


Dragages -China Harbour-VSL JV

Contract HY/2011/09
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road-Section between
HKSAR Boundary and Scenic Hill

Quarterly EM&A Report

February to May 2013

(Version 3.0)

Certified By	 _____ Dr. H.F. Chan Environmental Team Leader (Date: 19 August 2013)
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REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties

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EXECUTIVE SUMMARY**Introduction**

1. This is the 1st Quarterly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for the project “Contract No. HY/2011/09 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill” (hereinafter called the “Contract”). This report documents the findings of EM&A Works performed in the period between 22nd February and 31st May 2013.

Environmental Monitoring and Audit Progress

2. A summary of the monitoring activities in this reporting period is listed in **Table I** below:

Table I Summary Table for Monitoring Activities in the Reporting Period

Parameter(s)	Monitoring Date(s)
1-hr TSP Monitoring	22 nd and 28 th February 2013 6 th , 12 th , 18 th , 22 nd and 27 th March 2013
24-hr TSP Monitoring	2 nd , 8 th , 12 th , 18 th , 24 th and 30 th April 2013 6 th , 10 th , 16 th , 22 nd and 28 th May 2013
Noise Monitoring	23 rd February 2013 1 st , 7 th , 13 th , 19 th , 23 rd and 28 th March 2013 3 rd , 9 th , 15 th and 25 th April 2013 2 nd , 7 th , 13 th , 23 rd and 29 th May 2013
Water Quality Monitoring	22 nd , 25 th and 27 th February 2013 1 st , 4 th , 6 th , 8 th , 11 th , 13 th , 15 th , 18 th , 20 th , 23 rd , 25 th , 27 th and 29 th March 2013 1 st , 3 rd , 5 th , 8 th , 10 th , 12 th , 15 th , 17 th , 19 th , 22 th , 24 th , 26 th and 29 th April 2013 2 nd , 4 th , 6 th , 8 th , 10 th , 13 th , 15 th , 18 th , 20 th , 22 th , 24 th , 27 th , 29 th and 31 st May 2013
Dolphin Monitoring (Line-transect Vessel Surveys)	19 th and 25 th February 2013 8 th and 22 th March 2013 9 th and 17 th April 2013 6 th and 14 th May 2013
⁽¹⁾ Construction-phase underwater Noise Monitoring	<u>With Bored Piling Activities:</u> 18 th , 19 th , 20 th , 21 st , 22 nd , 23 rd , 25 th , 27 th , 28 th March 2013 2 nd , 3 rd , 5 th , 8 th , 9 th , 10 th , 25 th , 26 th , 27 th , 29 th

	<p>and 30th April 2013</p> <p><u>Without Bored Piling Activities:</u> 13th, 14th, 15th and 26th March 2013 11th April 2013</p>
⁽¹⁾ Dolphin Behaviour Monitoring	<p><u>With Bored Piling Activities:</u> 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 27th, 28th and 29th March 2013 1st, 2nd, 3rd, 5th, 7th, 8th, 10th and 11th April 2013</p> <p><u>Without Bored Piling Activities:</u> 6th, 7th, 8th, 9th, 11th to 17th, 24th and 30th March 2013</p>
⁽¹⁾ Land-based Dolphin Behaviour and Movement Monitoring	<p><u>With Bored Piling Activities:</u> 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 27th, 28th March 2013 1st, 2nd, 4th, 5th, 7th, 8th, 9th, 10th and 11th April 2013</p> <p><u>Without Bored Piling Activities:</u> 6th, 7th, 9th to 17th, 24th and 30th March 2013</p>
Environmental Site Inspection	<p>26th February 2013</p> <p>5th, 12th, 19th and 26th March 2013</p> <p>2nd, 9th, 16th, 26th and 30th April 2013</p> <p>7th, 14th, 21st and 31st May 2013</p>
Archaeological Site Inspection	<p>25th March 2013</p>

Remark: ⁽¹⁾ Dolphin-related monitoring was conducted in the reporting period. According to the EM&A Manual for HKLR, the dolphin-related monitoring was conducted during the bored piling activities (e.g. installation of permanent casing for bored piling activities) which presented in **Appendix A**. The dolphin-related monitoring conducted without bored piling activities are for reference only. In addition, no monitoring was conducted in May 2013 as no underwater sockets into rock can be carried out for marine bored piles in West Lantau in May and June in accordance with EP Condition 3.1.

Breaches of Action and Limit Levels

3. Summary of the environmental exceedances of the reporting period is tabulated in **Table II**.

Table II Summary Table for Events Recorded in the Reporting Period

Environmental Monitoring	Parameter	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
		Action Level	Limit Level	Action Level	Limit Level
Air Quality	1-hr TSP	0	0	0	0
	24-hr TSP	0	0	0	0
Noise	L _{eq(30min)}	1	0	1	0
Water Quality	Dissolved Oxygen (DO) (Surface & Middle)	7	6	0	0
	Dissolved Oxygen (DO) (Bottom)	10	0	0	0
	Turbidity	30	101	0	0
	Suspended Solids (SS)	22	92	0	0
Underwater Noise	RMS sound pressure level re 1 μ Pa	0	0	0	0
Dolphin Monitoring	Line-transect Vessel Surveys	0	0	0	0

4. Environmental monitoring works were performed in the reporting period and all monitoring results were checked and reviewed. The details of each exceedance were attached in the Monthly EM&A Reports.

Complaint Log

5. Summary of the environmental complaints of the reporting period is tabulated in **Table III**.

Table III Summary Table for Complaints Recorded in the Reporting Period

Complaint Log Ref.	Location	Received Date	Nature of Complaint
Com-2013-04-001	Near Tung Chung New Development Pier	8 April 2013	Water Quality
Com-2013-05-001	WA6	2 May 2013	Noise
Com-2013-05-002	WA6	18 May 2013	Noise

Com-2013-05-003	Near Tung Chung New Development Pier	18 May 2013	Water Quality
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Notification of Summons and Successful Prosecutions

6. No notification of summons and successful prosecution was received in the reporting period.

Reporting Changes

7. This report has been developed in compliance with the reporting requirements for the quarterly EM&A Summary Report as required by the EM&A Manual for Hong Kong Link Road (EM&A Manual).

Future Key Issues

8. Major site activities for the coming reporting month will include:

WA4

- Fabrication of rebar cages
- Loading and unloading
- Setup of casting yard

WA7

- Preparation for bored piling
- Fabrication of rebar cages
- Loading and Unloading
-

Portion A (Land Section)

- Site clearance and formation
- Timber Scaffolding
- Pre-drilling work
- Set-up facilities for marine delivery of concrete from land plants
- Slewing of the tele-communication & AA COM cables

Portion C

- Satellite site office set up
- Pre-drilling work
- Protection work to the fuel pipes
- Fabrication of reinforcement cage and piling jacket, setting up for land piling work

Western Water

- Pre-drilling Work
- Loading and Unloading
- Setting up of silt-curtain
- Platform installation for pre-drilling works
- Installation of temporary casings for the piling platform
- Installation of permanent casing

- Bored piling works

1 INTRODUCTION

- 1.1 Cinotech Consultants Limited (Cinotech) was appointed by Dragages -China Harbour-VSL JV (hereinafter called “the Contractor”) as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) programme during construction phase of the Contract No. HY/2011/09 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill” (hereinafter called the “Contract”) in accordance with EP Conditions 2.1.

Purpose of the report

- 1.2 This is the 1st Quarterly EM&A report which summarises the impact monitoring results and audit findings for the EM&A programme in the period between 22nd February and 31st May 2013. In order to compare the data analysis for dolphin monitoring results to the baseline monitoring results and the AFCD’s quarterly monitoring results, this first quarterly report will contain four months’ monitoring data instead of three. The Quarterly EM&A reports thereafter will contain three months’ monitoring data.

Structure of the report

- 1.3 The structure of the report is as follows:

Section 1: **Introduction** - purpose and structure of the report.

Section 2: **Contract Information** - summarises background and scope of the Contract, site description, project organization and contact details, construction programme, the construction works undertaken and the status of Environmental Permits/Licenses during the reporting month.

Section 3: **Environmental Monitoring and Audit Requirements** - summarises the monitoring parameters, monitoring frequency, monitoring locations, Action and Limit Levels, Event / Action Plans, site audit summary and environmental mitigation measures.

Section 4: **Environmental Monitoring Results** - summarises the environmental monitoring results in terms of air quality, noise, underwater noise, water quality, dolphin and waste management.

Section 5: **Environmental Non-conformance** - summarises any monitoring exceedance, environmental complaints, environmental summons and successful prosecutions within the reporting period.

Section 6: **Conclusions and Recommendation**

2 CONTRACT INFORMATION

Background

- 2.1 The proposed Hong Kong - Zhuhai - Macao Bridge Hong Kong Link Road (HKLR) is 12km long connecting the Hong Kong-Zhuhai-Macao Bridge (HZMB) at the HKSAR Boundary with the Hong Kong Boundary Crossing Facilities (HKBCF) situated at the north eastern waters of the Hong Kong International Airport, opening a new and direct connection route between Hong Kong, Macao and the Western Pearl River Delta.
- 2.2 The HKLR comprises a 9.4km long viaduct section from the HKSAR boundary to Scenic Hill on the Airport Island; a 1km tunnel section to the reclamation formed along the east coast of the Airport Island and a 1.6km long at-grade road section on the reclamation connecting to the HKBCF. The tunnel section of HKLR will pass under Scenic Hill, Airport Road and Airport Railway to minimize the environmental and visual impacts to Tung Chung residents.
- 2.3 An application (No ESB-110/2003) for an Environmental Impact Assessment (EIA) Study Brief under Section 5(1) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by Highways Department (the Project Proponent) on 8 October 2003 with a Project Profile (No. No. PP-201/2003) for the Hong Kong - Zhuhai - Macao Bridge Hong Kong Section and North Lantau Highway Connection. The Hong Kong - Zhuhai - Macao Bridge Hong Kong Section and North Lantau Highway Connection has subsequently been renamed as HKLR. EPD issued an EIA Study Brief (No: ESB-110/2003) in November 2003 to the Project Proponent to carry out an EIA study.
- 2.4 An EIA Study (Reg. No. AEIAR-144/2009) has been undertaken to provide information on nature and extent of environmental impacts arising from the construction and operation of HKLR. The Environmental Permit was issued on 4 November 2009 (Permit No. EP-352/2009). Pursuant to Section 13 of the EIAO, the Director of Environmental Protection amends the Environmental Permit (No. EP-352/2009) based on the Application No. VEP-339/2011 and the environmental Permit (Permit No. EP-352/2009/A) was issue on 9 November 2011 for HKLR to the Highways Department as the Permit Holder.
- 2.5 **Figure 1a-d** shows the layout of the Contract and the scope of the Contract works comprises the following major items:
 - a dual 3-lane carriageway in the form of viaduct from the HKSAR boundary (connecting with the HZMB Main Bridge) to the Scenic Hill (connecting with the tunnel under separate Contract No. HY/2011/03), of approximately 9.4km in length with a hard shoulder for each bound of carriageway and a utilities trough on the outer edge of each bound of viaducts;
 - a grade-separated turnaround facility located near San Shek Wan, composed of sliproads in the form of viaduct with single-lane carriageway bifurcated from the HKLR mainline with an elevated junction above the mainline;
 - provision of ancillary facilities including, but not limited to, meteorological enhancement measures including the provisioning of anemometers and modification of the wind profiler station at hillside of Sha Lo Wan, provisioning of a compensatory marine radar, and provisioning of security systems; and

- associated civil, structural, geotechnical, marine, environmental protection, landscaping, drainage and highways electrical and mechanical (E&M) works, street lightings, traffic aids and sign gantries, marine navigational aids, ship impact protection system, water mains and fire hydrants, lightning protection system, structural health monitoring and maintenance management system (SHM&MMS), supervisory control and data acquisition (SCADA) system, as well as operation and maintenance provisions of viaducts, provisioning of facilities for installation of traffic control and surveillance system (TCSS), provisioning of facilities for installation of telecommunication cables/equipments and reprovisioning works of affected existing facilities/utilities.

Contract Organisation

2.6 Different parties with different levels of involvement in the Contract organization include:

- Supervising Officer's Representative (SOR) – Ove Arup & Partners Hong Kong Limited (ARUP)
- Contractor – Dragages -China Harbour-VSL JV (DCVJV)
- Environmental Team (ET) – Cinotech Consultants Ltd. (Cinotech)

2.7 The proposed project organization and lines of communication with respect to the on-site environmental management structure are shown in **Figure 2**. The key personnel contact names and numbers are summarized in **Table 2.1**.

Table 2.1 Key Contacts of the Contract

Party	Position	Name	Phone No.	Fax No.
SOR (ARUP)	CRE	Mr. Michael Chan	3767 5803	3767 5922
		Mr. Colin Meadows	3767 5801	
ENPO/IEC (Environ)	Environmental Project Office Leader	Mr. Y. H Hui	3465 2888	3465 2899
	Independent Environmental Checker	Mr. Antony Wong	3465 2888	3465 2899
Contractor (DCVJV)	Deputy Project Director	Mr. W.K Poon	3121 6638	3121 6688
	Environmental Officer	Mr. CHU Chung Sing	3121 6672	
	24-hour Hotline	--	6898 6161	--
ET (Cinotech)	Environmental Team Leader	Dr. H.F Chan	2151 2088	3107 1388

2.8 ENVIRON Hong Kong Ltd. (Environ) is employed by the Highways Department as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

Construction Programme

2.9 A copy of Contractor's construction programme is provided in **Appendix A**.

Summary of Construction Works Undertaken During Reporting Period

2.10 The major site activities undertaken in the reporting period included:

February 2013:

- (a) Pre-drilling works at WA3;
- (b) Setting up of bentonite slurry barges and assembly of 2 nos. of BG40 piling rigs and fabrication of piling platforms at WA4;
- (c) Plant mobilization at WA7;
- (d) Trial pit excavation, Utilities diversion and erection of hoarding & fence and site office area at Portion C;
- (e) Pre-drilling works at P20, P51, P69, P71, P75, P82, P83, P101 & P103;
- (f) Installation of temporary casings for the piling platform at P48 and P0.

March 2013:

- (a) Predrilling works are in progress with marine jack-up rigs, land rigs on micro platforms and timber scaffoldings along sloping seawall at P14, P15, P53, P72, P94 & P104;
- (b) Trial pit excavation to locate the fuel pipes is completed with protection works in progress;
- (c) Slewing of existing 132KV CLP cable into newly built cable trough near the area of P113 and P108 was completed. Backfilling works to P113 area was commenced and to be completed before mid April 2013. Outstanding set of 11KV cable at P108 is to be completed before 3 April 2013;
- (d) Tele-communication cable man-holes for slewing were inspected. Meeting was conducted with relevant parties. It has been confirmed that slewing is feasible with method statement submitted to SO and parties. Workshop will be arranged for further discussion;
- (e) Erection of hoarding & fence and site office area set up in Portion C in are progress with decoration to follow;
- (f) Fabrication of 2 nos. piling platforms at WA4 was completed and the remaining platforms in progress at yard in the mainland;
- (g) Installation of temporary casings for the piling platform was completed at P0 and P49 and in progress at P20;
- (h) Installation of piling jackets at P52 and prefabrication of 2 nos. piling jackets for P50 were completed;
- (i) Piling platform was completed at P48 and the permanent pile casings have been installed;
- (j) Installation of 8 nos. permanent casing at P52 is in progress;
- (k) Rebar cages prefabrication at WA4 and WA7 for piles is in progress;
- (l) Earth Auger (Model: BG40) has been loaded onto Ro-Ro barge ready for transfer to P48 on 27 March 2013;
- (m) Progress of the precast concrete segment casting yard in Zhongshan are as follows:
 - Backfilling works were completed
 - Access roads work are in progress
 - 11 piling rigs are working on site (approx. 2800 piles completed)
 - Batch plant installation was completed and trial mixing initial has commenced
 - Gantry rail beams are also in progress (with 4400m completed)
 - Permanent power was energised and water were connected

- 75% of dredging works for the loading jetty were completed
- (n) Set up of the floating concrete batching plants was completed and awaiting the confirmation of the VEP and operating license from Marine Department;
- (o) Sub-contractor for piling of land section has been finalized. The company profile of the subcontractor, Bachy, has been submitted to SO for approval. Setting up works would be commenced as soon as the permit of site establishment is issued by AA;
- (p) Delivery of launching girder and lifting gantry from abroad with containers was commenced on 22 February 2013 for further assembling on site;
- (q) EBS monitoring with witness from SO's staff started on 24 January 2013 and report submitted to SO on bi-weekly basis;
- (r) Diversion to existing 1350 drainage pipe and the 600mm water main for facilitating the construction of piling works to pier 106 to 108 pending for permit of tree felling.

April 2013:

- (a) Trial pit excavation to locate the fuel pipes is completed with protection works and settlement markers;
- (b) Slewing of existing 11kV and 132kV CLP cable into newly built cable trough near the area of P108 and P113 including backfilling works was completed;
- (c) Tele-communication and AA COM cables man-holes for slewing were inspected. The cable slugs have been checked with sufficient length for slewing. Another meeting with AA & tele-communication providers are scheduled in 1st week of May;
- (d) Diversion to existing 1350mm drainage pipe and the 600mm water main for the construction of piling works of P106 to P108 is ready but pending for permit of tree felling and works permit from AA;
- (e) Fabrication of piling platforms in PRC: CP1 - 1 was delivered, CP2 and CP4 are in progress;
- (f) P0 - Installation of permanent casings completed and BG40 mobilized on 27 April, pile excavation is in progress;
- (g) P19 and P20 - Installation of temporary casings for the piling platform is in progress;
- (h) P48 - 1st pile concreting was completed on 25 April 2013;
- (i) P49 - Piling platform was installed with IDC certificate on 25 April 2013;
- (j) P50 - 1 no. pile at P50 was casted, 1 no. pile excavation was completed, 2 nos. piles are under excavation, the remaining 4 piles has not been started;
- (k) P52 - 2 nos. piles at P52 were casted, the remaining 6 piles are under excavation;
- (l) P71 to P73 - 1 no. piling jacket fabrication is in progress;
- (m) Rebar cages prefabrication for piles is in progress at WA4 and WA7;
- (n) Land piling machine from Bachy is pending to be mobilized to site awaiting for the AA's works permit;
- (o) Set up of the floating concrete batching plants was completed and awaiting the approval of the VEP and operating license from Marine Department;
- (p) Delivery of launching girder for landside (LG1) and lifting gantry from abroad was completed. All containers arrived on site. The components are being handled and put within the site area in Portion C and WA3. Pre-assembly of elements into 11m sections has commenced at Portion C;
- (q) Continue or commence the following works (subject to permits and/or approval): trench excavation for the tele-communication cable and AA's COM cable, satellite site office set-up in Portion C, site mobilization for piling work in Portion C, site clearance and setting up of barriers along Portion A, drainage and water main diversion near P108 and P109, pre-drilling work at Western Water, along sloping

seawall and at Portion C, installation of piling platform, installation of permanent casing, bored piling works, fabrication of reinforcement cage and piling jacket, set up casting yard and pre-assembly of 11m elements for launching gantries.

May 2013:

- (a) Diversion to existing 1350mm drainage pipe and the 600mm water main for construction of piling works of P106 to P108 is ready but still pending for tree felling permit and works permit from AA;
- (b) Erection of hoarding & fence and site office area set up in Portion C were completed;
- (c) Installation of decorative hoarding in Portion C was completed;
- (d) 2 nos. wheel washing bays in Portion C were completed and are in operation;
- (e) Installation of water-filled barrier and site clearance in Portion A along seawall was commenced;
- (f) Land piling Sub-Contractor (Bachy) completed mobilization in Portion C;
- (g) Piling Jacket and permanent casing were installed at P71, P72 & P73;
- (h) Pile excavation for P71, P72 & P73 was commenced;
- (i) Fabrication of piling platforms in PRC: all CP1 were completed, CP4 are in progress;
- (j) Installation of temporary casings for the piling platform at P19, P20, P74 and P78 carried out and P20, P74 and P78 complete;
- (k) Piling platform were installed at P49 and P74;
- (l) Installation of permanent casing at P74;
- (m) 1 no. pile at P48 and 1 no. of pile at P0 were casted in May;
- (n) 2 nos. pile at P52 and 2 nos. piles at P50 were casted in May;
- (o) Pile excavation down to rockhead continued at P50 & P52 in early May but rock socket excavation in Western Water was suspended during the peak dolphin calving season;
- (p) Installation of permanent casing at P0 was resumed;
- (q) Spoil disposal at Tuen Mun Area 38;
- (r) Rebar cages prefabrication for piles is in progress at WA4 and WA7 remains in progress;
- (s) Set up of the floating concrete batching plants was completed and awaiting the approval of the VEP and operating license from Maine Department. Floating concrete batching plant 1602 was mobilized to Hong Kong and moored off WA4 on 17 May 2013;
- (t) Pre-assembly of launching girder LG1 and the segment unloading gantry elements into 11m sections at Portion C are in progress.

Status of Environmental Licences, Notification and Permits

2.11 The valid environmental licenses and permits were attached in the Monthly EM&A Reports.

3 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

Monitoring Parameters and Monitoring Locations

3.1 The EM&A Manual designates locations for the ET to monitor environmental impacts in terms of air quality, noise, underwater noise, water quality and dolphin to the Contract. The monitoring locations are depicted in **Figures 3 to 6**. The details of monitoring requirements are presented in **Table 3.1**.

Table 3.1 Summary of Impact EM&A Requirements

Type of Monitoring	Parameter	Frequency	Location	Remarks
Air Quality	1-hr TSP	Three times / 6 days	AMS1 – Sha Lo Wan AMS4 – San Tau	While the highest dust impact was expected
	24-hr TSP	Once / 6 days		--
Noise	L _{10(30 min.)} dB(A) L _{90(30 min.)} dB(A) L _{eq(30 min.)} dB(A) (as six consecutive L _{eq, 5min} readings)	Once per week	NMS1 – Sha Lo Wan NMS4 – San Tau	Daytime on normal weekdays (0700-1900 hrs)
Water Quality	<ul style="list-style-type: none"> • Temperature(°C) • pH(pH unit) • turbidity (NTU) • water depth (m) • salinity (ppt) • dissolved oxygen (DO) (mg/L and % of saturation) • suspended solids (SS) (mg/L) 	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides (within ± 1.75 hour of the predicted time) during the construction period of the Contract	IS1, IS2, IS3 IS4, CS1, CS2, SR1, SR2, SR3, SR6, ST1, ST2, ST3, SRA	<ul style="list-style-type: none"> • 3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. • If the water depth is less than 3m, mid-depth sampling only. • If water depth less than 6m, mid-depth may be omitted.
Dolphin	Line-transect Methods	Twice per month	West Lantau	--
	Construction-phase Underwater Noise	10 days from the start of the bored piling activities for the first three pier sites during the bored piling process in the first three sits in the waters to the west of Airport	R1 and R2	20 days underwater noise monitoring at first two pier sites was conducted during the bored piling activities in the reporting period

	Dolphin Behaviour Monitoring (Acoustic)	During bridge construction	West Lantau	18 days Dolphin Behaviour Monitoring was conducted during the bored piling activities in the reporting period
	Land-based Dolphin Behaviour and Movement Monitoring	30 days from the start of bored piling activities at the three pier sites	Sham Wat	18 days Land-based Dolphin Behaviour and Movement Monitoring was conducted during the bored piling activities in the reporting period

3.2 The wind speed and wind direction were recorded by the installed Wind Anemometer set at AMS4. The location is shown in **Figure 3**.

Monitoring Methodology and Calibration Details

3.3 Monitoring works/equipments were conducted/calibrated regularly in accordance with the EM&A Manual. Copies of calibration certificates are attached in the appendices of the Monthly EM&A Reports.

Environmental Quality Performance Limits (Action and Limit Levels)

3.4 The environmental quality performance limits, i.e. Action and Limit Levels were derived from the baseline monitoring results (except the Action and Limit Levels for underwater noise monitoring). Should the measured environmental quality parameters exceed the Action/Limit Levels, the respective action plans would be implemented. The Action/Limit Levels for each environmental parameter are given in **Table 3.2a-f**.

Table 3.2a Action and Limit Levels for 1-Hour TSP

Location	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS1	381	500
AMS4	352	

Table 3.2b Action and Limit Levels for 24-Hour TSP

Location	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS1	170	260
AMS4	171	

Table 3.2c Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700-1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A) *

Noted: If works are to be carried during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

(*) reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

Table 3.2d Action and Limit Levels for Water Quality

Parameter (unit)	Water Depth	Action Level	Limit Level
Dissolved Oxygen (mg/L) (surface, middle, bottom)	Surface and Middle	<u>5.0</u>	4.2 except 5 for FCZ
	Bottom	<u>4.7</u>	3.6
Turbidity (NTU)	Depth average	Before 25 Mar 13: <u>27.5</u> or 120% of upstream control station's turbidity at the same tide of the same day	Before 25 Mar 13: <u>47.0</u> or 130% of turbidity at the upstream control station at the same tide of same day
		On or After 25 March 13: <u>27.5</u> and 120% of upstream control station's turbidity at the same tide of the same day	On or After 25 March 13: <u>47.0</u> and 130% of turbidity at the upstream control station at the same tide of same day
Suspended Solids (mg/L)	Depth average	Before 25 Mar 13: <u>23.5</u> or 120% of upstream control station's SS at the same tide of the same day	Before 25 Mar 13: <u>34.4</u> or 130% of SS at the upstream control station at the same tide of same day and 10mg/L for WSD Seawater Intakes
		On or After 25 March 13: <u>23.5</u> and 120% of upstream control station's SS at the same tide of the same day	On or After 25 March 13: <u>34.4</u> and 130% of SS at the upstream control station at the same tide of same day and 10mg/L for WSD Seawater Intakes

Note:

- (1) Depth-averaged is calculated by taking the arithmetic means of reading of all three depths
- (2) For DO, non-compliance of the water quality limit occurs when monitoring result is lower than the limit.
- (3) For SS & turbidity non-compliance of the water quality limits occur when monitoring result is higher than the limits.

- (4) All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.
- (5) The 1%-ile of baseline data for dissolved oxygen (surface and middle) and dissolved oxygen (bottom) are 4.2mg/L and 3.6mg/L respectively.
- (6) The proposal for changing Action and Limit Levels for water quality monitoring was submitted to EPD on 15 March 2013. No objection was received from EPD according to the letter (ref. (10) in Ax(3) to EP2/G/A/129pt.4) dated 25 March 2013. Therefore, the updated Action and Limit Levels for water quality monitoring was used for comparison starting from 25 March 2013.

Table 3.2e Action and Limit Levels for Dolphin Line Transect Monitoring

	West Lantau
Action Level	STG < 60% of baseline & ANI <60% of baseline
Limit Level	STG < 45% of baseline & ANI <45% of baseline

Derived Value of Action Level (AL) and Limit Level (LL):

	West Lantau
Action Level	STG < 9.8 & ANI <36.3
Limit Level	STG < 7.4 & ANI <27.2

Remarks:

1. STG means quarterly encounter rate of number of dolphin sightings
2. ANI means quarterly encounter rate of total number of dolphins
3. Baseline value: 16.4 for ER (STG) and 60.5 for ER (ANI)

Table 3.2f Action and Limit Levels for Underwater Construction Noise

Action Level	Limit Level
170 dB re 1µPa	180 dB re 1µPa

Event and Action Plan

- 3.5 Should non-compliance of the criteria occur, action in accordance with the Action Plan in **Appendix G** shall be carried out.

Implementation Status of Environmental Mitigation Measures

- 3.6 Relevant mitigation measures as recommended in the EIA report have been stipulated in the EM&A Manual for the Contractor to implement. The implementation status of environmental mitigation measures (EMIS) is given in **Appendix H**.
- 3.7 Regular marine travel route for marine vessels were implemented properly in accordance with the submitted plan and relevant records were kept properly.
- 3.8 Acoustic decoupling measures for the stationary equipment (generators, winch generators and air compressors) mounted on boards were adopted in according to the approved Acoustic Decoupling Measures Plan.
- 3.9 Dolphin exclusion zone was implemented by ET's trained dolphin observer in accordance with EP Condition 3.4. In addition, dolphin exclusion zone and dolphin watching plan according to EM&A Manual, Section 10.2.12 and EP Condition 3.5 was implemented by DCVJV's trained dolphin watcher.
- 3.10 Spill kits and booms are ready on site for the event of accidental spillage of oil or other hazardous chemicals from construction activities including vessels operating for the Contract.

Site Audit Summary

- 3.11 Site audits were carried out by ET on weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Contract site. The observations and recommendations made during the reporting period are summarized in **Appendix I**.
- 3.12 According to EP condition 4.7 and EM&A Manual, periodic monitoring (every three months) of construction works shall be conducted to ensure the avoidance of any impacts on Sha Lo Wan (West) Archaeological Site. Access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment is not allowed. One inspection to the Sha Lo Wan (West) Archaeological Site was conducted in the reporting period (25th March 2013). No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed. The photographic records of the inspection to the Sha Lo Wan (West) Archaeological Site are shown in the Monthly EM&A Reports.

Status of Waste Management

- 3.13 The amount of wastes generated by the activities of the Contract during the reporting month is shown in **Appendix J**.

4 ENVIRONMENTAL MONITORING RESULTS

Air Quality Monitoring Results

4.1 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Table 4.1 and 4.2** respectively. Graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in **Appendices B and C** respectively.

Table 4.1 Summary Table of 1-hour TSP Monitoring Results during the Reporting Period

Month	Monitoring Station	Concentration (µg/m ³)		Action Level, µg/m ³	Limit Level, µg/m ³
		Average	Range		
February 2013	AMS1	77	29 – 129	381	500
	AMS4	128	60 – 204	352	
March 2013	AMS1	59	3 - 238	381	
	AMS4	59	3 - 200	352	
April 2013	AMS1	47	15 - 97	381	
	AMS4	60	21 - 108	352	
May 2013	AMS1	54	23 - 104	381	
	AMS4	51	19 - 114	352	

Table 4.2 Summary Table of 24-hour TSP Monitoring Results during the Reporting Period

Month	Monitoring Station	Concentration (µg/m ³)		Action Level, µg/m ³	Limit Level, µg/m ³
		Average	Range		
February 2013	AMS1	45	20 – 70	170	260
	AMS4	51	30 – 72	171	
March 2013	AMS1	22	9 - 60	170	
	AMS4	20	8 - 42	171	
April 2013	AMS1	35	9 - 53	170	
	AMS4	49	24 - 77	171	
May 2013	AMS1	32	17 - 47	170	
	AMS4	37	22 - 56	171	

4.2 According to our field observations, the major dust source identified at the designated air quality monitoring stations in the reporting period are as follows:

Table 4.3 Observation at Dust Monitoring Stations

Monitoring Station	Major Dust Source
AMS1	N/A
AMS4	N/A

4.3 The wind data monitoring results were attached in the Monthly EM&A Reports

Noise Monitoring Results

- 4.4 The noise monitoring results are summarized in **Table 4.4**. Graphical presentations of noise monitoring are shown in **Appendices D**.

Table 4.4 Summary Table of Noise Monitoring Results during the Reporting Period

Month	Monitoring Station	Noise Level, $L_{eq(30min)}$ dB(A)		Limit Level
		Average	Range	
February 2013	NMS1	65	N/A	75 dB(A)
	NMS4	59	N/A	
March 2013	NMS1	68	65 – 71	
	NMS4	58	56 – 62	
April 2013	NMS1	69	66 – 70	
	NMS4	56	54 – 59	
May 2013	NMS1	66	55 – 74	
	NMS4	58	56 – 60	

Remark: +3dB(A) Façade correction included

N/A: Only one noise monitoring was conducted in the reporting period, no range of noise level is provided.

- 4.5 According to our field observations, the major noise source identified at the designated noise monitoring stations in the reporting period are as follows:

Table 4.5 Observation at Noise Monitoring Stations

Monitoring Station	Major Noise Source
NMS1	Air traffic & marine traffic noise
NMS4	Air traffic & marine traffic noise

Water Quality Monitoring Results

- 4.6 The graphical presentation of water quality at the monitoring stations is shown in **Appendix E**.
- 4.7 Water quality impact sources during the water quality monitoring were the construction activities of the Contract, nearby construction activities by other parties and near by operating vessels by other parties.

Dolphin Monitoring (Line-transect Vessel Survey)

Summary of survey effort and dolphin sightings

- 4.8 During the period of February to May 2013, eight sets of systematic line-transect vessel surveys were conducted to cover all transect lines in WL survey area twice per month.
- 4.9 From these surveys, a total of 254.95 km of survey effort was collected, with 90.2% of the total survey effort being conducted under favourable weather conditions (i.e.

Beaufort Sea State 3 or below with good visibility). The total survey effort conducted on primary lines was 171.08 km, while the effort on secondary lines was 83.87 km. Survey effort conducted on primary and secondary lines were both considered as on-effort survey data. Summary table of the survey effort is shown in Appendix I of **Appendix F-1**.

- 4.10 During the eight sets of monitoring surveys in February to May 2013, a total of 33 groups of 114 Chinese White Dolphins were sighted. All except two sightings were made during on-effort search. Twenty-two on-effort sightings were made on primary lines, while another nine on-effort sightings were made on secondary lines. Summary table of the dolphin sightings is shown in Appendix II of **Appendix F-1**.
- 4.11 For the detailed comparison of dolphin occurrence and usage of West Lantau survey area between the impact phase and baseline phase monitoring (i.e. Section 4.12-4.29), only the quarterly data of March-May 2013 from the impact phase monitoring was used in the present report to tally with the three month period of baseline monitoring (September-November 2011). The three-month period (March-May 2013) is also consistent with seasonality period as defined in the long-term monitoring dolphin research conducted by AFCDC (Hung 2012, 2013) to allow direct comparison between the baseline and impact phase monitoring data.

Distribution

- 4.12 Distribution of dolphin sightings made during monitoring surveys in March to May 2013 is shown in Figure 1 of **Appendix F-1**. Most dolphin sightings were made in the central and southern portions of the survey area, with particular concentrations near Kai Kung Shan and Fan Lau. A few sightings were also made near Tai O Peninsula, but only one sighting was made in the northern portion of the survey area.
- 4.13 Only one sighting was made in the vicinity of the HKLR09 alignment in West Lantau survey area, but it should be noted that this survey area only covers part of the HKLR09 alignment while the other half overlaps with the Northwest Lantau survey area.
- 4.14 When compared with the sighting distribution of dolphins during baseline monitoring surveys in September to November 2011, it appears that much fewer sightings were made to the north of Tai O Peninsula while more sightings were made in the southern portion of the survey area in the present quarter (Figure 1 of **Appendix F-1**). In addition, more sightings were made in the offshore waters of West Lantau during the baseline period than the impact monitoring period (Figure 1 of **Appendix F-1**).
- 4.15 It appears that the dolphins may have temporarily shifted their distribution further south during the present impact monitoring period. It remained to be confirmed whether they

have been affected by the HKLR09 construction activities in the present quarter to result in such shift in distribution, or such shift is related to seasonal fluctuation in dolphin habitat use. This will be continuously monitored and further assessed in the next quarterly period.

Encounter rate

- 4.16 During the four-month impact phase monitoring period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) from West Lantau survey area are shown in **Table 4.6**. The average encounter rates deduced from the six sets of surveys from March to May 2013 (encounter rates from February 2013 was excluded in the comparison to tally with the three-month period of baseline monitoring) were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (**Table 4.7**).
- 4.17 In WL, the average dolphin encounter rates (both STG and ANI) in the present three-month study period were very similar to the ones recorded in the 3-month baseline period, indicating the dolphin usage during this impact phase monitoring period in this survey area was maintained at the same level as in the baseline phase.

Table 4.6 Dolphin encounter rates (sightings per 100 km of survey effort) during the impact monitoring period (February - May 2013)

Survey Area	Dolphin Monitoring	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
West Lantau	Set 1 (February 19,2013)	4.6	18.4
	Set 2 (February 25,2013)	0.0	0.0
	Set 3 (March 8, 2013)	19.4	62.9
	Set 4 (March 22, 2013)	29.2	110.8
	Set 5 (April 9, 2013)	11.2	61.5
	Set 6 (April 17, 2013)	9.2	22.9
	Set 7 (May 6, 2013)	9.8	34.3
	Set 8 (May 14, 2013)	21.5	59.1

Table 4.7 Comparison of average dolphin encounter rates from impact monitoring period (March-May 2013) and baseline monitoring period (September-November 2011)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	March - May 2013	September- November 2011	March - May 2013	September- November 2011
West Lantau	16.70 ± 8.00	16.43 ± 7.70	58.59 ± 30.37	60.50 ± 38.47

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

- 4.18 A one-way ANOVA was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. For the comparison between the baseline period and the present quarter (first quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.9550 and 0.9259 respectively based on the alpha value of 0.05. Therefore, no significant difference in dolphin encounter rate was detected between the baseline period and the present quarter.
- 4.19 To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter (March-May 2013) using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in WL were 15.41 sightings and 56.49 dolphins per 100 km of survey effort respectively.

Group size

- 4.20 Group size of Chinese White Dolphins ranged from 1-12 individuals per group in WL survey area between March and May 2013. The average dolphin group sizes from these three months were compared with the one deduced from the baseline period in September to November 2011, as shown in **Table 4.8**. The average dolphin group sizes in the West Lantau region during March to May 2013 was slightly lower than the ones recorded in the 3-month baseline period (**Table 4.8**).

Table 4.8 Comparison of average dolphin group sizes from impact monitoring period (March-May 2013) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	March-May 2013	September-November 2011
West Lantau	3.44 ± 3.12 (n = 32)	3.63 ± 2.97 (n = 46)

4.21 Distribution of dolphins with larger group sizes (more than 5 animals per group) during March through May 2013 is shown in Figure 2 of **Appendix F-1**. These larger dolphin groups were mostly sighted between Kai Kung Shan and Fan Lau (Figure 2 of **Appendix F-1**). This was noticeably different from the baseline period, when more dolphin sightings were larger group sizes occurred near Tai O Peninsula and just to the south of the HKLR09 alignment (Figure 2 of **Appendix F-1**).

Habitat use

4.22 From March to May 2013, the most heavily utilized habitats by the dolphins mainly concentrated near Kai Kung Shan, Peaked Hill and Tai O (Figures 3a and 3b of **Appendix F-1**). However, it should be noted that the amount of survey effort collected in each grid during the three-month period was still fairly low (6 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will be collected throughout the impact phase monitoring programme.

4.23 When compared with the habitat use pattern recorded during the baseline period, it appears that the density of dolphins in the upper portion of WL survey area was much lower during the impact monitoring period, with an apparent shift to the southern side of the survey area (**Figure 4 of Appendix F-1**). Notably, several grids (22C-D, 23C-E) recorded high dolphin densities in the vicinity of the HKLR09 alignment during the baseline period, but these five grids recorded either no dolphin or very low dolphin density during the impact phase monitoring period (**Figure 4 of Appendix F-1**). Notably, Grid 21F also recorded very high dolphin density during the baseline period. However, as this grid is situated in the Northwest Lantau survey area and under the jurisdiction of another HZMB EM&A contracts (i.e. HKBCF and HKLR03), and therefore will not be included in this report that solely focuses on West Lantau survey area.

Mother-calf pairs

4.24 During the three-month impact phase monitoring period, a total of four unspotted juveniles (UJ) were sighted in WL survey area, and the mothers of two of these UJs were identified (i.e. WL44 and WL94). These young calves comprised only 3.6% of all animals sighted, which was much lower to the percentage recorded during the baseline monitoring period (6.6%). Moreover, two unspotted calves (UC) were sighted during the three-month baseline period, but no UC was sighted at all during the present impact monitoring period.

- 4.25 These four young calves only occurred between Peaked Hill and Fan Lau during March-May 2013, which was noticeably different from the frequent occurrence of calves near Tai O Peninsula during the baseline period (Figure 5 of **Appendix F-1**).

Activities and associations with fishing boats

- 4.26 A total of six and three dolphin sightings were associated with feeding and socializing activities respectively during the three-month impact monitoring period, comprising of 18.8% and 9.4% of the total number of dolphin sightings. Both percentages were higher than the percentages recorded during the baseline period (feeding activity: 13.0%; socializing activity: 6.5%). Only a lone dolphin was engaged in traveling activity in the present impact monitoring period, while this behaviour was not observed at all during the baseline period.
- 4.27 Distribution of dolphins engaged in different activities during the three-month study period is shown in Figure 6 of **Appendix F-1**. The feeding and socializing activities were scattered between Tai O Peninsula and Fan Lau with no apparent concentration. This is slightly different from the baseline period, when most feeding and socializing activities were concentrated between Tai O Peninsula and Kai Kung Shan (Figure 6 of **Appendix F-1**).
- 4.28 During the three-month period, only one dolphin group were found to be associated with an operating gill-netter, comprising of 3.1% of all dolphin groups. This was lower than the percentage recorded in baseline period (6.5%) in which all three sightings were associated with operating pair-trawlers. The low percentage of fishing boat association during the impact phase monitoring was likely related to the recent trawl ban being implemented in 2013 in Hong Kong waters.

Summary of photo-identification works

- 4.29 From February to May 2013, over 4,000 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 4.30 In total, 38 individuals sighted 61 times altogether were identified (see summary table in Appendix III of **Appendix F-1**). Most identified individuals were sighted only once or twice during the four-month period, with the exception of four individuals being sighted thrice (WL116, WL130, WL142 and WL201), and three individuals being sighted four times (SL05, WL25 and WL42).
- 4.31 During the four-month period, two females (WL44 and WL94) were sighted to be accompanied with their calves during their re-sightings.

Individual range use

- 4.32 Ranging patterns of the 38 individuals identified during the four-month study period were determined by fixed kernel method, and are shown in Appendix IV of **Appendix F-1**.
- 4.33 Among these 38 individuals, only a few were sighted near the HKLR09 alignment during the present impact monitoring period, and these individual dolphins mainly focused their range use in North Lantau waters (e.g. CH34, NL37, WL05) instead of

West Lantau waters.

- 4.34 On the contrary, most individuals were sighted far away from the HKLR09 alignment, which coincided with the infrequent occurrence of dolphins in the upper portion of West Lantau survey area during the present quarter. The 95%UD ranges of these individuals overlapped with HKLR09 alignment (e.g. CH108, WL25, WL42, WL72, WL116) where they used to occur in the past. It is possible that they may have shifted their range use further south in light of the increased disturbance from the construction activities.
- 4.35 Notably, the ranging patterns of several individuals (e.g. CH38, SL05, WL84, WL144) do not overlap with the HKLR09 alignment at all, but mostly located around the southwestern side of Lantau Island. It is likely that the impact of HKLR09 construction activities will be minimal to these individuals during the impact phase.

Conclusion

- 4.36 During this quarter of dolphin monitoring, no adverse impact from the activities of this construction project on Chinese White Dolphins was noticeable from general observations, and the dolphin occurrence in West Lantau survey area remained the same as in the baseline period.
- 4.37 Although the average dolphin encounter rates in the present three-month study period were similar to the ones in the three-month baseline monitoring period, the spatial occurrence of dolphins appeared to be noticeably different between the two periods, with lower usage of the area to the north of Tai O Peninsula (i.e. the vicinity of HKLR09 construction site) during the present impact monitoring period.
- 4.38 Dolphin usage in West Lantau waters should be continuously monitored, to examine whether such avoidance of the northern portion of the study area by the dolphins will continue in the upcoming quarter.

Construction-phase Underwater Noise Monitoring

- 4.39 The noise monitoring results are summarized in **Table 4.9**. Detailed monitoring results and graphical presentations of noise monitoring are shown in **Appendix F-2**. The averaging period was in general from 9am to 6pm, depending on the availability of the data as the monitoring might have temporarily paused due to bad weather or to give way for barge movement.

Table 4.9 Summary Table of Underwater Noise Monitoring Results during the Reporting Quarter

Date	Pier No.	Station	Underwater Noise (dB re 1μPa)			Period
			Max	Average	Min	
13-Mar-13	48	R1	159.6	129.3	108.3	10-17
14-Mar-13	48	R1	157.5	126.7	110.4	9-17
15-Mar-13	48	R1	163.0	128.5	108.7	9-17
*18-Mar-13	48	R1	152.3	125.0	109.4	9-18
*19-Mar-13	48	R1	154.2	121.4	109.9	9-15
*20-Mar-13	48	R1	145.0	125.5	112.2	13-20

*21-Mar-13	48	R1	162.8	122.8	108.7	9-18
*22-Mar-13	48	R1	144.9	121.6	108.9	9-18
*23-Mar-13	48	R1	161.5	122.9	110.5	9-17
*25-Mar-13	48	R1	151.5	125.6	109.4	9-16
26-Mar-13	52	R2	165.9	128.5	111.2	9-10, 14-15
*27-Mar-13	52	R2	152.1	127.9	110.7	9-18
*28-Mar-13	52	R2	156.5	133.3	112.2	12-16
*2-Apr-13	52	R2	155.8	129.5	110.8	9-18
*3-Apr-13	52	R2	147.1	125.5	111.8	9-18
*5-Apr-13	52	R2	156.7	129.8	111.6	9-17
*8-Apr-13	52	R2	157.2	128.7	109.4	9-18
*9-Apr-13	52	R2	155.2	130.3	112.3	9-18
*10-Apr-13	52	R2	146.6	129.1	112.7	9-16
11-Apr-13	52	R2	145.0	128.8	111.0	9-17
*25-Apr-13	48	R1	156.6	129.8	112.3	9-18
*26-Apr-13	48	R1	163.9	129.3	113.9	9-18
*27-Apr-13	52	R2	149.8	134.0	118.5	9-17
*29-Apr-13	52	R2	160.1	133.9	113.8	9-18
*30-Apr-13	48	R1	146.9	132.3	112.9	9-14, 16-18

Remarks: * Underwater noise monitoring was conducted during the bored piling activities
Frequency: 70 Hz – 125 kHz

Dolphin Behaviour Monitoring (Acoustic)

with bored piling

- 4.40 In March 2013, a total of 10 days of acoustic monitoring surveys were conducted on the 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 27th, 28th and 29th, when bored piling activities were concurrently conducted. During those dates, 623.6 km of survey effort were conducted to search for dolphins in the western and northwestern waters of Lantau. A total of 18 groups, numbering 45 dolphins, were sighted during these surveys. In addition, 11 sound samples with 58.3 hours of recordings were taken from some of these dolphin groups.
- 4.41 In April, 524.4 km of survey effort were conducted to search for dolphins in the western and northwestern waters of Lantau. A total of four groups, numbering seven dolphins, were sighted during these surveys. In addition, two sound samples with 10 minutes of recordings were taken from some of these dolphin groups.

without bored piling

- 4.42 In March 2013, a total of 13 days of acoustic monitoring surveys were conducted on the 6th, 7th, 8th, 9th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 24th and 30th, when no bored piling activities were conducted. During those dates, 820.0 km of survey effort were conducted to search for dolphins in the western and northwestern waters of Lantau. A total of 23 groups, numbering 72 dolphins, were sighted during these surveys. In addition, 21 sound samples with 102.2 hours of recordings were taken from some of these dolphin groups. Moreover, the EARs were deployed since February 25th, 2013 at Fan Lau (site B1) and near the bridge alignment (Site B2), which will be recovered at the end of the construction phase monitoring.

Land-based Dolphin Behaviour and Movement Monitoring

with bored piling

- 4.43 In March 2013, a total of 9 sessions with 49.87 hours of theodolite tracking were conducted from Shum Wat shore-based station on the 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 27th and 28th, when bored piling activities were concurrently conducted. More than 80% of effort was conducted in favourable weather conditions during those days. Dolphins were successfully tracked from shore on six of the nine days of efforts, and a total of eight dolphin groups were tracked. A total of 124 fixes of their positions were collected, and another 2,862 fixes were also made from locations of various vessels (e.g. fishing boats, high-speed ferries), to examine the level of vessel traffic in the study area.
- 4.44 In April 2013, a total of 9 sessions with 52.67 hours of theodolite tracking were conducted from Sham Wat shore-based station on April 1st, 2nd, 4th, 5th, 7th, 8th, 9th, 10th and 11th April 2013. More than 80% of effort was conducted in favourable weather conditions during those days. Dolphins were successfully tracked from shore on two of the nine days of efforts, and a total of three dolphin groups were tracked. A total of 93 fixes of their positions were collected, and another 2,314 fixes were also made from locations of various vessels (e.g. fishing boats, high-speed ferries), to examine the level

of vessel traffic in the study area.

without bored piling

4.45 In March 2013, a total of 13 sessions with 76.75 hours of theodolite tracking were conducted from Shum Wat shore-based station on the 6th, 7th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 24th and 30th, when no bored piling activities were conducted. More than 80% of effort was conducted in favourable weather conditions during those days. Dolphins were successfully tracked from shore on 6 of 13 days of efforts, and a total of 11 dolphin groups were tracked. A total of 240 fixes of their positions were collected, and another 3,716 fixes were also made from locations of various vessels (e.g. fishing boats, high-speed ferries), to examine the level of vessel traffic in the study area.

Advice on the Solid and Liquid Waste Management Status

- 4.46 The Contractor was advised to minimize the wastes generated through the recycling or reusing. All mitigation measures stipulated in approved waste management plan shall be fully implemented.
- 4.47 The amount of wastes generated by the activities of the Contract during the reporting month is shown in **Appendix J**.

5 ENVIRONMENTAL NON-CONFORMANCE (EXCEEDANCES)

Summary of Exceedances

- 5.1 Summary of exceedance is provided in **Appendix K**. The details of the exceedances were attached in the Monthly EM&A Report.

Air Quality

- 5.2 No Action/Limit Level exceedance was recorded in the reporting period.

Noise

- 5.3 One Action Level exceedance was recorded for noise in the reporting period as one documented complaint was received to complaint the noise nuisance due to loading of metal parts at barge near the seawall of Works Area WA6 early morning (around 8:45a.m) on 18 May 2013 (Saturday) in the reporting month.

- 5.4 Based on the record of site activities at WA6 on 18 May 2013, 4 metal plates and 2 oxygen-acetylene set were lifted onto a derrick boat “Chiu Kee” by a crane near seawall at WA6 in the morning on that day. Such operation was commenced around 8:40a.m and completed in 10 minutes during the normal construction working hour (0700 – 1900 Monday to Saturday). However, the duration of aforesaid activities is very short and infrequent. Nevertheless, the Contractor was reminded to strengthen their site supervision and provide training for the workers regularly to increase awareness of their environmental responsibilities to minimize the noise impact to the nearby residents and the specific mitigation measures for the complaint including but not limited to:-

- To place wooden planks or rubber mats on ground for loading and unloading heavy or metal objects; and
- To deploy professional personnel to supervise the works.

- 5.5 No Limit Level exceedance was recorded for noise.

Water Quality

- 5.6 There are 17 Action Level exceedances and 6 Limit Level exceedances were recorded for dissolved oxygen. 30 Action Level exceedances and 101 Limit Level exceedances for turbidity were recorded. 22 Action exceedances and 92 Limit Level exceedances for suspended solids were recorded.

- 5.7 According to the investigation, no major marine construction activities were conducted during the monitoring period between 22 February and 19 March 2013. No pollution discharge from the marine works and sediment plume due to natural fluctuation of shallow water were observed. Therefore, all exceedances are considered not due to the Contract.

Construction-phase Underwater Noise Monitoring

- 5.8 No Action/Limit Level exceedance was recorded in the reporting period.

Dolphin Monitoring (Line-transect Vessel Survey)

- 5.9 No Action/Limit Level exceedance was recorded in the reporting period.

Summary of Environmental Complaint

- 5.10 Four environmental related complaints were received in the reporting period. The Complaint Log is attached in **Appendix L**. All investigation reports for complaint of the Contract have been submitted to summarize the investigation results. The summary of environmental complaints is presented in **Table 5.1**.

Table 5.1 Summary of Environmental Complaints in the Reporting Period

Complaint Log Ref.	Location	Received Date	Nature of Complaint
Com-2013-04-001	Near Tung Chung New Development Pier	8 April 2013	Water Quality
Com-2013-05-001	WA6	2 May 2013	Noise
Com-2013-05-002	WA6	18 May 2013	Noise
Com-2013-05-003	Near Tung Chung New Development Pier	18 May 2013	Water Quality

Summary of Notification of Summons and Successful Prosecution

- 5.11 There was no prosecution or notification of summons received since the Contract commencement.

6 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 6.1 The Quarterly Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken in the period between 22nd February and 31st May 2013 in accordance with EM&A Manual.
- 6.2 No Action/Limit Level exceedance was recorded for air quality and underwater noise.
- 6.3 For water quality monitoring, there are 17 Action Level exceedances and 6 Limit Level exceedances were recorded for dissolved oxygen. 30 Action Level exceedances and 101 Limit Level exceedances for turbidity were recorded. 22 Action exceedances and 92 Limit Level exceedances for suspended solids were recorded.
- 6.4 According to the investigation, no major marine construction activities were conducted during the monitoring period between 22 February and 19 March 2013. No pollution discharge from the marine works and sediment plume due to natural fluctuation of shallow water were observed. Therefore, all exceedances are considered not due to the Contract.
- 6.5 One Action Level exceedance was recorded for noise as one documented complaint was received to complaint the noise nuisance due to loading of metal parts at barge near the seawall of Works Area WA6 early morning (around 8:45a.m) on 18 May 2013 (Saturday) in the reporting month. No Limit Level exceedance for noise was recorded.
- 6.6 During this quarter of dolphin monitoring, no adverse impact from the Contract on Chinese White Dolphins was noticeable from general observations, and the dolphin occurrence in West Lantau survey area remained the same as in the baseline period. No Action/Limit Level exceedance was recorded in the reporting period.
- 6.7 Although the average dolphin encounter rates in the present three-month study period were similar to the ones in the three-month baseline monitoring period, the spatial occurrence of dolphins appeared to be noticeably different between the two periods, with lower usage of the area to the north of Tai O Peninsula (i.e. the vicinity of HKLR09 construction site) during the present impact monitoring period.
- 6.8 Dolphin usage in West Lantau waters should be continuously monitored, to examine whether such avoidance of the northern portion of the study area by the dolphins will continue in the upcoming quarters.
- 6.9 Environmental site inspection was conducted on 26th February 2013, 5th, 12th, 19th and 26th March 2013, 2nd, 9th, 16th, 26th and 30th April 2013, 7th, 14th, 21st and 31st May 2013 by ET in the reporting month. All deficiencies identified during the site inspection have already rectified / improved during the follow-up audit session.
- 6.10 The inspection to the Sha Lo Wan (West) Archaeological Site was conducted on 25th March 2013. No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed.

6.11 There were four environmental complaints, no notification of summons and successful prosecution received in the reporting period.

6.12 The ET will keep track on the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Recommendations

6.13 According to the environmental audit performed in the reporting month, the following recommendations were made:

Air Quality Impact

- To regularly maintain the quality of machinery and vehicles on site.
- To implement dust suppression measures on all haul roads, stockpiles, dry surfaces and excavation works.
- To provide hoarding along the entire length of that portion of the site boundary.

Noise Impact

- To inspect the noise sources inside the site.
- To space out noisy equipment and position the equipment as far away as possible from sensitive receivers.
- To provide temporary noise barriers for operations of noisy equipment near the noise sensitive receivers, if necessary.

Water Impact

- To prevent any surface runoff discharge into any stream course and sea.
- To review and implement temporary drainage system.
- To identify any wastewater discharges from site.
- To ensure properly maintenance for de-silting facilities.
- To clear the silt and sediment in the sedimentation tanks.
- To review the capacity of de-silting facilities for discharge.
- To divert all the water generated from construction site to de-silting facilities with enough handling capacity before discharge.
- To avoid accumulation of stagnant and ponding water on site.

Ecology Impact

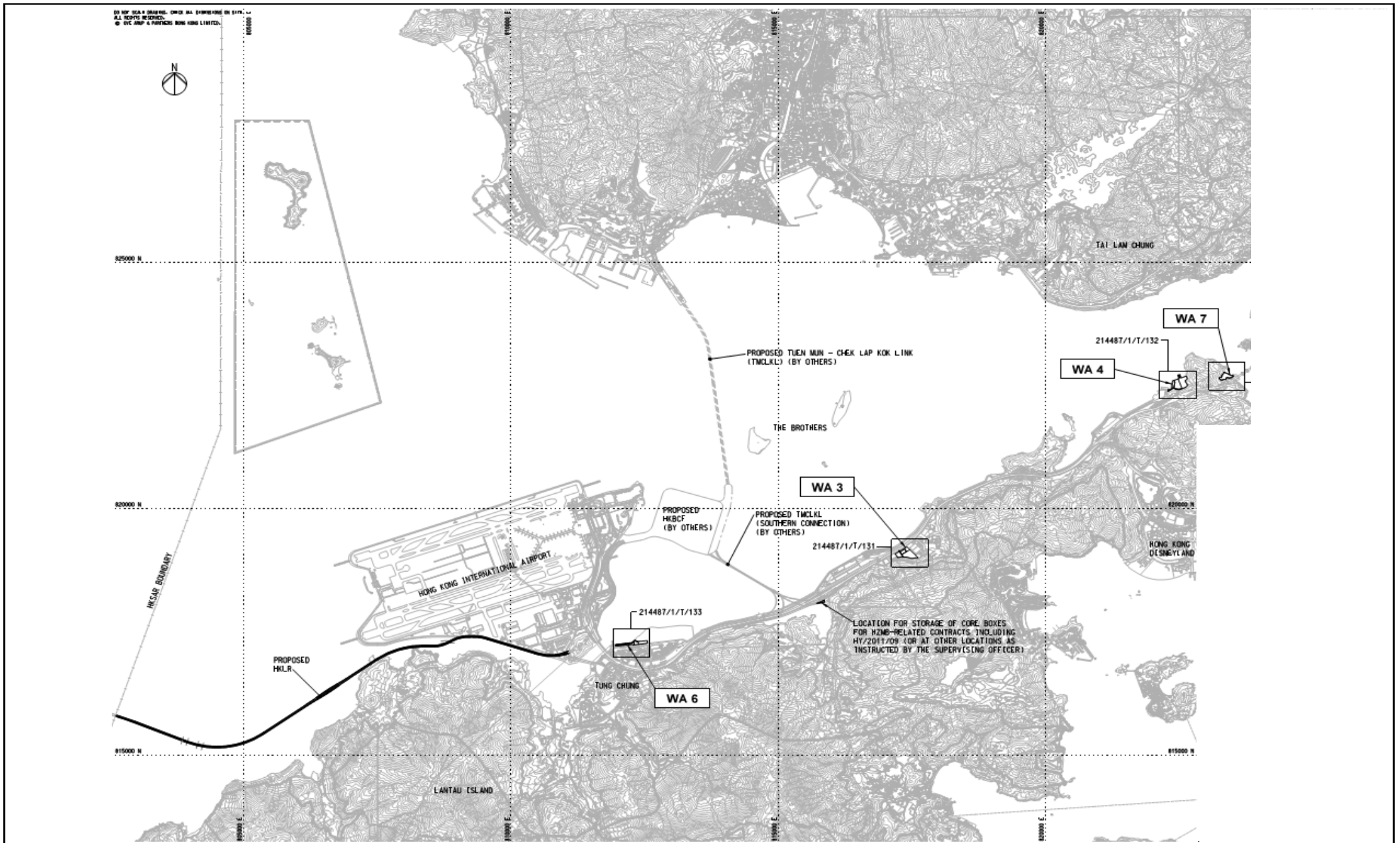
- To implement Spill Response Plan in the event of accidental spillage of or other hazardous chemicals.
- To implement Dolphin Exclusion Zone during the installation of bored pile casing located in the waters to the west of Airport.
- To implement Dolphin Watching Plan after the bored piling casing is installed.

- To ensure the acoustically-decoupled measures were implemented for air compressors and other noisy equipment mounted on construction vessels according to acoustic decoupling measures plan.

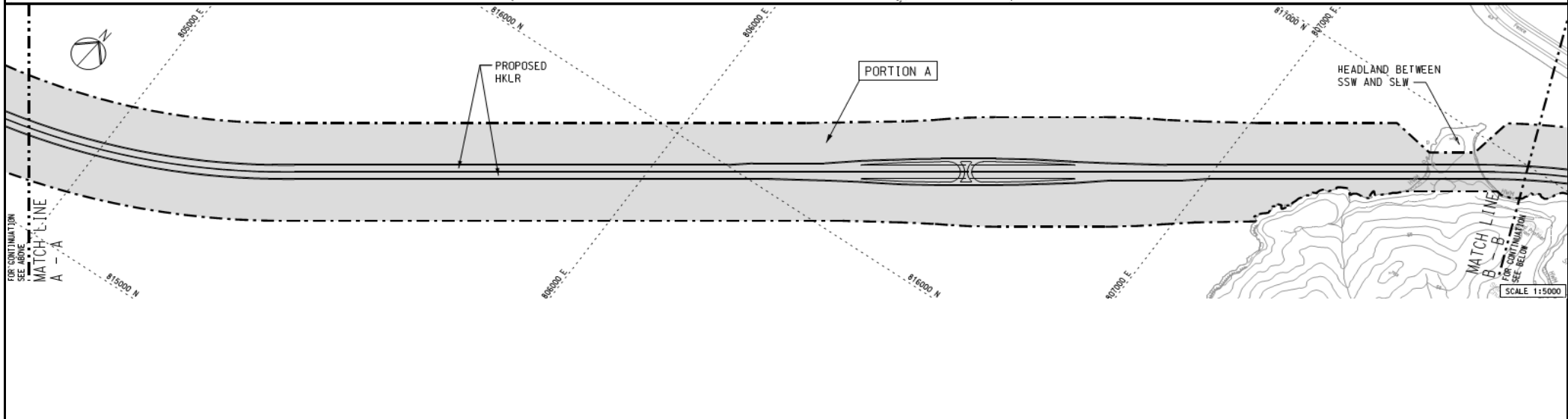
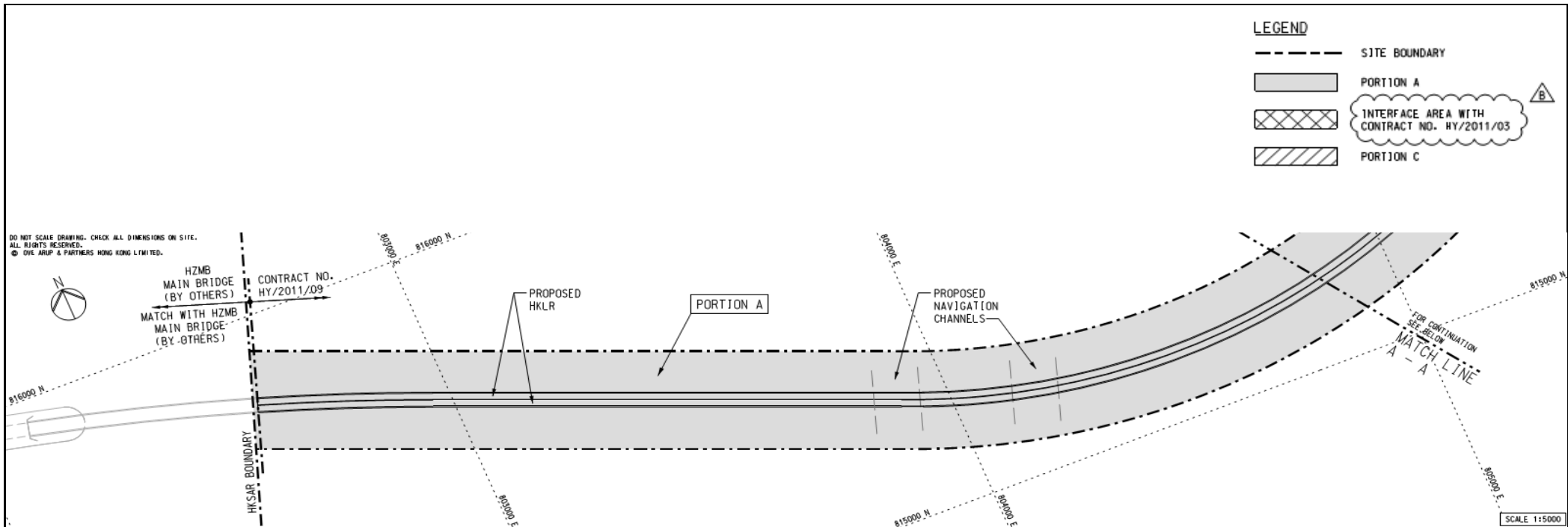
Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To ensure the performance of sorting of C&D materials at source (during generation);
- To carry out inspection of dump truck at site exit to ensure inert and non-inert C&D materials are properly segregated before removing off site.
- To avoid any discharge or accidental spillage of chemical waste or oil directly from the site.
- To avoid improper handling or storage of oil drum on site.

FIGURE(S)

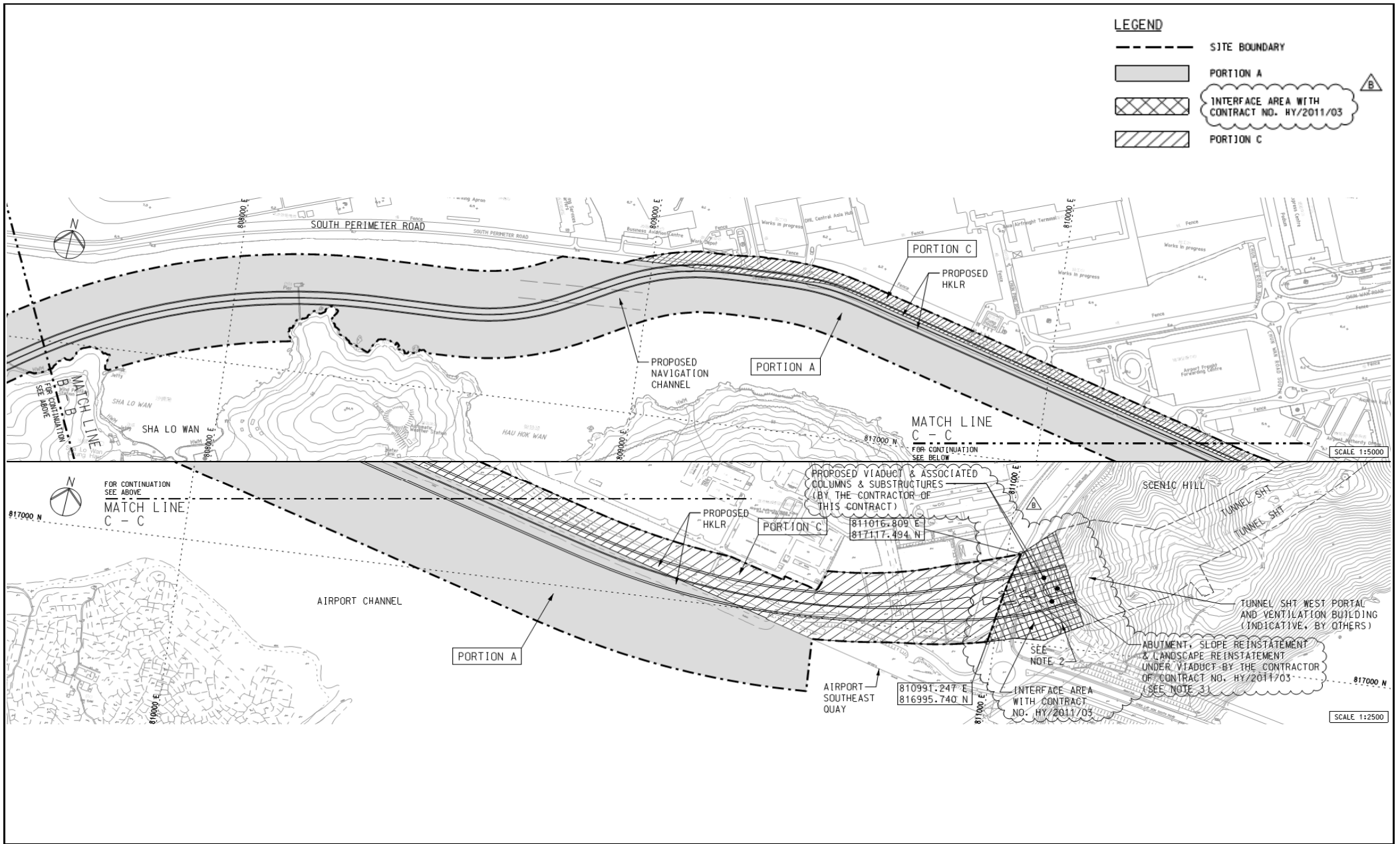


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (WA3, WA4, WA6 and WA7)		Scale	N.T.S	Propose No.	MA12014
	Date	Feb-13	Figure	1a		



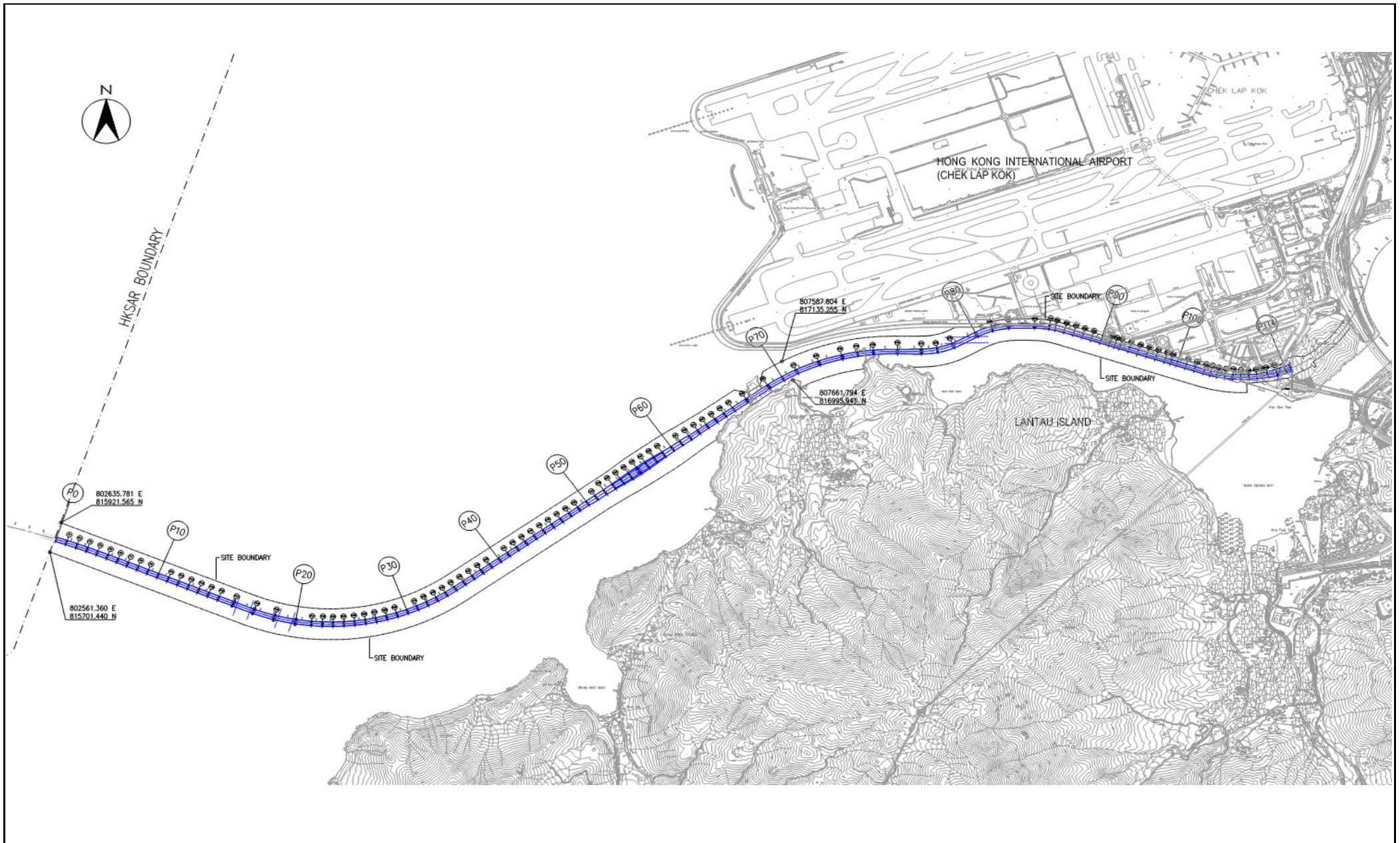
Title	Contract No. HY/2011/09		Scale	Propose
	Hong Kong-Zhuhai-Macao Bridge		N.T.S	No. MA12014
Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill			Date	Figure
Site Layout Plan (Portion A)			May-13	1b



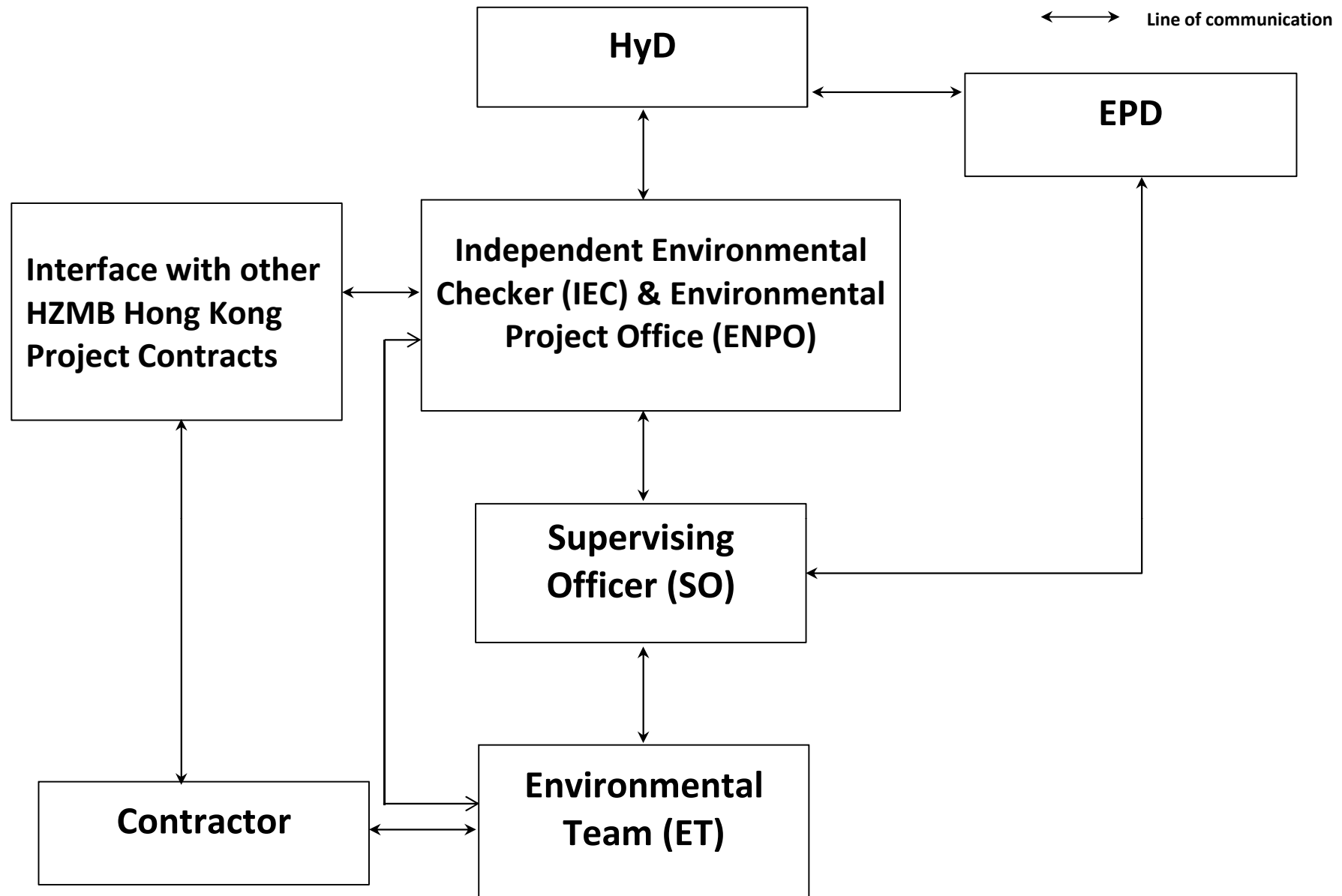


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge		Scale	Propose
	Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill		N.T.S	No. MA12014
	Site Layout Plan (Portion A and C)		Date	Figure
			May-13	1c

CINOTECH



Title	Contract No. HY/2011/09		Scale	Propose
	Hong Kong-Zhuhai-Macao Bridge		N.T.S	No. MA12014
	Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill		Date	Figure
	Site Layout Plan (Pier(s) Site)		Feb-13	1d
				CINOTECH

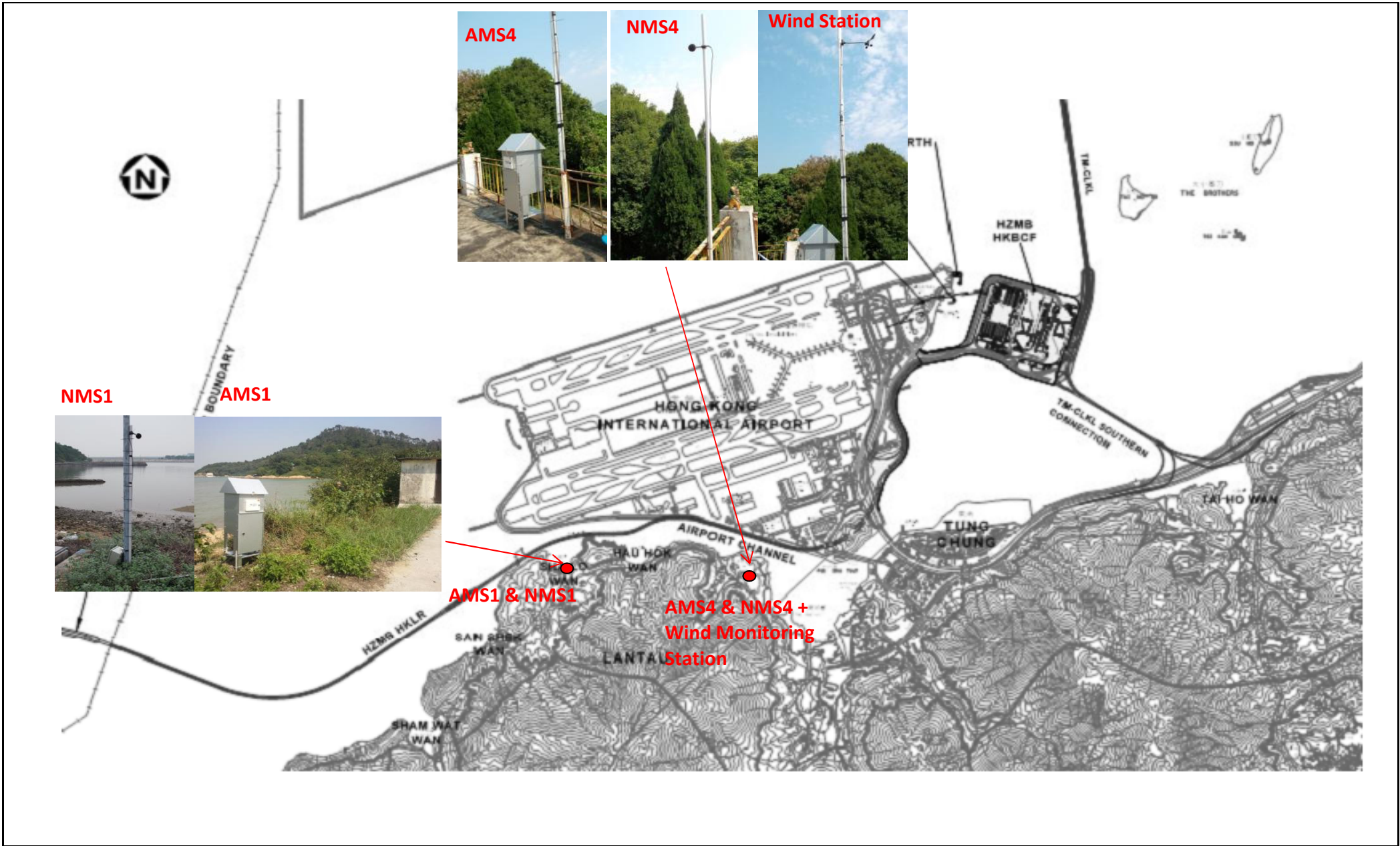


Title Contract No. HY/2011/09
 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between
 HKSAR Boundary and Scenic Hill
 Project Organisation for Environmental Works

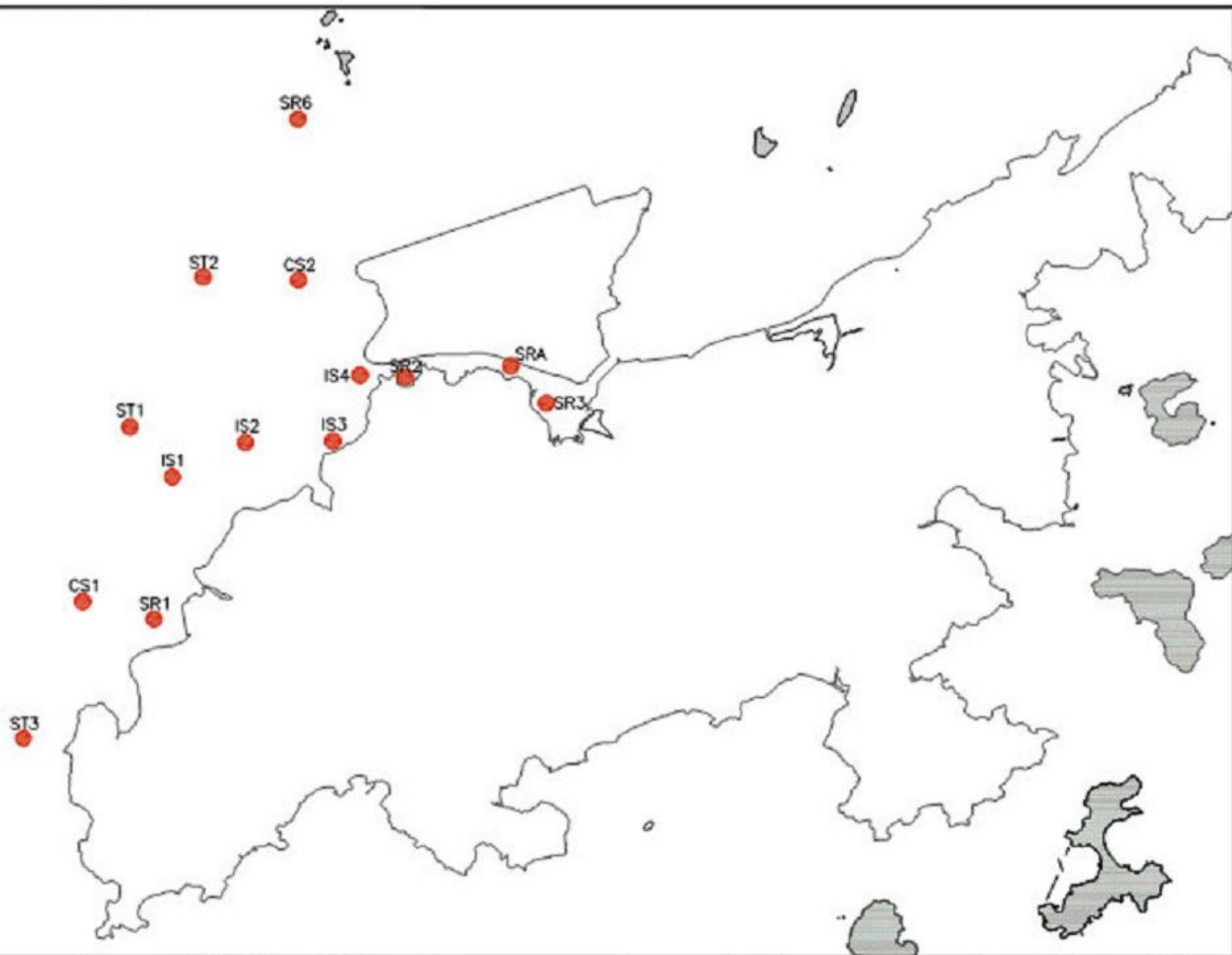
Scale N.T.S
 Date Feb-13

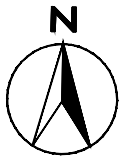
Propose No. MA12014
 Figure 2



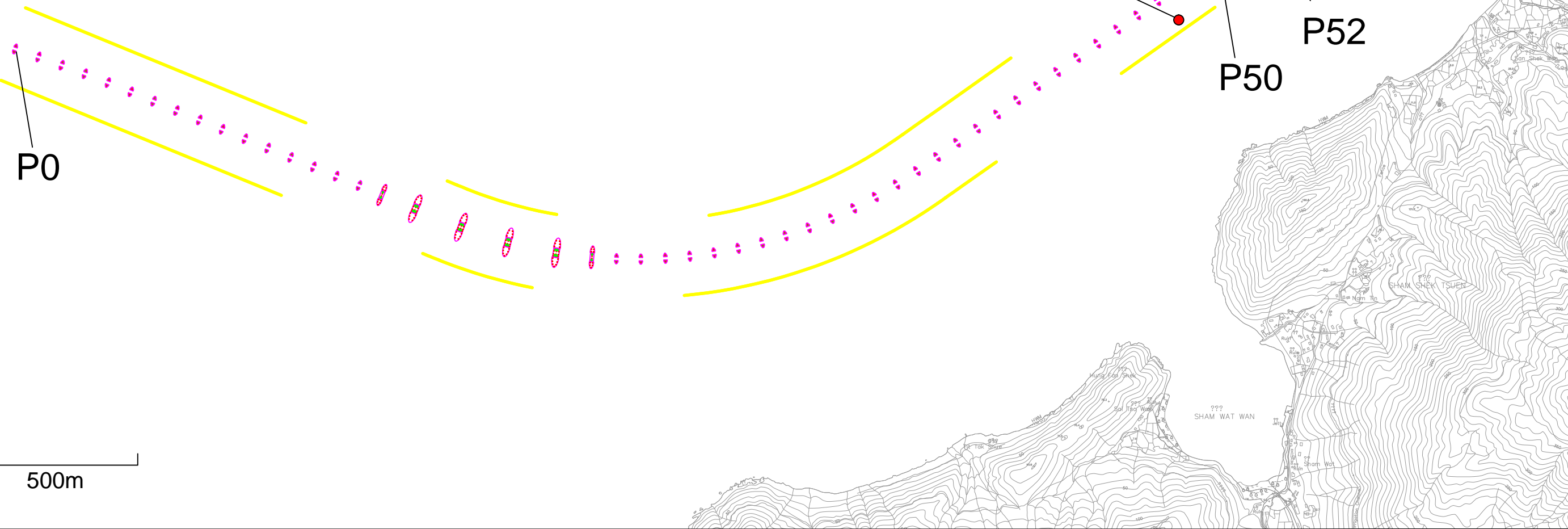


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill		Scale	N.T.S	Propose No.	MA12014	CINOTECH
	Locations of Air Quality and Noise Monitoring Stations		Date	Feb-13	Figure	3	

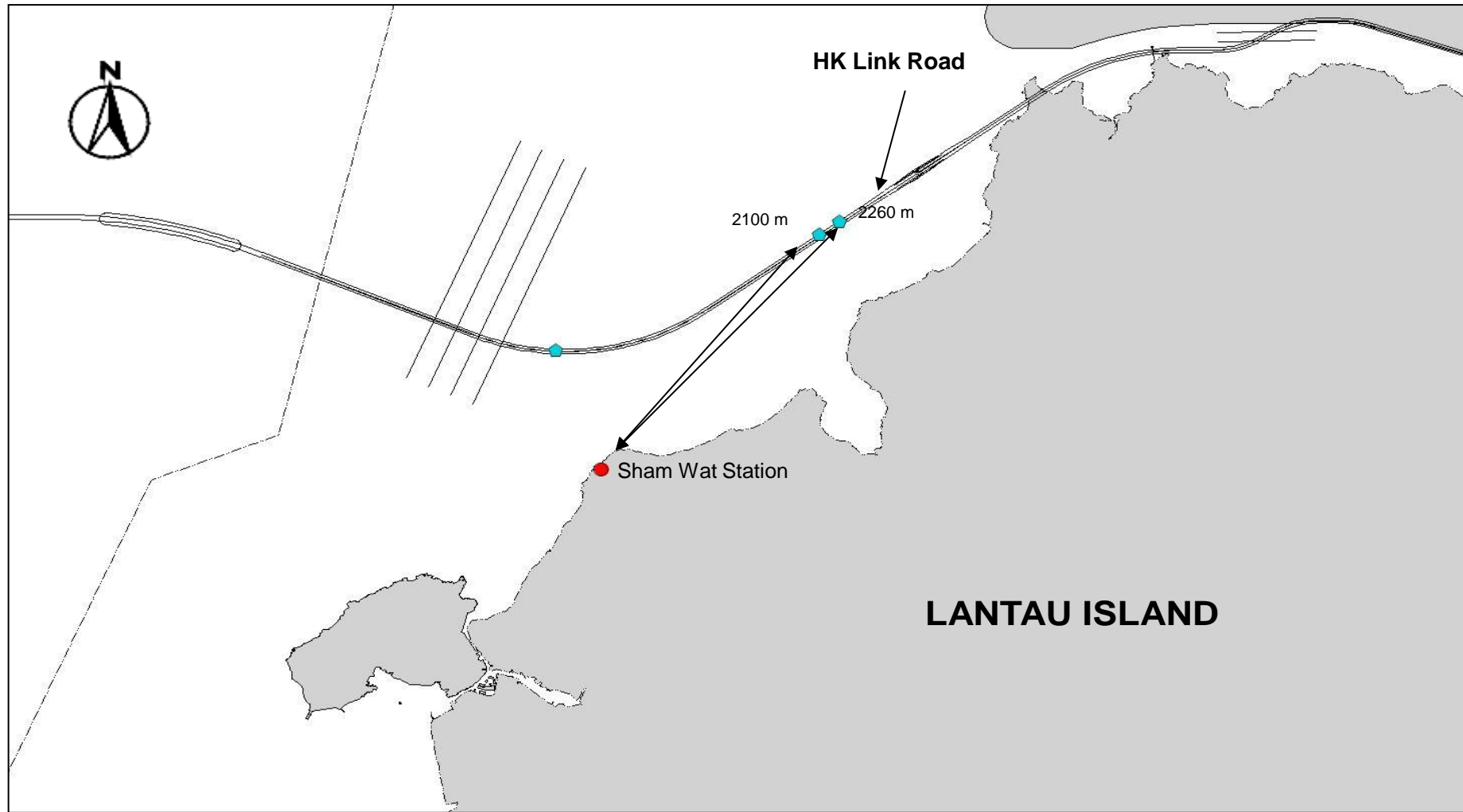




	Coordinates	
	x	y
Pier		
P48	806137	815984
P52	806376	816154
Station		
R1	806141	815885
R2	806390	816056



SCALE	-	DATE	MAY 13	
CHECK	KL	DRAWN	BC	
JOB No.	MA12014	DRAWING No.	5	REV
				-



Title
 Contract No. HY/2011/09
 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill
 Location of Land-based Dolphin Behaviour and Movement Monitoring Station

Scale	N.T.S	Project No.	MA12014
Date	Apr-13	Figure	6

CINOTECH

**APPENDIX A
CONSTRUCTION PROGRAMME**

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	2013				
						Feb 10	Mar 11	Apr 12	May 13	
HKZB Hong Kong Link Road - 3 Months Rolling Programme 2806 (Based on DWP_01)										
Design and Design Checking of the Works										
General Design Submission										
GDS1130	Final Durability Assessment Report	0	0		27/03/13 A					◆ Final Durability Assessment Report
Approval in Principle (AIP)										
AIP 04 Marine Viaduct Package 4										
AIP04-60	Approve Revise Final AIP - Airport Channel (Deck Widening)	35	0	01/02/13 A	01/03/13 A					Approve Revise Final AIP - Airport Channel (Deck Widening)
AIP 05 Lane Viaduct										
AIP05-60	Approve Revise Final AIP - Land Viaduct (Twins column)	35	0	30/01/13 A	27/02/13 A					Approve Revise Final AIP - Land Viaduct (Twins column)
AIP 07 E&M and Provisioning for TCSS										
AIP07-40	Rejected Design AIP - TCSS, E&M	35	0	20/11/12 A	04/02/13 A					Rejected Design AIP - TCSS, E&M
AIP07-50	Resubmit Design AIP with DC's Certificate - TCSS, E&M	28	0	05/02/13 A	20/03/13 A					Resubmit Design AIP with DC's Certificate - TCSS, E&M
AIP08-60	Approve Design AIP - TCSS, E&M	35	0	21/03/13 A	18/04/13 A					Approve Design AIP - TCSS, E&M
AIP 08 Geotechnical Works (e.g. slopework near Scenic Hill)										
AIP08-40	Approve Design AIP - Geotechnical Works	35	0	01/02/13 A	25/03/13 A					Approve Design AIP - Geotechnical Works
AIP08-50	Submit to GEO for Approval - Geotechnical Works	35	0	26/03/13 A	20/05/13 A					Submit to GEO for Approval - Geotechnical Works
AIP 09 Landscaping										
AIP09-40	Approve Design AIP - Landscaping	35	0	16/10/12 A	09/04/13 A					Approve Design AIP - Landscaping
AIP 10 SHM&MMS										
AIP10-20	Comment Design AIP - Remaining Works (SHM&MMS)	21	0	29/01/13 A	20/04/13 A					Comment Design AIP - Remaining Works (SHM&MMS)
AIP10-30	Resubmit Design AIP with DC's Certificate - Remaining Works (SHM&MMS)	28	0	21/04/13 A	26/04/13 A					Resubmit Design AIP with DC's Certificate - Remaining Works (SHM&MMS)
AIP10-40	Approve Design AIP - Remaining Works (SHM&MMS)	35	0	26/04/13 A	23/05/13 A					Approve Design AIP - Remaining Works (SHM&MMS)
Detailed Design Approval (DDA)										
Foundation										
Western Water										
DDA01.01-20	Comment Design DDA - ML01L/R	35	0	28/11/12 A	15/03/13 A					Comment Design DDA - ML01L/R
DDA01.01-30	Resubmit Design DDA with DC Certificate - ML01L/R	21	0	15/03/13 A	22/03/13 A					Resubmit Design DDA with DC Certificate - ML01L/R
DDA01.01-40	Approve Design DDA - ML01L/R	35	0	23/03/13 A	30/04/13 A					Approve Design DDA - ML01L/R
DDA05.01-10	Prepare and submit Design DDA - ML05L/R	35	0	28/02/13 A	29/05/13 A					Prepare and submit Design DDA - ML05L/R
DDA05.01-20	Comment Design DDA - ML05L/R	35	11	29/05/13 A	08/07/13					Comment Design DDA - ML05L/R
DDA06.01-10	Prepare and submit Design DDA - ML06L/R	31	0	23/02/13 A	28/03/13 A					Prepare and submit Design DDA - ML06L/R
DDA06.01-20	Comment Design DDA - ML06L/R	35	0	28/03/13 A	16/05/13 A					Comment Design DDA - ML06L/R
DDA06.01-30	Resubmit Design DDA with DC Certificate - ML06L/R	21	0	17/05/13 A	29/05/13 A					Resubmit Design DDA with DC Certificate - ML06L/R
DDA06.01-40	Approve Design DDA - ML06L/R	35	1	30/05/13 A	28/06/13					Approve Design DDA - ML06L/R
DDA07.01-40	Approve Design DDA - ML07L/R	35	0	29/01/13 A	25/03/13 A					Approve Design DDA - ML07L/R
DDA08.01-10	Prepare and submit Design DDA - ML08L/R (with Trunaround)	45	0	17/01/13 A	08/02/13 A					Prepare and submit Design DDA - ML08L/R (with Trunaround)
DDA08.01-20	Comment Design DDA - ML08L/R (with Trunaround)	35	0	09/02/13 A	24/05/13 A					Comment Design DDA - ML08L/R (with Trunaround)
DDA08.01-30	Resubmit Design DDA with DC Certificate - ML08L/R (with Trunaround)	21	0	25/05/13 A	31/05/13 A					Resubmit Design DDA with DC Certificate - ML08L/R (with Trunaround)
DDA09.01-10	Prepare and submit Design DDA - ML09L/R	35	0	19/12/12 A	22/04/13 A					Prepare and submit Design DDA - ML09L/R
DDA09.01-20	Comment Design DDA - ML09L/R	35	1	22/04/13 A	28/06/13					Comment Design DDA - ML09L/R
Navigation Channel										

█ Remaining Level of Effort ▬ Remaining Work
█ Actual Level of Effort ▬ Critical Remaining ...
█ Actual Work ◆ Milestone

Quarterly EMA Report Programme (Feb to May 13)

Date	Revision	Checked	Approved
090413	DWP_01 Final	Tim	

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	2013			
						Feb 10	Mar 11	Apr 12	May 13
DDA03.01-20	Comment Design DDA - ML03L/R (with Dolphin)	35	0	28/11/12 A	13/03/13 A				
DDA03.01-30	Resubmit Design DDA with DC Certificate - ML03L/R (with Dolphin)	25	0	13/03/13 A	29/04/13 A				
DDA03.01-40	Approve Design DDA - ML03L/R (with Dolphin)	35	0	20/04/13 A	24/05/13 A				
Airport Channel									
DDA10.01-10	Prepare and submit Design DDA - ML10L/R	35	0	26/01/13 A	28/03/13 A				
DDA10.01-20	Comment Design DDA - ML10L/R	35	1	28/03/13 A	28/06/13				
DDA11.01-20	Comment Design DDA - ML11L/R	35	0	04/12/12 A	05/02/13 A				
DDA11.01-30	Resubmit Design DDA with DC Certificate - ML11L/R	25	0	05/02/13 A	22/03/13 A				
DDA11.01-40	Approve Design DDA - ML11L/R	35	0	23/03/13 A	28/05/13 A				
DDA12.01-10	Prepare and submit Design DDA - ML12L/R	45	0	26/01/13 A	30/04/13 A				
DDA12.01-20	Comment Design DDA - ML12L/R	35	0	01/05/13 A	07/06/13 A				
DDA13.01-10	Prepare and submit Design DDA - ML13L/R	46	0	23/03/13 A	08/05/13 A				
DDA13.01-20	Comment Design DDA - ML13L/R	35	1	08/05/13 A	28/06/13				
DDA14.01-10	Prepare and submit Design DDA - ML14L/R	92	41	08/05/13 A	07/08/13				
Airport Island									
DDA15.01-10	Prepare and submit Design DDA - ML15L/R	45	0	28/11/12 A	12/03/13 A				
DDA16.01-10	Prepare and submit Design DDA - ML16L/R	45	0	13/04/13 A	18/06/13 A				
DDA17.01-30	Resubmit Design DDA with DC Certificate - ML17L/R	25	0	30/01/13 A	28/04/13 A				
DDA17.01-40	Approve Design DDA - ML17L/R	35	0	28/04/13 A	11/06/13 A				
DDA18.01-20	Comment Design DDA - ML18L/R	35	0	28/11/12 A	04/02/13 A				
DDA18.01-30	Resubmit Design DDA with DC Certificate - ML18L/R	25	0	05/02/13 A	22/02/13 A				
DDA18.01-40	Approve Design DDA - ML18L/R	35	0	23/02/13 A	11/04/13 A				
DDA19.01-10	Prepare and submit Design DDA - ML19L/C/R	45	0	28/11/12 A	12/03/13 A				
DDA19.01-20	Comment Design DDA - ML19L/C/R	35	0	13/03/13 A	22/05/13 A				
DDA19.01-30	Resubmit Design DDA with DC Certificate - ML19L/C/R	25	0	23/05/13 A	29/05/13 A				
Substructure									
Western Water									
DDA01.02-10	Prepare and submit Design DDA - ML01L/R	30	0	28/02/13 A	25/04/13 A				
DDA01.02-20	Comment Design DDA - ML01L/R	35	1	25/04/13 A	28/06/13				
DDA08.02-10	Prepare and submit Design DDA - ML08L/R (with trunaround)	30	0	24/05/13 A	31/05/13 A				
Navigation Channel									
DDA03.02-10	Prepare and submit Design DDA - ML03L/R (with Dolphin)	45	0	11/11/12 A	05/02/13 A				
DDA03.02-20	Comment Design DDA - ML03L/R (with Dolphin)	35	1	06/02/13 A	28/06/13				
Airport Channel									
DDA10.02-10	Prepare and submit Design DDA - ML10L/R	46	0	28/04/13 A	09/05/13 A				
DDA10.02-20	Comment Design DDA - ML10L/R	35	1	09/05/13 A	28/06/13				
DDA11.02-10	Prepare and submit Design DDA - ML11L/R	35	0	09/12/12 A	06/02/13 A				
DDA11.02-20	Comment Design DDA - ML11L/R	35	1	07/02/13 A	28/06/13				
DDA12.02-10	Prepare and submit Design DDA - ML12L/R	60	2	01/05/13 A	29/06/13				
DDA13.02-10	Prepare and submit Design DDA - ML13L/R	90	39	08/05/13 A	05/08/13				
Airport Island									
DDA17.02-10	Prepare and submit Design DDA - ML17L/R	30	1	10/05/13 A	28/06/13				
DDA18.02-10	Prepare and submit Design DDA - ML18L/R	70	0	01/03/13 A	11/06/13 A				
DDA19.02-10	Prepare and submit Design DDA - ML19L/C/R	45	0	15/03/13 A	05/04/13 A				
DDA19.02-20	Comment Design DDA - ML19L/C/R	35	1	06/04/13 A	28/06/13				
Superstructure									
Western Water									

█ Remaining Level of Effort ▬ Remaining Work
█ Actual Level of Effort ▬ Critical Remaining ...
█ Actual Work ◆ ◆ Milestone

Quarterly EMA Report Programme (Feb to May 13)

Date	Revision	Checked	Approved
090413	DWP_01 Final	Tim	

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	2013			
						Feb 10	Mar 11	Apr 12	May 13
DDA07.03-10	Prepare and submit Design DDA - ML07L/R	45	0	28/02/13 A	31/05/13 A				
Navigation Channel									
DDA03.03-10	Prepare and submit Design DDA - ML03L/R	45	1	15/05/13 A	24/07/13				
Airport Channel									
DDA10.03-10	Prepare and submit Design DDA - ML10L/R	84	33	08/05/13 A	30/07/13				
DDA11.03-10	Prepare and submit Design DDA - ML11L/R	45	3	15/04/13 A	26/07/13				
Airport Island									
DDA18.03-10	Prepare and submit Design DDA - ML18L/R	67	18	10/05/13 A	15/07/13				
DDA19.03-10	Prepare and submit Design DDA - ML19L/C/R	45	1	07/05/13 A	28/06/13				
Roadworks									
DDARW-10	Prepare and submit Design DDA - Roadworks	35	0	28/11/12 A	06/02/13 A				
DDARW-20	Comment Design DDA - Roadworks	35	0	07/02/13 A	21/05/13 A				
DDARW-30	Resubmit Design DDA with DC Certificate - Roadworks	35	0	22/05/13 A	23/05/13 A				
DDARW-40	Approve Design DDA - Roadworks	35	1	24/05/13 A	28/06/13				
TCSS and E&M									
DDAEM-10	Prepare and submit Design DDA - TCSS & E&M	90	26	25/04/13 A	23/07/13				
Geotechnical Works									
DDAGEO-10	Prepare and submit Design DDA - Geotechnical Works	80	21	30/04/13 A	18/07/13				
Landscaping									
DDALA-10	Prepare and submit Design DDA - Landscaping	90	1	23/02/13 A	28/06/13				
SHM/MMS									
DDASHM-10	Prepare and submit Design DDA - SHM/MMS	80	0	27/04/13 A	29/05/13 A				
DDASHM-20	Comment Design DDA - SHM/MMS	35	6	30/05/13 A	03/07/13				
Remaining Works									
DDAREW-10	Prepare and submit Design DDA - Remaining Works (barrier walls/ anemometers,MD's radar,VMS	60	0	23/01/13 A	22/03/13 A				
DDAREW-20	Comment Design DDA - Remaining Works (barrier walls/ anemometers,MD's radar,VMS,HKPF,FT	35	1	23/03/13 A	28/06/13				
Project General Submission									
Tree Felling/Transplantation Plan									
PGS1490	Tree Felling/Transplantation Plan Approval	60	0	06/11/12 A	07/02/13 A				
PGS1780	Tree Felling/Transplant	61	1	23/02/13 A	28/06/13				
TTA for CLK South Rd									
PGS1510	TTA Approval for CLK South Rd	105	0	12/12/12 A	24/04/13 A				
Utilities Diversion Schedule									
PGS2255	Resubmission and approval of utilities diversion schedule	21	0	15/11/12 A	24/04/13 A				
Dumping permit									
PGS1430	Tier III - Testing & Submit Formal SQR	21	0	22/09/12 A	12/03/13 A				
PGS1440	Approval of Dumping permit	30	0	12/03/13 A	03/06/13 A				
Temporary Piling Platform/Cofferdem									
PGS1650	Design approval of temporary piling platform	18	0	29/12/12 A	07/03/13 A				
PGS1655	Deliver maternal for temporary piling platform	28	0	20/11/12 A	07/03/13 A				
PGS2215	Design approval of temporary jetty	21	0	27/05/13 A	22/06/13 A				
PGS2225	Deliver maternal for temporary jetty	45	0	25/02/13 A	14/04/13 A				
Segment Casting Yard									
PGS2000	Detail design casting yard	61	0	01/10/12 A	25/02/13 A				
PGS2010	Formwork design (Typical span)	150	0	01/10/12 A	13/05/13 A				
Construct Concrete Batching Plant									

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						Feb 10	Mar 11	Apr 12	May 13
CPY1040	Install concrete batching plant	35	0	18/01/13 A	07/03/13 A	Install concrete batching plant			
CPY1050	QSPSC inspection and certification	60	0	08/03/13 A	22/05/13 A	QSP			
Office, Living Quarters, Labortary & Warehouse									
CPY1080	Building the site office & living quarters	60	0	24/01/13 A	28/02/13 A	Building the site office & living quarters			
CPY1090	Backfill for road	10	0	08/01/13 A	29/04/13 A	Backfill for road			
CPY1100	Road paving	21	0	29/04/13 A	31/05/13 A	Road paving			
Precast Area (Typical & Land Span)									
CPY1120	Piling works (include gantry rail foundation)	14	0	19/01/13 A	02/02/13 A	Piling works (include gantry rail foundation)			
CPY1130	Ground beams & cap for precast area	40	0	05/02/13 A	26/03/13 A	Ground beams & cap for precast area			
CPY1140	Ground beams and cap for gantry rail	21	0	05/02/13 A	04/03/13 A	Ground beams and cap for gantry rail			
CPY1150	Concrete paving	21	0	26/03/13 A	12/04/13 A	Concrete paving			
CPY1160	Install survey tower and rebar jigs	50	0	05/04/13 A	15/06/13 A	Install survey tower and rebar jigs			
CPY1270	Backfill storage area	14	0	09/03/13 A	20/03/13 A	Backfill storage area			
CPY1280	Piling works (include gantry rail foundation)	30	0	18/03/13 A	22/04/13 A	Piling works (include gantry r			
CPY1290	Ground beams & cap for storage area	30	0	23/04/13 A	31/05/13 A	Ground beams & cap for storage area			
CPY1300	Ground beams and cap for gantry rail (storage area)	50	0	23/04/13 A	31/05/13 A	Ground beams and cap for gantry rail (storage area)			
Pre-cast Area (Long Span)									
CPY1170	Backfill precast area	14	0	28/01/13 A	25/02/13 A	Backfill precast area			
CPY1180	Piling works (include gantry rail foundation)	14	0	05/02/13 A	25/02/13 A	Piling works (include gantry rail foundation)			
CPY1190	Ground beams & cap for precast area	35	0	27/03/13 A	13/05/13 A	Ground beams & cap for precast area			
CPY1200	Ground beams and cap for gantry rail	21	0	21/03/13 A	19/04/13 A	Ground beams and cap for gan			
CPY1210	Concrete paving	21	0	02/05/13 A	23/05/13 A	Concrete paving			
CPY1220	Install survey tower and rebar jigs	35	0	13/05/13 A	31/05/13 A	Install survey tower and rebar jigs			
CPY1230	Backfill storage area	14	0	16/02/13 A	04/03/13 A	Backfill storage area			
CPY1240	Piling works (include gantry rail foundation)	30	0	26/02/13 A	03/04/13 A	Piling works (include gantry rail foundation)			
CPY1250	Ground beams & cap for storage area	21	0	03/04/13 A	31/05/13 A	Ground beams & cap for storage area			
CPY1260	Ground beams and cap for gantry rail (storage area)	50	0	02/05/13 A	31/05/13 A	Ground beams and cap for gantry rail (storage area)			
Construct Gantry Cranes									
CPY1310	Install gantry rail (typical & land span area)	110	0	05/03/13 A	31/05/13 A	Install gantry rail (typical & land span area)			
CPY1320	Piling works (include gantry rail foundation)	90	0	02/04/13 A	31/05/13 A	Piling works (include gantry rail foundation)			
CPY1330	Gantries installation	80	0	05/05/13 A	31/05/13 A	Gantries installation			
Construct Jetty									
CPY1340	Safety assessment & design of jetty	107	0	29/08/12 A	28/05/13 A	Safety assessment & design of jetty			
CPY1350	Channel dredging	24	0	18/02/13 A	30/03/13 A	Channel dredging			
CPY1360	Construct the jetty	80	0	18/02/13 A	27/06/13 A	Construct the jetty			
CPY1365	Construct the material jetty	40	0	12/03/13 A	18/05/13 A	Construct the material jetty			
CPY1370	E&M works and obtain the certificate	21	0	27/05/13 A	22/06/13 A	E&M works and obtain the certificate			
Segment Moulds									
PGS2285	Fabrication & 2nd Deliver segment mould (Typical span)	120	1	01/03/13 A	28/06/13	Fabrication & 2nd Deliver segment mould (Typical span)			
PGS2325	Fabrication & 2nd Deliver segment mould (Long span)	201	142	30/03/13 A	16/11/13	Fabrication & 2nd Deliver segment mould (Long span)			
Major Method Statement									
PGS2120	Approve MS for Bored Pile (Kelly method)	21	0	12/12/12 A	25/03/13 A	Approve MS for Bored Pile (Kelly method)			
PGS2160	Approve MS for Bored Pile (RCD method)	60	0	09/01/13 A	06/03/13 A	Approve MS for Bored Pile (RCD method)			
Procurement and Fabrication									
PGS2183	Deliver bored pile rigs (Land RCD)	68	0	01/05/13 A	27/05/13 A	Deliver bored pile rigs (Land RCD)			
PGS2186	Deliver LG1 & LG2	120	88	29/04/13 A	01/10/13	Deliver LG1 & LG2			

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						Feb 10	Mar 11	Apr 12	May 13
Site Establishment Works									
PGS2475	Erection hoarding	120	0	14/09/12 A	30/03/13 A	Erection hoarding			
Viaduct between HKSAR Boundary and Landing Point on Airport Island									
ML01L/R 75mx8 - Stage 1 of Works									
Pier P0L/R									
Temporary Works									
WW1000	Install temporary working platform for bored pile P0 (Learning)	24	0	14/02/13 A	02/05/13 A	Install temporary wo			
Site Investigation									
WW1010	Site investigation for bored pile P0	10	0	02/04/13 A	23/04/13 A	Site investigation for bored			
Foundation - Bored Pile									
WW1029	Construct bored piles P0 - 6 nos. 1st Phase (Learning)	13	0	15/04/13 A	30/04/13 A	Construct bored piles			
ML02L/R 75mx8 - Stage 4 of Works									
Pier P14L/R									
Site Investigation									
WW2130	Site investigation for bored pile P14	24	0	12/03/13 A	22/04/13 A	Site investigation for bored p			
ML03L/R 109.661m+150mx3+109.661m Navigation Channel - Stage 4 of Works									
Pier P17L/R									
Site Investigation									
NC1130	Site investigation for bored pile P17 (Bridge)	20	20	28/03/13 A	20/01/14				
Pier P18L/R									
Site Investigation									
NC1250	Site investigation for bored pile P18 (Bridge)	20	20	22/03/13 A	27/12/13				
Pier P19L/R									
Temporary Works									
NC1360	Install temporary working platform for bored pile P19	30	30	21/04/13 A	28/10/13				
Site Investigation									
NC1370	Site investigation for bored pile P19 (Bridge)	20	20	12/03/13 A	20/11/13				
Pier P20L/R									
Temporary Works									
NC1480	Install temporary working platform for bored pile P20 (Learning)	45	2	30/04/13 A	12/08/13				
Site Investigation									
NC1490	Site investigation for bored pile P20 (Bridge)	20	20	01/02/13 A	25/07/13				
NC1500	Site investigation for bored pile P20 (Dolphin)	10	10	18/04/13 A	08/08/13				
ML06L/R 74.5mx8 - Stage 4 of Works									
Pier 43L/R									
Site Investigation									
WW6690	Site investigation for bored pile P43	9	0	06/05/13 A	08/07/13 A				
Pier 44L/R									
Site Investigation									
WW6770	Site investigation for bored pile P44	9	9	15/05/13 A	23/07/13				
ML07L/R 73.396mx8 - Stage 4 of Works									
Pier P45L/R (M.J.)									
Site Investigation									
WW6850	Site investigation for bored pile P45	9	9	03/05/13 A	10/07/13				
Pier P46L/R									
Site Investigation									

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						Feb 10	Mar 11	Apr 12	May 13
WW6930	Site investigation for bored pile P46	9	0	22/04/13 A	28/05/13 A				
Pier P47L/R									
Temporary Works									
WW7000	Install temporary working platform for bored pile P47	12	6	29/04/13 A	06/07/13				
Site Investigation									
WW7010	Site investigation for bored pile P47	10	0	18/01/13 A	20/03/13 A				
Pier P48L/R									
Temporary Works									
WW7080	Install temporary working platform for bored pile P48	25	0	28/01/13 A	28/02/13 A				
Site Investigation									
WW7090	Site investigation for bored pile P48	10	0	05/03/13 A	21/03/13 A				
Foundation - Bored Pile									
WW7110	Construct bored piles P48 - 4 nos. 1st Phase (Learning)	30	30	21/03/13 A	12/08/13				
Pier P49L/R									
Temporary Works									
WW7160	Install temporary working platform for bored pile P49 (Learning)	24	0	21/02/13 A	21/04/13 A				
Pier P50L/R									
Site Investigation									
WW7250	Site investigation for bored pile P50 (Learning)	12	0	19/01/13 A	09/02/13 A				
Foundation - Bored Pile									
WW7269	Construct bored piles P50 - 8 nos. 1st Phase (Learning)	18	0	09/04/13 A	30/04/13 A				
Pier P51L/R									
Site Investigation									
WW7320	Site investigation for bored pile P51	49	0	22/01/13 A	22/03/13 A				
Pier P52L/R									
Foundation - Bored Pile									
WW7409	Construct bored piles P52- 8 nos. 1st Phase (Learning)	30	0	20/03/13 A	30/04/13 A				
ML08L/R 70mx6 - Stage 4 of Works									
Pier P53L/R (M.J.)									
Site Investigation									
WW7460	Site investigation for bored pile P53	40	0	23/02/13 A	28/06/13 A				
Pier P54L/R									
Site Investigation									
WW7540	Site investigation for bored pile P54	40	0	23/02/13 A	29/04/13 A				
Pier P55L/R									
Site Investigation									
WW7620	Site investigation for bored pile P55	8	0	09/05/13 A	20/05/13 A				
Pier P56L/R									
Site Investigation									
WW7700	Site investigation for bored pile P56	30	30	18/03/13 A	08/08/13				
Pier P57L/R									
Site Investigation									
WW7780	Site investigation for bored pile P57	24	0	20/03/13 A	16/05/13 A				
Pier P58L/R									
Site Investigation									
WW7860	Site investigation for bored pile P58	24	0	02/04/13 A	06/05/13 A				

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						Feb 10	Mar 11	Apr 12	May 13	
ML09L/R 73.396Mx8 - Stage 4 of Works										
Pier P59L/R (M.J.)										
Site Investigation										
WW7940	Site investigation for bored pile P59	24	12	02/04/13 A	15/07/13					
ML11L/R 109m+165mx2+109m - Stage 4 of Works										
Pier P70L/R (M.J.)										
Site Investigation										
AC1160	Site investigation for bored pile P70	15	0	08/01/13 A	02/04/13 A					
Foundation - Bored Pile										
AC1190	Construct bored piles P70 - 6 nos.	30	30	29/05/13 A	08/08/13					
Pier P71L/R										
Site Investigation										
AC1260	Site investigation for bored pile P71	30	0	22/01/13 A	10/05/13 A					
Foundation - Bored Pile										
AC1270	Construct bored piles P71 - 12 nos.	70	28	02/05/13 A	06/08/13					
Pier P72L/R										
Temporary Works										
AC1312	Install temporary working platform for bored pile P72	30	0	23/02/13 A	23/05/13 A					
Site Investigation										
AC1350	Site investigation for bored pile P72	10	0	01/03/13 A	15/04/13 A					
Foundation - Bored Pile										
AC1360	Construct bored piles P72 - 12 nos.	51	15	02/05/13 A	02/09/13					
Pier P73L/R										
Site Investigation										
AC1440	Site investigation for bored pile P73	30	0	23/02/13 A	27/04/13 A					
Foundation - Bored Pile										
AC1450	Construct bored piles P73 - 12 nos.	64	40	02/05/13 A	24/08/13					
ML12L/R 109m+165mx2+109m - Stage 4 of Works										
Pier P74L/R (M.J.)										
Temporary Works										
AC1491	Install temporary working platform for bored pile P74	12	0	13/03/13 A	28/05/13 A					
Site Investigation										
AC1530	Site investigation for bored pile P74	15	0	23/02/13 A	26/04/13 A					
Foundation - Bored Pile										
AC1540	Construct bored piles P74 - 6 nos.	28	10	02/05/13 A	11/07/13					
Pier P75L/R										
Site Investigation										
AC1620	Site investigation for bored pile P75	30	0	21/01/13 A	28/05/13 A					
Pier P76L/R										
Site Investigation										
AC1700	Site investigation for bored pile P76	30	0	29/04/13 A	07/06/13 A					
Pier P77L/R										
Site Investigation										
AC1780	Site investigation for bored pile P77	30	10	29/05/13 A	11/07/13					
ML13L/R 115m+180m+115m - Stage 4 of Works										
Pier P78L/R (M.J.)										

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						Feb 10	Mar 11	Apr 12	May 13	
Site Investigation										
AC1860	Site investigation for bored pile P78	15	0	11/05/13 A	18/06/13 A					
Viaduct between Landing Point on Airport Island and Scenic Hill										
ML15L/R 43m+65mx6+37m - Stage 5 of Works										
Pier P85L/R										
Site Investigation										
AI1100	Site investigation for bored pile P85	10	10	08/05/13 A	23/09/13					
Pier P86L/R										
Site Investigation										
AI1170	Site investigation for bored pile P86	10	10	15/05/13 A	03/09/13					
Pier P87L/R										
Site Investigation										
AI1240	Site investigation for bored pile P87	10	0	13/04/13 A	26/04/13 A					
Pier P88L/R										
Site Investigation										
AI1310	Site investigation for bored pile P88	10	0	08/04/13 A	07/05/13 A					
Pier P89L/R										
Site Investigation										
AI1380	Site investigation for bored pile P89	10	0	06/04/13 A	08/05/13 A					
ML16L/R 37m+65mx5+43m - Stage 5 of Works										
Pier P92L/R (M.J.)										
Site Investigation										
AI1590	Site investigation for bored pile P92	10	0	05/04/13 A	29/05/13 A					
Pier P93L/R										
Site Investigation										
AI1660	Site investigation for bored pile P93	10	10	02/04/13 A	24/08/13					
Pier P94L/R										
Site Investigation										
AI1730	Site investigation for bored pile P94	10	10	23/03/13 A	10/08/13					
Pier P95L/R										
Site Investigation										
AI1800	Site investigation for bored pile P95	10	10	02/04/13 A	25/07/13					
Pier P96L/R										
Site Investigation										
AI1870	Site investigation for bored pile P96	10	10	11/03/13 A	27/07/13					
Pier P97L/R										
Site Investigation										
AI1940	Site investigation for bored pile P97	10	0	27/11/12 A	16/05/13 A					
Pier P98L/R										
Site Investigation										
AI2010	Site investigation for bored pile P98	10	10	28/02/13 A	11/07/13					
ML17L/R 43m+65mx3+47m - Stage 5 of Works										
Pier P99L/R (M.J.)										
Site Investigation										
AI2080	Site investigation for bored pile P99	10	10	22/02/13 A	13/07/13					
Pier P100L/R										

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						Feb 10	Mar 11	Apr 12	May 13		
Site Investigation											
AI2150	Site investigation for bored pile P100	10	10	20/02/13 A	11/07/13						
Pier P101L/R											
Site Investigation											
AI2220	Site investigation for bored pile P101	10	0	04/02/13 A	15/04/13 A						
Pier P102L/R											
Site Investigation											
AI2290	Site investigation for bored pile P102	10	0	02/11/12 A	15/04/13 A						
Pier P103L/R											
Site Investigation											
AI2360	Site investigation for bored pile P103	10	0	07/02/13 A	13/04/13 A						
ML18L/R 47m+55mx5+35m - Stage 5 of Works											
Pier P104L/R (M.J.)											
Site Investigation											
AI2430	Site investigation for bored pile P104	10	0	16/03/13 A	20/05/13 A						
Pier P105L/R											
Site Investigation											
AI2500	Site investigation for bored pile P105	10	0	16/05/13 A	06/06/13 A						
Pier P106L/R											
Site Investigation											
AI2580	Site investigation for bored pile P106R	10	0	23/04/13 A	10/05/13 A						
Pier P107L/R											
Site Investigation											
AI2640	Site investigation for bored pile P107R	10	0	24/04/13 A	06/05/13 A						
Land Viaduct P108 to P114											
ML18L/R 47m+55mx5+35m - Stage 5 of Works											
Pier P108L/R											
Utilities Diversion											
AI3540	Temporary slew Tel cable for P108 & P109	45	1	18/02/13 A	28/06/13						
AI3550	Temporary slew 11kv cable for P108 & P109	45	0	18/02/13 A	10/04/13 A						
Site Investigation											
AI2700	Site investigation for bored pile P108L	10	0	10/04/13 A	06/05/13 A						
Pier P109L/R											
Utilities Diversion											
AI3560	Diversion 132kv cable for P108, P109 & P113	112	0	18/02/13 A	28/03/13 A						
Site Investigation											
AI2770	Site investigation for bored pile P109	10	0	11/04/13 A	13/06/13 A						
Pier P110L/R											
Site Investigation											
AI2820	Site investigation for bored pile P110	10	0	14/01/13 A	18/03/13 A						
Foundation - Bored Pile											
AI2830	Construct bored piles P110 - 2 nos.	19	19	06/05/13 A	24/07/13						
ML19L/C/R 40m+65mx2 Stage 5 of Works											
Pier P111L/C/R											
Site Investigation											
AI2880	Site investigation for bored pile P111	30	0	08/01/13 A	06/03/13 A						

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						Feb	Mar	Apr	May	
						10	11	12	13	
Pier P112L/C/R										
Site Investigation										
AI2940	Site investigation for bored pile P112	20	0	03/01/13 A	22/03/13 A	Site investigation for bored pile P112				
Pier P113 L/C/R										
Site Investigation										
AI3000	Site investigation for bored pile P113	8	8	27/05/13 A	06/08/13					
Utilities Diversion										
AI3570	Temporary slew Tel cable for P113	30	16	18/02/13 A	17/07/13	Temporary slew Tel cable for P113				
AI3580	Temporary slew 11kv cable for P113	150	0	18/02/13 A	02/05/13 A	Temporary slew 11kv cable for P113				
Milestones schedule										
Design and Design Checking of the Works										
CC2-1090	Final Durability Assessment Report	0	0		27/05/13 A					◆ F
Marine Viaduct at chainage 4+260.000 to 11+800.000 approximate										
CC33-1010	Acceptance of final report for site investigation for DASO	0	0		28/02/13 A					◆ Acceptance of final report for site investigation for DASO
Land Viaduct										
CC42-1000	Piles	368	371	06/05/13 A	03/07/14					

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Bored Piling Activities in March 2013

Date	Location	Bored Piling Activities
18-Mar-13	P48	Commencement of inserting permanent casing for bored pile no. P48-R3
19-Mar-13	P48	Installation of permanent casing for bored pile no. P48-R3
20-Mar-13	P48	Installation of permanent casing for bored pile no. P48-R2 & P48-L2
	P52	Commencement of installing permanent casing of bored pile no. P52-R3
21-Mar-13	P48	Installation of permanent casing for bored pile no. P48-L1, P48-R1 & P48-L3
	P52	Installation of permanent casing for bored pile no. P52-R3
22-Mar-13	P48	Installation of permanent casing for bored pile in progress, extend casing to P48-L2 & P48-R1
	P52	Installation of permanent casing for bored pile no. P52-R4
23-Mar-13	P48	Installation of permanent casing for bored pile no. P48-R1, P48-L1 & P48-L3
	P52	Installation of permanent casing for bored pile no. P52-R2 & P52-R4
25-Mar-13	P48	Installation of permanent casing for bored pile no. P48-R1, P48-R2, P48-R3, P48-L1 P48-L2 & P48-L3
	P52	Installation of permanent casing for bored pile no. P52-R1
27-Mar-13	P52	Installation of permanent casing for bored pile no. P52-R1 & P52-L2
28-Mar-13	P52	Installation of permanent casing for bored pile no. P52-L1
29-Mar-13	P48	Adjust permanent casing for bored pile no. P48-L2 & P48-R1
	P52	Installation of permanent casing for bored pile no. P52-L1, P52-L2, P52-L3 & P52-L4

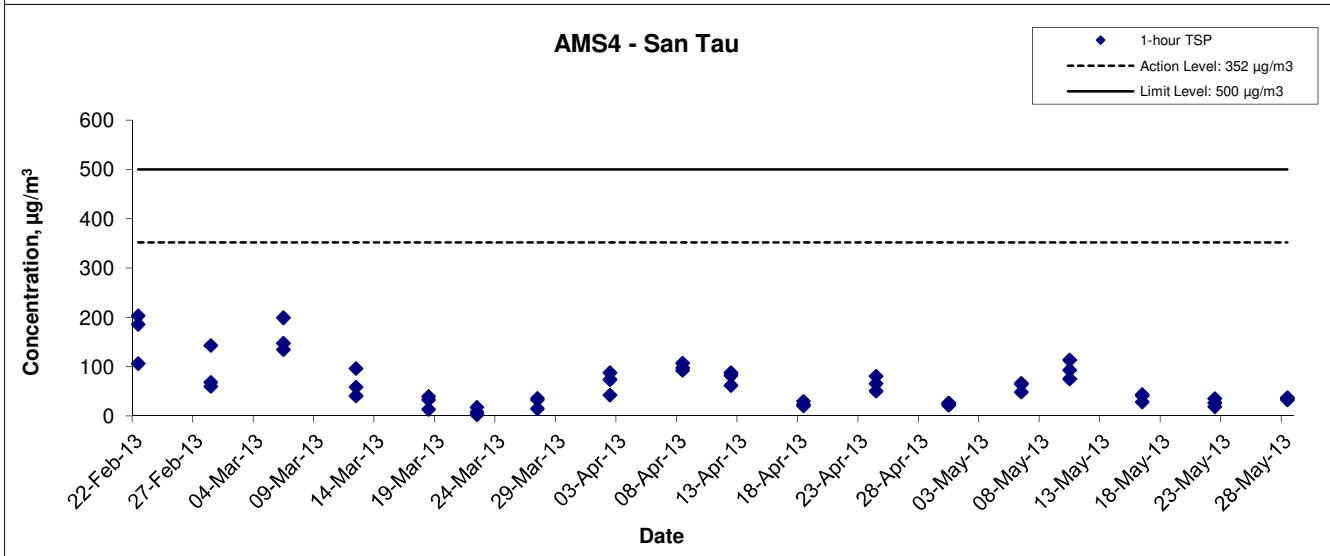
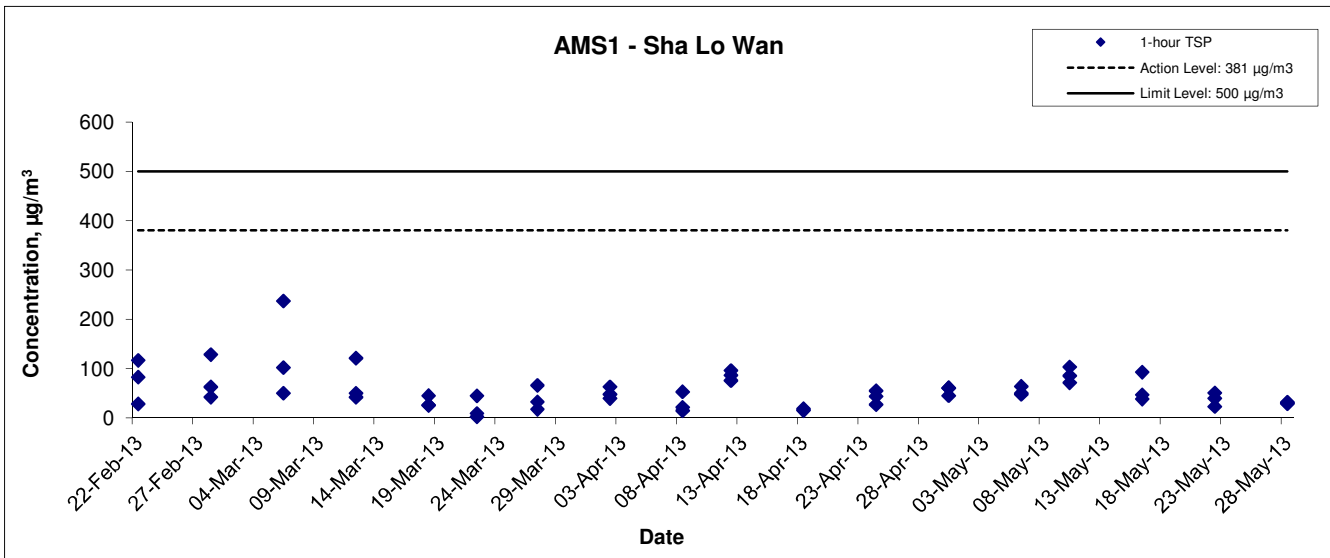
Bored Piling Activities in April 2013

Date	Location	Bored Piling Activities
1-Apr-13	Pier 52	Installation of permanent casing for bored pile no. P52-L3 & P52-L4.
2-Apr-13	Pier 52	Installation of permanent casing for bored pile.
3-Apr-13	Pier 48	Set up for bored pile excavation at P48-L1.
	Pier 52	Excavation for bored pile no. P52-R1, P52-R2, P52-R3, P52-R4, P52-L1, P52-L2, P52-L3 & P52-L4.
4-Apr-13	Pier 48	Set up for bored pile excavation at P48-L1.
	Pier 52	Excavation for bored pile no. P52-R2 and P52-R3 in progress.
5-Apr-13	Pier 48	Set up for bored pile excavation at P48-L1.
	Pier 52	Excavation for bored pile no. P52-R2 and P52-R3 in progress.
6-Apr-13	Pier 48	Set up for bored pile excavation at P48-L1.
	Pier 52	Excavation for bored pile no. P52-R2 and P52-R3 in progress.
7-Apr-13	Pier 52	Excavation for bored pile no. P52-R2 and P52-R3 in progress.
8-Apr-13	Pier 48	Set up for bored pile excavation at P48-L1.
	Pier 52	Excavation for bored pile in progress.
9-Apr-13	Pier 48	Set up for bored pile excavation at P48-L1.
	Pier 52	Excavation for bored pile in progress.
10-Apr-13	Pier 48	Commencement of bored pile excavation at P48-L1.
	Pier 52	Excavation at P52-R2.
11-Apr-13	Pier 48	Bored pile excavation at P48-L1 in progress.
12-Apr-13	Pier 48	Bored pile excavation at P48-L1 in progress.
13-Apr-13	Pier 48	Bored pile excavation at P48-L1 in progress.
	Pier 52	Set up RCD for bored pile excavation at P52-R4.
15-Apr-13	Pier 48	Bored pile excavation at P48-L1 completed & excavation at P48-R1 commenced.
	Pier 50	Preparation work for install RCD to permanent casing of bored pile.
	Pier 52	Commenced drilling for bored pile no. P52-R4 by RCD.
16-Apr-13	Pier 48	Bored pile excavation at P48-R1 in progress.
	Pier 50	Preparation work for install RCD to permanent casing of bored pile.
	Pier 52	Drilling for bored pile no. P52-R4 by RCD. Excavation for bored pile no. P52-L3 & L4 by grab.
night	Pier 52	Drilling for bored pile no. P52-R4 by RCD. Shifting of RCD from bored pile P52-R4 to P52-R3.
17-Apr-13	Pier 48	Bored pile excavation at P48-R1 in progress.
	Pier 50	Commenced excavation for bored pile no. P50-L4 by grab.
	Pier 52	Drilling for bored pile no. P52-R3 by RCD.
night	Pier 52	Drilling for bored pile no. P52-R3 by RCD.
18-Apr-13	Pier 48	Bored pile excavation at P48-R1 in progress.
	Pier 50	Excavation for bored pile P50-L2 by grab.
night	Pier 50	Drilling for bored pile no. P50-L2 by RCD.
	Pier 52	Drilling for bored pile no. P52-R3 by RCD.
night	Pier 52	Drilling for bored pile no. P52-R1 & R3 by RCD. 2 nos. of RCDs delivery on site.
19-Apr-13	Pier 48	Bored pile excavation at P48-R1 in progress.
	Pier 50	Drilling for bored pile P50-L2 by RCD.
night	Pier 50	Drilling for bored pile no. P50-L2 by RCD. Excavation for bored pile at P50-L3 by grab.
	Pier 52	Drilling for bored pile no. P52-R3 by RCD finish.
night	Pier 52	Preparation work for installation of RCD to P52-L4.
20-Apr-13	Pier 50	Drilling for bored pile P50-L2 by RCD. Excavation for bored pile P50-L4 by grab.
night	Pier 50	Drilling for bored pile P50-L3 by RCD. Excavation for bored pile P50-L1 by grab.
	Pier 52	Shifting of RCD from bored pile P52-R3 to P52-R1. Drilling for bored pile no. P52-R1 & L4 by RCD.
night	Pier 52	Drilling for bored pile no. P52-R1 & L4 by RCD.
21-Apr-13	Pier 50	Excavation for bored pile P50-L2 by RCD.
	Pier 52	Drilling for bored pile P52-R4 & P52-L4 by RCD.
22-Apr-13	Pier 50	Drilling for bored pile P50-L4 by RCD. Shifting RCD from bored pile P50-L4 to P50-L2.
night	Pier 50	Drilling for bored pile P50-L4 by RCD.
	Pier 52	Drilling for bored pile P52-R1 & P52-L4 by RCD.
night	Pier 52	Drilling for bored pile P52-R1 & P52-L4 by RCD.
23-Apr-13	Pier 48	Installation of rebar cage for bored pile no. P48-L1.
night	Pier 50	Drilling for bored pile P50-L2 by RCD.
	Pier 52	Drilling for bored pile P52-R1 & P52-L4 by RCD.

night	Pier 52	Drilling for bored pile P52-R1 by RCD finish. Air-lifting & install cage for P52-R3.
24-Apr-13	Pier 0	Installation permanent casings for bored pile P0-R2.
	Pier 48	Concreting for bored pile P48-L1.
	Pier 50	Drilling for bored pile P50-L2 by RCD.
night	Pier 50	Drilling for bored pile P50-L2 by RCD.
	Pier 52	Drilling for bored pile P52-L4 by RCD. Install steel cage for P52-R3.
night	Pier 52	Install steel cage for P52-R3.
25-Apr-13	Pier 0	Installation permanent casings for bored pile P0-R3, P0-L1 & P0-L2.
	Pier 48	Air-lifting for bored pile P48-R1.
night	Pier 48	Installation of bottom cage for P48-R1.
	Pier 50	Drilling for bored pile P50-L2 by RCD.
night	Pier 50	Drilling for bored pile P50-L2 by RCD finish.
	Pier 52	Concreting for bored pile P52-R3.
night	Pier 52	Drilling for bored pile P52-L4.
26-Apr-13	Pier 48	Installation of rebar cage (2nd & top) for P48-R1.
night	Pier 48	Installation of rebar cage for P48-R1. Preparation works for concreting of P48-R1.
	Pier 50	Drilling for bored pile P50-L4 by RCD.
night	Pier 50	Air-lifting for bored pile P50-L2.
	Pier 52	Install steel cage for P52-R3.
night	Pier 52	Install steel cage for P52-R1. Drilling for bored pile P52-L2.
27-Apr-13	Pier 48	Salvage rebar cage at P48-R1.
night	Pier 48	Salvage rebar cage at P48-R1.
	Pier 50	Install steel cage for bored pile P50-L2.
night	Pier 50	Drilling for bored pile P50-L4 by RCD.
	Pier 52	Drilling for bored pile P52-L2 by RCD.
night	Pier 52	Splicing permanent casing bored pile P52-L4.
28-Apr-13	Pier 0	Excavation of bored pile P0-L1.
	Pier 50	Drilling for bored pile P50-L4 by RCD finish. Install steel cage for bored pile P50-L2.
night	Pier 50	Install steel cage for bored pile P50-L2.
	Pier 52	Drilling for bored pile P52-L2 by RCD. Install steel cage for bored pile P52-R1.
night	Pier 52	Splicing permanent casing bored pile P52-L2.
29-Apr-13	Pier 0	Excavation of bored pile P0-L1.
	Pier 48	Salvage rebar cage at P48-R1.
night	Pier 48	Air-lifting for bored pile P48-R1.
	Pier 50	Install steel cage for bored pile P50-L2.
night	Pier 50	Set up for final air-lifting for bored pile P50-L2.
	Pier 52	Drilling for bored pile P52-L4 by RCD. Concreting to bored pile P52-R1.
night	Pier 52	Drilling for bored pile P52-L4 by RCD.
30-Apr-13	Pier 0	Excavation of bored pile P0-L1.
	Pier 48	Air-lifting for bored pile P48-R1.
night	Pier 48	Install steel cage for bored pile P48-R1.
	Pier 50	Concreting for bored pile P50-L2.
night	Pier 50	Air-lifting for bored pile P50-L4.
	Pier 52	Drilling for bored pile P52-L2 by RCD finish. Drilling for bored pile P52-R4 by RCD.
night	Pier 52	Drilling for bored pile P52-R4 by RCD.

**APPENDIX B
GRAPHICAL PRESENTATION OF 1-
HOUR TSP MONITORING RESULTS**

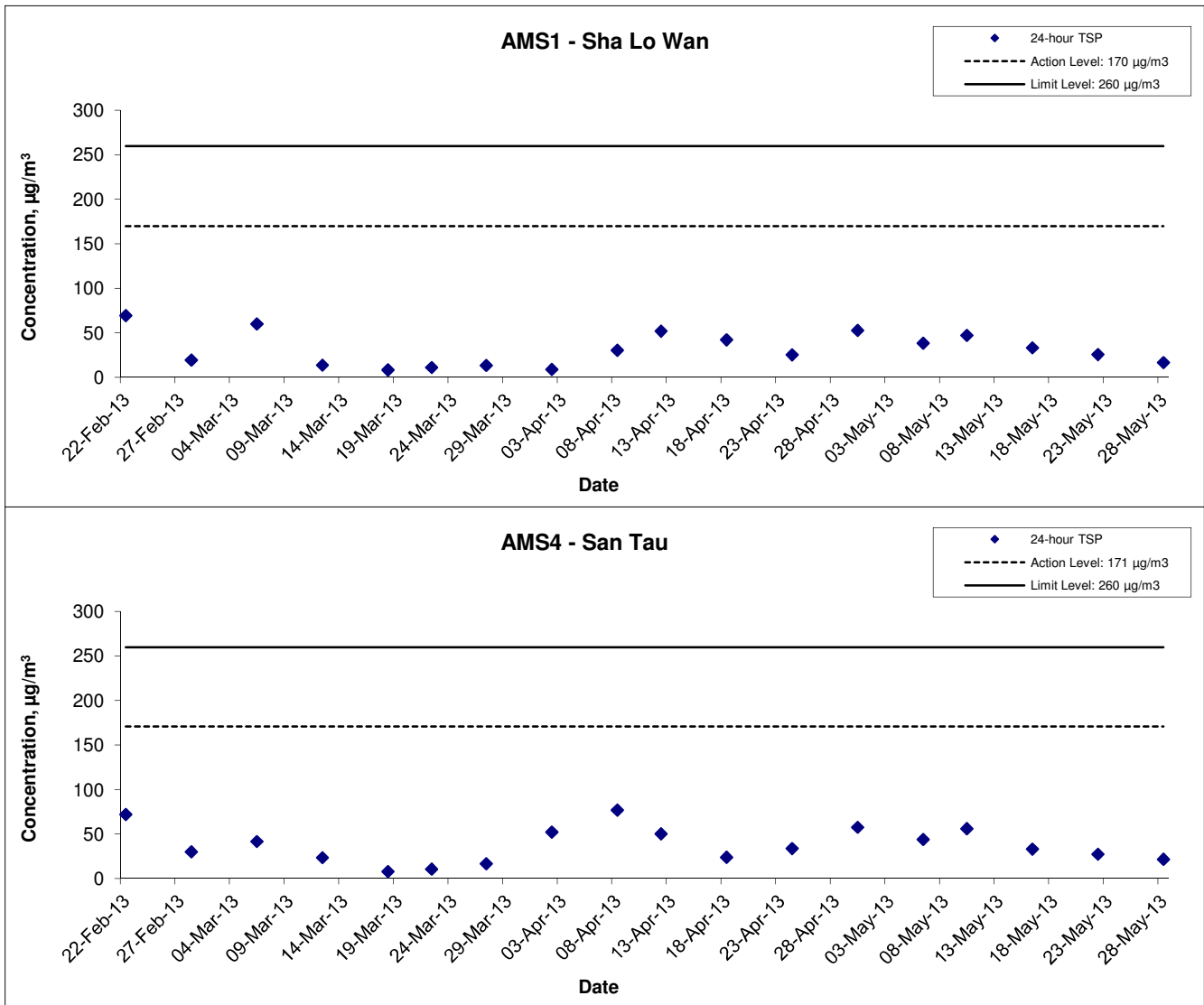
1-hour TSP Concentration Levels



Title Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Graphical Presentation of 1-hour TSP Monitoring Results	Scale	N.T.S	Project No.	MA12014	CINOTECH
	Date	May 13	Appendix	B	

**APPENDIX C
GRAPHICAL PRESENTATION OF 24-
HOUR TSP MONITORING RESULTS**

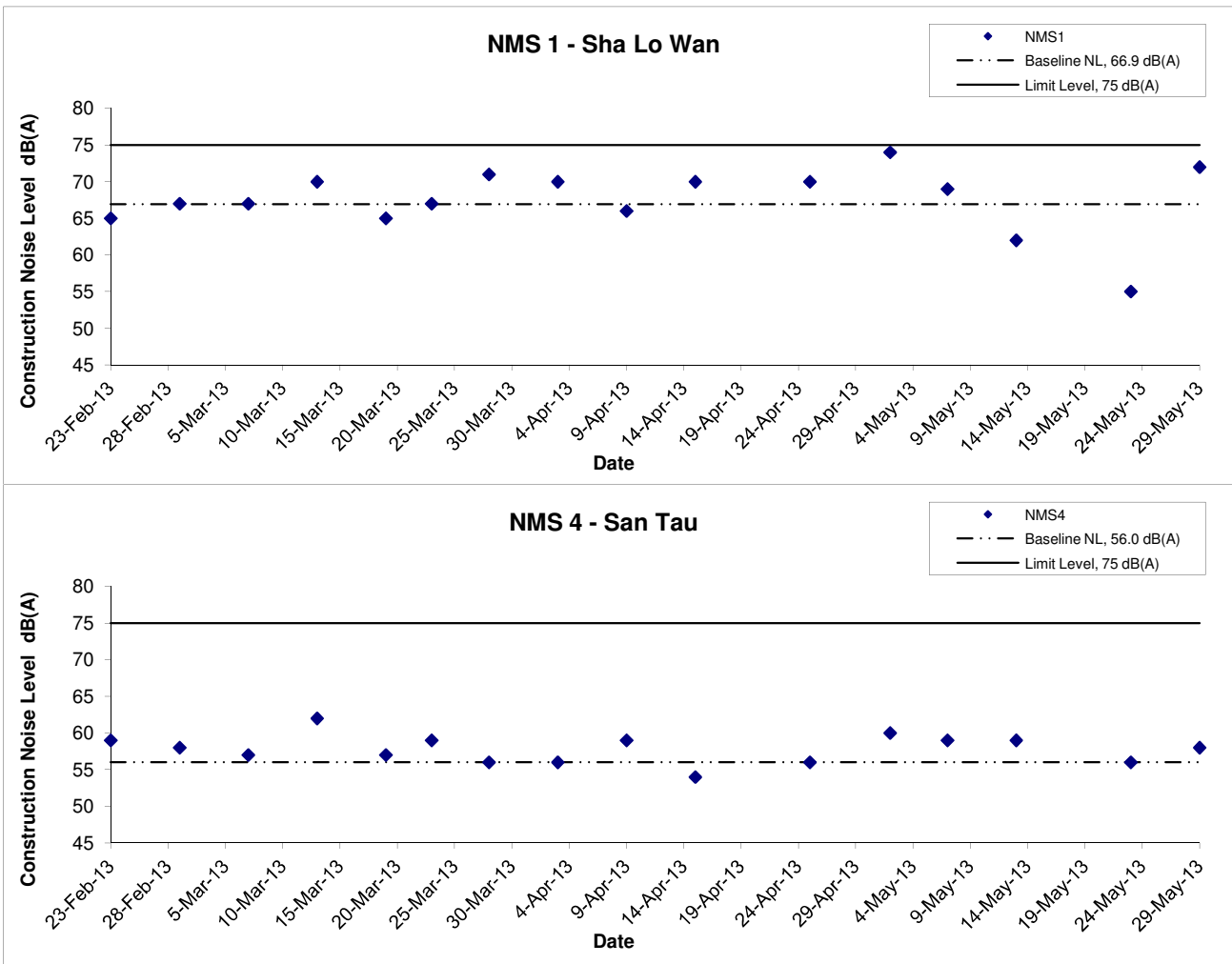
24-hour TSP Concentration Levels



Title Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Graphical Presentation of 24-hour TSP Monitoring Results	Scale N.T.S	Project No. MA12014	CINOTECH
	Date May 13	Appendix C	

**APPENDIX D
GRAPHICAL PRESENTATION OF
NOISE MONITORING RESULTS**

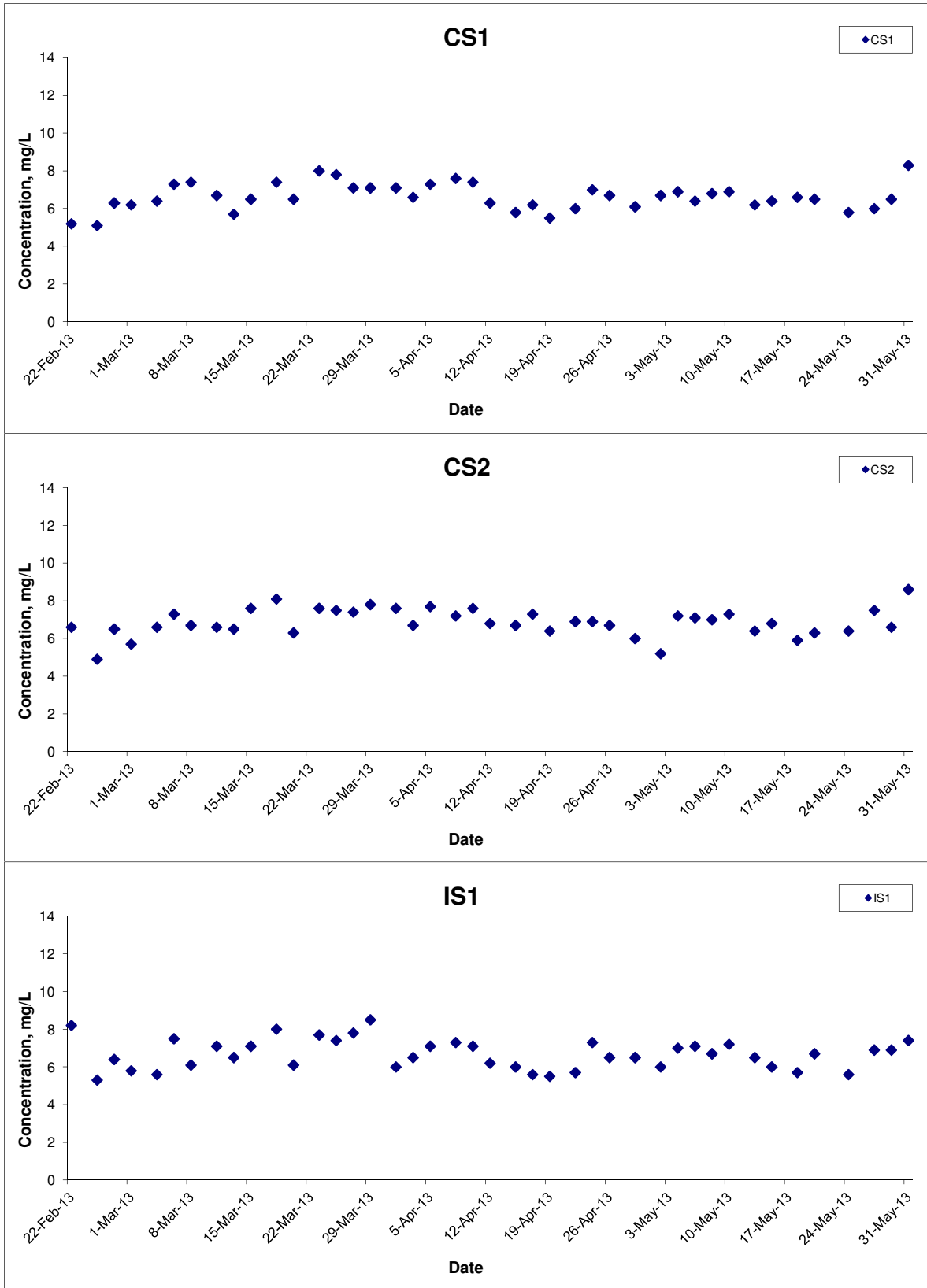
Noise Levels



Title Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Construction Noise Monitoring Results	Scale	N.T.S	Project No.	MA12014	CINOTECH
	Date	May 13	Appendix	D	

**APPENDIX E
GRAPHICAL PRESENTATION OF
WATER QUALITY MONITORING
RESULTS**

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



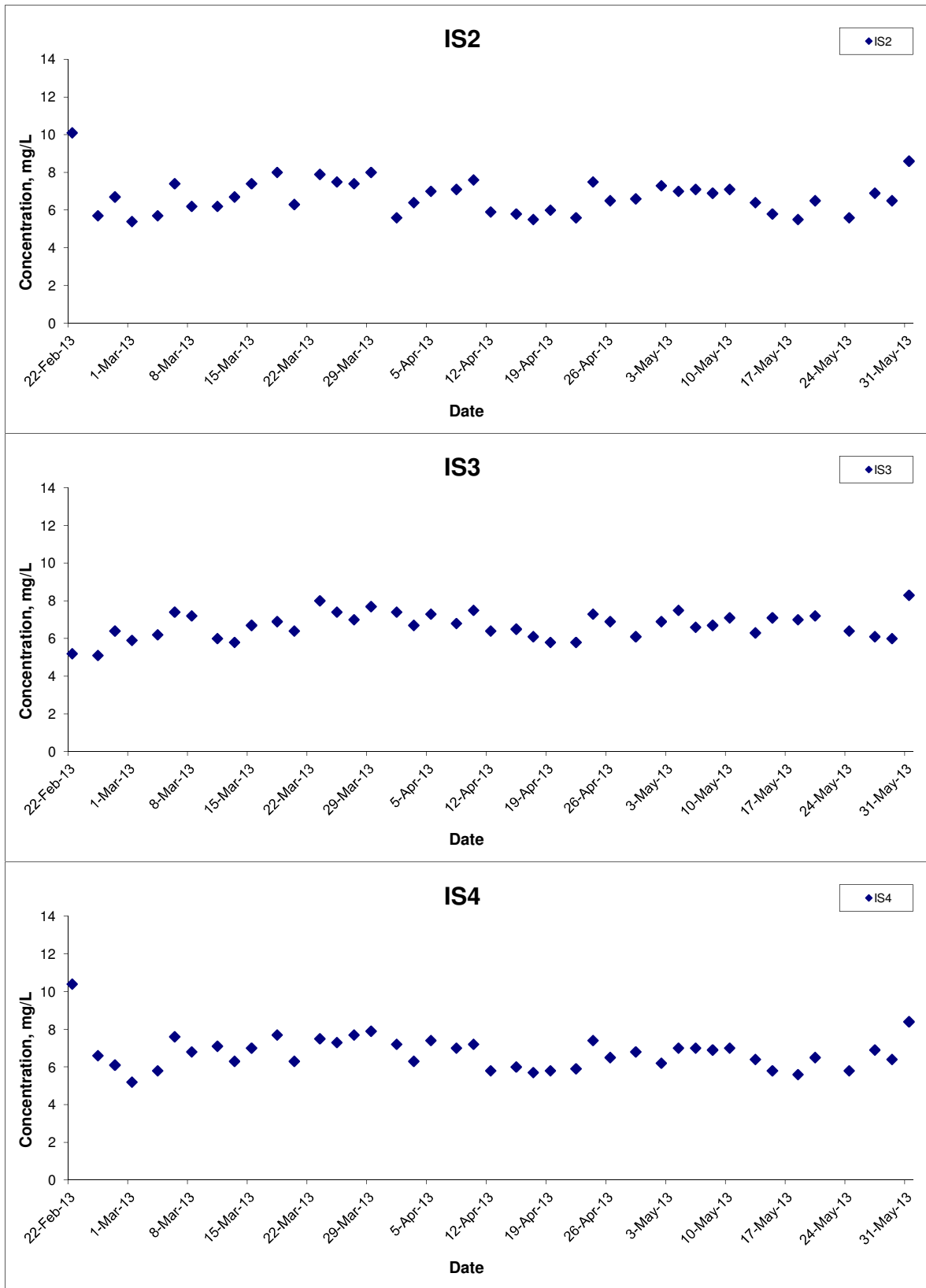
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

Scale N.T.S
 Date May 13

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 Appendix E



Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



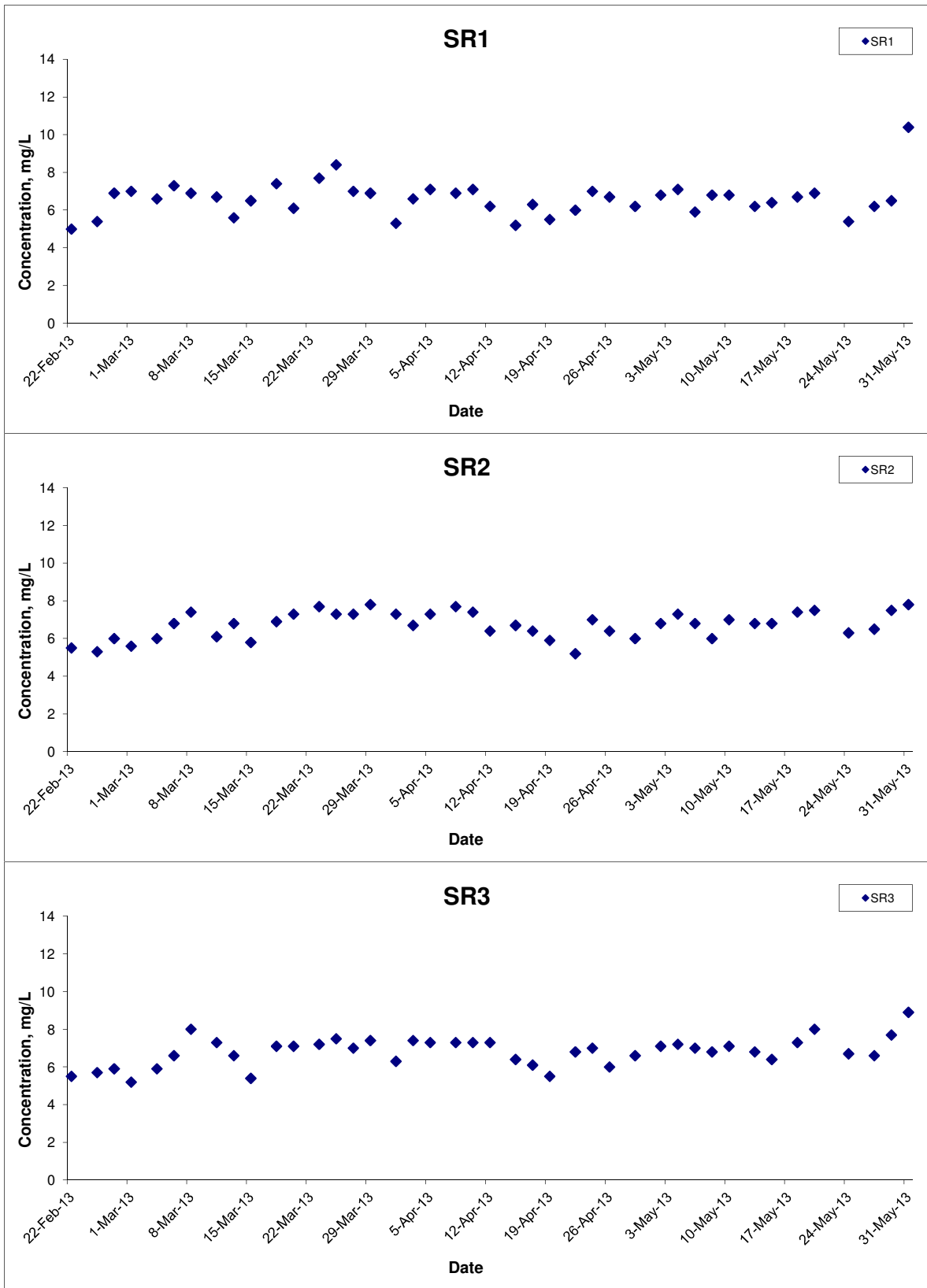
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 Hong Kong Link Road-Section between
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 Date May 13

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 Appendix E



Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



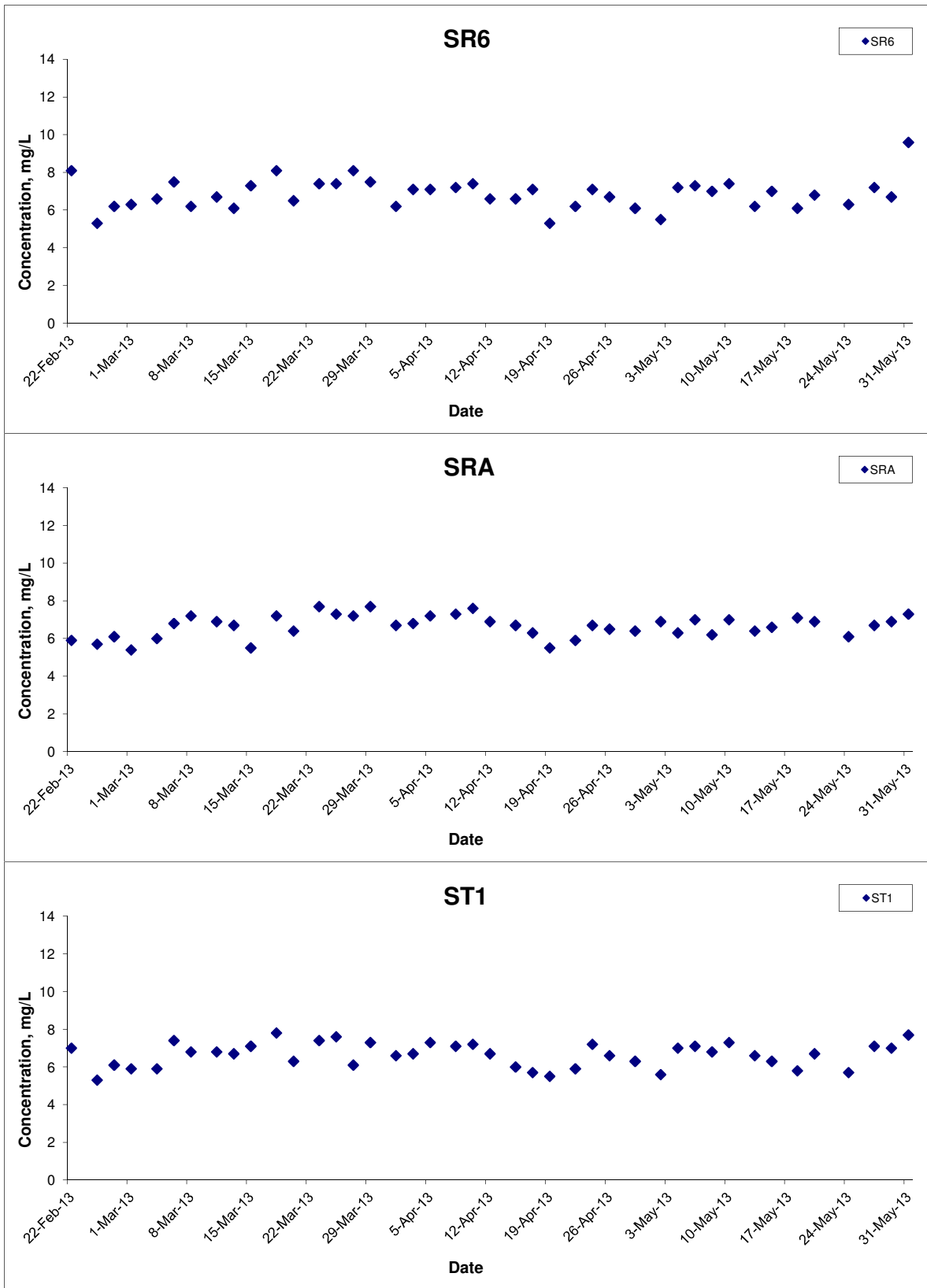
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 Hong Kong Link Road-Section between
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Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



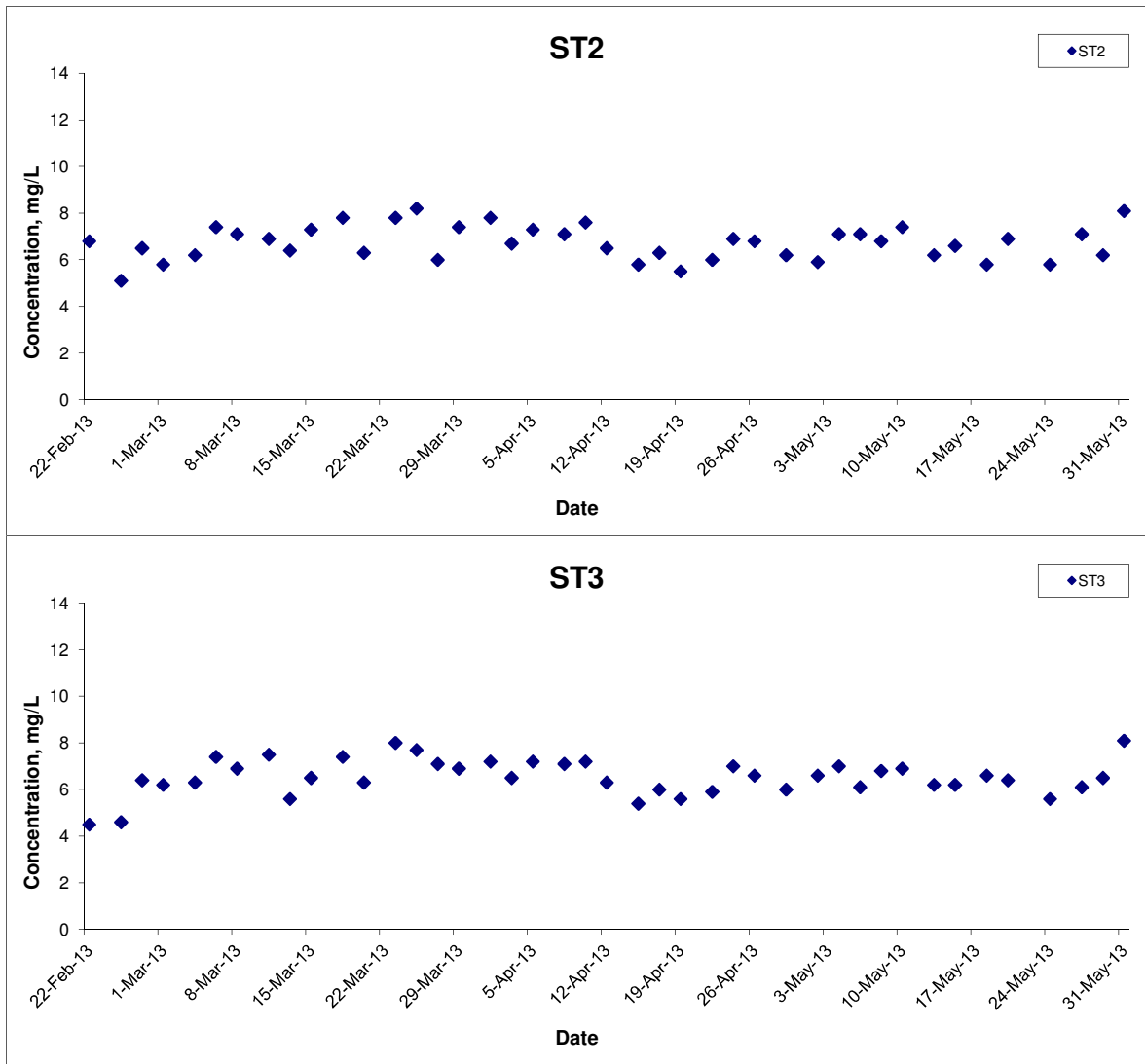
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 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
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Scale N.T.S
 Date May 13

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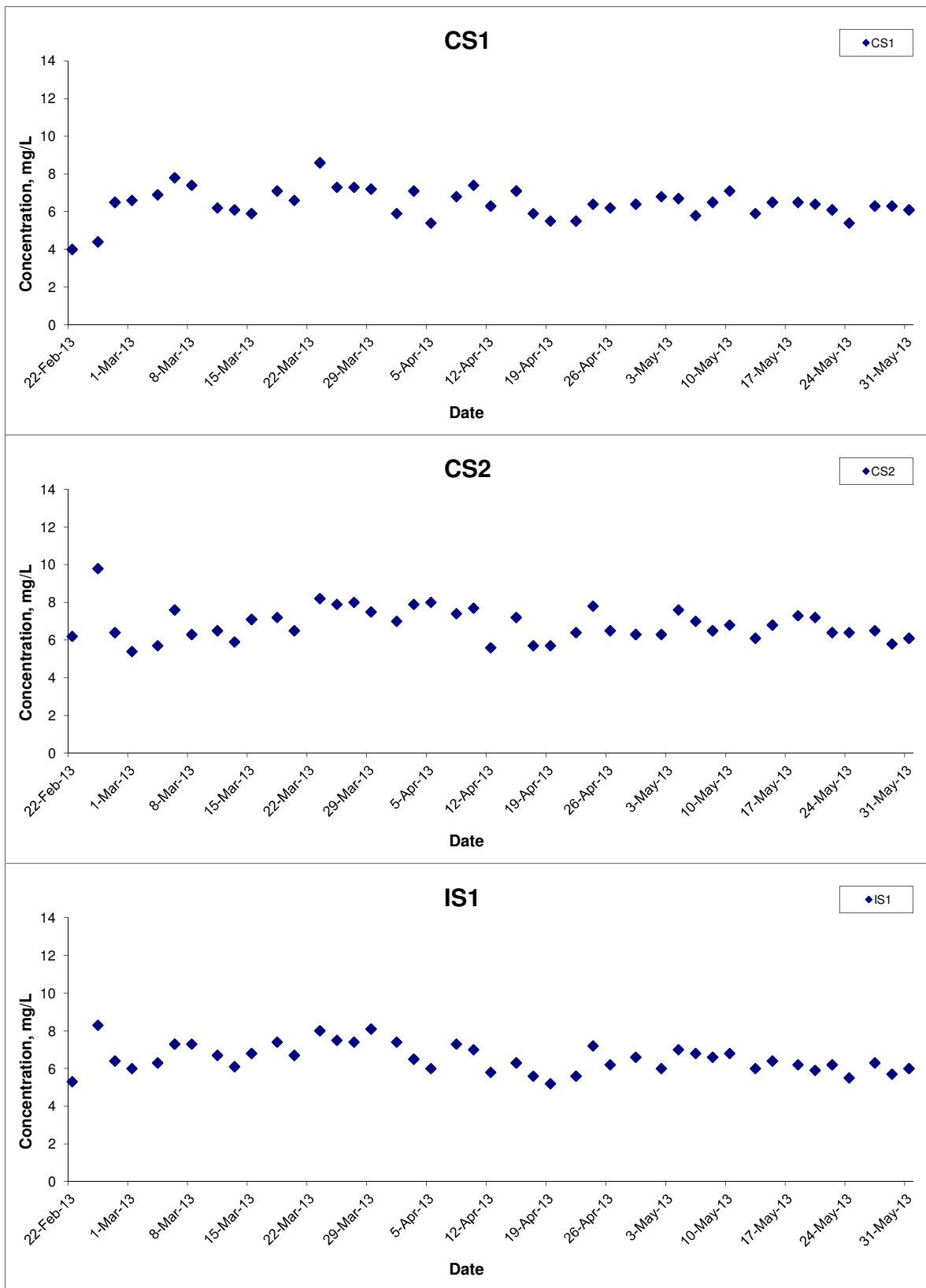


Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill	Scale	Project No. MA12014	CINOTECH
	Graphical Presentation of Water Quality Monitoring Results	Date	Appendix	
		N.T.S	E	
		May 13		

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



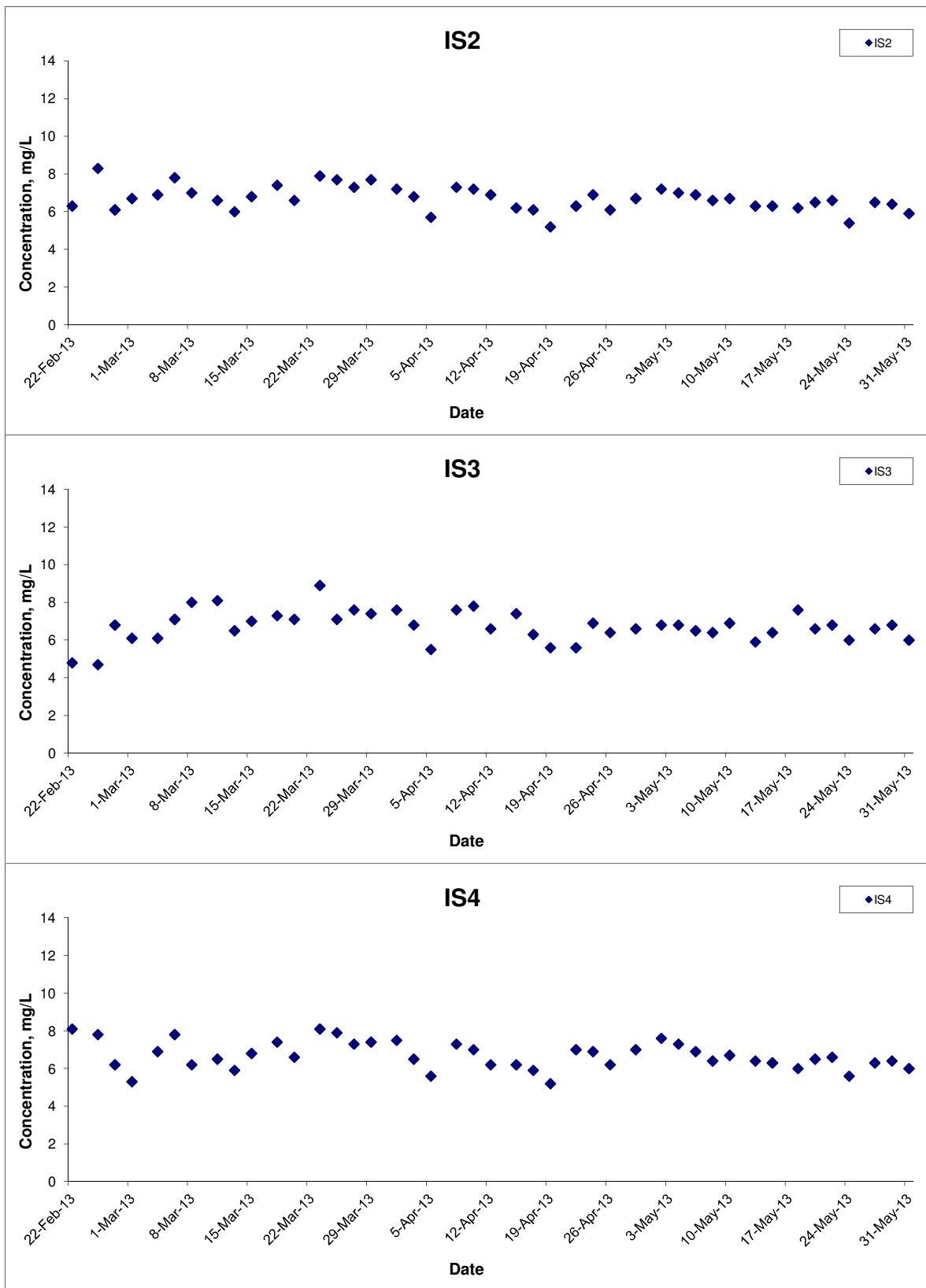
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

Scale N.T.S
 Date May 13

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 Appendix H



Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



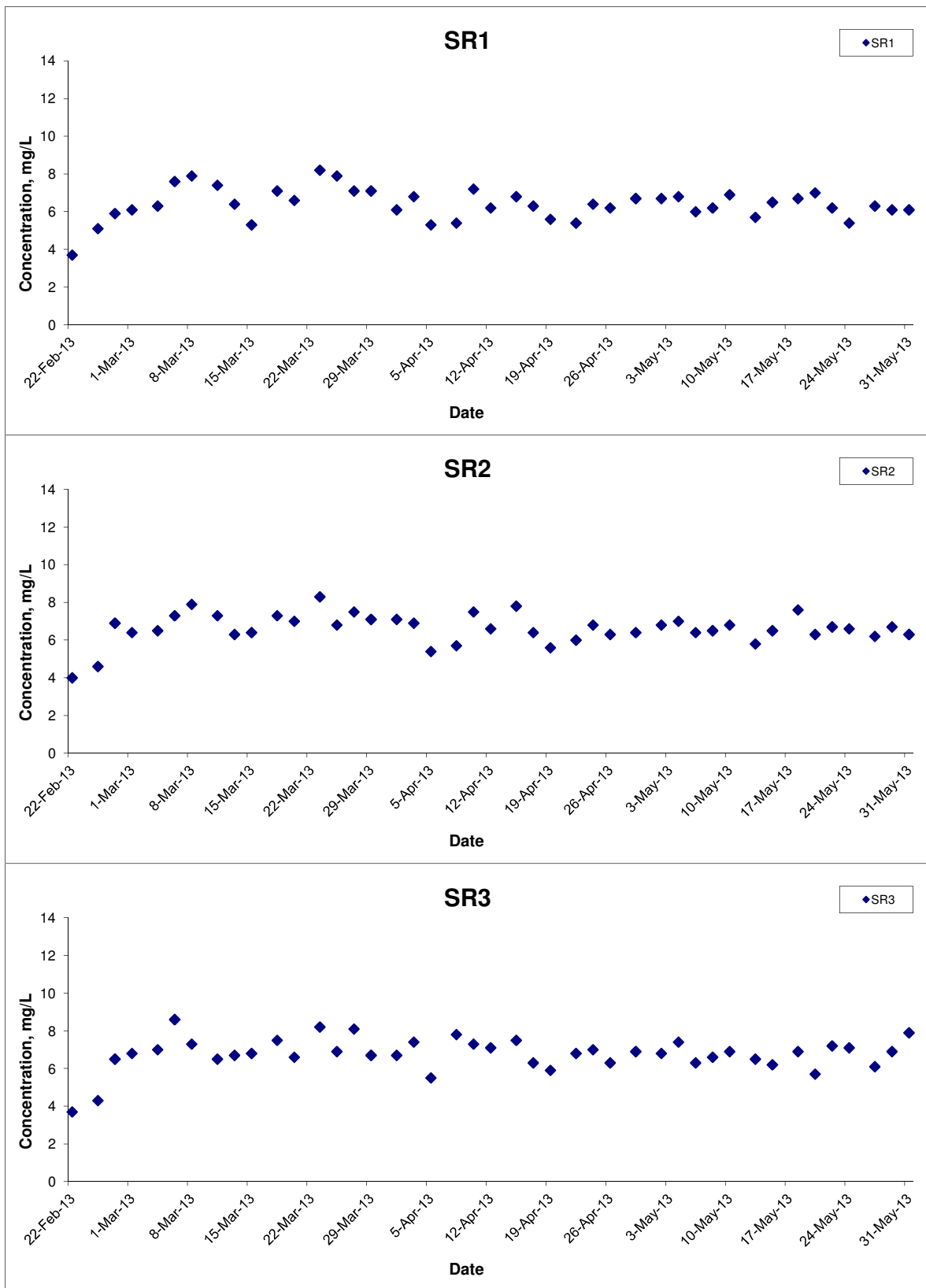
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
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Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



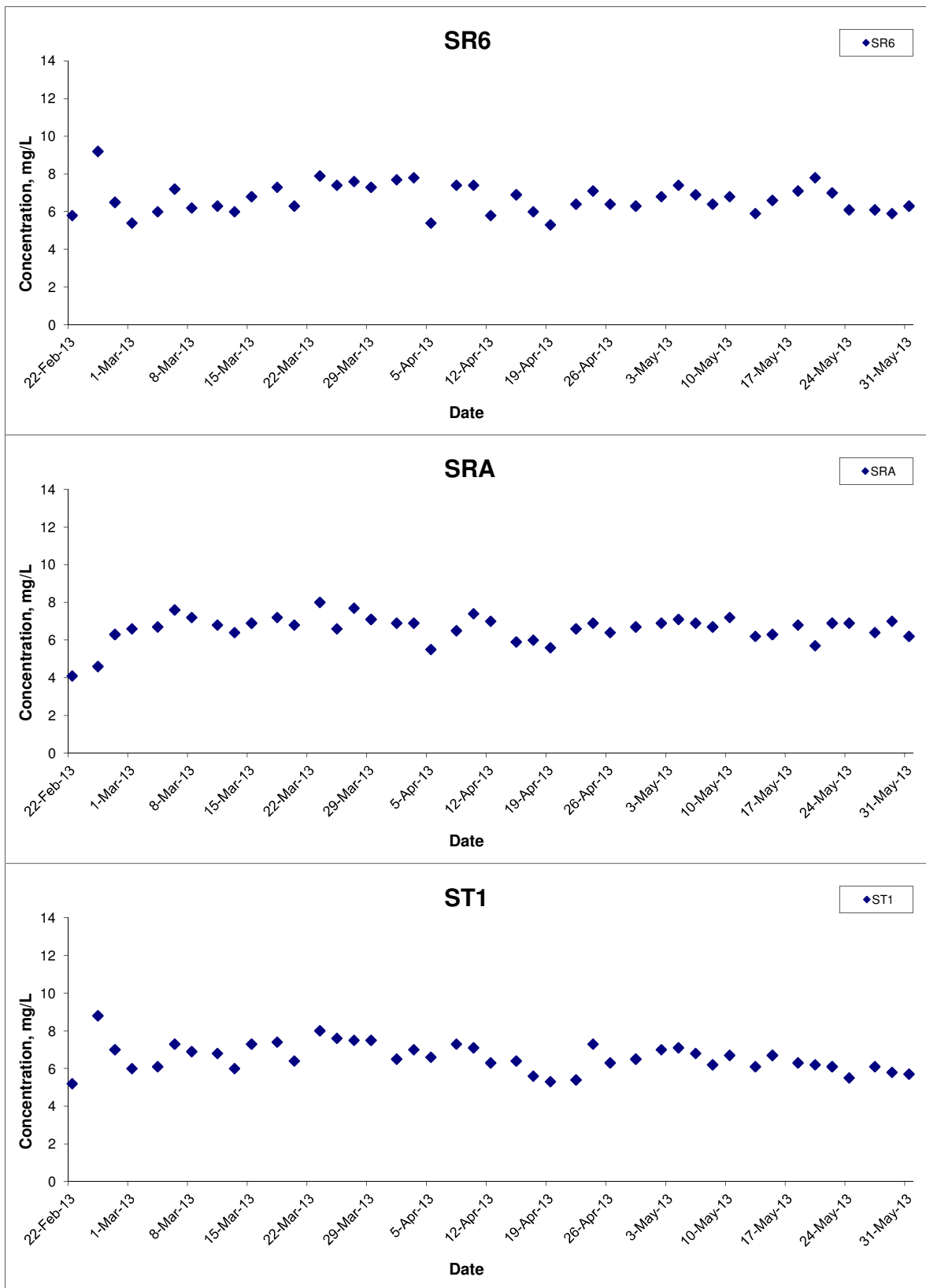
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
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 Appendix E



Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



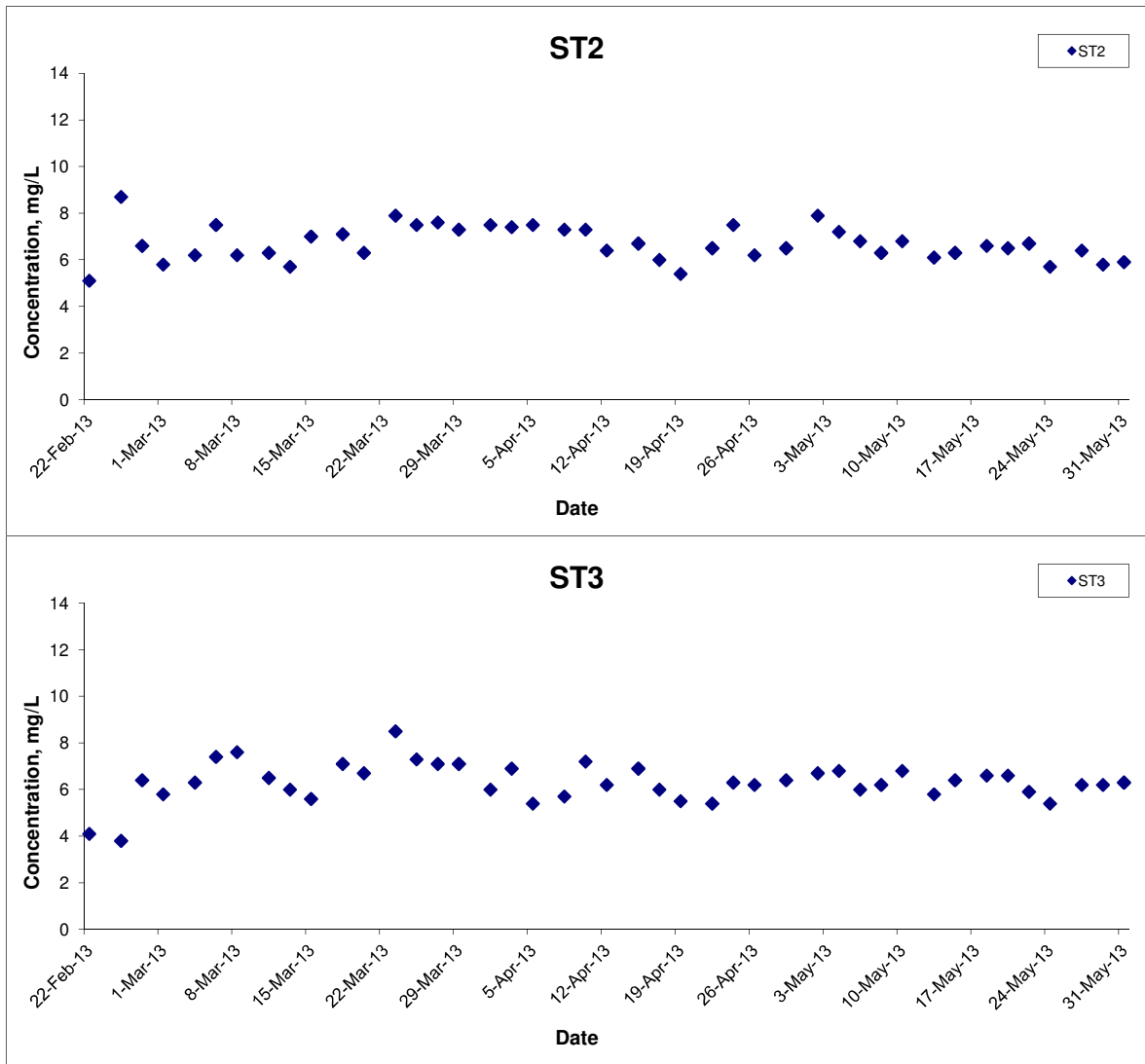
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
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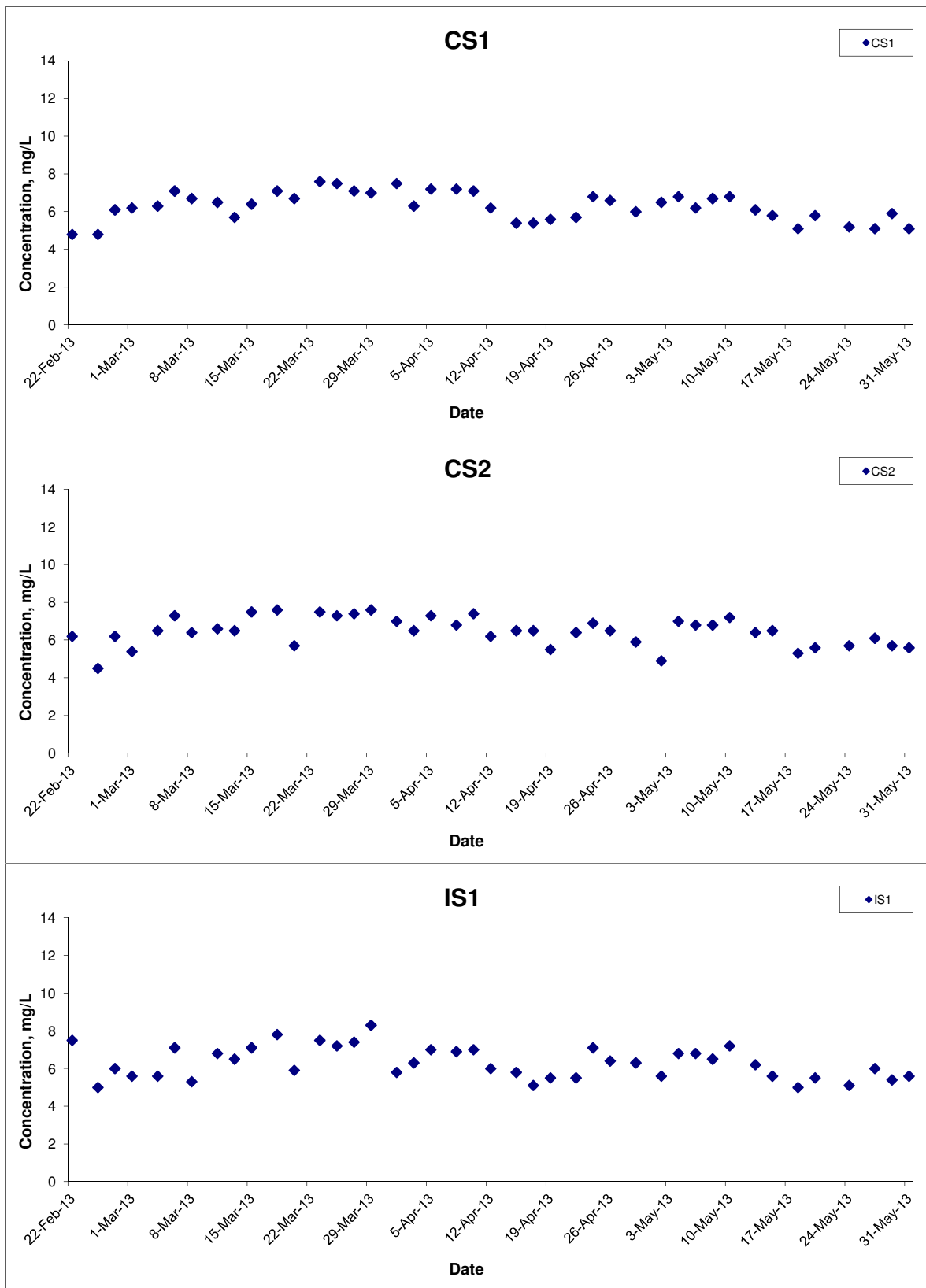


Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill	Scale	N.T.S	Project No. MA12014	CINOTECH
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



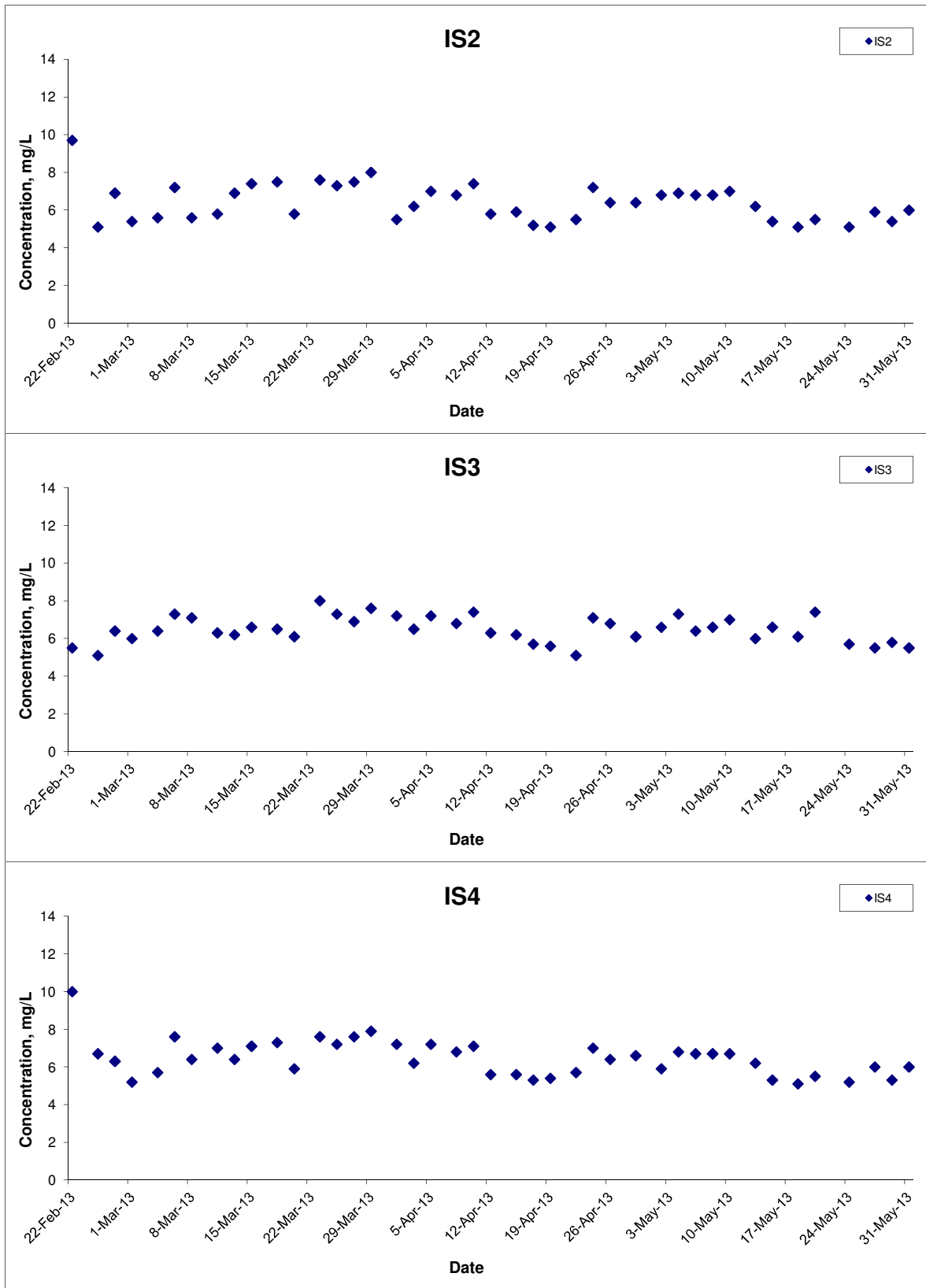
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
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 Results

Scale N.T.S
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Project No. MA12014
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



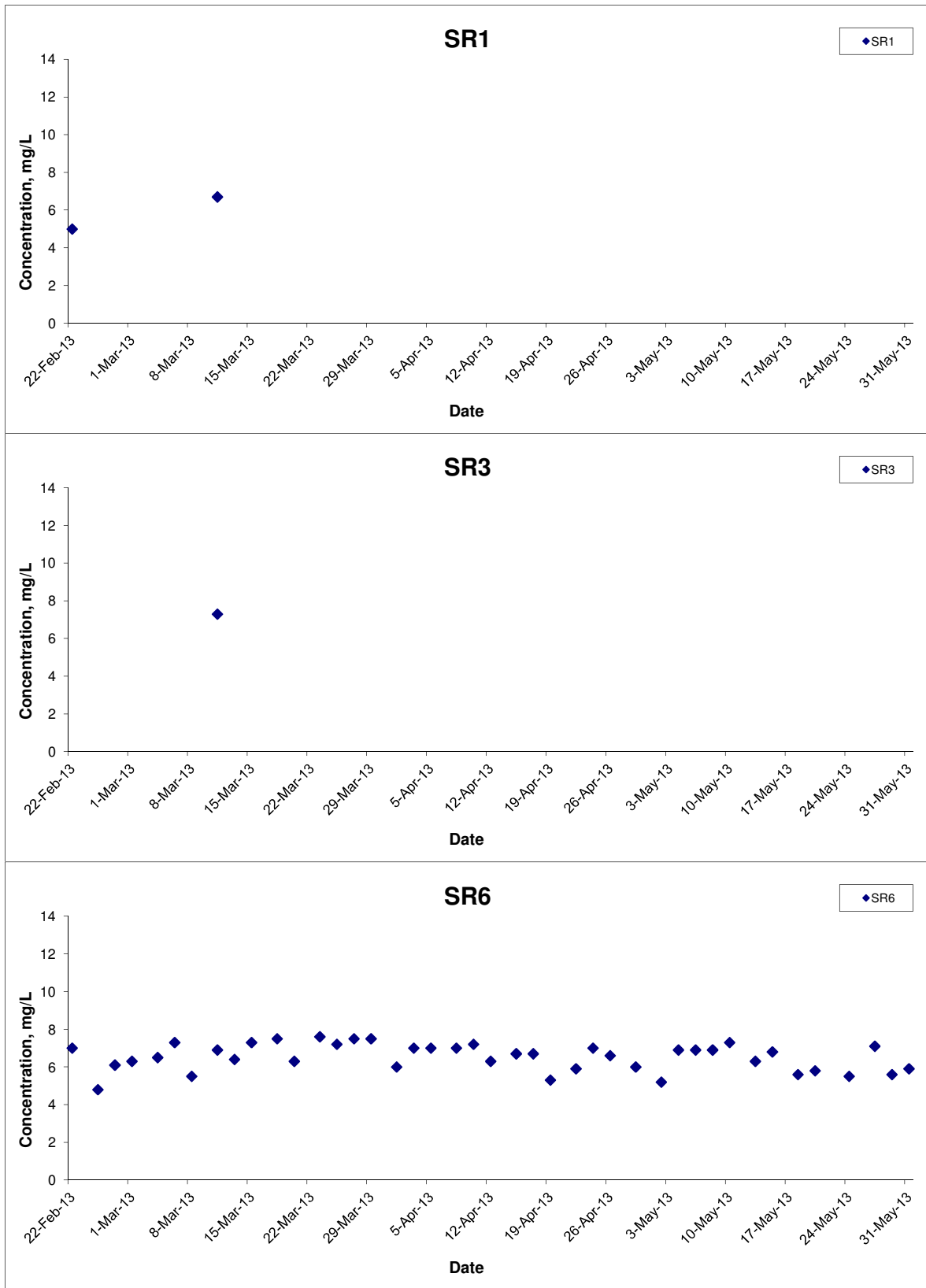
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 Hong Kong Link Road-Section between
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



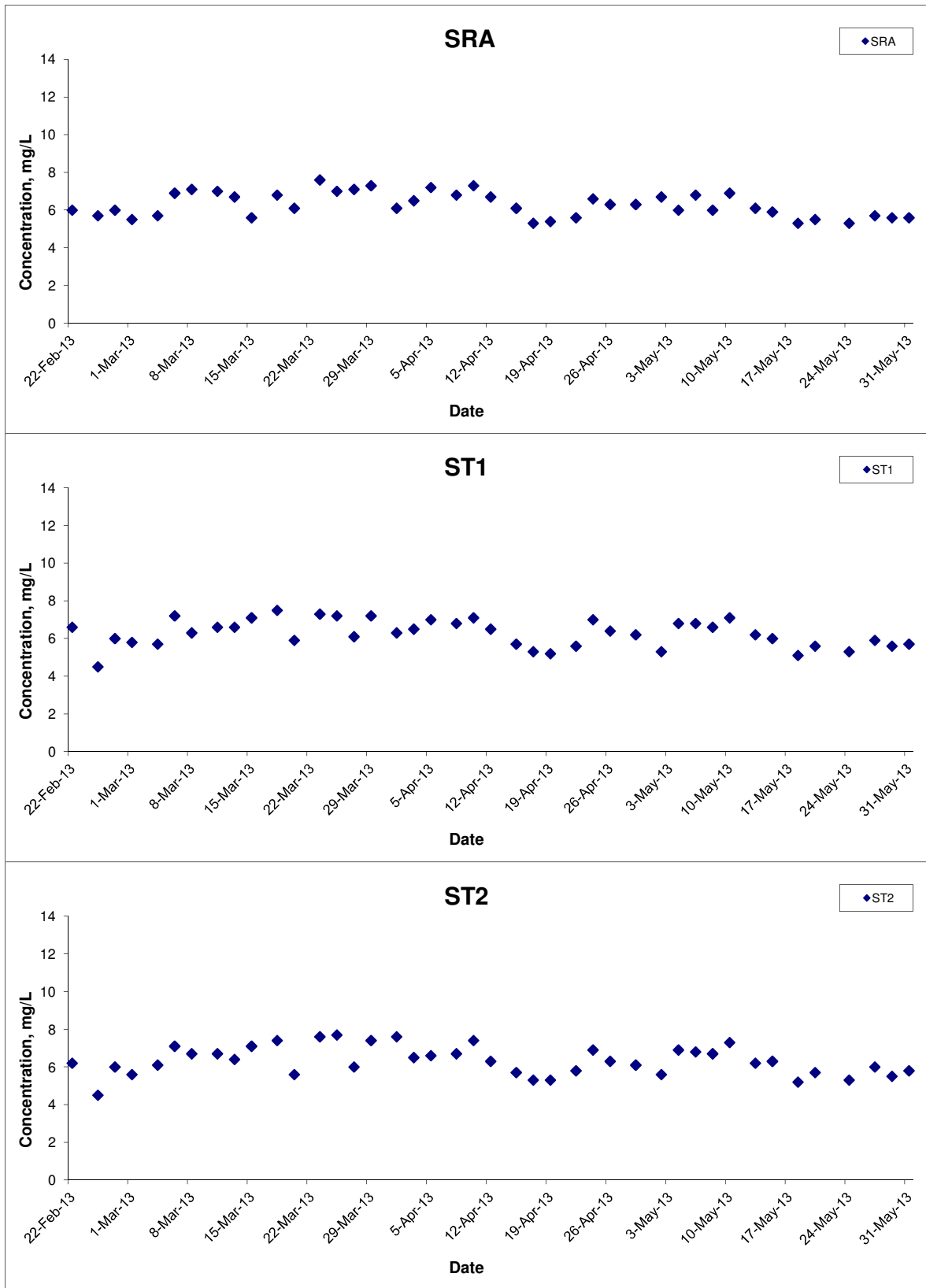
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 Hong Kong Link Road-Section between
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 Graphical Presentation of Water Quality Monitoring
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



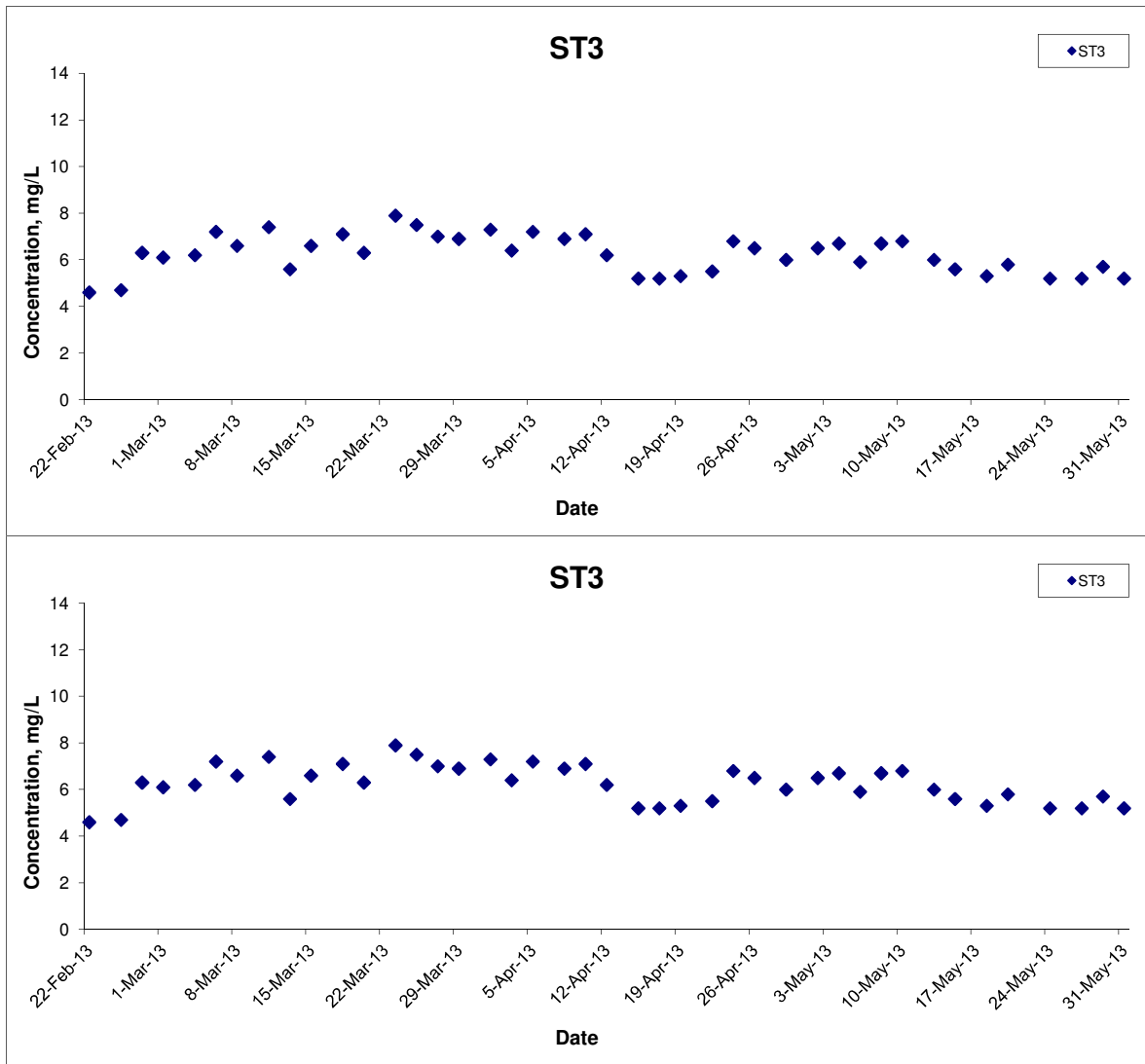
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
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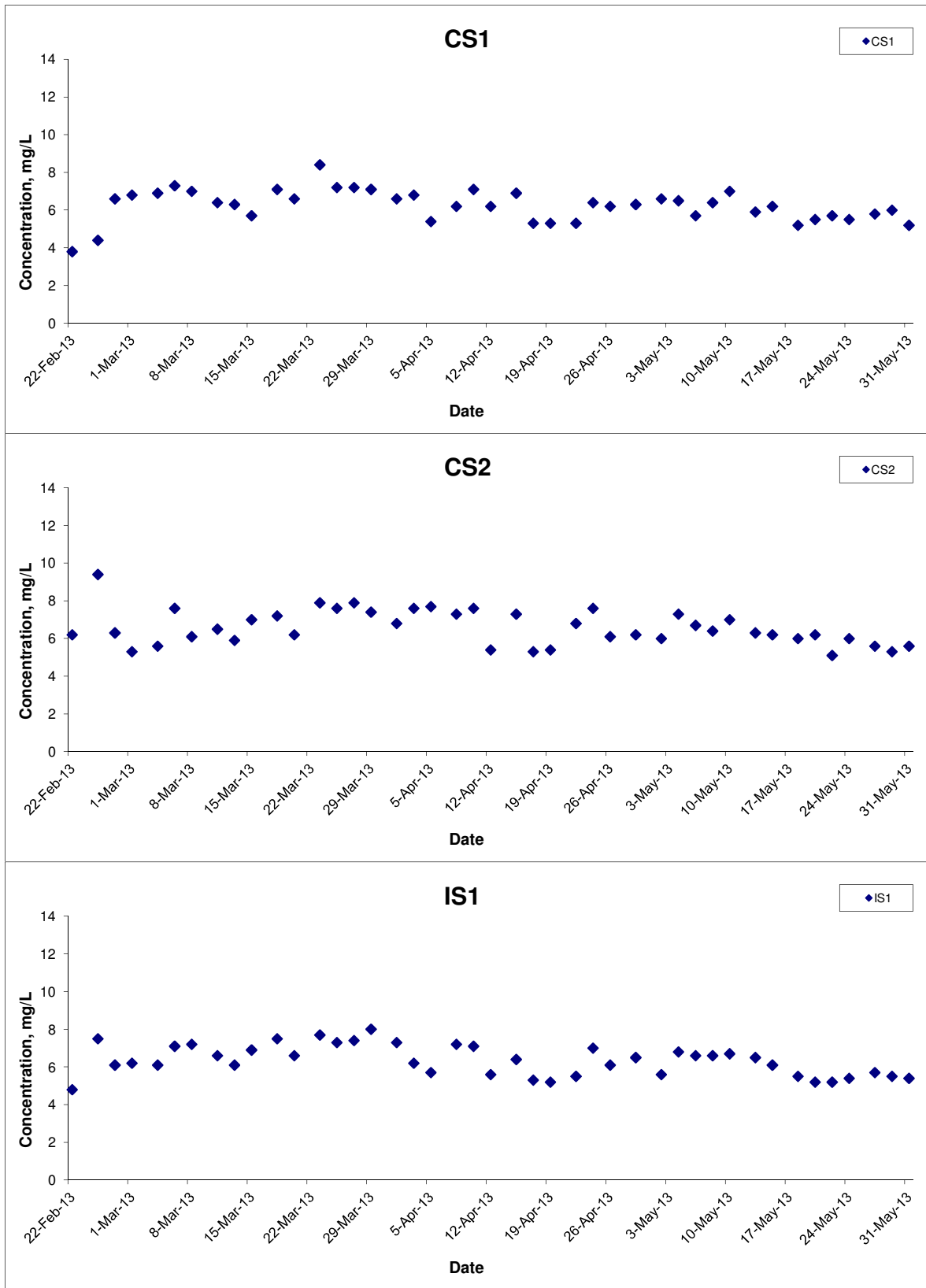


Dissolved Oxygen (Bottom) at Mid-Ebb Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale	N.T.S	Project No.	MA12014	CINOTECH
		Date	May 13	Appendix	E	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



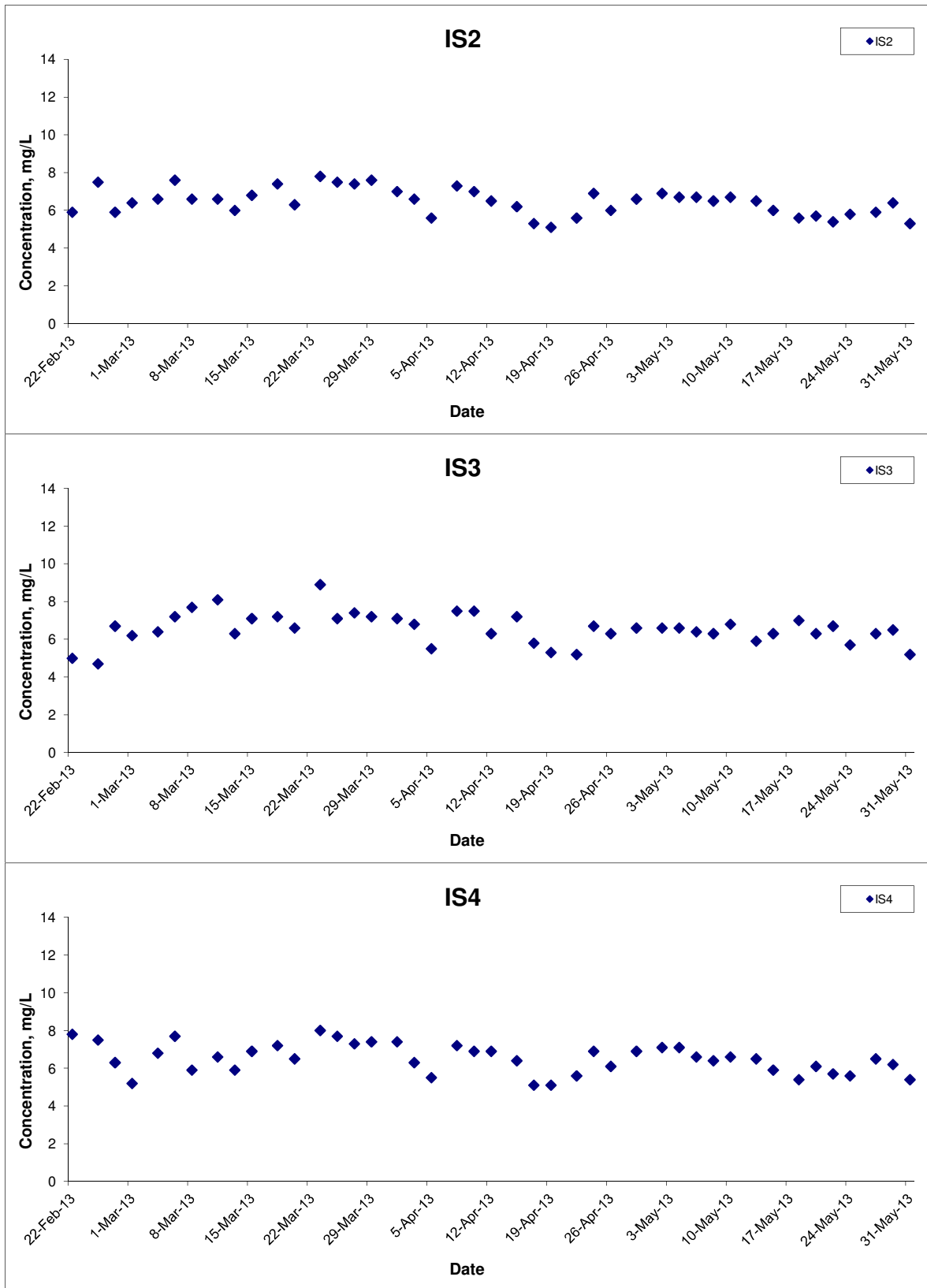
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 Hong Kong Link Road-Section between
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 Graphical Presentation of Water Quality Monitoring
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



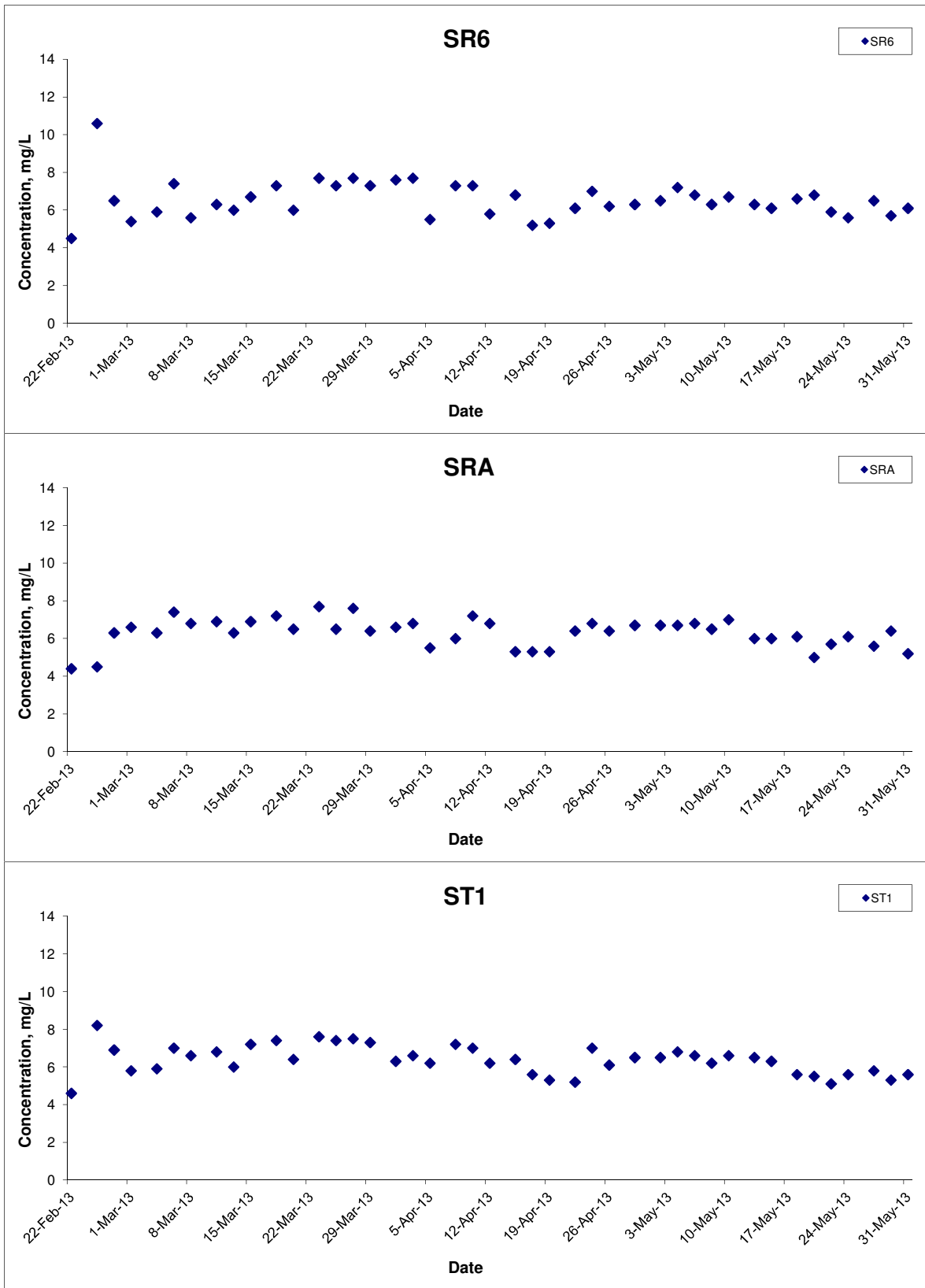
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 Hong Kong Link Road-Section between
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 Graphical Presentation of Water Quality Monitoring
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



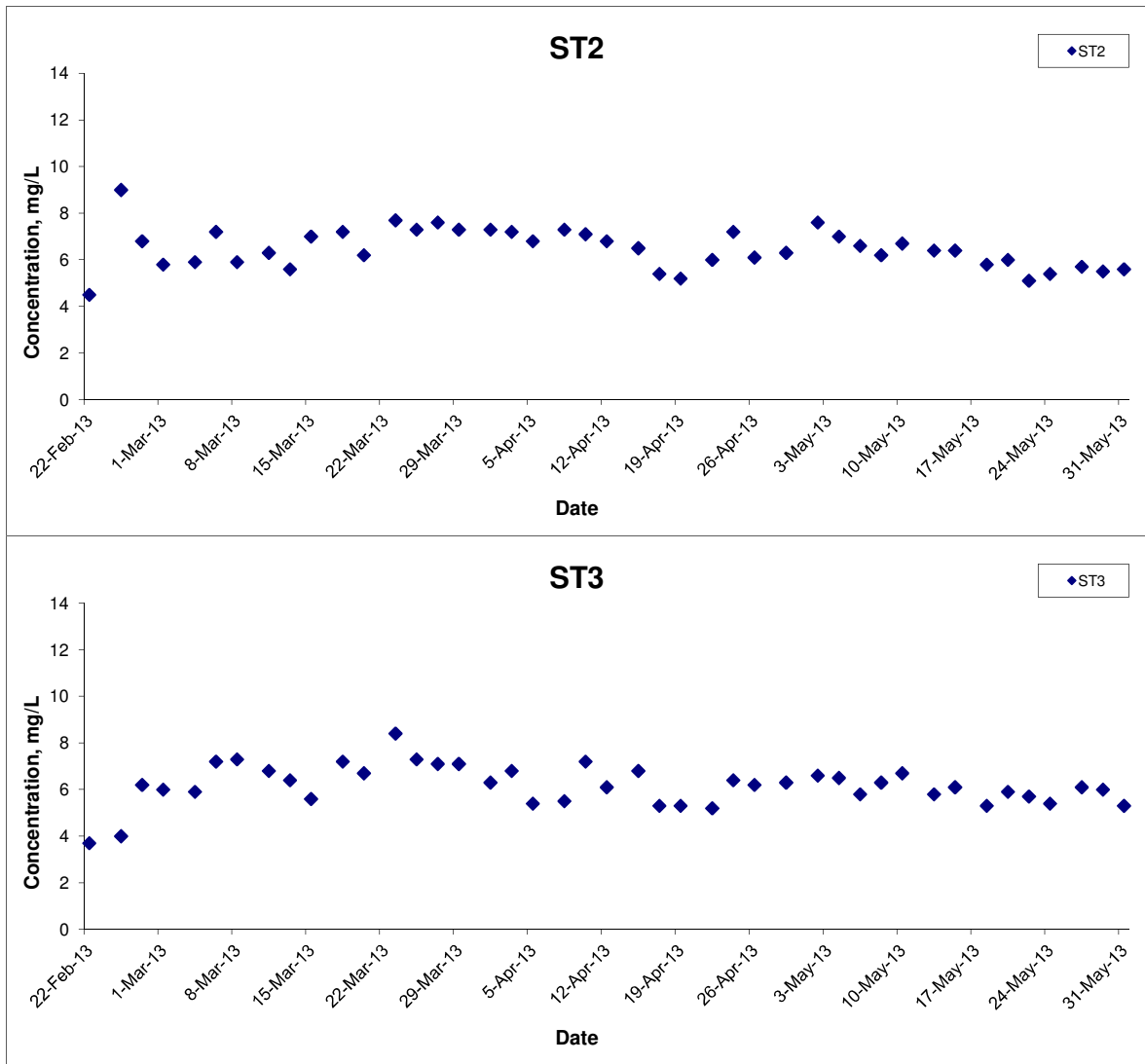
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
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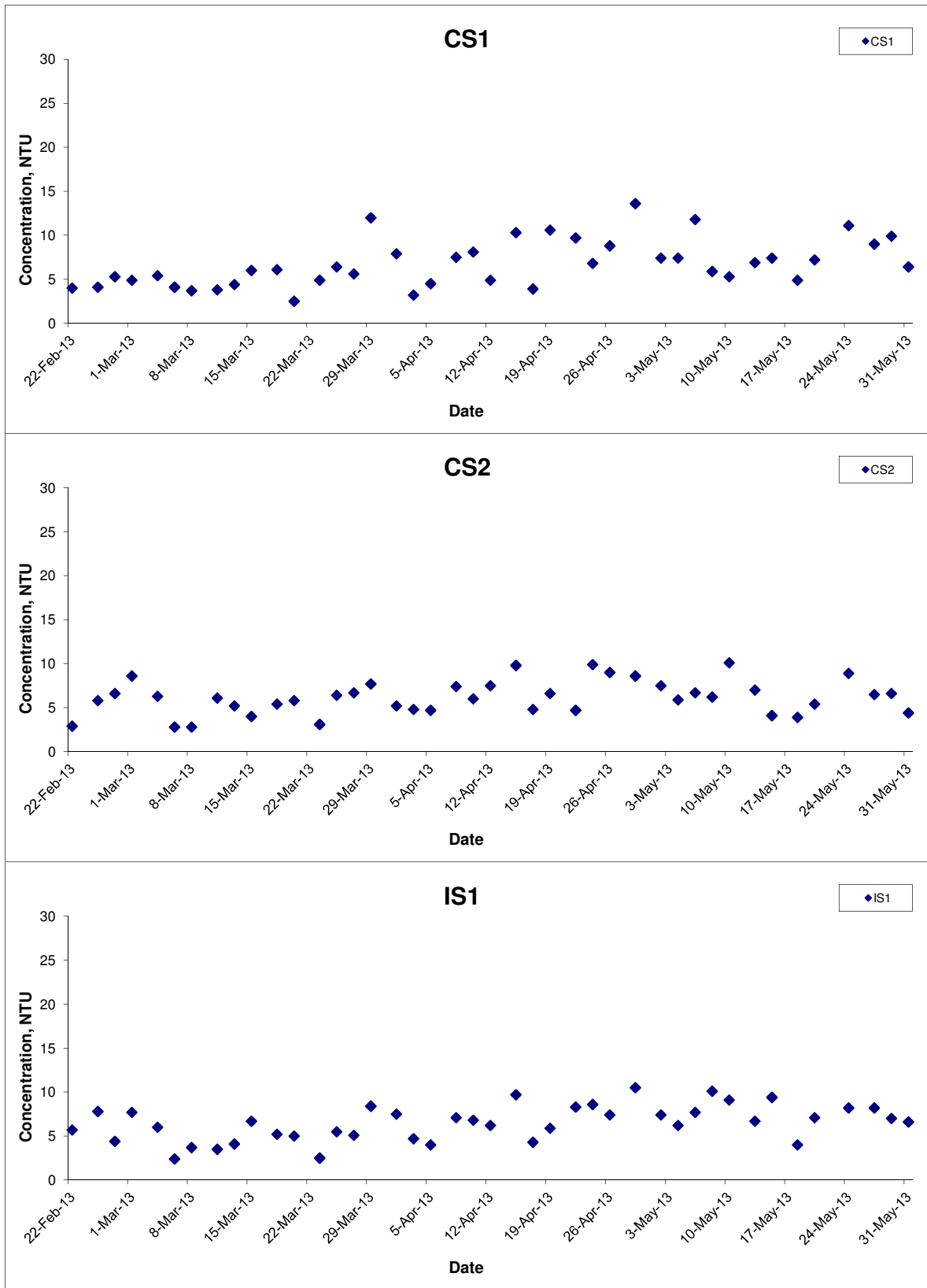


Dissolved Oxygen (Bottom) at Mid-Flood Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale	N.T.S	Project No.	MA12014	CINOTECH
		Date	May 13	Appendix	E	

Turbidity (Depth-averaged) at Mid-Ebb Tide



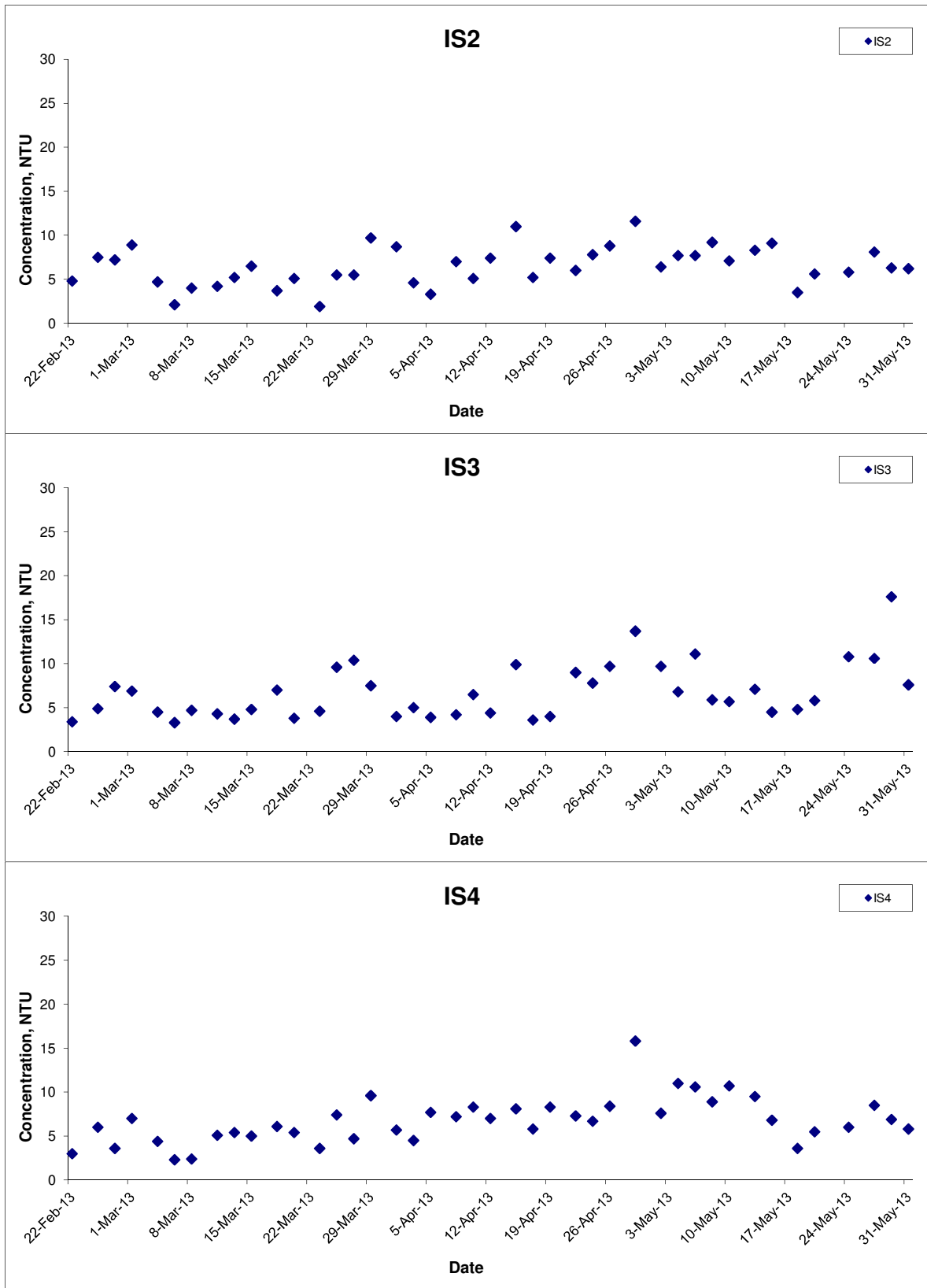
Title Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

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Turbidity (Depth-averaged) at Mid-Ebb Tide



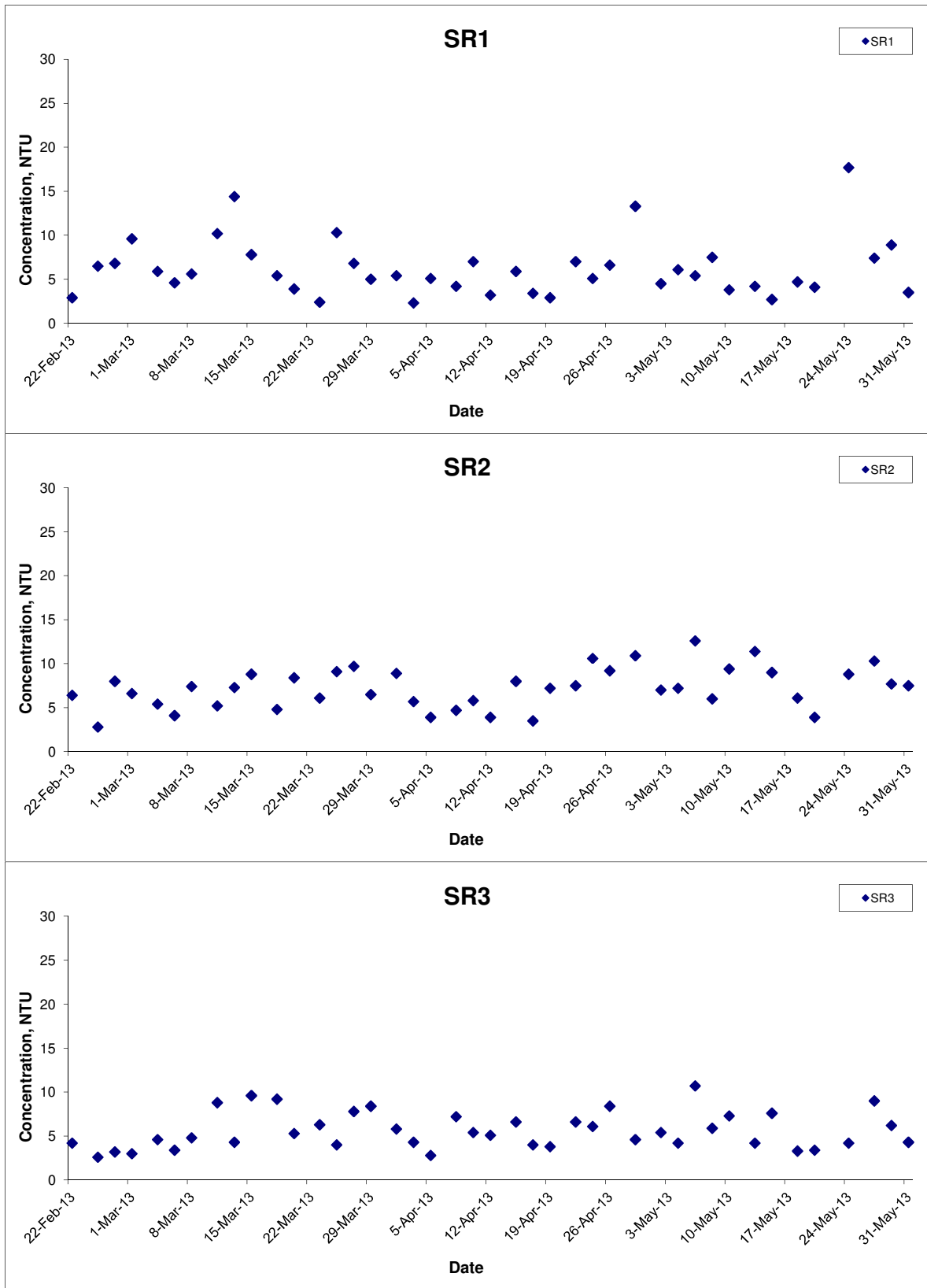
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 Hong Kong Link Road-Section between
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 Graphical Presentation of Water Quality Monitoring
 Results

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Turbidity (Depth-averaged) at Mid-Ebb Tide



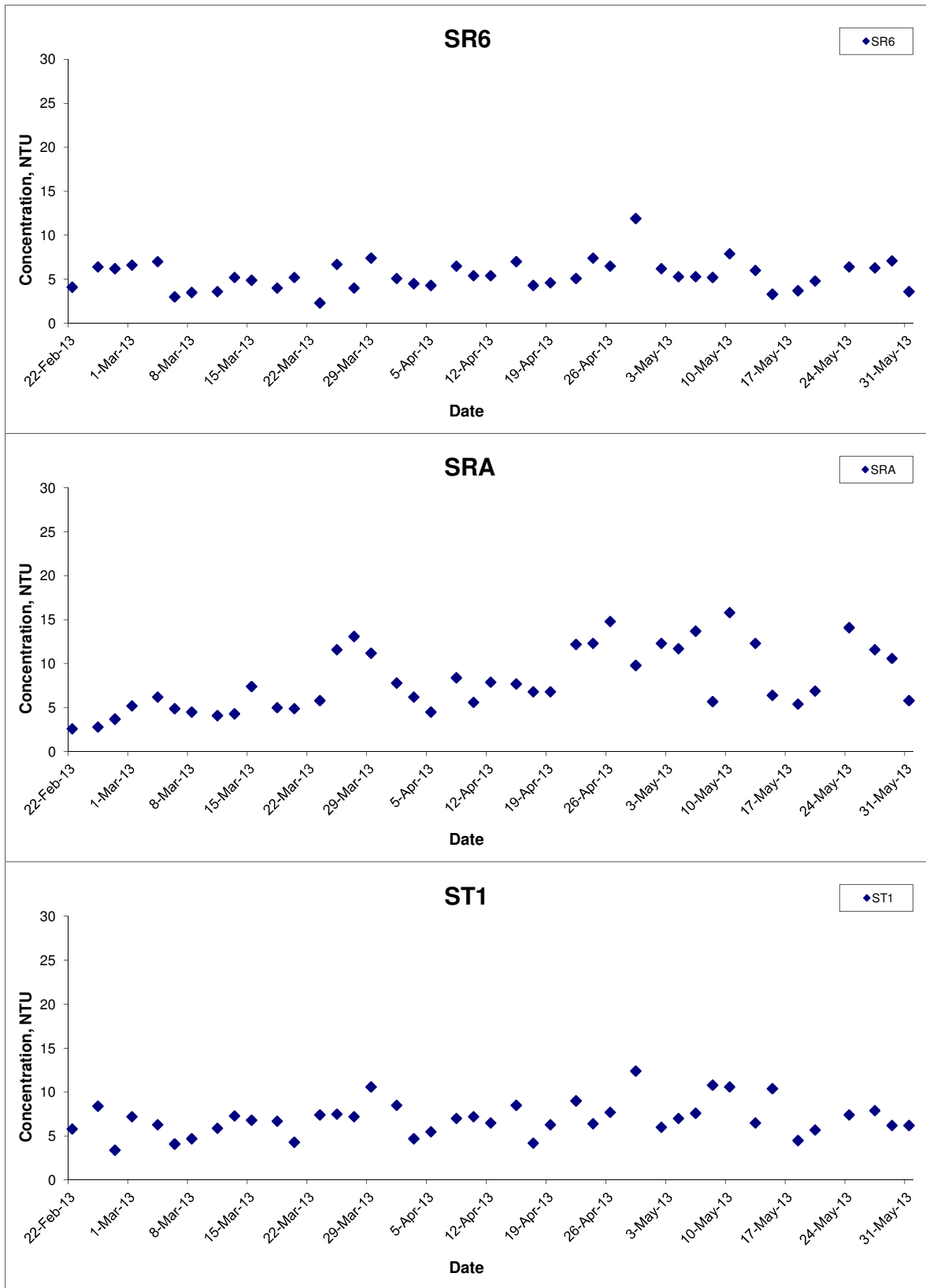
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
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Turbidity (Depth-averaged) at Mid-Ebb Tide



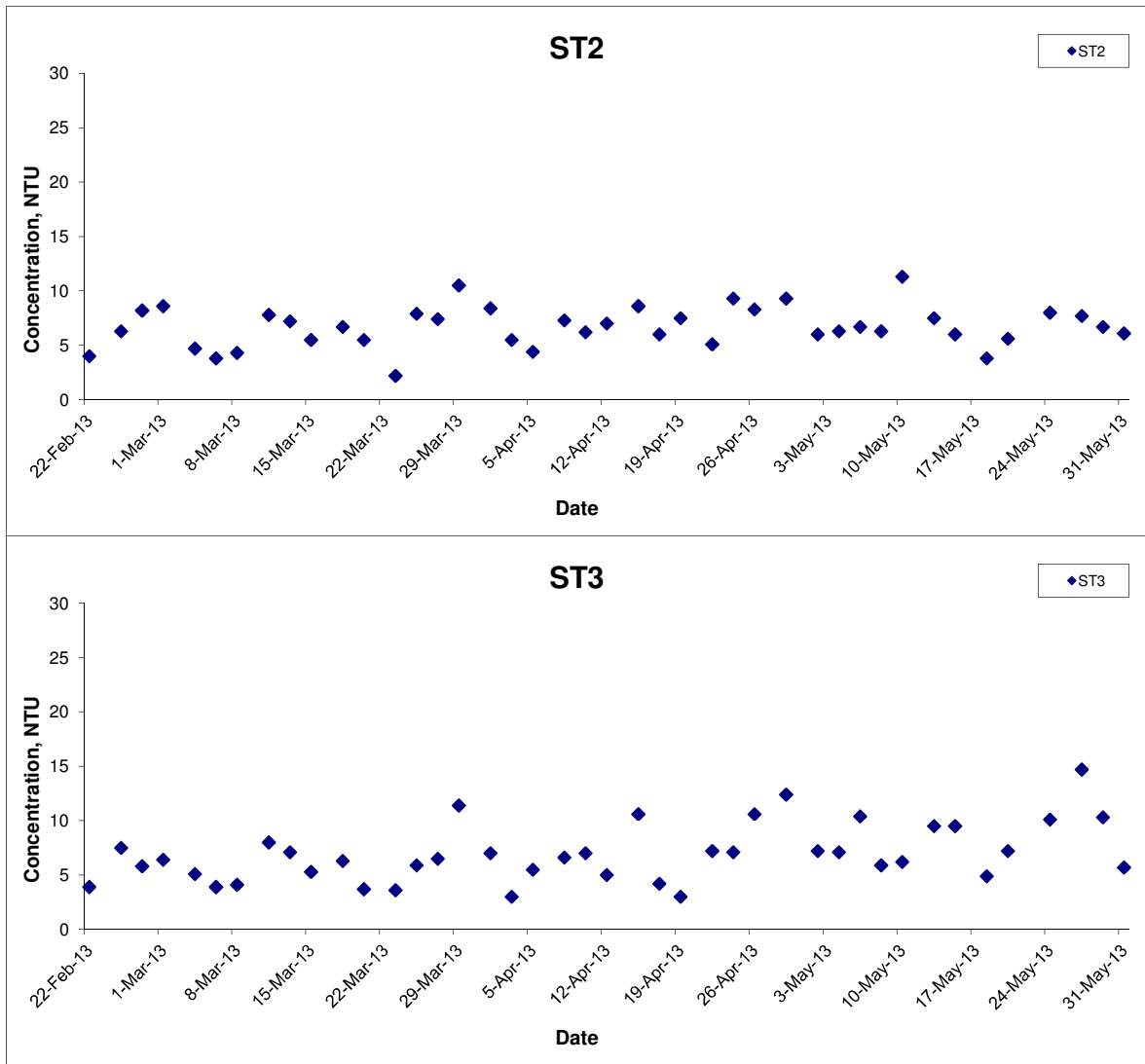
Title Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

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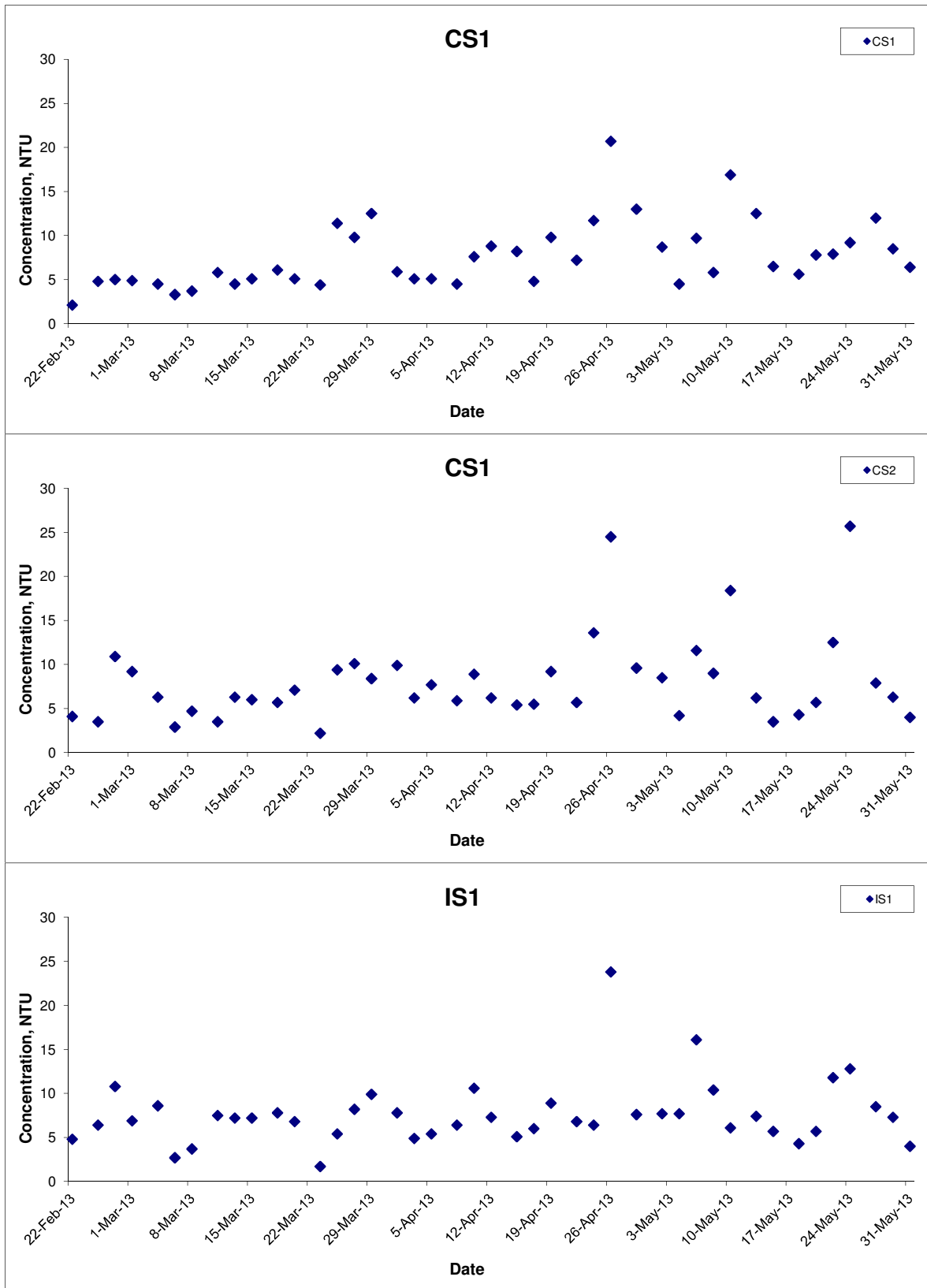


Turbidity (Depth-averaged) at Mid-Ebb Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill	Scale	N.T.S	Project No.	MA12014	CINOTECH
	Graphical Presentation of Water Quality Monitoring Results	Date	May 13	Appendix	E	

Turbidity (Depth-averaged) at Mid-Flood Tide



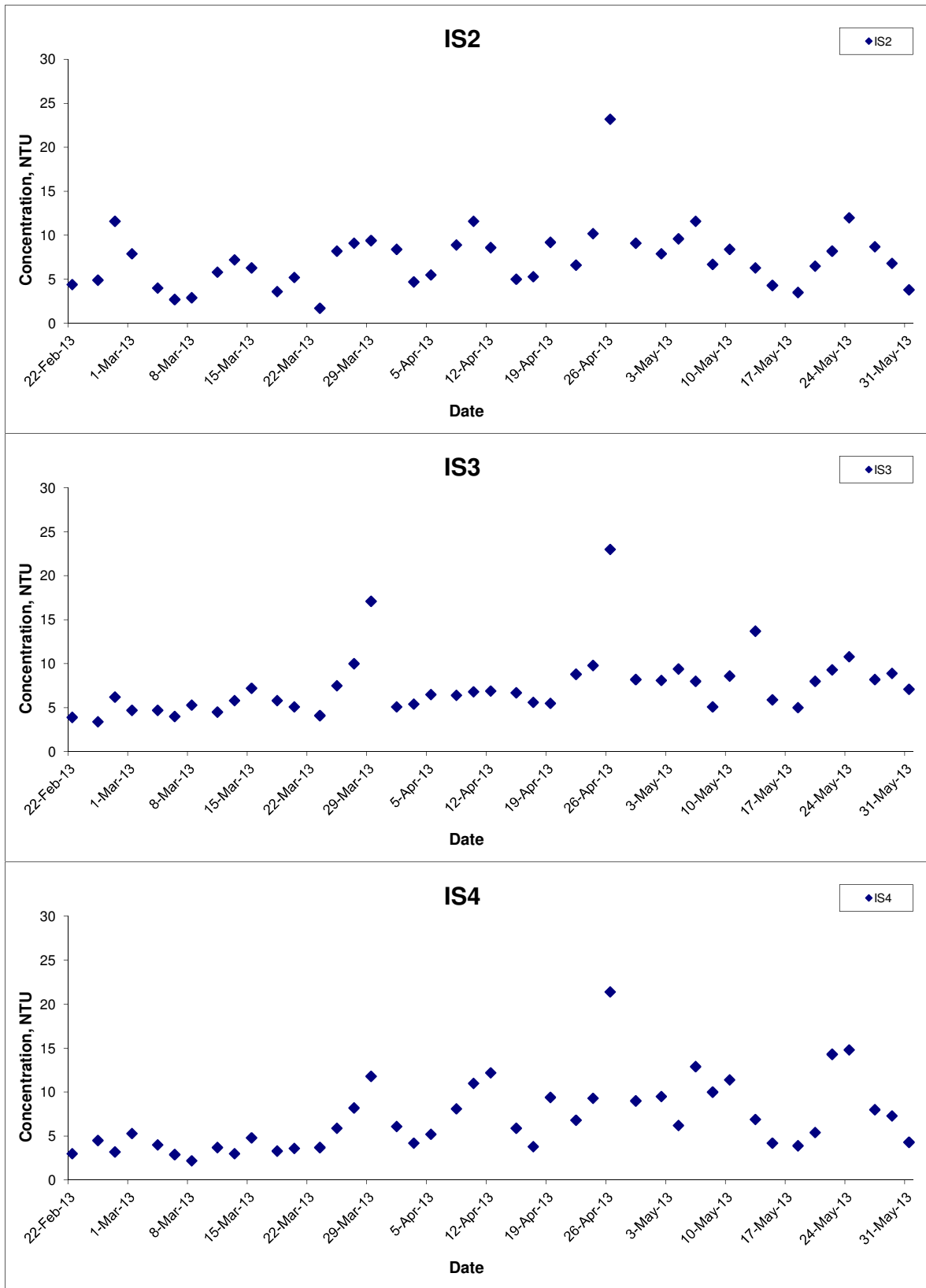
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

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Turbidity (Depth-averaged) at Mid-Flood Tide



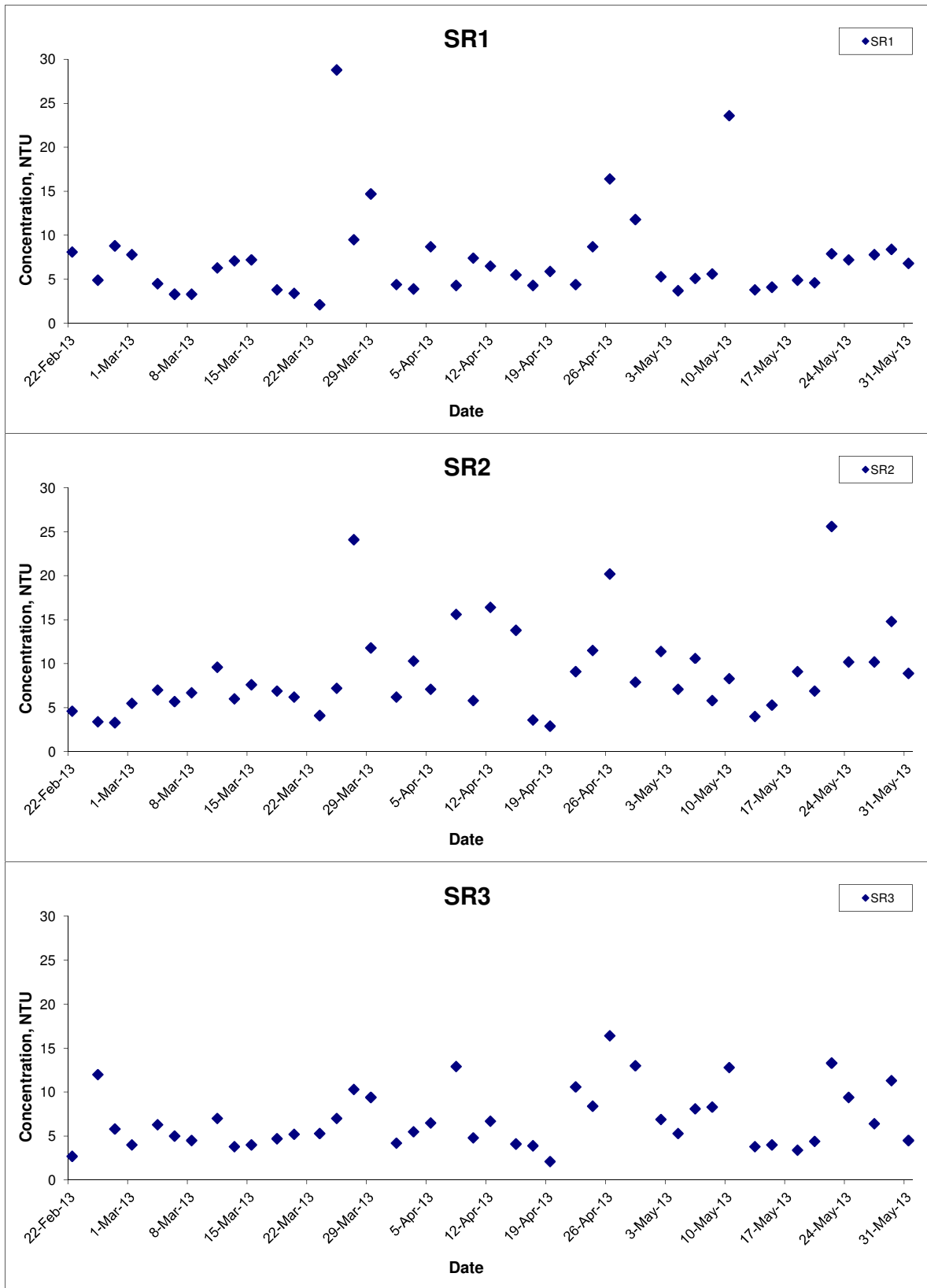
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 Hong Kong Link Road-Section between
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 Graphical Presentation of Water Quality Monitoring
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Turbidity (Depth-averaged) at Mid-Flood Tide



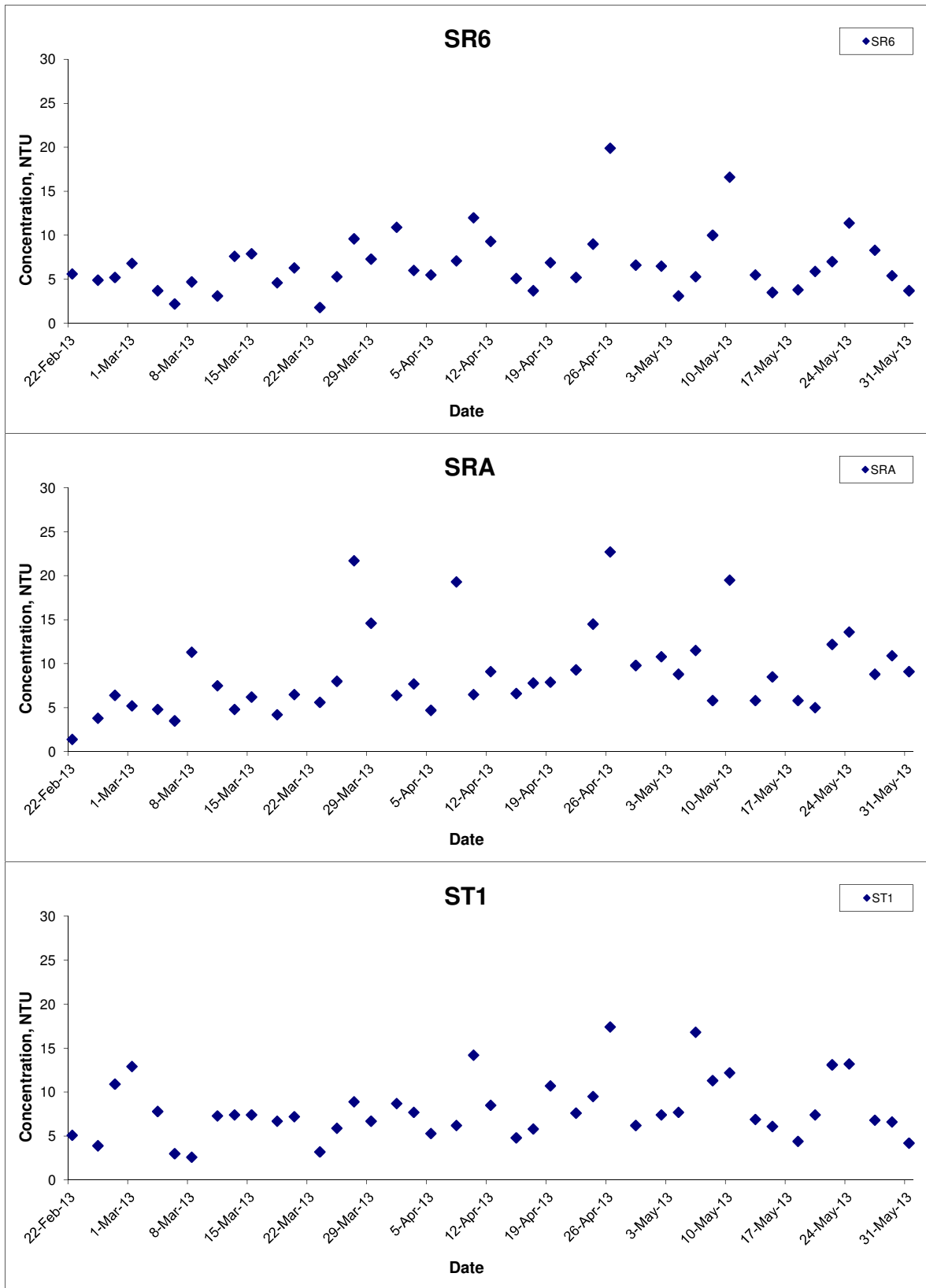
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
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Turbidity (Depth-averaged) at Mid-Flood Tide



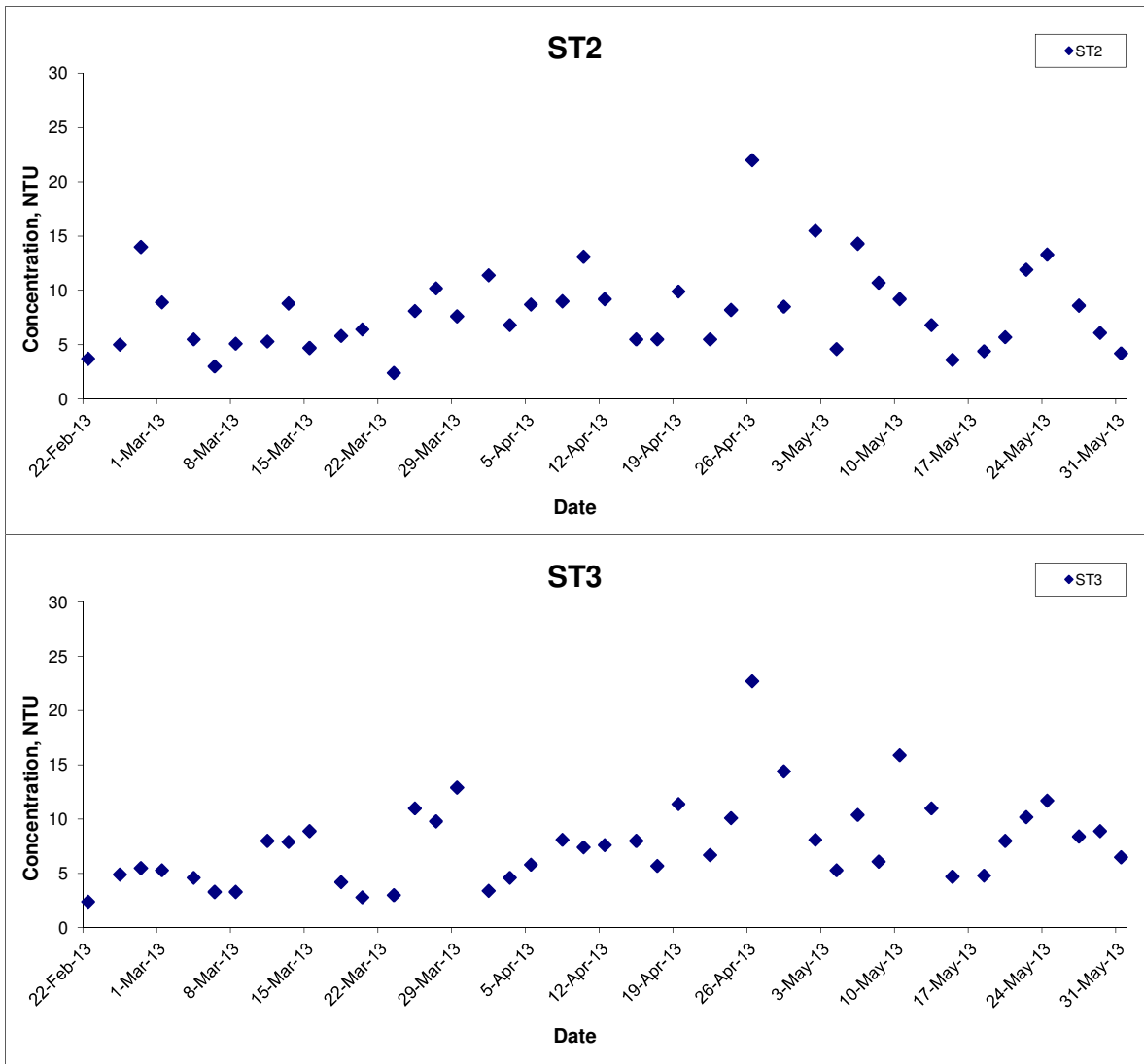
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 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

Scale N.T.S
 Date May 13

Project No. MA12014
 Appendix E



Turbidity (Depth-averaged) at Mid-Flood Tide



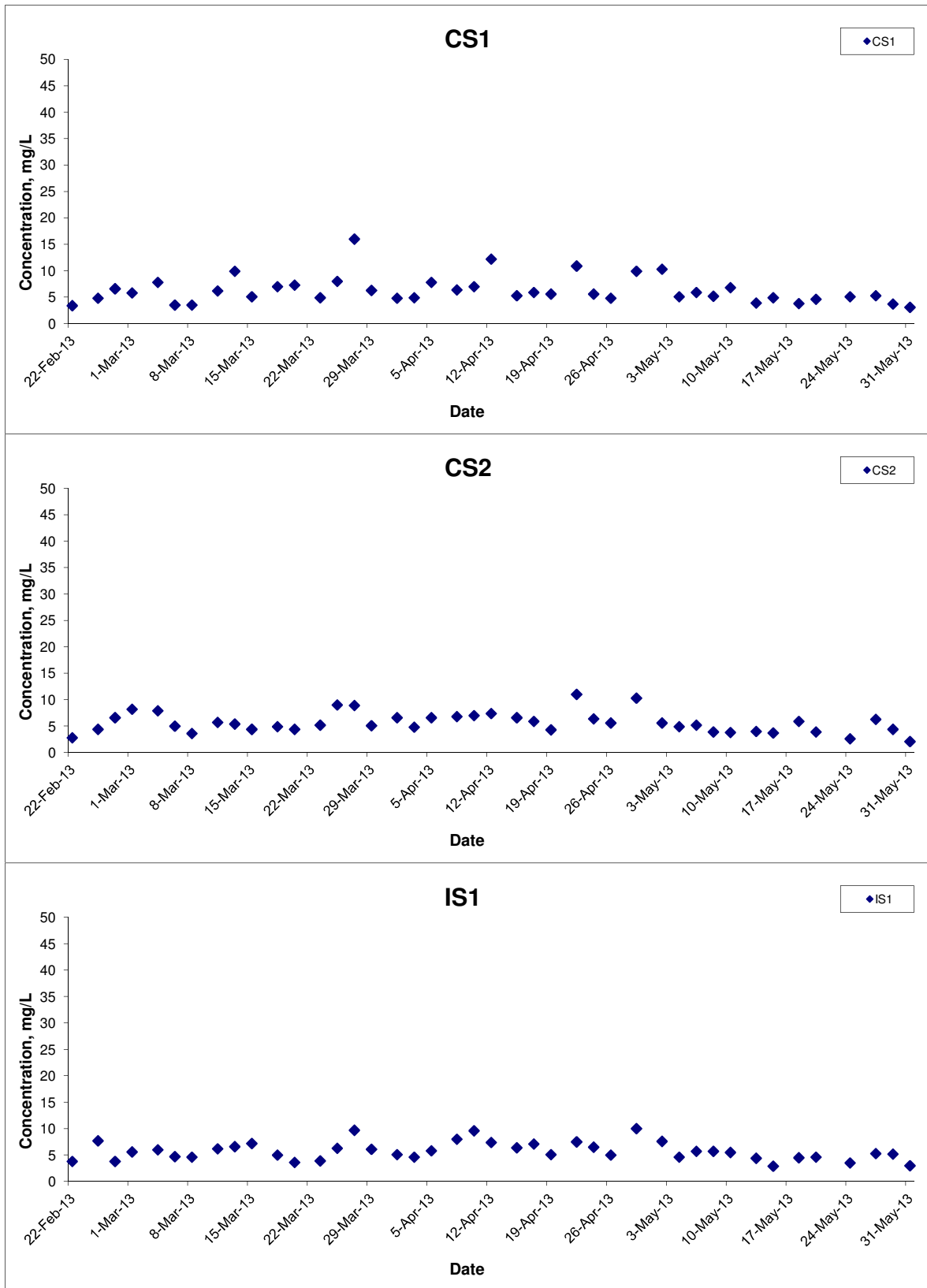
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 Hong Kong Link Road-Section between
 HKSAR Boundary and Scenic Hill
 Graphical Presentation of Water Quality Monitoring
 Results

Scale N.T.S
 Date May 13

Project No. MA12014
 Appendix E



Suspended Solids (Depth-averaged) at Mid-Ebb Tide



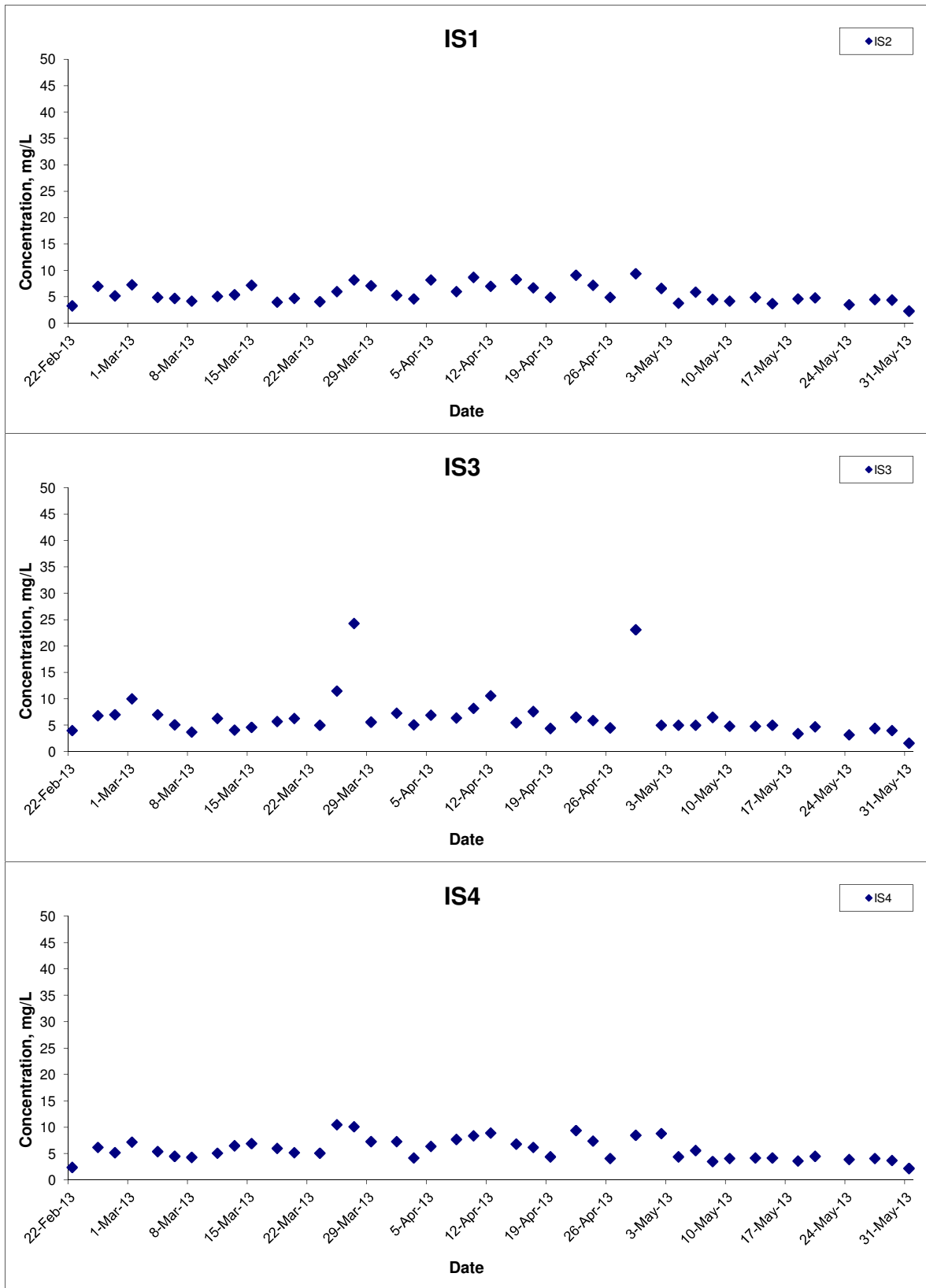
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 Graphical Presentation of Water Quality Monitoring
 Results

Scale N.T.S
 Date May 13

Project No. MA12014
 Appendix E

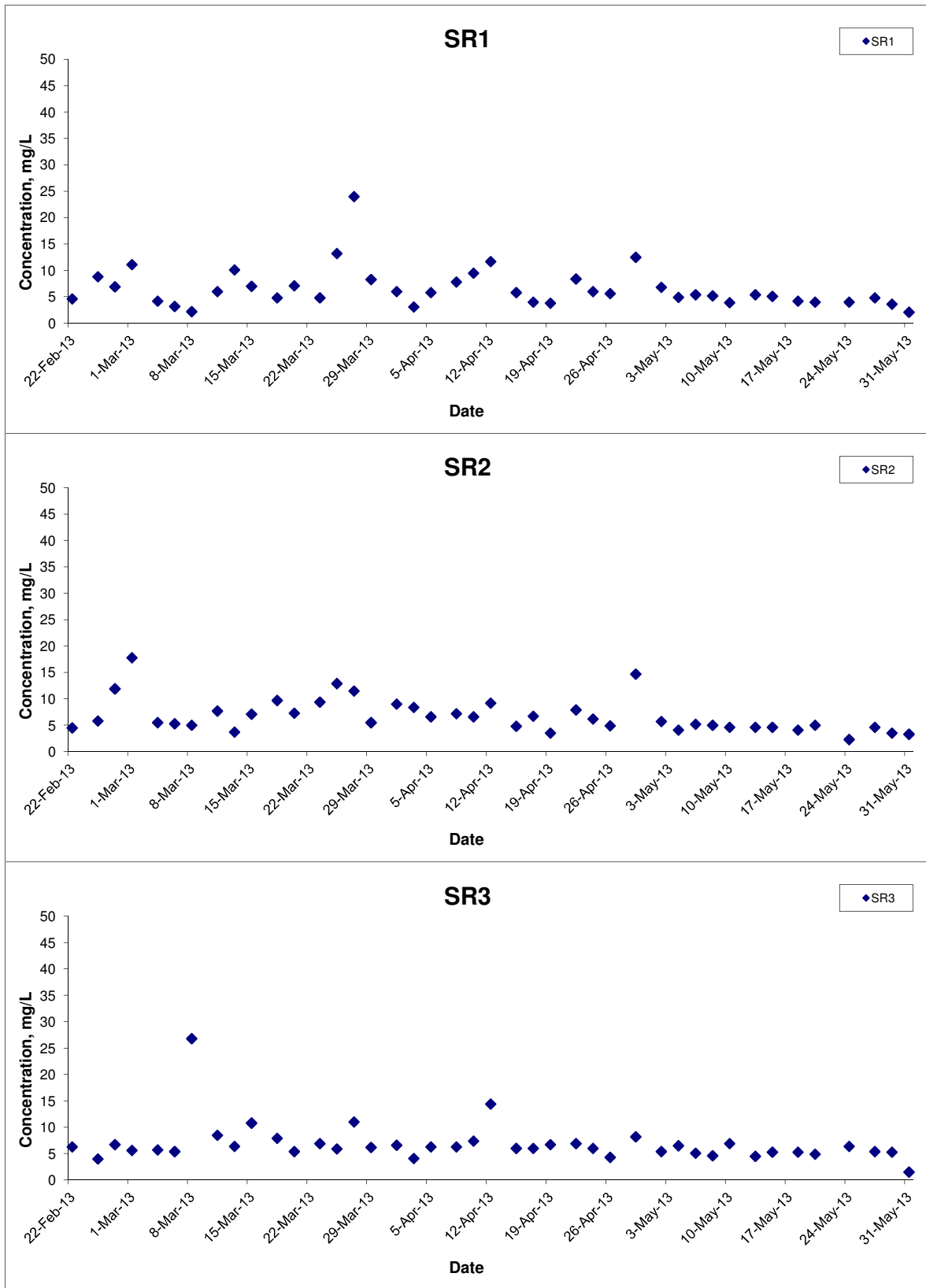


Suspended Solids (Depth-averaged) at Mid-Ebb Tide



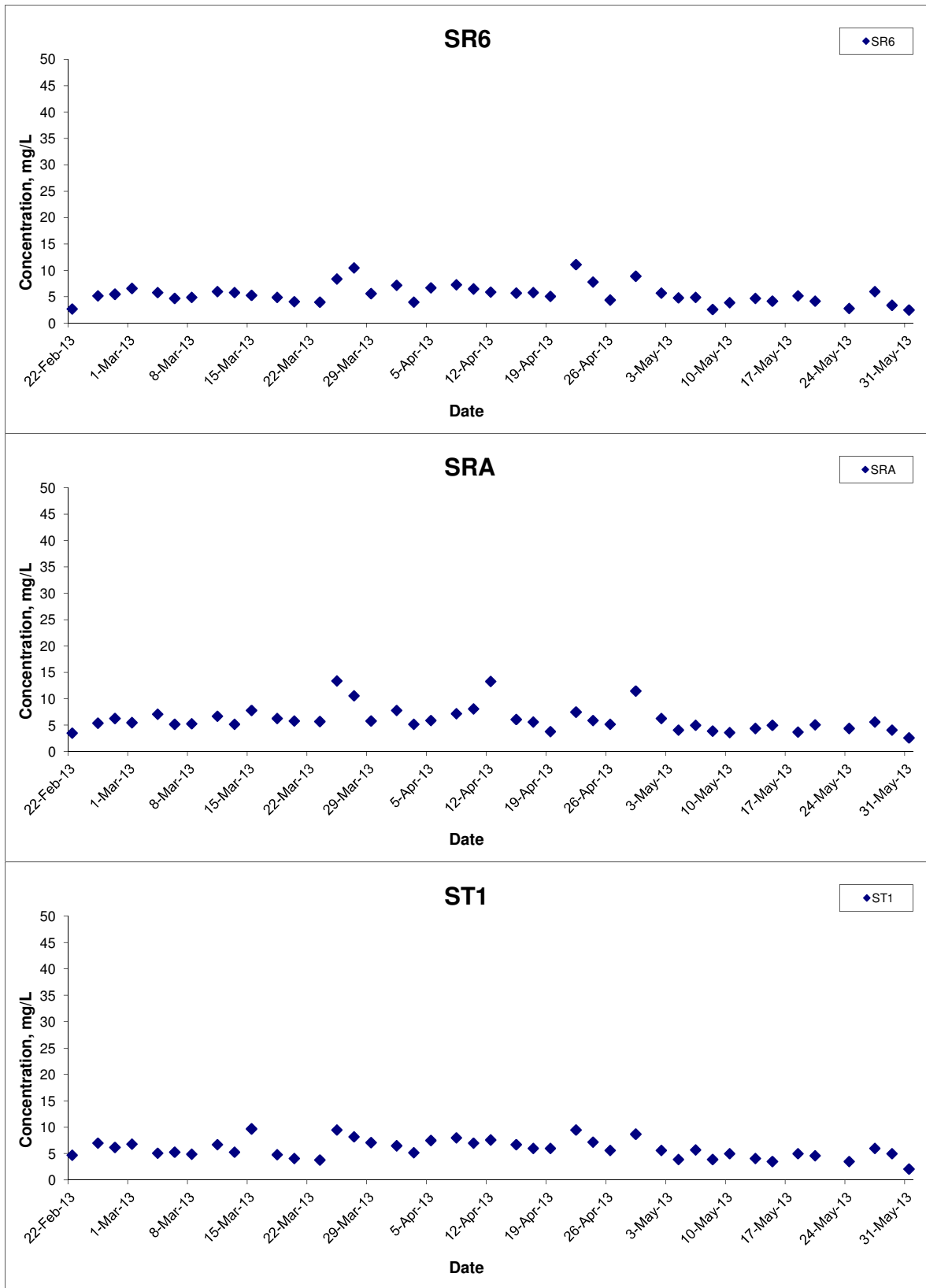
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	Graphical Presentation of Water Quality Monitoring Results	Date	May 13	Appendix E	

Suspended Solids (Depth-averaged) at Mid-Ebb Tide



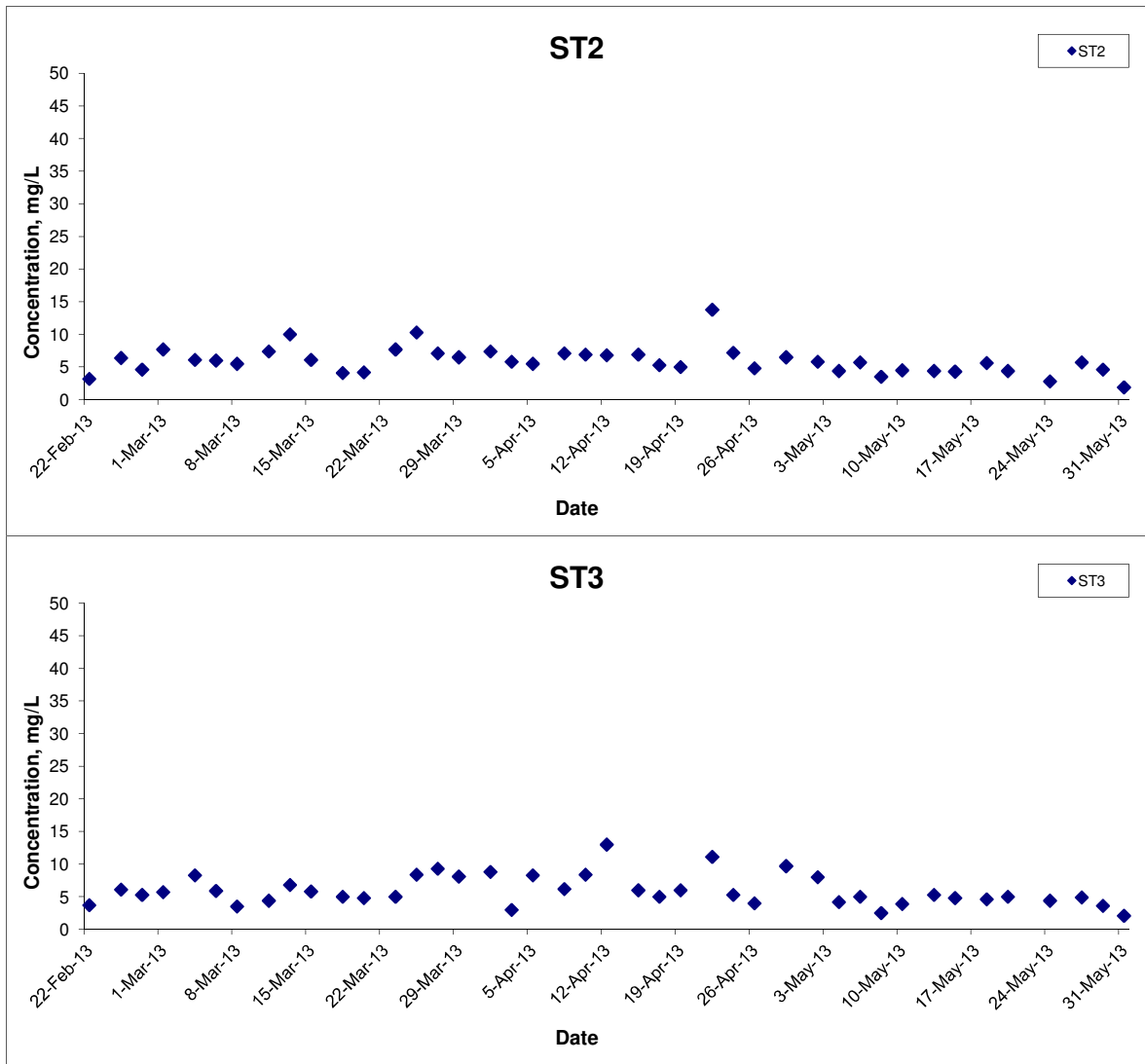
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	Graphical Presentation of Water Quality Monitoring Results	Date	May 13	Appendix	E	

Suspended Solids (Depth-averaged) at Mid-Ebb Tide



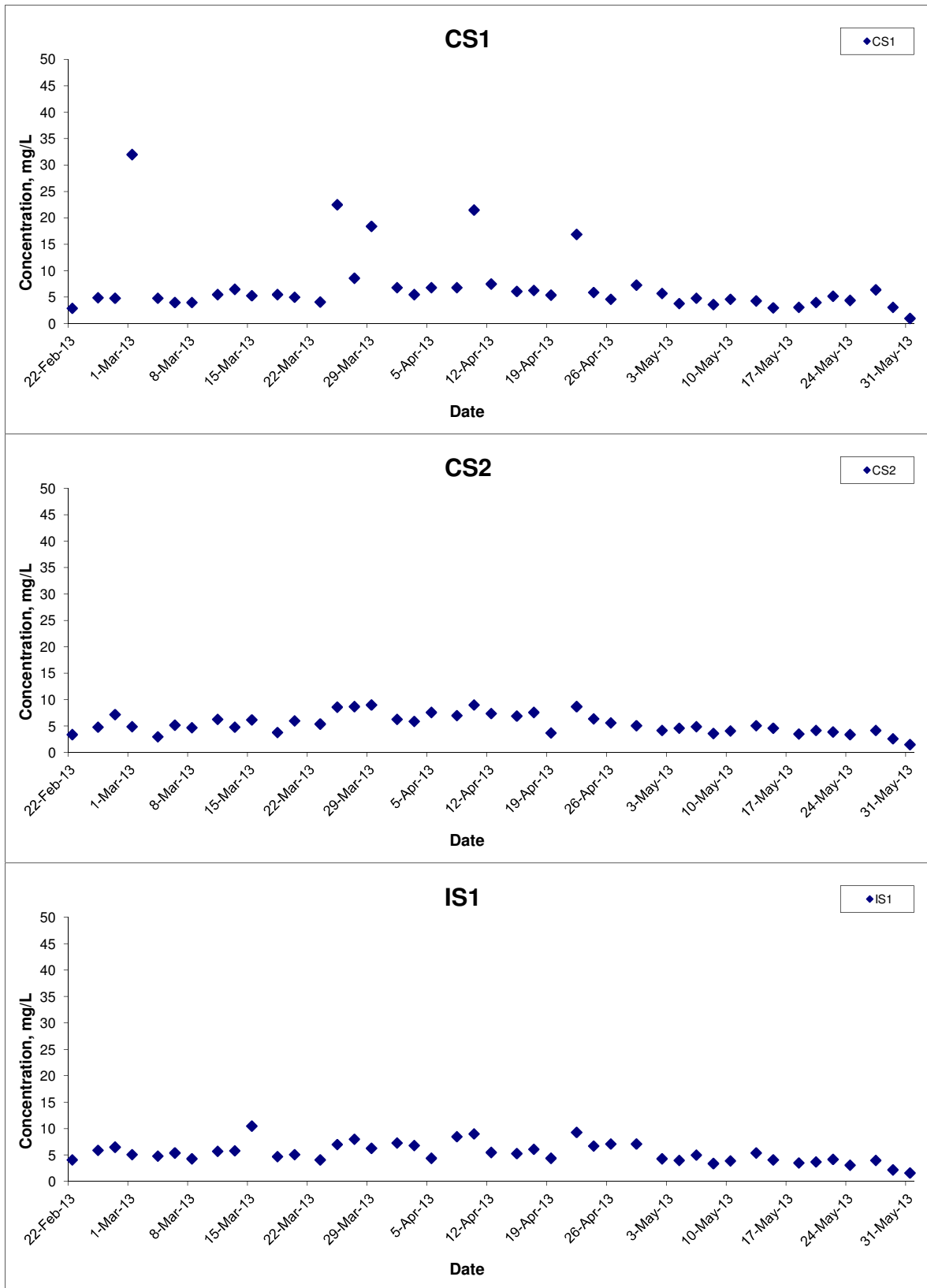
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	Graphical Presentation of Water Quality Monitoring Results	Date	May 13	Appendix	E	

Suspended Solids (Depth-averaged) at Mid-Ebb Tide



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Suspended Solids (Depth-averaged) at Mid-Flood Tide



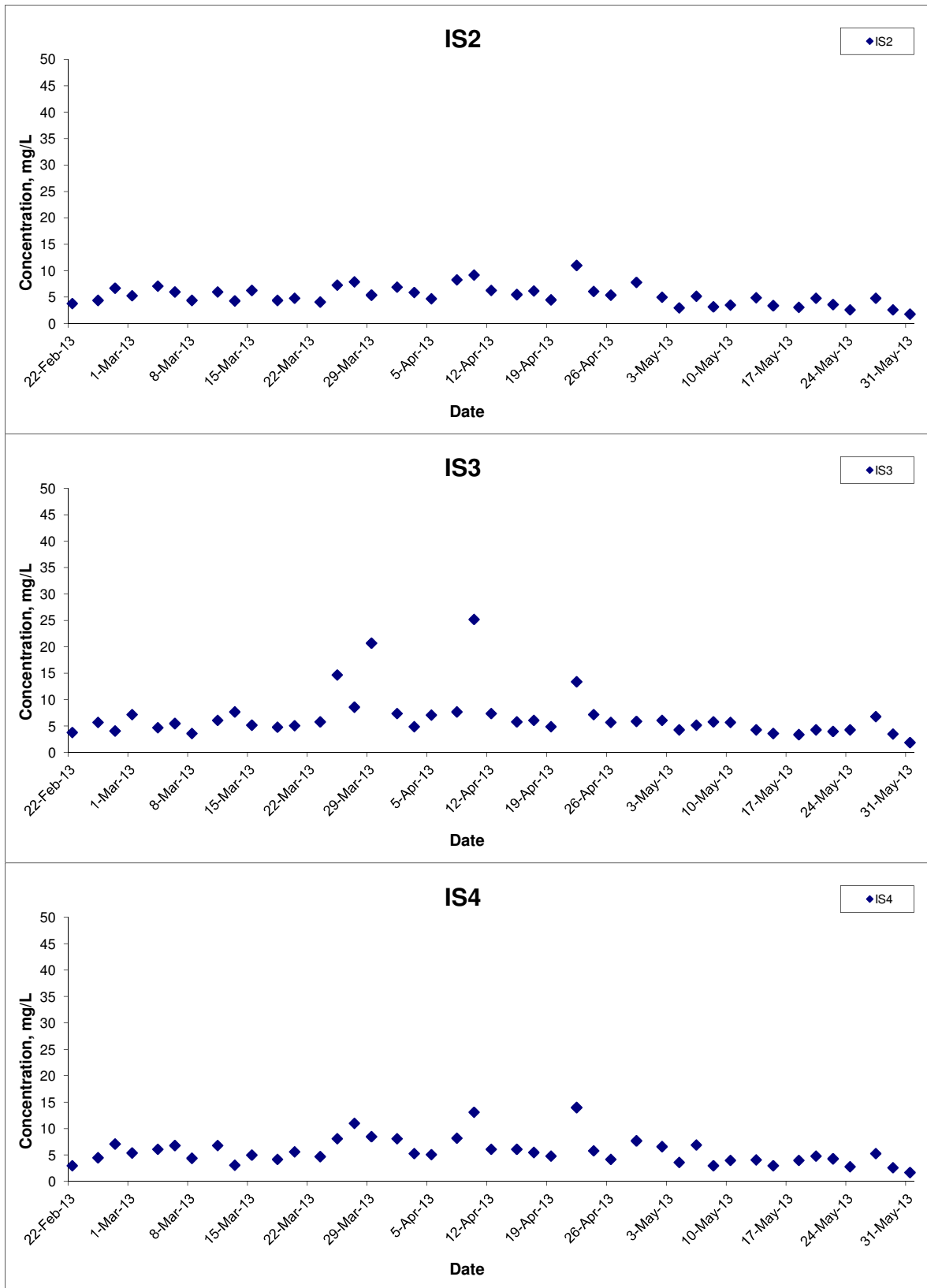
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Project No. MA12014
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Suspended Solids (Depth-averaged) at Mid-Flood Tide



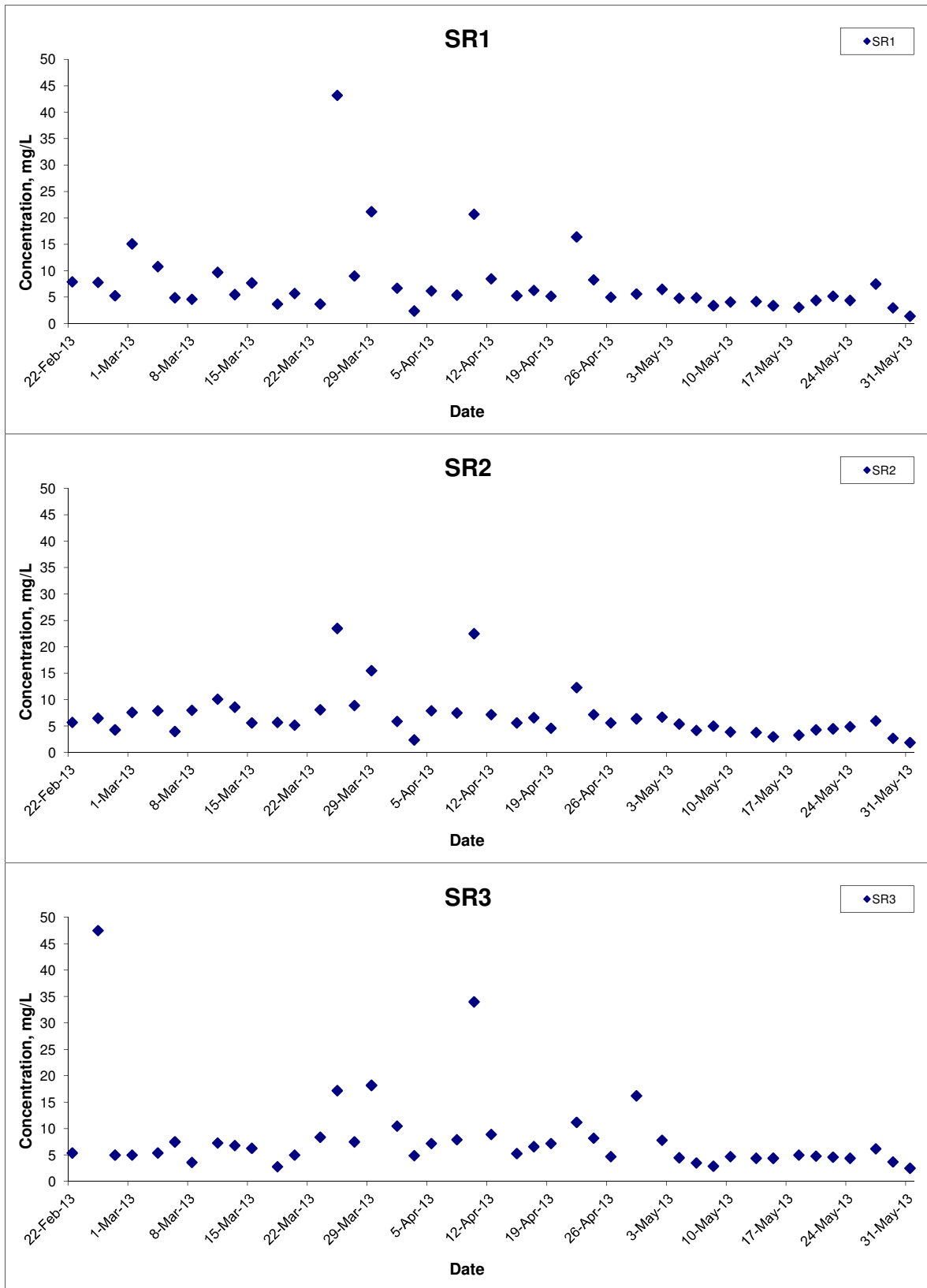
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Suspended Solids (Depth-averaged) at Mid-Flood Tide



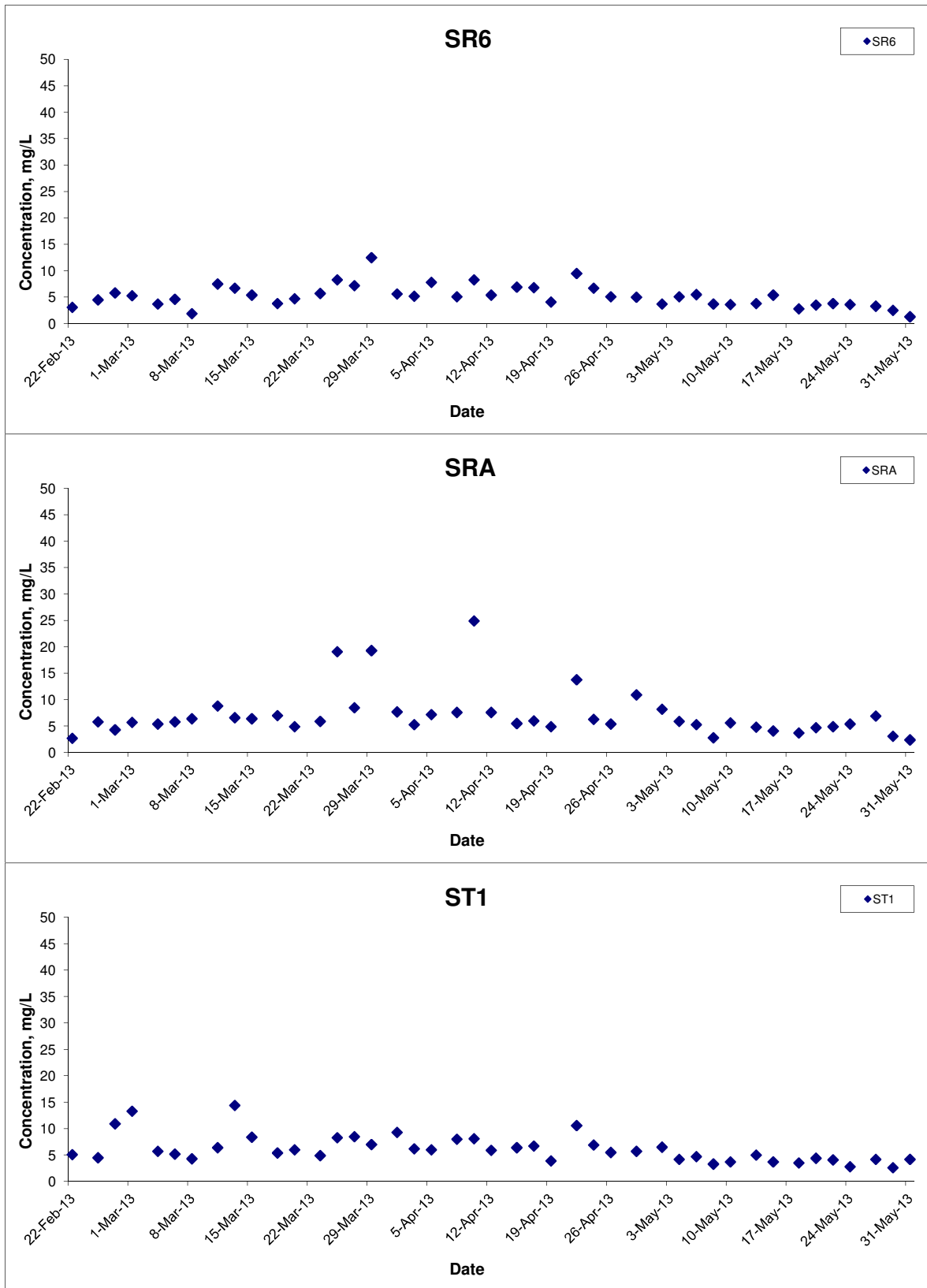
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Suspended Solids (Depth-averaged) at Mid-Flood Tide



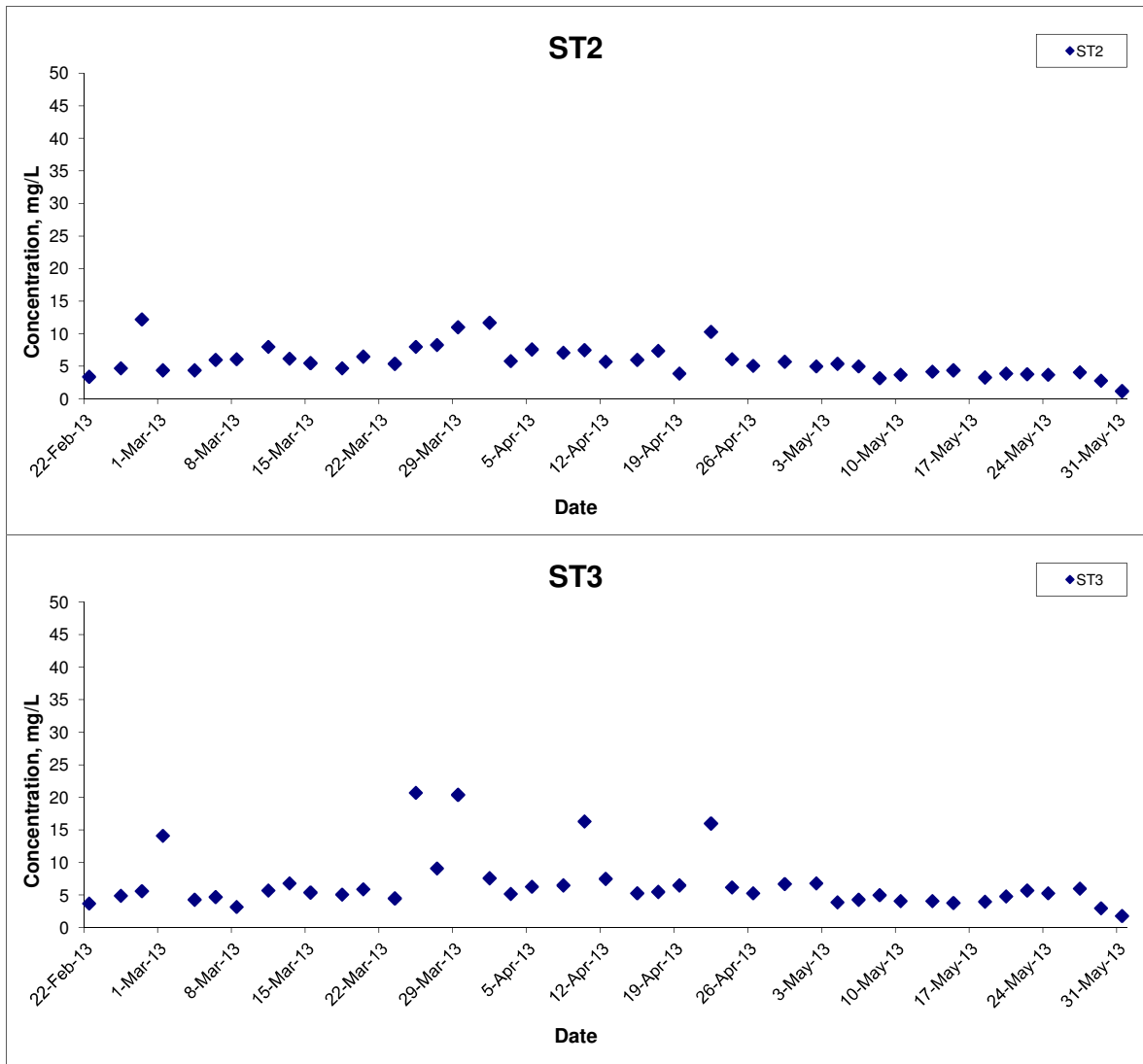
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	Graphical Presentation of Water Quality Monitoring Results	Date	May 13	Appendix E	

**APPENDIX F-1
DOLPHIN MONITORING REPORT
(LINE TRANSECT)**

Contract No. HY/2011/09
Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road –
Section between HKSAR Boundary and Scenic Hill Dolphin
Monthly Monitoring

Quarterly Progress Report (February – May 2013)

Submitted by

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

22 July 2013

1. Introduction

- 1.1. The Hong Kong Link Road (HKLR) serves to connect the Hong Kong-Zhuhai-Macao Bridge (HZMB) Main Bridge at the Hong Kong Special Administrative Region (HKSAR) Boundary and the HZMB Hong Kong Boundary Crossing Facilities (HKBCF) located at the northeastern waters of the Hong Kong International Airport.
- 1.2. According to the updated Environmental Monitoring and Audit (EM&A) Manual (for HKLR), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the West Lantau survey area as in AFCD annual marine mammal monitoring programme.
- 1.3. In November 2012, Hong Kong Cetacean Research Project (HKCRP) has been commissioned by Dragages – China Harbour – VSL JV (DCVJV) to conduct this 34-month dolphin monitoring study in order to collect data on Chinese White Dolphins during the construction phase (i.e. impact period) of the HKLR09 project in West Lantau (WL) survey area, and to analyze the collected survey data to monitor distribution, encounter rate, abundance, activities and occurrence of dolphin calves. Photo-identification will also be collected from individual Chinese White Dolphins to examine their individual range patterns and core area use.
- 1.4. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional

mitigation measures will be recommended as necessary.

1.5. This report is the first quarterly progress report under the HKLR09 construction phase dolphin monitoring programme submitted to DCVJV, summarizing the results of the surveys findings during the period of February to May 2013.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

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

Table 1. Co-ordinates of transect lines in WL survey area

Line No.		Easting	Northing		Line No.	Easting	Northing	
1	Start Point	803750	818500		7	Start Point	800200	810450
1	End Point	803750	815500		7	End Point	801400	810450
2	Start Point	803750	815500		8	Start Point	801300	809450
2	End Point	802940	815500		8	End Point	799750	809450
3	Start Point	802550	814500		9	Start Point	799400	808450
3	End Point	803700	814500		9	End Point	801430	808450
4	Start Point	803120	813600		10	Start Point	801500	807450
4	End Point	801640	813600		10	End Point	799600	807450
5	Start Point	801100	812450		11	Start Point	800300	806500
5	End Point	802900	812450		11	End Point	801750	806500
6	Start Point	802400	811500		12	Start Point	801760	805450
6	End Point	800660	811500		12	End Point	800700	805450

2.1.2. The survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data

collection that has been adopted over the last 16 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2012). For each monitoring vessel survey, a 15-m inboard vessel (*Standard 31516*) with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Steiner* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.
- 2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as

“primary” survey effort, while the survey effort being conducted along the connecting lines between parallel lines was labeled as “secondary” survey effort. According to HKCRP long-term dolphin monitoring data, encounter rates of Chinese white dolphins deduced from effort and sighting data collected along primary and secondary lines were similar in survey areas around Lantau Island (Hung 2013). Therefore, primary and secondary survey effort were both presented as on-effort survey effort in this report.

2.2. *Photo-identification Work*

- 2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 2.2.2. Two professional digital cameras (*Canon EOS 7D* and *60D* models), each equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. *Data analysis*

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

2.3.2. **Encounter rate analysis** – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in West Lantau (WL) survey area in relation to the amount of survey effort conducted during each month of monitoring survey. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone, and only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in West Lantau), which was also compared with the one deduced from the six events during the baseline period (i.e. six sets of line-transect surveys in West Lantau).

Secondly, the encounter rates were calculated using both primary and secondary survey effort collected under Beaufort 3 or below condition as in AFCD long-term monitoring study. The encounter rate of sightings and dolphins were deduced by dividing the total number of on-effort sightings (STG) and total number of dolphins (ANI) by the amount of survey effort for the entire quarterly period (March-May 2013).

2.3.3. **Quantitative grid analysis on habitat use** – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km² grids in WL survey area on GIS. Sighting densities (number of on-effort

sightings per km²) and dolphin densities (total number of dolphins from on-effort sightings per km²) were then calculated for each 1 km by 1 km grid with the aid of GIS. Sighting density grids and dolphin density grids were then further normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid was calculated by examining the survey coverage on each line-transect survey to determine how many times the grid was surveyed during the study period. For example, when the survey boat traversed through a specific grid 50 times, 50 units of survey effort were counted for that grid. With the amount of survey effort calculated for each grid, the sighting density and dolphin density of each grid were then normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort sightings per 100 units of survey effort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of dolphins per 100 units of survey effort. Among the 1-km² grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and DPSE in each 1-km² grid within the study area:

$$\text{SPSE} = ((S / E) \times 100) / \text{SA\%}$$

$$\text{DPSE} = ((D / E) \times 100) / \text{SA\%}$$

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

- 2.3.4. Behavioural analysis – When dolphins were sighted during vessel surveys, their behaviour was observed. Different activities were categorized (i.e. feeding, milling/resting, traveling, socializing) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.
- 2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month baseline monitoring period were obtained from the dolphin

sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView[®] 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

3. Monitoring Results

3.1. Summary of survey effort and dolphin sightings

- 3.1.1. During the period of February to May 2013, eight sets of systematic line-transect vessel surveys were conducted to cover all transect lines in WL survey area twice per month.
- 3.1.2. From these surveys, a total of 254.95 km of survey effort was collected, with 90.2% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). The total survey effort conducted on primary lines was 171.08 km, while the effort on secondary lines was 83.87 km. Survey effort conducted on primary and secondary lines were both considered as on-effort survey data. Summary table of the survey effort is shown in Appendix I.
- 3.1.3. During the eight sets of monitoring surveys in February to May 2013, a total of 33 groups of 114 Chinese White Dolphins were sighted. All except two sightings were made during on-effort search. Twenty-two on-effort sightings were made on primary lines, while another nine on-effort sightings were made on secondary lines. Summary table of the dolphin sightings is shown in Appendix II.
- 3.1.4. For the detailed comparison of dolphin occurrence and usage of West Lantau survey area between the impact phase and baseline phase monitoring (i.e. Section 3.2-3.7), only the quarterly data of March-May 2013 from the impact phase monitoring was used in the present report to tally with the three month period of baseline monitoring (September-November 2011). The three-month period (March-May 2013) is also consistent with seasonality period as defined in the long-term monitoring dolphin research conducted by AFCD (Hung 2012, 2013) to allow direct comparison between the baseline and impact phase monitoring data.

3.2. *Distribution*

- 3.2.1. Distribution of dolphin sightings made during monitoring surveys in March to May 2013 is shown in Figure 1. Most dolphin sightings were made in the central and southern portions of the survey area, with particular concentrations near Kai Kung Shan and Fan Lau. A few sightings were also made near Tai O Peninsula, but only one sighting was made in the northern portion of the survey area.
- 3.2.2. Only one sighting was made in the vicinity of the HKLR09 alignment in West Lantau survey area, but it should be noted that this survey area only covers part of the HKLR09 alignment while the other half overlaps with the Northwest Lantau survey area.
- 3.2.3. When compared with the sighting distribution of dolphins during baseline monitoring surveys in September to November 2011, it appears that much fewer sightings were made to the north of Tai O Peninsula while more sightings were made in the southern portion of the survey area in the present quarter (Figure 1). In addition, more sightings were made in the offshore waters of West Lantau during the baseline period than the impact monitoring period (Figure 1).
- 3.2.4. It appears that the dolphins may have temporarily shifted their distribution further south during the present impact monitoring period. It remained to be confirmed whether they have been affected by the HKLR09 construction activities in the present quarter to result in such shift in distribution, or such shift is related to seasonal fluctuation in dolphin habitat use. This will be continuously monitored and further assessed in the next quarterly period.

3.3. *Encounter rate*

- 3.3.1. During the four-month impact phase monitoring period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) from West Lantau survey area are shown in Table 2. The average encounter rates deduced from the six sets of surveys from March to May 2013 (encounter rates from February 2013 was excluded in the comparison to tally with the three-month period of baseline monitoring) were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (Table 3).
- 3.3.2. In WL, the average dolphin encounter rates (both STG and ANI) in the present three-month study period were very similar to the ones recorded in the 3-month

baseline period, indicating the dolphin usage during this impact phase monitoring period in this survey area was maintained at the same level as in the baseline phase.

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during the impact monitoring period (February - May 2013)

Survey Area	Dolphin Monitoring	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
West Lantau	Set 1 (February 19, 2013)	4.6	18.4
	Set 2 (February 25, 2013)	0.0	0.0
	Set 3 (March 8, 2013)	19.4	62.9
	Set 4 (March 22, 2013)	29.2	110.8
	Set 5 (April 9, 2013)	11.2	61.5
	Set 6 (April 17, 2013)	9.2	22.9
	Set 7 (May 6, 2013)	9.8	34.3
	Set 8 (May 14, 2013)	21.5	59.1

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (March-May 2013) and baseline monitoring period (September-November 2011) (Note: the encounter rates deduced from the baseline monitoring period have been recalculated based only on the survey effort and on-effort sighting data made along the primary transect lines under favourable conditions)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	March - May 2013	September - November 2011	March - May 2013	September - November 2011
West Lantau	16.70 ± 8.00	16.43 ± 7.70	58.59 ± 30.37	60.50 ± 38.47

3.3.3. A one-way ANOVA was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. For the comparison between the baseline period

and the present quarter (first quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.9550 and 0.9259 respectively based on the alpha value of 0.05. Therefore, no significant difference in dolphin encounter rate was detected between the baseline period and the present quarter.

3.3.4. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter (March-May 2013) using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in WL were 15.41 sightings and 56.49 dolphins per 100 km of survey effort respectively.

3.4. *Group size*

3.4.1. Group size of Chinese White Dolphins ranged from 1-12 individuals per group in WL survey area between March and May 2013. The average dolphin group sizes from these three months were compared with the one deduced from the baseline period in September to November 2011, as shown in Table 4. The average dolphin group sizes in the West Lantau region during March to May 2013 was slightly lower than the ones recorded in the 3-month baseline period (Table 4).

Table 4. Comparison of average dolphin group sizes from impact monitoring period (March-May 2013) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	March-May 2013	September-November 2011
West Lantau	3.44 ± 3.12 (n = 32)	3.63 ± 2.97 (n = 46)

3.4.2. Distribution of dolphins with larger group sizes (more than 5 animals per group) during March through May 2013 is shown in Figure 2. These larger dolphin groups were mostly sighted between Kai Kung Shan and Fan Lau (Figure 2). This was noticeably different from the baseline period, when more dolphin sightings were larger group sizes occurred near Tai O Peninsula and just to the south of the HKLR09 alignment (Figure 2). Such difference can be related to seasonal occurrence of dolphins in this survey area, and would be further assessed in the upcoming quarters to determine whether this difference is consistently detected in all four seasons.

3.5. *Habitat use*

- 3.5.1. From March to May 2013, the most heavily utilized habitats by the dolphins mainly concentrated near Kai Kung Shan, Peaked Hill and Tai O (Figures 3a and 3b). However, it should be noted that the amount of survey effort collected in each grid during the three-month period was still fairly low (6 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will be collected throughout the impact phase monitoring programme.
- 3.5.2. When compared with the habitat use pattern recorded during the baseline period, it appears that the density of dolphins in the upper portion of WL survey area was much lower during the impact monitoring period, with an apparent shift to the southern side of the survey area (Figure 4). Notably, several grids (22C-D, 23C-E) recorded high dolphin densities in the vicinity of the HKLR09 alignment during the baseline period, but these five grids recorded either no dolphin or very low dolphin density during the impact phase monitoring period (Figure 4). Notably, Grid 21F also recorded very high dolphin density during the baseline period. However, as this grid is situated in the Northwest Lantau survey area and under the jurisdiction of another HZMB EM&A contracts (i.e. HKBCF and HKLR03), and therefore will not be included in this report that solely focuses on West Lantau survey area.
- 3.5.3. Such shift can be related to seasonal occurrence of dolphins in the survey area, or the dolphins may possibly be affected by the construction activities near the HKLR09 construction site, resulting in a noticeable decline in dolphin usage in the northern portion of the survey area. This would be closely monitored and further assessed in the upcoming quarters to determine whether such difference is consistently detected in all four seasons.
- 3.6. *Mother-calf pairs*
- 3.6.1. During the three-month impact phase monitoring period, a total of four unspotted juveniles (UJ) were sighted in WL survey area, and the mothers of two of these UJs were identified (i.e. WL44 and WL94). These young calves comprised only 3.6% of all animals sighted, which was much lower to the percentage recorded during the baseline monitoring period (6.6%). Moreover, two unspotted calves (UC) were sighted during the three-month baseline period, but no UC was sighted at all during the present impact monitoring period.
- 3.6.2. These four young calves only occurred between Peaked Hill and Fan Lau during March-May 2013, which was noticeably different from the frequent occurrence of calves near Tai O Peninsula during the baseline period (Figure 5).

- 3.7. *Activities and associations with fishing boats*
- 3.7.1. A total of six and three dolphin sightings were associated with feeding and socializing activities respectively during the three-month impact monitoring period, comprising of 18.8% and 9.4% of the total number of dolphin sightings. Both percentages were higher than the percentages recorded during the baseline period (feeding activity: 13.0%; socializing activity: 6.5%). Only a lone dolphin was engaged in traveling activity in the present impact monitoring period, while this behaviour was not observed at all during the baseline period.
- 3.7.2. Distribution of dolphins engaged in different activities during the three-month study period is shown in Figure 6. The feeding and socializing activities were scattered between Tai O Peninsula and Fan Lau with no apparent concentration. This is slightly different from the baseline period, when most feeding and socializing activities were concentrated between Tai O Peninsula and Kai Kung Shan (Figure 6).
- 3.7.3. During the three-month period, only one dolphin group were found to be associated with an operating gill-netter, comprising of 3.1% of all dolphin groups. This was lower than the percentage recorded in baseline period (6.5%) in which all three sightings were associated with operating pair-trawlers. The low percentage of fishing boat association during the impact phase monitoring was likely related to the recent trawl ban being implemented in 2013 in Hong Kong waters.
- 3.8. *Summary of photo-identification works*
- 3.8.1. From February to May 2013, over 4,000 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, 38 individuals sighted 61 times altogether were identified (see summary table in Appendix III). Most identified individuals were sighted only once or twice during the four-month period, with the exception of four individuals being sighted thrice (WL116, WL130, WL142 and WL201), and three individuals being sighted four times (SL05, WL25 and WL42).
- 3.8.3. During the four-month period, two females (WL44 and WL94) were sighted to be accompanied with their calves during their re-sightings.
- 3.9. *Individual range use*

- 3.9.1. Ranging patterns of the 38 individuals identified during the four-month study period were determined by fixed kernel method, and are shown in Appendix IV.
- 3.9.2. Among these 38 individuals, only a few were sighted near the HKLR09 alignment during the present impact monitoring period, and these individual dolphins mainly focused their range use in North Lantau waters (e.g. CH34, NL37, WL05) instead of West Lantau waters.
- 3.9.3. On the contrary, most individuals were sighted far away from the HKLR09 alignment, which coincided with the infrequent occurrence of dolphins in the upper portion of West Lantau survey area during the present quarter. The 95% UD ranges of these individuals overlapped with HKLR09 alignment (e.g. CH108, WL25, WL42, WL72, WL116) where they used to occur in the past. It is possible that they may have shifted their range use further south in light of the increased disturbance from the construction activities.
- 3.9.4. Notably, the ranging patterns of several individuals (e.g. CH38, SL05, WL84, WL144) do not overlap with the HKLR09 alignment at all, but mostly located around the southwestern side of Lantau Island. It is likely that the impact of HKLR09 construction activities will be minimal to these individuals during the impact phase.

4. **Conclusion**

- 4.1. During this quarter of dolphin monitoring, no adverse impact from the activities of this construction project on Chinese White Dolphins was noticeable from general observations, and the dolphin occurrence in West Lantau survey area remained the same as in the baseline period.
- 4.2. Although the average dolphin encounter rates in the present three-month study period were similar to the ones in the three-month baseline monitoring period, the spatial occurrence of dolphins appeared to be noticeably different between the two periods, with lower usage of the area to the north of Tai O Peninsula (i.e. the vicinity of HKLR09 construction site) during the present impact monitoring period.
- 4.3. Dolphin usage in West Lantau waters should be continuously monitored, to examine whether such avoidance of the northern portion of the study area by

the dolphins will continue in the upcoming quarters.

5. **References**

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Hung, S. K. 2012. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2011-12). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 120 pp.

Hung, S. K. 2013. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2012-13). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 168 pp.

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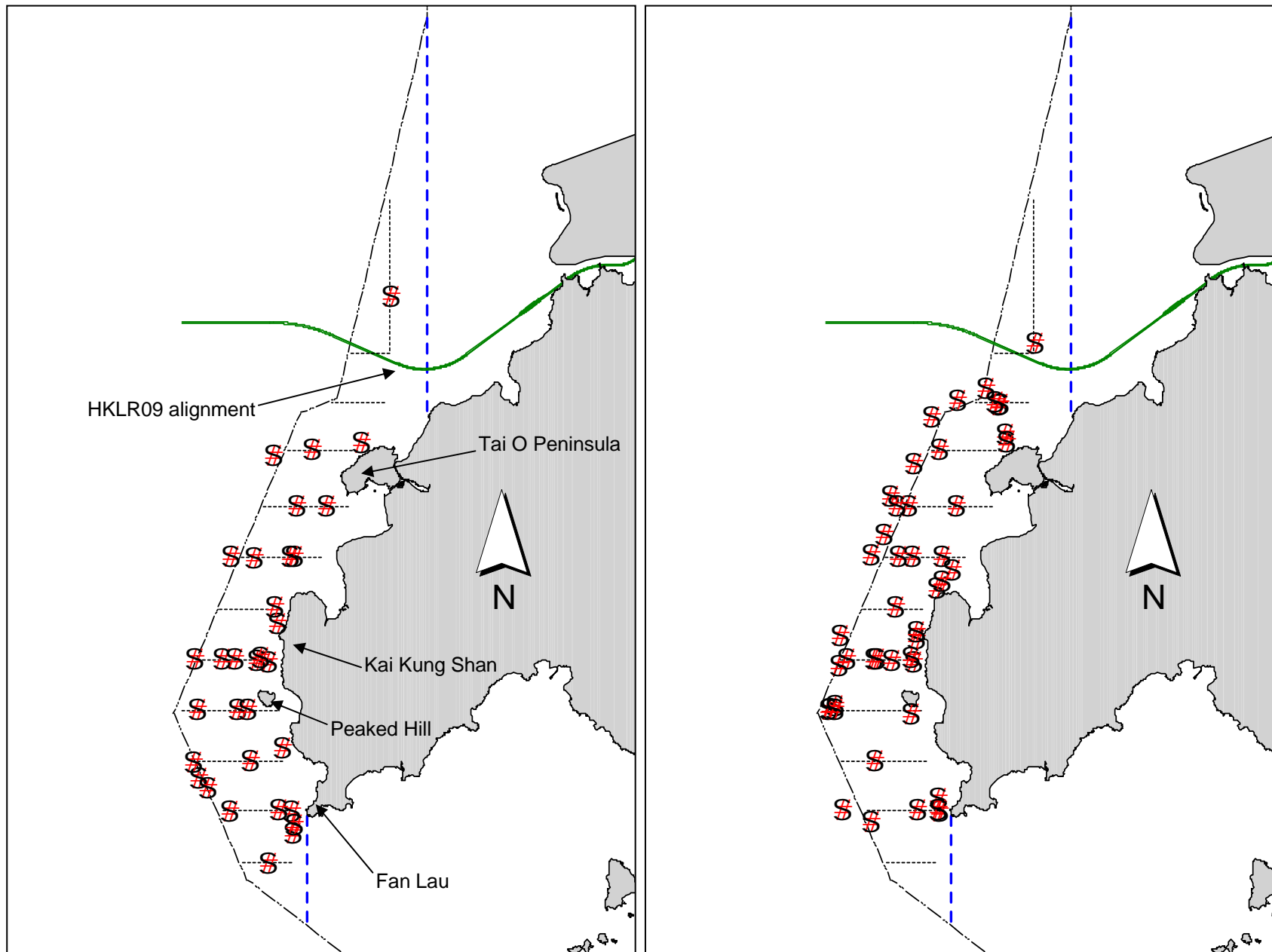


Figure 1. Distribution of Chinese white dolphin sighting in West Lantau during HKLR09 impact phase (left: March-May 2013) and baseline monitoring surveys (right: September-November 2011)

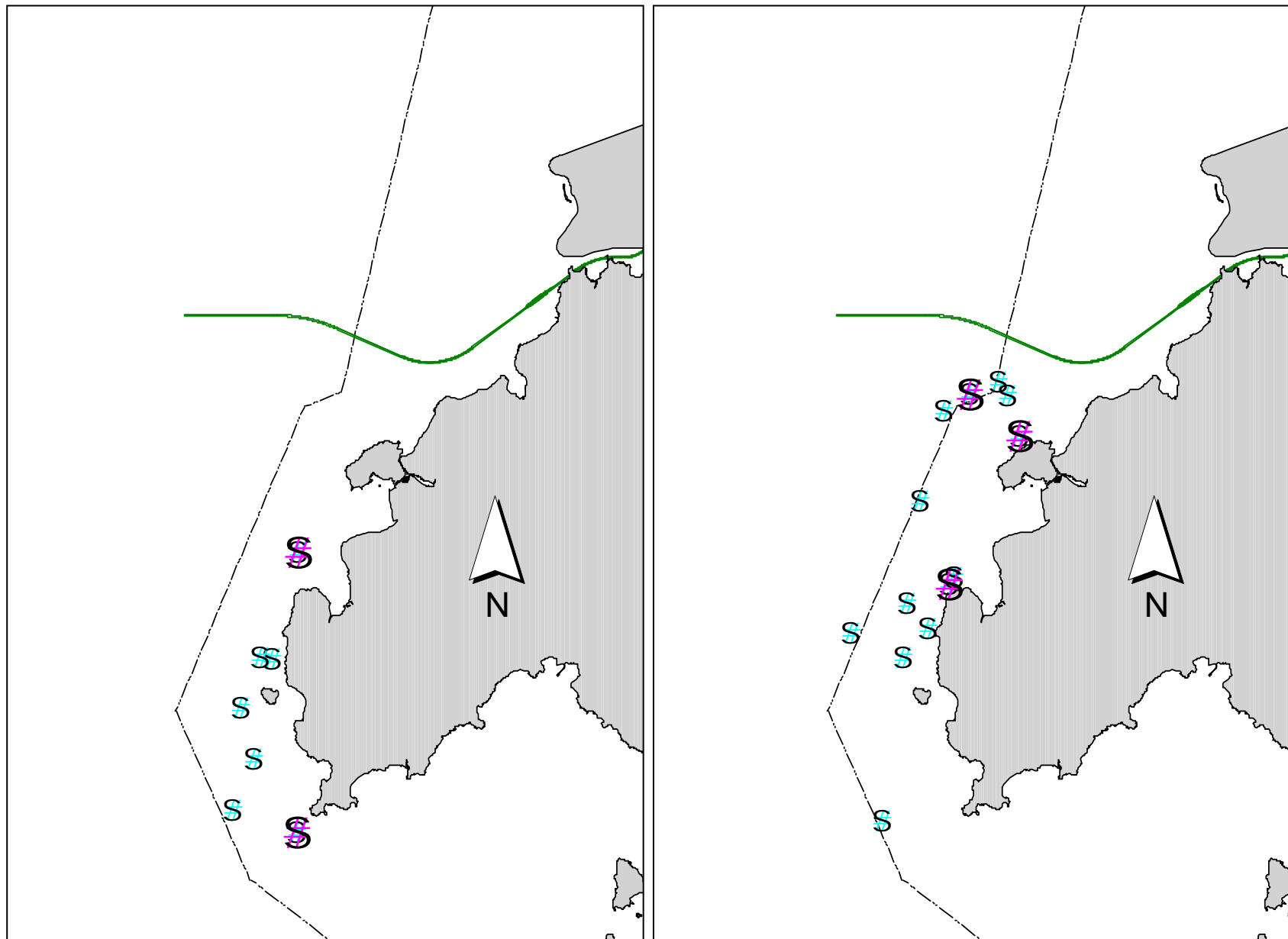


Figure 2. Distribution of Chinese white dolphins with larger group sizes during HKLR09 impact phase (left: March-May 2013) and baseline monitoring surveys (right: September-November 2011) (blue dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

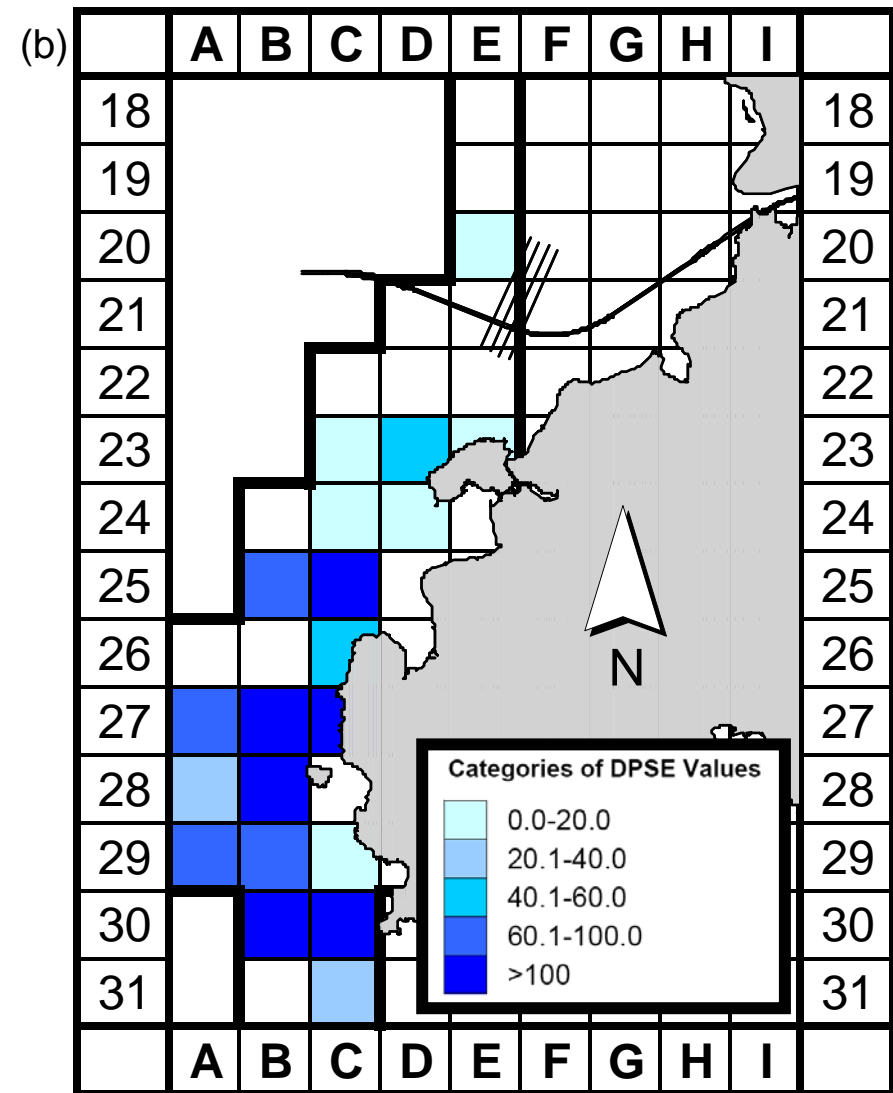
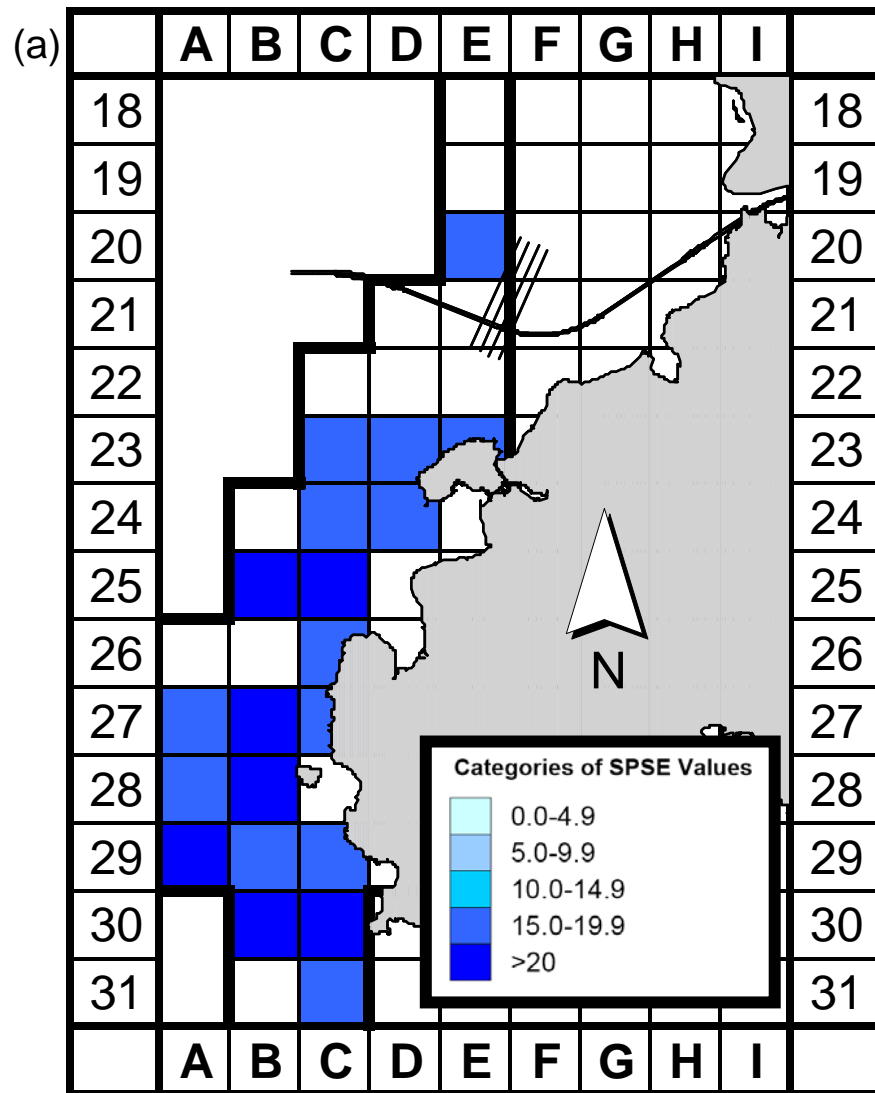


Figure 3a. Sighting density of Chinese white dolphins with corrected survey effort per km² in West Lantau survey area, using data collected during HKLR09 impact monitoring period (March-May 2013) (SPSE = no. of on-effort sightings per 100 units of survey effort)

Figure 3b. Density of Chinese white dolphins with corrected survey effort per km² in West Lantau survey area, using data collected during HKLR09 impact monitoring period (March-May 2013) (DPSE = no. of dolphins per 100 units of survey effort)

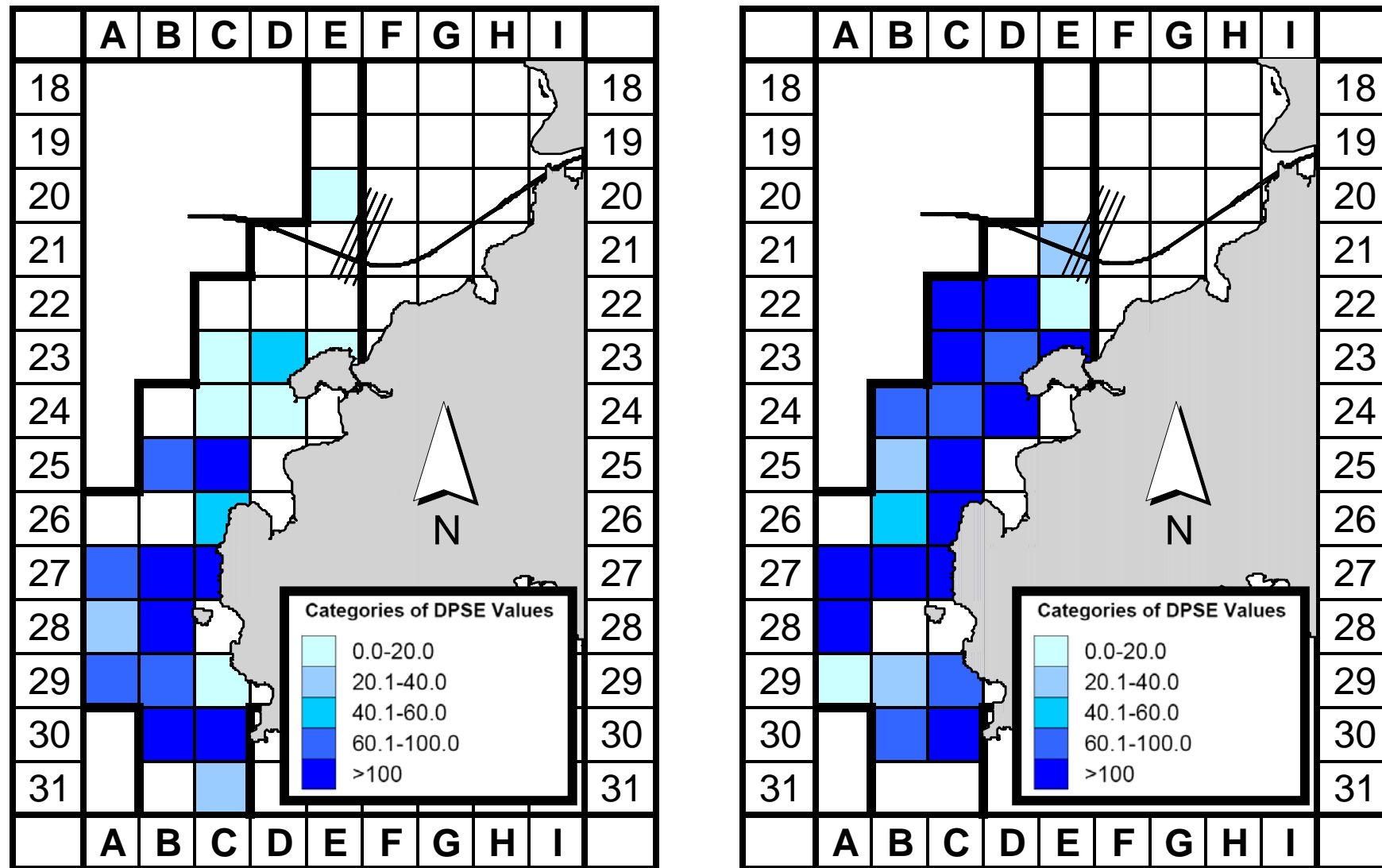


Figure 4. Comparison of density of Chinese white dolphins with corrected survey effort per km² in West Lantau survey area between the impact monitoring period (March-May 2013; left) and baseline monitoring period (September-November 2011; right) (DPSE = no. of dolphins per 100 units of survey effort)

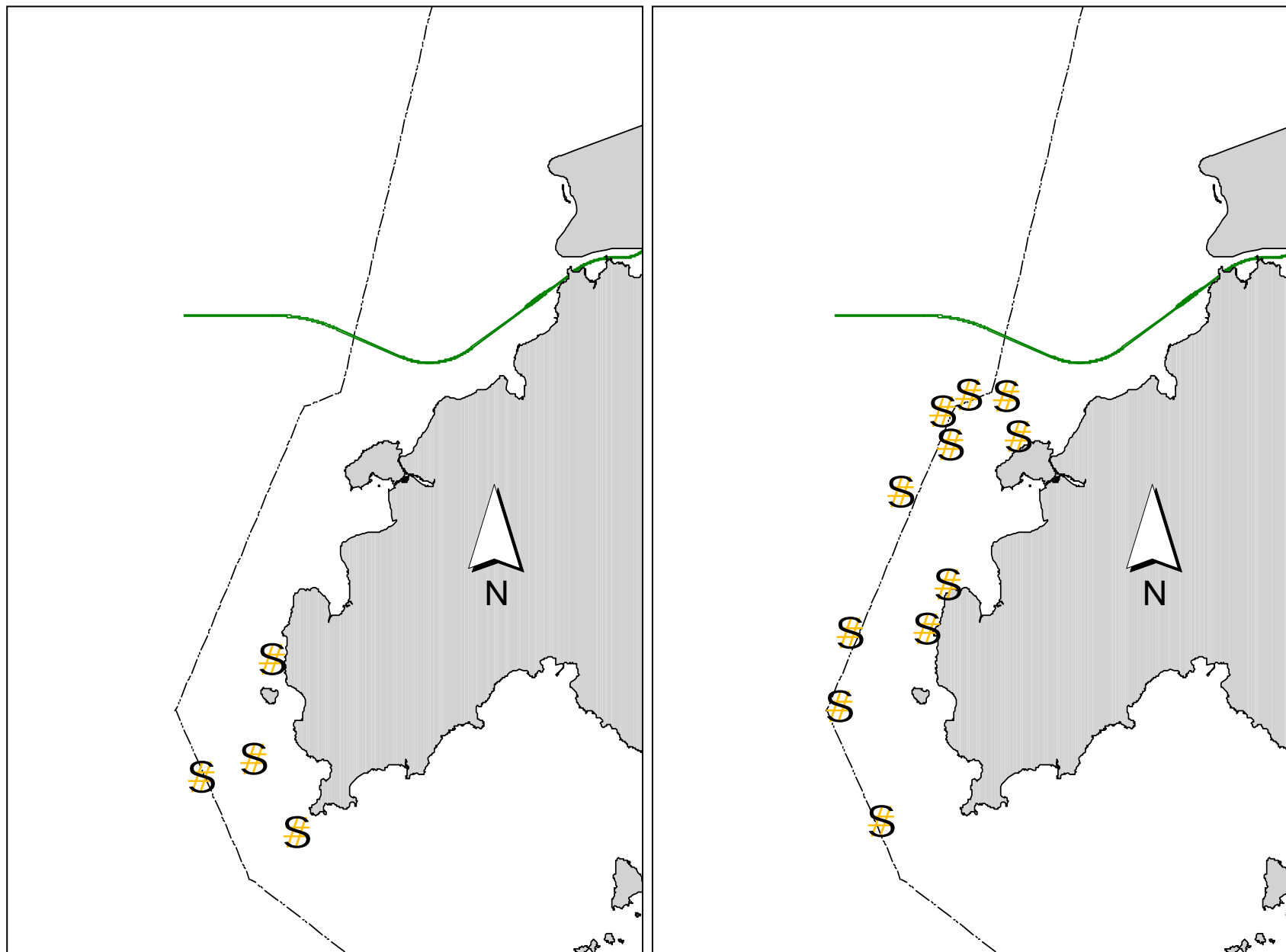


Figure 5. Distribution of young calves of Chinese white dolphins during HKLR09 impact phase (left: March-May 2013) and baseline monitoring surveys (right: September-November 2011)

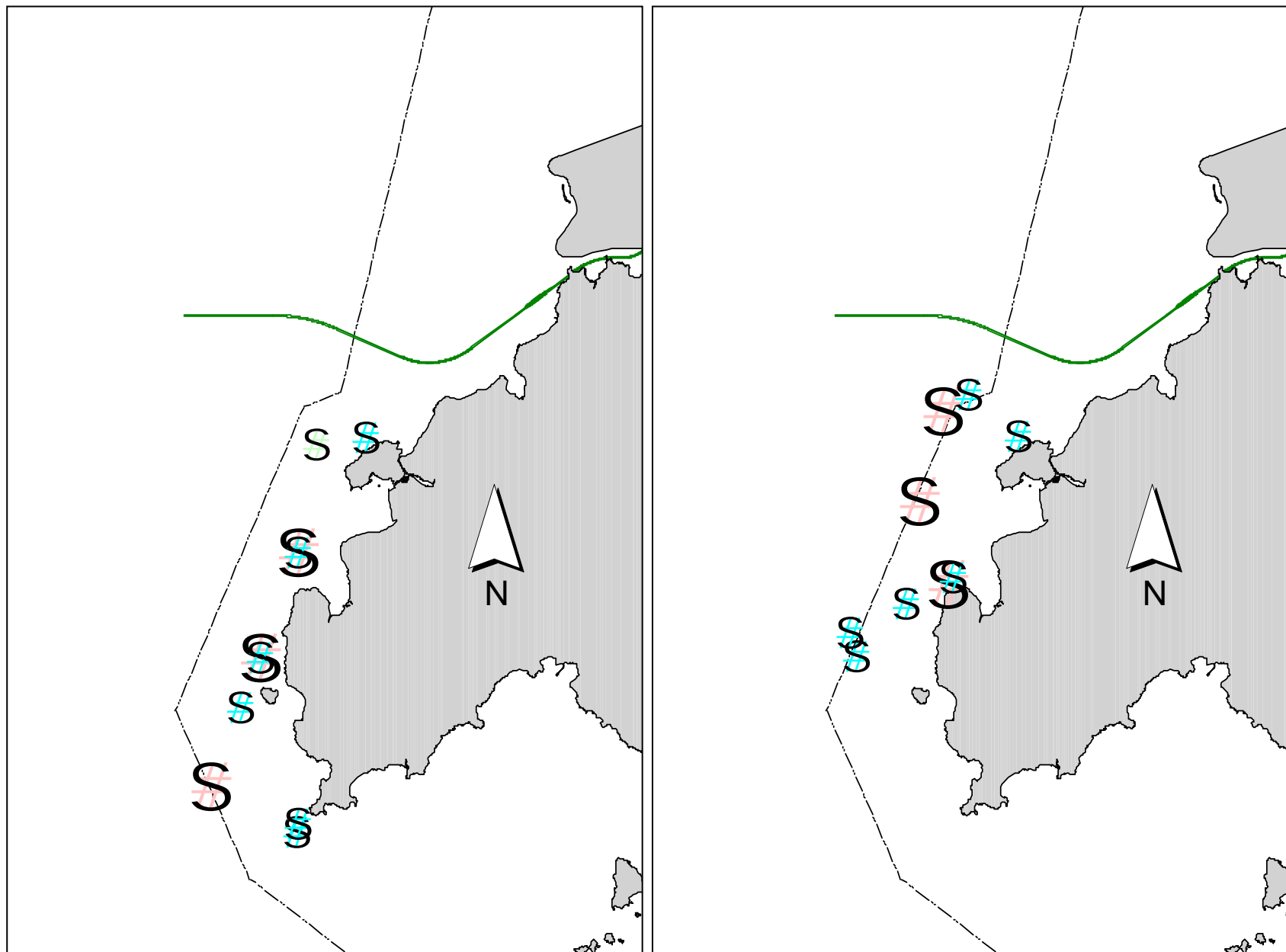


Figure 6. Distribution of Chinese white dolphins engaged in feeding (blue dots), socializing (pink dots) and traveling (green dots) activities during HKLR09 impact phase (left: March-May 2013) and baseline monitoring surveys (right: September-November 2011)

Appendix I. HKLR09 Survey Effort Database (February-May 2013)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
19-Feb-13	W LANTAU	0	6.00	WINTER	STANDARD31516	HKLR	P
19-Feb-13	W LANTAU	1	7.50	WINTER	STANDARD31516	HKLR	P
19-Feb-13	W LANTAU	2	3.10	WINTER	STANDARD31516	HKLR	P
19-Feb-13	W LANTAU	3	5.10	WINTER	STANDARD31516	HKLR	P
19-Feb-13	W LANTAU	0	2.40	WINTER	STANDARD31516	HKLR	S
19-Feb-13	W LANTAU	1	3.40	WINTER	STANDARD31516	HKLR	S
19-Feb-13	W LANTAU	2	3.10	WINTER	STANDARD31516	HKLR	S
19-Feb-13	W LANTAU	3	2.20	WINTER	STANDARD31516	HKLR	S
25-Feb-13	W LANTAU	2	6.20	WINTER	STANDARD31516	HKLR	P
25-Feb-13	W LANTAU	3	6.80	WINTER	STANDARD31516	HKLR	P
25-Feb-13	W LANTAU	4	8.80	WINTER	STANDARD31516	HKLR	P
25-Feb-13	W LANTAU	2	6.30	WINTER	STANDARD31516	HKLR	S
25-Feb-13	W LANTAU	3	2.70	WINTER	STANDARD31516	HKLR	S
25-Feb-13	W LANTAU	4	2.20	WINTER	STANDARD31516	HKLR	S
8-Mar-13	W LANTAU	1	13.41	SPRING	STANDARD31516	HKLR	P
8-Mar-13	W LANTAU	2	7.25	SPRING	STANDARD31516	HKLR	P
8-Mar-13	W LANTAU	1	7.07	SPRING	STANDARD31516	HKLR	S
8-Mar-13	W LANTAU	2	3.15	SPRING	STANDARD31516	HKLR	S
22-Mar-13	W LANTAU	1	4.19	SPRING	STANDARD31516	HKLR	P
22-Mar-13	W LANTAU	2	11.25	SPRING	STANDARD31516	HKLR	P
22-Mar-13	W LANTAU	3	1.71	SPRING	STANDARD31516	HKLR	P
22-Mar-13	W LANTAU	4	2.46	SPRING	STANDARD31516	HKLR	P
22-Mar-13	W LANTAU	1	1.34	SPRING	STANDARD31516	HKLR	S
22-Mar-13	W LANTAU	2	6.68	SPRING	STANDARD31516	HKLR	S
22-Mar-13	W LANTAU	3	1.93	SPRING	STANDARD31516	HKLR	S
22-Mar-13	W LANTAU	4	1.14	SPRING	STANDARD31516	HKLR	S
9-Apr-13	W LANTAU	2	14.70	SPRING	STANDARD31516	HKLR	P
9-Apr-13	W LANTAU	3	3.20	SPRING	STANDARD31516	HKLR	P
9-Apr-13	W LANTAU	4	3.90	SPRING	STANDARD31516	HKLR	P
9-Apr-13	W LANTAU	2	7.00	SPRING	STANDARD31516	HKLR	S
9-Apr-13	W LANTAU	3	0.00	SPRING	STANDARD31516	HKLR	S
17-Apr-13	W LANTAU	1	2.10	SPRING	STANDARD31516	HKLR	P
17-Apr-13	W LANTAU	2	18.90	SPRING	STANDARD31516	HKLR	P
17-Apr-13	W LANTAU	3	0.80	SPRING	STANDARD31516	HKLR	P
17-Apr-13	W LANTAU	1	2.00	SPRING	STANDARD31516	HKLR	S
17-Apr-13	W LANTAU	2	8.10	SPRING	STANDARD31516	HKLR	S
17-Apr-13	W LANTAU	3	1.60	SPRING	STANDARD31516	HKLR	S
6-May-13	W LANTAU	1	1.32	SPRING	STANDARD31516	HKLR	P
6-May-13	W LANTAU	2	14.65	SPRING	STANDARD31516	HKLR	P
6-May-13	W LANTAU	3	4.43	SPRING	STANDARD31516	HKLR	P
6-May-13	W LANTAU	4	1.21	SPRING	STANDARD31516	HKLR	P
6-May-13	W LANTAU	1	1.25	SPRING	STANDARD31516	HKLR	S
6-May-13	W LANTAU	2	6.94	SPRING	STANDARD31516	HKLR	S
6-May-13	W LANTAU	3	2.49	SPRING	STANDARD31516	HKLR	S
6-May-13	W LANTAU	4	0.28	SPRING	STANDARD31516	HKLR	S
14-May-13	W LANTAU	2	3.80	SPRING	STANDARD31516	HKLR	P
14-May-13	W LANTAU	3	14.80	SPRING	STANDARD31516	HKLR	P
14-May-13	W LANTAU	4	3.50	SPRING	STANDARD31516	HKLR	P
14-May-13	W LANTAU	2	1.00	SPRING	STANDARD31516	HKLR	S
14-May-13	W LANTAU	3	8.20	SPRING	STANDARD31516	HKLR	S
14-May-13	W LANTAU	4	1.40	SPRING	STANDARD31516	HKLR	S

Appendix II. HKLR09 Chinese White Dolphin Sighting Database (February-May 2013)

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

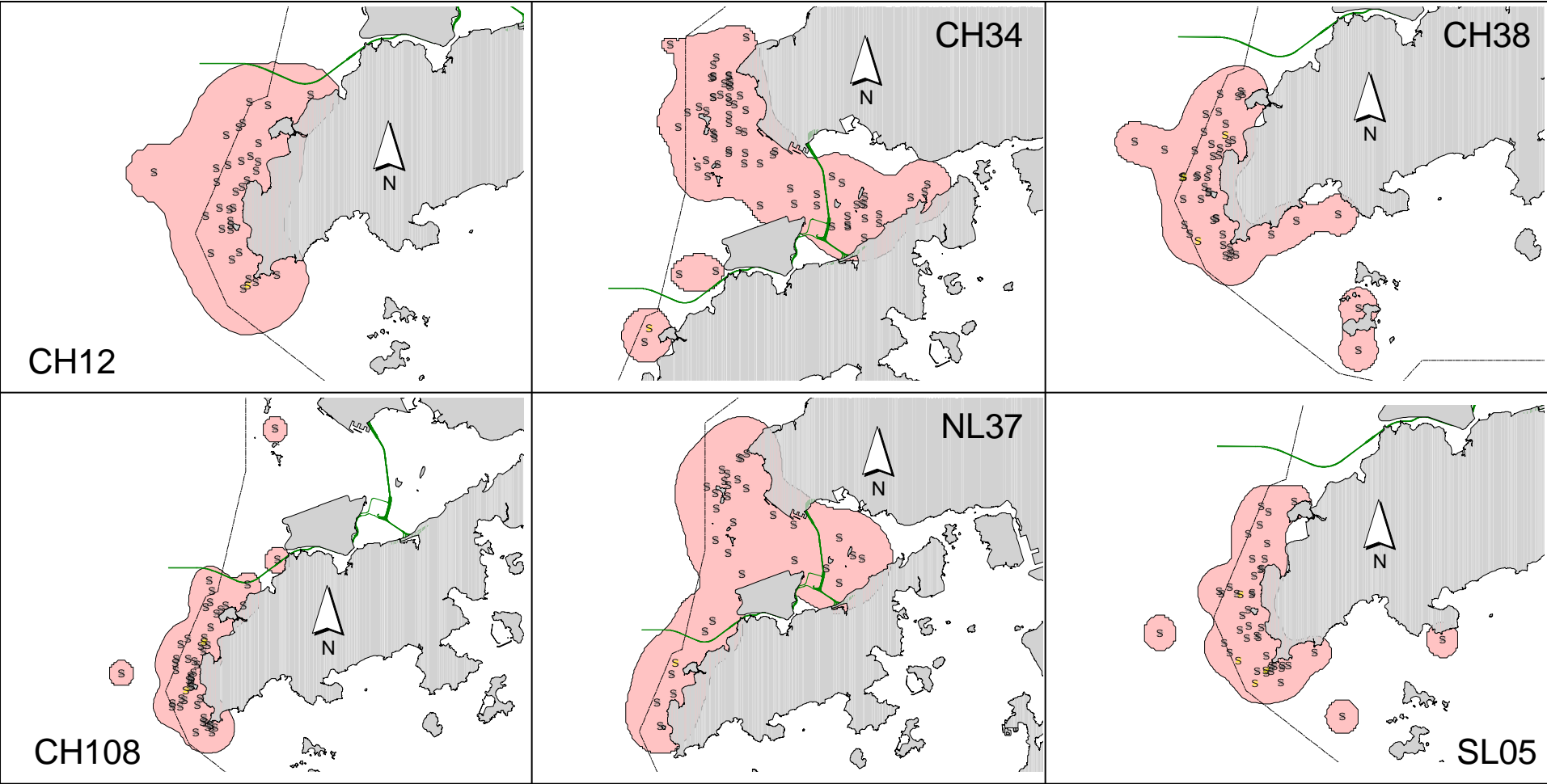
DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
19-Feb-13	1	1159	4	W LANTAU	3	533	ON	HKLR	809434	799834	WINTER	SHRIMP	P
8-Mar-13	1	1055	1	W LANTAU	1	87	ON	HKLR	813690	803163	SPRING	NONE	S
8-Mar-13	2	1118	1	W LANTAU	1	478	ON	HKLR	812451	802449	SPRING	NONE	P
8-Mar-13	3	1210	8	W LANTAU	1	40	ON	HKLR	809386	801215	SPRING	NONE	S
8-Mar-13	4	1229	1	W LANTAU	2	660	ON	HKLR	809433	800246	SPRING	NONE	P
8-Mar-13	5	1239	2	W LANTAU	2	77	ON	HKLR	808437	799749	SPRING	NONE	P
8-Mar-13	6	1306	3	W LANTAU	1	23	ON	HKLR	807097	799777	SPRING	NONE	S
8-Mar-13	7	1321	9	W LANTAU	1	424	ON	HKLR	806465	800425	SPRING	NONE	P
22-Mar-13	1	1119	1	W LANTAU	3	212	ON	HKLR	806462	801714	SPRING	NONE	S
22-Mar-13	2	1126	2	W LANTAU	3	84	ON	HKLR	806473	801446	SPRING	NONE	P
22-Mar-13	3	1144	5	W LANTAU	4	346	ON	HKLR	807449	800860	SPRING	NONE	P
22-Mar-13	4	1226	3	W LANTAU	2	0	ON	HKLR	810150	801423	SPRING	NONE	S
22-Mar-13	5	1254	12	W LANTAU	1	178	ON	HKLR	811456	801777	SPRING	NONE	P
22-Mar-13	6	1345	1	W LANTAU	2	175	ON	HKLR	812452	801831	SPRING	NONE	P
22-Mar-13	7	1400	3	W LANTAU	2	0	ON	HKLR	813559	802153	SPRING	NONE	P
22-Mar-13	8	1447	1	W LANTAU	1	119	ON	HKLR	816590	803788	SPRING	NONE	P
9-Apr-13	1	1242	4	W LANTAU	2	352	ON	HKLR	809445	799690	SPRING	NONE	P
9-Apr-13	2	1313	7	W LANTAU	2	221	ON	HKLR	808436	800574	SPRING	NONE	P
9-Apr-13	3	1404	12	W LANTAU	2	281	ON	HKLR	806019	801744	SPRING	NONE	S
17-Apr-13	1	1139	1	W LANTAU	1	160	ON	HKLR	808446	800791	SPRING	NONE	P
17-Apr-13	2	1211	4	W LANTAU	2	532	ON	HKLR	809432	800525	SPRING	NONE	P
6-May-13	1	1110	3	W LANTAU	4	458	ON	HKLR	806196	801755	SPRING	GILLNET	S
6-May-13	2	1137	4	W LANTAU	2	14	ON	HKLR	806920	799962	SPRING	NONE	S
6-May-13	3	1203	1	W LANTAU	3	186	ON	HKLR	807702	801521	SPRING	NONE	S
6-May-13	4	1301	3	W LANTAU	2	282	ON	HKLR	811447	800921	SPRING	NONE	P
6-May-13	5	1315	4	W LANTAU	2	7	ON	HKLR	811456	801684	SPRING	NONE	P
14-May-13	1	1106	1	W LANTAU	3	459	ON	HKLR	813450	801338	SPRING	NONE	P
14-May-13	2	1143	2	W LANTAU	3	159	ON	HKLR	811459	800457	SPRING	NONE	P
14-May-13	3	1204	1	W LANTAU	3	ND	OFF	HKLR	810460	801362	SPRING	NONE	
14-May-13	4	1215	6	W LANTAU	3	405	ON	HKLR	809420	800978	SPRING	NONE	P
14-May-13	5	1234	1	W LANTAU	3	ND	OFF	HKLR	809464	801071	SPRING	NONE	
14-May-13	6	1311	1	W LANTAU	4	217	ON	HKLR	807430	799664	SPRING	NONE	P
14-May-13	7	1335	2	W LANTAU	3	34	ON	HKLR	805444	801217	SPRING	NONE	P

Appendix III. Individual dolphins identified during HKLR09 monitoring surveys in February - May 2013

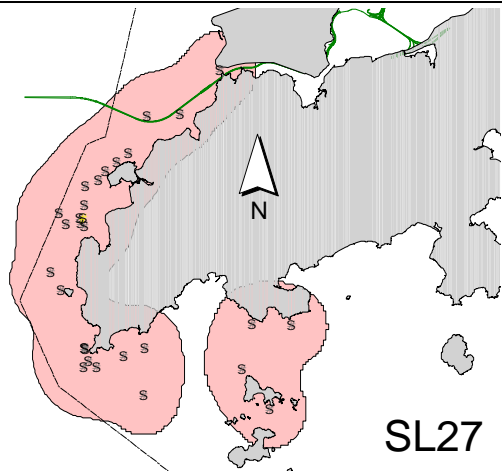
ID#	DATE	STG#	AREA
CH12	2013-04-09	3	W LANTAU
CH34	2013-03-22	7	W LANTAU
CH38	2013-03-08	7	W LANTAU
	2013-03-22	5	W LANTAU
	2013-04-09	1	W LANTAU
CH108	2013-03-22	5	W LANTAU
	2013-04-09	2	W LANTAU
NL37	2013-03-22	7	W LANTAU
SL05	2013-03-08	7	W LANTAU
	2013-04-09	3	W LANTAU
	2013-04-17	2	W LANTAU
	2013-05-14	7	W LANTAU
SL27	2013-03-22	5	W LANTAU
SL40	2013-04-09	3	W LANTAU
SL44	2013-03-22	4	W LANTAU
	2013-03-22	5	W LANTAU
SL47	2013-05-06	2	W LANTAU
WL05	2013-03-22	7	W LANTAU
WL25	2013-03-08	7	W LANTAU
	2013-04-09	2	W LANTAU
	2013-05-06	1	W LANTAU
	2013-05-06	3	W LANTAU
WL42	2013-03-08	3	W LANTAU
	2013-03-22	3	W LANTAU
	2013-04-09	1	W LANTAU
	2013-05-14	7	W LANTAU
WL44	2013-03-22	5	W LANTAU
	2013-05-14	4	W LANTAU
WL50	2013-03-08	7	W LANTAU
WL61	2013-05-06	1	W LANTAU
WL72	2013-04-09	2	W LANTAU
WL84	2013-04-09	3	W LANTAU
WL86	2013-03-08	3	W LANTAU
WL87	2013-03-22	1	W LANTAU
WL91	2013-04-17	2	W LANTAU
WL92	2013-03-22	5	W LANTAU
WL94	2013-03-22	3	W LANTAU
WL116	2013-03-08	3	W LANTAU
	2013-04-09	2	W LANTAU
	2013-04-09	3	W LANTAU

ID#	DATE	STG#	AREA
WL123	2013-04-17	2	W LANTAU
WL128	2013-04-09	3	W LANTAU
WL129	2013-04-09	1	W LANTAU
WL130	2013-03-08	6	W LANTAU
	2013-04-09	3	W LANTAU
	2013-05-14	4	W LANTAU
WL131	2013-03-22	5	W LANTAU
	2013-04-09	2	W LANTAU
WL137	2013-04-09	3	W LANTAU
WL142	2013-03-08	7	W LANTAU
	2013-03-22	4	W LANTAU
	2013-03-22	5	W LANTAU
WL144	2013-03-08	5	W LANTAU
	2013-04-09	3	W LANTAU
WL152	2013-04-17	2	W LANTAU
WL165	2013-03-08	3	W LANTAU
WL180	2013-03-08	7	W LANTAU
WL191	2013-03-22	8	W LANTAU
WL201	2013-03-22	4	W LANTAU
	2013-03-22	5	W LANTAU
	2013-04-09	2	W LANTAU
WL212	2013-05-06	5	W LANTAU

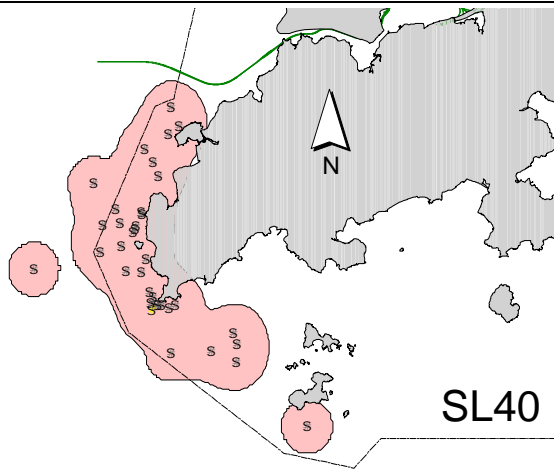
Appendix IV. Ranging patterns (95% kernel ranges) of 38 individual dolphins that were sighted during HKLR09 impact phase monitoring period (note: yellow dots indicates sightings made in March – May 2013)



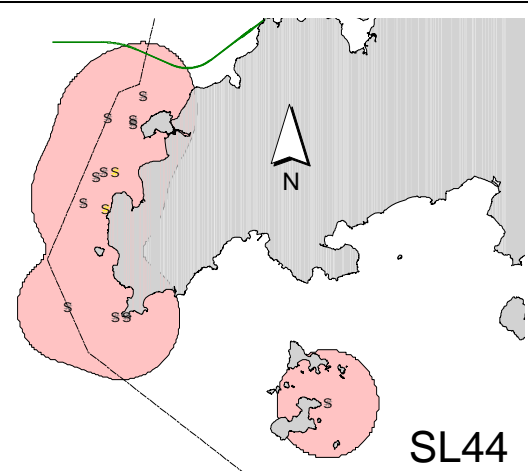
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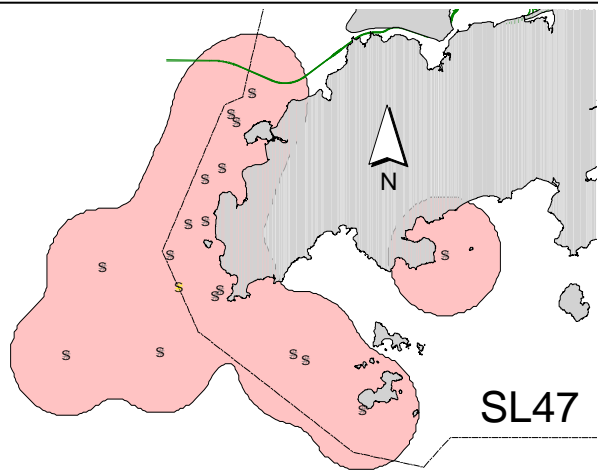
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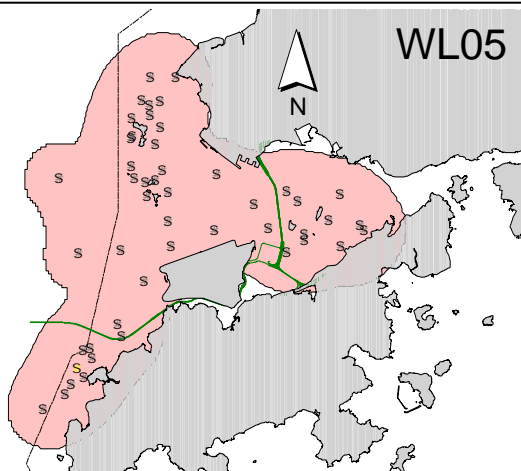
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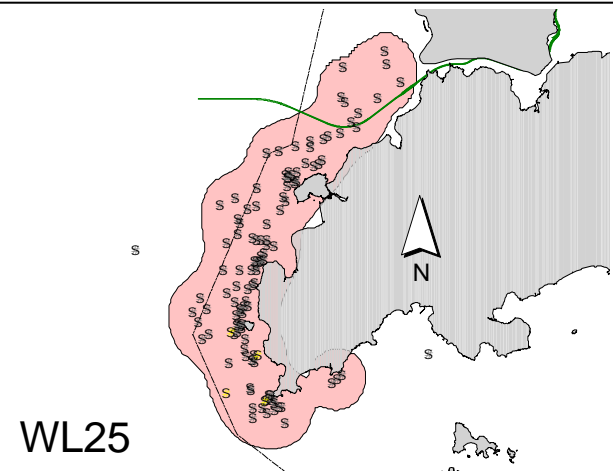
SL44



SL47

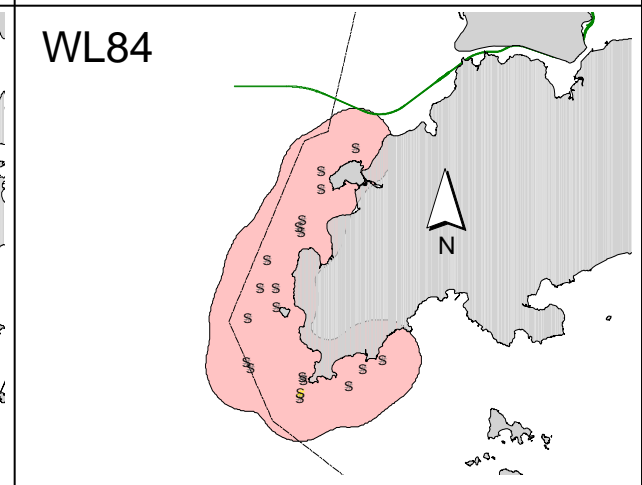
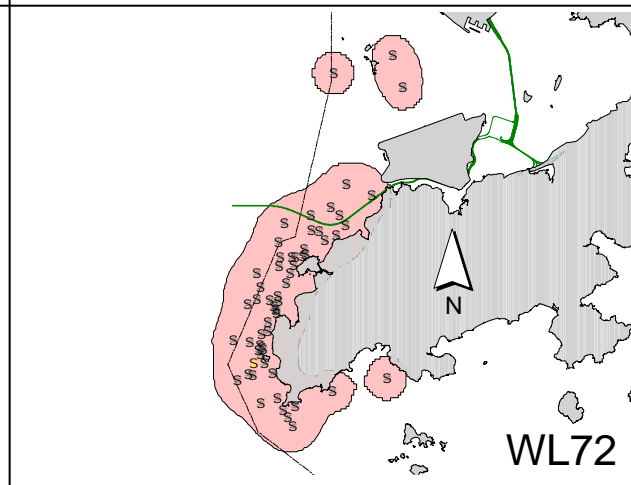
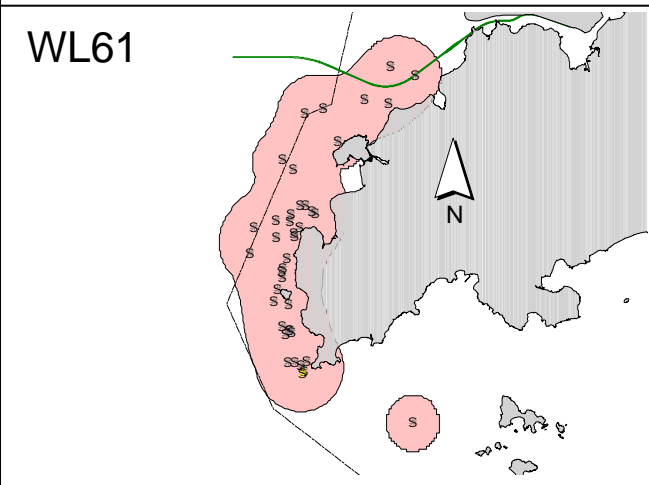
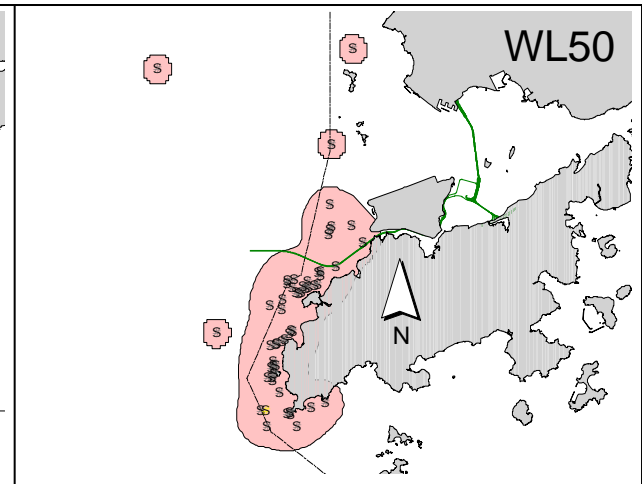
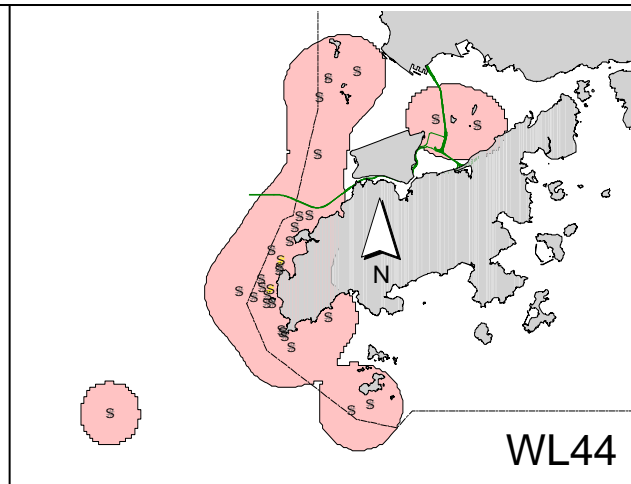
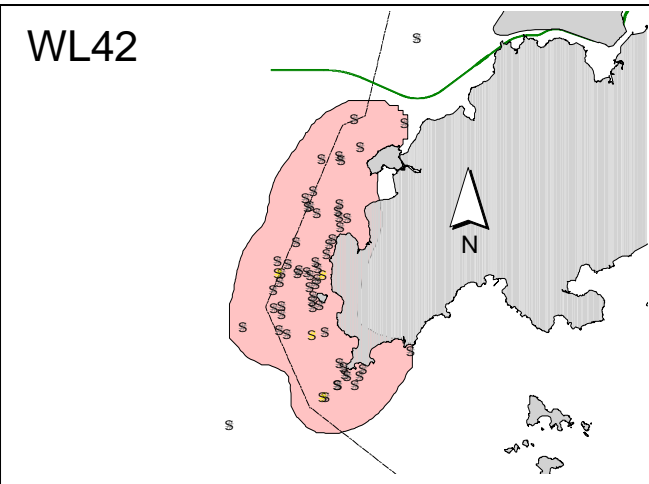


WL05

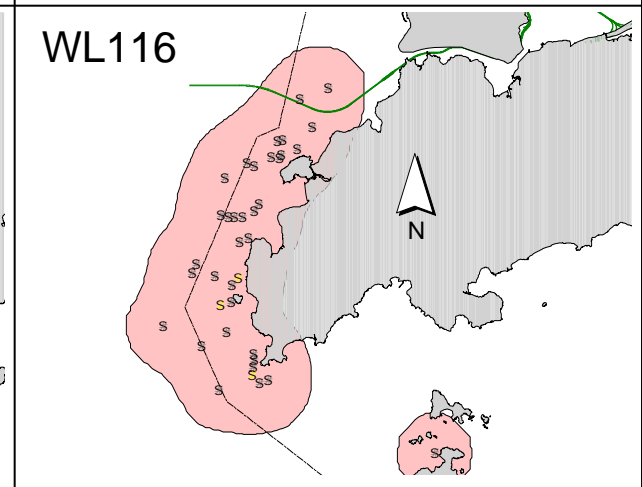
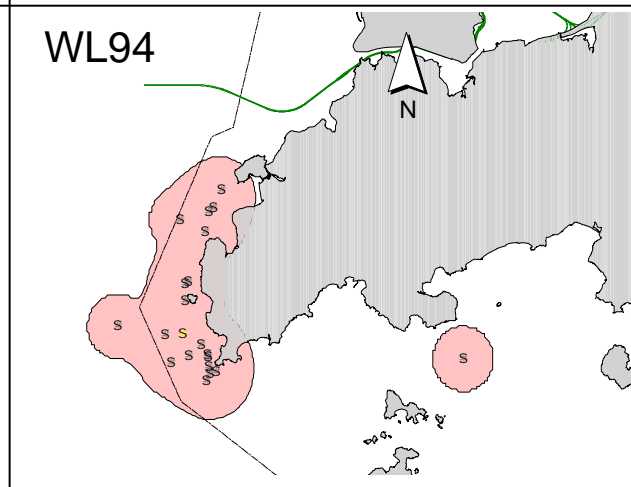
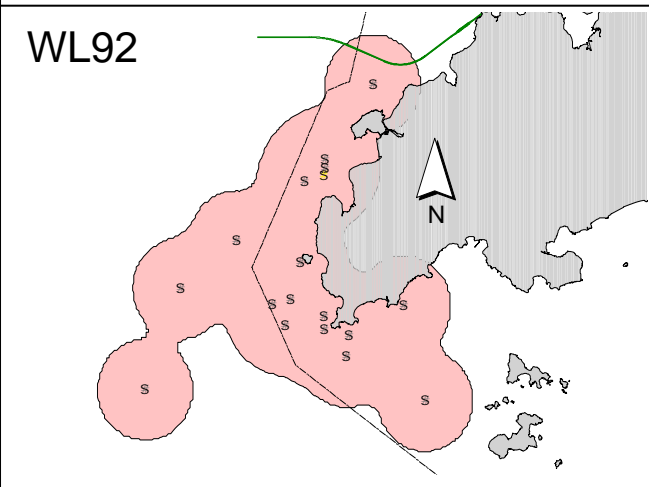
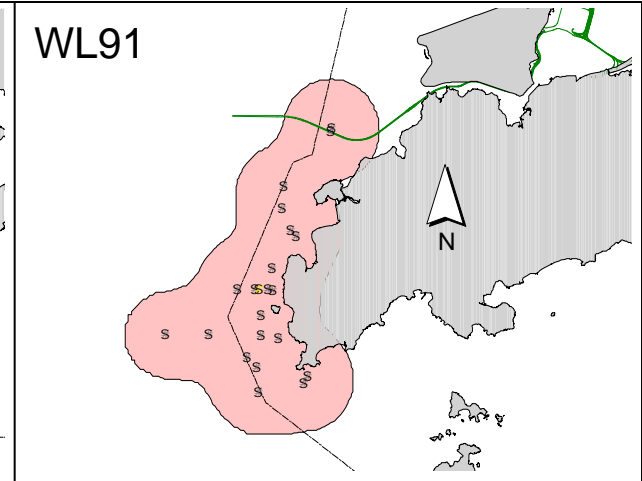
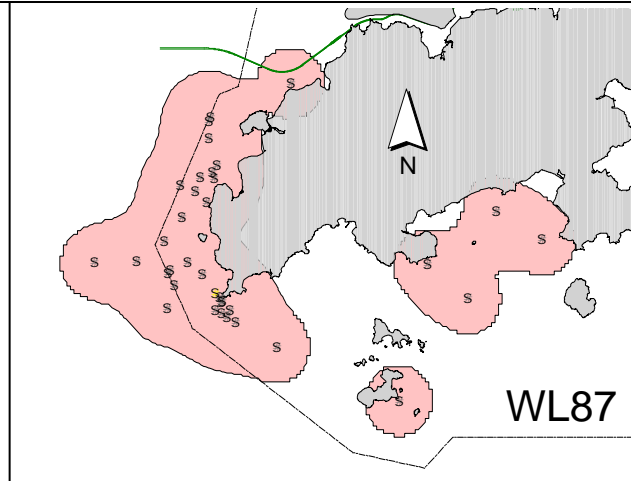
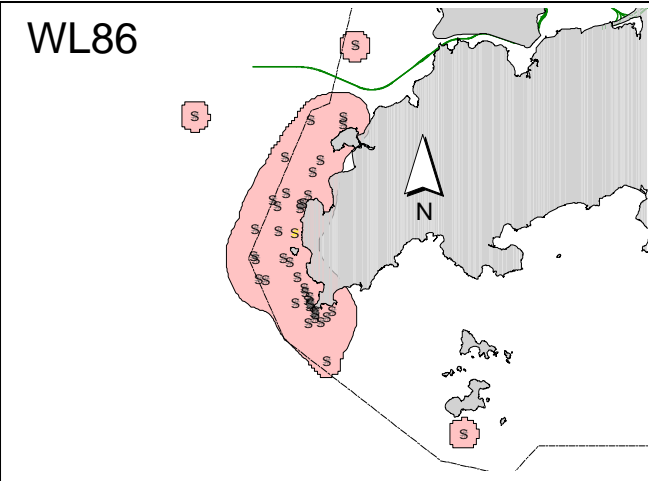


WL25

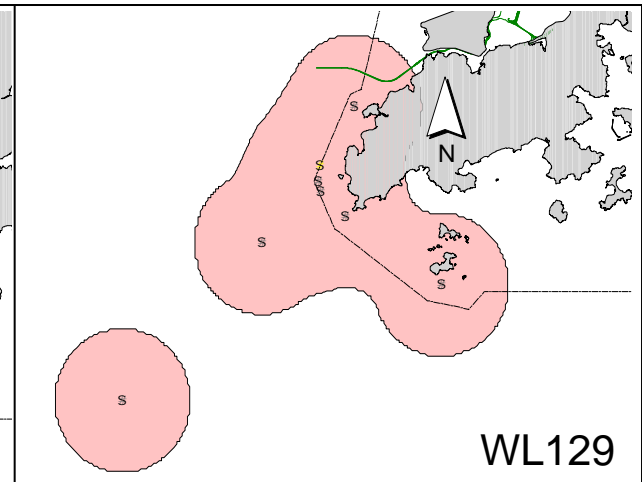
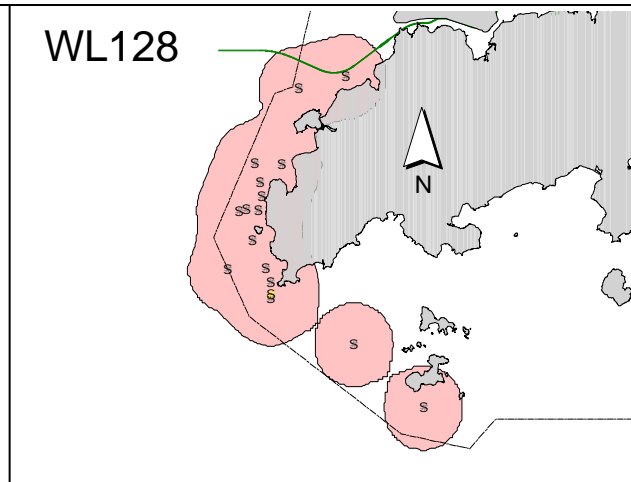
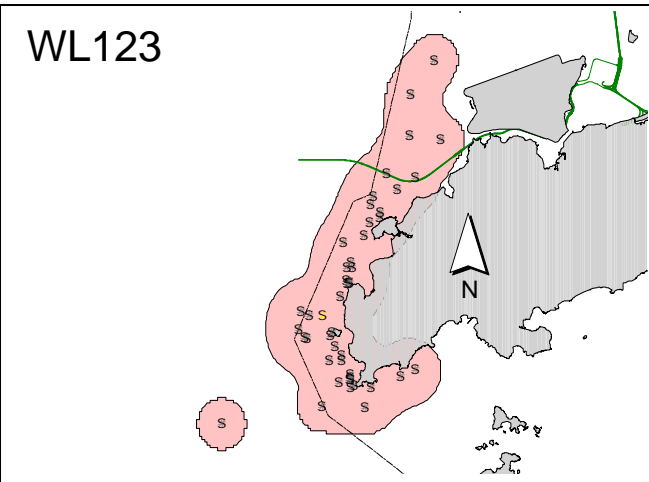
Appendix IV. (cont'd)



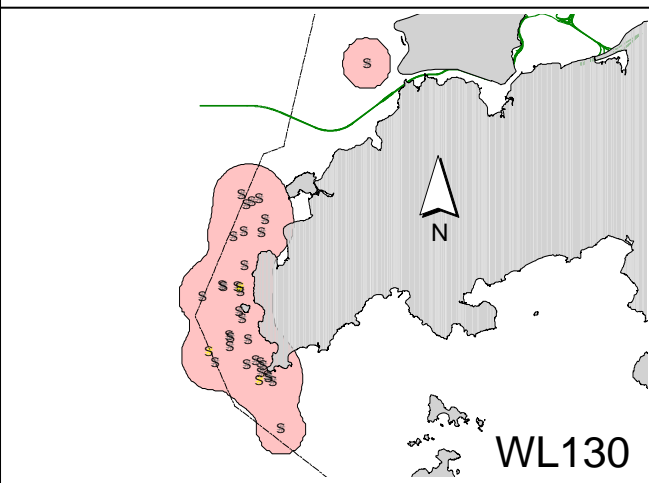
Appendix IV. (cont'd)



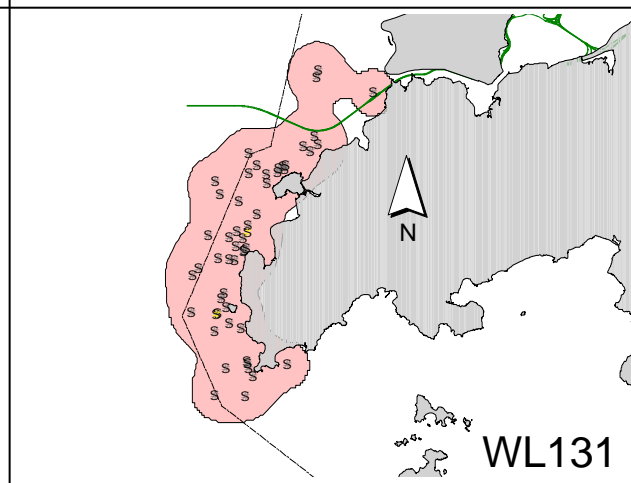
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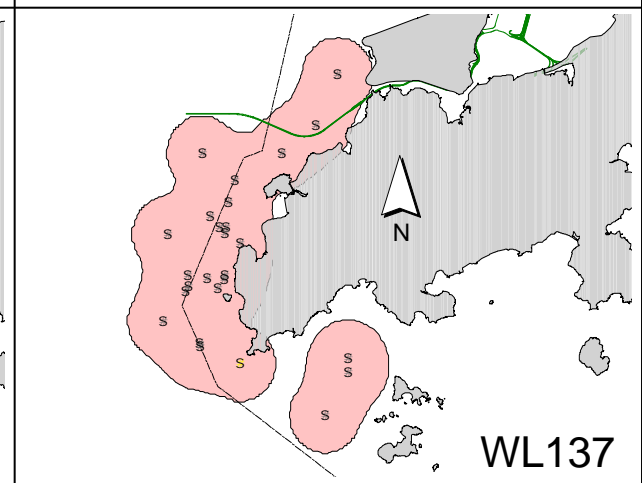
WL129



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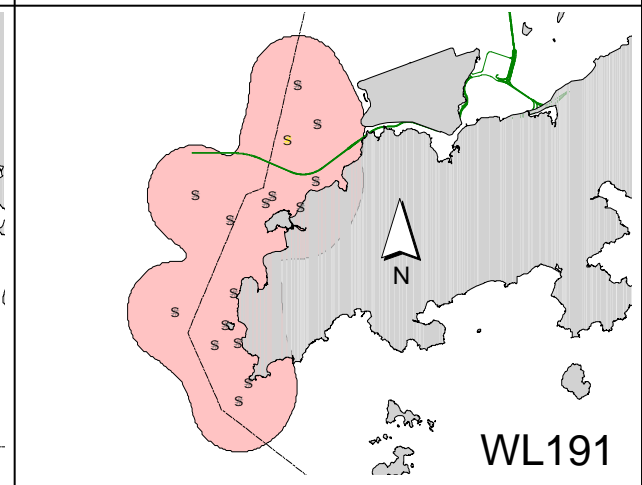
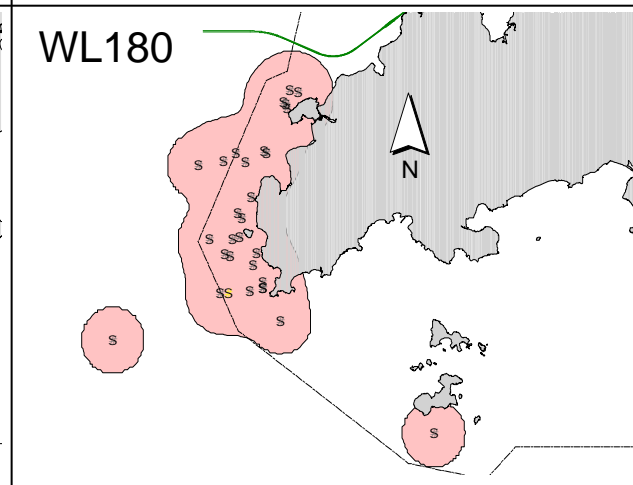
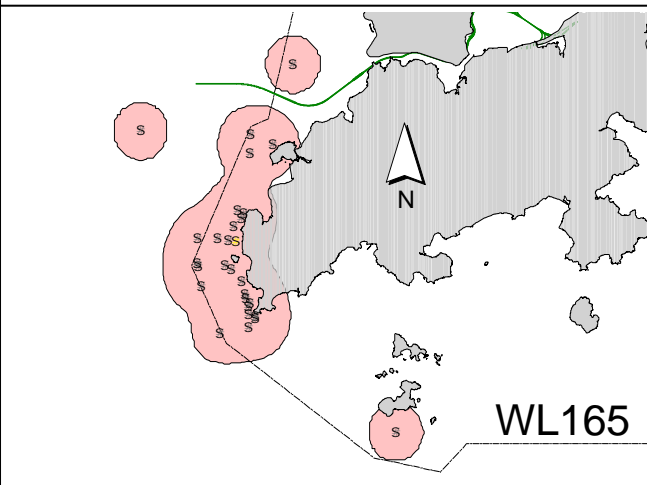
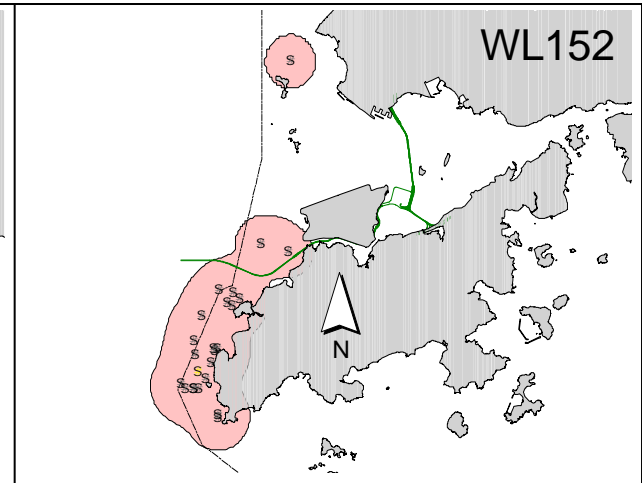
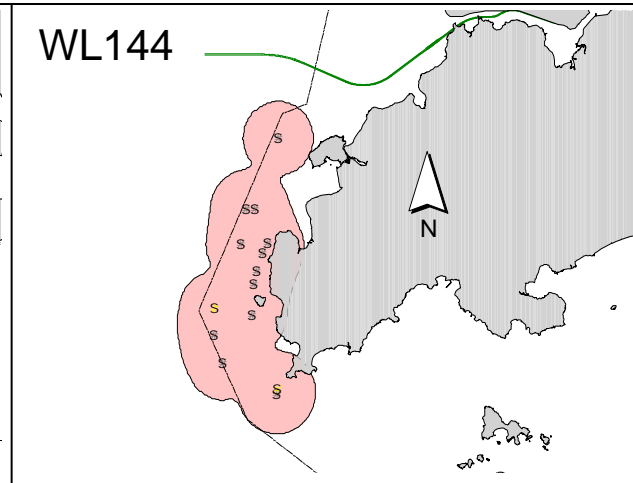
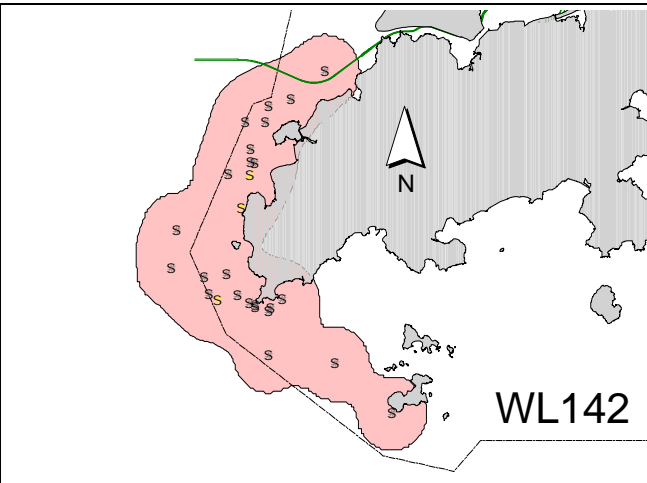


WL131

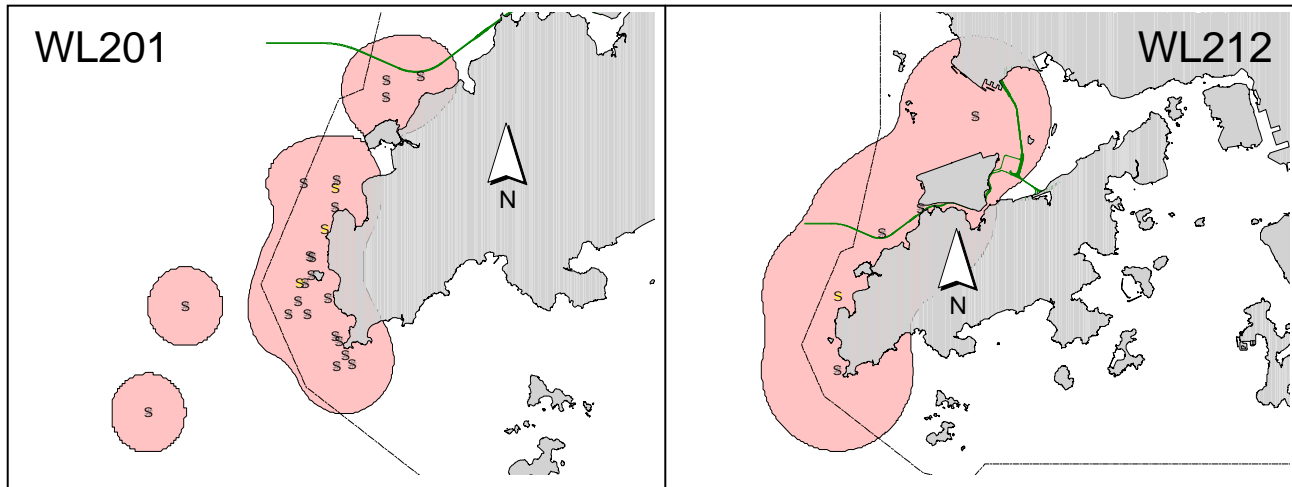


WL137

Appendix IV. (cont'd)



Appendix IV. (cont'd)



**APPENDIX F-2
UNDERWATER NOISE MONITORING
RESULTS**

Underwater Noise Monitoring in March & April 2013

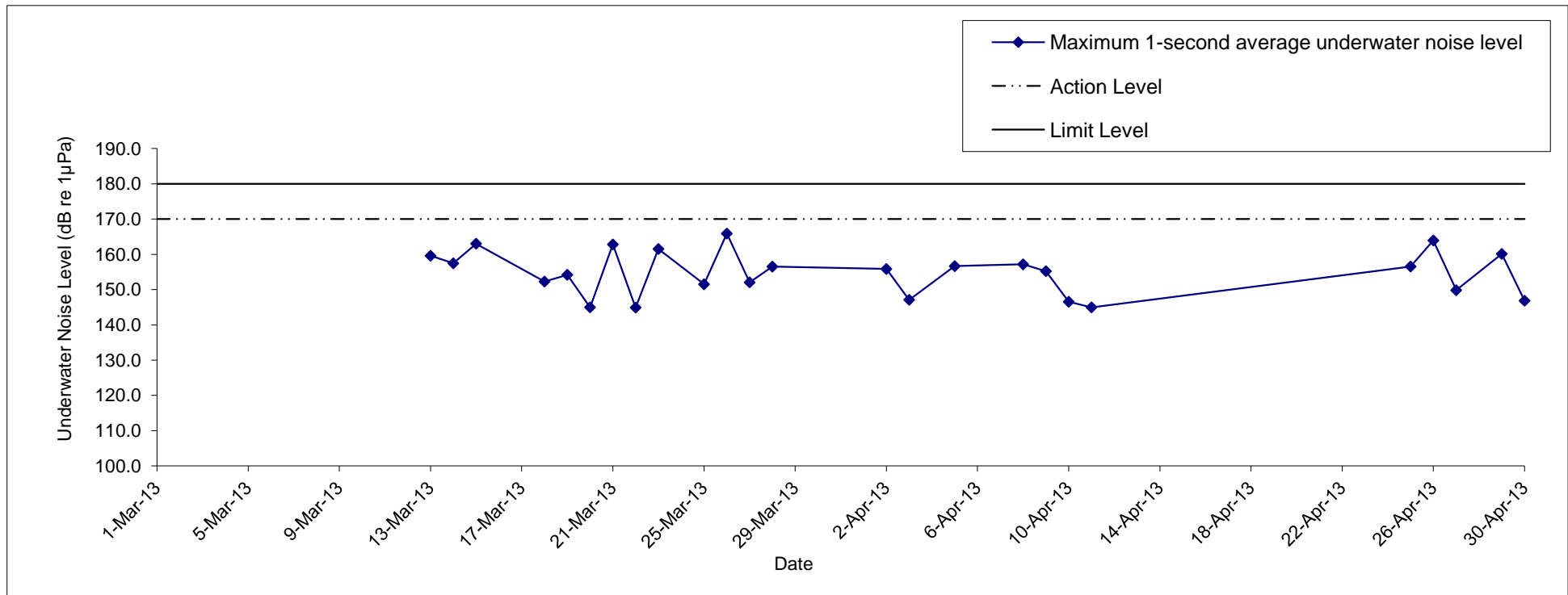
Date	Station	Hourly Average Underwater Noise (dB re 1µPa)												Daily Average (dB re 1µPa)
		9	10	11	12	13	14	15	16	17	18	19	20	
13-Mar-13	R1	-	125.2	117.2	115.2	122.3	134.9	141.8	140.4	137.4	-	-	-	129.3
14-Mar-13	R1	130.1	126.7	122.8	117.9	118.5	127.1	138.6	133.3	125.4	-	-	-	126.7
15-Mar-13	R1	134.7	131.3	119.6	114.3	119.4	123.4	133.6	140.0	139.9	-	-	-	128.5
18-Mar-13	R1	118.3	129.7	129.4	122.6	116.1	121.5	126.1	126.3	128.6	130.9	-	-	125.0
19-Mar-13	R1	117.8	121.4	124.9	124.6	119.3	120.3	121.2	-	-	-	-	-	121.4
20-Mar-13	R1	-	-	-	-	122.1	123.2	120.9	123.9	126.1	126.5	127.2	134.3	125.5
21-Mar-13	R1	121.3	117.4	122.8	121.6	120.8	122.0	123.0	127.1	126.2	125.4	-	-	122.8
22-Mar-13	R1	118.4	118.0	118.8	116.4	119.0	120.8	126.4	126.5	125.9	125.4	-	-	121.6
23-Mar-13	R1	116.1	117.6	117.7	119.9	120.6	119.0	129.7	134.5	131.1	-	-	-	122.9
25-Mar-13	R1	121.0	126.1	129.4	121.3	122.6	124.0	127.7	132.6	-	-	-	-	125.6
26-Mar-13	R2	126.5	137.1	-	-	-	128.0	122.7	-	-	-	-	-	128.5
27-Mar-13	R2	126.9	122.1	124.7	122.7	138.3	139.6	134.4	121.3	120.9	127.7	-	-	127.9
28-Mar-13	R2	-	-	-	134.46	137.197	142.725	126.329	125.946	-	-	-	-	133.3
2-Apr-13	R2	123.2	131.2	137.1	133.0	122.6	120.0	125.4	126.6	135.2	140.3	-	-	129.5
3-Apr-13	R2	124.4	124.3	127.6	126.7	127.9	123.4	125.9	126.6	124.8	123.8	-	-	125.5
5-Apr-13	R2	-	125.3	128.6	131.2	130.0	132.9	135.0	129.8	125.3	-	-	-	129.8
8-Apr-13	R2	119.7	122.9	128.3	134.8	135.3	123.2	120.7	129.0	135.6	137.8	-	-	128.7
9-Apr-13	R2	123.9	125.4	126.9	133.3	136.6	132.0	128.4	122.8	132.9	140.4	-	-	130.3
10-Apr-13	R2	122.5	123.3	122.7	129.7	136.6	138.4	136.3	123.4	-	-	-	-	129.1
11-Apr-13	R2	136.7	127.7	121.5	122.5	130.7	135.6	133.9	129.4	121.5	-	-	-	128.8
25-Apr-13	R1	121.4	131.6	134.2	132.4	132.1	130.3	125.6	124.6	131.4	134.8	-	-	129.8
26-Apr-13	R1	127.8	128.9	129.2	130.6	134.6	128.7	126.4	125.3	129.2	132.1	-	-	129.3
27-Apr-13	R2	132.5	128.5	126.6	130.5	135.7	141.4	139.6	138.9	132.2	-	-	-	134.0
29-Apr-13	R2	140.9	137.2	128.2	125.1	128.3	133.1	137.0	135.6	134.9	138.6	-	-	133.9
30-Apr-13	R1	135.4	138.6	131.6	126.0	127.0	126.9	-	135.2	137.0	132.9	-	-	132.3

Fequency: 70 Hz - 125 kHz

Station	Pier No.
R1	48
R2	52

* Daily average is calculated from all hourly average for that day.

* Underwater noise monitoring would be temporarily paused due to bad weather or to give way for barge movement.



Frequency: 70 Hz - 125 kHz

Title	Contract No. HY/2011/09	Scale	N.T.S	Project No.	MA12014	CINOTECH
	Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill	Date	Apr13	Appendix	F-2	
Graphical Presentation of Construction Underwater Noise Monitoring Results						

APPENDIX G
EVENT ACTION PLANS

Event / Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	SO	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and SO; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC and SO; 3. Advise the SO on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and SO; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 	<ol style="list-style-type: none"> 1. Submit proposals for remedial to SO within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

LIMIT LEVEL				
1.Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform SO, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the SO on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2.Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC, SO, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and SO to discuss 	<ol style="list-style-type: none"> 1. Discuss amongst SO, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly; 3. Supervise the implementation of 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the SO until the exceedance

	<p>the remedial actions to be taken;</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring.</p>	<p>remedial measures.</p>	<p>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</p>	<p>is abated.</p>
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Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Office

Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	SO	CONTRACTOR
Action Level	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Notify IEC and Contractor; 3. Report the results of investigation to the IEC, SO and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the SO accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, SO, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 	<ol style="list-style-type: none"> 1. Discuss amongst SO, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly; 3. Supervise the implementation of 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals;

EVENT	ACTION			
	ET	IEC	SO	CONTRACTOR
	<p>6. Inform IEC, SO and EPD the causes and actions taken for the exceedances;</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring.</p>	<p>remedial measures.</p>	<p>noise problem;</p> <p>4. Ensure remedial measures properly implemented;</p> <p>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</p>	<p>4. Resubmit proposals if problem still not under control;</p> <p>5. Stop the relevant portion of works as determined by the SO until the exceedance is abated.</p>

Event and Action Plan for Water Quality

Event	ET Leader	IEC	SO	Contractor
Action level being exceeded by one sampling day	<p>Repeat <i>in situ</i> measurement on next day of exceedance to confirm findings;</p> <p>Identify source(s) of impact;</p> <p>Inform IEC, contractor and SO;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods.</p>	<p>Check monitoring data submitted by ET and Contractor's working methods.</p>	<p>Confirm receipt of notification of non-compliance in writing;</p> <p>Notify Contractor.</p>	<p>Inform the SO and confirm notification of the non-compliance in writing;</p> <p>Rectify unacceptable practice;</p> <p>Amend working methods if appropriate.</p>
Action level being exceeded by two or more consecutive sampling days	<p>Repeat measurement on next day of exceedance to confirm findings;</p> <p>Identify source(s) of impact;</p> <p>Inform IEC, contractor, SO and EPD;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>Ensure mitigation measures are implemented;</p> <p>Increase the monitoring frequency to daily until no exceedance of Action level;</p>	<p>Check monitoring data submitted by ET and Contractor's working method;</p> <p>Discuss with ET and Contractor on possible remedial actions;</p> <p>Review the proposed mitigation measures submitted by Contractor and advise the SO accordingly;</p> <p>Supervise the implementation of mitigation measures.</p>	<p>Discuss with IEC on the proposed mitigation measures;</p> <p>Ensure mitigation measures are properly implemented;</p> <p>Assess the effectiveness of the implemented mitigation measures.</p>	<p>Inform the Supervising Officer and confirm notification of the non-compliance in writing;</p> <p>Rectify unacceptable practice;</p> <p>Check all plant and equipment and consider changes of working methods;</p> <p>Submit proposal of additional mitigation measures to SO within 3 working days of notification and discuss with ET, IEC and SO;</p> <p>Implement the agreed mitigation measures.</p>
Limit level being exceeded by one sampling day	<p>Repeat measurement on next day of exceedance to confirm findings;</p> <p>Identify source(s) of impact;</p> <p>Inform IEC, contractor, SO and EPD;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>Discuss mitigation measures with IEC, SO and Contractor;</p>	<p>Check monitoring data submitted by ET and Contractor's working method;</p> <p>Discuss with ET and Contractor on possible remedial actions;</p> <p>Review the proposed mitigation measures submitted by Contractor and advise the SO accordingly.</p>	<p>Confirm receipt of notification of failure in writing;</p> <p>Discuss with IEC, ET and Contractor on the proposed mitigation measures;</p> <p>Request Contractor to review the working methods.</p>	<p>Inform the SO and confirm notification of the non-compliance in writing;</p> <p>Rectify unacceptable practice;</p> <p>Check all plant and equipment and consider changes of working methods;</p> <p>Submit proposal of mitigation measures to SO within 3 working days of notification and discuss with ET,</p>

Event	ET Leader	IEC	SO	Contractor
				IEC and SO.
Limit level being exceeded by two or more consecutive sampling days	<p>Repeat measurement on next day of exceedance to confirm findings;</p> <p>Identify source(s) of impact;</p> <p>Inform IEC, contractor, SO and EPD;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>Discuss mitigation measures with IEC, SO and Contractor;</p> <p>Ensure mitigation measures are implemented;</p>	<p>Check monitoring data submitted by ET and Contractor's working method;</p> <p>Discuss with ET and Contractor on possible remedial actions;</p> <p>Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SO accordingly;</p> <p>Supervise the implementation of mitigation measures.</p>	<p>Discuss with IEC, ET and Contractor on the proposed mitigation measures;</p> <p>Request Contractor to critically review the working methods;</p> <p>Make agreement on the mitigation measures to be implemented;</p> <p>Ensure mitigation measures are properly implemented;</p> <p>Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</p>	<p>Take immediate action to avoid further exceedance;</p> <p>Submit proposal of mitigation measures to SO within 3 working days of notification and discuss with ET, IEC and SO;</p> <p>Implement the agreed mitigation measures;</p> <p>Resubmit proposals of mitigation measures if problem still not under control;</p> <p>As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</p>

Event / Action Plan for Underwater Construction Noise

Event	Action			
	ET Leader	IEC	ER	Contractor
Action level triggered	<ol style="list-style-type: none"> 1. Inform the IEC, ER and Contractor; 2. Advise Contractor of dolphin protection zone coverage. 3. Continue to monitor underwater noise level. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET. 	<ol style="list-style-type: none"> 1. Inform Contractor. 	<ol style="list-style-type: none"> 1. Review the piling sequence or method; 2. Implement the mitigation measure to lower the underwater noise level to below action limit within 30 minutes; 3. Implement protection zone. 4. Closely liaise with the ET on the progress.
Limit level triggered	<ol style="list-style-type: none"> 1. Instruct the Contractor to stop construction work; 2. Inform the IEC and ER; 3. Discuss with IEC, ER and Contractor on noise reduction proposal; 4. Assess effectiveness of Contractor's proposal and keep IEC and ER informed. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET. 2. Discuss amongst ER, ET and Contractor on the potential remedial actions. 	<ol style="list-style-type: none"> 1. Review the proposal by Contractor; 2. Make agreement on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Stop construction work 2. Inform the ER 3. Review the piling sequence or method in order to reduce the underwater noise levels to no higher than 170 dB. 4. Submit noise reduction proposal to the ER for endorsement. 5. Implement the agreed measures. 6. Re-submit proposals if problem still not under control; 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated

Event Action Plan for Dolphin Monitoring

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

Event	ET Leader	IEC	ER / SOR	Contractor
Limit Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings. 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences. 3. Identify source(s) of impact. 4. Inform the IEC, ER/SOR and Contractor of findings, 5. Check monitoring data. 6. Repeat reviewing to ensure all the dolphin protective measure are fully and properly implemented and advise on additional measures if necessary. 7. If the ET proves that the source of impact is caused by any of the construction activity by the works contract, the ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor for necessity of additional dolphin monitoring, and/or any other potential mitigation measures (eg, consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activities...etc), and submit to the IEC a proposal of additional dolphin monitoring and/or 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor, and advise ER/SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures, and advise ER/SOR of the results and findings accordingly. 	<ol style="list-style-type: none"> 1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If ER/SOR is satisfied with proposals for additional dolphin monitoring and/or any other mitigation measures submitted by the ET and Contractor and verified by the IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures. 3. Supervise the implementation of additional monitoring and/or any other mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

	mitigation measures where necessary.			
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Event and Action Plan on Dolphin Movement and Behaviour

EVENT	ACTION			
	ET Leader	IEC	SO	Contractor
<p><u>Action Level</u></p> <p>With the numerical values presented in Tables 7.1-7.2 of Baseline Environmental Monitoring Report, any of the response variable for dolphin movement patterns (speed, inter-breath interval, reorientation rate & linearity) and behaviour (proportion of time spent in each behavioural state) recorded in the construction phase monitoring is 20% higher or lower than that recorded in the baseline monitoring, action level should be triggered</p>	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented 	<ol style="list-style-type: none"> 1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.
<p><u>Limit Level</u></p> <p>With the numerical values presented in Tables 7.1-7.2 of Baseline Environmental Monitoring Report, any of the response variable for dolphin movement patterns (speed, inter-breath interval, reorientation rate & linearity) and behaviour (proportion of time spent in each behavioural state) recorded in the construction phase monitoring is 40% higher or lower than that recorded in the baseline monitoring, limit level should be triggered</p>	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 7. Discuss additional dolphin monitoring and any other potential mitigation measures (e.g. consider to 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 3. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise ER accordingly. 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented 	<ol style="list-style-type: none"> 1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

	temporarily stop relevant portion of construction activity) with the IEC and Contractor.			
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Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Officer

Event and Action Plan on Dolphin Acoustic Behaviour

EVENT	ACTION			
	ET Leader	IEC	SO	Contractor
<p><u>Action Level</u></p> <p>With the numerical values presented in Table 8.1 of Baseline Environmental Monitoring Report, when any of the response variable for dolphin acoustic behaviour recorded in the construction phase monitoring is 20% lower or higher than that recorded in the baseline monitoring, or when there is a shift of 3 hours or more in peak occurrence at B2 Site (i.e. 00:00 – 01:00), the action level should be triggered</p>	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.
<p><u>Limit Level</u></p> <p>With the numerical values presented in Table 8.1 of Baseline Environmental Monitoring Report, when any of the response variable for dolphin acoustic behaviour recorded in the construction phase monitoring is 40% lower or higher than that recorded in the baseline monitoring, or when there is a shift of 6 hours or more in peak occurrence at B2 Site (i.e. 00:00 – 01:00), the limit level should be triggered</p>	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 7. Discuss additional dolphin monitoring and any other potential mitigation measures (e.g. consider to temporarily stop relevant portion of construction activity) with the IEC and Contractor. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 3. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise ER accordingly. 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SO and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Officer

**APPENDIX H
UPDATED ENVIRONMENTAL
MITIGATION IMPLEMENTATION
SCHEDULE (EMIS)**

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
Air Quality							
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	^
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: <ul style="list-style-type: none"> • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; 	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	* * ^ ^ ^
S5.5.6.2	A2	<ul style="list-style-type: none"> • When there are open excavation and reinstatement works, hoarding 	Good construction site	Contractor	All construction	Construction	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<p>of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period;</p> <ul style="list-style-type: none"> • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; 	<p>practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.</p>		sites	stage	<p style="text-align: center;">^</p> <p style="text-align: center;">^</p> <p style="text-align: center;">^</p> <p style="text-align: center;">N/A</p> <p style="text-align: center;">^</p> <p style="text-align: center;">^</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
S5.5.6.2	A2	<ul style="list-style-type: none"> Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies. 	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	N/A ^ ^
S5.5.6.3	A3	3) The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) throughout the construction phase.	Control construction dust	Contractor	All construction sites	Construction stage	*
S5.5.6.4	A5	5) Implement regular dust monitoring under EM&A programme during the construction stage.	Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	^
S5.5.7.1	A6	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant:</p> <ul style="list-style-type: none"> Loading, unloading, handling, transfer or storage of any dusty 	Monitor the 24 hr and 1hr TSP levels at the representative dust	Contractor	Selected representative dust	Construction stage	N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<p>materials should be carried out in totally enclosed system;</p> <ul style="list-style-type: none"> All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; The materials which may generate airborne dusty emissions should be wetted by water spray system; All receiving hoppers should be enclosed on three sides up to 3m above unloading point; All conveyor transfer points should be totally enclosed; All access and route roads within the premises should be paved and wetted; and Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body. 	<p>monitoring stations to ensure compliance with relevant criteria throughout the construction period.</p>		monitoring station		<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>
S5.5.2.7	A7	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point:</p> <ul style="list-style-type: none"> All road surface within the barging facilities will be paved; Dust enclosures will be provided for the loading ramp; Vehicles will be required to pass through designated wheels wash facilities; and Continuous water spray at the loading points. 	Control construction dust	Contractor	All construction sites	Construction stage	<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>
Construction Noise (Air borne)							
S6.4.10	N1	1) Use of good site practices to limit noise emissions by considering the	Control construction airborne	Contractor	All construction	Construction	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<p>following:</p> <ul style="list-style-type: none"> only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; mobile plant should be sited as far away from NSRs as possible and practicable; material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 	noise by means of good site practices		sites	stage	^ ^ ^ ^ ^
S6.4.11	N2	2) Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites	Construction stage	^
S6.4.12	N3	3) Install movable noise barriers (typically density @14kg/m ²), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Screen the noisy plant items to be used at all construction sites	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	*
S6.4.13	N4	4) Select "Quiet plants" which comply with the BS 5228 Part 1 or TM	Reduce the noise levels of	Contractor	For plant items	Construction	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		standards.	plant items		listed in Appendix 6D of the EIA report at all construction sites	stage	
S6.4.14	N5	5) Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	^
	N6	6) Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction stage	^
Waste Management (Construction Waste)							
S8.3.8	WM1	<p><u>Construction and Demolition Material</u></p> <p>The following mitigation measures should be implemented in handling the waste:</p> <ul style="list-style-type: none"> Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; Carry out on-site sorting; Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; Implement a trip-ticket system for each works contract to ensure that 	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	^ ^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<p>the disposal of C&D materials are properly documented and verified; and</p> <ul style="list-style-type: none"> Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – “Environmental Management on Construction Sites” to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction. In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation 					<p>^</p> <p>^</p>
S8.3.9 - S8.3.11	WM2	<p><u>C&D Waste</u></p> <ul style="list-style-type: none"> Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different 	<p>Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal</p>	Contractor	All construction sites	Construction stage	<p>^</p> <p>^</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		areas of the sites should be considered for such segregation and storage.					
S8.2.12- S8.3.15	WM3	<p><u>Chemical Waste</u></p> <ul style="list-style-type: none"> Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical 	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction stage	<p>^</p> <p>^</p> <p>*</p> <p>^</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.					
S8.3.16	WM4	<u>Sewage</u> <ul style="list-style-type: none"> • Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly. 	Proper handling of sewage from worker to avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	^
S8.3.17	WM5	<u>General Refuse</u> <ul style="list-style-type: none"> • General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. • A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. • Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. • Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, 	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<p>plastic bottles etc., should be provided.</p> <ul style="list-style-type: none"> • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes. 					^
Water Quality (Construction Phase)							
S9.11.1 – S9.11.1.2	W1	<ul style="list-style-type: none"> • Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of dredging/backfilling, as well as protection measures. Details of the measures are provided below and summarised in the Environmental Mitigation Implementation Schedule in EM&A Manual. • Export for dredged spoils from NWWCZ avoiding exerting high demand on the disposal facilities in the NWWCZ and, hence, minimise potential cumulative impacts; • For the marine viaducts of HKLR, the bored piling will be undertaken within a metal casing; • where public fill is proposed for filling below -2.5mPD, the fine content in the public fill will be controlled to 25%; • single layer silt curtains will be applied around all works; • during the first two months of dredging work for HKLR, the silt-removal efficiency of the silt-curtains shall be verified by examining the results of water quality monitoring points. The water quality monitoring points to be selected for the above shall be those close to the locations of the initial period of dredging work. Details in this regard shall be determined by the ENPO to be established, 	To control construction water quality	Contractor	During seawall dredging and filling	Construction stage	^ ^ N/A ^ N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<ul style="list-style-type: none"> • 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; and • 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. 					<p style="text-align: center;">^</p> <p style="text-align: center;">^</p>
S9.11.1.3	W2	<p><u>Land Works</u></p> <p>General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include:</p> <ul style="list-style-type: none"> • wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; • storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; • silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including 	To control construction water quality	Contractor	During seawall dredging and filling	Construction stage	<p style="text-align: center;">^</p> <p style="text-align: center;">N/A</p> <p style="text-align: center;">^</p> <p style="text-align: center;">^</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<ul style="list-style-type: none"> • wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; • the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and • surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system. 					<p style="text-align: center;">^</p> <p style="text-align: center;">^</p> <p style="text-align: center;">*</p> <p style="text-align: center;">^</p> <p style="text-align: center;">^</p> <p style="text-align: center;">^</p>
S9.14	W3	Implement a water quality monitoring programme	Control water quality	Contractor	At identified monitoring location	During construction period	^
Ecology (Construction Phase)							
S10.7	E1	<ul style="list-style-type: none"> • Good site practices to avoid runoff entering woodland habitats in Scenic Hill 	Avoid potential disturbance on habitat of Romer's Tree	Designer; Contractor	Scenic Hill	During construction	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<ul style="list-style-type: none"> Reinstate works areas in Scenic Hill Avoid stream modification in Scenic Hill 	Frog in Scenic Hill				N/A ^
S10.7	E2	<ul style="list-style-type: none"> Use closed grab in dredging works. Install silt curtain during the construction. Limit dredging and works fronts. Good site practices Strict enforcement of no marine dumping. Site runoff control Spill response plan 	Minimise marine water quality impacts	Contractor	Seawall,	During construction	^ ^ ^ ^ ^ ^ *
S10.7	E3	<ul style="list-style-type: none"> Reprovision of replacement Artificial Reefs (of the same volume as the existing ARs inside Marine Exclusion Zone) 	Mitigate water quality impacts on the existing ARs	Project proponent	To be determined	Construction phase or operation phase	N/A
S10.7	E4	Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater	Prevent Sedimentation from Land-based works areas	Contractor	Land-based works areas	During construction	^
S10.7	E5	Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time	Prevent disturbance to terrestrial fauna and habitats	Contractor	Land-based works areas	During construction	^
S10.7	E6	<ul style="list-style-type: none"> Dolphin Exclusion Zone; Dolphin watching plan 	Minimize temporary marine habitat loss impact to dolphins	Contractor	Marine works	During marine works	* *
S10.7	E7	<ul style="list-style-type: none"> Decouple compressors and other equipment on working vessels Avoidance of percussive piling Marine underwater noise monitoring 	Minimise marine noise impacts on dolphins	Contractor	Marine works	During marine works	* ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<ul style="list-style-type: none"> Temporal suspension of drilling bored pile casing in rock during peak dolphin calving season in May and June 					N/A
S10.7	E8	<ul style="list-style-type: none"> Control vessel speed Skipper training. Predefined and regular routes for working vessels; avoid Brothers Islands. 	Minimise marine traffic disturbance on dolphins	Contractor	Marine traffic	During marine works	^ ^ ^
S10.10	E9	<ul style="list-style-type: none"> Dolphin vessel monitoring 	Minimise marine traffic disturbance on dolphins	Contractor	North Lantau and West Lantau	Prior to construction, during construction, and 1 year after operation	^
Fisheries							
S11.7	F1	<ul style="list-style-type: none"> Reprovision of replacement Artificial Reefs(of the same volume as the existing ARs inside Marine Exclusion Zone) 	Mitigate water quality impacts on the existing ARs	Project proponent	To be determined	Construction phase or operation phase	N/A
S11.7	F2	<ul style="list-style-type: none"> Reduce re-suspension of sediments Limit dredging and works fronts. Good site practices Strict enforcement of no marine dumping Spill response plan 	Minimise marine water quality impacts	Contractor	Seawall,	During construction	^ ^ ^ ^ ^
Landscape & Visual (Construction Phase)							
S14.3.3.3	LV2	<p>Mitigate both Landscape and Visual Impacts</p> <ul style="list-style-type: none"> G1. Grass-hydroseed bare soil surface and stock pile areas. 	Minimise visual & landscape impact	Contractor	HKLR	Construction stage	N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		<ul style="list-style-type: none"> • G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. • G3. For HKLR, providing aesthetic design on the viaduct, tunnel portals, at-grade roads (e.g. subtle colour tone and slim form for viaduct, featured form of tunnel portals, roadside planting along at-grade roads and landscape berm on) to beautify the HKLR alignment. • G5. Vegetation reinstatement and upgrading to disturbed areas. • G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed. • G7. Provide planting area around peripheral of and within HKLR for tree screening buffer effect. • G8. Plant salt tolerant native tree and shrubs etc along the planter strip at affected seawall. • G9. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt “natural-look” by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance “natural-look” of the new coastline (see Figure 14.4.2 for example). 					<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>
S14.3.3.3	LV3	<p><u>Mitigate Visual Impacts</u></p> <ul style="list-style-type: none"> • V1.Minimize time for construction activities during construction period. • V2.Provide screen hoarding at the portion of the project site / works areas / storage areas near VSRs who have close low-level views to the Project during HKLR construction. 					<p>^</p> <p>^</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
EM&A							
S15.2.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Project Proponent	All construction sites	Construction stage	^
S15.5 - S15.6	EM2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Contractor	All construction sites	Construction stage	^ ^ ^

Remarks: ^ Compliance of mitigation measure
 * Recommendation was made during site audit but improved/rectified by the contractor
 N/A Not Applicable at this stage as no such site activities were conducted in the reporting month (e.g. concrete batching plan, barging point, seawall dredging and filling, bored piling, landscaping works etc)

**APPENDIX I
SITE AUDIT SUMMARY**

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

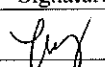

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130226
Date	26 February 2013 (Tuesday)
Time	13:30 – 14:45

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
	• No environmental deficiency was identified during site inspection.	
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130219), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		26 February 2013
Checked by	Dr. Priscilla Choy		26 February 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130305
Date	5 March 2013 (Tuesday)
Time	9:50 – 11:50

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130305-R01	• To clear the oil leakage from the generator at P15. (This deficiency has already rectified by the Contractor during the site inspection)	F8
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130226), no environmental deficiencies were identified during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		5 March 2013
Checked by	Dr. Priscilla Choy		5 March 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130312
Date	12 March 2013 (Tuesday)
Time	9:30 – 11:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
130312-R02	• Provide water spray for the exposed area and stockpiles of dusty materials at Portion C.	B5, 6, 8 & 14
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130312-R01	• To clear the deposited sediment at the drip tray at Portion C.	F9
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130305), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		12 March 2013
Checked by	Dr. Priscilla Choy		12 March 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

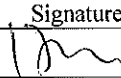
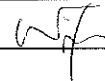
Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130319
Date	19 March 2013 (Tuesday)
Time	9:30 – 11:15

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130319-R01	• Clear the oil stain leaked to paved ground at Portion WA4.	F8
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130312), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Johnny Fung		19 March 2013
Checked by	Dr. Priscilla Choy		19 March 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

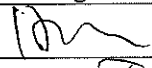

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130326
Date	26 March 2013 (Tuesday)
Time	13:30 – 14:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130326-R02	• To install fencing for tree protection area at Portion C.	F7
	F. Permits/Licences	
130326-R01	• To display the Environmental Permit at the site entrance of Portion C.	G5
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130319), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Johnny Fung		26 March 2013
Checked by	Dr. Priscilla Choy		26 March 2013

Contract HY/2011/09



Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary
Inspection Information

Checklist Reference Number	130402
Date	2 April 2013 (Tuesday)
Time	9:40 – 11:15

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
130402-R01	E. Waste / Chemical Management	F8 & F9
	• Clear the oil leakage from the drip tray for the air compressor and provide the plug for the drip tray to avoid further leakage at WA4.	
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130326), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		2 April 2013
Checked by	Dr. Priscilla Choy		2 April 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130409
Date	9 April 2013 (Tuesday)
Time	9:35 – 11:20

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130409-R01	• Clear the oil spillage at WA4 properly.	F8
130409-R02	• Provide the plug for the drip tray for generator at WA4.	F9
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130402), follow up action is needed for the item 130402-R02 and renamed as 130409-R01&R02 in this site inspection report.	

	Name	Signature	Date
Recorded by	Ivy Tam		9 April 2013
Checked by	Dr. Priscilla Choy		9 April 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130416
Date	16 April 2013 (Tuesday)
Time	9:35 – 11:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
130416-R03	C. Air Quality • Properly cover the stockpile of dusty material at Portion C.	D7
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130416-R01	• Empty chemical containers should be stored in temporary chemical waste storage area at WA4.	F2i.
130416-R02	• Clear the oil spillage from the drip tray at WA4.	F8
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130409), follow up action is needed for the item 130409-R01 and renamed as 130416-R02 in this site inspection report.	

	Name	Signature	Date
Recorded by	Ivy Tam		16 April 2013
Checked by	Dr. Priscilla Choy		16 April 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge


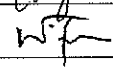
Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130426
Date	26 April 2013 (Friday)
Time	13:45 – 15:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
	• No environmental deficiency was identified during site inspection.	
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
130426-R01	• The boom for oil spillage was observed not ready on site (Pier 48). According to DCVJV, such boom has already ordered. The Contractor was reminded to arrange it on site urgently.	
130426-R02	• Properly implement the acoustic decoupling measures according to the approved plan (e.g. isolation pad)	
	• Follow-up on previous site audit session (Ref. No. 130416), follow up action is needed for the item 130416-R02.	

	Name	Signature	Date
Recorded by	Ivy Tam		26 April 2013
Checked by	Dr. Priscilla Choy		26 April 2013

Contract HY/2011/09



Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary
Inspection Information

Checklist Reference Number	130430
Date	30 April 2013 (Tuesday)
Time	9:30 – 11:15

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130430-R01	• To seal the hole of the drip tray for the generator at Portion C.	F9
130430-R02	• Clear the oil spillage at near the generator and workshop for steel bar at WA4.	F8
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130426), all environmental deficiencies were improved/rectified by contractor during the site inspection. However, follow up action is needed for the item 130416-R02 and renamed as 130430-R02 in this site inspection report.	

	Name	Signature	Date
Recorded by	Ivy Tam		30 April 2013
Checked by	Dr. Priscilla Choy		30 April 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130507
Date	7 May 2013 (Tuesday)
Time	9:15 – 11:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
130507-R02	• To close the door when operation of compressor at P52..	E10
	E. Waste / Chemical Management	
130507-R01	• To clear the oil leakage at near the drip tray at P52.	F8
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130430), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		7 May 2013
Checked by	Dr. Priscilla Choy		7 May 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130514
Date	14 May 2013 (Tuesday)
Time	9:30 – 11:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
130514-R01	• To remove the water tube which is directly connected to the public drain at Portion C.	B3
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130514-R02	• Clear the accumulated waste materials at the material skip at WA4.	F1i.
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130507), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		14 May 2013
Checked by	Dr. Priscilla Choy		14 May 2013

Contract HY/2011/09

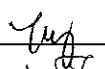
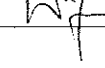
Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary
Inspection Information

Checklist Reference Number	130521
Date	21 May 2013 (Tuesday)
Time	9:00 – 11:40

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
130521-O01	• Leakage of water from the GI Platform was observed at P11. The Contractor was reminded to check and rectify the bund of the platform to avoid further leakage.	B21 & 22
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130521-R02	• To provide the drip tray for the chemical containers at P0.	F9
130521-R03	• To replace the damage sand bags at P48.	F4ii.
130521-R04	• Provide the plug for the drip tray for power pack at P72.	F9
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130514), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		21 May 2013
Checked by	Dr. Priscilla Choy		21 May 2013

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge



Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	130531
Date	31 May 2013 (Friday)
Time	13:30 – 15:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	A. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	B. Ecology	
	• No environmental deficiency was identified during site inspection.	
	C. Air Quality	
130531-R03	• Provide water spray for the dry exposed area at Portion C.	D6 & D8
	D. Noise	
	• No environmental deficiency was identified during site inspection.	
	E. Waste / Chemical Management	
130531-R01	• Regular clear the waste materials at material skip at WA4 and cover the material skip properly.	F4ii.
130531-R02	• Clear the leaked soda powder at WA4.	F8
	F. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	G. Others	
	• Follow-up on previous site audit session (Ref. No. 130521), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		31 May 2013
Checked by	Dr. Priscilla Choy		31 May 2013

**APPENDIX J
WASTE GENERATION IN THE
REPORTING PERIOD**



Appendix: C6 Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No.: HY/2011/09

Monthly Summary Waste Flow Table for 2013 (Year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete ⁶	Reused in the Contract ^{8,9}	Reused in other Projects ^{5,8,9}	Disposed as Public Fill ⁷	Imported Fill ^{6,7}	Metals	Paper/ cardboard packaging	Plastics ³	Chemical Waste	Others, e.g. general refuse ^{8,9}
	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m ³)
Jan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150
Feb	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.072
Mar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091
Apr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.410	0.000	0.000	0.098
May	1.436	0.000	0.000	0.000	1.436	0.000	0.000	0.465	0.000	0.000	0.117
Jun											
Sub-Total	1.436	0.000	0.000	0.000	1.436	0.000	0.000	1.250	0.000	0.000	0.527
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	1.436	0.000	0.000	0.000	1.436	0.000	0.000	1.250	0.000	0.000	0.527



Forecast of Total Quantities of C&D Materials to be Generated from the Contract¹⁰

Total Quantity Generated	Hard Rock and Large Broken Concrete ⁶	Reused in the Contract ^{8,9}	Reused in other Projects ^{5,8,9}	Disposed as Public Fill ⁷	Imported Fill ^{6,7}	Metals	Paper/ cardboard packaging	Plastics ³	Chemical Waste	Others, e.g. general refuse ^{8,9}
(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m ³)
0.000	124.366	0.000	124.366	0.000	0.000	0.000	9.681	0.000	0.000	2.940

Notes:

- (1) The performance targets are given in ER Appendix 8J Clause 14 and the EM&A Manual.
- (2) The waste flow table shall also include C&D materials to be imported for use at the Site.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (ER Part 8 Clause 8.8.5 (d) (ii) refers).
- (5) The materials reused in other Project shall not be treated as waste under the Waste Disposal Ordinance (CAP354).
- (6) According to the EIA Appendix 8B, the density of rock (bulked) is 2.0 tonnes/m³.
- (7) According to the EIA Appendix 8B, the density of soil (bulked) is 1.8 tonnes/m³.
- (8) Assuming the loading quantities of a 30-tonne truck is 8.0m³.
- (9) Assuming the loading quantities of a 24-tonne truck is 6.5m³.
- (10) The forecast of C&D materials to be generated from the Contract is sourced from the works program in December 2012.

APPENDIX K
SUMMARY OF EXCEEDANCE

Contract No. HY/2011/09

**Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road –
Section between HKSAR Boundary and Scenic Hill**

Exceedance Report

(A) Exceedance Report for Air Quality (1 hour TSP)

(NIL in the reporting period)

(B) Exceedance Report for Air Quality (24 hours TSP)

(NIL in the reporting period)

(C) Exceedance Report for Construction Noise

Parameter	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
	Action Level	Limit Level	Action Level	Limit Level
Noise	*1	0	1	0

Remark: * One Action Level exceedance was recorded as one documented complaint was received in the period of 0700-1900 hrs on normal weekdays in the reporting period

(D) Exceedance Report for Water Quality

Environmental Monitoring	Parameter	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
		Action Level	Limit Level	Action Level	Limit Level
Water Quality	Dissolved Oxygen (DO) (Surface & Middle)	7	6	0	0
	Dissolved Oxygen (DO) (Bottom)	10	0	0	0
	Turbidity	30	101	0	0
	Suspended Solids (SS)	22	92	0	0

(E) Exceedance Report for Underwater Construction Noise

(NIL in the reporting period)

**APPENDIX L
COMPLAINT LOG**

Appendix L - Complaint Log

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
Com-2013-04-001	Near Tung Chung New Development Pier	8 April 2013	EPD received the complaint on 8 April 2013. The complainant complained about oil was dumped from various vessels operating for Hong Kong-Zhuhai-Macao Bridge Hong Kong (HZMB HK) Projects near Tung Chung New Development Pier over the past few months.	1) The vessels photos in the complainant's photo are not the working vessels under Contract No. HK/2011/09. 2) No oil dumped from Contract No. HK/2011/09's working vessels was observed according to ET's site inspection conducted on 9 April 2013 at near Tung Chung New Development Ferry Pier. 3) Joint site inspection (DCVJV and ARUP) was conducted on 10 April 2013 and confirmed that Contract No. HY/2011/09's vessels are not involved the complaint case. 4) DCVJV will keep remind their boat crews not discharging contaminated effluent directly into the sea.	Closed
Com-2013-05-001	WA6	2 May 2013	ARUP received the complaint on 2 May 2013. The complainant alleged the noise nuisance was generated from the Works Area	The site diary report was reviewed and confirmed that no works were carried out at WA6 on 1 May 2013. In addition, no noise was heard from	Closed

			WA6 at around 13:00 on 1 May 2013 (Wednesday).	WA6 according to the security guard who on duty at WA6 on 1 May 2013. Based on the information provided, the complaint regarding the construction noise at WA6 is not considered justifiable.	
Com-2013-05-002	WA6	18 May 2013	ARUP received the complaint on 18 May 2013. The complainant advised that the noise nuisance due to loading of metal parts at barge near the seawall of Works Area WA6 early morning (around 8:45a.m) on 18 May 2013 (Saturday).	Based on the record of site activities at WA6 on 18 May 2013, 4 metal plates and 2 oxygen-acetylene set were lifted onto a derrick boat “Chiu Kee” by a crane near seawall at WA6 in the morning on that day. Such operation was commenced around 8:40a.m and completed in 10 minutes during the normal construction working hour (0700 – 1900 Monday to Saturday). However, the duration of aforesaid activities is very short and infrequent. Nevertheless, the Contractor was reminded to strengthen their site supervision and provide training for the workers regularly to increase awareness of their environmental responsibilities to minimize the noise impact to the nearby residents and the specific mitigation measures for the complaint including but not limited to:- <ul style="list-style-type: none"> • To place wooden planks or rubber 	Closed

				<p>mats on ground for loading and unloading heavy or metal objects; and</p> <ul style="list-style-type: none"> • To deploy professional personnel to supervise the works. 	
Com-2013-05-003	Near Tung Chung New Development Pier	18 May 2013	<p>EPD received the public complaint on 18 May 2013. This complaint was a follow-up of a previous complaint received by EPD on 8 April 2013 (Com-2013-04-001).</p> <p>The complainant complained again about the oil was dumped from various vessels operating for Hong Kong-Zhuhai-Macao Bridge Hong Kong (HZMB HK) Projects near Tung Chung New Development Pier over the past months.</p>	<p>After receiving the complaint, additional site inspection was conducted at near Tung Chung New Development Pier on 30 May 2013 to investigate whether oil dumped was due to Contract No. HY/2011/09's vessels. During the site inspection, three working vessels under Contract No.HY/2011/09 was anchored off near Tung Chung New Development Pier. No oil dumped from Contract No. HY/2011/09's vessels were observed and the water around the vessels was clear.</p> <p>The following mitigation measures have been implemented by DCVJV:</p> <ul style="list-style-type: none"> • DCVJV has sent the letter to the shipping agent to remind them to ensure the vessels under Contract No. HY/2011/09 are in good condition and any oil dumped to sea should be avoided to prevent water pollution. • Provide training to the vessel skippers for prevention of pollution 	Closed

				<p>from ships.</p> <ul style="list-style-type: none">• DCVJV requested vessel skippers to provide engine oil disposal records <p>The vessel skippers assured to us that all waste lubricants were sent to waste collectors regularly and no oil discharge into seawater.</p>	
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