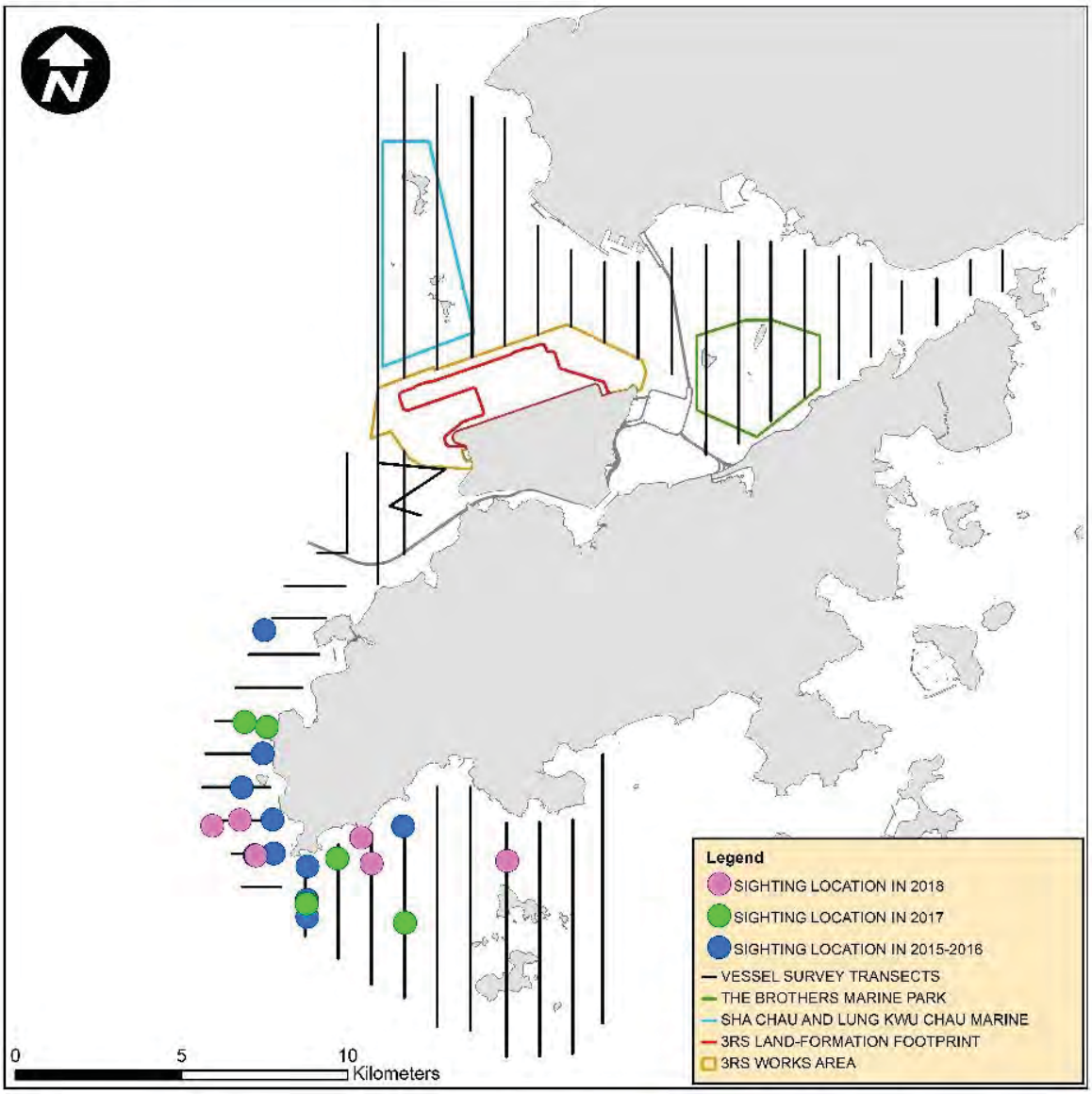
SLMM014 – the most frequently re-sighted animal since 2015



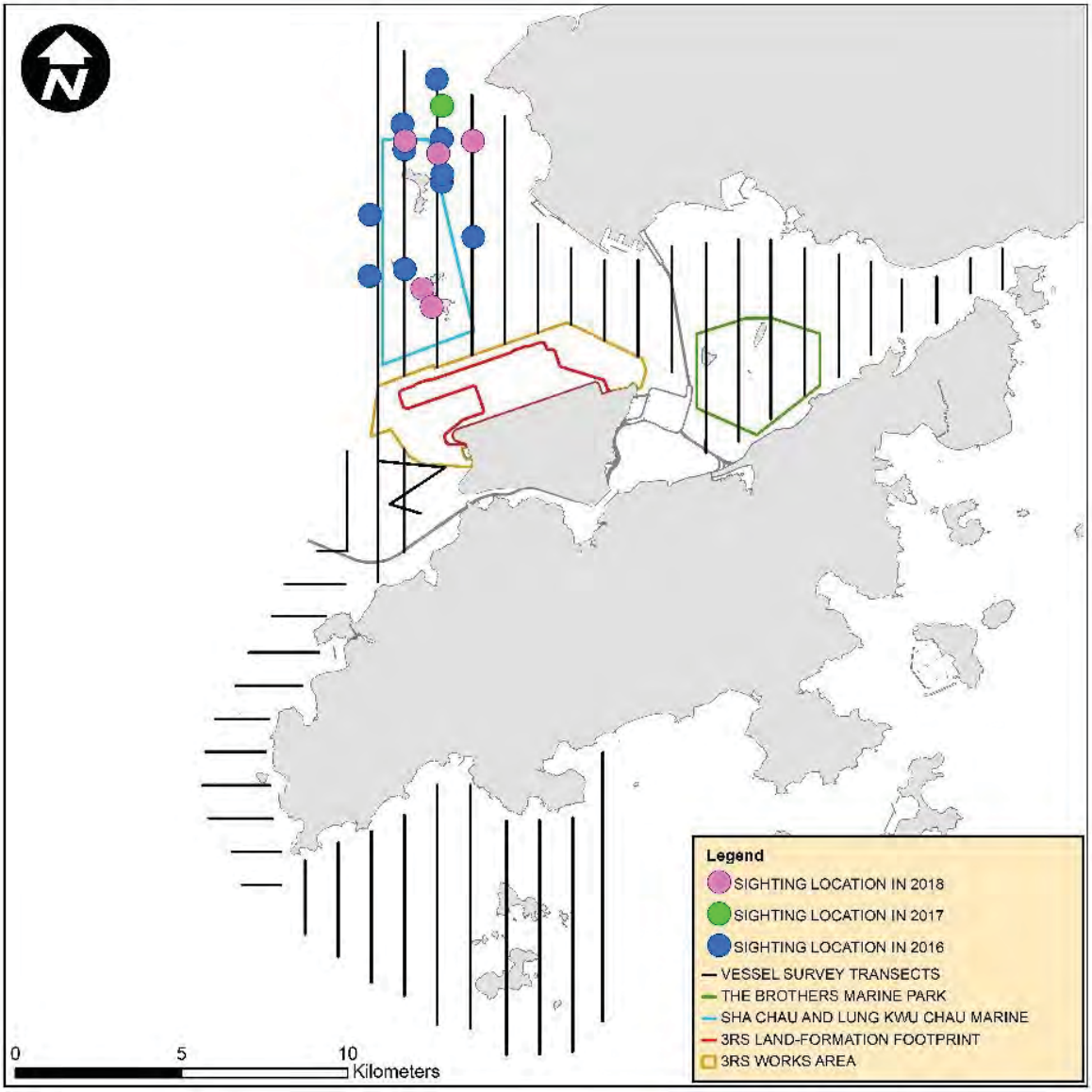
WLMM027 – the second most frequently re-sighted animal since 2015



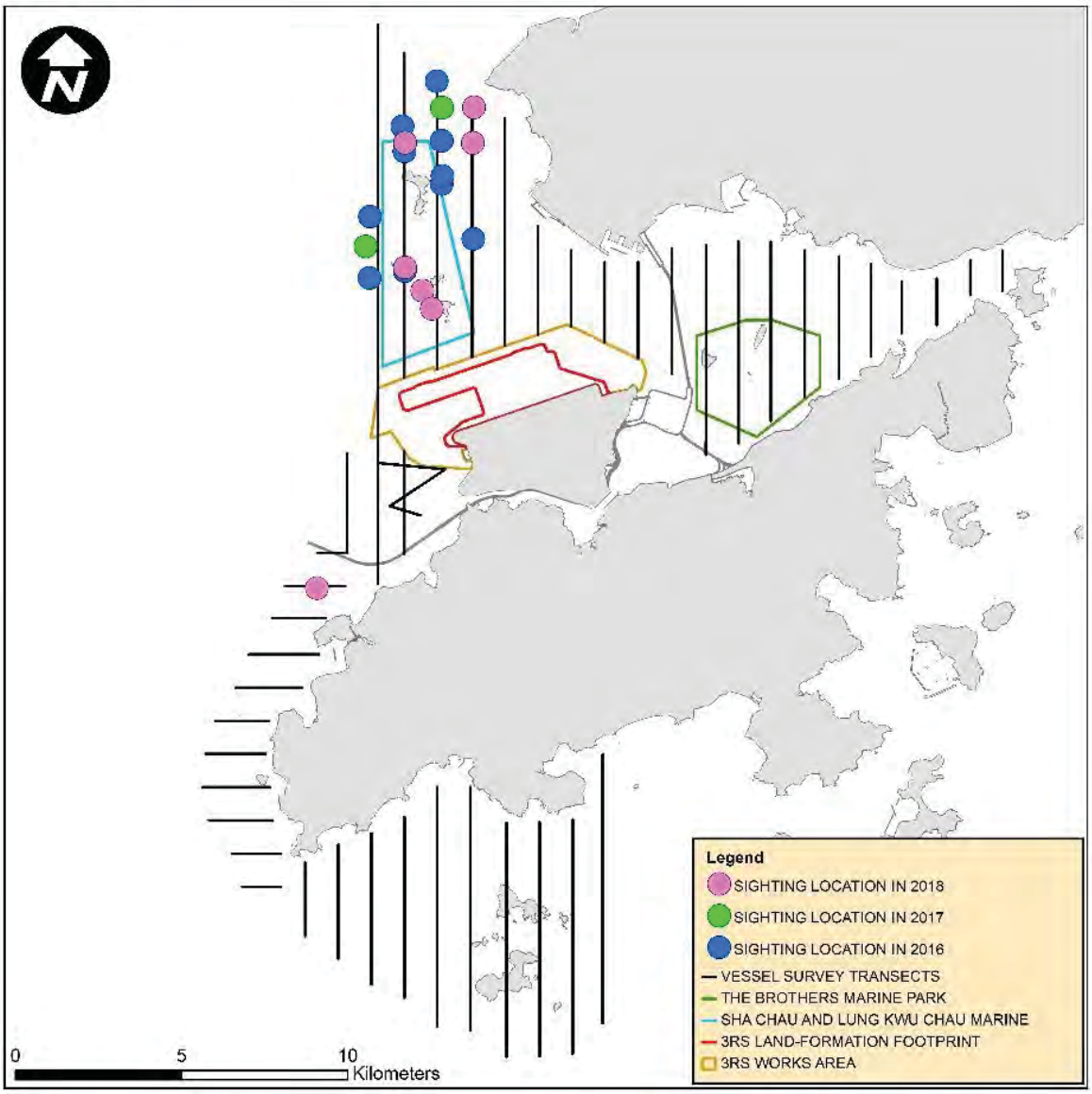
SLMM010 – the third most frequently re-sighted animal since 2015



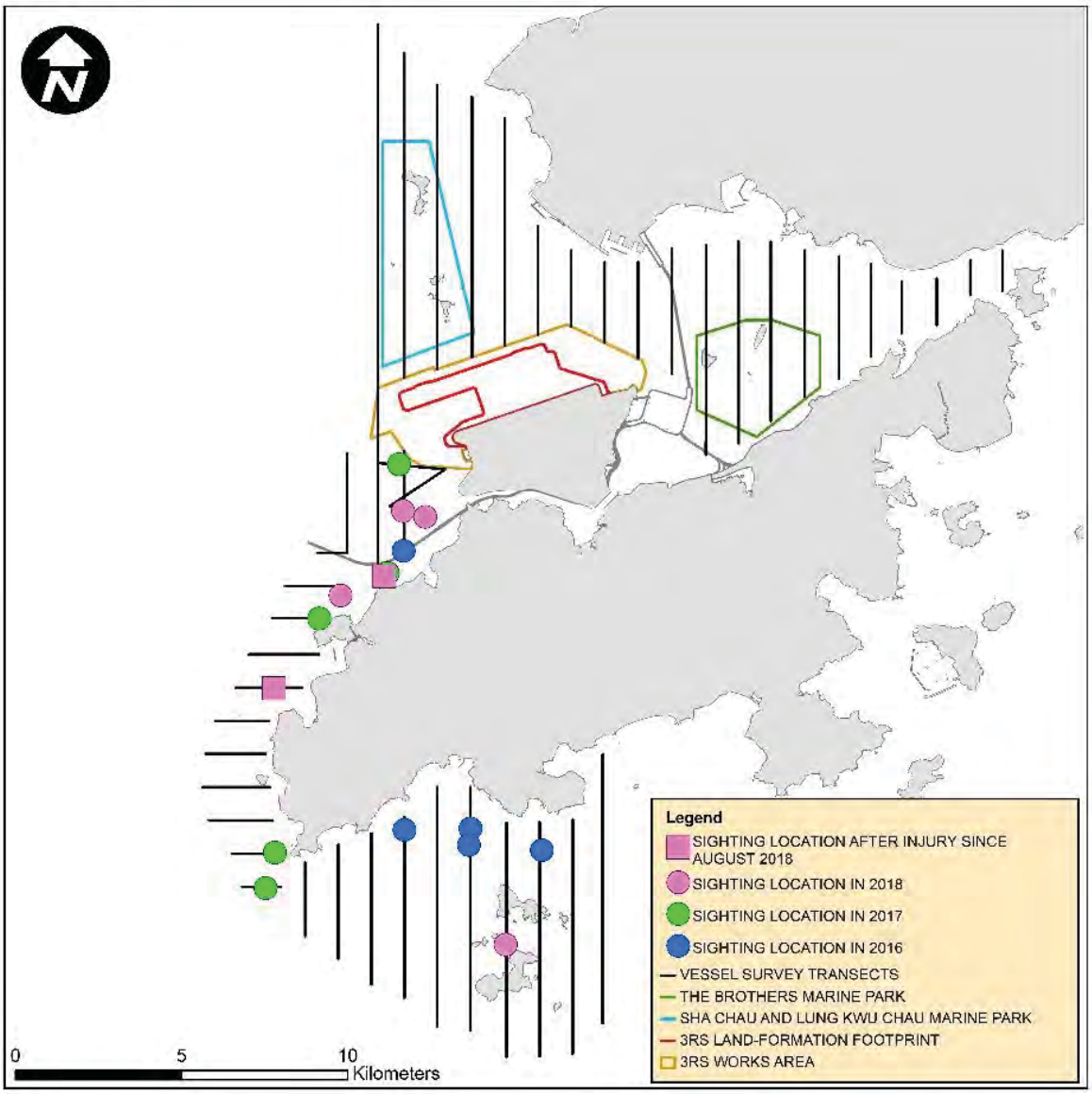
NLMM006 – the mother-and-spotted juvenile pair that re-frequent Hong Kong waters in 2018



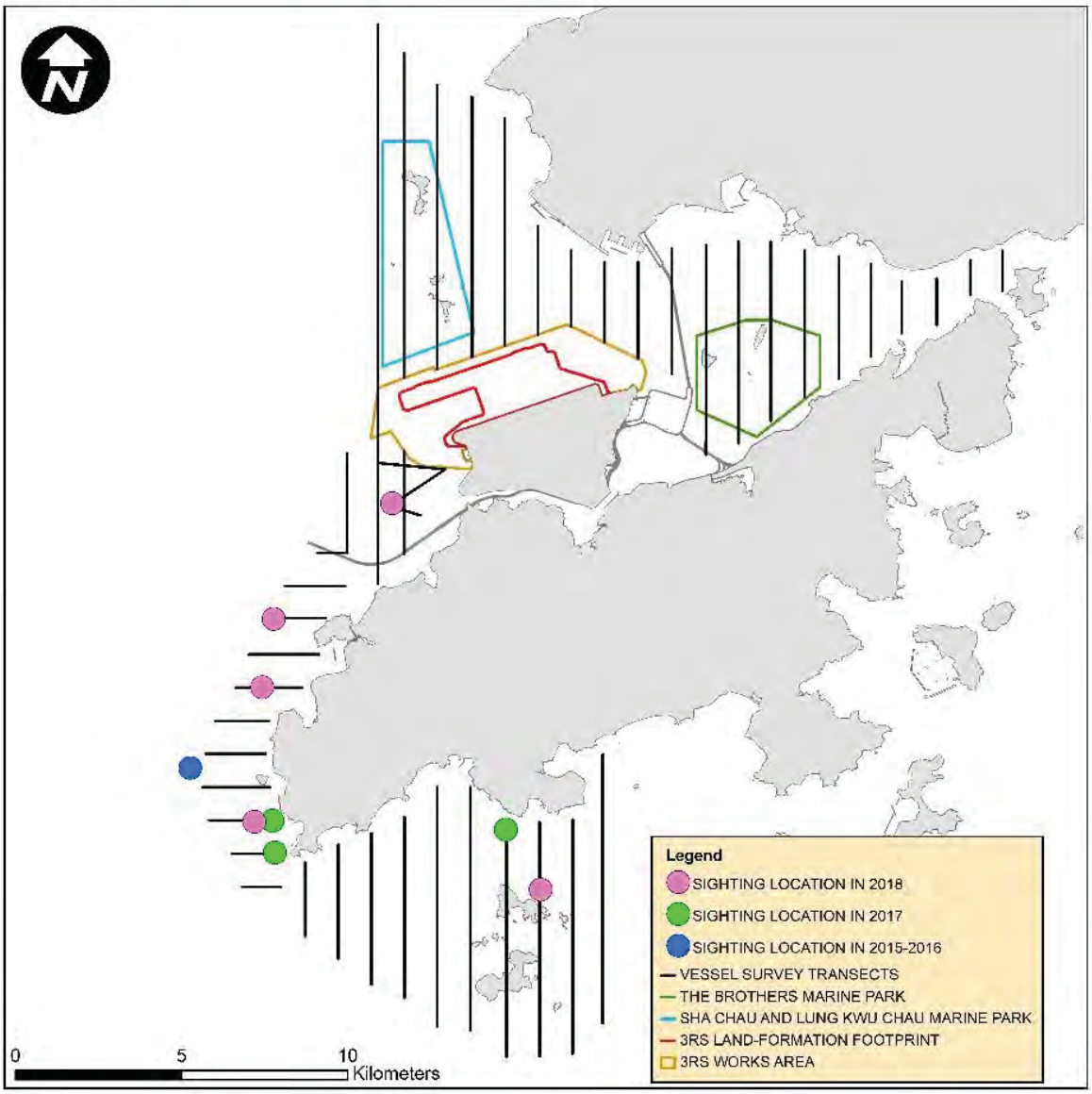
NLMM013 – the mother-and-spotted juvenile pair that re-frequent Hong Kong waters in 2018



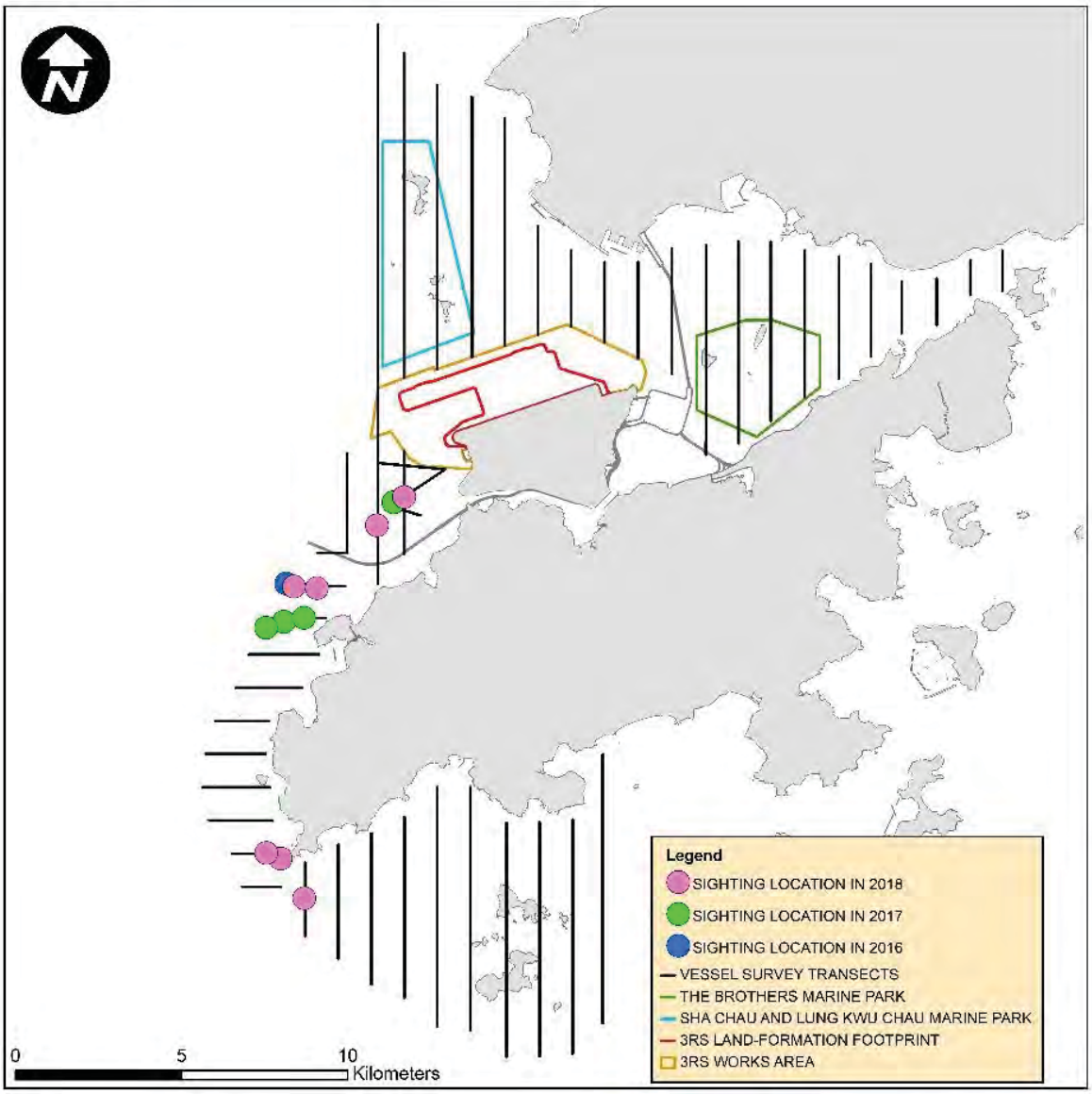
SLMM028 – the severely injured dolphin under spotlight



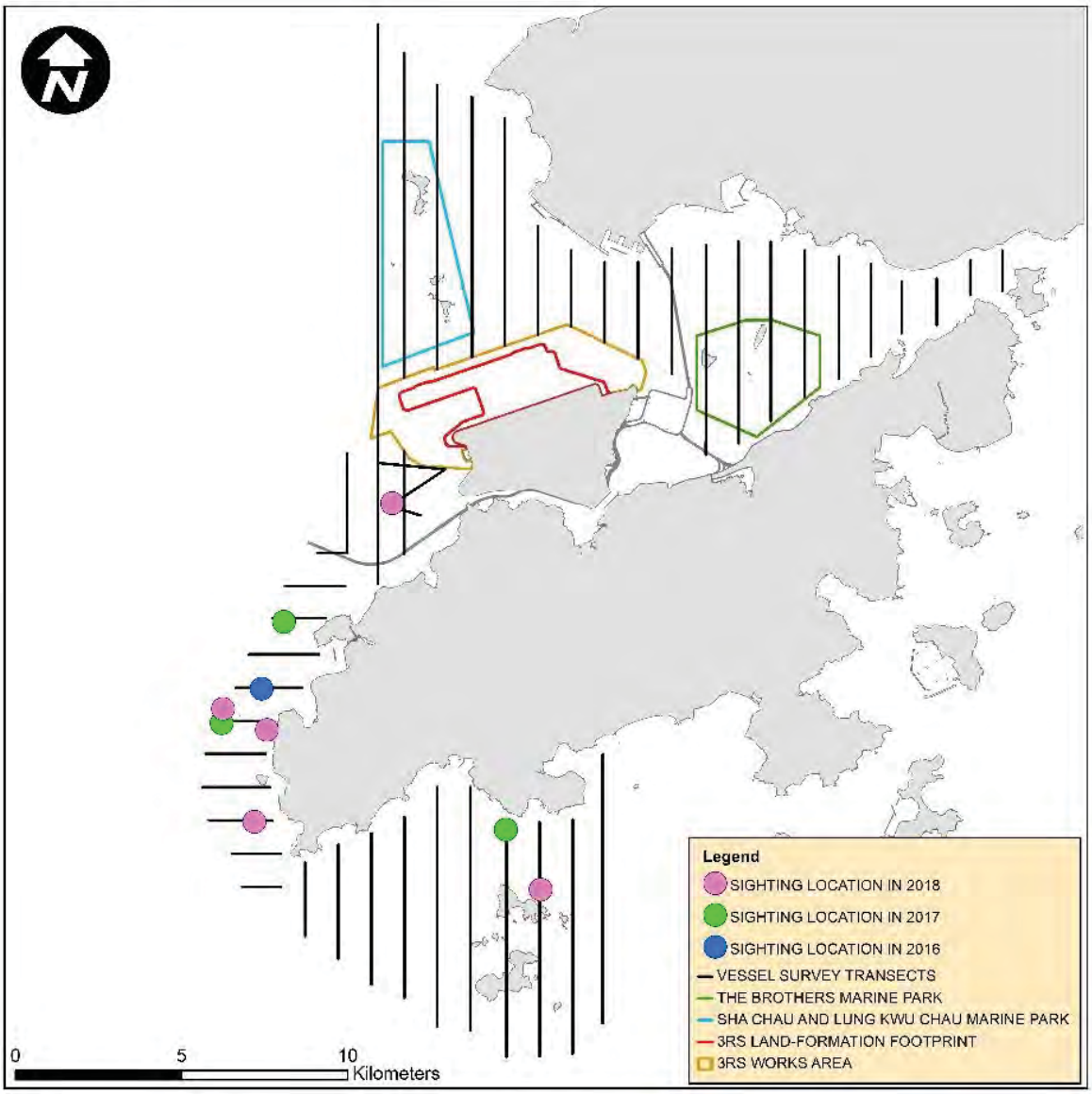
WLMM004 – dolphin which shows cross-area movement in NWL, WL and SWL



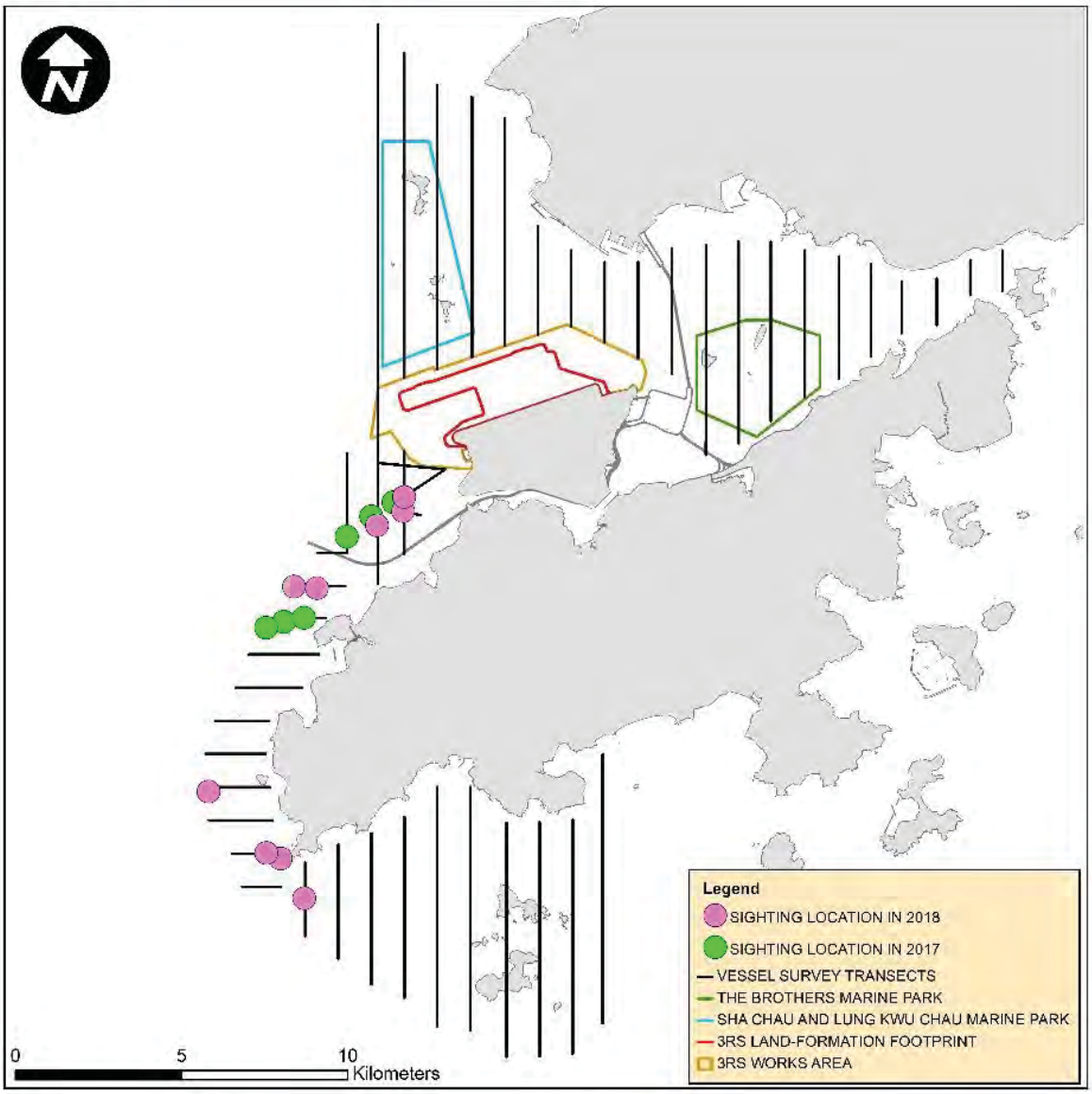
WLMM060 – dolphin which shows cross-area movement in NWL, WL and SWL



WLMM063 – dolphin which shows cross-area movement in NWL, WL and SWL



WLMM071 – dolphin which shows cross-area movement in NWL, WL and SWL



WLMM080 – dolphin which shows cross-area movement in NWL, WL and SWL

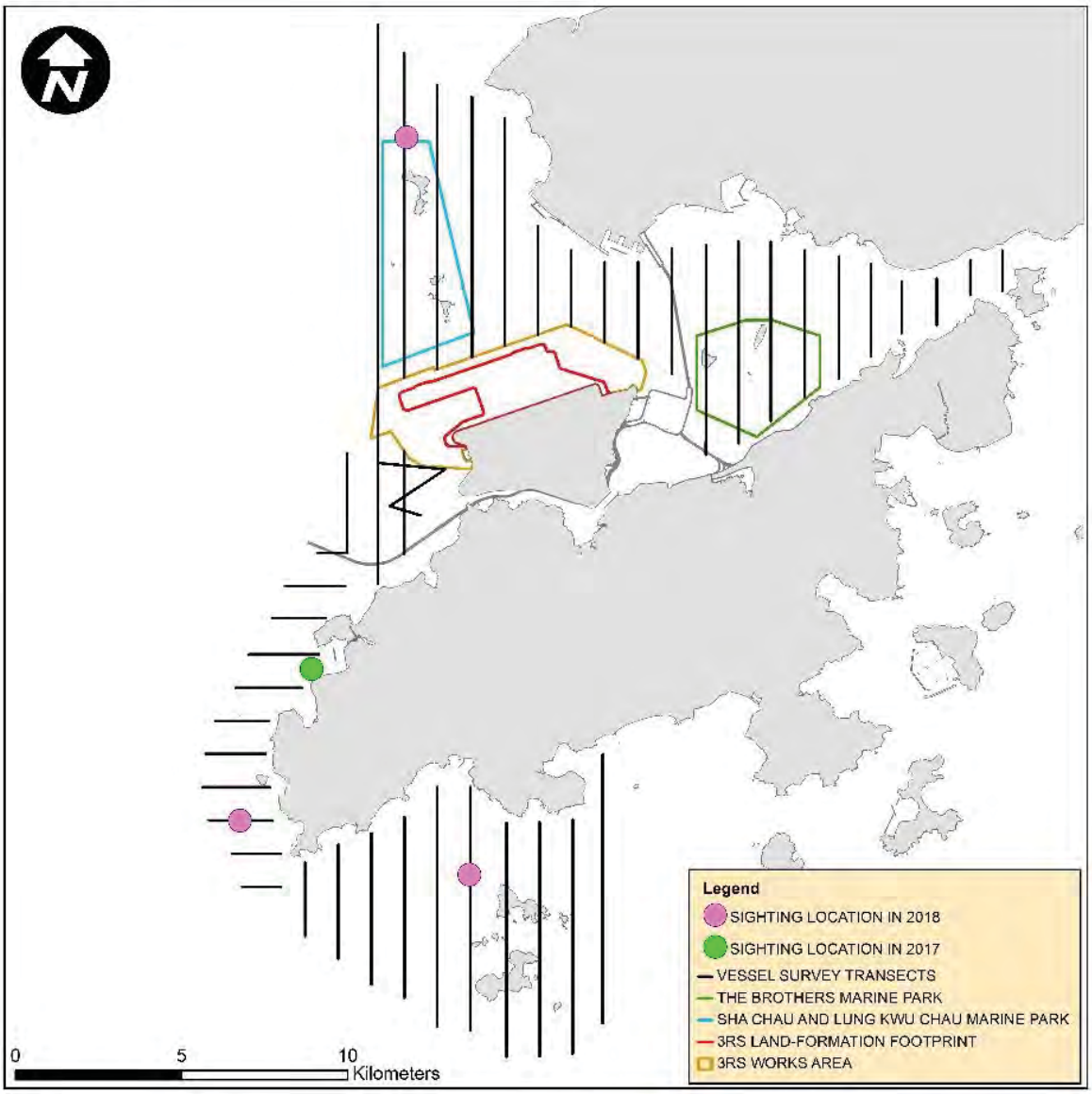


Figure 12: Plots of First Sightings of All CWD Groups (prior to filtering out short-track data) Obtained from Land-based Station at Lung Kwu Chau in 2018

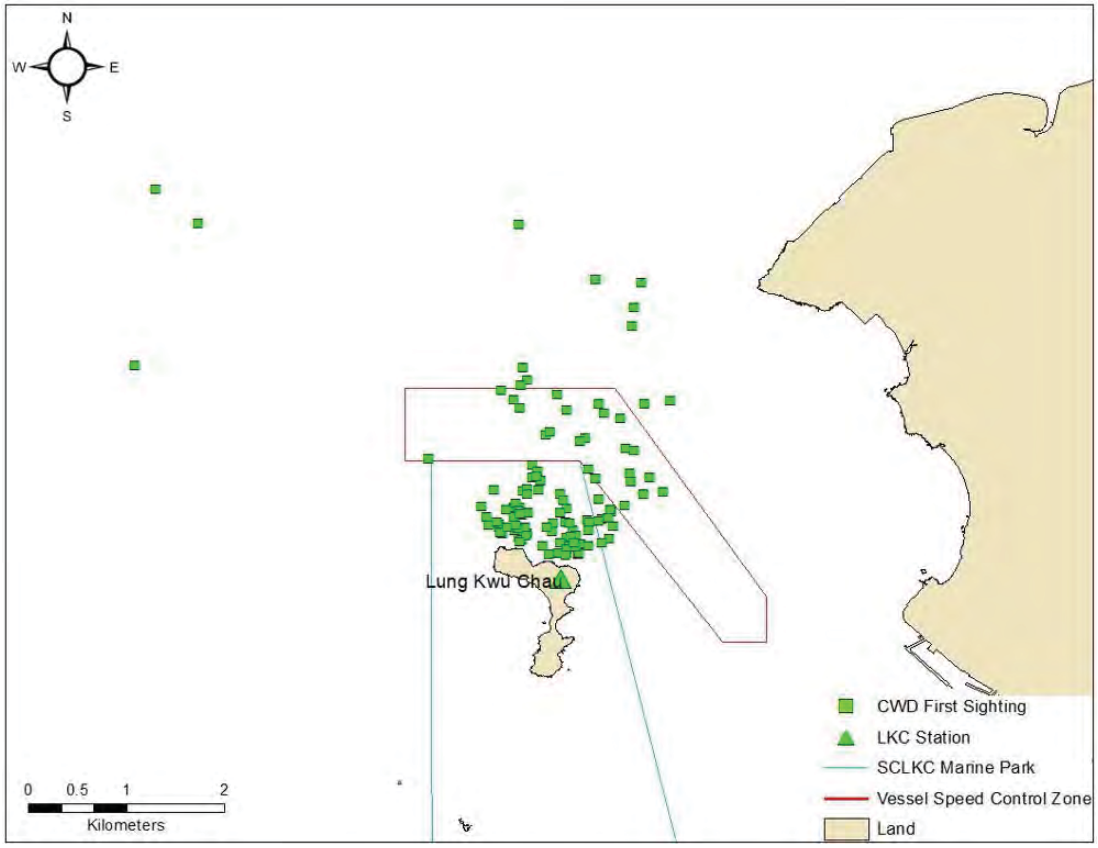


Figure 13: Total Duration of CWD Groups Tracked (per total effort time) from Lung Kwu Chau (prior to filtering short-track data) Based on Time of Day in 2018

[Time indicates the hour block during which CWD groups were tracked. The "n" in parentheses represents the number of days that survey effort was carried out during the associated hour block.]

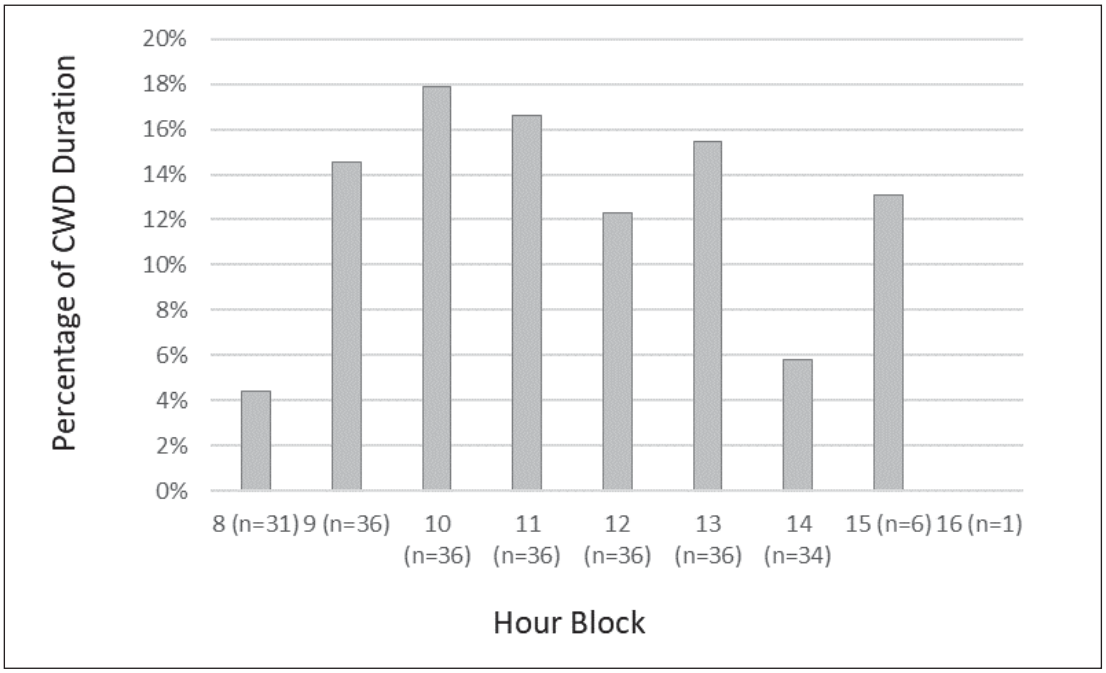


Figure 14: CWD Groups Sighted and Tracked from Lung Kwu Chau Based on Month of the Year in 2018

[The numbers above the bars indicate the total number of CWD groups tracked per study period (prior to filtering data)]

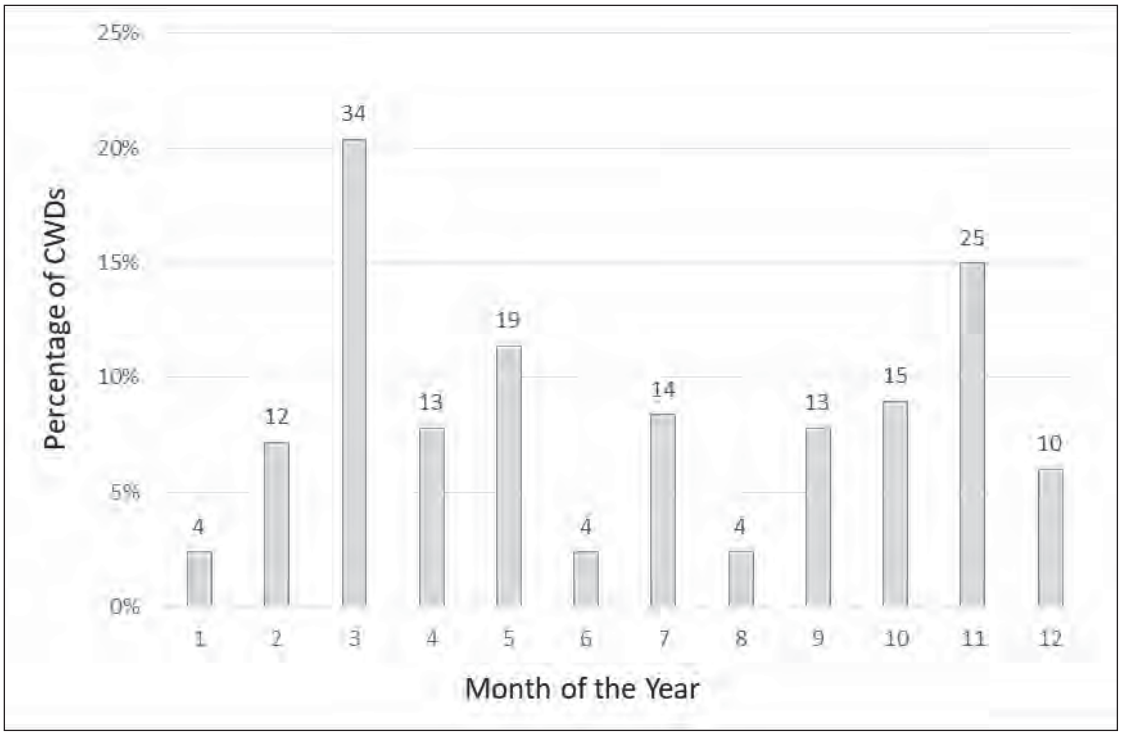


Figure 15: Plots of CWD Short-track Positions (Standardized Segments) relative to Group Size tracked within Sha Chau and Lung Kwu Chau Marine Park in 2018

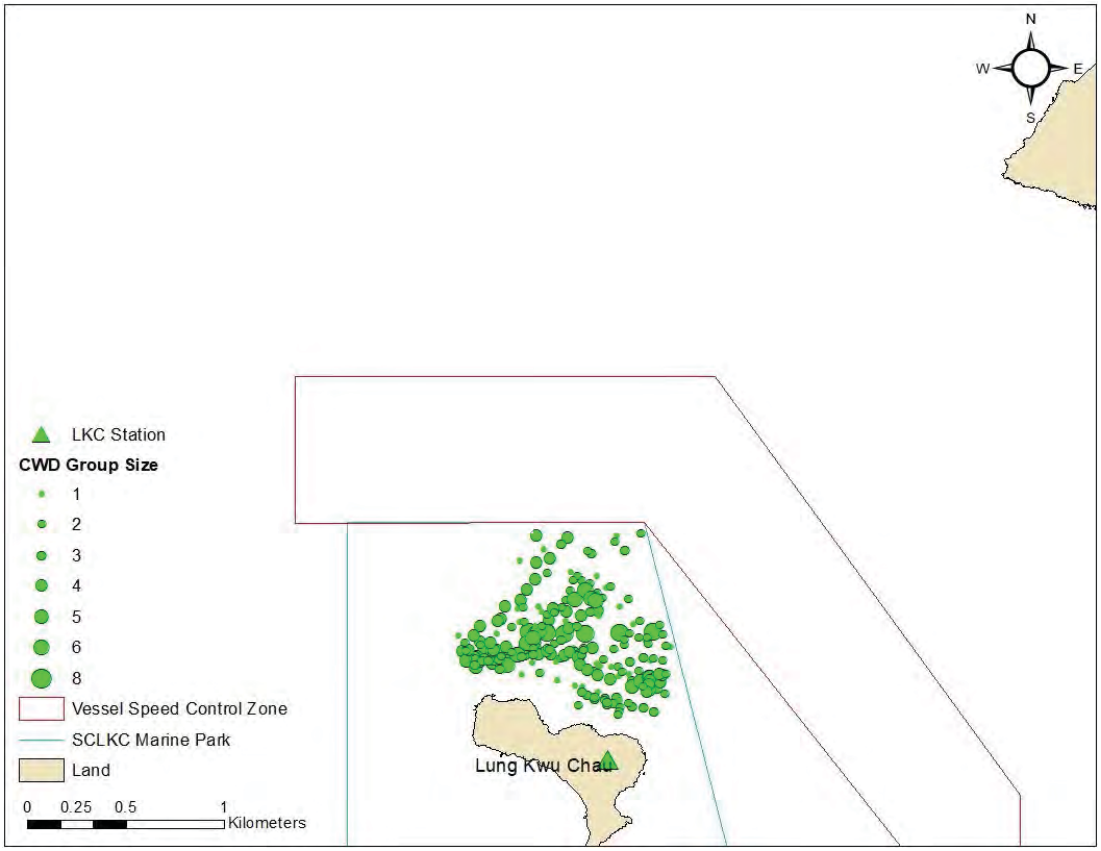


Figure 16: Plots of CWD Short-track Positions (Standardized Segments) relative to Group Size crossing the boundary of Sha Chau and Lung Kwu Chau Marine Park in 2018

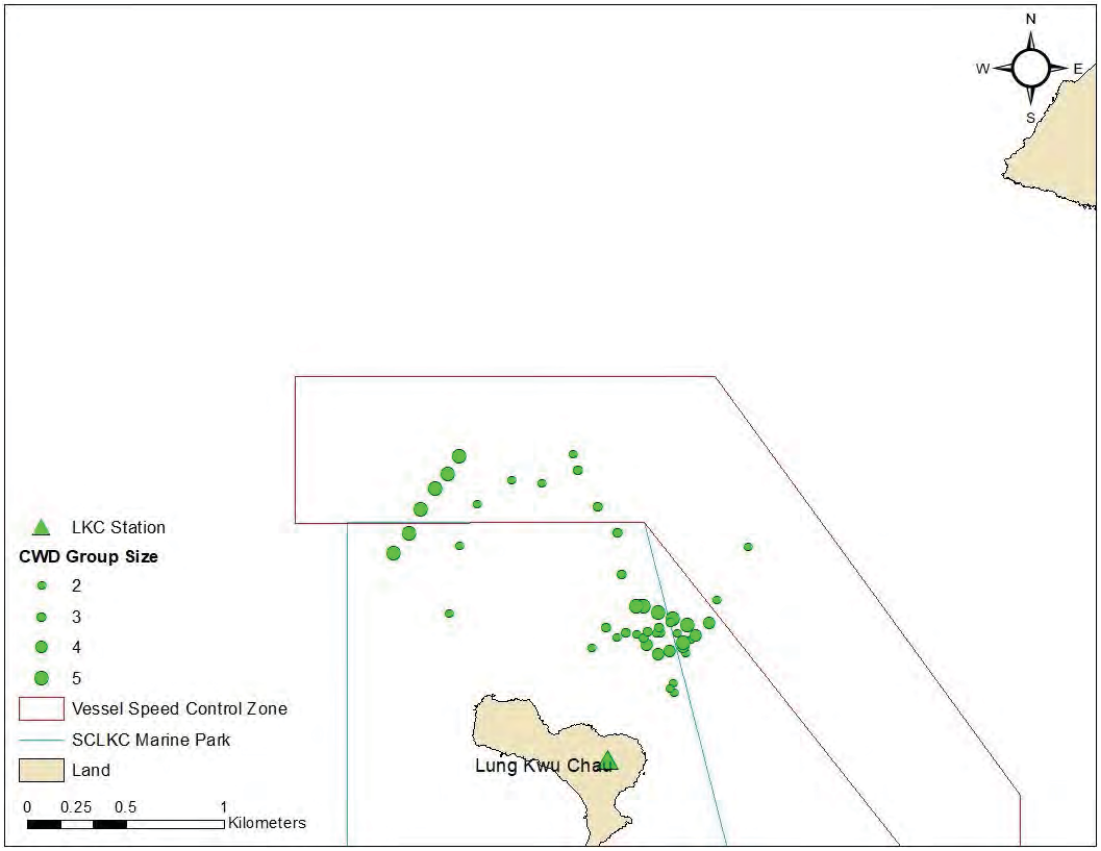


Figure 17: Plots of CWD Short-track Positions (Standardized Segments) relative to Group Size tracked outside Sha Chau and Lung Kwu Chau Marine Park in 2018

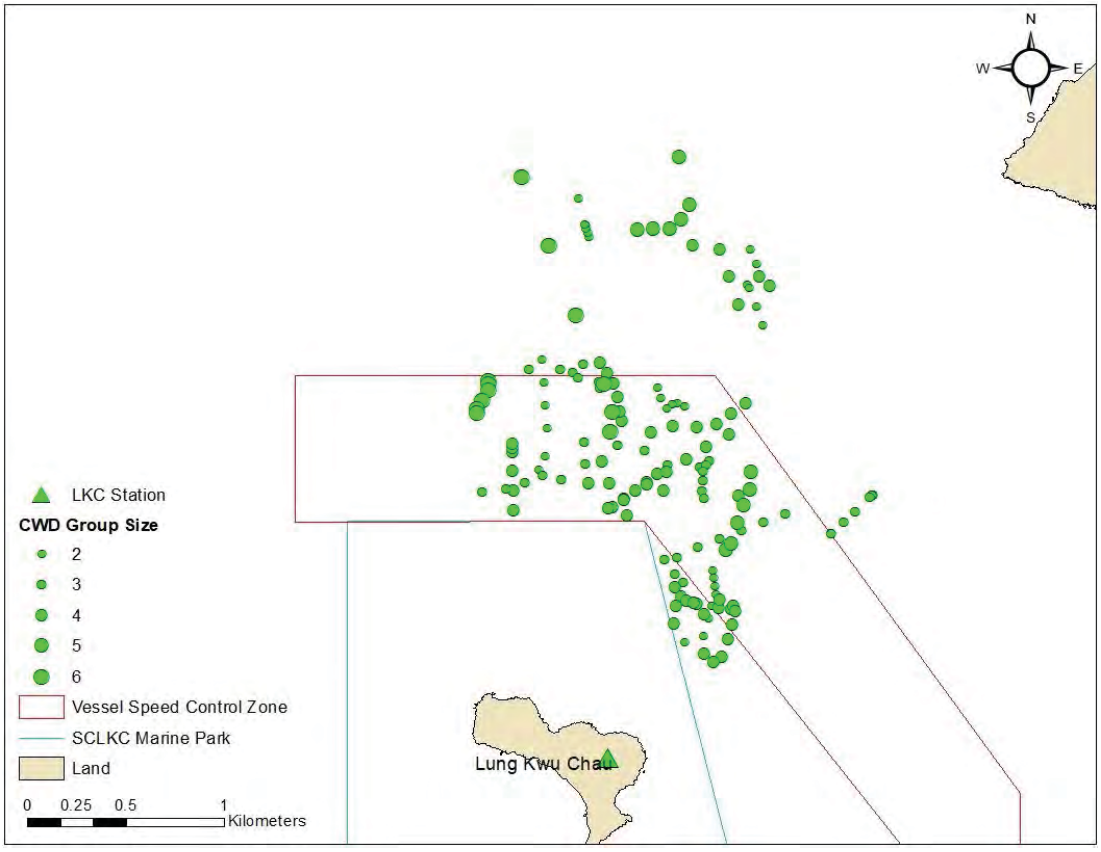


Figure 18: Percentages of CWD Behavioural States, excluding Unknown Category, recorded from Lung Kwu Chau in 2018

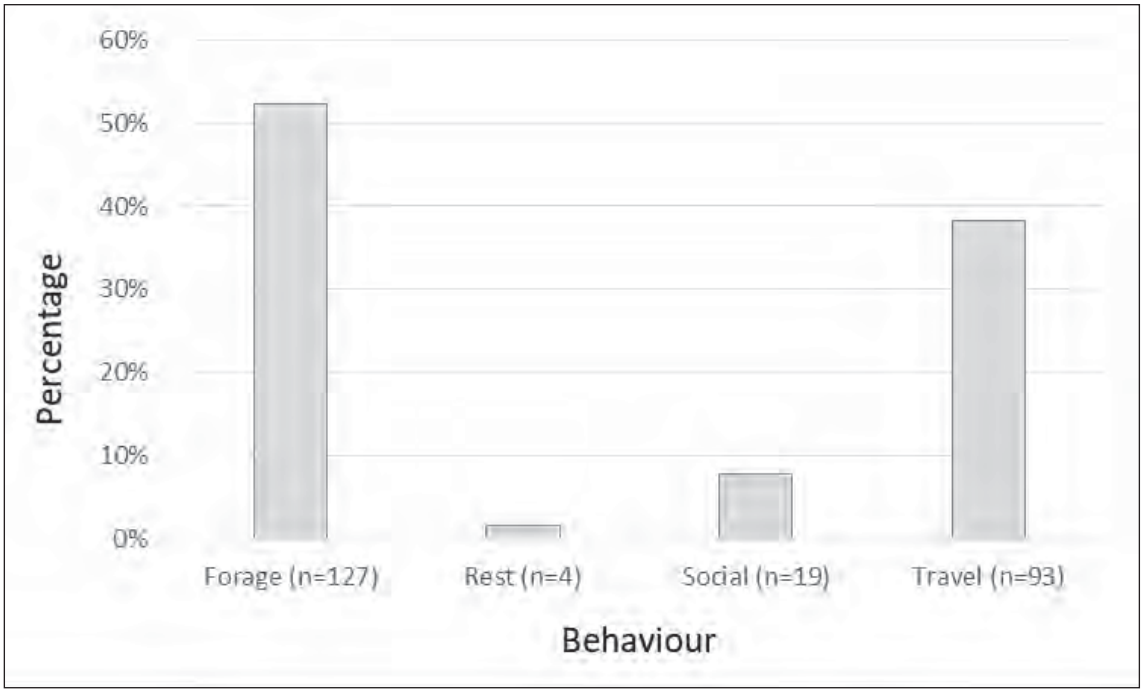


Figure 19: Stacked bar graph showing percentages of CWD Behavioural States, excluding Unknown Category, relative to the Sha Chau and Lung Kwu Chau Marine Park Location, recorded from Lung Kwu Chau in 2018

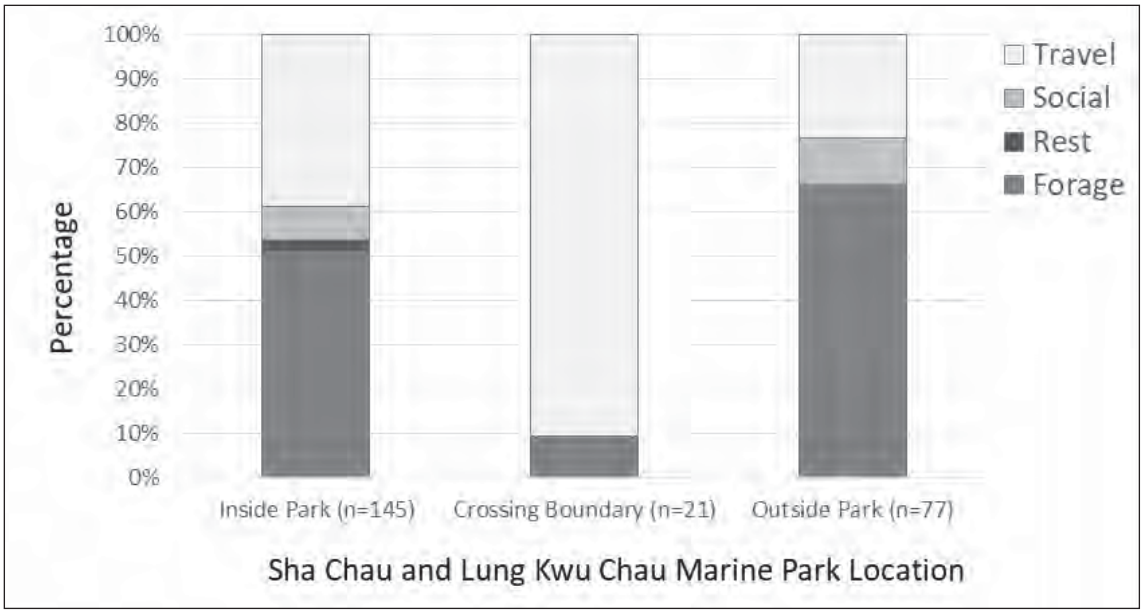


Figure 20: Plots of All Vessel Positions and All CWD Positions (prior to filtering out short-track data) obtained from Lung Kwu Chau in 2018

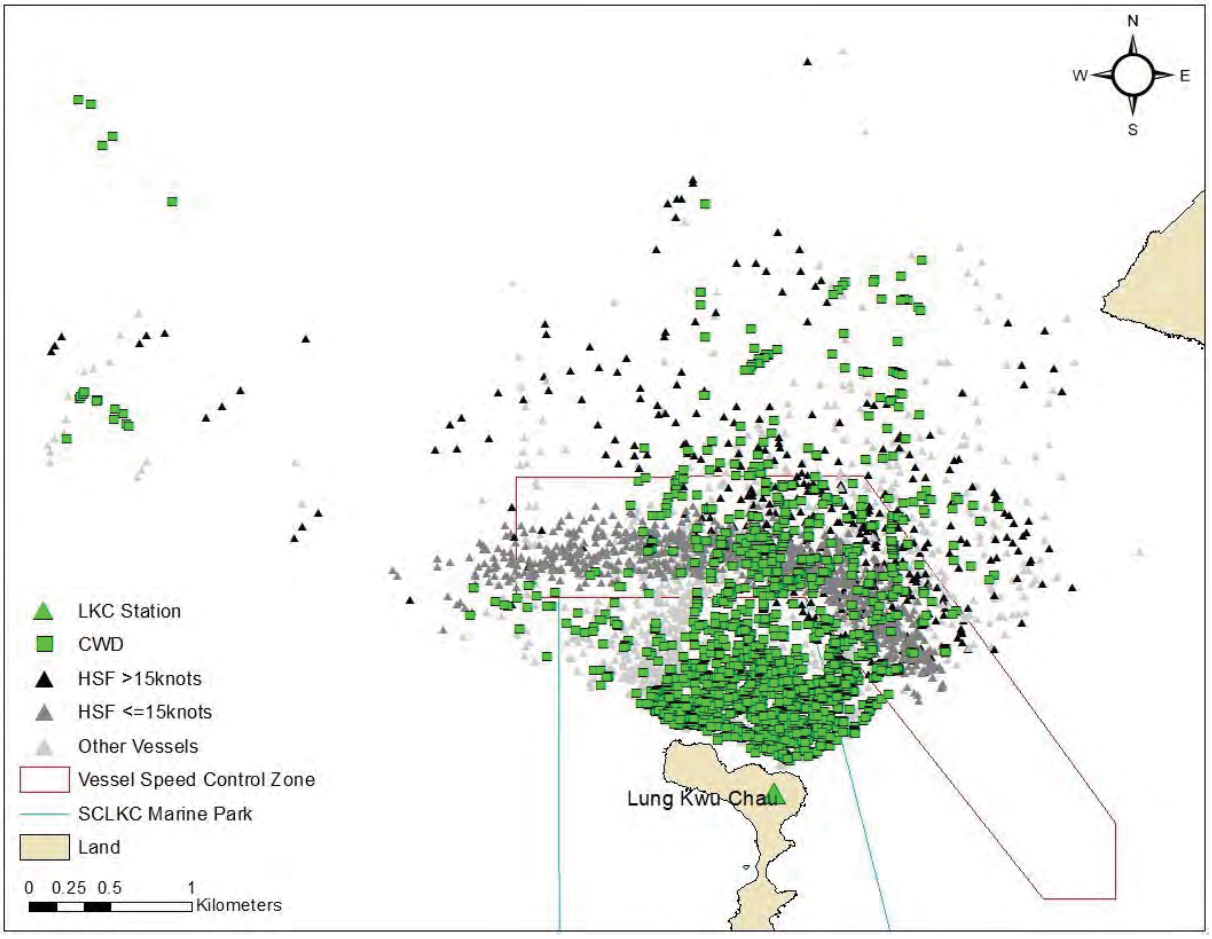
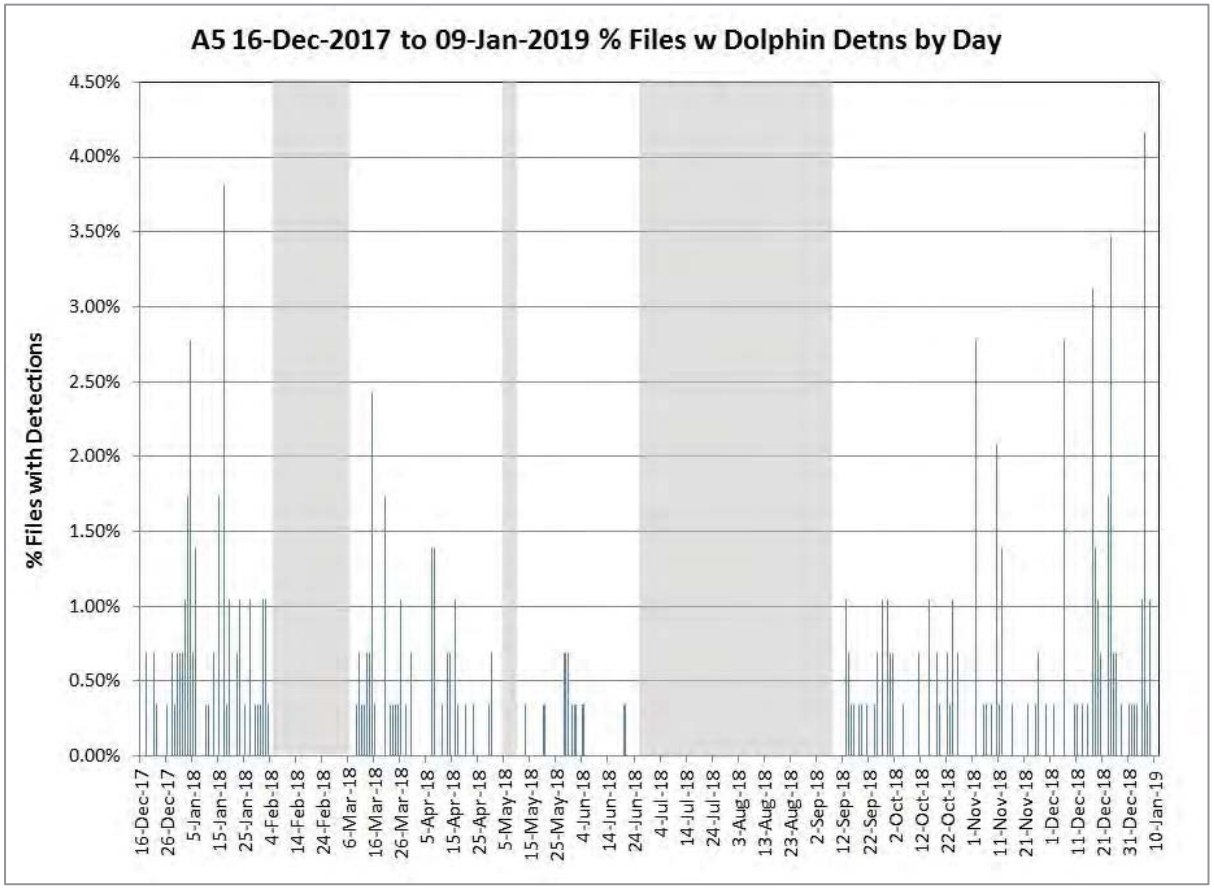


Figure 21: Dolphin Detections as Percentage of Files Per Day, 16 Dec 2017 to 09 Jan 2019.



[Grey shading indicates no recording]

Figure 22: Dolphin Detections by Hour of Day, 16 Dec 2017 to 09 Jan 2019.

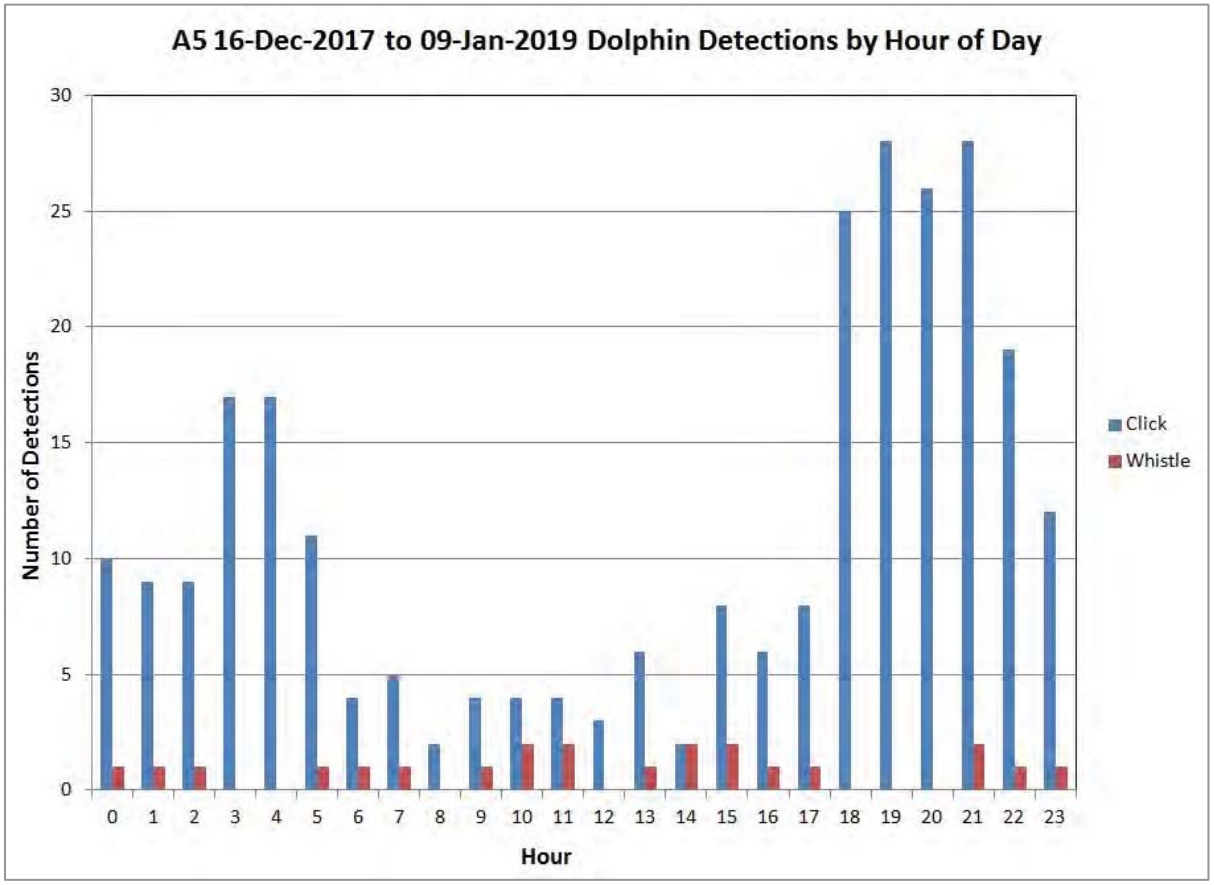
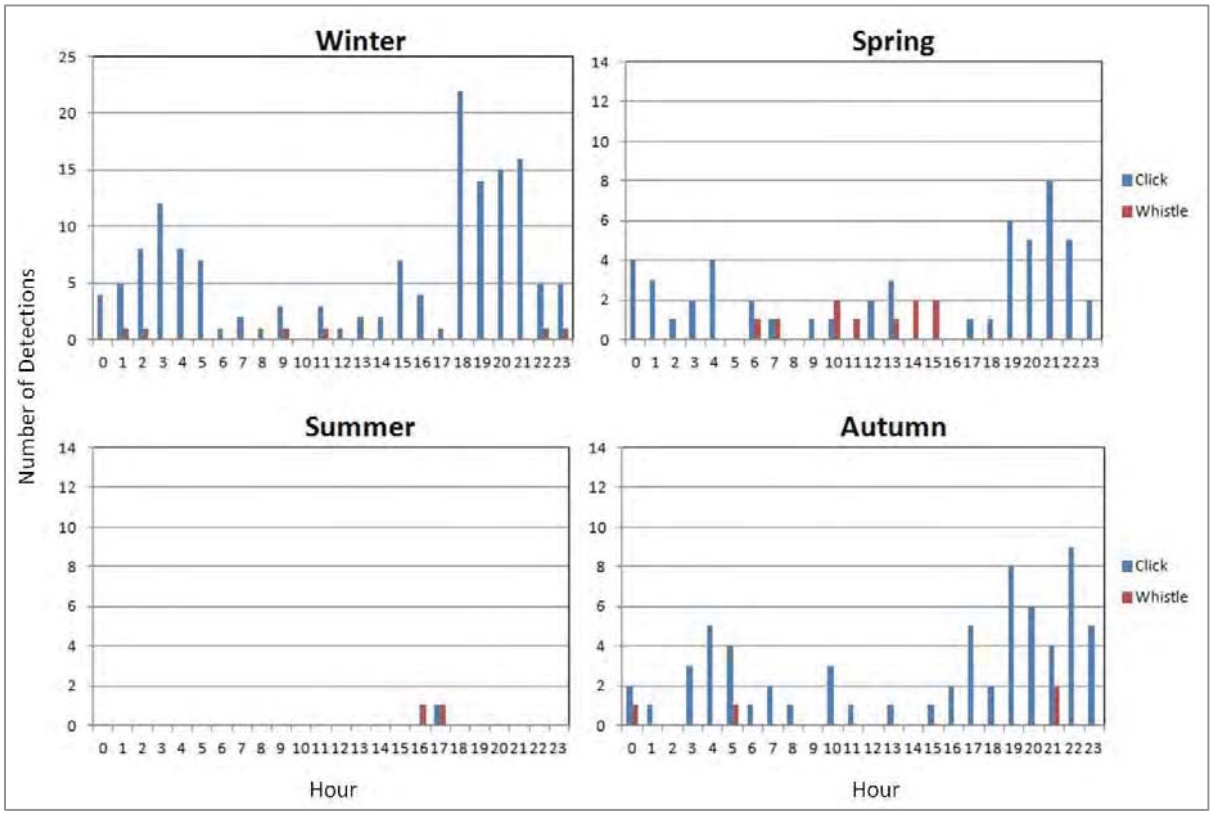
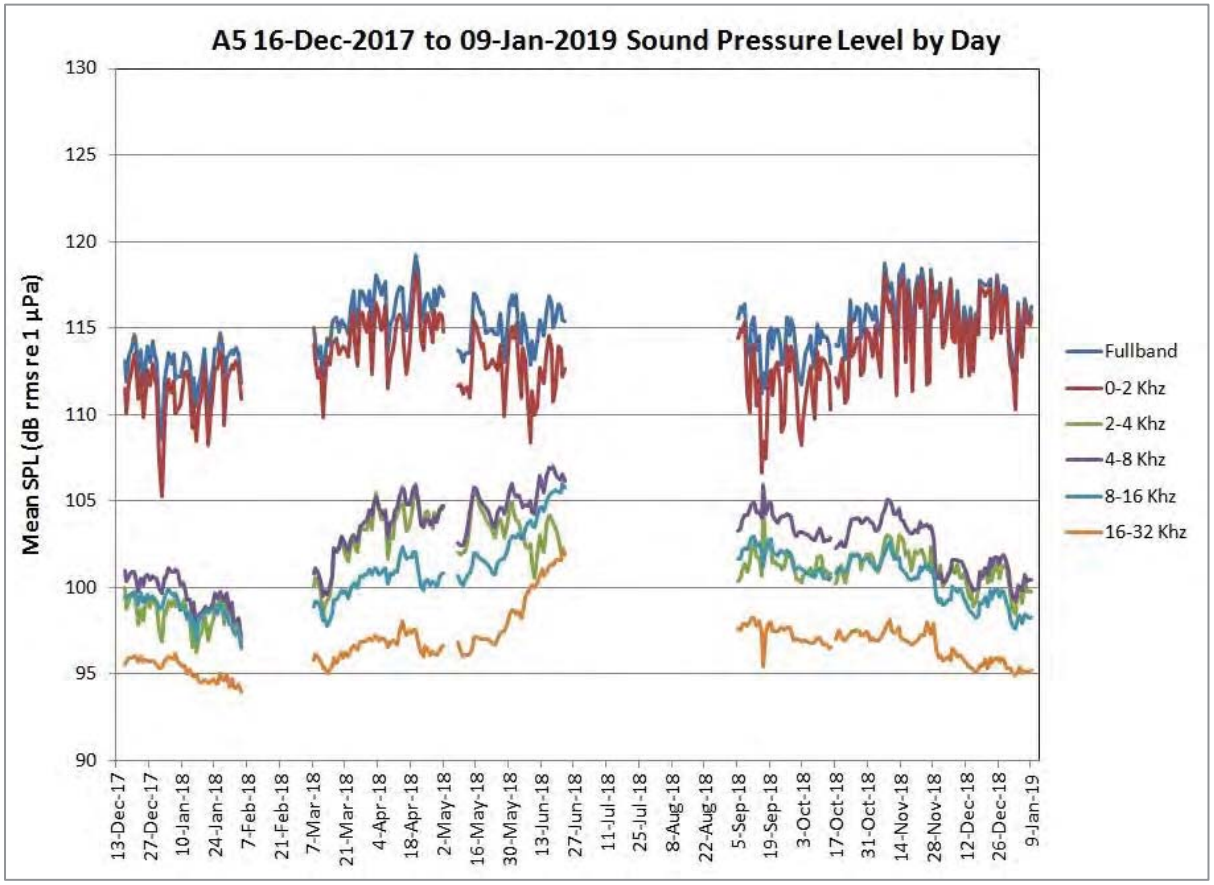


Figure 23: Dolphin Detections by Hour of Day and Solar Season, 16 Dec 2017 to 09 Jan 2019.



[Winter = Dec-Jan-Feb, Spring = Mar-Apr-May, Summer = Jun-Jul-Aug, Autumn = Sep-Oct-Nov]

Figure 24: Daily Mean Sound Pressure Level (SPL), 16 Dec 2017 to 09 Jan 2019.



[Blank area indicates no recording]

Figure 25: Sound Pressure Level (SPL) by Hour of Day, 16 Dec 2017 to 09 Jan 2019.

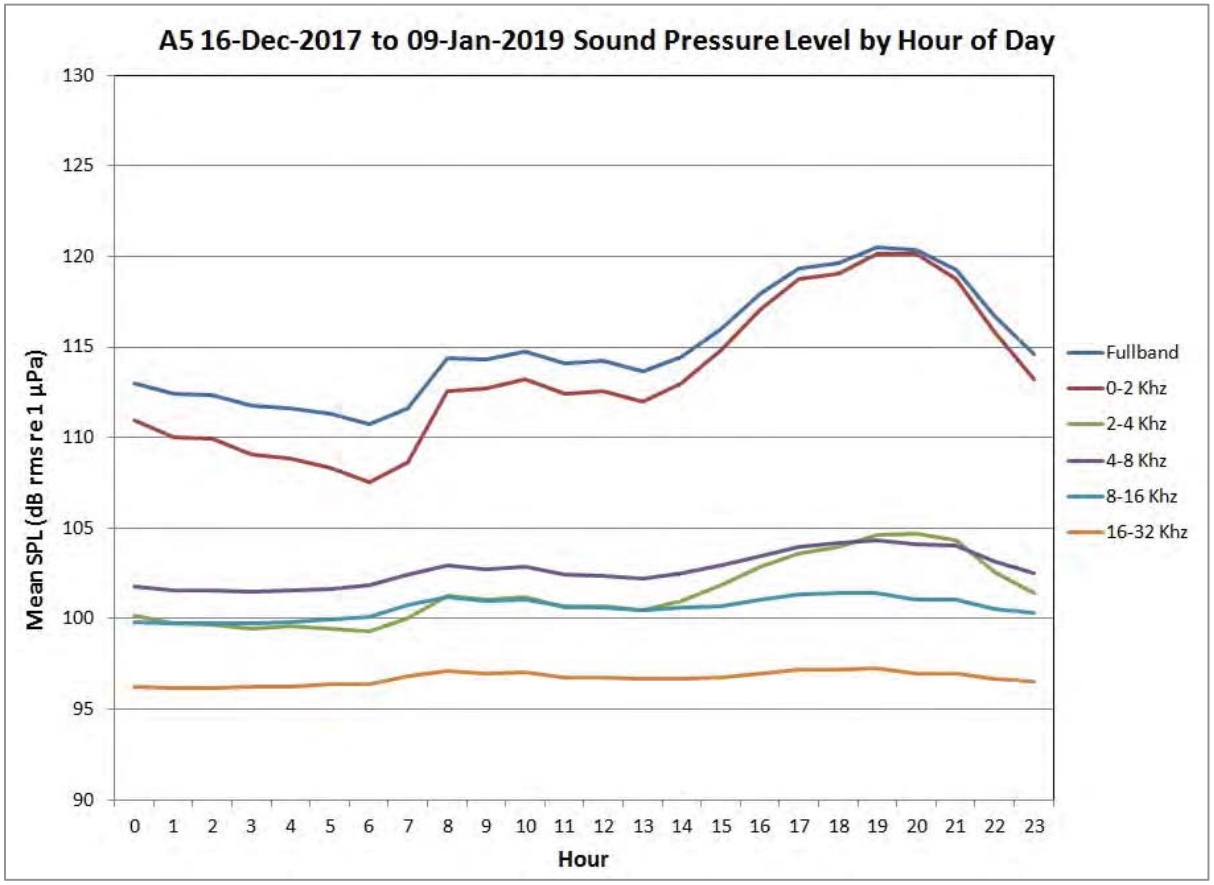
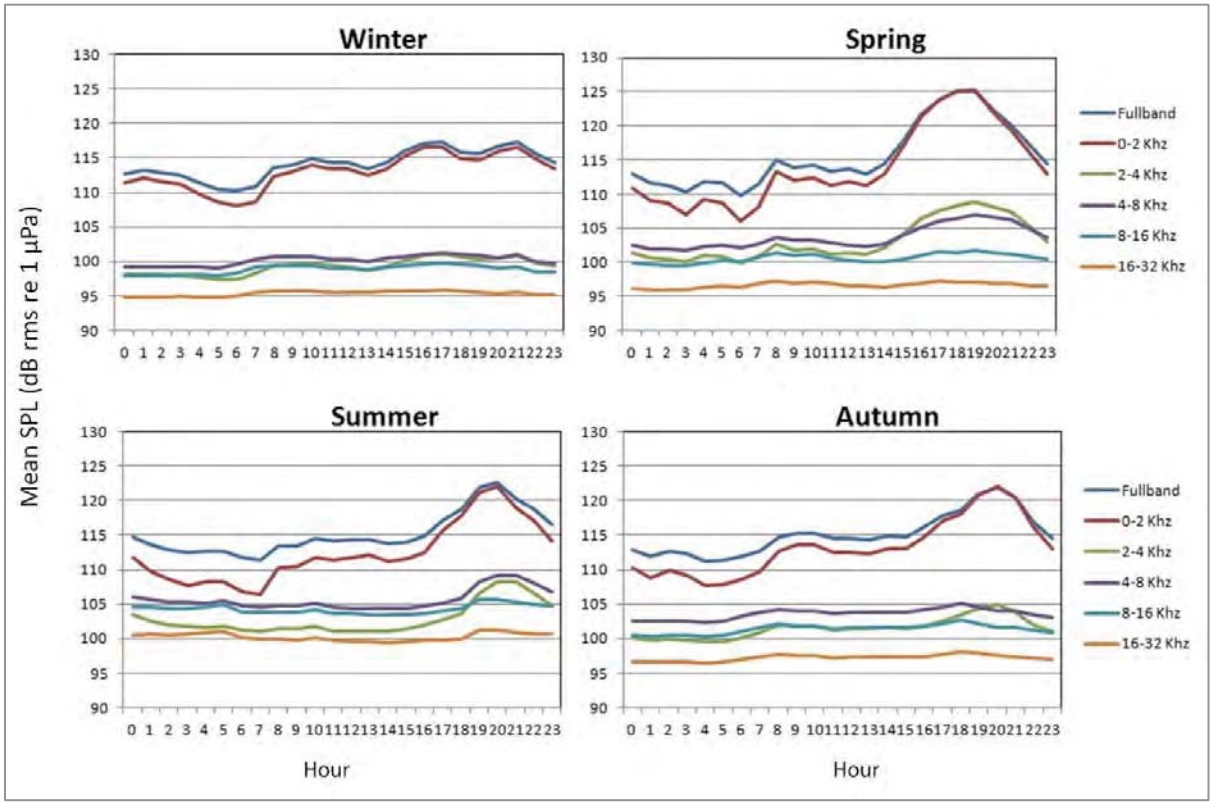


Figure 26: Sound Pressure Level (SPL) by Hour of Day and Solar Season, 16 Dec 2017 to 09 Jan 2019.



[Winter = Dec-Jan-Feb, Spring = Mar-Apr-May, Summer = Jun-Jul-Aug, Autumn = Sep-Oct-Nov]

Table 1: CWD Encounter Rates by Survey Areas

Survey Area	Encounter Rate (STG)		Encounter Rate (ANI)	
	2017	**2018**	2017	**2018**
NEL	0	**0.18**	0	**0.18**
NWL	2.41	**2.84**	8.14	**8.15**
AW	4.55	**4.62**	14.57	**19.42**
WL	17.85	**16.13**	67.94	**56.52**
SWL	5.00	**2.61**	15.39	**7.90**
Combined	4.80	**4.00**	16.82	**13.02**

Table 2: Summary of Monthly and Running Quarterly Encounter Rates STG and ANI

Encounter Rate	Winter		Spring			Summer			Autumn			Winter
	Jan 18	Feb 18	Mar 18	Apr 18	May 18	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18
Monthly STG	5.10	5.38	3.84	3.38	1.90	4.48	5.04	4.48	4.97	3.07	4.85	1.67
Monthly ANI	19.94	16.15	10.33	11.28	4.51	17.36	13.86	15.67	16.26	8.97	14.28	8.10
Running Quarterly STG	**4.27**	**5.27**	**4.78**	**4.18**	**3.04**	**3.19**	**3.74**	**4.66**	**4.82**	**4.19**	**4.29**	**3.16**
Running Quarterly ANI	**16.27**	**18.89**	**15.52**	**12.54**	**8.74**	**10.72**	**11.57**	**15.58**	**15.32**	**13.71**	**13.19**	**10.36**

Table 3: CWD Line Transects Parameters and Estimates of Density and Abundance for Western Hong Kong based on 3RS Project Data (January 2018 – December 2018)

Time Period	Stratum	No. of Sight-ings*	Average Group Size	Trackline Detection Prob. - g(0)	Individual Density (no./100km^2)	Abundance	95% CI (Abund.)	%CV
Jan-Dec 2018	AW	5	2.8	1.0	43.05	2	1-5	45.0
Jan-Dec 2018	DB	2	2.8	1.0	4.51	1	1-2	19.7
Jan-Dec 2018	NEL	2	2.8	1.0	2.94	2	0-6	73.2
Jan-Dec 2018	NWL	46	2.8	1.0	24.85	22	13-36	25.6
Jan-Dec 2018	SWL	40	2.8	1.0	22.23	15	8-27	31.1
Jan-Dec 2018	WL	107	2.8	1.0	137.68	38	25-59	22.0
Jan-Dec 2018	**Pooled^**	**202**	**2.8**	**1.0**	**29.13**	**77**	**53-112**	**18.9**
Jan-Dec 2018	Winter#	46	2.7	1.0	25.99	61	34-109	29.4
Jan-Dec 2018	Spring#	39	2.7	1.0	28.57	67	41-108	24.4
Jan-Dec 2018	Summer#	56	2.7	1.0	42.12	99	56-173	28.6
Jan-Dec 2018	Autumn#	54	2.7	1.0	35.63	83	40-175	37.7

* Before truncation

^ Pooled abundance not including Airport West (AW). Note that the pooled estimates do not necessarily add up to the sum of the individual stratum estimates, as these are computed separately.

The seasonal estimates do not include AW or DB.

Table 4: Average Group Sizes of CWDs by Survey Areas in 2018

Survey Area	Average Group Size of CWDs
NEL	1.00
NWL	2.83
AW	3.67
WL	3.47
SWL	2.93
Overall	3.09 ± 2.84

Table 5: Average Group Sizes of CWDs by Seasons in 2018

Solar Season	Average Group Size of CWDs
Spring	2.80
Summer	3.23
Autumn	3.12
Winter	3.54

Table 6: Percentage of CWD Groups recorded as Exhibiting Various Behaviours/Activities, and recorded as having Association with Fishing Boat

		Activity				
Survey Area	Year	Feeding	Travelling	Socialising	Resting/Milling	Fishing Boat Association
AW	2017	80%	20%	-	-	20%
	2018	**67%**	**-**	**17%**	**-**	**-**
NEL	2017	-	-	-	-	-
	2018	**50%**	**-**	**-**	**-**	**-**
NWL	2017	15%	8%	10%	3%	-
	2018	**38%**	**3%**	**4%**	**-**	**13%**
WL	2017	23%	12%	12%	-	8%
	2018	**22%**	**8%**	**10%**	**-**	**20%**
SWL	2017	28%	6%	10%	1%	9%
	2018	**17%**	**5%**	**7%**	**2%**	**14%**

Table 7: Summary of Photo Identification Works in 2018

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
NLMM001	12-Feb-18	4	NWL
	20-Sep-18	1	WL
		4	WL
NLMM002	18-Jan-18	1	NWL
	12-Feb-18	2	NWL
	22-Mar-18	1	NWL
	8-Oct-18	3	NWL
NLMM004	6-Feb-18	4	NWL
	12-Feb-18	2	NWL
	22-Mar-18	1	NWL
	23-Apr-18	1	NWL
	3-May-18	1	NWL
	8-Oct-18	4	NWL
	6-Nov-18	2	NWL
NLMM005	21-Sep-18	4	WL
NLMM006	20-Jul-18	2	NWL
		3	NWL
	26-Sep-18	3	NWL
	8-Oct-18	5	NWL
	6-Nov-18	2	NWL
NLMM009	12-Feb-18	2	NWL
	22-Mar-18	1	NWL
NLMM010	18-Jan-18	1	NWL
	19-Apr-18	2	NWL
	23-Apr-18	1	NWL
NLMM011	27-Jun-18	4	WL
NLMM012	21-Sep-18	1	WL
	6-Nov-18	1	NWL
NLMM013	3-May-18	1	NWL
	20-Jul-18	2	NWL
		3	NWL
	14-Sep-18	1	NWL
	20-Sep-18	2	WL
	8-Oct-18	5	NWL
	6-Nov-18	2	NWL
NLMM015	12-Feb-18	2	NWL
	2-Aug-18	1	NWL
		3	NWL
	8-Oct-18	1	NWL
		3	NWL
NLMM016	14-Feb-18	5	WL
	11-Jul-18	2	WL
NLMM018	22-Mar-18	1	NWL
	27-Jun-18	2	WL
		4	WL
	20-Nov-18	2	WL
		3	WL
NLMM019	2-Aug-18	1	NWL
	4-Oct-18	5	WL
NLMM020	19-Sep-18	1	SWL
	4-Oct-18	5	WL
NLMM021	18-Jan-18	2	NWL
NLMM023	18-Jan-18	1	NWL
	12-Feb-18	2	NWL
	11-Jul-18	7	WL
	20-Sep-18	3	WL
	5-Oct-18	1	NWL
	12-Nov-18	2	NWL
NLMM028	27-Jun-18	6	WL
NLMM033	21-Aug-18	5	WL

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
NLMM036	19-Apr-18	3	NWL
		4	NWL
NLMM037	18-Jan-18	1	NWL
	23-Apr-18	1	NWL
	6-Nov-18	2	NWL
NLMM039	6-Nov-18	1	NWL
NLMM040	27-Jun-18	4	WL
	26-Sep-18	1	NWL
	8-Oct-18	3	NWL
NLMM041	27-Jun-18	4	WL
	26-Sep-18	1	NWL
	8-Oct-18	3	NWL
NLMM043	12-Feb-18	2	NWL
	22-Mar-18	1	NWL
	23-Apr-18	1	NWL
	11-Jul-18	7	WL
	2-Aug-18	1	NWL
	5-Oct-18	1	NWL
NLMM049	12-Feb-18	3	NWL
NLMM052	6-Feb-18	3	NWL
	27-Jun-18	6	WL
	26-Sep-18	4	NWL
	12-Nov-18	2	NWL
NLMM055	12-Feb-18	2	NWL
NLMM056	21-Aug-18	1	WL
NLMM057	18-Jan-18	3	NWL
NLMM058	20-Sep-18	1	WL
	8-Oct-18	1	NWL
NLMM059	30-Jul-18	4	SWL
	12-Oct-18	1	NEL
NLMM061	15-Jan-18	1	AW
	18-Jan-18	3	NWL
	12-Feb-18	1	NWL
NLMM062	15-Jan-18	2	WL
	12-Apr-18	3	WL
NLMM063	18-Jan-18	2	NWL
	22-Mar-18	1	NWL
	23-Apr-18	1	NWL
	27-Jun-18	2	WL
		4	WL
	2-Aug-18	1	NWL
	4-Oct-18	5	WL
	8-Oct-18	1	NWL
		3	NWL
NLMM064	6-Feb-18	1	NWL
	27-Jun-18	6	WL
NLMM065	12-Feb-18	4	NWL
	14-Mar-18	4	NWL
		6	NWL
NLMM066	2-Aug-18	1	NWL
NLMM067	2-Aug-18	1	NWL
	21-Aug-18	5	WL
NLMM068	6-Nov-18	2	NWL
SLMM002	14-Feb-18	8	WL
	25-Jun-18	2	SWL
	21-Aug-18	8	WL
SLMM003	15-Jan-18	8	WL
	14-Feb-18	8	WL
	12-Mar-18	1	WL
	12-Apr-18	3	WL
	25-Jun-18	3	SWL
	11-Jul-18	7	WL

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
	21-Aug-18	8	WL
	16-Nov-18	1	WL
	20-Nov-18	2	WL
SLMM007	15-Jan-18	8	WL
	25-Jun-18	3	SWL
	24-Oct-18	2	WL
	16-Nov-18	1	WL
SLMM009	27-Jun-18	6	WL
SLMM010	15-Jan-18	8	WL
	17-Jan-18	7	SWL
	25-Jun-18	3	SWL
	21-Aug-18	7	WL
		8	WL
	4-Dec-18	1	SWL
SLMM012	17-Jan-18	7	SWL
	25-Jun-18	3	SWL
	21-Aug-18	8	WL
	4-Dec-18	1	SWL
SLMM014	12-Mar-18	1	WL
		3	SWL
	4-Apr-18	5	SWL
	21-Nov-18	1	SWL
		3	SWL
	4-Dec-18	1	SWL
	21-Dec-18	2	WL
SLMM017	16-Jan-18	3	SWL
SLMM018	17-Jan-18	5	SWL
SLMM019	30-Jul-18	3	SWL
	23-Aug-18	1	SWL
		2	SWL
	4-Dec-18	1	SWL
SLMM022	15-Jan-18	8	WL
	4-Dec-18	1	SWL
SLMM023	13-Mar-18	3	WL
	21-Jun-18	3	SWL
SLMM025	12-Mar-18	1	WL
SLMM027	12-Mar-18	1	WL
	11-Apr-18	3	WL
	12-Apr-18	3	WL
	17-Jul-18	5	WL
	4-Oct-18	3	WL
SLMM028	15-Jan-18	1	AW
	16-Jan-18	1	AW
	11-Apr-18	1	WL
	30-Jul-18	3	SWL
	20-Nov-18	1	WL
	3-Dec-18	1	NWL
SLMM029	25-Jun-18	6	SWL
SLMM030	17-Jan-18	6	SWL
		7	SWL
	21-Dec-18	1	WL
SLMM031	13-Mar-18	5	WL
	25-Jun-18	4	SWL
SLMM034	12-Mar-18	2	WL
	13-Mar-18	2	WL
	19-Sep-18	1	SWL
	21-Nov-18	2	SWL
SLMM035	27-Jun-18	6	WL
SLMM036	23-Apr-18	1	NWL
SLMM037	14-Feb-18	8	WL
	20-Nov-18	2	WL
SLMM044	13-Feb-18	8	WL

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
	4-Oct-18	5	WL
SLMM045	12-Apr-18	3	WL
	2-Aug-18	1	NWL
	26-Sep-18	2	NWL
SLMM046	15-Jan-18	3	WL
SLMM048	13-Feb-18	5	WL
SLMM049	15-Jan-18	8	WL
	12-Mar-18	1	WL
	19-Sep-18	1	SWL
SLMM052	15-Jan-18	8	WL
	12-Apr-18	3	WL
	25-Jun-18	3	SWL
		6	SWL
	16-Nov-18	1	WL
SLMM053	14-Feb-18	3	WL
	25-Jun-18	5	SWL
	21-Aug-18	2	WL
	21-Dec-18	1	WL
		2	WL
SLMM055	14-Feb-18	4	WL
SLMM057	2-Aug-18	1	NWL
SLMM058	12-Apr-18	2	WL
SLMM059	20-Nov-18	3	WL
SLMM060	8-Jan-18	1	SWL
	19-Sep-18	1	SWL
		2	SWL
SLMM062	13-Feb-18	7	WL
SLMM064	11-Apr-18	2	WL
	11-Jul-18	7	WL
SLMM065	14-May-18	2	SWL
SLMM066	26-Jul-18	1	SWL
SLMM067	4-Dec-18	1	SWL
WLMM001	13-Feb-18	5	WL
	12-Mar-18	2	WL
	11-Apr-18	4	WL
	12-Apr-18	4	WL
	11-Jul-18	8	WL
	24-Oct-18	2	WL
	16-Nov-18	8	WL
	4-Dec-18	1	SWL
	20-Dec-18	1	WL
	21-Dec-18	1	WL
		2	WL
WLMM003	13-Mar-18	3	WL
	11-Apr-18	4	WL
WLMM004	15-Jan-18	3	WL
	13-Feb-18	1	AW
	12-Apr-18	3	WL
	25-Jun-18	6	SWL
	11-Jul-18	7	WL
WLMM005	11-Jul-18	8	WL
WLMM006	14-Feb-18	2	AW
		3	WL
	12-Apr-18	2	WL
	17-Jul-18	3	WL
	2-Aug-18	1	NWL
WLMM007	15-Jan-18	8	WL
	12-Mar-18	1	WL
	19-Sep-18	1	SWL
	16-Nov-18	8	WL
WLMM008	7-Aug-18	4	WL
WLMM009	14-Feb-18	2	AW

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
		3	WL
	12-Apr-18	2	WL
	17-Jul-18	3	WL
	21-Aug-18	2	WL
WLMM013	20-Sep-18	1	WL
		5	WL
WLMM015	15-Jan-18	3	WL
WLMM017	13-Feb-18	8	WL
WLMM018	12-Mar-18	1	WL
	20-Nov-18	4	WL
WLMM019	20-Sep-18	4	WL
	8-Oct-18	1	NWL
WLMM020	11-Jul-18	7	WL
WLMM026	15-Jan-18	1	AW
	14-Mar-18	1	NWL
		3	NWL
WLMM027	15-Jan-18	1	AW
	18-Jan-18	4	NWL
	14-Mar-18	1	NWL
		3	NWL
	30-Jul-18	2	SWL
		4	SWL
	22-Aug-18	1	SWL
WLMM028	14-Feb-18	2	AW
		3	WL
	13-Mar-18	3	WL
	21-Aug-18	2	WL
	21-Dec-18	1	WL
		2	WL
WLMM029	14-Feb-18	2	AW
	13-Mar-18	3	WL
	2-Aug-18	1	NWL
	21-Aug-18	2	WL
	21-Dec-18	1	WL
		2	WL
WLMM030	12-Apr-18	2	WL
WLMM043	15-Jan-18	3	WL
	11-Apr-18	1	WL
	12-Apr-18	1	WL
	21-Aug-18	5	WL
	21-Sep-18	4	WL
	4-Oct-18	1	WL
WLMM046	14-Mar-18	4	NWL
WLMM047	25-Jun-18	3	SWL
WLMM048	11-Jul-18	7	WL
		8	WL
WLMM049	21-Sep-18	3	WL
WLMM051	11-Jul-18	4	WL
WLMM053	17-Jul-18	1	WL
	2-Aug-18	1	NWL
WLMM054	23-May-18	4	SWL
	27-Jun-18	6	WL
WLMM055	13-Feb-18	2	AW
WLMM056	12-Apr-18	7	SWL
	19-Sep-18	1	SWL
	24-Oct-18	1	WL
	20-Nov-18	3	WL
WLMM060	18-Jan-18	5	NWL
	11-Jul-18	8	WL
	23-Aug-18	2	SWL
	20-Sep-18	2	WL
	4-Oct-18	5	WL

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
	24-Oct-18	2	WL
	12-Nov-18	1	NWL
WLMM062	12-Feb-18	1	NWL
	11-Jul-18	8	WL
WLMM063	13-Feb-18	1	AW
	25-Jun-18	6	SWL
	11-Jul-18	7	WL
	21-Aug-18	4	WL
	16-Nov-18	3	WL
WLMM064	15-Jan-18	2	WL
	12-Apr-18	3	WL
WLMM065	18-Jan-18	3	NWL
	14-Mar-18	2	NWL
	21-Aug-18	6	WL
		7	WL
	4-Oct-18	1	WL
	24-Oct-18	1	WL
WLMM066	15-Jan-18	1	AW
	18-Jan-18	3	NWL
	14-Mar-18	2	NWL
WLMM067	21-Aug-18	5	WL
WLMM069	12-Apr-18	4	WL
		5	WL
	4-Dec-18	1	SWL
WLMM071	15-Jan-18	1	AW
	18-Jan-18	5	NWL
	11-Jul-18	6	WL
		8	WL
	23-Aug-18	2	SWL
	20-Sep-18	2	WL
	4-Oct-18	5	WL
	24-Oct-18	2	WL
	12-Nov-18	1	NWL
WLMM073	12-Mar-18	1	WL
	11-Apr-18	3	WL
	21-Dec-18	1	WL
WLMM075	11-Jul-18	6	WL
WLMM076	23-May-18	4	SWL
	20-Sep-18	6	WL
WLMM078	13-Mar-18	1	WL
	23-May-18	4	SWL
	25-Jun-18	6	SWL
	7-Aug-18	4	WL
	21-Dec-18	1	WL
		2	WL
WLMM079	15-Jan-18	8	WL
	12-Mar-18	1	WL
	21-Aug-18	5	WL
	16-Nov-18	1	WL
		8	WL
WLMM080	14-Mar-18	4	NWL
	21-Jun-18	3	SWL
	21-Dec-18	1	WL
WLMM081	15-Jan-18	3	WL
	11-Jul-18	3	WL
	2-Aug-18	1	NWL
	20-Sep-18	6	WL
WLMM083	7-Aug-18	2	WL
WLMM085	11-Apr-18	4	WL
	25-Jun-18	3	SWL
	11-Jul-18	7	WL
WLMM086	12-Apr-18	2	WL

Individual ID	Date of Sighting (dd/mmm/yy)	Sighting No.	Area
	19-Apr-18	3	NWL
		4	NWL
	20-Sep-18	2	WL
WLMM087	2-Aug-18	1	NWL
WLMM089	2-Aug-18	1	NWL
	5-Oct-18	1	NWL
WLMM090	12-Apr-18	2	WL
	19-Apr-18	3	NWL
		4	NWL
	20-Sep-18	2	WL
WLMM091	20-Sep-18	2	WL
WLMM092	27-Jun-18	8	WL
	20-Sep-18	2	WL
WLMM096	21-Aug-18	2	WL
WLMM103	17-Jul-18	1	WL
WLMM107	13-Feb-18	5	WL
	11-Jul-18	7	WL
WLMM108	15-Jan-18	3	WL
WLMM109	15-Jan-18	3	WL
		5	WL
		7	WL
	16-Nov-18	8	WL
WLMM110	15-Jan-18	3	WL
WLMM111	15-Jan-18	3	WL
		7	WL
WLMM112	15-Jan-18	3	WL
WLMM113	14-Feb-18	4	WL
WLMM114	12-Mar-18	1	WL
	25-Jun-18	5	SWL
	21-Aug-18	9	WL
	19-Sep-18	1	SWL
	4-Oct-18	3	WL
	4-Dec-18	2	SWL
WLMM115	16-May-18	1	WL
	20-Jul-18	1	NWL
	2-Aug-18	2	NWL
	7-Aug-18	2	WL
WLMM116	11-Jul-18	7	WL
		8	WL
	30-Jul-18	2	SWL
		4	SWL
WLMM117	11-Jul-18	7	WL
WLMM118	17-Jul-18	5	WL
WLMM119	7-Aug-18	4	WL
	24-Oct-18	2	WL
WLMM120	7-Aug-18	4	WL
WLMM121	21-Aug-18	5	WL
WLMM122	20-Sep-18	1	WL
		4	WL
WLMM124	20-Sep-18	6	WL
WLMM125	20-Sep-18	6	WL
	20-Nov-18	3	WL
WLMM126	20-Sep-18	6	WL
WLMM127	21-Sep-18	3	WL
	8-Oct-18	1	NWL
		2	NWL
	6-Nov-18	2	NWL
WLMM128	21-Sep-18	3	WL
WLMM129	21-Sep-18	6	WL
WLMM130	24-Oct-18	2	WL
WLMM131	20-Nov-18	2	WL

Table 8: Land-based Survey, Theodolite Effort and CWD Group Summary in 2018

Land-based Station	# of Survey Sessions	Survey Effort (hh:mm)	# CWD Groups Sighted	CWD Group Sighting per Survey Hr	# Groups After Filtering	# of 10-minutes segments
Sha Chau	24	144:00	0	0.0	0	0
Lung Kwu Chau	36	216:00	167	0.77	65	72
TOTAL	**60**	**360:00**	**167**	**0.464**	**65**	**72**

Table 9: Land-based CWD Focal Group Size Summary in 2018

Category	n (sample size)	Minimum # Individuals	Maximum # Individuals	Mean Grp Size	Standard Deviation
Winter	66	1	4	2.64	1.08
Spring	168	1	8	3.64	1.54
Summer	48	1	3	2.29	0.68
Autumn	150	1	7	3.41	1.58
Dry Season	312	1	8	3.57	1.56
Wet Season	120	1	4	2.45	0.94
Inside SCLKCMP boundary	229	1	8	3.05	1.72
Crossing SCLKCMP boundary	48	2	5	3.25	1.21
Outside SCLKCMP boundary	155	2	6	3.57	1.13
No boats present	330	1	8	3.12	1.58
HSF within 500 m	12	4	5	4.50	0.52
SSF within 500 m	48	2	6	3.75	1.10
Other boats within 500 m	42	2	5	3.43	1.06

Table 10: CWD Mean Swimming Speed, Reorientation Rate, and Linearity based on Vessel Presence record from Lung Kwu Chau in 2018

Vessel Type	Sample Size	Mean Speed (Std. dev.)	Mean Reorientation Rate (Std. dev.)	Mean Linearity (Std. dev.)
No Vessel	55	2.71 (1.14)	20.71 (15.50)	0.85 (0.18)
High Speed Ferry	2	2.65 (1.02)	41.17 (29.54)	0.49 (0.36)
High Speed Ferry Under Speed Restriction	8	4.32 (2.47)	25.91 (24.65)	0.77 (0.34)
Other	7	3.43 (2.22)	18.92 (12.05)	0.85 (0.24)

Table 11: Summary of PAM Deployments and Dolphin Detections, 16 Dec 2017 to 09 Jan 2019

Site	Dep #	Data start (dd/mm/yyyy)	Data end (dd/mm/yyyy)	# recording days	# files	Days with dolphins (%)	Files with dolphins (%)
A5	1	16/12/2017	16/01/2018	32	9153	18 (56%)	46 (0.50%)
A5	2	17/01/2018	04/02/2018	19	5427	13 (68%)	34 (0.63%)
A5	3	07/03/2018	02/05/2018	57	16370	27 (47%)	54 (0.33%)
A5	4	08/05/2018	23/06/2018	47	13311	8 (17%)	10 (0.08%)
A5	5	05/09/2018	15/10/2018	41	11808	16 (39%)	29 (0.25%)
A5	6	17/10/2018	28/11/2018	43	12226	17 (40%)	38 (0.31%)
A5	7	29/11/2018	09/01/2019	42	11951	24 (57%)	75 (0.63%)
Total	All	16/12/2017	09/01/2019	281	80246	123 (44%)	286 (0.36%)

Table 12: Summary of PAM Deployments and Dolphin Detections in the Previous Year (12 Jan 2017 to 02 Dec 2017)

Site	Dep #	Data start (dd/mm/yyyy)	Data end (dd/mm/yyyy)	# recording days	# files	Days with dolphins (%)	Files with dolphins (%)
A5	1	12/01/2017	04/02/2017	24	6769	7 (29%)	15 (0.22%)
A5	2	11/02/2017	17/03/2017	35	9792	25 (71%)	86 (0.88%)
A5	3	25/03/2017	13/05/2017	50	14260	23 (46%)	43 (0.30%)
A5	4	14/05/2017	09/07/2017	57	16370	11 (19%)	16 (0.10%)
A5	5	03/08/2017	28/09/2017	57	16370	22 (39%)	35 (0.21%)
A5	6	07/10/2017	02/12/2017	57	16370	21 (37%)	41 (0.25%)

Table 13: Summary of Dolphin Sightings within the Dolphin Exclusion Zone in 2018

Date	Works Area* and Type of Works Suspended	Location of the DEZ Monitoring Station	Time of Initial Sighting of Dolphin Group	Time of Last Sighting of Dolphin Group
22/02/2018	DCM works at Area G4	22°18.436N, 113°53.515E	17:30	18:10
24/02/2018	DCM works at Area G4	22°18.438N, 113°53.515E	15:00	15:30
24/02/2018	DCM works at Area G4	22°18.434N, 113°53.515E	17:18	17:35
08/03/2018	DCM works at Area G4	22°18.443N, 113°53.502E	16:47	17:10
09/03/2018	DCM works at Area G4	22°18.428N, 113°53.504E	13:35	16:40
18/03/2018	DCM works at Area G4	22°18.437N, 113°53.494E	09:03	09:12

*Note: Please refer to **Figure 1.2** for the location of works area.

CWD Small Vessel Line-transect Survey — Survey Effort Data

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
8-Jan-18	SWL	2	1.780	WINTER	32166	3RS ET	N/A
8-Jan-18	SWL	3	15.124	WINTER	32166	3RS ET	N/A
8-Jan-18	SWL	4	17.100	WINTER	32166	3RS ET	N/A
10-Jan-18	NEL	2	7.314	WINTER	32166	3RS ET	N/A
10-Jan-18	NEL	3	36.486	WINTER	32166	3RS ET	N/A
10-Jan-18	NEL	4	2.800	WINTER	32166	3RS ET	N/A
10-Jan-18	DB	3	17.688	WINTER	32166	3RS ET	N/A
10-Jan-18	DB	4	0.732	WINTER	32166	3RS ET	N/A
11-Jan-18	DB	3	1.600	WINTER	32166	3RS ET	N/A
11-Jan-18	DB	4	8.850	WINTER	32166	3RS ET	N/A
11-Jan-18	DB	5	7.950	WINTER	32166	3RS ET	N/A
11-Jan-18	NEL	2	21.000	WINTER	32166	3RS ET	N/A
11-Jan-18	NEL	3	24.500	WINTER	32166	3RS ET	N/A
11-Jan-18	NEL	4	1.900	WINTER	32166	3RS ET	N/A
15-Jan-18	AW	2	4.691	WINTER	32166	3RS ET	N/A
15-Jan-18	WL	2	32.670	WINTER	32166	3RS ET	N/A
15-Jan-18	SWL	2	1.020	WINTER	32166	3RS ET	N/A
15-Jan-18	SWL	3	9.910	WINTER	32166	3RS ET	N/A
15-Jan-18	SWL	4	1.590	WINTER	32166	3RS ET	N/A
16-Jan-18	AW	2	4.820	WINTER	32166	3RS ET	N/A
16-Jan-18	WL	2	3.719	WINTER	32166	3RS ET	N/A
16-Jan-18	WL	3	29.681	WINTER	32166	3RS ET	N/A
16-Jan-18	SWL	2	14.580	WINTER	32166	3RS ET	N/A
16-Jan-18	SWL	3	14.510	WINTER	32166	3RS ET	N/A
17-Jan-18	SWL	1	12.768	WINTER	32166	3RS ET	N/A
17-Jan-18	SWL	2	38.865	WINTER	32166	3RS ET	N/A
17-Jan-18	SWL	3	9.180	WINTER	32166	3RS ET	N/A
17-Jan-18	SWL	4	1.600	WINTER	32166	3RS ET	N/A
18-Jan-18	NWL	1	6.510	WINTER	32166	3RS ET	N/A
18-Jan-18	NWL	2	66.180	WINTER	32166	3RS ET	N/A
18-Jan-18	NWL	3	1.200	WINTER	32166	3RS ET	N/A
19-Jan-18	NWL	1	2.700	WINTER	32166	3RS ET	N/A
19-Jan-18	NWL	2	68.300	WINTER	32166	3RS ET	N/A
19-Jan-18	NWL	3	3.700	WINTER	32166	3RS ET	N/A
6-Feb-18	NWL	2	10.500	WINTER	32166	3RS ET	N/A
6-Feb-18	NWL	3	51.794	WINTER	32166	3RS ET	N/A
6-Feb-18	NWL	4	13.389	WINTER	32166	3RS ET	N/A
7-Feb-18	DB	2	8.350	WINTER	32166	3RS ET	N/A
7-Feb-18	DB	3	10.250	WINTER	32166	3RS ET	N/A
7-Feb-18	NEL	1	9.800	WINTER	32166	3RS ET	N/A
7-Feb-18	NEL	2	37.100	WINTER	32166	3RS ET	N/A
12-Feb-18	NWL	2	7.850	WINTER	32166	3RS ET	N/A
12-Feb-18	NWL	3	62.380	WINTER	32166	3RS ET	N/A
12-Feb-18	NWL	4	4.890	WINTER	32166	3RS ET	N/A
13-Feb-18	AW	2	4.800	WINTER	32166	3RS ET	N/A
13-Feb-18	WL	2	17.744	WINTER	32166	3RS ET	N/A
13-Feb-18	WL	3	9.140	WINTER	32166	3RS ET	N/A
13-Feb-18	WL	4	5.970	WINTER	32166	3RS ET	N/A

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
13-Feb-18	SWL	5	6.830	WINTER	32166	3RS ET	N/A
14-Feb-18	AW	2	4.620	WINTER	32166	3RS ET	N/A
14-Feb-18	WL	2	27.499	WINTER	32166	3RS ET	N/A
14-Feb-18	WL	3	2.810	WINTER	32166	3RS ET	N/A
14-Feb-18	WL	4	1.420	WINTER	32166	3RS ET	N/A
14-Feb-18	SWL	4	6.860	WINTER	32166	3RS ET	N/A
21-Feb-18	SWL	2	28.770	WINTER	32166	3RS ET	N/A
21-Feb-18	SWL	3	25.830	WINTER	32166	3RS ET	N/A
21-Feb-18	SWL	4	7.600	WINTER	32166	3RS ET	N/A
22-Feb-18	DB	3	18.060	WINTER	32166	3RS ET	N/A
22-Feb-18	NEL	2	8.700	WINTER	32166	3RS ET	N/A
22-Feb-18	NEL	3	36.900	WINTER	32166	3RS ET	N/A
22-Feb-18	NEL	4	1.300	WINTER	32166	3RS ET	N/A
23-Feb-18	SWL	2	1.640	WINTER	32166	3RS ET	N/A
23-Feb-18	SWL	3	60.860	WINTER	32166	3RS ET	N/A
5-Mar-18	SWL	1	40.540	SPRING	32166	3RS ET	N/A
5-Mar-18	SWL	2	21.840	SPRING	32166	3RS ET	N/A
7-Mar-18	NEL	2	6.660	SPRING	32166	3RS ET	N/A
7-Mar-18	NEL	3	29.130	SPRING	32166	3RS ET	N/A
7-Mar-18	NEL	4	11.510	SPRING	32166	3RS ET	N/A
7-Mar-18	DB	2	1.010	SPRING	32166	3RS ET	N/A
7-Mar-18	DB	3	9.690	SPRING	32166	3RS ET	N/A
7-Mar-18	DB	4	4.800	SPRING	32166	3RS ET	N/A
8-Mar-18	NEL	2	25.549	SPRING	32166	3RS ET	N/A
8-Mar-18	NEL	3	21.251	SPRING	32166	3RS ET	N/A
8-Mar-18	DB	3	2.160	SPRING	32166	3RS ET	N/A
8-Mar-18	DB	4	13.240	SPRING	32166	3RS ET	N/A
12-Mar-18	AW	2	1.070	SPRING	32166	3RS ET	N/A
12-Mar-18	AW	3	3.660	SPRING	32166	3RS ET	N/A
12-Mar-18	WL	2	32.876	SPRING	32166	3RS ET	N/A
12-Mar-18	WL	3	0.550	SPRING	32166	3RS ET	N/A
12-Mar-18	SWL	2	1.970	SPRING	32166	3RS ET	N/A
12-Mar-18	SWL	3	14.329	SPRING	32166	3RS ET	N/A
12-Mar-18	SWL	4	2.130	SPRING	32166	3RS ET	N/A
13-Mar-18	AW	1	4.700	SPRING	32166	3RS ET	N/A
13-Mar-18	WL	2	22.370	SPRING	32166	3RS ET	N/A
13-Mar-18	WL	3	9.417	SPRING	32166	3RS ET	N/A
13-Mar-18	WL	4	1.643	SPRING	32166	3RS ET	N/A
13-Mar-18	SWL	3	6.820	SPRING	32166	3RS ET	N/A
14-Mar-18	NWL	2	59.690	SPRING	32166	3RS ET	N/A
14-Mar-18	NWL	3	14.666	SPRING	32166	3RS ET	N/A
21-Mar-18	SWL	2	16.139	SPRING	32166	3RS ET	N/A
21-Mar-18	SWL	3	10.311	SPRING	32166	3RS ET	N/A
21-Mar-18	SWL	4	23.030	SPRING	32166	3RS ET	N/A
22-Mar-18	NWL	2	34.844	SPRING	32166	3RS ET	N/A
22-Mar-18	NWL	3	37.876	SPRING	32166	3RS ET	N/A
3-Apr-18	SWL	1	14.910	SPRING	32166	3RS ET	N/A
3-Apr-18	SWL	2	45.610	SPRING	32166	3RS ET	N/A
3-Apr-18	SWL	3	2.000	SPRING	32166	3RS ET	N/A

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
4-Apr-18	SWL	1	31.340	SPRING	32166	3RS ET	N/A
4-Apr-18	SWL	2	28.140	SPRING	32166	3RS ET	N/A
4-Apr-18	SWL	3	2.610	SPRING	32166	3RS ET	N/A
11-Apr-18	AW	2	4.770	SPRING	32166	3RS ET	N/A
11-Apr-18	WL	2	14.970	SPRING	32166	3RS ET	N/A
11-Apr-18	WL	3	16.070	SPRING	32166	3RS ET	N/A
11-Apr-18	SWL	2	2.140	SPRING	32166	3RS ET	N/A
11-Apr-18	SWL	3	4.680	SPRING	32166	3RS ET	N/A
12-Apr-18	AW	2	3.530	SPRING	32166	3RS ET	N/A
12-Apr-18	AW	3	1.280	SPRING	32166	3RS ET	N/A
12-Apr-18	WL	2	12.481	SPRING	32166	3RS ET	N/A
12-Apr-18	WL	3	18.889	SPRING	32166	3RS ET	N/A
12-Apr-18	SWL	2	6.735	SPRING	32166	3RS ET	N/A
18-Apr-18	NEL	2	30.140	SPRING	32166	3RS ET	N/A
18-Apr-18	NEL	3	17.060	SPRING	32166	3RS ET	N/A
18-Apr-18	DB	2	16.000	SPRING	32166	3RS ET	N/A
19-Apr-18	NWL	2	15.530	SPRING	32166	3RS ET	N/A
19-Apr-18	NWL	3	53.430	SPRING	32166	3RS ET	N/A
19-Apr-18	NWL	4	6.030	SPRING	32166	3RS ET	N/A
23-Apr-18	NWL	2	39.210	SPRING	32166	3RS ET	N/A
23-Apr-18	NWL	3	31.250	SPRING	32166	3RS ET	N/A
23-Apr-18	NWL	4	4.500	SPRING	32166	3RS ET	N/A
27-Apr-18	NEL	1	22.760	SPRING	32166	3RS ET	N/A
27-Apr-18	NEL	2	23.840	SPRING	32166	3RS ET	N/A
27-Apr-18	DB	2	12.880	SPRING	32166	3RS ET	N/A
27-Apr-18	DB	3	3.020	SPRING	32166	3RS ET	N/A
3-May-18	NWL	2	38.810	SPRING	32166	3RS ET	N/A
3-May-18	NWL	3	34.290	SPRING	32166	3RS ET	N/A
3-May-18	NWL	4	2.300	SPRING	32166	3RS ET	N/A
8-May-18	NWL	2	56.994	SPRING	32166	3RS ET	N/A
8-May-18	NWL	3	18.306	SPRING	32166	3RS ET	N/A
9-May-18	AW	3	0.851	SPRING	32166	3RS ET	N/A
9-May-18	AW	4	3.879	SPRING	32166	3RS ET	N/A
9-May-18	WL	2	4.840	SPRING	32166	3RS ET	N/A
9-May-18	WL	3	4.940	SPRING	32166	3RS ET	N/A
9-May-18	WL	4	14.440	SPRING	32166	3RS ET	N/A
9-May-18	WL	5	7.080	SPRING	32166	3RS ET	N/A
14-May-18	SWL	2	30.850	SPRING	32166	3RS ET	N/A
14-May-18	SWL	3	38.892	SPRING	32166	3RS ET	N/A
14-May-18	SWL	4	1.550	SPRING	32166	3RS ET	N/A
16-May-18	AW	2	1.060	SPRING	32166	3RS ET	N/A
16-May-18	AW	3	3.640	SPRING	32166	3RS ET	N/A
16-May-18	WL	2	2.390	SPRING	32166	3RS ET	N/A
16-May-18	WL	3	21.580	SPRING	32166	3RS ET	N/A
16-May-18	WL	4	7.180	SPRING	32166	3RS ET	N/A
23-May-18	SWL	2	37.660	SPRING	32166	3RS ET	N/A
23-May-18	SWL	3	32.490	SPRING	32166	3RS ET	N/A
24-May-18	NEL	2	31.200	SPRING	32166	3RS ET	N/A
24-May-18	NEL	3	15.800	SPRING	32166	3RS ET	N/A

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
24-May-18	DB	2	0.980	SPRING	32166	3RS ET	N/A
24-May-18	DB	3	12.290	SPRING	32166	3RS ET	N/A
24-May-18	DB	4	2.230	SPRING	32166	3RS ET	N/A
25-May-18	DB	2	10.211	SPRING	32166	3RS ET	N/A
25-May-18	DB	3	5.489	SPRING	32166	3RS ET	N/A
25-May-18	NEL	2	27.700	SPRING	32166	3RS ET	N/A
25-May-18	NEL	3	18.900	SPRING	32166	3RS ET	N/A
25-May-18	NEL	4	1.000	SPRING	32166	3RS ET	N/A
4-Jun-18	DB	3	9.830	SUMMER	32166	3RS ET	P
4-Jun-18	DB	4	0.230	SUMMER	32166	3RS ET	P
4-Jun-18	DB	3	5.540	SUMMER	32166	3RS ET	S
4-Jun-18	NEL	3	25.370	SUMMER	32166	3RS ET	P
4-Jun-18	NEL	4	12.140	SUMMER	32166	3RS ET	P
4-Jun-18	NEL	3	6.690	SUMMER	32166	3RS ET	S
4-Jun-18	NEL	4	3.400	SUMMER	32166	3RS ET	S
19-Jun-18	NWL	3	26.640	SUMMER	32166	3RS ET	P
19-Jun-18	NWL	4	36.150	SUMMER	32166	3RS ET	P
19-Jun-18	NWL	3	8.580	SUMMER	32166	3RS ET	S
19-Jun-18	NWL	4	4.130	SUMMER	32166	3RS ET	S
20-Jun-18	DB	3	10.020	SUMMER	32166	3RS ET	P
20-Jun-18	DB	4	0.200	SUMMER	32166	3RS ET	P
20-Jun-18	DB	3	4.450	SUMMER	32166	3RS ET	S
20-Jun-18	DB	4	1.030	SUMMER	32166	3RS ET	S
20-Jun-18	NEL	2	26.500	SUMMER	32166	3RS ET	P
20-Jun-18	NEL	3	9.030	SUMMER	32166	3RS ET	P
20-Jun-18	NEL	4	2.130	SUMMER	32166	3RS ET	P
20-Jun-18	NEL	2	9.000	SUMMER	32166	3RS ET	S
20-Jun-18	NEL	3	0.940	SUMMER	32166	3RS ET	S
21-Jun-18	SWL	2	7.120	SUMMER	32166	3RS ET	P
21-Jun-18	SWL	3	44.051	SUMMER	32166	3RS ET	P
21-Jun-18	SWL	4	3.720	SUMMER	32166	3RS ET	P
21-Jun-18	SWL	2	2.200	SUMMER	32166	3RS ET	S
21-Jun-18	SWL	3	13.730	SUMMER	32166	3RS ET	S
22-Jun-18	NWL	2	13.400	SUMMER	32166	3RS ET	P
22-Jun-18	NWL	3	44.550	SUMMER	32166	3RS ET	P
22-Jun-18	NWL	4	5.060	SUMMER	32166	3RS ET	P
22-Jun-18	NWL	2	5.400	SUMMER	32166	3RS ET	S
22-Jun-18	NWL	3	3.960	SUMMER	32166	3RS ET	S
22-Jun-18	NWL	4	2.790	SUMMER	32166	3RS ET	S
25-Jun-18	SWL	2	7.272	SUMMER	32166	3RS ET	P
25-Jun-18	SWL	3	27.789	SUMMER	32166	3RS ET	P
25-Jun-18	SWL	4	14.840	SUMMER	32166	3RS ET	P
25-Jun-18	SWL	5	5.230	SUMMER	32166	3RS ET	P
25-Jun-18	SWL	2	5.402	SUMMER	32166	3RS ET	S
25-Jun-18	SWL	3	3.810	SUMMER	32166	3RS ET	S
25-Jun-18	SWL	4	4.030	SUMMER	32166	3RS ET	S
25-Jun-18	SWL	5	1.210	SUMMER	32166	3RS ET	S
26-Jun-18	WL	2	4.210	SUMMER	32166	3RS ET	P
26-Jun-18	WL	3	15.962	SUMMER	32166	3RS ET	P

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
26-Jun-18	WL	3	11.178	SUMMER	32166	3RS ET	S
26-Jun-18	AW	2	2.940	SUMMER	32166	3RS ET	P
26-Jun-18	AW	3	1.900	SUMMER	32166	3RS ET	P
27-Jun-18	AW	2	4.720	SUMMER	32166	3RS ET	P
27-Jun-18	WL	2	4.010	SUMMER	32166	3RS ET	P
27-Jun-18	WL	3	12.576	SUMMER	32166	3RS ET	P
27-Jun-18	WL	4	2.970	SUMMER	32166	3RS ET	P
27-Jun-18	WL	3	8.257	SUMMER	32166	3RS ET	S
27-Jun-18	WL	4	1.967	SUMMER	32166	3RS ET	S
5-Jul-18	NWL	2	4.400	SUMMER	32166	3RS ET	P
5-Jul-18	NWL	3	20.570	SUMMER	32166	3RS ET	P
5-Jul-18	NWL	4	37.860	SUMMER	32166	3RS ET	P
5-Jul-18	NWL	2	1.900	SUMMER	32166	3RS ET	S
5-Jul-18	NWL	3	4.170	SUMMER	32166	3RS ET	S
5-Jul-18	NWL	4	5.600	SUMMER	32166	3RS ET	S
9-Jul-18	DB	2	4.340	SUMMER	32166	3RS ET	P
9-Jul-18	DB	3	5.830	SUMMER	32166	3RS ET	P
9-Jul-18	DB	2	3.500	SUMMER	32166	3RS ET	S
9-Jul-18	DB	3	2.030	SUMMER	32166	3RS ET	S
9-Jul-18	NEL	2	7.900	SUMMER	32166	3RS ET	P
9-Jul-18	NEL	3	21.800	SUMMER	32166	3RS ET	P
9-Jul-18	NEL	4	7.500	SUMMER	32166	3RS ET	P
9-Jul-18	NEL	2	2.400	SUMMER	32166	3RS ET	S
9-Jul-18	NEL	3	7.700	SUMMER	32166	3RS ET	S
11-Jul-18	AW	1	2.230	SUMMER	32166	3RS ET	P
11-Jul-18	AW	2	2.610	SUMMER	32166	3RS ET	P
11-Jul-18	WL	1	0.935	SUMMER	32166	3RS ET	P
11-Jul-18	WL	2	5.562	SUMMER	32166	3RS ET	P
11-Jul-18	WL	3	9.521	SUMMER	32166	3RS ET	P
11-Jul-18	WL	4	2.406	SUMMER	32166	3RS ET	P
11-Jul-18	WL	2	3.839	SUMMER	32166	3RS ET	S
11-Jul-18	WL	3	4.997	SUMMER	32166	3RS ET	S
11-Jul-18	WL	4	1.230	SUMMER	32166	3RS ET	S
17-Jul-18	AW	2	4.530	SUMMER	32166	3RS ET	P
17-Jul-18	WL	1	1.730	SUMMER	32166	3RS ET	P
17-Jul-18	WL	2	9.190	SUMMER	32166	3RS ET	P
17-Jul-18	WL	3	6.564	SUMMER	32166	3RS ET	P
17-Jul-18	WL	4	0.430	SUMMER	32166	3RS ET	P
17-Jul-18	WL	1	1.070	SUMMER	32166	3RS ET	S
17-Jul-18	WL	2	5.640	SUMMER	32166	3RS ET	S
17-Jul-18	WL	3	4.746	SUMMER	32166	3RS ET	S
19-Jul-18	NEL	2	20.870	SUMMER	32166	3RS ET	P
19-Jul-18	NEL	3	16.680	SUMMER	32166	3RS ET	P
19-Jul-18	NEL	2	8.630	SUMMER	32166	3RS ET	S
19-Jul-18	NEL	3	1.050	SUMMER	32166	3RS ET	S
19-Jul-18	DB	3	10.480	SUMMER	32166	3RS ET	P
19-Jul-18	DB	3	4.320	SUMMER	32166	3RS ET	S
19-Jul-18	DB	4	1.100	SUMMER	32166	3RS ET	S
20-Jul-18	NWL	1	9.440	SUMMER	32166	3RS ET	P

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
20-Jul-18	NWL	2	19.567	SUMMER	32166	3RS ET	P
20-Jul-18	NWL	3	33.930	SUMMER	32166	3RS ET	P
20-Jul-18	NWL	2	3.400	SUMMER	32166	3RS ET	S
20-Jul-18	NWL	3	8.660	SUMMER	32166	3RS ET	S
26-Jul-18	SWL	2	32.460	SUMMER	32166	3RS ET	P
26-Jul-18	SWL	3	22.153	SUMMER	32166	3RS ET	P
26-Jul-18	SWL	4	0.487	SUMMER	32166	3RS ET	P
26-Jul-18	SWL	2	8.040	SUMMER	32166	3RS ET	S
26-Jul-18	SWL	3	6.770	SUMMER	32166	3RS ET	S
26-Jul-18	SWL	4	0.580	SUMMER	32166	3RS ET	S
30-Jul-18	SWL	2	37.816	SUMMER	32166	3RS ET	P
30-Jul-18	SWL	3	17.730	SUMMER	32166	3RS ET	P
30-Jul-18	SWL	2	12.124	SUMMER	32166	3RS ET	S
30-Jul-18	SWL	3	3.490	SUMMER	32166	3RS ET	S
2-Aug-18	NWL	2	9.284	SUMMER	32166	3RS ET	P
2-Aug-18	NWL	3	46.887	SUMMER	32166	3RS ET	P
2-Aug-18	NWL	4	6.300	SUMMER	32166	3RS ET	P
2-Aug-18	NWL	2	2.029	SUMMER	32166	3RS ET	S
2-Aug-18	NWL	3	9.770	SUMMER	32166	3RS ET	S
2-Aug-18	NWL	4	0.400	SUMMER	32166	3RS ET	S
7-Aug-18	AW	2	4.960	SUMMER	32166	3RS ET	P
7-Aug-18	WL	1	2.480	SUMMER	32166	3RS ET	P
7-Aug-18	WL	2	8.859	SUMMER	32166	3RS ET	P
7-Aug-18	WL	3	4.158	SUMMER	32166	3RS ET	P
7-Aug-18	WL	4	3.370	SUMMER	32166	3RS ET	P
7-Aug-18	WL	2	3.270	SUMMER	32166	3RS ET	S
7-Aug-18	WL	3	4.142	SUMMER	32166	3RS ET	S
7-Aug-18	WL	4	1.120	SUMMER	32166	3RS ET	S
16-Aug-18	NEL	1	0.900	SUMMER	32166	3RS ET	P
16-Aug-18	NEL	2	29.510	SUMMER	32166	3RS ET	P
16-Aug-18	NEL	3	7.200	SUMMER	32166	3RS ET	P
16-Aug-18	NEL	1	0.400	SUMMER	32166	3RS ET	S
16-Aug-18	NEL	2	9.690	SUMMER	32166	3RS ET	S
16-Aug-18	DB	2	5.590	SUMMER	32166	3RS ET	P
16-Aug-18	DB	3	4.520	SUMMER	32166	3RS ET	P
16-Aug-18	DB	2	4.520	SUMMER	32166	3RS ET	S
16-Aug-18	DB	3	1.070	SUMMER	32166	3RS ET	S
17-Aug-18	DB	2	12.070	SUMMER	32166	3RS ET	P
17-Aug-18	DB	2	3.830	SUMMER	32166	3RS ET	S
17-Aug-18	NEL	2	35.410	SUMMER	32166	3RS ET	P
17-Aug-18	NEL	3	1.100	SUMMER	32166	3RS ET	P
17-Aug-18	NEL	2	9.880	SUMMER	32166	3RS ET	S
17-Aug-18	NEL	3	0.200	SUMMER	32166	3RS ET	S
20-Aug-18	NWL	1	9.500	SUMMER	32166	3RS ET	P
20-Aug-18	NWL	2	51.800	SUMMER	32166	3RS ET	P
20-Aug-18	NWL	3	1.300	SUMMER	32166	3RS ET	P
20-Aug-18	NWL	1	1.000	SUMMER	32166	3RS ET	S
20-Aug-18	NWL	2	11.000	SUMMER	32166	3RS ET	S
21-Aug-18	AW	1	4.700	SUMMER	32166	3RS ET	P

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
21-Aug-18	WL	2	24.554	SUMMER	32166	3RS ET	P
21-Aug-18	WL	3	3.309	SUMMER	32166	3RS ET	P
21-Aug-18	WL	2	7.939	SUMMER	32166	3RS ET	S
21-Aug-18	WL	3	0.572	SUMMER	32166	3RS ET	S
22-Aug-18	SWL	2	50.350	SUMMER	32166	3RS ET	P
22-Aug-18	SWL	3	4.900	SUMMER	32166	3RS ET	P
22-Aug-18	SWL	2	13.170	SUMMER	32166	3RS ET	S
22-Aug-18	SWL	3	2.400	SUMMER	32166	3RS ET	S
23-Aug-18	SWL	2	51.850	SUMMER	32166	3RS ET	P
23-Aug-18	SWL	3	2.905	SUMMER	32166	3RS ET	P
23-Aug-18	SWL	2	11.220	SUMMER	32166	3RS ET	S
23-Aug-18	SWL	3	4.000	SUMMER	32166	3RS ET	S
7-Sep-18	SWL	1	0.800	AUTUMN	32166	3RS ET	P
7-Sep-18	SWL	2	43.560	AUTUMN	32166	3RS ET	P
7-Sep-18	SWL	3	11.660	AUTUMN	32166	3RS ET	P
7-Sep-18	SWL	1	1.500	AUTUMN	32166	3RS ET	S
7-Sep-18	SWL	2	8.130	AUTUMN	32166	3RS ET	S
7-Sep-18	SWL	3	4.900	AUTUMN	32166	3RS ET	S
10-Sep-18	NEL	2	37.280	AUTUMN	32166	3RS ET	P
10-Sep-18	NEL	2	8.640	AUTUMN	32166	3RS ET	S
10-Sep-18	NEL	3	1.080	AUTUMN	32166	3RS ET	S
10-Sep-18	DB	2	7.250	AUTUMN	32166	3RS ET	P
10-Sep-18	DB	3	2.480	AUTUMN	32166	3RS ET	P
10-Sep-18	DB	2	4.620	AUTUMN	32166	3RS ET	S
10-Sep-18	DB	3	0.950	AUTUMN	32166	3RS ET	S
14-Sep-18	NWL	1	1.400	AUTUMN	32166	3RS ET	P
14-Sep-18	NWL	2	58.520	AUTUMN	32166	3RS ET	P
14-Sep-18	NWL	3	3.600	AUTUMN	32166	3RS ET	P
14-Sep-18	NWL	2	11.780	AUTUMN	32166	3RS ET	S
18-Sep-18	DB	2	2.630	AUTUMN	32166	3RS ET	P
18-Sep-18	DB	3	4.790	AUTUMN	32166	3RS ET	P
18-Sep-18	DB	4	2.700	AUTUMN	32166	3RS ET	P
18-Sep-18	DB	2	3.400	AUTUMN	32166	3RS ET	S
18-Sep-18	DB	3	2.080	AUTUMN	32166	3RS ET	S
18-Sep-18	NEL	2	4.900	AUTUMN	32166	3RS ET	P
18-Sep-18	NEL	3	28.270	AUTUMN	32166	3RS ET	P
18-Sep-18	NEL	4	4.070	AUTUMN	32166	3RS ET	P
18-Sep-18	NEL	2	1.000	AUTUMN	32166	3RS ET	S
18-Sep-18	NEL	3	8.260	AUTUMN	32166	3RS ET	S
18-Sep-18	NEL	4	1.000	AUTUMN	32166	3RS ET	S
19-Sep-18	SWL	2	42.334	AUTUMN	32166	3RS ET	P
19-Sep-18	SWL	3	12.170	AUTUMN	32166	3RS ET	P
19-Sep-18	SWL	2	13.810	AUTUMN	32166	3RS ET	S
19-Sep-18	SWL	3	0.900	AUTUMN	32166	3RS ET	S
20-Sep-18	AW	2	4.940	AUTUMN	32166	3RS ET	P
20-Sep-18	WL	2	6.421	AUTUMN	32166	3RS ET	P
20-Sep-18	WL	3	11.471	AUTUMN	32166	3RS ET	P
20-Sep-18	WL	2	5.212	AUTUMN	32166	3RS ET	S
20-Sep-18	WL	3	6.235	AUTUMN	32166	3RS ET	S

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
21-Sep-18	AW	2	4.690	AUTUMN	32166	3RS ET	P
21-Sep-18	WL	2	4.136	AUTUMN	32166	3RS ET	P
21-Sep-18	WL	3	13.589	AUTUMN	32166	3RS ET	P
21-Sep-18	WL	2	2.288	AUTUMN	32166	3RS ET	S
21-Sep-18	WL	3	7.393	AUTUMN	32166	3RS ET	S
26-Sep-18	NWL	2	40.190	AUTUMN	32166	3RS ET	P
26-Sep-18	NWL	3	21.690	AUTUMN	32166	3RS ET	P
26-Sep-18	NWL	2	6.418	AUTUMN	32166	3RS ET	S
26-Sep-18	NWL	3	3.520	AUTUMN	32166	3RS ET	S
4-Oct-18	AW	2	1.010	AUTUMN	32166	3RS ET	P
4-Oct-18	AW	3	3.830	AUTUMN	32166	3RS ET	P
4-Oct-18	WL	3	16.560	AUTUMN	32166	3RS ET	P
4-Oct-18	WL	4	3.020	AUTUMN	32166	3RS ET	P
4-Oct-18	WL	2	0.740	AUTUMN	32166	3RS ET	S
4-Oct-18	WL	3	8.310	AUTUMN	32166	3RS ET	S
4-Oct-18	WL	4	1.110	AUTUMN	32166	3RS ET	S
5-Oct-18	NWL	2	9.800	AUTUMN	32166	3RS ET	P
5-Oct-18	NWL	3	37.010	AUTUMN	32166	3RS ET	P
5-Oct-18	NWL	4	15.400	AUTUMN	32166	3RS ET	P
5-Oct-18	NWL	2	1.100	AUTUMN	32166	3RS ET	S
5-Oct-18	NWL	3	8.290	AUTUMN	32166	3RS ET	S
5-Oct-18	NWL	4	1.400	AUTUMN	32166	3RS ET	S
8-Oct-18	NWL	2	45.386	AUTUMN	32166	3RS ET	P
8-Oct-18	NWL	3	14.046	AUTUMN	32166	3RS ET	P
8-Oct-18	NWL	2	10.674	AUTUMN	32166	3RS ET	S
8-Oct-18	NWL	3	1.390	AUTUMN	32166	3RS ET	S
11-Oct-18	DB	3	10.360	AUTUMN	32166	3RS ET	P
11-Oct-18	DB	2	0.910	AUTUMN	32166	3RS ET	S
11-Oct-18	DB	3	3.500	AUTUMN	32166	3RS ET	S
11-Oct-18	DB	4	1.030	AUTUMN	32166	3RS ET	S
11-Oct-18	NEL	2	15.780	AUTUMN	32166	3RS ET	P
11-Oct-18	NEL	3	19.940	AUTUMN	32166	3RS ET	P
11-Oct-18	NEL	4	1.900	AUTUMN	32166	3RS ET	P
11-Oct-18	NEL	2	3.580	AUTUMN	32166	3RS ET	S
11-Oct-18	NEL	3	5.900	AUTUMN	32166	3RS ET	S
12-Oct-18	DB	3	10.430	AUTUMN	32166	3RS ET	P
12-Oct-18	DB	3	5.370	AUTUMN	32166	3RS ET	S
12-Oct-18	NEL	2	29.540	AUTUMN	32166	3RS ET	P
12-Oct-18	NEL	3	6.500	AUTUMN	32166	3RS ET	P
12-Oct-18	NEL	2	7.440	AUTUMN	32166	3RS ET	S
12-Oct-18	NEL	3	2.900	AUTUMN	32166	3RS ET	S
23-Oct-18	SWL	2	24.730	AUTUMN	32166	3RS ET	P
23-Oct-18	SWL	3	31.390	AUTUMN	32166	3RS ET	P
23-Oct-18	SWL	2	9.780	AUTUMN	32166	3RS ET	S
23-Oct-18	SWL	3	5.100	AUTUMN	32166	3RS ET	S
24-Oct-18	AW	2	4.710	AUTUMN	32166	3RS ET	P
24-Oct-18	WL	2	13.470	AUTUMN	32166	3RS ET	P
24-Oct-18	WL	3	4.494	AUTUMN	32166	3RS ET	P
24-Oct-18	WL	4	1.000	AUTUMN	32166	3RS ET	P

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
24-Oct-18	WL	2	6.760	AUTUMN	32166	3RS ET	S
24-Oct-18	WL	3	2.240	AUTUMN	32166	3RS ET	S
24-Oct-18	WL	4	0.300	AUTUMN	32166	3RS ET	S
24-Oct-18	WL	5	0.500	AUTUMN	32166	3RS ET	S
26-Oct-18	SWL	2	25.709	AUTUMN	32166	3RS ET	P
26-Oct-18	SWL	3	30.667	AUTUMN	32166	3RS ET	P
26-Oct-18	SWL	2	9.234	AUTUMN	32166	3RS ET	S
26-Oct-18	SWL	3	5.860	AUTUMN	32166	3RS ET	S
6-Nov-18	NWL	2	7.350	AUTUMN	32166	3RS ET	P
6-Nov-18	NWL	3	40.500	AUTUMN	32166	3RS ET	P
6-Nov-18	NWL	4	12.930	AUTUMN	32166	3RS ET	P
6-Nov-18	NWL	2	2.000	AUTUMN	32166	3RS ET	S
6-Nov-18	NWL	3	7.820	AUTUMN	32166	3RS ET	S
6-Nov-18	NWL	4	1.800	AUTUMN	32166	3RS ET	S
7-Nov-18	DB	2	7.160	AUTUMN	32166	3RS ET	P
7-Nov-18	DB	3	2.960	AUTUMN	32166	3RS ET	P
7-Nov-18	DB	2	3.780	AUTUMN	32166	3RS ET	S
7-Nov-18	DB	3	1.800	AUTUMN	32166	3RS ET	S
7-Nov-18	NEL	2	2.200	AUTUMN	32166	3RS ET	P
7-Nov-18	NEL	3	30.480	AUTUMN	32166	3RS ET	P
7-Nov-18	NEL	4	4.540	AUTUMN	32166	3RS ET	P
7-Nov-18	NEL	2	0.700	AUTUMN	32166	3RS ET	S
7-Nov-18	NEL	3	9.180	AUTUMN	32166	3RS ET	S
12-Nov-18	NWL	2	60.880	AUTUMN	32166	3RS ET	P
12-Nov-18	NWL	3	2.180	AUTUMN	32166	3RS ET	P
12-Nov-18	NWL	2	12.440	AUTUMN	32166	3RS ET	S
13-Nov-18	DB	2	1.200	AUTUMN	32166	3RS ET	P
13-Nov-18	DB	3	10.270	AUTUMN	32166	3RS ET	P
13-Nov-18	DB	2	0.800	AUTUMN	32166	3RS ET	S
13-Nov-18	DB	3	4.730	AUTUMN	32166	3RS ET	S
13-Nov-18	NEL	1	10.400	AUTUMN	32166	3RS ET	P
13-Nov-18	NEL	2	13.700	AUTUMN	32166	3RS ET	P
13-Nov-18	NEL	3	13.500	AUTUMN	32166	3RS ET	P
13-Nov-18	NEL	1	1.800	AUTUMN	32166	3RS ET	S
13-Nov-18	NEL	2	2.100	AUTUMN	32166	3RS ET	S
13-Nov-18	NEL	3	5.600	AUTUMN	32166	3RS ET	S
16-Nov-18	AW	2	2.900	AUTUMN	32166	3RS ET	P
16-Nov-18	AW	3	1.910	AUTUMN	32166	3RS ET	P
16-Nov-18	WL	2	2.752	AUTUMN	32166	3RS ET	P
16-Nov-18	WL	3	10.665	AUTUMN	32166	3RS ET	P
16-Nov-18	WL	4	2.306	AUTUMN	32166	3RS ET	P
16-Nov-18	WL	2	1.680	AUTUMN	32166	3RS ET	S
16-Nov-18	WL	3	5.483	AUTUMN	32166	3RS ET	S
16-Nov-18	WL	4	0.355	AUTUMN	32166	3RS ET	S
20-Nov-18	AW	3	2.570	AUTUMN	32166	3RS ET	P
20-Nov-18	AW	4	1.950	AUTUMN	32166	3RS ET	P
20-Nov-18	WL	2	6.864	AUTUMN	32166	3RS ET	P
20-Nov-18	WL	3	6.279	AUTUMN	32166	3RS ET	P
20-Nov-18	WL	4	5.049	AUTUMN	32166	3RS ET	P

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
20-Nov-18	WL	5	1.710	AUTUMN	32166	3RS ET	P
20-Nov-18	WL	2	6.792	AUTUMN	32166	3RS ET	S
20-Nov-18	WL	3	1.259	AUTUMN	32166	3RS ET	S
20-Nov-18	WL	4	1.812	AUTUMN	32166	3RS ET	S
20-Nov-18	WL	5	0.370	AUTUMN	32166	3RS ET	S
21-Nov-18	SWL	2	10.974	AUTUMN	32166	3RS ET	P
21-Nov-18	SWL	3	29.690	AUTUMN	32166	3RS ET	P
21-Nov-18	SWL	4	10.110	AUTUMN	32166	3RS ET	P
21-Nov-18	SWL	5	1.200	AUTUMN	32166	3RS ET	P
21-Nov-18	SWL	2	3.840	AUTUMN	32166	3RS ET	S
21-Nov-18	SWL	3	9.400	AUTUMN	32166	3RS ET	S
21-Nov-18	SWL	4	2.860	AUTUMN	32166	3RS ET	S
23-Nov-18	SWL	2	17.802	AUTUMN	32166	3RS ET	P
23-Nov-18	SWL	3	33.670	AUTUMN	32166	3RS ET	P
23-Nov-18	SWL	4	4.260	AUTUMN	32166	3RS ET	P
23-Nov-18	SWL	2	8.268	AUTUMN	32166	3RS ET	S
23-Nov-18	SWL	3	6.410	AUTUMN	32166	3RS ET	S
23-Nov-18	SWL	4	1.090	AUTUMN	32166	3RS ET	S
3-Dec-18	NWL	2	40.660	WINTER	32166	3RS ET	P
3-Dec-18	NWL	3	21.070	WINTER	32166	3RS ET	P
3-Dec-18	NWL	2	9.970	WINTER	32166	3RS ET	S
3-Dec-18	NWL	3	1.200	WINTER	32166	3RS ET	S
4-Dec-18	SWL	1	1.500	WINTER	32166	3RS ET	P
4-Dec-18	SWL	2	53.480	WINTER	32166	3RS ET	P
4-Dec-18	SWL	2	13.410	WINTER	32166	3RS ET	S
6-Dec-18	DB	2	0.699	WINTER	32166	3RS ET	P
6-Dec-18	DB	3	9.501	WINTER	32166	3RS ET	P
6-Dec-18	DB	2	0.920	WINTER	32166	3RS ET	S
6-Dec-18	DB	3	4.180	WINTER	32166	3RS ET	S
6-Dec-18	NEL	2	31.662	WINTER	32166	3RS ET	P
6-Dec-18	NEL	3	5.158	WINTER	32166	3RS ET	P
6-Dec-18	NEL	2	9.300	WINTER	32166	3RS ET	S
6-Dec-18	NEL	3	1.080	WINTER	32166	3RS ET	S
7-Dec-18	NEL	2	25.400	WINTER	32166	3RS ET	P
7-Dec-18	NEL	3	11.810	WINTER	32166	3RS ET	P
7-Dec-18	NEL	2	5.200	WINTER	32166	3RS ET	S
7-Dec-18	NEL	3	4.890	WINTER	32166	3RS ET	S
7-Dec-18	DB	3	9.820	WINTER	32166	3RS ET	P
7-Dec-18	DB	4	0.360	WINTER	32166	3RS ET	P
7-Dec-18	DB	3	5.020	WINTER	32166	3RS ET	S
17-Dec-18	NWL	2	9.700	WINTER	32166	3RS ET	P
17-Dec-18	NWL	3	50.000	WINTER	32166	3RS ET	P
17-Dec-18	NWL	4	3.700	WINTER	32166	3RS ET	P
17-Dec-18	NWL	2	3.400	WINTER	32166	3RS ET	S
17-Dec-18	NWL	3	9.000	WINTER	32166	3RS ET	S
18-Dec-18	SWL	2	13.300	WINTER	32166	3RS ET	P
18-Dec-18	SWL	3	19.310	WINTER	32166	3RS ET	P
18-Dec-18	SWL	4	6.734	WINTER	32166	3RS ET	P
18-Dec-18	SWL	5	15.820	WINTER	32166	3RS ET	P

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE	P/S
18-Dec-18	SWL	2	1.300	WINTER	32166	3RS ET	S
18-Dec-18	SWL	3	9.990	WINTER	32166	3RS ET	S
18-Dec-18	SWL	4	2.406	WINTER	32166	3RS ET	S
18-Dec-18	SWL	5	2.140	WINTER	32166	3RS ET	S
20-Dec-18	AW	2	4.680	WINTER	32166	3RS ET	P
20-Dec-18	WL	1	1.360	WINTER	32166	3RS ET	P
20-Dec-18	WL	2	18.841	WINTER	32166	3RS ET	P
20-Dec-18	WL	2	10.999	WINTER	32166	3RS ET	S
21-Dec-18	AW	1	4.800	WINTER	32166	3RS ET	P
21-Dec-18	WL	1	1.990	WINTER	32166	3RS ET	P
21-Dec-18	WL	2	12.080	WINTER	32166	3RS ET	P
21-Dec-18	WL	3	4.200	WINTER	32166	3RS ET	P
21-Dec-18	WL	4	0.800	WINTER	32166	3RS ET	P
21-Dec-18	WL	1	1.370	WINTER	32166	3RS ET	S
21-Dec-18	WL	2	5.760	WINTER	32166	3RS ET	S
21-Dec-18	WL	3	1.900	WINTER	32166	3RS ET	S
21-Dec-18	WL	4	1.200	WINTER	32166	3RS ET	S

CWD Small Vessel Line-transect Survey

Sighting Data

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
8-Jan-18	1	1019	CWD	5	SWL	2	30	ON	3RS ET	22.2153	113.9359	WINTER	PURSE SEINER	N/A
10-Jan-18	1	1318	CWD	8	DB	3	12	ON	3RS ET	22.4278	113.8780	WINTER	NONE	N/A
15-Jan-18	1	0949	CWD	11	AW	2	72	ON	3RS ET	22.2896	113.8777	WINTER	NONE	N/A
15-Jan-18	2	1048	CWD	2	WL	2	147	ON	3RS ET	22.2938	113.8616	WINTER	NONE	N/A
15-Jan-18	3	1128	CWD	13	WL	2	817	ON	3RS ET	22.2602	113.8400	WINTER	GILLNETTER	N/A
15-Jan-18	4	1217	CWD	2	WL	2	206	ON	3RS ET	22.2418	113.8359	WINTER	GILLNETTER	N/A
15-Jan-18	5	1242	CWD	3	WL	2	309	ON	3RS ET	22.2281	113.8377	WINTER	NONE	N/A
15-Jan-18	6	1316	CWD	2	WL	2	65	ON	3RS ET	22.2145	113.8313	WINTER	NONE	N/A
15-Jan-18	7	1335	CWD	6	WL	2	281	ON	3RS ET	22.2053	113.8346	WINTER	NONE	N/A
15-Jan-18	8	1405	CWD	9	WL	2	179	ON	3RS ET	22.1958	113.8350	WINTER	NONE	N/A
15-Jan-18	9	1432	CWD	3	WL	2	5	ON	3RS ET	22.1873	113.8318	WINTER	NONE	N/A
15-Jan-18	10	1453	CWD	2	SWL	2	248	ON	3RS ET	22.1841	113.8501	WINTER	NONE	N/A
16-Jan-18	1	0944	CWD	1	AW	2	79	ON	3RS ET	22.2880	113.8842	WINTER	NONE	N/A
16-Jan-18	2	1032	CWD	2	WL	3	74	ON	3RS ET	22.2687	113.8541	WINTER	NONE	N/A
16-Jan-18	3	1448	CWD	1	SWL	2	191	ON	3RS ET	22.1746	113.8975	WINTER	NONE	N/A
17-Jan-18	1	1045	FP	2	SWL	2	813	ON	3RS ET	22.1681	113.9359	WINTER	NONE	N/A
17-Jan-18	2	1057	FP	1	SWL	2	N/A	OFF	3RS ET	22.1529	113.9358	WINTER	NONE	N/A
17-Jan-18	3	1106	FP	1	SWL	1	372	ON	3RS ET	22.1437	113.9272	WINTER	NONE	N/A
17-Jan-18	4	1152	FP	1	SWL	2	140	ON	3RS ET	22.1835	113.9203	WINTER	NONE	N/A
17-Jan-18	5	1244	CWD	2	SWL	2	43	ON	3RS ET	22.1907	113.9078	WINTER	NONE	N/A
17-Jan-18	6	1457	CWD	1	SWL	2	149	ON	3RS ET	22.1874	113.8683	WINTER	NONE	N/A
17-Jan-18	7	1512	CWD	6	SWL	2	533	ON	3RS ET	22.1937	113.8687	WINTER	NONE	N/A
18-Jan-18	1	0933	CWD	4	NWL	2	451	ON	3RS ET	22.4000	113.8681	WINTER	NONE	N/A
18-Jan-18	2	1017	CWD	4	NWL	1	362	ON	3RS ET	22.3321	113.8689	WINTER	NONE	N/A
18-Jan-18	3	1044	CWD	4	NWL	2	221	ON	3RS ET	22.3129	113.8680	WINTER	NONE	N/A
18-Jan-18	4	1121	CWD	1	NWL	2	120	ON	3RS ET	22.2809	113.8782	WINTER	NONE	N/A
18-Jan-18	5	1135	CWD	2	NWL	2	56	ON	3RS ET	22.2934	113.8780	WINTER	NONE	N/A
6-Feb-18	1	1043	CWD	2	NWL	3	N/A	OFF	3RS ET	22.2784	113.8777	WINTER	GILLNETTER	N/A
6-Feb-18	2	1058	CWD	1	NWL	3	80	ON	3RS ET	22.2829	113.8785	WINTER	NONE	N/A
6-Feb-18	3	1153	CWD	5	NWL	3	75	ON	3RS ET	22.3720	113.8771	WINTER	NONE	N/A
6-Feb-18	4	1523	CWD	2	NWL	2	N/A	OFF	3RS ET	22.3304	113.9495	WINTER	NONE	N/A

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
12-Feb-18	1	1121	CWD	2	NWL	3	76	ON	3RS ET	22.3384	113.8781	WINTER	NONE	N/A
12-Feb-18	2	1153	CWD	7	NWL	2	80	ON	3RS ET	22.3709	113.8768	WINTER	NONE	N/A
12-Feb-18	3	1240	CWD	3	NWL	3	345	ON	3RS ET	22.4121	113.8780	WINTER	NONE	N/A
12-Feb-18	4	1348	CWD	3	NWL	3	114	ON	3RS ET	22.3460	113.8981	WINTER	NONE	N/A
13-Feb-18	1	0943	CWD	3	AW	2	548	ON	3RS ET	22.2917	113.8745	WINTER	NONE	N/A
13-Feb-18	2	1011	CWD	1	AW	2	N/A	OFF	3RS ET	22.2879	113.8838	WINTER	NONE	N/A
13-Feb-18	3	1052	CWD	1	WL	2	366	ON	3RS ET	22.2686	113.8559	WINTER	NONE	N/A
13-Feb-18	4	1115	CWD	3	WL	2	475	ON	3RS ET	22.2604	113.8491	WINTER	NONE	N/A
13-Feb-18	5	1141	CWD	4	WL	2	392	ON	3RS ET	22.2604	113.8445	WINTER	NONE	N/A
13-Feb-18	6	1158	CWD	1	WL	2	47	ON	3RS ET	22.2605	113.8419	WINTER	NONE	N/A
13-Feb-18	7	1212	CWD	4	WL	2	200	ON	3RS ET	22.2504	113.8388	WINTER	NONE	N/A
13-Feb-18	8	1248	CWD	2	WL	2	456	ON	3RS ET	22.2375	113.8262	WINTER	NONE	N/A
14-Feb-18	1	0931	CWD	1	AW	2	11	ON	3RS ET	22.3019	113.8813	WINTER	NONE	N/A
14-Feb-18	2	0944	CWD	5	AW	2	638	ON	3RS ET	22.2951	113.8805	WINTER	NONE	N/A
14-Feb-18	3	1020	CWD	5	WL	2	269	ON	3RS ET	22.3031	113.8611	WINTER	NONE	N/A
14-Feb-18	4	1035	CWD	4	WL	2	231	ON	3RS ET	22.2937	113.8616	WINTER	GILLNETTER	N/A
14-Feb-18	5	1058	CWD	1	WL	3	761	ON	3RS ET	22.2751	113.8494	WINTER	NONE	N/A
14-Feb-18	6	1156	CWD	1	WL	2	71	ON	3RS ET	22.2415	113.8386	WINTER	NONE	N/A
14-Feb-18	7	1211	CWD	4	WL	2	6	ON	3RS ET	22.2416	113.8352	WINTER	NONE	N/A
14-Feb-18	8	1256	CWD	5	WL	2	110	ON	3RS ET	22.2140	113.8237	WINTER	NONE	N/A
22-Feb-18	1	0936	CWD	1	DB	3	240	ON	3RS ET	22.4219	113.8837	WINTER	HANG TRAWLER	N/A
23-Feb-18	1	1222	CWD	1	SWL	3	8	ON	3RS ET	22.1759	113.9072	WINTER	NONE	N/A
5-Mar-18	1	1328	FP	2	SWL	2	58	ON	3RS ET	22.1574	113.8973	SPRING	NONE	N/A
5-Mar-18	2	1338	FP	2	SWL	2	145	ON	3RS ET	22.1484	113.8941	SPRING	NONE	N/A
5-Mar-18	3	1454	FP	3	SWL	2	103	ON	3RS ET	22.1824	113.8685	SPRING	NONE	N/A
12-Mar-18	1	1146	CWD	10	WL	2	122	ON	3RS ET	22.2076	113.8396	SPRING	NONE	N/A
12-Mar-18	2	1208	CWD	2	WL	2	17	ON	3RS ET	22.2053	113.8384	SPRING	NONE	N/A
12-Mar-18	3	1412	CWD	1	SWL	3	164	ON	3RS ET	22.1995	113.8784	SPRING	NONE	N/A
13-Mar-18	1	1037	CWD	2	WL	2	56	ON	3RS ET	22.2666	113.8596	SPRING	NONE	N/A
13-Mar-18	2	1128	CWD	1	WL	2	140	ON	3RS ET	22.2348	113.8251	SPRING	NONE	N/A
13-Mar-18	3	1205	CWD	5	WL	2	384	ON	3RS ET	22.2231	113.8195	SPRING	NONE	N/A
13-Mar-18	4	1244	CWD	1	WL	4	12	ON	3RS ET	22.2143	113.8273	SPRING	NONE	N/A
13-Mar-18	5	1324	CWD	1	WL	2	36	ON	3RS ET	22.1961	113.8406	SPRING	NONE	N/A

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
14-Mar-18	1	1000	CWD	2	NWL	2	65	ON	3RS ET	22.3539	113.8689	SPRING	NONE	N/A
14-Mar-18	2	1013	CWD	2	NWL	2	335	ON	3RS ET	22.3431	113.8687	SPRING	NONE	N/A
14-Mar-18	3	1126	CWD	2	NWL	2	N/A	OFF	3RS ET	22.3245	113.8729	SPRING	NONE	N/A
14-Mar-18	4	1208	CWD	4	NWL	2	57	ON	3RS ET	22.3912	113.8785	SPRING	NONE	N/A
14-Mar-18	5	1253	CWD	1	NWL	3	587	ON	3RS ET	22.3824	113.8888	SPRING	NONE	N/A
14-Mar-18	6	1310	CWD	2	NWL	3	13	ON	3RS ET	22.3837	113.8887	SPRING	NONE	N/A
21-Mar-18	1	1050	FP	4	SWL	2	59	ON	3RS ET	22.1486	113.9340	SPRING	NONE	N/A
21-Mar-18	2	1106	FP	1	SWL	2	201	ON	3RS ET	22.1599	113.9272	SPRING	NONE	N/A
21-Mar-18	3	1111	FP	2	SWL	2	262	ON	3RS ET	22.1658	113.9272	SPRING	NONE	N/A
21-Mar-18	4	1202	FP	1	SWL	2	30	ON	3RS ET	22.1453	113.9176	SPRING	NONE	N/A
21-Mar-18	5	1311	FP	1	SWL	4	225	ON	3RS ET	22.1641	113.8975	SPRING	NONE	N/A
22-Mar-18	1	1219	CWD	6	NWL	3	981	ON	3RS ET	22.3840	113.8774	SPRING	PURSE SEINER	N/A
22-Mar-18	2	1305	CWD	2	NWL	3	579	ON	3RS ET	22.3952	113.8893	SPRING	NONE	N/A
22-Mar-18	3	1418	CWD	1	NWL	2	50	ON	3RS ET	22.3780	113.8980	SPRING	NONE	N/A
22-Mar-18	4	1454	CWD	1	NWL	2	51	ON	3RS ET	22.3760	113.9062	SPRING	NONE	N/A
3-Apr-18	1	1048	FP	1	SWL	1	1489	ON	3RS ET	22.1788	113.9360	SPRING	NONE	N/A
3-Apr-18	2	1056	FP	2	SWL	1	192	ON	3RS ET	22.1652	113.9359	SPRING	NONE	N/A
4-Apr-18	1	1058	FP	3	SWL	1	23	ON	3RS ET	22.1556	113.9361	SPRING	NONE	N/A
4-Apr-18	2	1208	FP	2	SWL	1	116	ON	3RS ET	22.1499	113.9178	SPRING	NONE	N/A
4-Apr-18	3	1216	FP	1	SWL	1	85	ON	3RS ET	22.1415	113.9128	SPRING	NONE	N/A
4-Apr-18	4	1335	FP	5	SWL	2	176	ON	3RS ET	22.1487	113.8963	SPRING	NONE	N/A
4-Apr-18	5	1405	CWD	2	SWL	2	78	ON	3RS ET	22.2025	113.8879	SPRING	NONE	N/A
11-Apr-18	1	1034	CWD	2	WL	2	444	ON	3RS ET	22.2666	113.8595	SPRING	PURSE SEINER	N/A
11-Apr-18	2	1108	CWD	1	WL	3	117	ON	3RS ET	22.2500	113.8442	SPRING	NONE	N/A
11-Apr-18	3	1129	CWD	3	WL	3	511	ON	3RS ET	22.2414	113.8365	SPRING	SHRIMP TRAWLER	N/A
11-Apr-18	4	1226	CWD	3	WL	3	119	ON	3RS ET	22.2145	113.8315	SPRING	NONE	N/A
12-Apr-18	1	1029	CWD	2	WL	2	N/A	OFF	3RS ET	22.2601	113.8489	SPRING	NONE	N/A
12-Apr-18	2	1054	CWD	6	WL	3	285	ON	3RS ET	22.2507	113.8431	SPRING	NONE	N/A
12-Apr-18	3	1130	CWD	8	WL	2	18	ON	3RS ET	22.2416	113.8367	SPRING	NONE	N/A
12-Apr-18	4	1201	CWD	3	WL	3	136	ON	3RS ET	22.2321	113.8322	SPRING	NONE	N/A
12-Apr-18	5	1242	CWD	5	WL	3	119	ON	3RS ET	22.2145	113.8317	SPRING	NONE	N/A
12-Apr-18	6	1345	CWD	1	WL	3	N/A	OFF	3RS ET	22.1919	113.8428	SPRING	NONE	N/A
12-Apr-18	7	1352	CWD	3	SWL	2	320	ON	3RS ET	22.1928	113.8491	SPRING	NONE	N/A

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
12-Apr-18	8	1421	CWD	1	SWL	2	21	ON	3RS ET	22.1684	113.8577	SPRING	NONE	N/A
19-Apr-18	1	0953	CWD	1	NWL	3	114	ON	3RS ET	22.3730	113.8693	SPRING	NONE	N/A
19-Apr-18	2	1207	CWD	1	NWL	2	15	ON	3RS ET	22.3832	113.8769	SPRING	NONE	N/A
19-Apr-18	3	1235	CWD	5	NWL	2	410	ON	3RS ET	22.4063	113.8775	SPRING	NONE	N/A
19-Apr-18	4	1316	CWD	5	NWL	2	N/A	OFF	3RS ET	22.4033	113.8881	SPRING	NONE	N/A
23-Apr-18	1	0946	CWD	6	NWL	2	413	ON	3RS ET	22.3930	113.8703	SPRING	NONE	N/A
3-May-18	1	1131	CWD	2	NWL	3	35	ON	3RS ET	22.3558	113.8781	SPRING	NONE	N/A
14-May-18	1	1057	CWD	2	SWL	2	151	ON	3RS ET	22.1972	113.8588	SPRING	NONE	N/A
14-May-18	2	1115	CWD	5	SWL	2	121	ON	3RS ET	22.1994	113.8690	SPRING	NONE	N/A
14-May-18	3	1139	CWD	1	SWL	2	4	ON	3RS ET	22.1953	113.8689	SPRING	NONE	N/A
14-May-18	4	1250	CWD	1	SWL	3	191	ON	3RS ET	22.1881	113.8882	SPRING	NONE	N/A
14-May-18	5	1537	FP	6	SWL	3	21	ON	3RS ET	22.1652	113.9273	SPRING	NONE	N/A
14-May-18	6	1602	FP	3	SWL	3	116	ON	3RS ET	22.1439	113.9274	SPRING	NONE	N/A
14-May-18	7	1610	FP	1	SWL	3	16	ON	3RS ET	22.1462	113.9327	SPRING	NONE	N/A
14-May-18	8	1622	FP	3	SWL	3	509	ON	3RS ET	22.1633	113.9366	SPRING	NONE	N/A
16-May-18	1	1036	CWD	1	WL	3	225	ON	3RS ET	22.2655	113.8581	SPRING	NONE	N/A
16-May-18	2	1059	CWD	2	WL	3	122	ON	3RS ET	22.2573	113.8370	SPRING	NONE	N/A
23-May-18	1	1039	FP	2	SWL	3	15	ON	3RS ET	22.1684	113.9365	SPRING	NONE	N/A
23-May-18	2	1046	FP	2	SWL	3	37	ON	3RS ET	22.1651	113.9361	SPRING	NONE	N/A
23-May-18	3	1110	FP	3	SWL	3	182	ON	3RS ET	22.1618	113.9279	SPRING	NONE	N/A
23-May-18	4	1138	CWD	5	SWL	2	1155	ON	3RS ET	22.1989	113.9180	SPRING	NONE	N/A
23-May-18	5	1238	FP	4	SWL	3	17	ON	3RS ET	22.1411	113.9136	SPRING	NONE	N/A
21-Jun-18	1	1054	CWD	1	SWL	3	51	ON	3RS ET	22.1914	113.8491	SUMMER	NONE	P
21-Jun-18	2	1219	CWD	3	SWL	3	21	ON	3RS ET	22.2040	113.8781	SUMMER	NONE	P
21-Jun-18	3	1331	CWD	6	SWL	3	11	ON	3RS ET	22.1907	113.8973	SUMMER	NONE	P
21-Jun-18	4	1606	FP	3	SWL	3	24	ON	3RS ET	22.1653	113.9368	SUMMER	NONE	P
25-Jun-18	1	1059	CWD	1	SWL	4	138	ON	3RS ET	22.1822	113.8686	SUMMER	NONE	P
25-Jun-18	2	1308	CWD	4	SWL	3	119	ON	3RS ET	22.1934	113.9080	SUMMER	NONE	P
25-Jun-18	3	1332	CWD	8	SWL	3	32	ON	3RS ET	22.1945	113.9083	SUMMER	NONE	P
25-Jun-18	4	1356	CWD	1	SWL	3	129	ON	3RS ET	22.1780	113.9054	SUMMER	NONE	S
25-Jun-18	5	1456	CWD	4	SWL	2	6	ON	3RS ET	22.1805	113.9218	SUMMER	NONE	S
25-Jun-18	6	1519	CWD	7	SWL	2	29	ON	3RS ET	22.1867	113.9181	SUMMER	NONE	P
26-Jun-18	1	1137	CWD	1	WL	3	33	ON	3RS ET	22.2154	113.8192	SUMMER	NONE	P

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
27-Jun-18	1	1049	CWD	2	WL	3	51	ON	3RS ET	22.2524	113.8341	SUMMER	NONE	S
27-Jun-18	2	1106	CWD	3	WL	3	188	ON	3RS ET	22.2497	113.8406	SUMMER	NONE	P
27-Jun-18	3	1141	CWD	2	WL	3	27	ON	3RS ET	22.2331	113.8236	SUMMER	NONE	S
27-Jun-18	4	1200	CWD	5	WL	3	30	ON	3RS ET	22.2318	113.8390	SUMMER	NONE	P
27-Jun-18	5	1226	CWD	1	WL	3	122	ON	3RS ET	22.2237	113.8249	SUMMER	NONE	P
27-Jun-18	6	1234	CWD	12	WL	3	38	ON	3RS ET	22.2166	113.8199	SUMMER	NONE	S
27-Jun-18	7	1309	CWD	2	WL	3	145	ON	3RS ET	22.2141	113.8319	SUMMER	NONE	P
27-Jun-18	8	1341	CWD	2	WL	4	165	ON	3RS ET	22.1938	113.8425	SUMMER	NONE	S
11-Jul-18	1	1007	CWD	2	WL	2	569	ON	3RS ET	22.2873	113.8608	SUMMER	NONE	P
11-Jul-18	2	1027	CWD	1	WL	2	151	ON	3RS ET	22.2731	113.8471	SUMMER	NONE	S
11-Jul-18	3	1045	CWD	1	WL	2	247	ON	3RS ET	22.2692	113.8602	SUMMER	NONE	P
11-Jul-18	4	1108	CWD	1	WL	3	470	ON	3RS ET	22.2601	113.8498	SUMMER	NONE	P
11-Jul-18	5	1212	CWD	1	WL	3	303	ON	3RS ET	22.2232	113.8315	SUMMER	NONE	P
11-Jul-18	6	1237	CWD	3	WL	3	201	ON	3RS ET	22.2132	113.8211	SUMMER	NONE	P
11-Jul-18	7	1308	CWD	12	WL	3	159	ON	3RS ET	22.2050	113.8345	SUMMER	NONE	P
11-Jul-18	8	1403	CWD	10	WL	3	163	ON	3RS ET	22.1950	113.8422	SUMMER	NONE	S
17-Jul-18	1	1033	CWD	3	WL	2	696	ON	3RS ET	22.2607	113.8455	SUMMER	NONE	P
17-Jul-18	2	1100	CWD	1	WL	2	83	ON	3RS ET	22.2504	113.8371	SUMMER	NONE	P
17-Jul-18	3	1122	CWD	3	WL	3	501	ON	3RS ET	22.2415	113.8447	SUMMER	NONE	P
17-Jul-18	4	1201	CWD	1	WL	3	90	ON	3RS ET	22.2148	113.8195	SUMMER	NONE	S
17-Jul-18	5	1232	CWD	3	WL	3	46	ON	3RS ET	22.2009	113.8247	SUMMER	NONE	S
20-Jul-18	1	1040	CWD	1	NWL	3	680	ON	3RS ET	22.2720	113.8702	SUMMER	NONE	P
20-Jul-18	2	1233	CWD	2	NWL	2	N/A	OFF	3RS ET	22.3495	113.8832	SUMMER	NONE	N/A
20-Jul-18	3	1251	CWD	2	NWL	2	N/A	OFF	3RS ET	22.3446	113.8860	SUMMER	NONE	N/A
26-Jul-18	1	1152	CWD	2	SWL	2	30	ON	3RS ET	22.1924	113.8878	SUMMER	NONE	P
26-Jul-18	2	1255	CWD	1	SWL	2	28	ON	3RS ET	22.1821	113.8982	SUMMER	NONE	P
26-Jul-18	3	1412	FP	2	SWL	3	52	ON	3RS ET	22.1540	113.9177	SUMMER	NONE	P
30-Jul-18	1	1244	CWD	1	SWL	3	252	ON	3RS ET	22.1949	113.8973	SUMMER	NONE	P
30-Jul-18	2	1317	CWD	2	SWL	2	85	ON	3RS ET	22.1986	113.9080	SUMMER	NONE	P
30-Jul-18	3	1345	CWD	3	SWL	3	401	ON	3RS ET	22.1717	113.9079	SUMMER	NONE	P
30-Jul-18	4	1611	CWD	3	SWL	2	219	ON	3RS ET	22.2085	113.9363	SUMMER	NONE	P
2-Aug-18	1	1029	CWD	15	NWL	2	999	ON	3RS ET	22.2945	113.8705	SUMMER	NONE	P
2-Aug-18	2	1122	CWD	1	NWL	3	12	ON	3RS ET	22.2741	113.8705	SUMMER	NONE	P

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
2-Aug-18	3	1156	CWD	2	NWL	2	17	ON	3RS ET	22.2901	113.8786	SUMMER	NONE	P
7-Aug-18	1	1008	CWD	2	WL	1	250	ON	3RS ET	22.2920	113.8613	SUMMER	NONE	P
7-Aug-18	2	1043	CWD	5	WL	2	69	ON	3RS ET	22.2642	113.8578	SUMMER	NONE	S
7-Aug-18	3	1328	CWD	2	WL	2	524	ON	3RS ET	22.2027	113.8233	SUMMER	NONE	S
7-Aug-18	4	1344	CWD	5	WL	2	352	ON	3RS ET	22.1966	113.8411	SUMMER	NONE	P
17-Aug-18	1	1149	CWD	1	NEL	2	8	ON	3RS ET	22.3387	113.9562	SUMMER	NONE	P
21-Aug-18	1	1025	CWD	2	WL	2	22	ON	3RS ET	22.2688	113.8601	SUMMER	NONE	P
21-Aug-18	2	1052	CWD	5	WL	2	267	ON	3RS ET	22.2526	113.8343	SUMMER	NONE	S
21-Aug-18	3	1133	CWD	1	WL	2	380	ON	3RS ET	22.2417	113.8352	SUMMER	NONE	P
21-Aug-18	4	1149	CWD	1	WL	2	181	ON	3RS ET	22.2357	113.8253	SUMMER	NONE	S
21-Aug-18	5	1209	CWD	8	WL	2	93	ON	3RS ET	22.2226	113.8359	SUMMER	NONE	P
21-Aug-18	6	1241	CWD	2	WL	2	26	ON	3RS ET	22.2140	113.8291	SUMMER	NONE	P
21-Aug-18	7	1304	CWD	2	WL	2	26	ON	3RS ET	22.2055	113.8303	SUMMER	NONE	P
21-Aug-18	8	1320	CWD	5	WL	2	160	ON	3RS ET	22.2039	113.8222	SUMMER	NONE	S
21-Aug-18	9	1340	CWD	2	WL	3	162	ON	3RS ET	22.1963	113.8415	SUMMER	NONE	P
22-Aug-18	1	1439	CWD	3	SWL	2	17	ON	3RS ET	22.1860	113.8689	SUMMER	NONE	P
23-Aug-18	1	1457	CWD	1	SWL	2	161	ON	3RS ET	22.1881	113.8592	SUMMER	NONE	P
23-Aug-18	2	1522	CWD	5	SWL	2	263	ON	3RS ET	22.1842	113.8491	SUMMER	NONE	P
7-Sep-18	1	1408	FP	1	SWL	2	244	ON	3RS ET	22.1951	113.9275	AUTUMN	NONE	P
7-Sep-18	2	1425	FP	5	SWL	2	147	ON	3RS ET	22.1751	113.9282	AUTUMN	NONE	P
14-Sep-18	1	1326	CWD	1	NWL	2	38	ON	3RS ET	22.3994	113.8982	AUTUMN	NONE	P
19-Sep-18	1	1041	CWD	9	SWL	2	808	ON	3RS ET	22.1925	113.8590	AUTUMN	NONE	P
19-Sep-18	2	1112	CWD	3	SWL	2	208	ON	3RS ET	22.1937	113.8589	AUTUMN	NONE	P
19-Sep-18	3	1303	CWD	1	SWL	3	49	ON	3RS ET	22.1726	113.8970	AUTUMN	NONE	P
20-Sep-18	1	1025	CWD	5	WL	3	38	ON	3RS ET	22.2686	113.8478	AUTUMN	NONE	P
20-Sep-18	2	1047	CWD	10	WL	2	18	ON	3RS ET	22.2686	113.8526	AUTUMN	NONE	P
20-Sep-18	3	1108	CWD	1	WL	2	72	ON	3RS ET	22.2600	113.8497	AUTUMN	NONE	P
20-Sep-18	4	1135	CWD	3	WL	3	66	ON	3RS ET	22.2416	113.8462	AUTUMN	NONE	P
20-Sep-18	5	1145	CWD	2	WL	3	8	ON	3RS ET	22.2415	113.8406	AUTUMN	NONE	P
20-Sep-18	6	1250	CWD	7	WL	3	77	ON	3RS ET	22.1964	113.8414	AUTUMN	NONE	P
20-Sep-18	7	1317	CWD	1	WL	3	83	ON	3RS ET	22.1871	113.8399	AUTUMN	NONE	P
20-Sep-18	8	1327	CWD	2	WL	3	81	ON	3RS ET	22.1870	113.8312	AUTUMN	NONE	P
21-Sep-18	1	1026	CWD	6	WL	3	44	ON	3RS ET	22.2688	113.8523	AUTUMN	NONE	P

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
21-Sep-18	2	1105	CWD	2	WL	3	520	ON	3RS ET	22.2499	113.8394	AUTUMN	NONE	P
21-Sep-18	3	1142	CWD	3	WL	3	4	ON	3RS ET	22.2285	113.8377	AUTUMN	NONE	S
21-Sep-18	4	1208	CWD	6	WL	3	279	ON	3RS ET	22.2143	113.8313	AUTUMN	NONE	P
21-Sep-18	5	1237	CWD	1	WL	2	2	ON	3RS ET	22.2135	113.8351	AUTUMN	NONE	P
21-Sep-18	6	1306	CWD	4	WL	3	57	ON	3RS ET	22.1957	113.8348	AUTUMN	NONE	P
26-Sep-18	1	1030	CWD	2	NWL	2	77	ON	3RS ET	22.2832	113.8697	AUTUMN	NONE	P
26-Sep-18	2	1050	CWD	1	NWL	2	125	ON	3RS ET	22.2713	113.8721	AUTUMN	NONE	S
26-Sep-18	3	1221	CWD	1	NWL	3	387	ON	3RS ET	22.3863	113.8878	AUTUMN	NONE	P
26-Sep-18	4	1426	CWD	1	NWL	2	131	ON	3RS ET	22.3659	113.9188	AUTUMN	NONE	S
4-Oct-18	1	1104	CWD	3	WL	3	461	ON	3RS ET	22.2411	113.8415	AUTUMN	NONE	P
4-Oct-18	2	1148	CWD	1	WL	3	2	ON	3RS ET	22.2319	113.8356	AUTUMN	NONE	P
4-Oct-18	3	1210	CWD	3	WL	3	325	ON	3RS ET	22.2232	113.8283	AUTUMN	NONE	P
4-Oct-18	4	1253	CWD	2	WL	3	49	ON	3RS ET	22.2029	113.8235	AUTUMN	NONE	S
4-Oct-18	5	1314	CWD	7	WL	4	214	ON	3RS ET	22.1965	113.8380	AUTUMN	NONE	P
5-Oct-18	1	1038	CWD	3	NWL	3	182	ON	3RS ET	22.2805	113.8703	AUTUMN	NONE	P
8-Oct-18	1	0948	CWD	6	NWL	3	860	ON	3RS ET	22.3855	113.8703	AUTUMN	NONE	P
8-Oct-18	2	1201	CWD	1	NWL	2	59	ON	3RS ET	22.3717	113.8774	AUTUMN	NONE	P
8-Oct-18	3	1223	CWD	4	NWL	2	196	ON	3RS ET	22.3923	113.8781	AUTUMN	NONE	P
8-Oct-18	4	1410	CWD	1	NWL	2	116	ON	3RS ET	22.3887	113.8980	AUTUMN	NONE	P
8-Oct-18	5	1423	CWD	2	NWL	2	15	ON	3RS ET	22.3897	113.8979	AUTUMN	NONE	P
12-Oct-18	1	1210	CWD	1	NEL	2	18	ON	3RS ET	22.3219	113.9658	AUTUMN	NONE	P
24-Oct-18	1	1033	CWD	5	WL	3	264	ON	3RS ET	22.2690	113.8447	AUTUMN	NONE	S
24-Oct-18	2	1054	CWD	6	WL	3	300	ON	3RS ET	22.2690	113.8459	AUTUMN	NONE	P
26-Oct-18	1	1236	FP	1	SWL	2	55	ON	3RS ET	22.1571	113.8774	AUTUMN	NONE	S
6-Nov-18	1	0941	CWD	4	NWL	3	997	ON	3RS ET	22.3858	113.8695	AUTUMN	NONE	P
6-Nov-18	2	1202	CWD	7	NWL	2	259	ON	3RS ET	22.3897	113.8781	AUTUMN	NONE	P
12-Nov-18	1	1036	CWD	2	NWL	2	635	ON	3RS ET	22.2857	113.8701	AUTUMN	NONE	P
12-Nov-18	2	1145	CWD	2	NWL	3	4	ON	3RS ET	22.3678	113.8780	AUTUMN	NONE	P
16-Nov-18	1	1038	CWD	4	WL	3	60	ON	3RS ET	22.2604	113.8462	AUTUMN	NONE	P
16-Nov-18	2	1059	CWD	3	WL	2	131	ON	3RS ET	22.2502	113.8359	AUTUMN	NONE	P
16-Nov-18	3	1144	CWD	3	WL	3	783	ON	3RS ET	22.2300	113.8381	AUTUMN	NONE	S
16-Nov-18	4	1219	CWD	1	WL	2	20	ON	3RS ET	22.2233	113.8273	AUTUMN	NONE	P
16-Nov-18	5	1223	CWD	3	WL	2	244	ON	3RS ET	22.2237	113.8249	AUTUMN	NONE	P

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.	P/S
16-Nov-18	6	1237	CWD	1	WL	3	170	ON	3RS ET	22.2144	113.8230	AUTUMN	NONE	P
16-Nov-18	7	1243	CWD	2	WL	3	413	ON	3RS ET	22.2146	113.8296	AUTUMN	NONE	P
16-Nov-18	8	1300	CWD	8	WL	3	103	ON	3RS ET	22.2054	113.8384	AUTUMN	NONE	P
16-Nov-18	9	1322	CWD	3	WL	3	171	ON	3RS ET	22.2000	113.8254	AUTUMN	NONE	S
16-Nov-18	10	1345	CWD	2	WL	3	77	ON	3RS ET	22.1963	113.8401	AUTUMN	NONE	P
20-Nov-18	1	1058	CWD	3	WL	2	127	ON	3RS ET	22.2413	113.8401	AUTUMN	NONE	P
20-Nov-18	2	1210	CWD	4	WL	2	N/A	OFF	3RS ET	22.2234	113.8330	AUTUMN	NONE	N/A
20-Nov-18	3	1226	CWD	4	WL	3	7	ON	3RS ET	22.2230	113.8315	AUTUMN	NONE	P
20-Nov-18	4	1244	CWD	2	WL	3	495	ON	3RS ET	22.2227	113.8233	AUTUMN	NONE	P
21-Nov-18	1	1450	CWD	1	SWL	3	354	ON	3RS ET	22.1994	113.8604	AUTUMN	NONE	S
21-Nov-18	2	1516	CWD	1	SWL	2	339	ON	3RS ET	22.1757	113.8489	AUTUMN	NONE	P
21-Nov-18	3	1532	CWD	1	SWL	2	N/A	OFF	3RS ET	22.1869	113.8490	AUTUMN	NONE	N/A
23-Nov-18	1	1320	FP	2	SWL	2	52	ON	3RS ET	22.1551	113.9041	AUTUMN	NONE	S
3-Dec-18	1	1039	CWD	2	NWL	2	178	ON	3RS ET	22.2718	113.8723	WINTER	NONE	S
3-Dec-18	2	1302	CWD	1	NWL	3	21	ON	3RS ET	22.3659	113.8976	WINTER	NONE	P
4-Dec-18	1	1442	CWD	10	SWL	2	210	ON	3RS ET	22.2007	113.8657	WINTER	NONE	S
4-Dec-18	2	1533	CWD	2	SWL	2	541	ON	3RS ET	22.1810	113.8491	WINTER	NONE	P
18-Dec-18	1	1315	FP	2	SWL	3	4	ON	3RS ET	22.1552	113.9043	WINTER	NONE	S
18-Dec-18	2	1419	FP	3	SWL	5	112	ON	3RS ET	22.1667	113.9268	WINTER	NONE	P
20-Dec-18	1	1136	CWD	1	WL	2	34	ON	3RS ET	22.2138	113.8278	WINTER	NONE	P
21-Dec-18	1	1143	CWD	11	WL	3	170	ON	3RS ET	22.2053	113.8303	WINTER	NONE	P
21-Dec-18	2	1218	CWD	7	WL	3	244	ON	3RS ET	22.1872	113.8315	WINTER	NONE	P

Abbreviations: STG# = Sighting Number; GP SZ = Dolphin Group Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance (in metres); N/A = Not Applicable; DEC LAT = Latitude (WGS84 in Decimal), DEC LON = Longitude (WGS84 in Decimal); BOAT ASSOC. = Fishing Boat Association; P/S = Primary Transect / Secondary Transect

CWD Land-based Theodolite Tracking

CWD Groups by Survey Date

Date	Station	Start Time	End Time	Duration	Beaufort Range	Visibility	No. of Focal Follow Dolphin Groups Tracked	Dolphin Group Size Range
15/Jan/18	Sha Chau	8:44	14:44	6:00	2	3	0	N/A
16/Jan/18	Lung Kwu Chau	8:49	14:49	6:00	2-3	3-4	2	1-5
22/Jan/18	Lung Kwu Chau	8:54	14:54	6:00	2	4	1	2
23/Jan/18	Lung Kwu Chau	9:00	15:00	6:00	1-2	3-4	1	1
24/Jan/18	Sha Chau	8:48	14:48	6:00	4	2	0	N/A
8/Feb/18	Sha Chau	8:49	14:49	6:00	2-3	2	0	N/A
9/Feb/18	Lung Kwu Chau	8:43	14:43	6:00	2	2	2	2
13/Feb/18	Lung Kwu Chau	8:49	14:49	6:00	2	2	4	3-5
26/Feb/18	Lung Kwu Chau	8:44	14:44	6:00	2	2	2	1-3
27/Feb/18	Sha Chau	8:45	14:45	6:00	2	2	0	N/A
12/Mar/18	Lung Kwu Chau	8:45	14:45	6:00	2	3	3	2-6
22/Mar/18	Lung Kwu Chau	8:48	14:48	6:00	3-4	2	6	2-7
23/Mar/18	Lung Kwu Chau	8:40	14:40	6:00	2	2	10	1-6
26/Mar/18	Sha Chau	8:37	14:37	6:00	2	3	0	N/A
27/Mar/18	Sha Chau	8:42	14:42	6:00	2	3	0	N/A
13/Apr/18	Lung Kwu Chau	8:53	14:53	6:00	2-3	2	2	2
19/Apr/18	Lung Kwu Chau	8:43	14:43	6:00	2	2	6	1-2
20/Apr/18	Sha Chau	8:48	14:48	6:00	2-4	2-3	0	N/A
23/Apr/18	Lung Kwu Chau	8:51	14:51	6:00	2	2	3	2-4
26/Apr/18	Sha Chau	8:49	14:49	6:00	2-3	3	0	N/A
3/May/18	Lung Kwu Chau	9:20	15:20	6:00	2-3	3	1	2
14/May/18	Sha Chau	8:50	14:50	6:00	2-3	2	0	N/A
17/May/18	Sha Chau	8:45	14:45	6:00	2-3	2	0	N/A
28/May/18	Lung Kwu Chau	8:54	14:54	6:00	2-3	2-3	7	1-3
29/May/18	Lung Kwu Chau	8:50	14:50	6:00	2	2	4	1-4
11/Jun/18	Sha Chau	8:37	14:37	6:00	2	2	0	N/A
19/Jun/18	Lung Kwu Chau	8:54	13:54	5:00	2-3	3	0	N/A
20/Jun/18	Lung Kwu Chau	8:45	15:15	6:30	2-3	3	0	N/A
25/Jun/18	Sha Chau	9:00	15:00	6:00	2-3	2-3	0	N/A
26/Jun/18	Lung Kwu Chau	9:05	15:35	6:30	2-3	2	4	1-2
11/Jul/18	Lung Kwu Chau	8:51	14:51	6:00	2	2-3	2	1-3

Date	Station	Start Time	End Time	Duration	Beaufort Range	Visibility	No. of Focal Follow Dolphin Groups Tracked	Dolphin Group Size Range
12/Jul/18	Lung Kwu Chau	8:50	14:50	6:00	2-3	2	3	2-3
19/Jul/18	Sha Chau	8:55	14:55	6:00	2-4	2	0	N/A
20/Jul/18	Lung Kwu Chau	8:45	14:45	6:00	2-3	2-3	6	1-2
26/Jul/18	Sha Chau	8:34	14:34	6:00	2-3	2	0	N/A
1/Aug/18	Lung Kwu Chau	8:50	14:50	6:00	2-3	2	3	1-4
2/Aug/18	Sha Chau	9:05	15:05	6:00	3	2	0	N/A
6/Aug/18	Lung Kwu Chau	8:58	13:28	4:30	2	3	0	N/A
9/Aug/18	Sha Chau	8:38	14:38	6:00	3	2	0	N/A
21/Aug/18	Lung Kwu Chau	8:52	16:22	7:30	2	3-4	0	N/A
4/Sep/18	Lung Kwu Chau	8:42	14:42	6:00	2	2	2	1-3
5/Sep/18	Sha Chau	8:31	14:31	6:00	2	2	0	N/A
14/Sep/18	Lung Kwu Chau	8:42	14:42	6:00	2	2-4	4	2-3
18/Sep/18	Sha Chau	9:00	15:00	6:00	3	2	0	N/A
26/Sep/18	Lung Kwu Chau	9:03	15:03	6:00	2-3	3	5	1-4
8/Oct/18	Sha Chau	8:37	14:37	6:00	2	3	0	N/A
9/Oct/18	Sha Chau	8:51	14:51	6:00	2	3	0	N/A
15/Oct/18	Lung Kwu Chau	8:47	14:47	6:00	2	2	3	1-2
22/Oct/18	Lung Kwu Chau	8:42	14:42	6:00	2	2-3	4	1-5
29/Oct/18	Lung Kwu Chau	9:22	15:22	6:00	2-3	2	4	1-7
5/Nov/18	Lung Kwu Chau	8:50	14:50	6:00	2-3	2-3	6	1-3
13/Nov/18	Lung Kwu Chau	8:36	14:36	6:00	2-3	3-4	4	2-5
14/Nov/18	Sha Chau	8:37	14:37	6:00	2-3	2-3	0	N/A
21/Nov/18	Lung Kwu Chau	8:53	14:53	6:00	2-3	2-3	2	2-5
27/Nov/18	Sha Chau	8:27	14:27	6:00	2	3	0	N/A
10/Dec/18	Lung Kwu Chau	8:46	14:46	6:00	2	2	4	1-3
11/Dec/18	Sha Chau	8:41	14:41	6:00	2-3	2	0	N/A
14/Dec/18	Sha Chau	8:43	14:43	6:00	2	2	0	N/A
18/Dec/18	Lung Kwu Chau	8:40	14:40	6:00	2-3	1	2	3-4
19/Dec/18	Lung Kwu Chau	8:43	14:43	6:00	2-3	1-2	2	3-5

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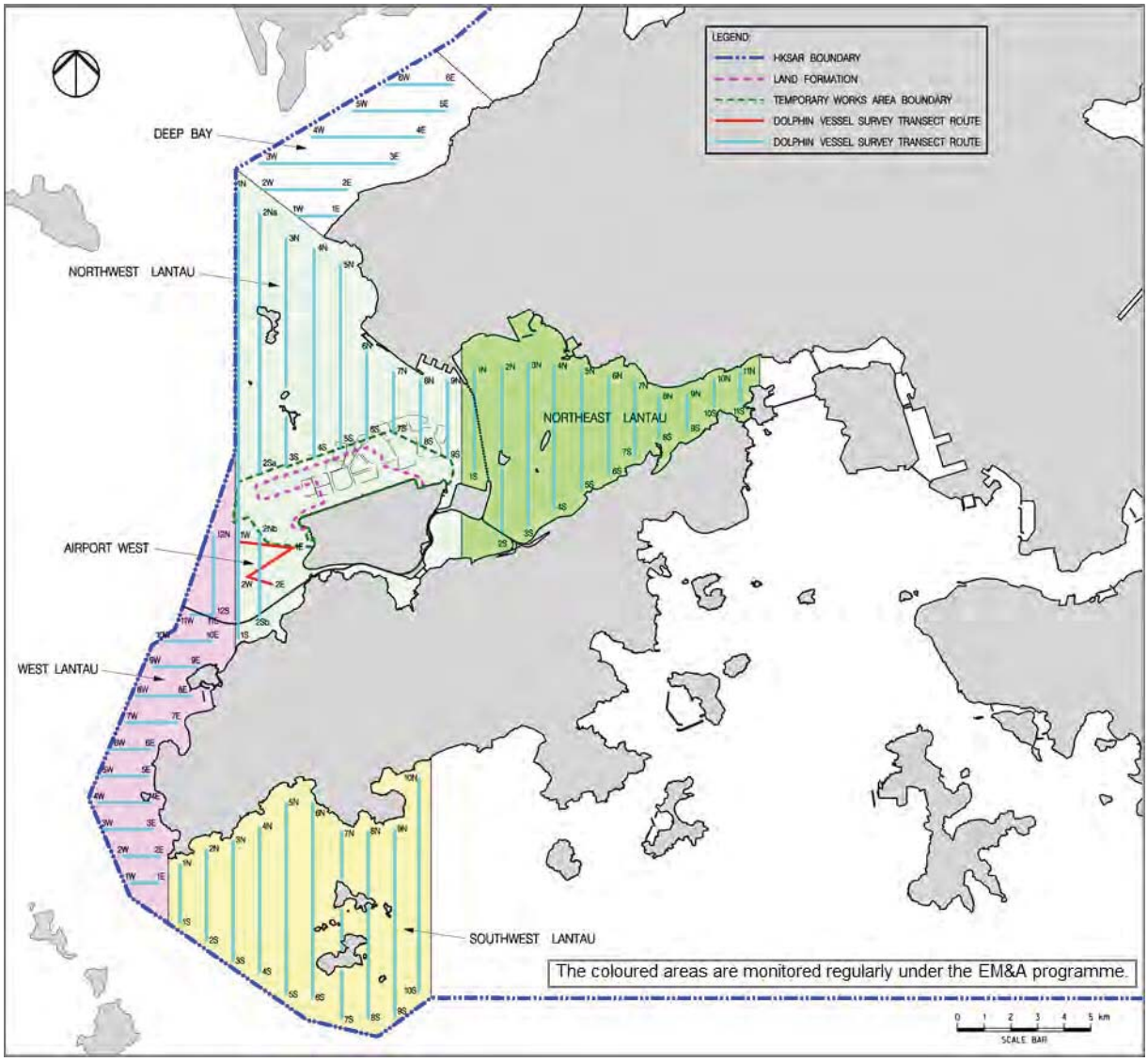

The additional survey in Deep Bay (DB) was conducted on a voluntary basis at the same frequency of two surveys per month.

All DB data were for reference and used only for density and abundance estimation.

(Note: The transect route in the DB survey area could not be fully travelled due to obstruction by the existing oyster culture rafts.)

Appendix F. Summary of Environmental Complaints and Cumulative Statistics on Exceedances, Notification of Summons, and Prosecution

Summary of Environmental Complaints

Date of Complaint Received	Details	Analysis / Remedial Actions	Status
19 Jan 2018	A complaint was received regarding the use of non-road mobile machineries (NRMM) in works sites of HKIA under the Development Bureau's Technical Circular (Works) No. 1/2015.	While the mentioned Technical Circular applies only to the government's public works projects, and that the 3RS Project is not classified under public works, this Technical Circular does not apply to the case of the 3RS Project. Nevertheless, based on ET's site inspections, it was observed that Contractors have used NRMMs with appropriate labels under Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation.	Closed
5 Feb 2018	A complaint was received on regarding noise from Sha Chau works.	Based on information including daily inspection records and vessel records from 29 January 2018 to 4 February 2018, as well as the observation from the ad-hoc site inspection on 30 January 2018, no construction activities were conducted and no powered mechanical equipment was deployed at Sheung Sha Chau Island during the restricted hours. And there was no evidence on any non-compliance with the relevant EP conditions or the Construction Noise Permit (CNP) conditions found. Nevertheless, the contractor has been reminded to strictly follow the EP and CNP conditions and the ET will continue to conduct regular and ad-hoc inspections at Sheung Sha Chau to ensure relevant regulations and conditions are complied.	Closed
16 May 2018	A complaint was received regarding water quality monitoring equipment of a DCM barge.	While the equipment was one of the specific contract requirements between AAHK and contractors, it is not a statutory requirement according to the EP and EM&A Manual. Nevertheless, based on ET's site inspections on the concerned barge, no abnormal observation was found regarding the equipment.	Closed
28 May 2018	A complaint was received covering issues related to water quality and DEZ monitoring for DCM works.	On the water quality issue, based on ET's inspection on 21 May 2018, overflow of seawater was observed from a DCM barge due to malfunction of a level sensor of a seawater storage tank. No oil mixture on the open water around the barge was observed. The contractor stopped the overflow and fixed the level sensor on the same day upon ET's request. No abnormal discharge was observed in subsequent site inspections. On the issue concerning the piping of the water quality monitoring	Closed

Date of Complaint Received	Details	Analysis / Remedial Actions	Status
		system on DCM barges, ET has carried out checking on the concerned barges. It should be noted that this part of monitoring is not a statutory requirement according to the EP and EM&A Manual, but an additional contract requirement AA set for the DCM contractors. After investigation, nonetheless, no abnormal pipe connection of the monitoring systems was observed. On the point related to DEZ monitoring issue, it is considered not valid after investigation. Based on contractor's site log, no DCM works was carried out on the concerned barge during the concerned period. Hence, implementation of DEZ monitoring by dolphin observer was not required at the mentioned time in the complaint.	
3 Jul 2018	A complaint was received regarding an incident of suspected effluent discharge from a construction vessel of Contract 3205.	Based on contractor's records, deck cleaning due to minor overflow of cement grout was conducted on the vessel during the said incident, and the wash water was collected to an onboard wastewater treatment facility for treatment and reuse. ET conducted a site inspection on the vessel next day after receiving the complaint, where the wastewater treatment facility was found in normal operation and no discharge was observed. Nevertheless, ET in conjunction with the AAHK, gave further briefing to the contractor during the Environmental Management Meeting. ET would also continue the regular site audit to ensure the pollution control measures are properly implemented.	Closed
27 Aug 2018	A complaint was received relating to the DEZ monitoring schedule for DCM works.	Based on on-site inspection on the concerned barge Sambo 2HO in the Project area by ET and AAHK next day after receiving the complaint and the records provided by the contractor, the contractor had implemented DEZ monitoring for DCM works. Nevertheless, ET reminded the contractor to maintain good communication with dolphin observers and conduct regular review/training on contingency arrangement for different operational scenarios.	Closed
21 Sep 2018	A complaint was received relating to exhaust gas and dust emission from a Korean construction vessel.	The anonymous complainant did not provide any specific information (e.g. date, time, location, name of construction vessel) on the case. Site inspections which covered all environmental aspects arising from construction activities in the work site, including air pollution control measures of construction vessels, are routinely undertaken by ET in accordance with the requirements in the EM&A Manual. When air emission problem (e.g. dust, dark smoke) is identified by ET, the responsible contractor will be required to provide immediate rectification. The air quality monitoring data in September was also reviewed, where all monitoring results were within the Action and Limit Levels at all monitoring stations. ET will continue the regular site inspection to ensure contractors' measures are properly implemented. In addition, ET will also continue reminding all contractors to conduct on-site training for frontline staff on related environmental issues and regularly maintain and check their construction vessels and equipment regularly.	Closed
6 Nov 2018	A complaint was received on 6 Nov 2018 regarding dust	Investigation was conducted by the ET in accordance with the Manual and the Complaint	Closed

Date of Complaint Received	Details	Analysis / Remedial Actions	Status
	nuisance from sand barges at Tuen Mun.	Management Plan of the Project. The anonymous complainant did not provide any specific information (e.g. date, time, name of vessels) on the case. In recent months, only one contractor has deployed sand delivery vessels for 3RS Project, and photo records of implementation of dust mitigation measure, such as water spraying, were provided by the contractor. Considering that Tuen Mun Anchorage Area is one of the designated anchorage areas for all vessels in Hong Kong waters, including construction vessels of various construction projects. Based on the information provided by the complainant, there were no evidences suggesting that the Project's sand delivery vessels caused dust nuisance to nearby residence at Tuen Mun. Nevertheless, ET will continue reminding all contractors to continue the implementation of dust mitigation measures and to conduct regular training for all frontline staff to avoid dust nuisance to the public. ET will also continue to monitor the implementation of dust mitigation measures.	

Cumulative Statistics for Valid Exceedances for the Environmental Monitoring

		Total no. recorded in the reporting month	Total no. recorded since the project commenced
1-hr TSP	Action	0	0
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Waste	Action	0	0
	Limit	0	0
Water	Action	0	0
	Limit	0	0
CWD	Action	0	0
	Limit	0	0

Remark: Exceedances, which are not found project related, are not shown in this table.

Cumulative Statistics for Non-compliance, Complaints, Notifications of Summons and Prosecution

Reporting Period	Cumulative Statistics			
	Non-compliance	Complaints	Notifications of Summons	Prosecutions
This reporting period	0	8	0	0
From 28 December 2015 to end of the reporting period	0	16	1	1