

# **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**  
**Monthly EM&A Report**  
**July 2013**  
**(Version 2.0)**

Certified By



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Environmental Team Leader  
(Date: 15 August 2013)

REMARKS:

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

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## EXECUTIVE SUMMARY

### Introduction

1. This is the 6<sup>th</sup> monthly 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 conducted in July 2013.

### Environmental Monitoring and Audit Progress

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

**Table I Summary Table for Monitoring Activities in the Reporting Month**

| Parameter(s)  | Date(s)   |
|---|---|
| 1-hr TSP Monitoring   | 4 <sup>th</sup> , 10 <sup>th</sup> , 16 <sup>th</sup> , 22 <sup>th</sup> and 26 <sup>th</sup> July 2013   |
| 24-hr TSP Monitoring  | 4 <sup>th</sup> , 10 <sup>th</sup> , 16 <sup>th</sup> , 22 <sup>th</sup> and 26 <sup>th</sup> July 2013   |
| Noise Monitoring  | 2 <sup>nd</sup> , 8 <sup>th</sup> , 17 <sup>th</sup> , 23 <sup>rd</sup> and 29 <sup>th</sup> July 2013  |
| Water Quality Monitoring  | 2 <sup>nd</sup> , 4 <sup>th</sup> , 6 <sup>th</sup> , 8 <sup>th</sup> , 10 <sup>th</sup> , 12 <sup>th</sup> , 15 <sup>th</sup> , 17 <sup>th</sup> , 19 <sup>th</sup> , 22 <sup>th</sup> , 24 <sup>th</sup> , 26 <sup>th</sup> , 29 <sup>th</sup> and 31 <sup>st</sup> July 2013 |
| Dolphin Monitoring (Line-transect Vessel Surveys)                   | 5 <sup>th</sup> and 10 <sup>th</sup> July 2013  |
| <sup>(1)</sup> Construction-phase underwater Noise Monitoring       | 11 <sup>th</sup> , 12 <sup>th</sup> , 15 <sup>th</sup> , 16 <sup>th</sup> , 17 <sup>th</sup> , 18 <sup>th</sup> , 19 <sup>th</sup> , 22 <sup>nd</sup> , 23 <sup>rd</sup> and 24 <sup>th</sup> July 2013   |
| <sup>(1)</sup> Dolphin Behaviour Monitoring                         | 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> , 12 <sup>th</sup> , 13 <sup>th</sup> , 15 <sup>th</sup> , 17 <sup>th</sup> , 18 <sup>th</sup> , 19 <sup>th</sup> , 23 <sup>rd</sup> , 24 <sup>th</sup> and 29 <sup>th</sup> July 2013                  |
| <sup>(1)</sup> Land-based Dolphin Behaviour and Movement Monitoring | 9 <sup>th</sup> , 11 <sup>th</sup> , 12 <sup>th</sup> , 15 <sup>th</sup> , 16 <sup>th</sup> , 17 <sup>th</sup> , 18 <sup>th</sup> , 22 <sup>nd</sup> , 23 <sup>rd</sup> , 24 <sup>th</sup> , 25 <sup>th</sup> and 26 <sup>th</sup> July 2013                                    |
| Environmental Site Inspection                                       | 2 <sup>nd</sup> , 9 <sup>th</sup> , 16 <sup>th</sup> , 23 <sup>th</sup> and 30 <sup>th</sup> July 2013  |
| Archaeological Site Inspection                                      | <sup>(2)</sup> N/A  |

Remark: <sup>(1)</sup>Dolphin-related monitoring was conducted in the reporting month. According to the EM&A Manual for HKLR, the dolphin-related monitoring was conducted during the bored piling activities which presented in **Appendix A**.

<sup>(2)</sup> No archaeological site inspection was conducted in the reporting month.

### Breaches of Action and Limit Levels

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

**Table II Summary Table for Events Recorded in the Reporting Month**

| 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                    | $L_{eq(30min)}$                          | 0                 | 0           | 0   | 0           |
| Water Quality            | Dissolved Oxygen (DO) (Surface & Middle) | 0                 | 0           | 0   | 0           |
|                          | Dissolved Oxygen (DO) (Bottom)           | 0                 | 0           | 0   | 0           |
|                          | Turbidity                                | 0                 | 0           | 0   | 0           |
|                          | Suspended Solids (SS)                    | 3                 | 1           | 0   | 0           |
| Undewater Noise          | RMS sound pressure level re 1 $\mu$ Pa   | 0                 | 0           | 0   | 0           |

*1-hour TSP Monitoring*

4. All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

*24-hour TSP Monitoring*

5. All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

*Construction Noise*

6. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

*Construction Underwater Noise*

7. All construction underwater noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

*Water Quality*

8. All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances for suspended solids were recorded.

9. According to the investigation, no pollution discharge from the marine works and no exceedances were recorded at the impact stations (i.e. IS1 to IS4) which are close to construction site. Therefore, all exceedances are considered not due to the Contract.

### **Complaint Log**

10. One environmental complaint was received in the reporting month.

### **Notification of Summons and Successful Prosecutions**

11. No notification of summons and successful prosecution was received in the reporting month.

### **Reporting Changes**

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

### **Future Key Issues**

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

#### **WA4**

- Fabrication of rebar cages
- Fabrication of temporary piling platforms

#### **WA7**

- Fabrication of rebar cages
- Loading and Unloading

#### **Portion A (Land Section)**

- Site formation and clearance
- Slewing the tele-communication cable and Airport Authority (AA)'s COM cable
- Set up of barriers
- Laying piling platforms.
- Pre-drilling work

#### **Portion C**

- Land piling
- Tree felling/transplant
- Water main diversion

#### **Airport Channel**

- Piling jacket and permanent casing
- Pile excavation by Reverse Circulation Drilling (RCD) method
- Pile excavation by Kelly method
- Piling works for temporary jetty
- Installation of permanent casing
- Setting up of silt-curtain

**Western Water**

- Pre-drilling Work
- Setting up of silt-curtain
- Platform installation for pre-drilling works and bored piling works
- Installation of temporary casings for the piling platform
- Installation of permanent casing
- Bored piling works
- Piling Jacket and permanent casing

## 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 6<sup>th</sup> EM&A report which summarises the impact monitoring results and audit findings for the EM&A programme in July 2013.

### **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: **Air Quality Monitoring** - summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 4: **Noise Monitoring** - summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 5: **Water Quality Monitoring** - summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 6: **Dolphin-Related Monitoring** - summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels and monitoring results.

Section 7: **Environmental Site Inspection** - summarises the audit findings of the weekly site inspections undertaken within the reporting month.

Section 8: **Environmental Non-conformance** - summarises any monitoring exceedance, environmental complaints, environmental summons and successful prosecutions within the reporting month.

Section 9: **Future Key Issues** - summarises the impact forecast and monitoring schedule for the next three months.

## Section 10: **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. Subsequently, the Director of Environmental Protection amends the Environmental Permit (No. EP-352/2009/A) based on the Application No. VEP-409/2013 and the environmental Permit (Permit No. EP-352/2009/B) was issue on 1 August 2013.
- 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                            | Position           | Phone No. | Fax No.   |
|-----------------------|-------------------------------------|--------------------|-----------|-----------|
| SOR<br>(ARUP)         | CRE                                 | Mr. Michael Chan   | 3767 5803 | 3767 5922 |
|                       |                                     | Mr. Colin Meadows  | 3767 5801 |           |
| ENPO/IEC<br>(Environ) | Environmental Project Office Leader | Mr. Y. H Hui       | 3465 2888 | 3465 2899 |
|                       | Independent Environmental Checker   | Mr. Antony Wong    | 3465 2888 | 3465 2899 |
| Contractor<br>(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<br>(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 Month**

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

- (a) Land piling works are in progress with 5 piles concreted in Portion C in this reporting period;
- (b) Piling equipment was started mobilizing to seawall in Portion A. Water treatment system is on site;
- (c) Installation of piling platform along seawall is in progress and 4 nos. of platforms will be completed in this reporting period;
- (d) First batch of formworks for column of land viaduct was delivered to Portion C. Trial panel will be fabricated;
- (e) 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;
- (f) Installation of water-filled barrier and site clearance in Portion A along seawall was commenced with 70% completed. Forming of site access along the top of the existing seawall are in progress;
- (g) One wheel washing bay for haul road at Portion A (near SE Quay) was completed and in use;
- (h) Tracing of AA COM cables alignment and terminals was completed. A report will be submitted;
- (i) Marine landing access establishment work near P82 was commenced;
- (j) Piling works for the temporary jetty at P69 - P70 continued and 32% of piling completed;
- (n) Pile excavation by RCD method at P53 was commenced and down to rockhead continued at P50, P72 & P73 in July;
- (o) 14 nos. piles excavation by RCD method were concreted in July 13;
- (p) Pile excavation by Kelly method at P74, P78, P0 and P20. 3 nos. pile at P74, 5 no. of pile at P78 and 1 no. of pile at P0 were cast in July;
- (q) Temporary piles for P46, P47 were extracted;
- (r) Installation of temporary casings for the piling platform at P43 and P45 are in progress;
- (s) Piling platform at P19 was installed;
- (t) 4<sup>th</sup> BG arrived and installation at P20 was completed.

**Status of Environmental Licences, Notification and Permits**

2.11 A summary of the relevant permits, licences, and/or notifications on environmental protection for this Contract is presented in **Table 2.2**.

**Table 2.2 Status of Environmental Licences, Notification and Permits**

| Permit / License No.  | Valid Period       |                    | Status                                |
|---|--------------------|--------------------|---------------------------------------|
|   | From               | To                 |                                       |
| Environmental Permit (EP)   |                    |                    |                                       |
| EP-352/2009/A   | 09/11/2011         | N/A                | Valid                                 |
| EP-352/2009/B   | 01/08/2013         | N/A                | Valid                                 |
| Consruction Noise Permit (CNP)  |                    |                    |                                       |
| <b>P48-P52:</b> GW-RS0171-13  | 24/02/2013(07:00)  | 23/08/2013(23:00)  | Valid                                 |
| <b>P50-P52:</b> GW-RS0180-13  | 24/02/2013(23:00)  | 23/08/2013(07:00)  | Superseded by CNP<br>No. GW-RS0792-13 |
| <b>WA7:</b> GW-RS0125-13  | 28/02/2013(19:00)  | 27/08/2013(23:00)  | Valid                                 |
| <b>Pier 0:</b> GW-RS0353-13   | 07/04/2013(07:00)  | 06/10/2013(23:00)  | Valid                                 |
| <b>Pier 0:</b> GW-RS0361-13   | 07/04/2013(23:00)  | 06/10/2013(23:00)  | Valid                                 |
| <b>P19-P20:</b> GW-RS0370-13  | 17/04/2013(23:00)  | 16/10/2013(23:00)  | Valid                                 |
| <b>Waters in works area Portion A:</b><br>GW-RS0426-13                        | 22/04/2013(07:00)  | 21/10/2013 (23:00) | Valid                                 |
| <b>WA4:</b> GW-RW0274-13  | 30/04/2013(19:00)  | 29/10/2013 (23:00) | Superseded by CNP<br>No. GW-RW0496-13 |
| <b>WA3B:</b> GW-RS0499-13   | 15/05/2013 (00:00) | 14/11/2013 (24:00) | Valid                                 |
| <b>P106-P114:</b> GW-RS0553-13  | 23/05/2013(19:00)  | 22/11/2013 (23:00) | Valid                                 |
| <b>P67-P74:</b> GW-RS0571-13  | 25/05/2013(01:30)  | 31/08/2013 (07:00) | Valid                                 |
| <b>P43-P47:</b> GW-RS0580-13  | 27/05/2013(19:00)  | 26/11/2013(23:00)  | Valid                                 |
| <b>P17-P19:</b> GW-RS0596-13  | 10/06/2013(19:00)  | 09/12/2013(23:00)  | Valid                                 |
| <b>P71-P73:</b> GW-RS0636-13  | 17/06/2013(19:00)  | 28/07/2013(23:00)  | Valid                                 |
| <b>P83:</b> GW-RS0648-13  | 21/06/2013(19:00)  | 16/12/2013(24:00)  | Valid                                 |
| <b>P69-P70:</b> GW-RS0664-13  | 24/06/2013(19:00)  | 23/12/2013(23:00)  | Valid                                 |
| <b>WA4B:</b> GW-RW0427-13   | 27/06/2013(00:00)  | 26/12/2013(24:00)  | Valid                                 |
| <b>WA7:</b> GWRW0484-13   | 15/07/2013(23:00)  | 14/01/2014(07:00)  | Valid                                 |
| <b>WA4:</b> GWRW0496-13   | 19/07/2013(19:00)  | 18/01/2014(23:00)  | Valid                                 |
| <b>P50-P64:</b> GWRS0792-13   | 24/07/2013(23:00)  | 24/01/2014(07:00)  | Valid                                 |
| Notification pursuant to Air Pollution Control (Construction Dust) Regulation |                    |                    |                                       |
| 345773  | 04/06/2012         | N/A                | Receipt acknowledged by<br>EPD        |
| Billing Account for Construction Waste Disposal                               |                    |                    |                                       |
| A/C# 7015341<br>(Construction Site)   | 13/06/2012         | N/A                | Valid                                 |
| A/C# 7016948<br>(Vessel Disposal)   | 15/05/2013         | 31/08/2013         | Valid                                 |
| Registration of Chemical Waste Producer                                       |                    |                    |                                       |
| WPN 5213-951-D2499-01   | 18/07/2012         | N/A                | Valid                                 |
| Effluent Discharge License under Water Pollution Control Ordinance            |                    |                    |                                       |
| <b>WA6A(DCVJV site office):</b><br>WT00014053-2012                            | 12/09/2012         | 30/09/2017         | Valid                                 |

| Permit / License No.   | Valid Period |            | Status  |
|--|--------------|------------|---------|
|  | From         | To         |         |
| <b><u>WA6B (SOR site office):</u></b><br>WT00014447-2012   | 30/10/2012   | 31/10/2017 | Valid   |
| <b><u>WA3:</u></b> WT00015118-2013   | 30/01/2013   | 31/01/2018 | Valid   |
| <b><u>Portion C:</u></b> WT00015356-2013   | 22/02/2013   | 28/02/2018 | Valid   |
| <b><u>Portion A:</u></b> WT00016076-2013   | 21/05/2013   | 31/05/2018 | Valid   |
| <b>Marine Dumping Permit</b>   |              |            |         |
| <b><u>Dumping of Phase 1 marine sediment at South Cheung Chau:</u></b><br>EP/MD/13-125                                   | 11/04/2013   | 10/10/2013 | Valid   |
| <b><u>Dumping of Phase 2a marine sediment at South Cheung Chau:</u></b><br>EP/MD/13-142                                  | 23/04/2013   | 22/10/2013 | Valid   |
| <b><u>Dumping of Phase 2b, 2c and 2d marine sediment at South Cheung Chau:</u></b><br>EP/MD/14-003                       | 23/04/2013   | 22/10/2013 | Valid   |
| <b><u>Dumping of Phase 1 (Type 1D and Type 2) marine sediment at East Sha Chau:</u></b><br>EP/MD/14-017                  | 03/06/2013   | 02/07/2013 | Expired |
| <b><u>Dumping of Phase 2a (Type 1D and Type 2) marine sediment at East Sha Chau:</u></b><br>EP/MD/14-016                 | 03/06/2013   | 02/07/2013 | Expired |
| <b><u>Dumping of Phase Phase 2b,2c and 2d (Type 1D and Type 2) marine sediment at East Sha Chau:</u></b><br>EP/MD/14-015 | 03/06/2013   | 02/07/2013 | Expired |
| <b><u>Dumping of Phase 1 (Type 1D and Type 2) marine sediment at East Sha Chau</u></b><br>EP/MD/14-031                   | 03/07/2013   | 02/08/2013 | Valid   |
| <b><u>Dumping of Phase 2a (Type 1D and Type 2) marine sediment at East Sha Chau</u></b><br>EP/MD/14-030                  | 03/07/2013   | 02/08/2013 | Valid   |
| <b><u>Dumping of Phase Phase 2b, 2c and 2d (Type 1D and Type 2) marine sediment at East Sha Chau</u></b><br>EP/MD/14-029 | 03/07/2013   | 02/08/2013 | Valid   |

### 3 AIR QUALITY MONITORING

#### Monitoring Requirements

- 3.1 In accordance with the EM&A Manual, impact 1-hour TSP and 24-hour TSP monitoring were conducted to monitor the air quality for the Contract. **Appendix B** shows the established Action/Limit Levels for the air quality monitoring works.
- 3.2 Impact 1-hour TSP monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was conducted for at least once every 6 days at 2 air quality monitoring stations.

#### Monitoring Location

- 3.3 Impact air quality monitoring was conducted at the 2 monitoring stations under the Contract, as shown in **Figure 3**. **Table 3.1** describes the locations of the air quality monitoring stations.

**Table 3.1 Location for Air Quality Monitoring Locations**

| Monitoring Stations | Location   |
|---------------------|------------|
| AMS1                | Sha Lo Wan |
| AMS4                | San Tau    |

#### Monitoring Equipment

- 3.4 **Table 3.2** summarizes the equipment used in the impact air monitoring programme. Copies of calibration certificates are attached in **Appendix C**.

**Table 3.2 Air Quality Monitoring Equipment**

| Equipment       | Model and Make                    | Quantity |
|-----------------|-----------------------------------|----------|
| HVS Sampler     | TISCH Model: TE-5170              | 2        |
| Calibrator      | TISCH Model: TE-5025A             | 2        |
| Wind Anemometer | DAVIS Model: Vantage PRO2 6152CUK | 1        |

#### Monitoring Parameters, Frequency and Duration

- 3.5 **Table 3.3** summarizes the monitoring parameters and frequencies of impact dust monitoring during the course of the Contract activities. The air quality monitoring schedule for the reporting month is shown in **Appendix D**.

**Table 3.3 Impact Dust Monitoring Parameters, Frequency and Duration**

| Parameters | Frequency            |
|------------|----------------------|
| 1-hr TSP   | Three times / 6 days |
| 24-hr TSP  | Once / 6 days        |

## **Monitoring Methodology and QA/QC Procedure**

### **1-hour and 24-hour TSP Air Quality Monitoring**

#### ***Instrumentation***

- 3.6 High Volume Samplers (HVS) completed with appropriate sampling inlets were employed for air quality monitoring. Each sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

#### ***HVS Installation***

- 3.7 The following guidelines were adopted during the installation of HVS:
- Sufficient support was provided to secure the sampler against gusty wind.
  - No two samplers were placed less than 2 meters apart.
  - The distance between the sampler and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
  - A minimum of 2 meters of separation from walls, parapets and penthouses was required for rooftop samples.
  - A minimum of 2 meters separation from any supporting structure, measured horizontally was required.
  - No furnaces or incineration flues were nearby.
  - Airflow around the sampler was unrestricted.
  - The samplers were more than 20 meters from the drip line.
  - Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.
  - Permission must be obtained to set up the samples and to obtain access to the monitoring stations; and
  - A secured supply of electricity is needed to operate the samplers.

#### ***Filters Preparation***

- 3.8 Filter paper of size 8" X 10" was used. A HOKLAS accredited laboratory, ETS – Testconsult Limited (ETS), was responsible for the preparation of 24-hr conditioned and pre-weighed filter papers for Cinotech's monitoring team.
- 3.9 All filters, which were prepared by ETS, were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than  $\pm 3$  °C; the relative humidity (RH) was < 50% and not variable by more than  $\pm 5\%$ . A convenient working RH was 40%.
- 3.10 ETS has comprehensive quality assurance and quality control programmes.

#### ***Operating/Analytical Procedures***

- 3.11 Operating/analytical procedures for the air quality monitoring were highlighted as follows:

- Prior to the commencement of the dust sampling, the flow rate of the HVS was properly set (between 1.1 m<sup>3</sup>/min. and 1.4 m<sup>3</sup>/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.
- The power supply was checked to ensure the sampler worked properly.
- On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air quality monitoring station.
- The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.
- The filter was aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- The shelter lid was closed and secured with the aluminum strip.
- The timer was then programmed. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number).
- After sampling, the filter was removed and sent to the ETS for weighing. The elapsed time was also recorded.
- Before weighing, all filters were equilibrated in a conditioning environment for 24 hours. The conditioning environment temperature should be between 25°C and 30°C and not vary by more than ±3°C; the relative humidity (RH) should be < 50% and not vary by more than ±5%. A convenient working RH is 40%. Weighing results were returned to Cinotech for further analysis of TSP concentrations collected by each filter.

#### ***Maintenance/Calibration***

3.12 The following maintenance/calibration was required for the HVS:

- The high volume motors and their accessories were properly maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
- All HVS were calibrated (five point calibration) using Calibration Kit prior to the commencement of the baseline monitoring and thereafter at bi-monthly intervals.

#### **Results and Observations**

3.13 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Table 3.4 and 3.5** respectively. Detailed monitoring results and graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in **Appendices E and F** respectively.



**Table 3.4 Summary Table of 1-hour TSP Monitoring Results during the Reporting Month**

| Monitoring Station | Concentration (µg/m <sup>3</sup> ) |         | Action Level, µg/m <sup>3</sup> | Limit Level, µg/m <sup>3</sup> |
|--------------------|------------------------------------|---------|---------------------------------|--------------------------------|
|                    | Average                            | Range   |                                 |                                |
| AMS1               | 33                                 | 15 - 51 | 381                             | 500                            |
| AMS4               | 37                                 | 23 - 56 | 352                             |                                |

**Table 3.5 Summary Table of 24-hour TSP Monitoring Results during the Reporting Month**

| Monitoring Station | Concentration (µg/m <sup>3</sup> ) |        | Action Level, µg/m <sup>3</sup> | Limit Level, µg/m <sup>3</sup> |
|--------------------|------------------------------------|--------|---------------------------------|--------------------------------|
|                    | Average                            | Range  |                                 |                                |
| AMS1               | 15                                 | 6 - 20 | 170                             | 260                            |
| AMS4               | 18                                 | 8 - 25 | 171                             |                                |

- 3.14 All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 3.15 All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 3.16 According to our field observations, the major dust source identified at the designated air quality monitoring stations in the reporting month are as follows:

**Table 3.6 Observation at Dust Monitoring Stations**

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

- 3.17 The wind speed and wind direction were recorded by the installed Wind Anemometer set at AMS4. The location is shown in **Figure 3**.
- 3.18 The wind data for the reporting month is summarized in **Appendix J**.

### Event and Action Plan

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

## 4 NOISE MONITORING

### Monitoring Requirements

- 4.1 In accordance with EM&A Manual, two noise monitoring stations, namely NMS1 and NMS4 were selected for impact monitoring for the Contract. Impact noise monitoring was conducted for at least once per week during the construction phase of the Contract. **Appendix B** shows the established Action and Limit Levels for the noise monitoring works.

### Monitoring Location

- 4.2 Impact noise monitoring was conducted at the 2 monitoring stations under the Contract, as shown in **Figure 3**. **Table 4.1** describes the locations of the air quality monitoring stations.

**Table 4.1 Location for Air Quality Monitoring Locations**

| Monitoring Stations | Location   |
|---------------------|------------|
| NMS1                | Sha Lo Wan |
| NMS4                | San Tau    |

### Monitoring Equipment

- 4.3 **Table 4.2** summarizes the noise monitoring equipment. Copies of calibration certificates are provided in **Appendix C**.

**Table 4.2 Noise Monitoring Equipment**

| Equipment                     | Model and Make | Qty. |
|-------------------------------|----------------|------|
| Integrating Sound Level Meter | SVAN 957       | 2    |
| Calibrator                    | SV 30A         | 2    |

### Monitoring Parameters, Frequency and Duration

- 4.4 **Table 4.3** summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in **Appendix D**.

**Table 4.3 Noise Monitoring Parameters, Frequency and Duration**

| Monitoring Stations | Parameter   | Period                           | Frequency     |
|---------------------|---|----------------------------------|---------------|
| NMS1<br>NMS4        | L <sub>10</sub> (30 min.) dB(A)<br>L <sub>90</sub> (30 min.) dB(A)<br>L <sub>eq</sub> (30 min.) dB(A) (as six consecutive L <sub>eq, 5min</sub> readings) | 0700-1900 hrs on normal weekdays | Once per week |

## Monitoring Methodology and QA/QC Procedures

- The microphone head of the sound level meter was positioned 1m exterior of the noise sensitive facade and lowered sufficiently so that the building's external wall acts as a reflecting surface.
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - frequency weighting : A
  - time weighting : Fast
  - time measurement :  $L_{eq}(30 \text{ min.})$  dB(A) (as six consecutive  $L_{eq, 5min}$  readings) during non-restricted hours (i.e. 0700-1900 hrs on normal weekdays)
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB, the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- During the monitoring period, the  $L_{eq}$ ,  $L_{90}$  and  $L_{10}$  were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Noise measurement was paused temporarily during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible and observation was recorded when intrusive noise was not avoided.
- Noise monitoring was cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

### *Maintenance and Calibration*

- 4.5 The microphone head of the sound level meter and calibrator were cleaned with a soft cloth at quarterly intervals.
- 4.6 The sound level meter and calibrator were checked and calibrated at yearly intervals.
- 4.7 Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

## Results and Observations

- 4.8 The noise monitoring results are summarized in **Table 4.4**. Detailed monitoring results and graphical presentations of noise monitoring are shown in **Appendices G**.

**Table 4.4 Summary Table of Noise Monitoring Results during the Reporting Month**

| Monitoring Station | Noise Level, $L_{eq}(30min)$ dB(A) |         | Limit Level |
|--------------------|------------------------------------|---------|-------------|
|                    | Average                            | Range   |             |
| NMS1               | 68                                 | 64 – 69 | 75 dB(A)    |
| NMS4               | 58                                 | 56 – 59 |             |

Remark: +3dB(A) Façade correction included

- 4.9 All noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 4.10 According to our field observations, the major noise source identified at the designated noise monitoring stations in the reporting month 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 |

**Event and Action Plan**

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

## 5 WATER QUALITY MONITORING

### Monitoring Requirements

- 5.1 According to EM&A Manual, impact water quality monitoring shall be carried out three days per week during the construction period. The interval between two sets of monitoring will not be less than 36 hours.
- 5.2 Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database.
- 5.3 Impact water quality monitoring was conducted two times per monitoring day during mid ebb (within  $\pm 1.75$  hours of the predicted time) and mid flood tides (within  $\pm 1.75$  hours of the predicted time) at three depths (i.e. 1m below surface, mid-depth and 1m above seabed, except where the water depth less than 6m, mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station was monitored) Dissolved oxygen, Suspended solids (SS), turbidity, pH, salinity and temperature were monitored in accordance with the requirements set out in the EM&A Manual.
- 5.4 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.
- 5.5 **Appendix B** shows the established Action/Limit Levels for the water quality monitoring works.

### Monitoring Locations

- 5.6 Impact water quality monitoring was conducted at 14 monitoring stations under the Contract which are summarized in **Table 5.1**. The monitoring station is also shown in **Figure 4**.

**Table 5.1 Location for Marine Water Quality Monitoring Locations**

| Monitoring Stations | Coordinates |          |
|---------------------|-------------|----------|
|                     | Easting     | Northing |
| IS1                 | 803474      | 815060   |
| IS2                 | 804851      | 815715   |
| IS3                 | 806502      | 815743   |
| IS4                 | 807008      | 816986   |
| CS1                 | 801784      | 812711   |
| CS2                 | 805849      | 818780   |
| SR1                 | 803126      | 812379   |
| SR2                 | 807856      | 816953   |
| SR3                 | 810525      | 816456   |
| SR6                 | 805837      | 821818   |
| ST1                 | 802677      | 816006   |
| ST2                 | 804055      | 818840   |

| Monitoring Stations | Coordinates |          |
|---------------------|-------------|----------|
|                     | Easting     | Northing |
| ST3                 | 800667      | 810126   |
| SRA                 | 809872      | 817152   |

## Monitoring Equipment

### Instrumentation

- 5.7 A multi-parameter meters (Model YSI 6820-C-M) were used to measure DO, turbidity, salinity, pH and temperature.

### Dissolved Oxygen (DO) and Temperature Measuring Equipment

- 5.8 The instrument for measuring dissolved oxygen and temperature was portable and weatherproof complete with cable, sensor, comprehensive operation manuals and use DC power source. It was capable of measuring:
- a dissolved oxygen level in the range of 0-20 mg/L and 0-200% saturation; and
  - a temperature of 0-45 degree Celsius.
- 5.9 It has a membrane electrode with automatic temperature compensation complete with a cable.
- 5.10 Sufficient stocks of spare electrodes and cables were available for replacement where necessary.
- 5.11 Salinity compensation was built-in in the DO equipment.

### Turbidity

- 5.12 Turbidity was measured in situ by the nephelometric method. The instrument was portable and weatherproof using a DC power source complete with cable, sensor and comprehensive operation manuals. The equipment was capable of measuring turbidity between 0-1000 NTU. The probe cable was not less than 25m in length. The meter was calibrated in order to establish the relationship between NTU units and the levels of suspended solids. The turbidity measurement was carried out on split water sample collected from the same depths of suspended solids samples.

### Sampler

- 5.13 A water sampler, consisting of a transparent PVC or glass cylinder of a capacity of not less than two litres which can be effectively sealed with cups at both ends was used. The water sampler has a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler was at the selected water depth.

### Water Depth Detector

- 5.14 A portable, battery-operated echo sounder was used for the determination of water depth

at each designated monitoring station.

### **pH**

- 5.15 The instrument was consisting of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It was readable to 0.1pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 were used for calibration of the instrument before and after use.

### **Salinity**

- 5.16 A portable salinometer capable of recording salinity within the range of 0-40 ppt was used for salinity measurements.

### **Monitoring Position Equipment**

- 5.17 A hand held Differential Global Positioning System (DGPS) was used during water quality monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

### **Sample Container and Storage**

- 5.18 Following collection, water samples for laboratory analysis were stored in high density polythene bottles (250ml/1L) with no preservatives added, packed in ice (cooled to 4°C without being frozen) and kept in dark during both on-site temporary storage and shipment to the testing laboratory. The samples were delivered to the laboratory as soon as possible and the laboratory determination works were started within 24 hours after collection of the water samples. Sufficient volume of samples was collected to achieve the detection limit.

### **Calibration of In Situ Instruments**

- 5.19 All in situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring programme. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter was carried out before measurement at each monitoring event.
- 5.20 For the on site calibration of field equipment (Multi-parameter Water Quality System), the BS 1427:2009, "Guide to on-site test methods for the analysis of waters" was observed.
- 5.21 Sufficient stocks of spare parts were maintained for replacements when necessary. Backup monitoring equipment was also being made available so that monitoring can proceed uninterrupted even when some equipment was under maintenance, calibration, etc.
- 5.22 The equipment used for impact water quality monitoring is shown in **Table 5.2** and copies of the calibration certificates are shown in **Appendix C**. All the monitoring

equipment complied with the requirements set out in the EM&A Manual.

**Table 5.2 Water Quality Monitoring Equipment**

| Equipment                            | Model and Make                             | Qty |
|--------------------------------------|--|-----|
| Sonar Water Depth Detector           | Garmin Fishfinder 140                      | 2   |
| Monitoring Position Equipment        | KODEN DGPS<br>(KGP913MKIID, GA-08 & BA-03) | 2   |
| Multi-parameter Water Quality System | YSI 6820-C-M                               | 2   |
| Water Sampler                        | Kahlsico Water-Bottle Model 135DW 150      | 2   |

### Monitoring Parameters, Frequency

5.23 **Table 5.3** summarizes the monitoring parameters, monitoring period and frequencies of the water quality monitoring. The water quality monitoring schedule for the reporting month is shown in **Appendix D**.

**Table 5.3 Water Quality Monitoring Parameters and Frequency**

| Monitoring Stations   | Parameters, unit   | Depth   | Frequency   |
|---|--|---|---|
| IS1, IS2, IS3<br>IS4, CS1, CS2,<br>SR1, SR2, SR3,<br>SR6, ST1, ST2,<br>ST3, SRA | <ul style="list-style-type: none"> <li>Temperature(°C)</li> <li>pH(pH unit)</li> <li>turbidity (NTU)</li> <li>water depth (m)</li> <li>salinity (ppt)</li> <li>dissolved oxygen (DO) (mg/L and % of saturation)</li> <li>suspended solids (SS) (mg/L)</li> </ul> | <ul style="list-style-type: none"> <li>3 water depths: 1m below sea surface, mid-depth and 1m above sea bed.</li> <li>If the water depth is less than 3m, mid-depth sampling only.</li> <li>If water depth less than 6m, mid-depth may be omitted.</li> </ul> | <ul style="list-style-type: none"> <li>Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract</li> </ul> |

5.24 Monitoring location/position, time, water depth, sampling depth, pH, salinity, DO saturation, water temperature, tidal stages, weather conditions and any special phenomena or work underway nearby were recorded.

### Monitoring Methodology

#### *Instrumentation*

5.25 A multi-parameter meters (Model YSI 6820-C-M) were used to measure DO, turbidity, salinity, pH and temperature.

#### *Operating/Analytical Procedures*

5.26 The monitoring stations were accessed by the guide of a hand-held Differential Global Positioning System (DGPS) during water quality monitoring in accordance with the EM&A Manual. The depth of the monitoring location was measured using depth meter in order to determine the sampling depths. Afterwards, the probes of the in-situ



measurement equipment were lowered to the predetermined depths (1 m below water surface, mid-depth and 1 m above seabed) and the measurements were carried out accordingly.

- 5.27 At each measurement, two consecutive measurements of DO concentration, DO saturation, salinity, turbidity, pH and temperature were taken. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.
- 5.28 Water sampler was lowered into the water to the required depths of sampling. Upon reaching the pre-determined depth, a messenger to activate the sampler was then released to travel down the wire. The water sample was sealed within the sampler before retrieving. At each station, water samples at three depths (1 m below water surface, mid-depth and 1 m above seabed) were collected accordingly. Water samples were stored in a cool box and kept at less than 4°C but without frozen and sent to the laboratory as soon as possible. In addition, field information as described in Section 5.23 was also recorded.

### ***Laboratory Analytical Methods***

- 5.29 The testing of all parameters was conducted by CMA Testing and Certification Laboratories (HOKLAS Registration No.004) and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results. The testing method, reporting limit and detection limit are provided in **Table 5.4**.

**Table 5.4 Methods for Laboratory Analysis for Water Samples**

| <b>Determinant</b>   | <b>Instrumentation</b> | <b>Analytical Method</b> | <b>Detection Limit</b> |
|----------------------|------------------------|--------------------------|------------------------|
| Suspended Solid (SS) | Weighing               | APHA 21e 2540D           | 0.5 mg/L               |

### ***QA/QC Requirements***

#### Decontamination Procedures

- 5.30 Water sampling equipment used during the course of the monitoring programme was decontaminated by manual washing and rinsed clean seawater/distilled water after each sampling event. All disposal equipment was discarded after sampling.

#### Sampling Management and Supervision

- 5.31 All sampling bottles were labelled with the sample I.D (including the indication of sampling station and tidal stage e.g. IS1\_me\_a), laboratory number and sampling date. Water samples were dispatched to the testing laboratory for analysis as soon as possible after the sampling. All samples were stored in a cool box and kept at less than 4°C but without frozen. All water samples were handled under chain of custody protocols and relinquished to the laboratory representatives at locations specified by the laboratory.

- 5.32 The laboratory determination works were started within 24 hours after collection of the water samples.

Quality Control Measures for Sample Testing

- 5.33 The samples testing were performed by CMA Testing and Certification Laboratories.
- 5.34 The following quality control programme was performed by the CMA Testing and Certification Laboratories for every batch of 20 samples:
- ✧ One set of quality control (QC) samples.

***Maintenance and Calibration***

- 5.35 All in situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring programme.

**Results and Observations**

- 5.36 The monitoring results and graphical presentation of water quality at the monitoring stations is shown in **Appendix H**.
- 5.37 The summary of exceedance record in reporting month is shown in **Appendix L** and summarized in the **Table 5.5**.

**Table 5.5 Summary of Water Quality Exceedances**

| Station | Exceedance Level | DO (Surface & Middle) |           | DO(Bottom) |           | Turbidity |           | SS         |                          | Total Number of Exceedances |           |
|---------|------------------|-----------------------|-----------|------------|-----------|-----------|-----------|------------|--------------------------|-----------------------------|-----------|
|         |                  | Mid-Ebb               | Mid-Flood | Mid-Ebb    | Mid-Flood | Mid-Ebb   | Mid-Flood | Mid-Ebb    | Mid-Flood                | Mid-Ebb                     | Mid-Flood |
| IS1     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| IS2     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| IS3     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| IS4     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| SR1     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| SR2     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| SR3     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| SR6     | Action Level     |                       |           |            |           |           |           |            | 08/07/2013               | 0                           | 1         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| ST1     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| ST2     | Action Level     |                       |           |            |           |           |           |            | 08/07/2013<br>24/07/2013 | 0                           | 2         |
|         | Limit Level      |                       |           |            |           |           |           | 24/07/2013 |                          | 1                           | 0         |
| ST3     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| SRA     | Action Level     |                       |           |            |           |           |           |            |                          | 0                           | 0         |
|         | Limit Level      |                       |           |            |           |           |           |            |                          | 0                           | 0         |
| Total   | Action Level     | 0                     | 0         | 0          | 0         | 0         | 0         | 0          | 3                        |                             |           |
|         | Limit Level      | 0                     | 0         | 0          | 0         | 0         | 0         | 1          | 0                        |                             |           |

5.38 All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances for suspended solids were recorded.

5.39 According to the investigation, no pollution discharge from the marine works and no exceedances were recorded at the impact stations (i.e. IS1 to IS4) which are close to construction site. Therefore, all exceedances are considered not due to the Contract.

### Event and Action Plan

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

## 6 DOLPHIN-RELATED MONITORING

### Monitoring Requirements

- 6.1 According to Section 10 of the EM&A Manual, four kinds of ecological monitoring works are required during the construction phase, namely dolphin monitoring, construction-phase underwater noise monitoring, dolphin behavior monitoring and land-based dolphin behavior and movement monitoring.
- 6.2 The monitoring work shall be undertaken by suitably qualified specialist(s), (i.e. dolphin specialist and bio-acoustician), who shall have sufficient (at least 5-10 years) relevant post-graduate experience and publication in the respective aspects. They should be approved by Agriculture, Fisheries and Conservation Department (AFCD) and Environmental Protection Department (EPD).

### Dolphin Monitoring (Line-transect Vessel Survey)

#### Monitoring Requirements

- 6.3 According to EM&A Manual Section 10.3.2, a dolphin monitoring programme should be set up to verify the predictions of impacts and to ensure that there are no unforeseen impacts on the dolphin population during construction phase.
- 6.4 Following the requirement in the EM&A Manual Section 10.4.1, the dolphin monitoring should adopt line-transect vessel survey method, and cover the following line-transect survey areas as in AFCD annual marine mammal monitoring programme.

#### Monitoring Location

- 6.5 For this contract, dolphin monitoring will be carried out in the West Lantau (WL) along the line transect as depicted in **Figure 1** of **Appendix I-1**. The co-ordinates of all transect lines are shown in **Table 6.1**.

**Table 6.1 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   |

| Line No. |             | Easting | Northing | Line No. |             | Easting | Northing |
|----------|-------------|---------|----------|----------|-------------|---------|----------|
| 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   |

#### Monitoring Frequency

- 6.6 Dolphin transect survey was carried out at least twice a month (i.e. complete all the transect lines of West Lantau survey area twice per month) throughout the construction period.

#### Monitoring Day

- 6.7 Dolphin monitoring was carried out on 5<sup>th</sup> and 10<sup>th</sup> July 2013. The dolphin monitoring schedule for the reporting period is shown in **Appendix D**.

#### Monitoring Results

- 6.8 From these surveys, a total of 60.3 km of survey effort was collected, with 100.0% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) Out of the 60.3 km of survey effort, the total survey effort conducted on primary lines (the vertical lines perpendicular to the coastlines) was 40.2 km.
- 6.9 15 groups of 63 Chinese White Dolphins were sighted from primary lines. These sightings were evenly distributed throughout the WL survey area, which was very different from previous months of monitoring when most sightings were made at the middle and southern portions of the survey area. Notably, two dolphin sightings were made near the HKLR09 alignment.
- 6.10 Dolphin encounter rates deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) are shown in **Table 6.2**.

**Table 6.2**                      **Dolphin encounter rates (sightings per 100 km of survey effort) in July's surveys**

|    |                              | Encounter rate (STG)<br>(no. of on-effort dolphin sightings per 100 km of survey effort) | Encounter rate (ANI)<br>(no. of dolphins from all on-effort sightings per 100 km of survey effort) |
|----|------------------------------|--|--|
|    |                              | Primary Lines Only   | Primary Lines Only   |
| WL | Set 1: July 5 <sup>th</sup>  | 38.7   | 159.5  |
|    | Set 2: July 10 <sup>th</sup> | 35.8   | 153.5  |

- 6.11 A total of 28 re-sightings of known individual Chinese White Dolphins were made during the July's surveys.
- 6.12 No adverse impact on Chinese white dolphins was noticeable from general observations.
- 6.13 Evaluation of impacts on dolphins due to construction work will be conducted in the

quarterly EM&A report.

6.14 Detailed monitoring methodology and results can be found in **Appendix I-1**.

### **Construction-phase Underwater Noise Monitoring**

#### **Monitoring Requirements**

- 6.15 According to EM&A Manual Section 10.3.3 and 10.4.2, construction-phase underwater noise monitoring has to be carried out to verify the assessment outcome in the EIA and to collect field data of this construction activity. The actual underwater noise level of bored piling will be monitored during the pile construction in the waters to the west of the Airport for HKLR.
- 6.16 Following the requirement in the EM&A Manual Section 10.6.2, construction-phase underwater noise monitoring will be constructed for 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.

#### **Monitoring Location**

- 6.17 The equipment was positioned at an appropriate and safe distance from a barge (about 100m away from the center of the pier) where the piling work was carried out at the pier site to monitor the underwater noise during the bored piling activities. After anchoring, the boat would drift within the radius of the anchor (about 5m), which was unavoidable.
- 6.18 In July 2013, bored piling work was carried out at Pier site no. 0. The approximate locations of the monitoring stations are depicted in **Figure 5**. The co-ordinates of the monitoring station are shown in **Table 6.3**.

**Table 6.3 Co-ordinates of underwater noise monitoring stations**

| Pier No. | Station | Easting | Northing |
|----------|---------|---------|----------|
| 0        | R3      | 802556  | 815708   |

- 6.19 Due to programme change, the first three piers were changed to P48, P52 and P0 instead of P20, P47 or P49 proposed in the methodology statement. While the location of impact monitoring has changed, the position of the station remained around 100m away from the piers as proposed. The change in monitoring location will not affect comparison against Action and Limit level.

#### **Monitoring Day**

- 6.20 R3 was monitored on 11<sup>th</sup>, 12<sup>th</sup>, 15<sup>th</sup>-19<sup>th</sup> and 22<sup>nd</sup>-24<sup>th</sup> July 2013. A total of 10 days of underwater noise monitoring were conducted at R3 during the bored piling activities for P0. The underwater noise monitoring schedule for the reporting period is shown in **Appendix D**. Since the commencement of the underwater noise monitoring, a total of 30-day results from the start of the bored piling activities for the first three pier sites were collected.

Monitoring Equipment

- 6.21 PAM004, a proprietary product of Sea Mammal Research Unit (SMRU), was adopted for impact underwater noise monitoring. It is the same equipment used in baseline monitoring. While this is different from the system proposed in the method statement, the difference in sensitivity and pre-amplifier gain will not affect the monitoring results. Therefore, this still allows compatible comparison of the measurement. Copies of calibration certificates are provided in **Appendix C**.

Monitoring Methodology

- 6.22 The data recorded by PAM004 were transmitted to a receiving station on a boat via cable. The data were viewed on a laptop computer in real time by an operator from Cinotech who has been well trained and technically supported by SMRU for the operation.
- 6.23 The RMS sound pressure level re 1 $\mu$ Pa were checked against the Action Level and Limit Level (170 and 180 dB re 1 $\mu$ Pa respectively).

Monitoring Results

- 6.24 The underwater noise monitoring results are summarized in **Table 6.4**. Hourly average RMS and graphical presentations of underwater noise monitoring are shown in **Appendix I-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 6.4 Summary Table of Underwater Noise Monitoring Results during the Reporting Month**

| Date      | Pier No. | Station | Underwater Noise (dB re 1 $\mu$ Pa) |         |       | Period |
|-----------|----------|---------|-------------------------------------|---------|-------|--------|
|           |          |         | Max                                 | Average | Min   |        |
| 11-Jul-13 | 0        | R3      | 156.8                               | 139.8   | 117.7 | 10-18  |
| 12-Jul-13 | 0        | R3      | 164.6                               | 139.7   | 115.4 | 9-18   |
| 15-Jul-13 | 0        | R3      | 161.6                               | 135.3   | 119.7 | 9-18   |
| 16-Jul-13 | 0        | R3      | 153.9                               | 133.6   | 120.5 | 9-18   |
| 17-Jul-13 | 0        | R3      | 149.8                               | 134.4   | 120.1 | 9-18   |
| 18-Jul-13 | 0        | R3      | 149.9                               | 138.4   | 122.5 | 9-18   |
| 19-Jul-13 | 0        | R3      | 159.1                               | 138.8   | 120.3 | 9-18   |
| 22-Jul-13 | 0        | R3      | 155.2                               | 140.0   | 122.2 | 9-18   |
| 23-Jul-13 | 0        | R3      | 154.8                               | 141.9   | 122.4 | 9-18   |
| 24-Jul-13 | 0        | R3      | 155.1                               | 141.2   | 120.8 | 9-18   |

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

- 6.25 As shown in the table above, no Action/Limit Level exceedance was recorded.
- 6.26 A total of 30-day results from the start of the bored piling activities for the first three pier sites were collected, further analysis on PSD and within audiological range of frequencies of Chinese white dolphin will be carried out and presented in a separate report.

## **Event and Action Plan**

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

## **Dolphin Behaviour Monitoring (Acoustic)**

### Monitoring Requirements

- 6.28 According to EM&A Manual Section 10.3.4, acoustic behavior and movement of Chinese White Dolphin near the bored piling sites should be monitored during bridge construction.

### Monitoring Location

- 6.29 The dedicated acoustic surveys with calibrated hydrophone deployment were conducted in the western side of Lantau Island during the construction phase. The research vessel followed a predefined route for systematic search effort in West Lantau waters to cover the HKLR alignment in Northwest and West Lantau waters (in particular the area near the first three bored piling sites), where dolphins will be potentially disturbed by the bored piling works.
- 6.30 The EARs were deployed at two locations: 1) near the bridge alignment (N22°17.222, E113°53.016), about 500 m from the first three bored piling sites (Site B2), and 2) at a less disturbed site away from the bridge alignment as control site, off Fan Lau (N22°11.827, 113°50.648; Site B1). EAR B2 was in water depth 4 m, and EAR B1 in 7 m.

### Monitoring Day

- 6.31 In July 2013, a total of 12 days of acoustic monitoring surveys were conducted on the 9<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 22<sup>nd</sup>, 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup> and 26<sup>th</sup>, when bored piling activities were concurrently conducted. The schedule is shown in **Appendix D**.

### Monitoring Results

- 6.32 In July, 783.8 km of survey effort were conducted to search for dolphins in the western and northwestern waters of Lantau. A total of 46 groups, numbering 170 dolphins, were sighted during these surveys. In addition, 52 sound samples with 4.2 hours of recordings were taken from some of these dolphin groups. Moreover, the EARs were deployed since early July 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.
- 6.33 Detailed monitoring methodology and results can be found in **Appendix I-3**.



## **Land-based Dolphin Behaviour and Movement Monitoring**

### **Monitoring Requirements**

- 6.34 According to EM&A Manual Section 10.3.5, land-based theodolite tracking has to be carry out to study dolphin behaviour near bored piling work site, and examine their north-south movement across the bridge alignment during after bridge construction.
- 6.35 Following the requirement in the EM&A Manual Section 10.4.3 and 10.6.3, the monitoring should be conducted at the three pier sites for 30 days from the start of bored piling activities in the waters to the west of Airport.

### **Monitoring Location**

- 6.36 A theodolite tracking station was set up in Sham Wat located along the northwest coast of Lantau Island (22°16.10' N. and 113°52.32' E) as depicted in **Figure 6**.

### **Monitoring Frequency**

- 6.37 Thirty days of monitoring would be carried out during the construction phase. Additional land-based dolphin behavior and movement monitoring (twice per month) throughout the construction period will be commenced subject to the detailed analysis of 30 days monitoring results.

### **Monitoring Day**

- 6.38 In July 2013, a total of 13 sessions with 74.1 hours of theodolite tracking were conducted from Shum Wat shore-based station on the 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 23<sup>rd</sup>, 24<sup>th</sup> and 29<sup>th</sup>, when bored piling activities were concurrently conducted. The schedule is shown in **Appendix D**.

### **Monitoring Results**

- 6.39 More than 93% of effort was conducted in favourable weather conditions during those days. Dolphins were successfully tracked from shore on 12 of the 13 days of efforts, and a total of 57 dolphin groups were tracked. A total of 1,536 fixes of their positions were collected, and another 2,174 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. At the end of the construction phase monitoring period, the data will be used for the analyses on movement pattern, speed, reorientation rate, linearity, inter-breath interval, and north-south movement of Chinese White Dolphins.
- 6.40 Detailed monitoring methodology and results can be found in **Appendix I-4**.

## 7 ENVIRONMENTAL SITE INSPECTION

### Site Audits

- 7.1 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 summaries of site audits are attached in **Appendix M**.
- 7.2 Site audits were conducted on 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup> July 2013 by ET after the commencement of construction works for the Contract. A joint site audit with the representative with IEC, ER, the Contractor and the ET was carried out on 30<sup>th</sup> July 2013. The details of observations during site audit can refer to **Table 7.1**.
- 7.3 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. The 2<sup>nd</sup> inspection to the Sha Lo Wan (West) Archaeological Site was conducted on 18<sup>th</sup> June 2013 and next inspection will be conducted in September 2013.

### Implementation Status of Environmental Mitigation Measures

- 7.4 According to the EIA Study Report, Environmental Permit and the EM&A Manual, the mitigation measures detailed in the documents are recommended to be implemented during the construction phase. An updated summary of the EMIS is provided in **Appendix N**.
- 7.5 Regular marine travel route for marine vessels were implemented properly in accordance with the submitted plan and relevant records were kept properly.
- 7.6 Acoustic decoupling measures for the stationary equipment (generators, winch generators and air compressors) mounted on boards were adopted according to the approved Acoustic Decoupling Measures Plan.
- 7.7 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.
- 7.8 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.
- 7.9 During site inspections in the reporting month, no non-conformance was identified. The observations and recommendations made during the audit sessions are summarized in **Table 7.1**.

**Table 7.1 Observations and Recommendations of Site Audit**

| Parameters   | Date               | Observations and Recommendations  | Follow-up  |
|--|--------------------|---|--|
| <b>Water Quality</b>   | 02/07/2013         | To review the sedimentation process of the surface runoff at Portion C.                 | Rectification/improvement was observed during the follow-up audit session on 9 July 2013.  |
|  | 09/07/2013         | To clear the water at wheel washing bay at Portion C.                                   | Rectification/improvement was observed during the follow-up audit session on 16 July 2013. |
|  | 09/07/2013         | To clear the sand and silt settled at the drain at Portion C.                           | Rectification/improvement was observed during the follow-up audit session on 16 July 2013. |
|  | 16/07/2013         | To clear the sediment at the deck of flap-top work barge at P50.                        | Rectification/improvement was observed during the follow-up audit session on 23 July 2013. |
| <b>Ecology</b>   | N/A <sup>(1)</sup> | N/A <sup>(1)</sup>  | N/A <sup>(1)</sup>   |
| <b>Air Quality</b>   | 16/07/2013         | To check the air compressor at P50 to avoid emitting grey smoke.                        | Rectification/improvement was observed during the follow-up audit session on 23 July 2013. |
| <b>Noise</b>   | 16/07/2013         | To close the door of air compressor which is in operation at P50.                       | Rectification/improvement was observed during the follow-up audit session on 23 July 2013. |
| <b>Waste / Chemical Management</b>                               | 23/07/2013         | To seal the hole of the drip tray near the office containers at Portion C.              | Follow-up action was needed for the item.  |
|  | 23/07/2013         | To remove the construction materials which were placed at near the tree at Portion C.   | Follow-up action was needed for the item.  |
|  | 23/07/2013         | Clear the deposit silt and sediment at the site exit and drainage channel at Portion C. | Rectification/improvement was observed during the follow-up audit session on 30 July 2013. |
|  | 23/07/2013         | Clear the oil stain at near the Pontoon at WA4.   | Rectification/improvement was observed during the follow-up audit session on 30 July 2013. |
|  | 30/07/2013         | To remove the construction materials which were placed at near the tree at Portion C.   | Follow-up action was needed for the item.  |
|  | 30/07/2013         | Clear the deposit silt and sediment at the drainage channel at Portion C.               | Follow-up action was needed for the item.  |
|  | 30/07/2013         | To seal the hole of the drip tray near the office containers at Portion C.              | Follow-up action was needed for the item.  |
| <b>Landscape &amp; Visual Impact</b>                             | N/A <sup>(1)</sup> | N/A <sup>(1)</sup>  | N/A <sup>(1)</sup>   |
| <b>Other(s)</b>  | N/A <sup>(1)</sup> | N/A <sup>(1)</sup>  | N/A <sup>(1)</sup>   |
| <b>Cultural Heritage (Sha Lo Wan (West) Archaeological Site)</b> | N/A <sup>(2)</sup> | N/A <sup>(2)</sup>  | N/A <sup>(2)</sup>   |

Remark: N/A<sup>(1)</sup> No major environmental deficiency was identified during the site inspection in the reporting month.

N/A<sup>(2)</sup> No archaeological site inspection was conducted in the reporting month.

**Advice on the Solid and Liquid Waste Management Status**

- 7.10 According to the Contractor, 12,438m<sup>3</sup> inert C&D materials were generated during the reporting month.
- 7.11 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.
- 7.12 The amount of wastes generated by the activities of the Contract during the reporting month is shown in **Appendix O**.

## **8 ENVIRONMENTAL NON-CONFORMANCE (EXCEEDANCES)**

### **Summary of Exceedances**

- 8.1 Summary of exceedance is provided in **Appendix L**.
- 8.2 No Action/Limit Level exceedance was recorded for air quality, construction noise and underwater noise.
- 8.3 All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances for suspended solids were recorded.
- 8.4 According to the investigation, no pollution discharge from the marine works and no exceedances were recorded at the impact stations (i.e. IS1 to IS4) which are close to construction site. Therefore, all exceedances are considered not due to the Contract.

### **Summary of Environmental Complaint**

- 8.5 One environmental related complaint was received in the reporting month. The Complaint Log is attached in **Appendix P**.

### **Summary of Notification of Summons and Successful Prosecution**

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

## 9 FUTURE KEY ISSUES

### Key Issues in the Coming Month

9.1 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

- Erection of hoarding & fencing
- Pre-drilling work
- Protection work to the fuel pipes
- Backfilling works
- 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

### Monitoring Schedule for the Next Month

9.2 The tentative environmental monitoring schedule for the next month is shown in **Appendix D**.

### Construction Programme for the Next Month

9.3 A tentative construction programme is provided in **Appendix A**.

## 10 CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

- 10.1 The Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken in July 2013 in accordance with EM&A Manual.
- 10.2 No Action/Limit Level exceedance was recorded for air quality, construction noise and underwater noise.
- 10.3 For water quality monitoring, there is three Action Level and one Limit Level exceedances for suspended solids were recorded.
- 10.4 According to the investigation, no pollution discharge from the marine works and no exceedances were recorded at the impact stations (i.e. IS1 to IS4) which are close to construction site. Therefore, all exceedances are considered not due to the Contract.
- 10.5 Dolphin transect survey was carried out on 5<sup>th</sup> and 10<sup>th</sup> July 2013. No adverse impact on Chinese White Dolphins was noticeable from general observations.
- 10.6 Dolphin Behaviour Monitoring (Acoustic) was carried out on 9<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 22<sup>nd</sup>, 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup> and 26<sup>th</sup> July 2013.
- 10.7 Land-based Dolphin Behaviour and Movement Monitoring was conducted on 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 23<sup>rd</sup>, 24<sup>th</sup> and 29<sup>th</sup> July 2013.
- 10.8 Environmental site inspection was conducted on 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup> July 2013 by ET in the reporting month. All deficiencies identified during the site inspection have already rectified / improved during the follow-up audit session.
- 10.9 There was one environmental complaint, no notification of summons and successful prosecution received.
- 10.10 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

- 10.11 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.



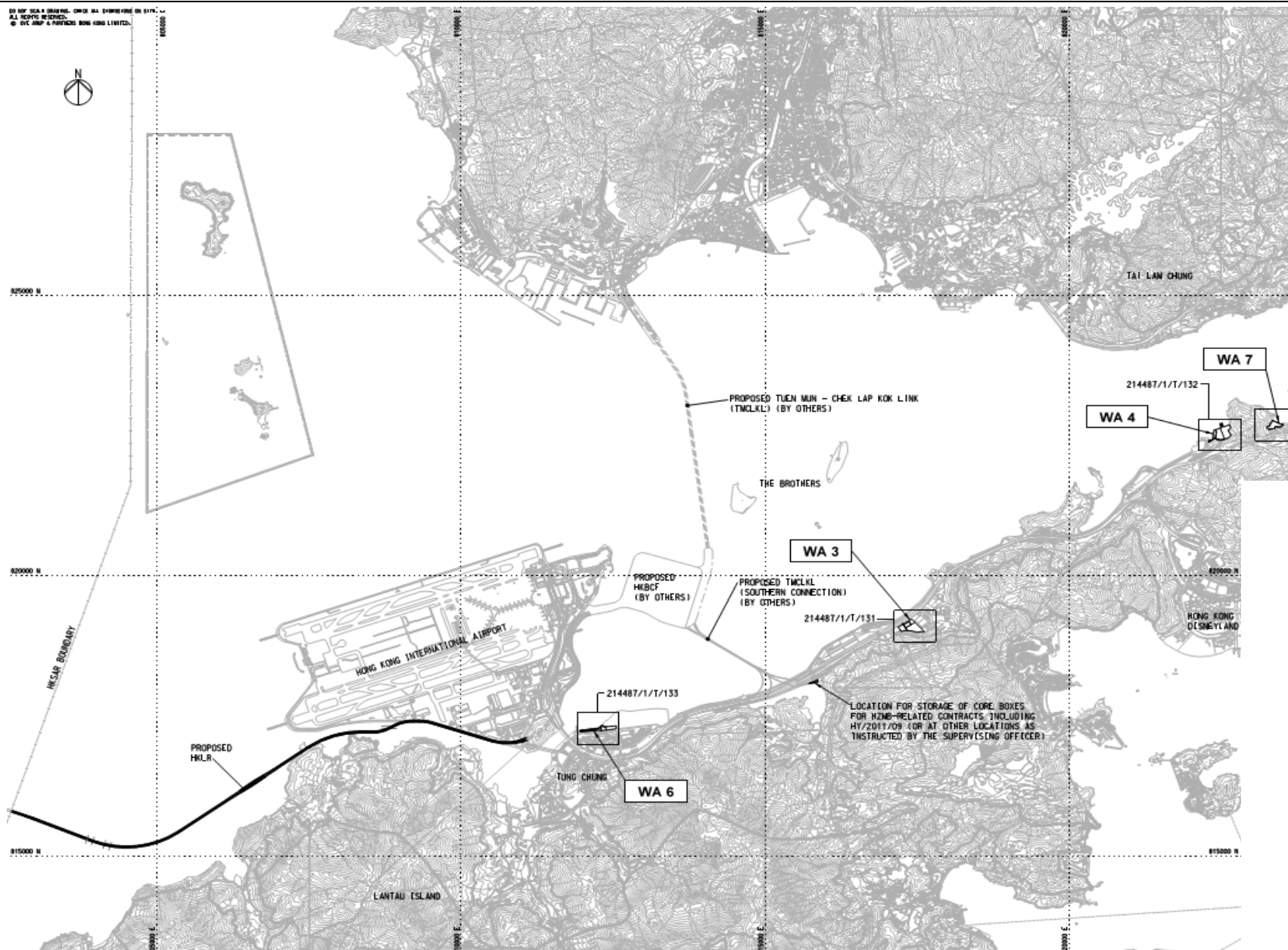
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**FIGURE(S)**

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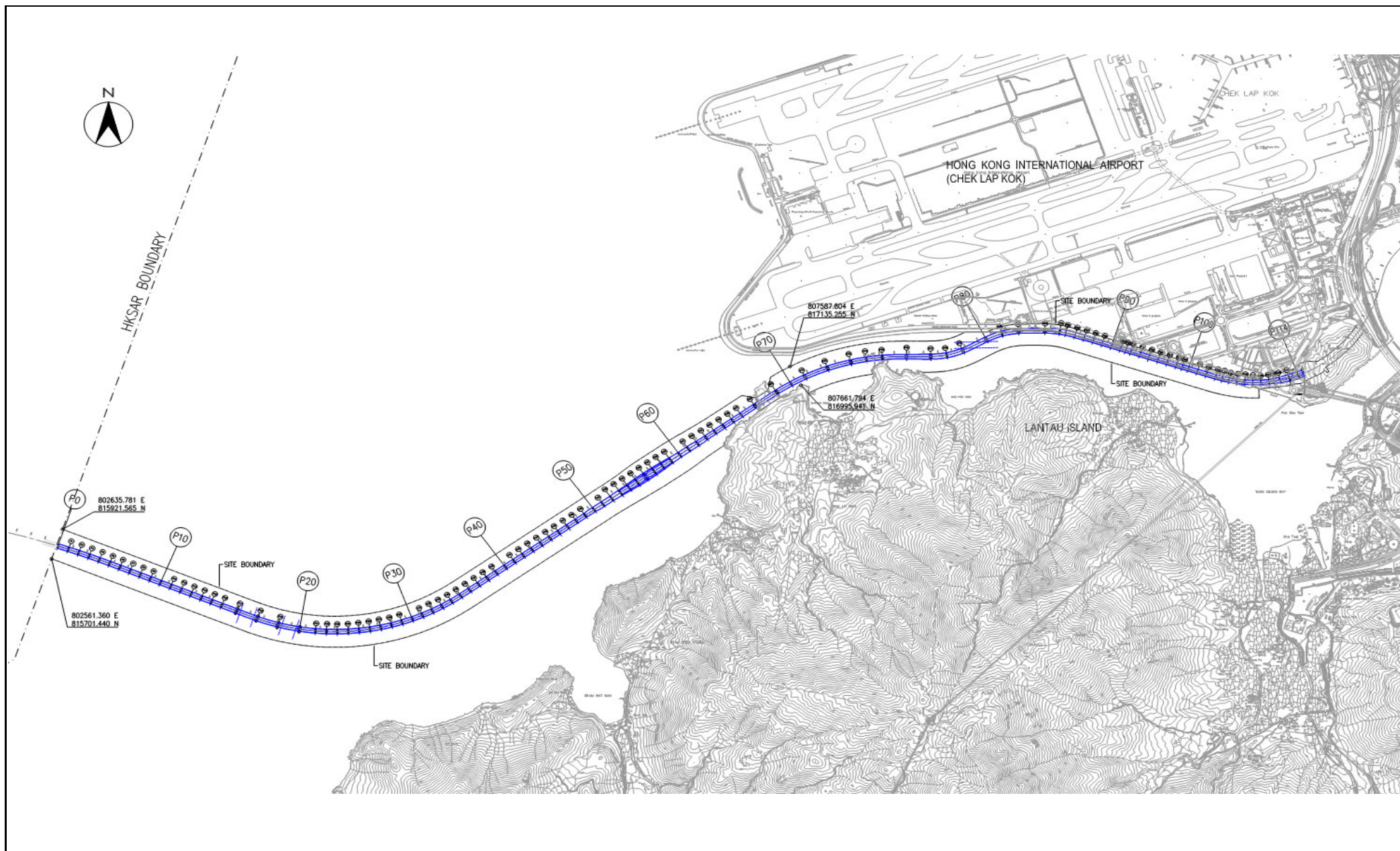


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|-------|--|--------|-------------|----------|
| Title | Contract No. HY/2011/09  | Scale  | Propose     | CINOTECH |
|       | Hong Kong-Zhuhai-Macao Bridge  | N.T.S  | No. MA12014 |          |
|       | Hong Kong Link Road – Section between HKSAR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

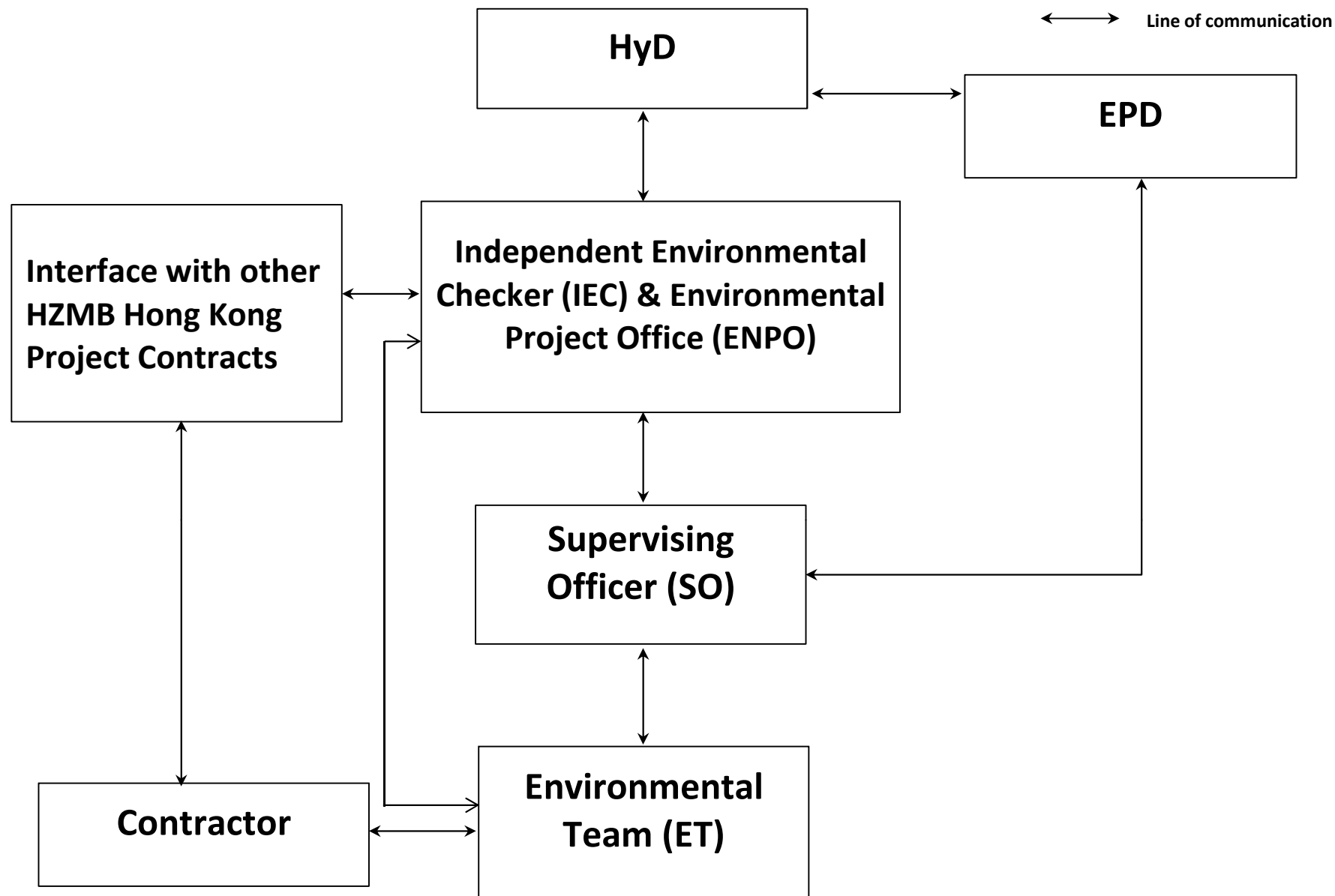
CINOTECH



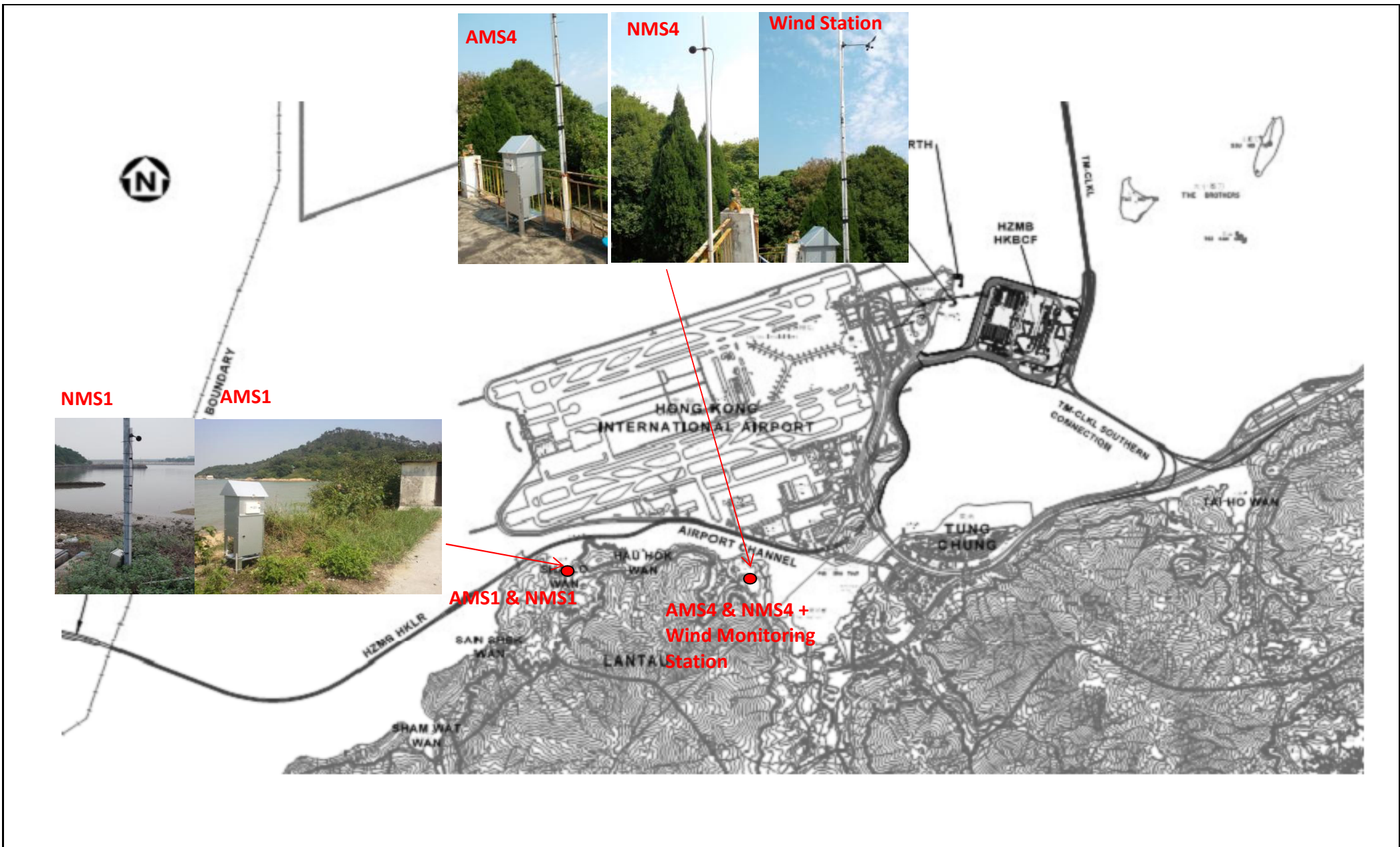




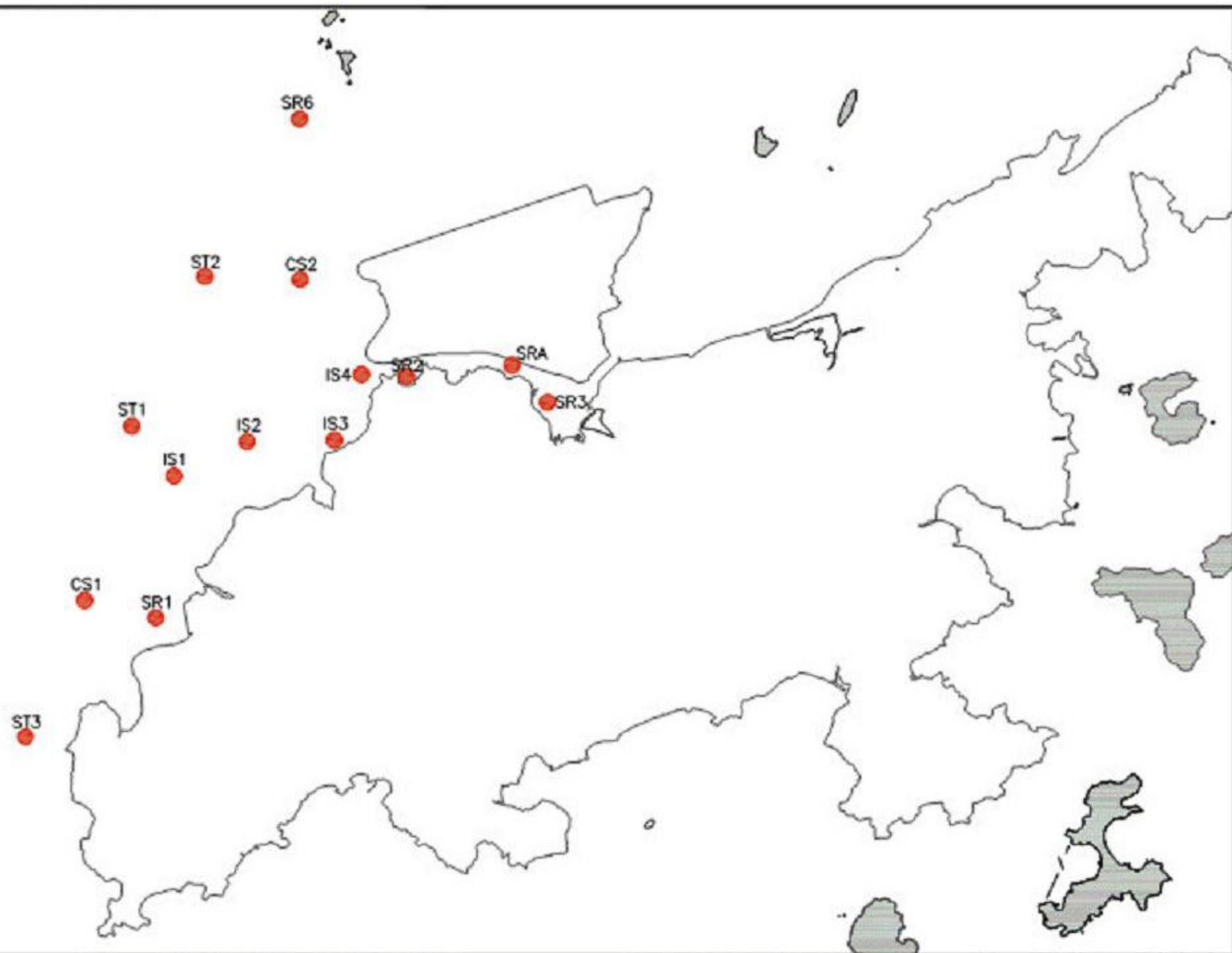
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|-------|--|--------|-------------|----------|
| Title | Contract No. HY/2011/09  | Scale  | Propose     | CINOTECH |
|       | Hong Kong-Zhuhai-Macao Bridge  | N.T.S  | No. MA12014 |          |
|       | Hong Kong Link Road – Section between HKSAR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







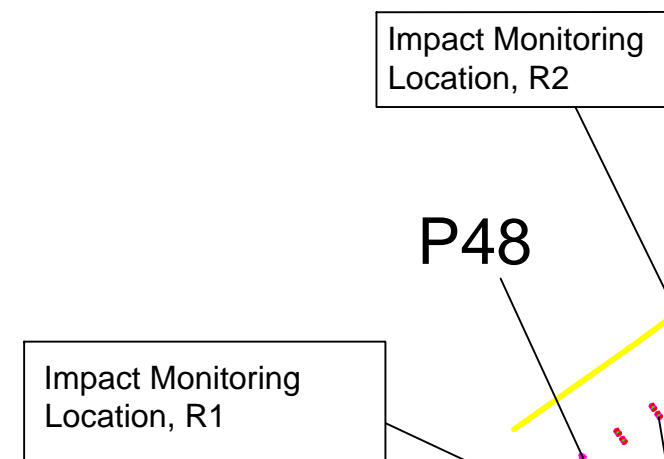
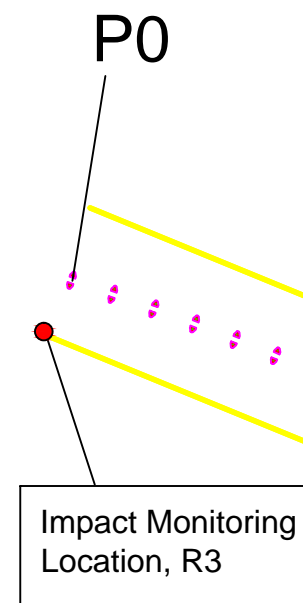
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| Title  | Contract No. HY/2011/09               | Scale  | Propose     | CINOTECH |
|  | Hong Kong-Zhuhai-Macao Bridge         | N.T.S  | No. MA12014 |          |
|  | Hong Kong Link Road – Section between | Date   | Figure      |          |
|  |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







|         | Coordinates |        |
|---------|-------------|--------|
|         | x           | y      |
| Pier    |             |        |
| P48     | 806137      | 815984 |
| P52     | 806376      | 816154 |
| P0      | 802604      | 815797 |
| Station |             |        |
| R1      | 806141      | 815885 |
| R2      | 806390      | 816056 |
| R3      | 802556      | 815708 |



500m

Contract No. HY/2011/09 Hong Kong Link Road - Section between HKSAR Boundary & Scenic Hill

## Location of Underwater Noise Monitoring Stations

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**APPENDIX A**  
**CONSTRUCTION PROGRAMME**

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## Bored Piling Activities at P0, P48, P50 & P52 conducted in July 2013

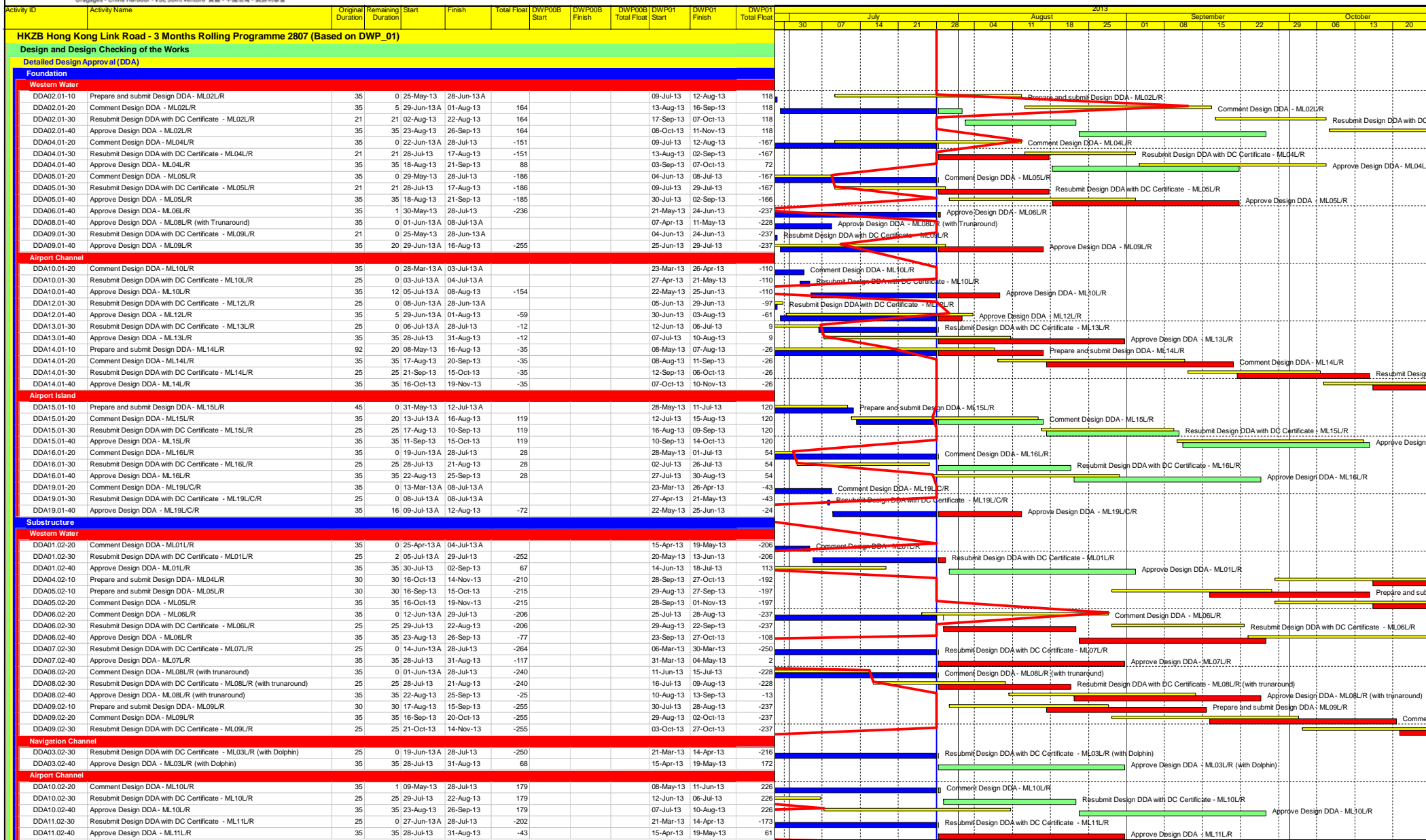
| Date      | Location | Bored Piling Activities   |
|-----------|----------|---|
| 8-Jul-13  | Pier 0   | P0-R1 Bored pile excavation works by BG40.                                    |
|           | Night    | P0-R1 Excavation works reached Founding Level by BG40.                        |
|           |          | P0-L3 Excavation works by BG40.   |
|           | Pier 50  | Excavation for bored pile P50-R2 by RCD.                                      |
|           |          | Splicing of permanent casing to bored pile P50-R3.                            |
|           | Night    | Set up RCD to bored pile P50-R1.  |
|           | Pier 52  | Set up RCD to bored pile P52-L4.  |
|           |          | Excavation for bored pile P52-L1 by RCD.                                      |
|           | Night    | Set up RCD to bored pile P52-L4.  |
|           |          | Excavation for bored pile P52-L1 by RCD.                                      |
| 9-Jul-13  | Pier 0   | P0-R1 Air-lifting & preparation work for Kodan test.                          |
|           | Night    | Tidy up and maintenance drilling bit.   |
|           | Pier 50  | Excavation for bored pile P50-R1 by RCD.                                      |
|           |          | Set up RCD to bored pile P50-R3.  |
|           | Night    | Excavation for bored pile P50-R1 by RCD.                                      |
|           |          | Set up RCD to bored pile P50-R3.  |
|           | Pier 52  | Set up RCD and excavation for bored pile P52-R4.                              |
|           | Night    | Installation of steel cage for bored pile P52-L4.                             |
| 10-Jul-13 | Pier 0   | P0-R1 Remedial works  |
|           | Night    | Tidy up and maintenance drilling bit.   |
|           | Pier 50  | Excavation for bored pile P50-R4 by RCD.                                      |
|           | Night    | Excavation for bored pile P50-R4 by RCD.                                      |
|           | Pier 52  | Concreting to bored pile P52-L4.  |
|           | Night    | Excavation for bored pile P52-R4 by RCD.                                      |
|           |          | Shifting of RCD from bored pile P52-R4 to P52-R2.                             |
|           |          | Concreting to bored pile P52-L4.  |
| 11-Jul-13 | Pier 0   | P0-R1 placing concrete for Remedial works.                                    |
|           | Night    | P0-R1 placing concrete for Remedial works.                                    |
|           |          | Tidy up and maintenance work.   |
|           | Pier 50  | Excavation for bored pile P50-R4 by RCD.                                      |
|           |          | Splicing of permanent casing to bored pile P50-R2.                            |
|           | Night    | Excavation for bored pile P50-L1 by RCD.                                      |
|           | Pier 52  | Air-lifting, Kodan test and installation of steel cage for bored pile P52-R4. |
|           | Night    | Installation of steel cage for bored pile P52-R4.                             |
| 12-Jul-13 | Pier 0   | P0-R1 Remedial works  |
|           | Night    | Tidy up and maintenance work.   |
|           | Pier 50  | Excavation for bored pile P50-L1 by RCD.                                      |
|           | Night    | Excavation for bored pile P50-L1 by RCD.                                      |
|           | Pier 52  | Installation of steel cage and concreting to bored pile P52-R4.               |
|           | Night    | Concreting to bored pile P52-R4.  |
|           |          | Excavation for bored pile P52-L1 by RCD.                                      |
| 13-Jul-13 | Pier 0   | Tidy up & maintenance on CP1 platform.  |
|           | Night    | P0-L3 excavation works by BG40.   |
|           | Pier 50  | Installation of steel cage for bored pile P50-R4.                             |
|           | Night    | No site activity.   |
|           | Pier 52  | Excavation for bored pile P52-L1 by RCD.                                      |
|           | Night    | Excavation for bored pile P52-R2 by RCD.                                      |
| 14-Jul-13 | Pier 0   | No site activity on Sunday.   |
|           | Night    | No site activity on Sunday.   |
|           | Pier 50  | Installation of steel cage for bored pile P50-R4.                             |
|           | Night    | Installation of steel cage for bored pile P50-R4.                             |
|           | Pier 52  | No site activity on Sunday.   |
|           | Night    | No site activity on Sunday.   |

## Bored Piling Activities at P0, P48, P50 & P52 conducted in July 2013

| Date      | Location | Bored Piling Activities  |
|-----------|----------|--|
| 15-Jul-13 | Pier 0   | P0-R1 excavation works by BG40.  |
|           | Night    | P0-R1 excavation works by BG40.  |
|           | Pier 50  | Installation of steel cage and concreting to bored pile P50-R4.                  |
|           | Night    | Concreting to bored pile P50-R4.   |
|           |          | General cleaning and tidying on barge.   |
|           | Pier 52  | Excavation for bored pile P52-R2 by RCD.   |
|           | Night    | Installation of steel cage for bored pile P52-L1.                                |
| 16-Jul-13 | Pier 0   | P0-L3 excavation works by BG40.  |
|           |          | P0-R1 placing concrete for Remedial works.                                       |
|           | Night    | Tidy up and maintenance drilling bit.  |
|           | Pier 50  | Installation of steel cage for bored pile P50-L1.                                |
|           |          | Set up RCD to bored pile P50-R1.   |
|           | Night    | Installation of steel cage for bored pile P50-L1.                                |
|           | Pier 52  | Installation of steel cage and concreting to bored pile P52-L1.                  |
|           | Night    | Concreting to bored pile P52-L1.   |
|           |          | Set up RCD to bored pile P52-R2.   |
| 17-Jul-13 | Pier 0   | P0-L3 excavation works by BG40.  |
|           |          | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Night    | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Pier 50  | Installation of steel cage for bored pile P50-L1.                                |
|           | Night    | Installation of steel cage and tremie pipe for concreting for bored pile P50-L1. |
|           | Pier 52  | Set up RCD to bored pile P52-L3.   |
|           | Night    | Preparation work of installation of steel cage for bored pile P52-R2.            |
| 18-Jul-13 | Pier 0   | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Night    | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Pier 50  | Concreting to bored pile P50-L1.   |
|           | Night    | No site activity.  |
|           | Pier 52  | Set up RCD to bored pile P52-L3.   |
|           |          | Installation of rebar cage for bored pile P50-R2.                                |
|           | Night    | Air-lifting for bored pile P52-L3.   |
|           |          | Installation of rebar cage for bored pile P52-R2.                                |
| 19-Jul-13 | Pier 0   | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Night    | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Pier 50  | Excavation for bored pile P50-R1 and P50-R3 by RCD.                              |
|           | Night    | Excavation for bored pile P50-L3 by RCD.   |
|           | Pier 52  | Installation of rebar cage for bored pile P52-R2 and P52-L3.                     |
|           | Night    | Installation of rebar cage for bored pile P52-R2 and P52-L3.                     |
| 22-Jul-13 | Pier 0   | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Night    | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           | Pier 50  | Excavation for bored pile P50-R1 by RCD.   |
|           |          | Installation of rebar cage and concreting to bored pile P50-L3.                  |
|           | Night    | Excavation for bored pile P50-R1 by RCD.   |
|           |          | Concreting to bored pile R50-L3.   |
|           | Pier 52  | Preparation work for removal of Jacket Platform (LHS and RHS).                   |
|           | Night    | No site activity.  |
| 23-Jul-13 | Pier 0   | P0-R1 Re-excavation works for infill concrete by BG40.                           |
|           |          | P0-L3 Excavation works by BG40.  |
|           | Night    | P0-L3 Excavation works by BG40.  |
|           | Pier 50  | Excavation for bored pile P50-R1 by RCD.   |
|           | Night    | Excavation for bored pile P50-R1 by RCD.   |
|           | Pier 52  | Preparation work for removal of Jacket Platform (LHS and RHS).                   |
|           | Night    | No site activity.  |

## Bored Piling Activities at P0, P48, P50 & P52 conducted in July 2013

| Date      | Location | Bored Piling Activities  |
|-----------|----------|--|
| 24-Jul-13 | Pier 0   | P0-R1 Re-excavation works by BG40.                                 |
|           | Night    | P0-R1 Exchange bentonite.  |
|           | Pier 50  | Excavation for bored pile P50-R3 by RCD.                           |
|           | Night    | Excavation for bored pile P50-R3 by RCD.                           |
|           | Pier 52  | Preparation work for removal of Jacket Platform (LHS and RHS).     |
|           | Night    | No site activity.  |
| 25-Jul-13 | Pier 0   | P0-R1 air-lifting.   |
|           | Night    | P0-R1 Exchange bentonite.  |
|           | Pier 50  | Excavation for bored pile P50-R3 by RCD.                           |
|           |          | Installation of rebar cage to bored pile P50-R1.                   |
|           | Night    | Installation of rebar cage to bored pile P50-R1.                   |
|           | Pier 52  | Removal of pin piles of Jacket Platform (LHS and RHS).             |
|           |          | No site activity.  |
| 26-Jul-13 | Pier 0   | P0-R1 air-lifting.   |
|           | Night    | P0-R1 installation works of steel cage.                            |
|           | Pier 50  | Excavation for bored pile P50-R2 by RCD.                           |
|           |          | Installation of rebar cage to bored pile P50-R1.                   |
|           | Night    | Excavation for bored pile P50-R3 by RCD.                           |
|           |          | Installation of rebar cage to bored pile P50-R1.                   |
|           | Pier 52  | Removal of pin piles of Jacket Platform (LHS and RHS).             |
|           |          | No site activity.  |
| 29-Jul-13 | Pier 0   | P0-R1 installation works of steel cage.                            |
|           | Night    | P0-R1 installation works of steel cage.                            |
|           | Pier 48  | P48-L3 Excavation work by BG40.                                    |
|           | Night    | No site activity.  |
|           | Pier 50  | Splicing of permanent casing and set up RCD for bored pile P50-R3. |
|           | Night    | Excavation for bored pile P50-R3 by RCD.                           |
|           |          |  |

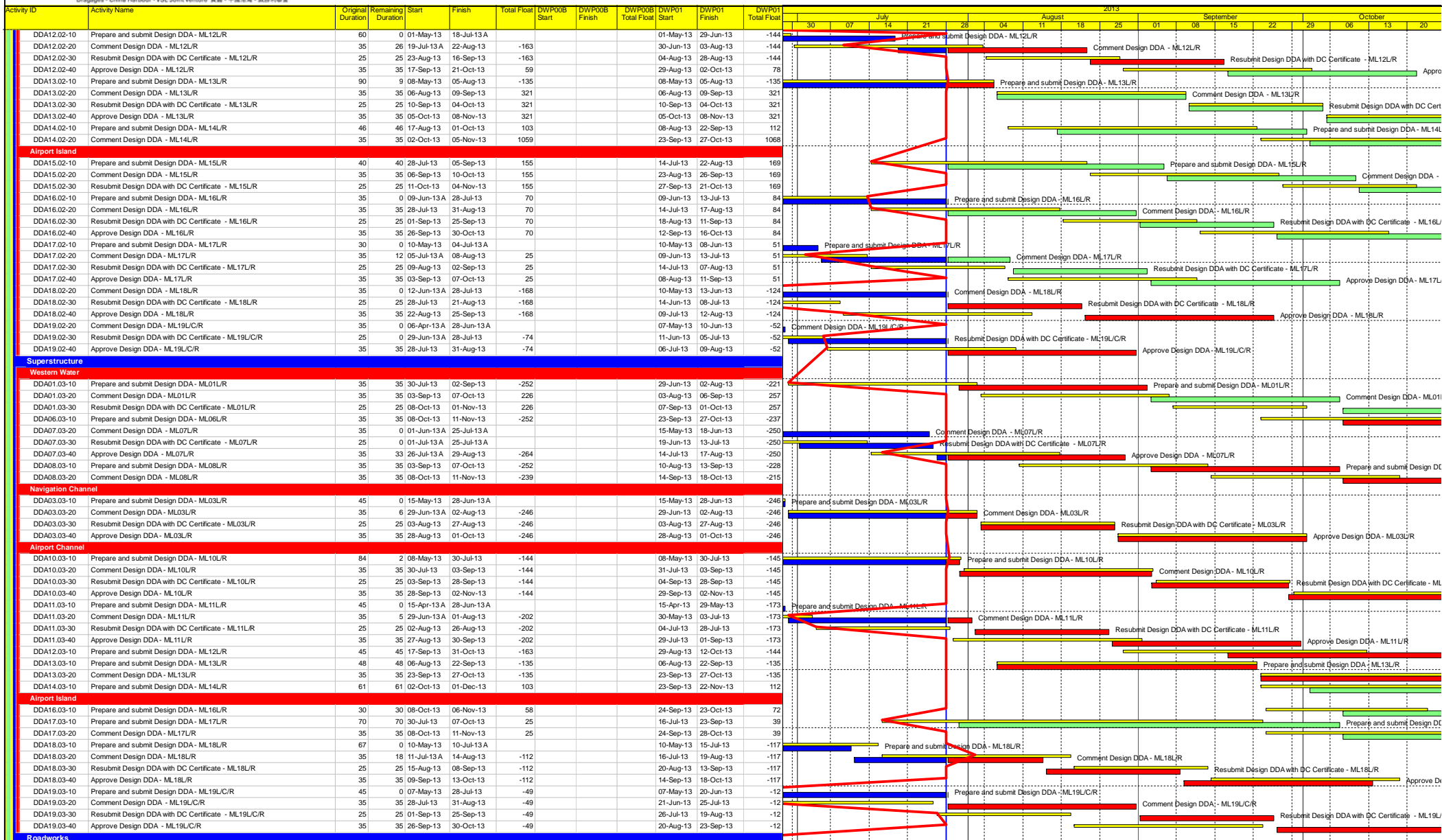


■ Actual Work      ■ Remaining Work      ■ Critical Remaining Work  
◆ Milestone      ◆ Milestone  
— Approved DWP00B      — Submitted DWP01

3 Months Rolling Programme - 28 Jul 2013

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| Date      | Revision     | Checked | Approved |
|-----------|--------------|---------|----------|
| 29-Jul-13 | 1307 Rolling | Tim     |          |
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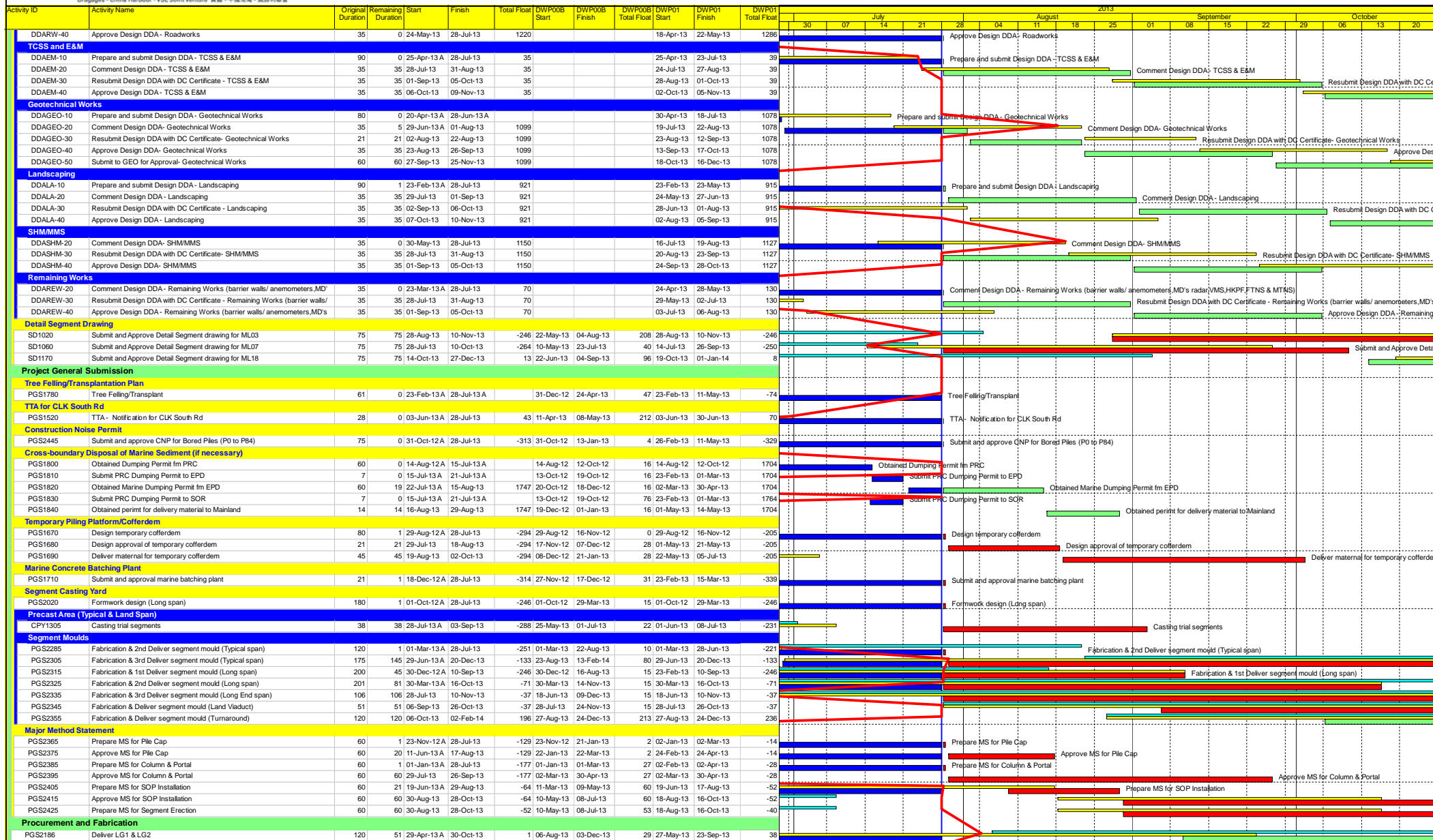
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◆ Milestone      ◆ Milestone  
— Approved DWP00B      — Submitted DWP01

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| Date      | Revision     | Checked | Approved |
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| 29-Jul-13 | 1307 Rolling | Tim     |          |
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Actual Work
  Remaining Work
  Critical Remaining Work

◆ Milestone
  Approved DWP00B
  Submitted DWP01

3 Months Rolling Programme - 28 Jul 2013

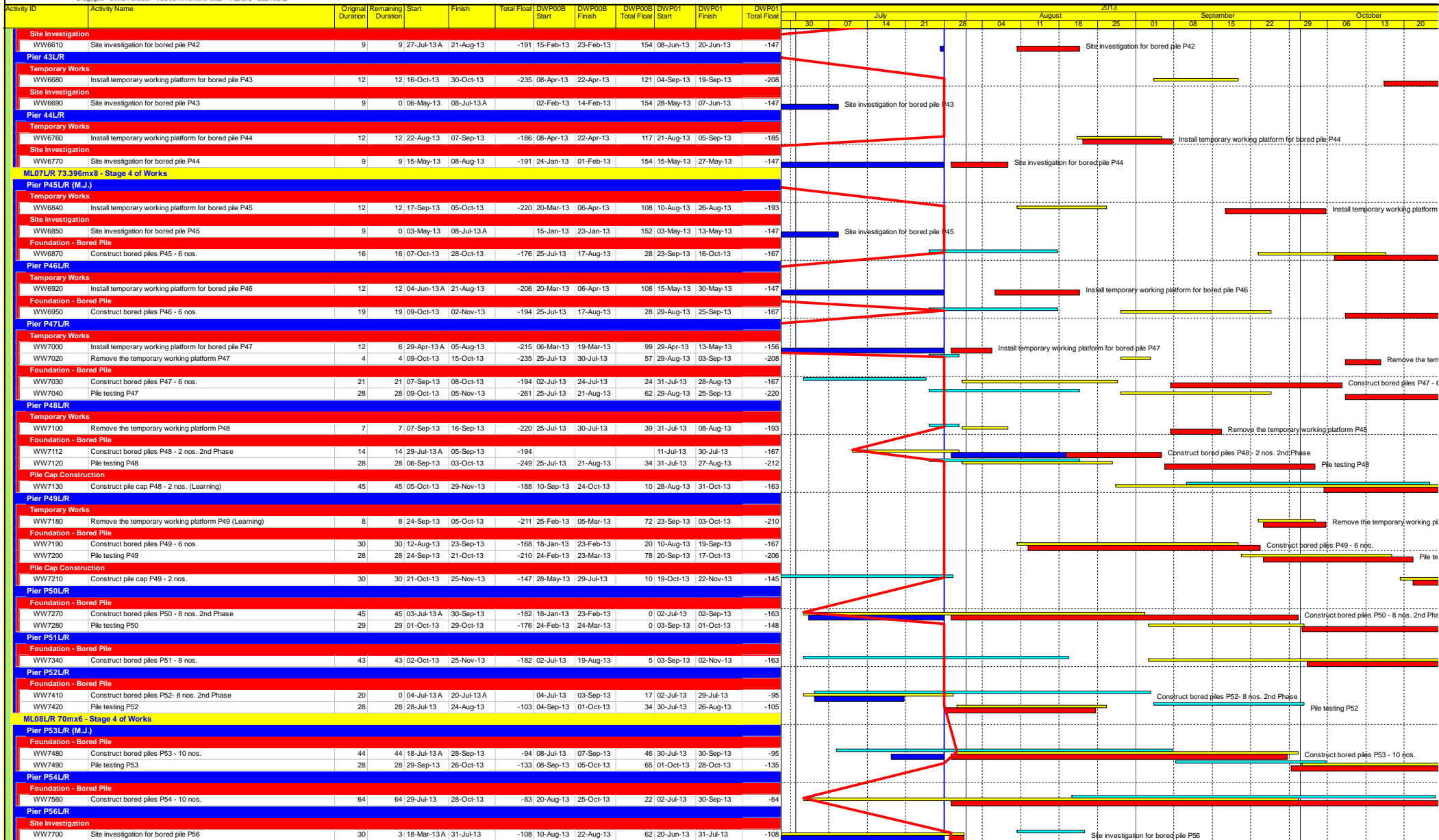
Page 3 of 8

| Date      | Revision     | Checked | Approved |
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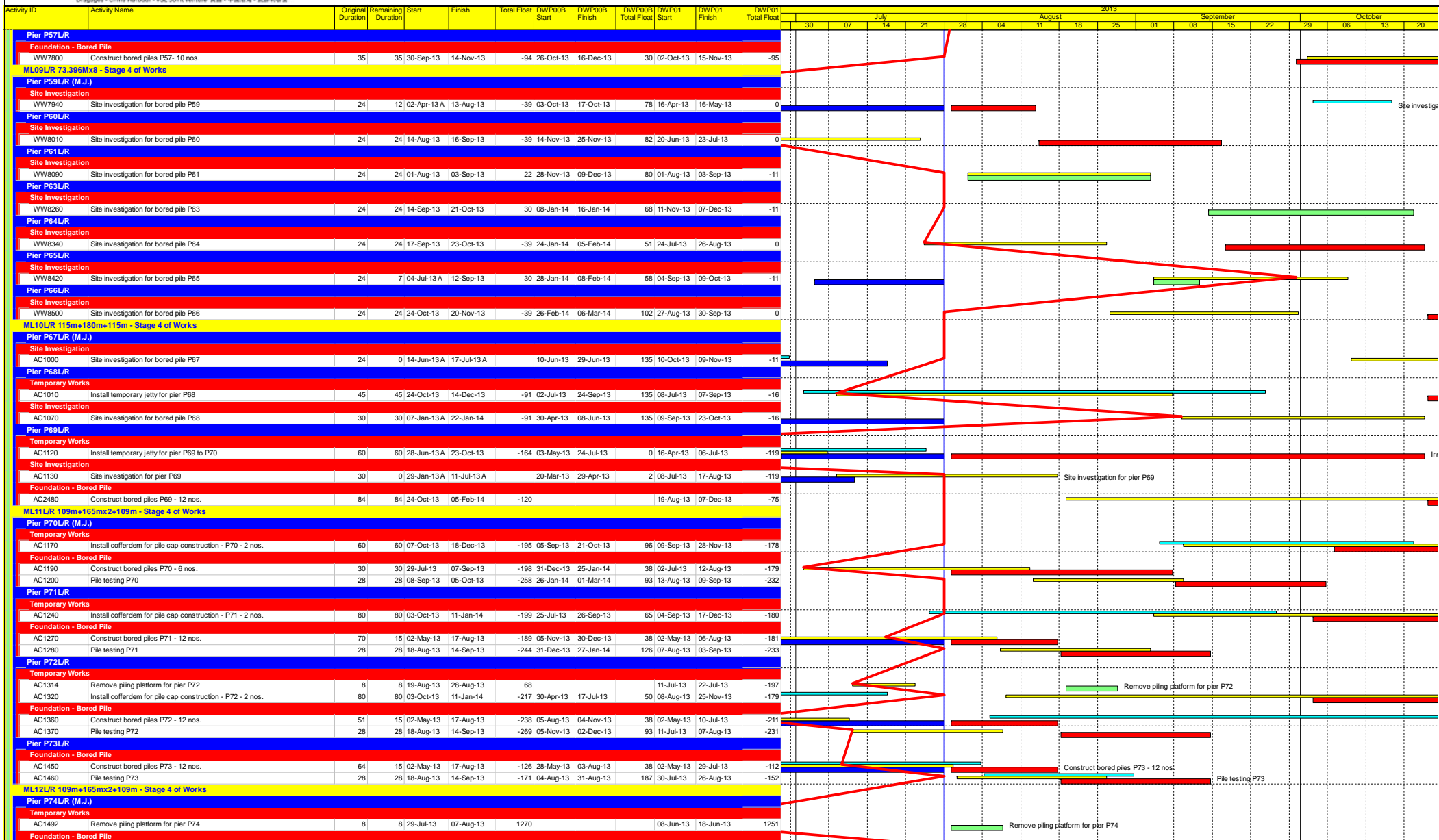


■ Actual Work      ◆ Milestone  
■ Remaining Work      ■ Approved DWP00B  
■ Critical Remaining Work      ■ Submitted DWP01

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| Date      | Revision     | Checked | Approved |
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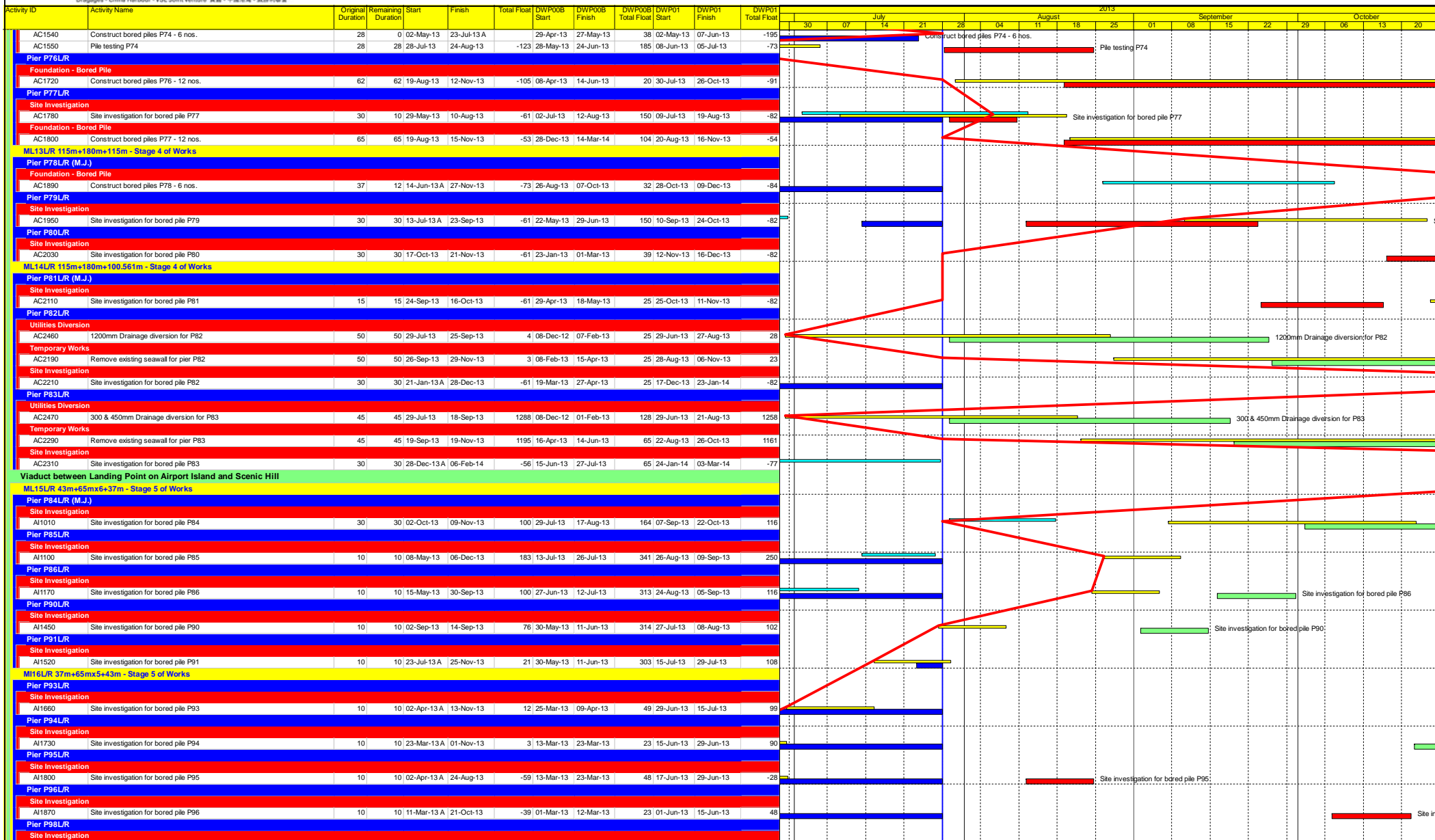


Actual Work  
 Remaining Work  
 Critical Remaining Work  
 Milestone  
 Approved DWP00B  
 Submitted DWP01

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| Date      | Revision     | Checked | Approved |
|-----------|--------------|---------|----------|
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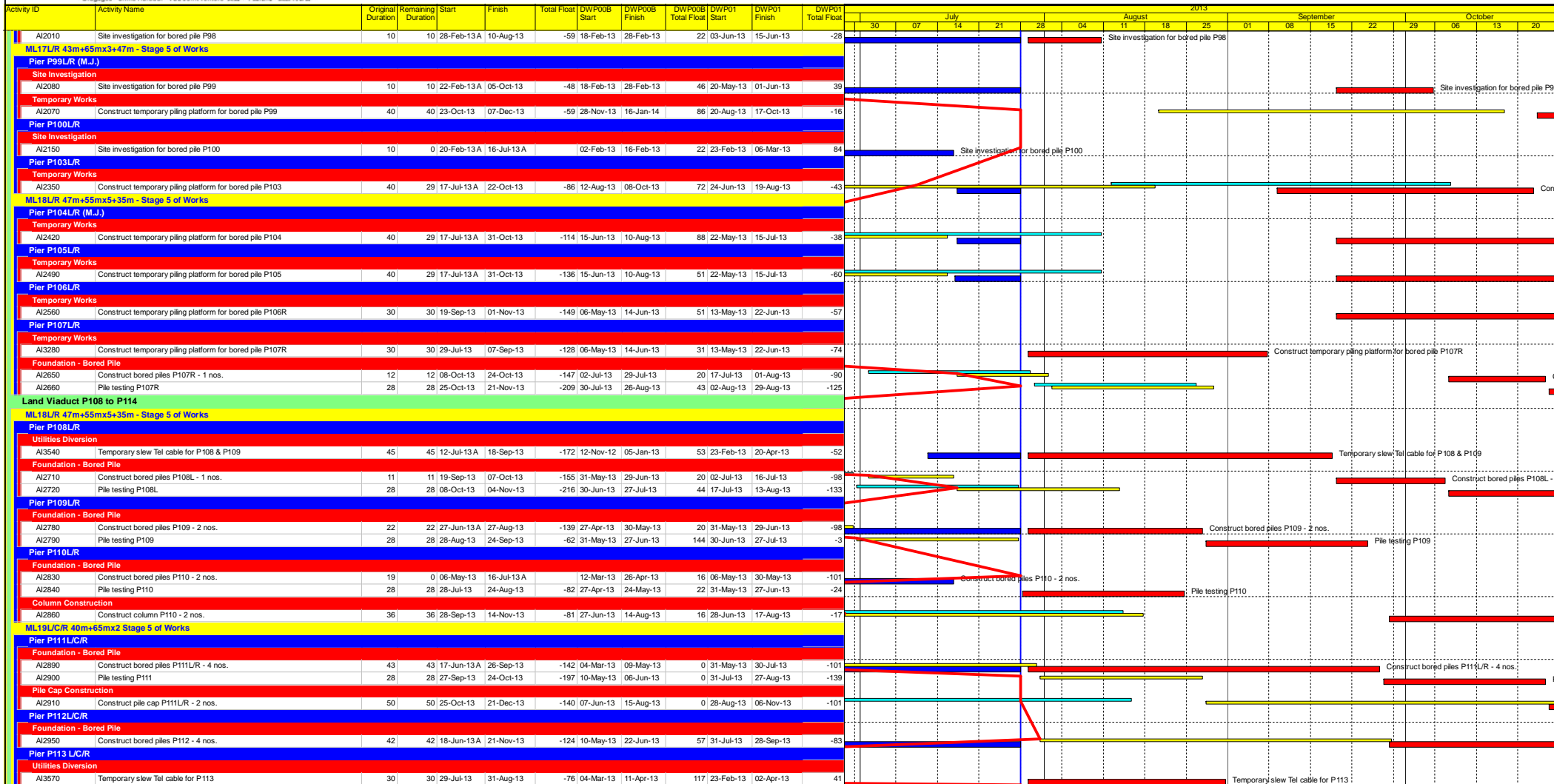


Actual Work
  Remaining Work
  Critical Remaining Work
  Submitted DWP01
  Approved DWP00B
  Milestone

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| Date      | Revision     | Checked | Approved |
|-----------|--------------|---------|----------|
| 29-Jul-13 | 1307 Rolling | Tim     |          |
|           |              |         |          |
|           |              |         |          |



Actual Work      ◆ ◆ Milestone  
 Remaining Work      Approved DWP00B  
 Critical Remaining Work      Submitted DWP01

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| Date      | Revision     | Checked | Approved |
|-----------|--------------|---------|----------|
| 29-Jul-13 | 1307 Rolling | Tim     |          |
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**APPENDIX B**  
**ACTION AND LIMIT LEVELS**

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## Appendix B - Action and Limit Levels

**Table B-1 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 B-2 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 B-3 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 B-4 Action and Limit Levels for Underwater Construction Noise**

| Action Level              | Limit Level               |
|---------------------------|---------------------------|
| 170 dB re $1\mu\text{Pa}$ | 180 dB re $1\mu\text{Pa}$ |

**Table B-5      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>  | <b>4.2</b> except 5 for FCZ   |
|   | Bottom             | <u>4.7</u>  | <b>3.6</b>  |
| Turbidity (NTU)                                   | Depth average      | <u>27.5</u> and 120% of upstream control station's turbidity at the same tide of the same day | <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      | <u>23.5</u> and 120% of upstream control station's SS at the same tide of the same day        | <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.



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**APPENDIX C  
COPIES OF CALIBRATION  
CERTIFCATES**

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# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA12014/67/0003

Project No. AMS 1 - Sha Lo Wan Operator: Hei  
 Date: 17-Jun-13 Next Due Date: 16-Aug-13  
 Equipment No.: A-01-67 Serial No. 3218

| Ambient Condition   |       |                     |       |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 301.2 | Pressure, Pa (mmHg) | 755.4 |

| Orifice Transfer Standard Information |           |   |        |               |         |
|---------------------------------------|-----------|---|--------|---------------|---------|
| Equipment No.:                        | A-04-05   | Slope, mc   | 0.0592 | Intercept, bc | -0.0283 |
| Last Calibration Date:                | 26-Dec-12 | $mc \times Q_{std} + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ |        |               |         |
| Next Calibration Date:                | 25-Dec-13 | $Q_{std} = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$  |        |               |         |

| Calibration of TSP Sampler |                                    |  |                        |                              |  |
|----------------------------|------------------------------------|--|------------------------|------------------------------|--|
| Calibration Point          | Orifice                            |  |                        | HVS                          |  |
|                            | $\Delta H$ (orifice), in. of water | $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd (CFM)<br>X - axis | $\Delta W$ (HVS), in. of oil | $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$<br>Y-axis |
| 1                          | 11.8                               | 3.41   | 58.02                  | 6.9                          | 2.60   |
| 2                          | 9.4                                | 3.04   | 51.84                  | 5.4                          | 2.30   |
| 3                          | 7.1                                | 2.64   | 45.11                  | 4.2                          | 2.03   |
| 4                          | 4.6                                | 2.13   | 36.40                  | 2.9                          | 1.69   |
| 5                          | 2.8                                | 1.66   | 28.51                  | 1.9                          | 1.37   |

By Linear Regression of Y on X

Slope, mw = 0.0414 Intercept, bw : 0.1774

Correlation coefficient\* = 0.9993

\*If Correlation Coefficient < 0.990, check and recalibrate.

| Set Point Calculation  |  |
|--|--|
| From the TSP Field Calibration Curve, take Qstd = 43 CFM   |  |
| From the Regression Equation, the "Y" value according to   |  |
| $mw \times Q_{std} + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$                              |  |
| Therefore, Set Point; W = $(mw \times Q_{std} + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ <u>3.90</u> |  |

Remarks: \_\_\_\_\_

Conducted by: Hei Signature: Hei Date: 17/6/13  
 Checked by: Wk Tang Signature: Wk Tang Date: 17/6/2013

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET

**CINOTECH**

File No. MA12014/74/0003

Project No. AMS 4 - San Tau Operator: Hei  
 Date: 17-Jun-13 Next Due Date: 16-Aug-13  
 Equipment No.: A-01-74 Serial No. 2202

| Ambient Condition   |       |                     |       |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 300.8 | Pressure, Pa (mmHg) | 755.9 |

| Orifice Transfer Standard Information |           |   |        |               |         |
|---------------------------------------|-----------|---|--------|---------------|---------|
| Equipment No.:                        | A-04-05   | Slope, mc   | 0.0592 | Intercept, bc | -0.0283 |
| Last Calibration Date:                | 26-Dec-12 | $mc \times Q_{std} + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ |        |               |         |
| Next Calibration Date:                | 25-Dec-13 | $Q_{std} = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$  |        |               |         |

| Calibration of TSP Sampler |                                    |  |                     |                              |   |
|----------------------------|------------------------------------|--|---------------------|------------------------------|---|
| Calibration Point          | Orifice                            |  |                     | HVS                          |   |
|                            | $\Delta H$ (orifice), in. of water | $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd (CFM) X - axis | $\Delta W$ (HVS), in. of oil | $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis |
| 1                          | 11.4                               | 3.35   | 57.09               | 7.7                          | 2.75  |
| 2                          | 9.2                                | 3.01   | 51.34               | 6.5                          | 2.53  |
| 3                          | 7.0                                | 2.63   | 44.84               | 5.2                          | 2.26  |
| 4                          | 4.5                                | 2.11   | 36.05               | 3.4                          | 1.83  |
| 5                          | 2.7                                | 1.63   | 28.03               | 2.2                          | 1.47  |

### By Linear Regression of Y on X

Slope, mw = 0.0446 Intercept, bw : 0.2306  
 Correlation coefficient\* = 0.9992

\*If Correlation Coefficient < 0.990, check and recalibrate.

| Set Point Calculation  |  |
|--|--|
| From the TSP Field Calibration Curve, take Qstd = 43 CFM   |  |
| From the Regression Equation, the "Y" value according to   |  |
| $mw \times Q_{std} + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$                              |  |
| Therefore, Set Point; W = $(mw \times Q_{std} + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ <u>4.69</u> |  |

Remarks: \_\_\_\_\_

Conducted by: Hei Signature: Hei Date: 17/6/13  
 Checked by: Wick Tang Signature: Kwai Date: 17/6/2013



TISCH ENVIRONMENTAL, INC.  
145 SOUTH MIAMI AVE.  
VILLAGE OF CLEVELAND, OH 45002  
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513.467.9009 FAX  
WWW.TISCH-ENV.COM

# AIR POLLUTION MONITORING EQUIPMENT

## ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Dec 26, 2012 Rootsmeter S/N 0438320 Ta (K) - 295  
Operator Tisch Orifice I.D. - 2323 Pa (mm) - 753.11

| PLATE<br>OR<br>Run # | VOLUME<br>START<br>(m3) | VOLUME<br>STOP<br>(m3) | DIFF<br>VOLUME<br>(m3) | DIFF<br>TIME<br>(min) | METER<br>DIFF<br>Hg<br>(mm) | ORFICE<br>DIFF<br>H2O<br>(in.) |
|----------------------|-------------------------|------------------------|------------------------|-----------------------|-----------------------------|--------------------------------|
| 1                    | NA                      | NA                     | 1.00                   | 1.4440                | 3.2                         | 2.00                           |
| 2                    | NA                      | NA                     | 1.00                   | 1.0240                | 6.4                         | 4.00                           |
| 3                    | NA                      | NA                     | 1.00                   | 0.9120                | 8.0                         | 5.00                           |
| 4                    | NA                      | NA                     | 1.00                   | 0.8720                | 8.8                         | 5.50                           |
| 5                    | NA                      | NA                     | 1.00                   | 0.7200                | 12.8                        | 8.00                           |

## DATA TABULATION

| Vstd                                | (x axis)<br>Qstd | (y axis) | Va                        | (x axis)<br>Qa | (y axis) |
|-------------------------------------|------------------|----------|---------------------------|----------------|----------|
| 0.9967                              | 0.6902           | 1.4149   | 0.9957                    | 0.6896         | 0.8851   |
| 0.9925                              | 0.9693           | 2.0010   | 0.9915                    | 0.9683         | 1.2517   |
| 0.9903                              | 1.0858           | 2.2372   | 0.9893                    | 1.0847         | 1.3995   |
| 0.9893                              | 1.1345           | 2.3464   | 0.9883                    | 1.1334         | 1.4678   |
| 0.9840                              | 1.3666           | 2.8299   | 0.9830                    | 1.3652         | 1.7702   |
| Qstd slope (m) = 2.09107            |                  |          | Qa slope (m) = 1.30939    |                |          |
| intercept (b) = -0.02838            |                  |          | intercept (b) = -0.01775  |                |          |
| coefficient (r) = 0.99996           |                  |          | coefficient (r) = 0.99996 |                |          |
| y axis = SQRT[H2O(Pa/760) (298/Ta)] |                  |          | y axis = SQRT[H2O(Ta/Pa)] |                |          |

## CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)  
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]  
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{ [SQRT(H2O(Pa/760) (298/Ta))] - b}  
Qa = 1/m{ [SQRT H2O(Ta/Pa)] - b}



Hong Kong Calibration Ltd.

香港校正有限公司

# Calibration Certificate

Certificate No. 30130

Page 1 of 2 Pages

**Customer :** Dragages - China Harbour - VSL Joint Venture

**Address :** 3/F., Island Place Tower, 510 King's Road, North Point, H. K.

**Order No. :** Q30108

**Date of receipt :** 4-Jan-13

## Item Tested

**Description :** Weather Station

**Manufacturer :** DAVIS

**Model :** Vantage PRO2 6152CUK

**Serial No. :** AA120924015

## Test Conditions

**Date of Test :** 15-Jan-13

**Supply Voltage :** --

**Ambient Temperature :**  $(23 \pm 3)^{\circ}\text{C}$

**Relative Humidity :**  $(50 \pm 25) \%$

## Test Specifications

Calibration check.

Ref. Document/Procedure : Z04, M14.

## Test Results

The results are shown in the attached page(s).


Main Test equipment used:


| <u>Equipment No.</u> | <u>Description</u> | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|--------------------|------------------|---------------------|
| S155                 | Std. Anemometer    | NSC201230022     | NIM-PRC             |
| S070                 | Protractor         | 01121            | NIM-PRC             |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
S. K. Tang

**Approved by :**   
Steve Kwan

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8846

**Date:** 15-Jan-13

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# Calibration Certificate

Certificate No. 30130

Page 2 of 2 Pages

Results :

## 1. Wind Speed

| Applied Value (m/s) | UUT Reading (m/s) |
|---------------------|-------------------|
| 2.50                | 2.2               |
| 4.70                | 4.5               |
| 7.50                | 7.2               |
| 9.80                | 9.4               |
| 15.50               | 14.3              |
| 19.93               | 19.5              |

Uncertainty :  $\pm (2 \% + 0.2 \text{ m/s})$

## 2. Wind Direction

| Reference Value | UUT Indication |
|-----------------|----------------|
| N (0°)          | N              |
| NE (45°)        | NE             |
| E (90°)         | E              |
| SE (135°)       | SE             |
| S (180°)        | S              |
| SW (225°)       | SW             |
| W (270°)        | W              |
| NW (315°)       | NW             |

Remark : 1. UUT: Unit-Under-Test

2. Atmospheric Pressure : 1 013 hPa

3. Before the calibration of the Wind Direction function, the Arrow Head was adjusted to the magnetic NORTH direction while the monitor indicated N. The customer is reminded to do the alignment again after installation.

----- END -----



# Calibration Certificate

Certificate No. **34537**

Page 1 of 2 Pages

**Customer :** Dragages - China Harbour - VSL Joint Venture

**Address :** 3/F., Island Place Tower, 510 King's Road, North Point, H. K.

**Order No. :** Q30108

**Date of receipt :** 4-Jul-13

## Item Tested

**Description :** Vantage Pro2 Weather Stations

**Manufacturer :** Davis

**Model :** 6152 CUK

**Serial No. :** AK130520006

## Test Conditions

**Date of Test :** 15-Jul-13

**Supply Voltage :** --

**Ambient Temperature :**  $(23 \pm 3)^{\circ}\text{C}$

**Relative Humidity :**  $(50 \pm 25) \%$

## Test Specifications

Calibration check.

Ref. Document/Procedure : Z04.

## Test Results

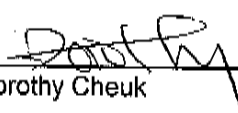
The results are shown in the attached page(s).

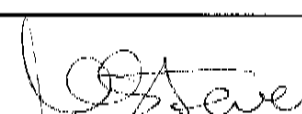
Main Test equipment used:

| <u>Equipment No.</u> | <u>Description</u> | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|--------------------|------------------|---------------------|
| S155                 | Std. Anemometer    | NSC201331006     | NIM-PRC             |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).  
The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Dorothy Cheuk

**Approved by :**   
Steve Kwan

**Date:** 6-Aug-13

This Certificate is issued by:  
Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ts Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646

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P1 13 2013 07 Aug 2013 12:13

FAX NO. :

FROM :



# Calibration Certificate

Certificate No. 34537

Page 2 of 2 Pages

Results :

## 1. Wind Speed

| Applied Value (m/s) | UUT Reading (m/s) |
|---------------------|-------------------|
| 2.7                 | 2.7               |
| 5.3                 | 5.4               |
| 7.5                 | 7.6               |
| 10.4                | 10.7              |
| 15.3                | 15.6              |
| 19.0                | 20.1              |

Uncertainty :  $\pm (2 \% + 0.2 \text{ m/s})$

## 2. Wind Direction

| Reference Value | UUT Indication |
|-----------------|----------------|
| N (0°)          | N (0°)         |
| NE (45°)        | NE (45°)       |
| E (90°)         | E (90°)        |
| SE (135°)       | SE (135°)      |
| S (180°)        | S (180°)       |
| SW (225°)       | SW (225°)      |
| W (270°)        | W (270°)       |
| NW (315°)       | NW (315°)      |

Remark : 1. UUT: Unit-Under-Test

2. Atmospheric Pressure : 1 003 hPa

3. Before the calibration of the Wind Direction function, the Arrow Head was adjusted to the magnetic NORTH direction while the monitor indicated N. The customer is reminded to do the alignment again after installation.

----- END -----





輝創工程有限公司  
Sun Creation Engineering Limited  
Calibration and Testing Laboratory

# Certificate of Calibration 校正證書

Certificate No. : C130600  
證書編號

## ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0227)

Description / 儀器名稱 : Sound & Vibration Analyser  
Manufacturer / 製造商 : Svantek  
Model No. / 型號 : SVAN957  
Serial No. / 編號 : 21460  
Supplied By / 委託者 : Dragages - China Harbour - VSL Joint Venture  
3/F, Island Place Tower, 510 King's Road,  
North Point, Hong Kong

## TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$   
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

## TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 January 2013

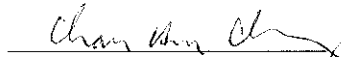
## TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
All results are within manufacturer's specification.  
The results are detailed in the subsequent page(s).


The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By  
測試

:   
H C Chan

Certified By  
核證

:   
K C Lee

Date of Issue : 28 January 2013  
簽發日期

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Sun Creation Engineering Limited - Calibration & Testing Laboratory  
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130600

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the Svantek acoustic calibrator SV30A, S/N : 24791 was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

| Equipment ID | Description                         | Certificate No. |
|--------------|-------------------------------------|-----------------|
| CL280        | 40 MHz Arbitrary Waveform Generator | C130019         |
| CL281        | Multifunction Acoustic Calibrator   | DC110233        |

5. Test procedure : MA101N.

6. Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

| UUT Setting |      |                     |                | Applied Value |             | UUT Reading | IEC 61672          |
|-------------|------|---------------------|----------------|---------------|-------------|-------------|--------------------|
| Range       | Mode | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) | (dB)        | Class 1 Spec. (dB) |
| HIGH        | SPL  | A                   | Fast           | 114.00        | 1           | 114.2       | $\pm 1.1$          |

#### 6.1.2 Linearity

| UUT Setting |      |                     |                | Applied Value |             | UUT Reading  |
|-------------|------|---------------------|----------------|---------------|-------------|--------------|
| Range       | Mode | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) | (dB)         |
| HIGH        | SPL  | A                   | Fast           | 114.00        | 1           | 114.2 (Ref.) |
|             |      |                     |                | 104.00        |             | 104.2        |
|             |      |                     |                | 94.00         |             | 94.2         |

IEC 61672 Class 1 Spec. :  $\pm 0.6$  dB per 10 dB step and  $\pm 1.1$  dB for overall different.

#### 6.2 Time Weighting

| UUT Setting |      |                     |                | Applied Value |             | UUT Reading | IEC 61672          |
|-------------|------|---------------------|----------------|---------------|-------------|-------------|--------------------|
| Range       | Mode | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) | (dB)        | Class 1 Spec. (dB) |
| HIGH        | SPL  | A                   | Fast           | 114.00        | 1           | 114.2       | Ref.               |
|             |      |                     | Slow           |               |             | 114.2       | $\pm 0.3$          |

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

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# Certificate of Calibration

## 校正證書

Certificate No. : C130600  
證書編號

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

| UUT Setting |      |                        |                   | Applied Value |          | UUT<br>Reading<br>(dB) | IEC 61672<br>Class 1 Spec.<br>(dB) |
|-------------|------|------------------------|-------------------|---------------|----------|------------------------|------------------------------------|
| Range       | Mode | Frequency<br>Weighting | Time<br>Weighting | Level<br>(dB) | Freq.    |                        |                                    |
| HIGH        | SPL  | A                      | Fast              | 114.00        | 63 Hz    | 88.0                   | -26.2 ± 1.5                        |
|             |      |                        |                   |               | 125 Hz   | 98.0                   | -16.1 ± 1.5                        |
|             |      |                        |                   |               | 250 Hz   | 105.5                  | -8.6 ± 1.4                         |
|             |      |                        |                   |               | 500 Hz   | 110.9                  | -3.2 ± 1.4                         |
|             |      |                        |                   |               | 1 kHz    | 114.2                  | Ref.                               |
|             |      |                        |                   |               | 2 kHz    | 115.4                  | +1.2 ± 1.6                         |
|             |      |                        |                   |               | 4 kHz    | 115.2                  | +1.0 ± 1.6                         |
|             |      |                        |                   |               | 8 kHz    | 113.2                  | -1.1 (+2.1 ; -3.1)                 |
|             |      |                        |                   |               | 12.5 kHz | 109.9                  | -4.3 (+3.0 ; -6.0)                 |

#### 6.3.2 C-Weighting

| UUT Setting |      |                        |                   | Applied Value |          | UUT<br>Reading<br>(dB) | IEC 61672<br>Class 1 Spec.<br>(dB) |
|-------------|------|------------------------|-------------------|---------------|----------|------------------------|------------------------------------|
| Range       | Mode | Frequency<br>Weighting | Time<br>Weighting | Level<br>(dB) | Freq.    |                        |                                    |
| HIGH        | SPL  | C                      | Fast              | 114.00        | 63 Hz    | 113.4                  | -0.8 ± 1.5                         |
|             |      |                        |                   |               | 125 Hz   | 114.0                  | -0.2 ± 1.5                         |
|             |      |                        |                   |               | 250 Hz   | 114.2                  | 0.0 ± 1.4                          |
|             |      |                        |                   |               | 500 Hz   | 114.2                  | 0.0 ± 1.4                          |
|             |      |                        |                   |               | 1 kHz    | 114.2                  | Ref.                               |
|             |      |                        |                   |               | 2 kHz    | 114.0                  | -0.2 ± 1.6                         |
|             |      |                        |                   |               | 4 kHz    | 113.5                  | -0.8 ± 1.6                         |
|             |      |                        |                   |               | 8 kHz    | 111.3                  | -3.0 (+2.1 ; -3.1)                 |
|             |      |                        |                   |               | 12.5 kHz | 108.0                  | -6.2 (+6.0 ; -∞)                   |

Remarks : - UUT Microphone Model No. : AC07052H & S/N : 43679

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.45 dB  
 250 Hz - 500 Hz : ± 0.40 dB  
 1 kHz : ± 0.30 dB  
 2 kHz - 4 kHz : ± 0.45 dB  
 8 kHz : ± 0.55 dB  
 12.5 kHz : ± 0.80 dB  
 104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)  
 114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

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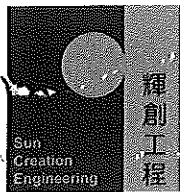
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Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130601

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0227)

Description / 儀器名稱 : Sound & Vibration Analyser  
Manufacturer / 製造商 : Svantek  
Model No. / 型號 : SVAN957  
Serial No. / 編號 : 23851  
Supplied By / 委託者 : Dragages - China Harbour - VSL Joint Venture  
3/F, Island Place Tower, 510 King's Road,  
North Point, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 January 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

All results are within manufacturer's specification.

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By  
測試

:   
H C Chan

Certified By  
核證

:   
K C Lee

Date of Issue  
簽發日期

28 January 2013

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

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Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130601

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the Svantek acoustic calibrator SV30A, S/N : 24780 was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

| Equipment ID | Description                         | Certificate No. |
|--------------|-------------------------------------|-----------------|
| CL280        | 40 MHz Arbitrary Waveform Generator | C130019         |
| CL281        | Multifunction Acoustic Calibrator   | DC110233        |

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

| UUT Setting |      |                     |                | Applied Value |             | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range       | Mode | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                              |
| HIGH        | SPL  | A                   | Fast           | 114.00        | 1           | 113.8            | ± 1.1                        |

- 6.1.2 Linearity

| UUT Setting |      |                     |                | Applied Value |             | UUT Reading (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|
| Range       | Mode | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |
| HIGH        | SPL  | A                   | Fast           | 114.00        | 1           | 113.8 (Ref.)     |
|             |      |                     |                | 104.00        |             | 103.8            |
|             |      |                     |                | 94.00         |             | 93.8             |

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

- 6.2 Time Weighting

| UUT Setting |      |                     |                | Applied Value |             | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range       | Mode | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                              |
| HIGH        | SPL  | A                   | Fast           | 114.00        | 1           | 113.8            | Ref.                         |
|             |      |                     | Slow           |               |             | 113.8            | ± 0.3                        |

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

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# Certificate of Calibration

## 校正證書

Certificate No. : C130601  
證書編號

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

| UUT Setting |      |                        |                   | Applied Value |          | UUT<br>Reading<br>(dB) | IEC 61672<br>Class 1 Spec.<br>(dB) |
|-------------|------|------------------------|-------------------|---------------|----------|------------------------|------------------------------------|
| Range       | Mode | Frequency<br>Weighting | Time<br>Weighting | Level<br>(dB) | Freq.    |                        |                                    |
| HIGH        | SPL  | A                      | Fast              | 114.00        | 63 Hz    | 87.6                   | -26.2 ± 1.5                        |
|             |      |                        |                   |               | 125 Hz   | 97.6                   | -16.1 ± 1.5                        |
|             |      |                        |                   |               | 250 Hz   | 105.1                  | -8.6 ± 1.4                         |
|             |      |                        |                   |               | 500 Hz   | 110.5                  | -3.2 ± 1.4                         |
|             |      |                        |                   |               | 1 kHz    | 113.8                  | Ref.                               |
|             |      |                        |                   |               | 2 kHz    | 115.0                  | +1.2 ± 1.6                         |
|             |      |                        |                   |               | 4 kHz    | 114.8                  | +1.0 ± 1.6                         |
|             |      |                        |                   |               | 8 kHz    | 112.8                  | -1.1 (+2.1 ; -3.1)                 |
|             |      |                        |                   |               | 12.5 kHz | 109.6                  | -4.3 (+3.0 ; -6.0)                 |

#### 6.3.2 C-Weighting

| UUT Setting |      |                        |                   | Applied Value |          | UUT<br>Reading<br>(dB) | IEC 61672<br>Class 1 Spec.<br>(dB) |
|-------------|------|------------------------|-------------------|---------------|----------|------------------------|------------------------------------|
| Range       | Mode | Frequency<br>Weighting | Time<br>Weighting | Level<br>(dB) | Freq.    |                        |                                    |
| HIGH        | SPL  | C                      | Fast              | 114.00        | 63 Hz    | 113.0                  | -0.8 ± 1.5                         |
|             |      |                        |                   |               | 125 Hz   | 113.6                  | -0.2 ± 1.5                         |
|             |      |                        |                   |               | 250 Hz   | 113.8                  | 0.0 ± 1.4                          |
|             |      |                        |                   |               | 500 Hz   | 113.8                  | 0.0 ± 1.4                          |
|             |      |                        |                   |               | 1 kHz    | 113.8                  | Ref.                               |
|             |      |                        |                   |               | 2 kHz    | 113.7                  | -0.2 ± 1.6                         |
|             |      |                        |                   |               | 4 kHz    | 113.1                  | -0.8 ± 1.6                         |
|             |      |                        |                   |               | 8 kHz    | 110.9                  | -3.0 (+2.1 ; -3.1)                 |
|             |      |                        |                   |               | 12.5 kHz | 107.6                  | -6.2 (+6.0 ; -∞)                   |

Remarks : - UUT Microphone Model No. : AC07502E & S/N : 48532

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.45 dB  
 250 Hz - 500 Hz : ± 0.40 dB  
 1 kHz : ± 0.30 dB  
 2 kHz - 4 kHz : ± 0.45 dB  
 8 kHz : ± 0.55 dB  
 12.5 kHz : ± 0.80 dB  
 104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)  
 114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

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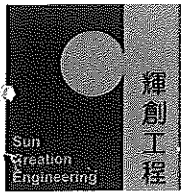
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Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130599

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0227)

Description / 儀器名稱 : Acoustic Calibrator

Manufacturer / 製造商 : Svantek

Model No. / 型號 : SV30A

Serial No. / 編號 : 24780

Supplied By / 委託者 : Dragages - China Harbour - VSL Joint Venture  
3/F, Island Place Tower, 510 King's Road,  
North Point, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 January 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

All results are within manufacturer's specification.

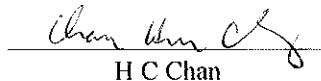
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

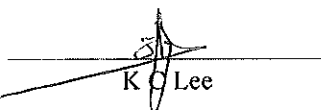
Tested By  
測試

:

  
H C Chan

Certified By  
核證

:

  
K C Lee

Date of Issue  
簽發日期

:

28 January 2013

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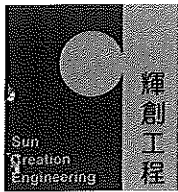
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Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130599

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

| Equipment ID | Description                       | Certificate No. |
|--------------|-----------------------------------|-----------------|
| CL130        | Universal Counter                 | C123541         |
| CL281        | Multifunction Acoustic Calibrator | DC110233        |
| TST150A      | Measuring Amplifier               | C120886         |

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

| UUT<br>Nominal Value | Measured Value<br>(dB) | Mfr's Spec.<br>(dB) | Uncertainty of Measured Value<br>(dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz         | 94.1                   | $\pm 0.3$           | $\pm 0.2$                             |
| 114 dB, 1 kHz        | 114.0                  |                     |                                       |

### 5.2 Frequency Accuracy

| UUT Nominal Value<br>(kHz) | Measured Value<br>(kHz) | Mfr's<br>Spec.     | Uncertainty of Measured Value<br>(Hz) |
|----------------------------|-------------------------|--------------------|---------------------------------------|
| 1                          | 0.999 99                | 1 kHz $\pm 0.02$ % | $\pm 0.01$                            |

Remark : - The uncertainties are for a confidence probability of not less than 95 %.

### Note :

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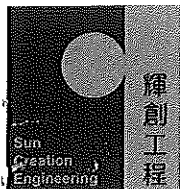
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Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130598

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0227)

Description / 儀器名稱 : Acoustic Calibrator

Manufacturer / 製造商 : Svantek

Model No. / 型號 : SV30A

Serial No. / 編號 : 24791

Supplied By / 委託者 : Dragages - China Harbour - VSL Joint Venture  
3/F, Island Place Tower, 510 King's Road,  
North Point, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 January 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

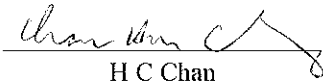
All results are within manufacturer's specification.

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By  
測試

:   
H C Chan

Certified By  
核證

:   
K C Lee

Date of Issue  
簽發日期

28 January 2013

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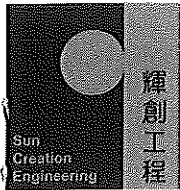
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Page 1 of 2



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C130598

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

| Equipment ID | Description                       | Certificate No. |
|--------------|-----------------------------------|-----------------|
| CL130        | Universal Counter                 | C123541         |
| CL281        | Multifunction Acoustic Calibrator | DC110233        |
| TST150A      | Measuring Amplifier               | C120886         |

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

| UUT<br>Nominal Value | Measured Value<br>(dB) | Mfr's Spec.<br>(dB) | Uncertainty of Measured Value<br>(dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz         | 93.9                   | ± 0.3               | ± 0.2                                 |
| 114 dB, 1 kHz        | 113.9                  |                     |                                       |

### 5.2 Frequency Accuracy

| UUT Nominal Value<br>(kHz) | Measured Value<br>(kHz) | Mfr's<br>Spec. | Uncertainty of Measured Value<br>(Hz) |
|----------------------------|-------------------------|----------------|---------------------------------------|
| 1                          | 1.000 00                | 1 kHz ± 0.02 % | ± 0.01                                |

Remark : - The uncertainties are for a confidence probability of not less than 95 %.

### Note :

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### TEST REPORT Chemical Analysis of Water Accuracy check of YSI Sondes Environmental Monitoring System

Date of issue: 07-06-2013

Page 1A of 1 pages

Castco LRN: EN0130514-18

#### Sample details as supplied by customer

Customer : Dragages-China Harbour-VSL Joint Venture

Customer Ref. No. : --

Address: Tung Chung Waterfront Road, adjacent to Tung Chung New Development Pier

Job Title : Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road - Section between HKSAR Boundary and Scenic Hill

Contract No.: HY/2011/09

#### Laboratory Test Result

Instrument Name: Sonde Environmental Monitoring System

Manufacturer : YSI

Model No. : YSI 6920

Serial No. : 03H1764AA

Instrument No. : W.03.03

Date of Calibration : 20-05-2013

Date of Next Calibration : 20-08-2013

pH Value Check ( pH Probe : YSI 6561 - 10E )

| Expected Reading (pH Unit) | Sonde Reading (pH Unit) | Tolerance (pH Unit) | Tolerance Limit (pH Unit) | Method Reference                |
|----------------------------|-------------------------|---------------------|---------------------------|---------------------------------|
| 4.00                       | 4.03                    | 0.03                | ± 0.2                     | APHA 21e, 4500-H <sup>+</sup> B |
| 7.02                       | 7.01                    | -0.01               |                           |                                 |
| 10.06                      | 10.01                   | -0.05               |                           |                                 |

Turbidity Check (Turbidity Sensor : YSI 6136 - 09M100672 )

| Expected Reading (NTU) | Sonde Reading (NTU) | Tolerance (%) | Tolerance Limit (%) | Method Reference |
|------------------------|---------------------|---------------|---------------------|------------------|
| 4.00                   | 3.9                 | -2.5          | ± 10                | APHA 21e, 2130B  |
| 10.00                  | 9.5                 | -5.0          |                     |                  |
| 20.00                  | 19.0                | -5.0          |                     |                  |
| 50.00                  | 50.5                | 1.0           |                     |                  |
| 100.00                 | 100.5               | 0.5           |                     |                  |

Conductivity Performance Check ( Conductivity Sensor : YSI 6560 - 10C100151 )

| Expected Reading (µS/cm) | Sonde Reading (µS/cm) | Tolerance (%) | Tolerance Limit (%) | Method Reference |
|--------------------------|-----------------------|---------------|---------------------|------------------|
| 1412 at 25 °C            | 1490 at 25 °C         | 5.5           | ± 10                | APHA 21e, 2510B  |

Salinity Performance Check ( Salinity Sensor : YSI 6560 - 10C100151 )

| Expected Reading (ppt) | Sonde Reading (ppt) | Tolerance (%) | Tolerance Limit (%) | Method Reference |
|------------------------|---------------------|---------------|---------------------|------------------|
| 35                     | 34.83               | -0.5          | ± 10                | APHA 19e, 2520B  |

Dissolved Oxygen Check ( Dissolved Oxygen Sensor : YSI 6562 - 12A100930 )

| DO from Winkler Titration (mg/L) | Sonde Reading (mg/L) | Tolerance (mg/L) | Tolerance Limit (mg/L) | Method Reference     |
|----------------------------------|----------------------|------------------|------------------------|----------------------|
| 8.20                             | 8.27                 | 0.07             | ± 0.20                 | APHA 21e, 4500-O C&G |
| 4.76                             | 4.80                 | 0.04             |                        |                      |

Water Level Meter Check

| Expected Reading (m) | Sonde Reading (m) | Tolerance (m) | Tolerance Limit (m) | Method Reference     |
|----------------------|-------------------|---------------|---------------------|----------------------|
| 1.00                 | 1.01              | 0.01          | ± 0.05              | YSI Sondes Procedure |

Temperature Check

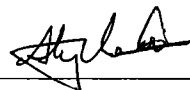
| Expected Reading (°C) | Sonde Reading (°C) | Tolerance (°C) | Tolerance Limit (°C) | Method Reference                 |
|-----------------------|--------------------|----------------|----------------------|----------------------------------|
| 25.0                  | 25.1               | 0.1            | ± 2.0                | Telarc Technical Guide No.3 1986 |

Remark: 1. This report supersedes previous test report of Castco LRN: EN0130514-18 issued on 21-05-2013.

Checked by:

Shan

Certified by:



**LI YIN SHAN**  
Assistant Chemist

End of Report

**LEE STEPHEN SHU HANG**  
Ph.D.  
Technical Director

Form No. ENV SONDE\_T1 dd 22/02/2013

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## TEST REPORT

## Chemical Analysis of Water

## Accuracy check of YSI Sondes Environmental Monitoring System

Date of issue: 07-06-2013

Page 1A of 1 pages

Castco LRN: EN0130514-19

Sample details as supplied by customer

Customer : Dragages-China Harbour-VSL Joint Venture

Customer Ref. No. : --

Address: Tung Chung Waterfront Road, adjacent to Tung Chung New Development Pier

Job Title : Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road - Section between HKSAR Boundary and Scenic Hill

Contract No.: HY/2011/09

Laboratory Test Result

Instrument Name: Sonde Environmental Monitoring System

Manufacturer : YSI

Model No. : YSI 6820

Serial No. : 11J101088

Instrument No. : W.03.11

Date of Calibration : 20-05-2013

Date of Next Calibration : 20-08-2013

pH Value Check (pH Probe : YSI 6561 - 11H)

| Expected Reading (pH Unit) | Sonde Reading (pH Unit) | Tolerance (pH Unit) | Tolerance Limit (pH Unit) | Method Reference                |
|----------------------------|-------------------------|---------------------|---------------------------|---------------------------------|
| 4.00                       | 4.06                    | 0.06                | ± 0.2                     | APHA 21e, 4500-H <sup>+</sup> B |
| 7.02                       | 7.03                    | 0.01                |                           |                                 |
| 10.06                      | 9.97                    | -0.09               |                           |                                 |

Turbidity Check (Turbidity Sensor : YSI 6136 - 11J100474)

| Expected Reading (NTU) | Sonde Reading (NTU) | Tolerance (%) | Tolerance Limit (%) | Method Reference |
|------------------------|---------------------|---------------|---------------------|------------------|
| 4.00                   | 3.8                 | -5.0          | ± 10                | APHA 21e, 2130B  |
| 10.00                  | 9.6                 | -4.0          |                     |                  |
| 20.00                  | 19.1                | -4.5          |                     |                  |
| 50.00                  | 48.8                | -2.4          |                     |                  |
| 100.00                 | 95.5                | -4.5          |                     |                  |

Conductivity Performance Check (Conductivity Sensor : YSI 6560 - 11J100023)

| Expected Reading (µS/cm) | Sonde Reading (µS/cm) | Tolerance (%) | Tolerance Limit (%) | Method Reference |
|--------------------------|-----------------------|---------------|---------------------|------------------|
| 1412 at 25 °C            | 1459 at 25 °C         | 3.3           | ± 10                | APHA 21e, 2510B  |

Salinity Performance Check (Salinity Sensor : YSI 6560 - 11J100023)

| Expected Reading (ppt) | Sonde Reading (ppt) | Tolerance (%) | Tolerance Limit (%) | Method Reference |
|------------------------|---------------------|---------------|---------------------|------------------|
| 35                     | 33.49               | -4.3          | ± 10                | APHA 19e, 2520B  |

Dissolved Oxygen Check (Dissolved Oxygen Sensor : YSI 6562 - 11J100272)

| DO from Winkler Titration (mg/L) | Sonde Reading (mg/L) | Tolerance (mg/L) | Tolerance Limit (mg/L) | Method Reference     |
|----------------------------------|----------------------|------------------|------------------------|----------------------|
| 8.20                             | 8.18                 | -0.02            | ± 0.20                 | APHA 21e, 4500-O C&G |
| 4.76                             | 4.86                 | 0.10             |                        |                      |

Water Level Meter Check

| Expected Reading (m) | Sonde Reading (m) | Tolerance (m) | Tolerance Limit (m) | Method Reference     |
|----------------------|-------------------|---------------|---------------------|----------------------|
| 1.00                 | 1.01              | 0.01          | ± 0.05              | YSI Sondes Procedure |

Temperature Check

| Expected Reading (°C) | Sonde Reading (°C) | Tolerance (°C) | Tolerance Limit (°C) | Method Reference                 |
|-----------------------|--------------------|----------------|----------------------|----------------------------------|
| 25.0                  | 25.1               | 0.1            | ± 2.0                | Telarc Technical Guide No.3 1986 |

Remark: 1. This report supersedes previous test report of Castco LRN: EN0130514-19 issued on 21-05-2013.

Checked by: ShanCertified by: Lee Stephen Shu HangLI YIN SHAN  
Assistant Chemist

End of Report

LEE STEPHEN SHU HANG  
Ph.D.  
Technical Director

Form No. ENV SONDE\_T1 dd 22/02/2013

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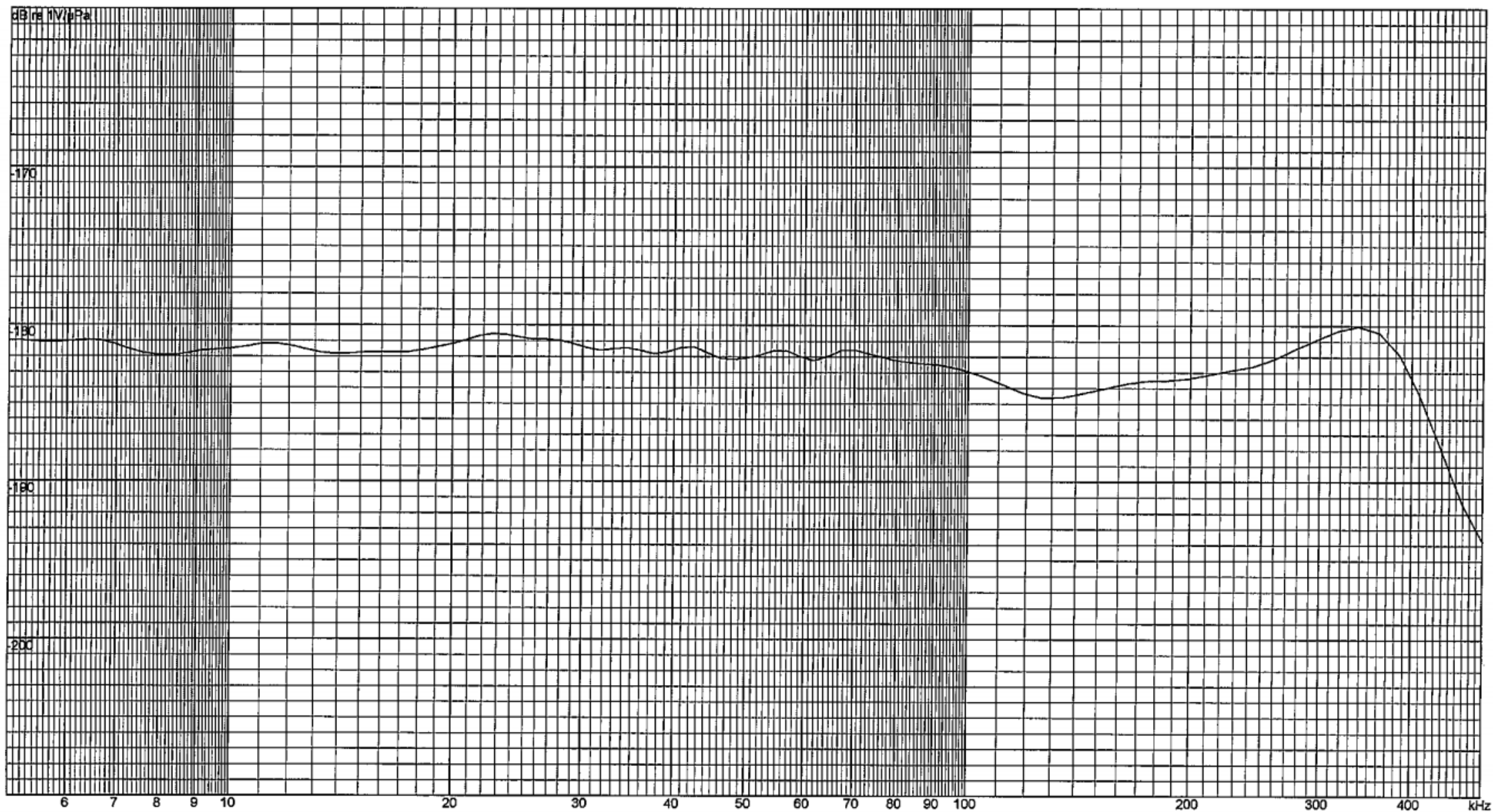


# HYDROPHONE SENSITIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference:  
Date: 2012-01-24  
Session, Run: 14825, 43  
Comment: PHO @ 250 Hz: -180.8 dB.

Amplitude: 10.0 Vrms  
Pulse Width: 357.1  $\mu$ s  
Rep Rate: 33.3 ms  
Averages: 8

Temperature: °C  
Depth: 0.0 m  
Distance: 0.00 m  
Tested by: PRA





## HYDROPHONE DIRECTIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference: TC4034  
Date: 2012-01-24  
Session, Run: 14825, 42  
Max RR: -183.0 dB re 1 $\mu$ Pa/V at 1m  
SL Right: -15.0°, 0.0dB dB re 1 $\mu$ Pa/V at 1m  
Comment: Horizontal.

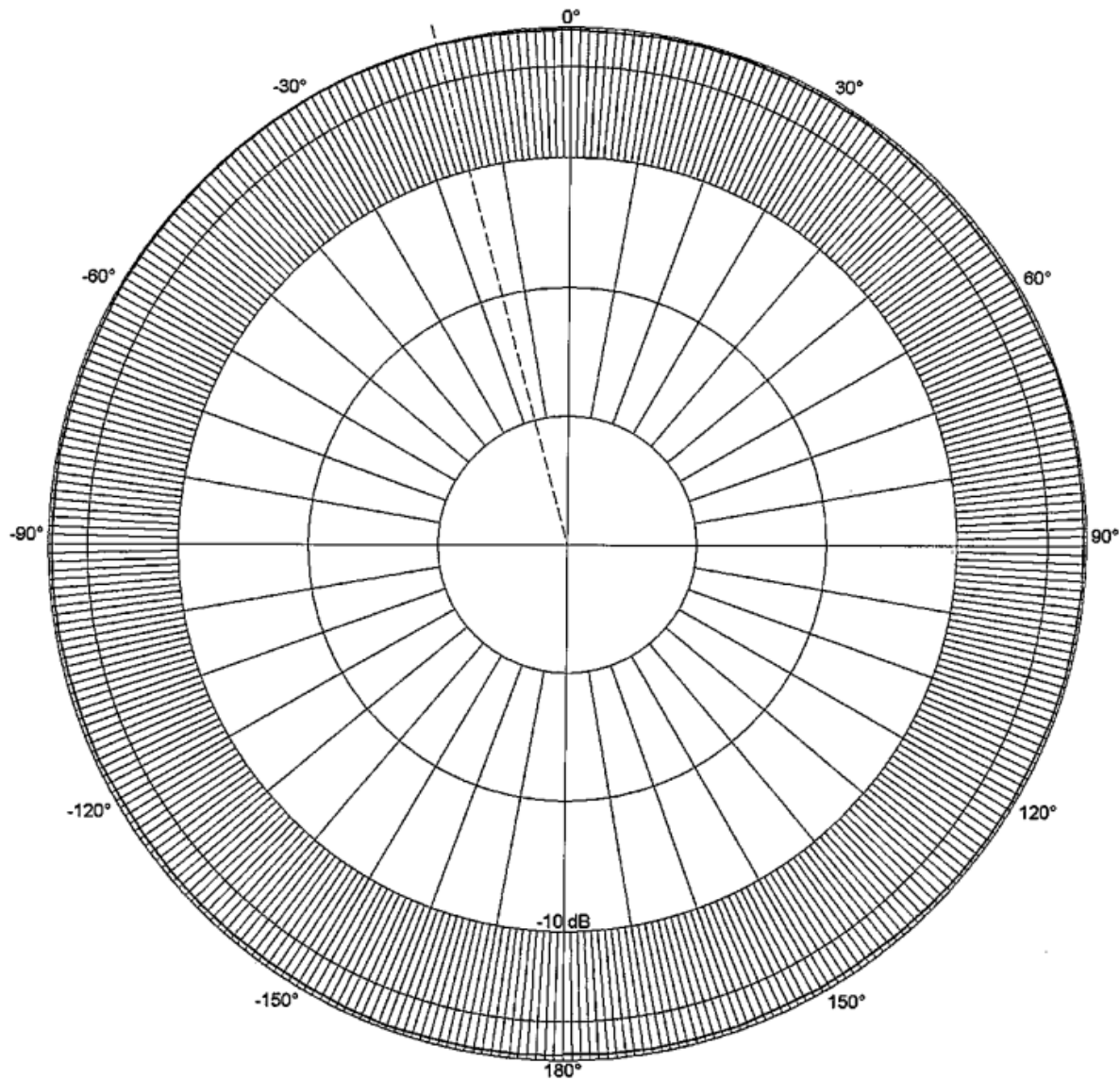
Amplitude: 10.0 Vrms  
Pulse Width: 250.0  $\mu$ s  
Angle: -180.0° to 180.0°  
Frequency: 100.00 kHz

Temperature: 18.51°C  
Depth: 1.2 m  
Distance: 0.65 m  
Tested by: PRA

*For all seven pages*  
2012 -01- 25 *Osaka*

*For all plots!*  
2012-01-24 PRA

HK



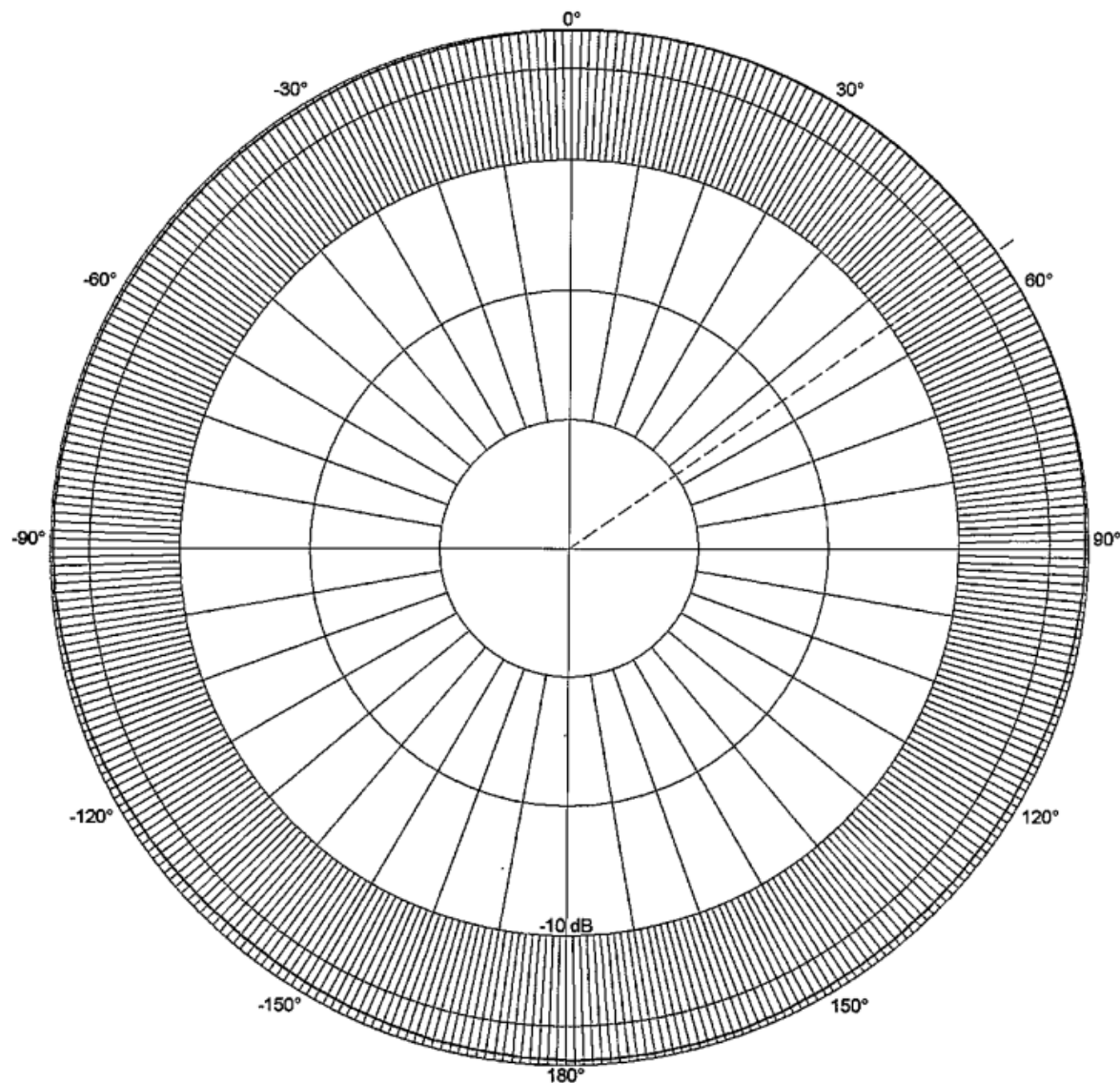


## HYDROPHONE DIRECTIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference: TC4034  
Date: 2012-01-24  
Session, Run: 14825, 42  
Max RR: -183.5 dB re 1 $\mu$ Pa/V at 1m  
SL Right: 55.0°, 0.0dB dB re 1 $\mu$ Pa/V at 1m  
Comment: Horizontal.

Amplitude: 10.0 Vrms  
Pulse Width: 250.0  $\mu$ s  
Angle: -180.0° to 180.0°  
Frequency: 200.00 kHz

Temperature: 18.51°C  
Depth: 1.2 m  
Distance: 0.65 m  
Tested by: PRA



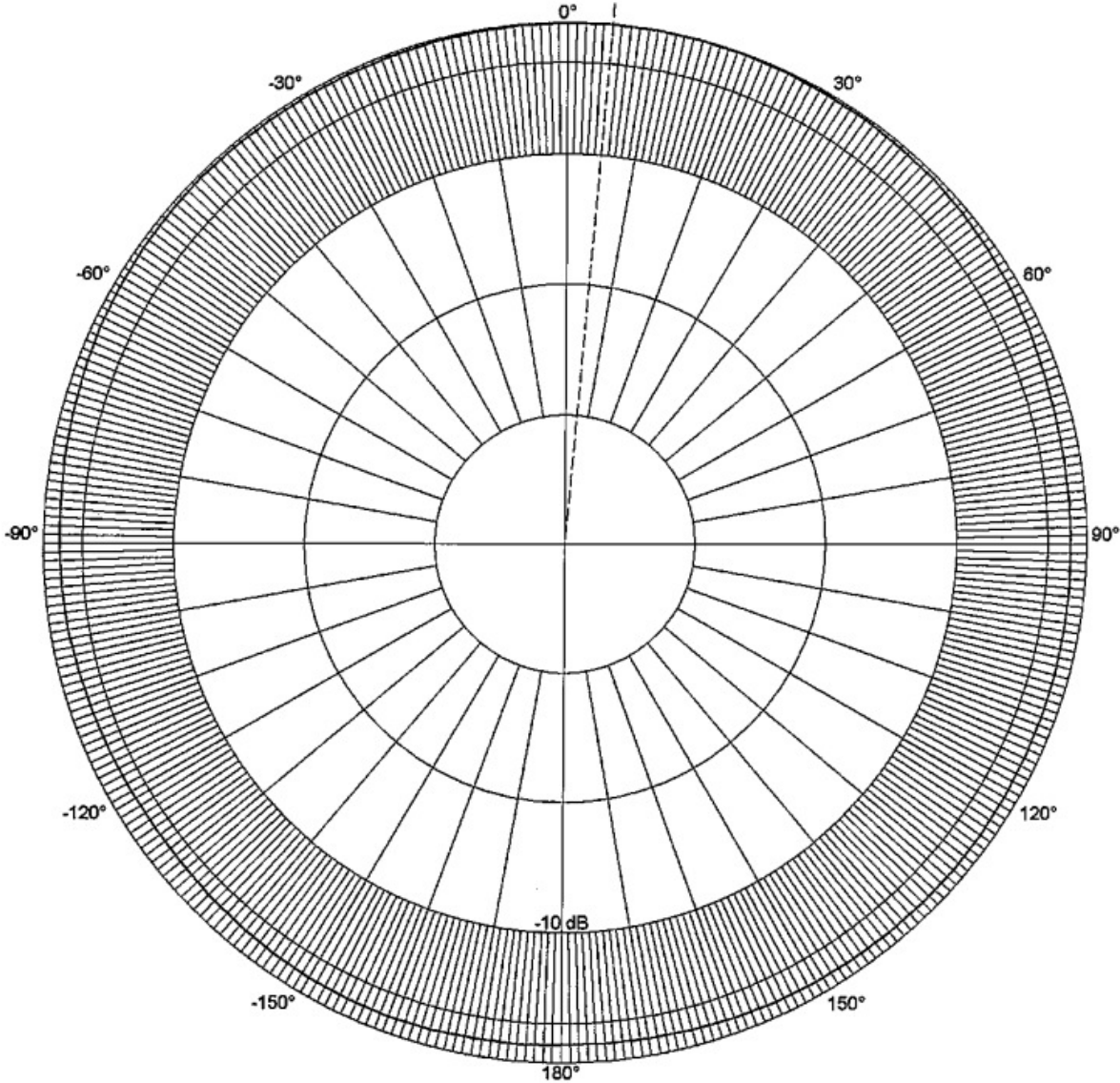


# HYDROPHONE DIRECTIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference: TC4034  
Date: 2012-01-24  
Session, Run: 14825, 42  
Max RR: -180.8 dB re 1 $\mu$ Pa/V at 1m  
SL Right: 5.0°, 0.0dB dB re 1 $\mu$ Pa/V at 1m  
Comment: Horizontal.

Amplitude: 10.0 Vrms  
Pulse Width: 250.0  $\mu$ s  
Angle: -180.0° to 180.0°  
Frequency: 300.00 kHz

Temperature: 18.51°C  
Depth: 1.2 m  
Distance: 0.65 m  
Tested by: PRA





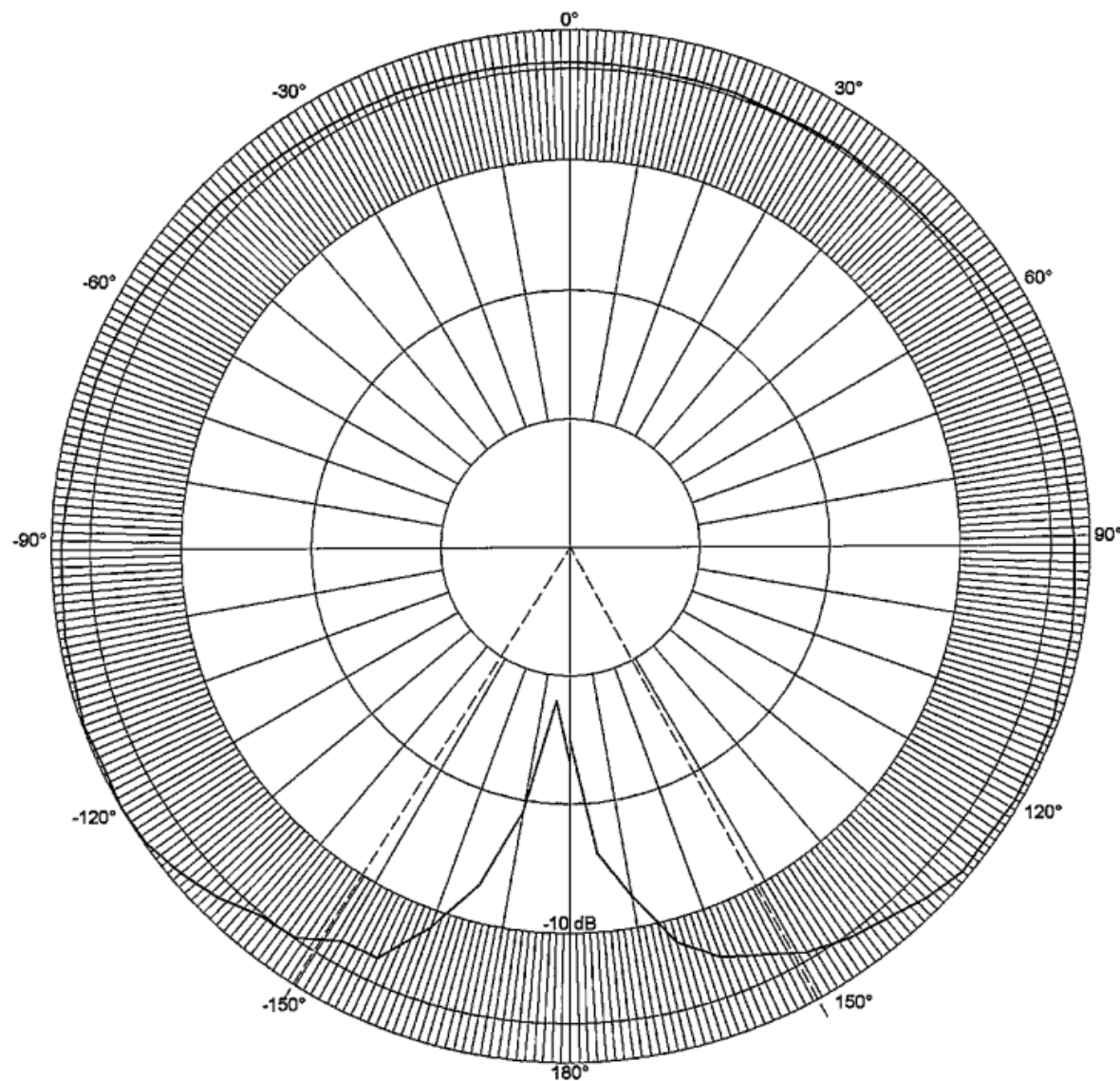


# HYDROPHONE DIRECTIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference: TC4034  
Date: 2012-01-24  
Session, Run: 14825, 3  
Max RR: -182.0 dB re 1 $\mu$ Pa/V at 1m  
W: 299.2°  
Comment: Vertical

Amplitude: 10.0 Vrms  
Pulse Width: 125.0  $\mu$ s  
Angle: -180.0° to 180.0°  
Frequency: 100.00 kHz

Temperature: 18.51°C  
Depth: 1.2 m  
Distance: 0.65 m  
Tested by: PRA



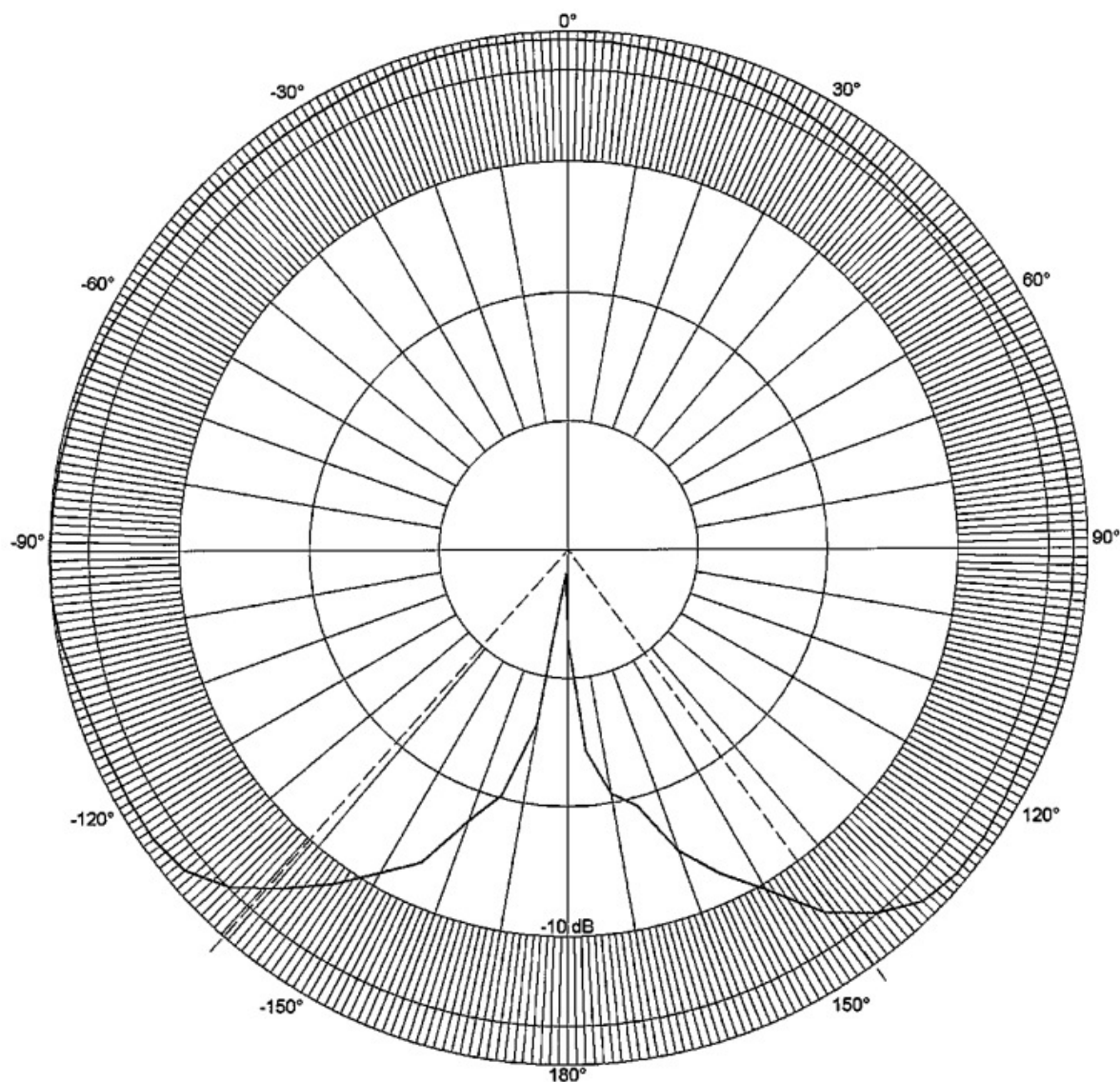


## HYDROPHONE DIRECTIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference: TC4034  
Date: 2012-01-24  
Session, Run: 14825, 3  
Max RR: -183.4 dB re 1 $\mu$ Pa/V at 1m  
W: 282.3°  
Comment: Vertical

Amplitude: 10.0 Vrms  
Pulse Width: 125.0  $\mu$ s  
Angle: -180.0° to 180.0°  
Frequency: 200.00 kHz

Temperature: 18.51°C  
Depth: 1.2 m  
Distance: 0.65 m  
Tested by: PRA



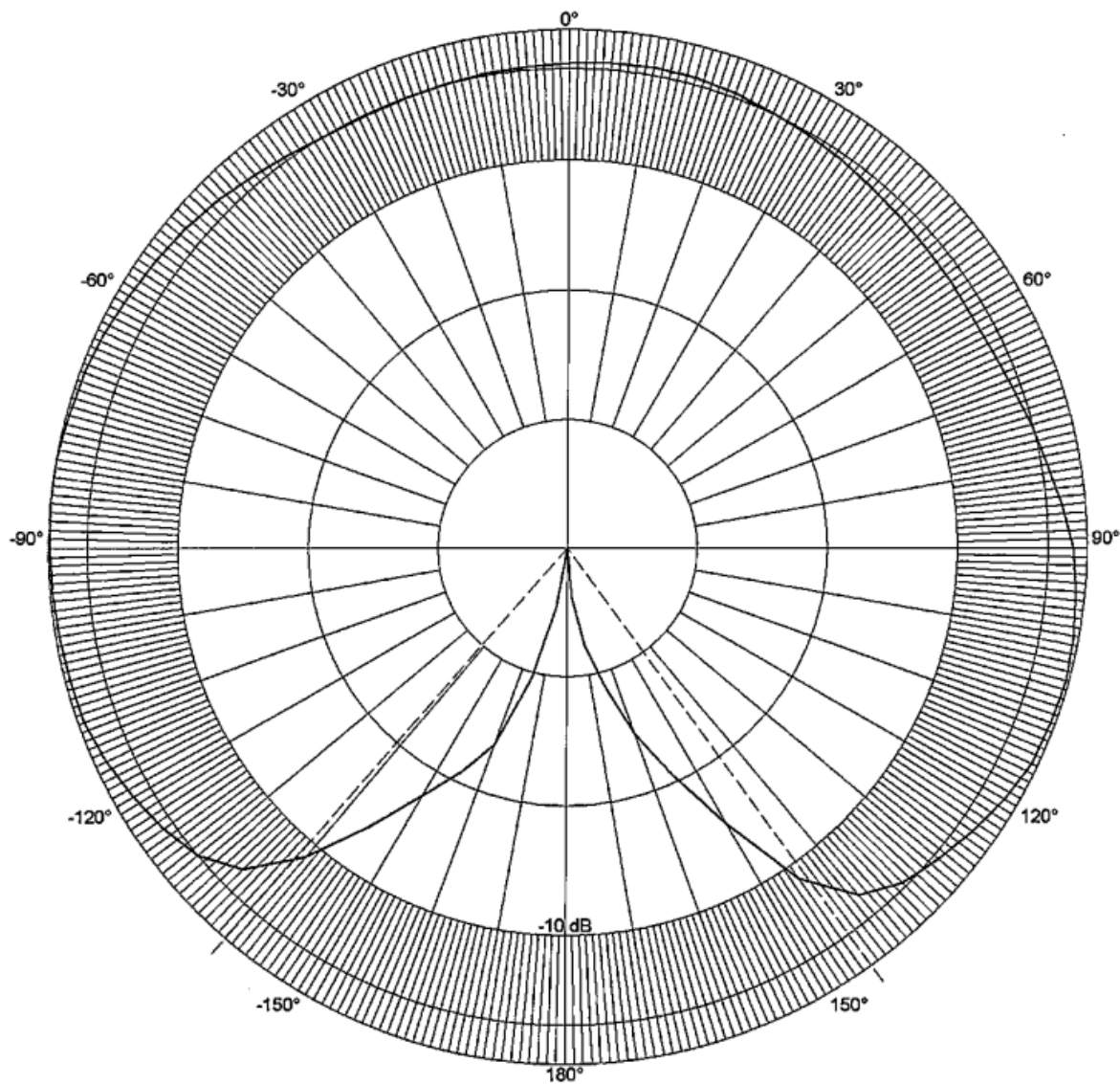


## HYDROPHONE DIRECTIVITY

Under Test: TC4014-5  
S/N: 5111003  
Reference: TC4034  
Date: 2012-01-24  
Session, Run: 14825, 3  
Max RR: -180.9 dB re 1 $\mu$ Pa/V at 1m  
W: 283.0°  
Comment: Vertical

Amplitude: 10.0 Vrms  
Pulse Width: 125.0  $\mu$ s  
Angle: -180.0° to 180.0°  
Frequency: 300.00 kHz

Temperature: 18.51°C  
Depth: 1.2 m  
Distance: 0.65 m  
Tested by: PRA



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**APPENDIX D  
ENVIRONMENTAL MONITORING  
SCHEDULES**

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**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill**  
**Impact Air Quality and Noise Monitoring Schedule in July 2013**

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

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

**Air Quality Monitoring Stations**

AMS1 - Sha Lo Wan  
AMS4 - San Tau

**Noise Monitoring Stations**

NMS1 - Sha Lo Wan  
NMS4 - San Tau

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill  
Tentative Impact Air Quality and Noise Monitoring Schedule in August 2013**

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

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

**Air Quality Monitoring Stations**

AMS1 - Sha Lo Wan  
AMS4 - San Tau

**Noise Monitoring Stations**

NMS1 - Sha Lo Wan  
NMS4 - San Tau

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill**  
**Impact Water Quality Monitoring Schedule in July 2013**

| Sunday        | Monday   | Tuesday  | Wednesday  | Thursday   | Friday   | Saturday   |
|---------------|--|--|--|--|--|--|
|               | <b>1-Jul</b>   | 2-Jul  | 3-Jul  | 4-Jul  | 5-Jul  | 6-Jul  |
|               |  | Water Quality Monitoring<br>Mid-Ebb 08:56<br>Mid-Flood 15:05 |  | Water Quality Monitoring<br>Mid-Ebb 10:35<br>Mid-Flood 17:26 |  | Water Quality Monitoring<br>Mid-Ebb 11:53<br>Mid-Flood 18:50 |
| <b>7-Jul</b>  | 8-Jul  | 9-Jul  | 10-Jul   | 11-Jul   | 12-Jul   | 13-Jul   |
|               | Water Quality Monitoring<br>Mid-Ebb 13:02<br>Mid-Flood 19:54 |  | Water Quality Monitoring<br>Mid-Flood 07:17<br>Mid-Ebb 14:06 |  | Water Quality Monitoring<br>Mid-Flood 08:32<br>Mid-Ebb 15:11 |  |
| <b>14-Jul</b> | 15-Jul   | 16-Jul   | 17-Jul   | 18-Jul   | 19-Jul   | 20-Jul   |
|               | Water Quality Monitoring<br>Mid-Flood 10:55<br>Mid-Ebb 17:07 |  | Water Quality Monitoring<br>Mid-Flood 14:01<br>Mid-Ebb 19:39 |  | Water Quality Monitoring<br>Mid-Ebb 09:45<br>Mid-Flood 16:53 |  |
| <b>21-Jul</b> | 22-Jul   | 23-Jul   | 24-Jul   | 25-Jul   | 26-Jul   | 27-Jul   |
|               | Water Quality Monitoring<br>Mid-Ebb 12:17<br>Mid-Flood 19:26 |  | Water Quality Monitoring<br>Mid-Flood 07:18<br>Mid-Ebb 13:53 |  | Water Quality Monitoring<br>Mid-Flood 08:58<br>Mid-Ebb 15:20 |  |
| <b>28-Jul</b> | 29-Jul   | 30-Jul   | 31-Jul   |  |  |  |
|               | Water Quality Monitoring<br>Mid-Flood 11:38<br>Mid-Ebb 17:27 |  | Water Quality Monitoring<br>Mid-Ebb 08:10<br>Mid-Flood 14:51 |  |  |  |

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill  
Tentative Impact Water Quality Monitoring Schedule in August 2013**

| Sunday | Monday  | Tuesday | Wednesday   | Thursday | Friday  | Saturday  |
|--------|---|---------|---|----------|---|---|
|        |   |         |   | 1-Aug    | 2-Aug   | 3-Aug   |
|        |   |         |   |          |   | <u>Water Quality Monitoring</u><br>Mid-Ebb 10:53<br>Mid-Flood 18:04 |
| 4-Aug  | 5-Aug   | 6-Aug   | 7-Aug   | 8-Aug    | 9-Aug   | 10-Aug  |
|        | <u>Water Quality Monitoring</u><br>Mid-Ebb 12:08<br>Mid-Flood 18:59 |         | <u>Water Quality Monitoring</u><br>Mid-Ebb 13:15<br>Mid-Flood 19:51 |          | <u>Water Quality Monitoring</u><br>Mid-Ebb 14:20<br>Mid-Flood 20:49 |   |
| 11-Aug | 12-Aug  | 13-Aug  | 14-Aug  | 15-Aug   | 16-Aug  | 17-Aug  |
|        | <u>Water Quality Monitoring</u><br>Mid-Flood 09:54<br>Mid-Ebb 16:03 |         | <u>Water Quality Monitoring</u><br>Mid-Flood 12:12<br>Mid-Ebb 17:57 |          | <u>Water Quality Monitoring</u><br>Mid-Ebb 08:14<br>Mid-Flood 15:40 |   |
| 18-Aug | 19-Aug  | 20-Aug  | 21-Aug  | 22-Aug   | 23-Aug  | 24-Aug  |
|        | <u>Water Quality Monitoring</u><br>Mid-Ebb 11:14<br>Mid-Flood 18:22 |         | <u>Water Quality Monitoring</u><br>Mid-Ebb 12:52<br>Mid-Flood 19:36 |          | <u>Water Quality Monitoring</u><br>Mid-Flood 08:00<br>Mid-Ebb 14:18 |   |
| 25-Aug | 26-Aug  | 27-Aug  | 28-Aug  | 29-Aug   | 30-Aug  | 31-Aug  |
|        | <u>Water Quality Monitoring</u><br>Mid-Flood 10:17<br>Mid-Ebb 16:09 |         | <u>Water Quality Monitoring</u><br>Mid-Flood 12:26<br>Mid-Ebb 17:34 |          |   | <u>Water Quality Monitoring</u><br>Mid-Ebb 09:31<br>Mid-Flood 17:11 |

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)



**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill  
Construction-Phase Dolphin Monitoring in West Lantau (Line Transect Vessel Survey) in July 2013**

| Sunday | Monday | Tuesday | Wednesday                   | Thursday | Friday                      | Saturday |
|--------|--------|---------|-----------------------------|----------|-----------------------------|----------|
|        | 1-Jul  | 2-Jul   | 3-Jul                       | 4-Jul    | 5-Jul                       | 6-Jul    |
|        |        |         |                             |          | Line Transect Vessel Survey |          |
| 7-Jul  | 8-Jul  | 9-Jul   | 10-Jul                      | 11-Jul   | 12-Jul                      | 13-Jul   |
|        |        |         | Line Transect Vessel Survey |          |                             |          |
| 14-Jul | 15-Jul | 16-Jul  | 17-Jul                      | 18-Jul   | 19-Jul                      | 20-Jul   |
|        |        |         |                             |          |                             |          |
| 21-Jul | 22-Jul | 23-Jul  | 24-Jul                      | 25-Jul   | 26-Jul                      | 27-Jul   |
|        |        |         |                             |          |                             |          |
| 28-Jul | 29-Jul | 30-Jul  | 31-Jul                      |          |                             |          |
|        |        |         |                             |          |                             |          |

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill  
Tentative Construction-Phase Dolphin Monitoring in West Lantau (Line Transect Vessel Survey) in August 2013**

| Sunday | Monday | Tuesday | Wednesday                   | Thursday | Friday | Saturday |
|--------|--------|---------|-----------------------------|----------|--------|----------|
|        |        |         |                             | 1-Aug    | 2-Aug  | 3-Aug    |
|        |        |         |                             |          |        |          |
| 4-Aug  | 5-Aug  | 6-Aug   | 7-Aug                       | 8-Aug    | 9-Aug  | 10-Aug   |
|        |        |         |                             |          |        |          |
| 11-Aug | 12-Aug | 13-Aug  | 14-Aug                      | 15-Aug   | 16-Aug | 17-Aug   |
|        |        |         | Line Transect Vessel Survey |          |        |          |
| 18-Aug | 19-Aug | 20-Aug  | 21-Aug                      | 22-Aug   | 23-Aug | 24-Aug   |
|        |        |         | Line Transect Vessel Survey |          |        |          |
| 25-Aug | 26-Aug | 27-Aug  | 28-Aug                      | 29-Aug   | 30-Aug | 31-Aug   |
|        |        |         |                             |          |        |          |

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill**  
**Construction-Phase Underwater Noise Monitoring in July 2013**

| Sunday | Monday                                     | Tuesday                                    | Wednesday                                  | Thursday                                   | Friday                                     | Saturday |
|--------|--|--|--|--|--|----------|
|        | 1-Jul                                      | 2-Jul                                      | 3-Jul                                      | 4-Jul                                      | 5-Jul                                      | 6-Jul    |
|        |  |  |  |  |  |          |
| 7-Jul  | 8-Jul                                      | 9-Jul                                      | 10-Jul                                     | 11-Jul                                     | 12-Jul                                     | 13-Jul   |
|        |  |  |  | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) |          |
| 14-Jul | 15-Jul                                     | 16-Jul                                     | 17-Jul                                     | 18-Jul                                     | 19-Jul                                     | 20-Jul   |
|        | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) |          |
| 21-Jul | 22-Jul                                     | 23-Jul                                     | 24-Jul                                     | 25-Jul                                     | 26-Jul                                     | 27-Jul   |
|        | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) | Underwater Noise<br>Monitoring<br>(Pier 0) |  |  |          |
| 28-Jul | 29-Jul                                     | 30-Jul                                     | 31-Jul                                     |  |  |          |
|        |  |  |  |  |  |          |

The schedule may be changed due to changes in work programme and unforeseen circumstances (adverse weather, etc)

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill  
Dolphin Behaviour & Land-based Dolphin Behaviour and Movement Monitoring in July 2013**

| Sunday | Monday   | Tuesday  | Wednesday  | Thursday   | Friday   | Saturday   |
|--------|--|--|--|--|--|--|
|        | 1-Jul  | 2-Jul  | 3-Jul  | 4-Jul  | 5-Jul  | 6-Jul  |
|        |  |  |  |  |  |  |
| 7-Jul  | 8-Jul  | 9-Jul  | 10-Jul   | 11-Jul   | 12-Jul   | 13-Jul   |
|        | *2) Land-based Dolphin Behaviour and Movement Monitoring                                     | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *2) Land-based Dolphin Behaviour and Movement Monitoring                                     | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *2) Land-based Dolphin Behaviour and Movement Monitoring |
| 14-Jul | 15-Jul   | 16-Jul   | 17-Jul   | 18-Jul   | 19-Jul   | 20-Jul   |
|        | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *1) Dolphin Behaviour Monitoring   | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *2) Land-based Dolphin Behaviour and Movement Monitoring                                     |  |
| 21-Jul | 22-Jul   | 23-Jul   | 24-Jul   | 25-Jul   | 26-Jul   | 27-Jul   |
|        | *1) Dolphin Behaviour Monitoring   | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *1) Dolphin Behaviour Monitoring<br>*2) Land-based Dolphin Behaviour and Movement Monitoring | *1) Dolphin Behaviour Monitoring   | *1) Dolphin Behaviour Monitoring   |  |
| 28-Jul | 29-Jul   | 30-Jul   | 31-Jul   |  |  |  |
|        | *2) Land-based Dolphin Behaviour and Movement Monitoring                                     |  |  |  |  |  |

Remarks: \* Dolphin-related monitoring was conducted during the bored piling activities

**Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill  
Tentative Land-based Dolphin Behaviour and Movement Monitoring in August 2013**

| Sunday | Monday | Tuesday | Wednesday | Thursday   | Friday   | Saturday |
|--------|--------|---------|-----------|--|--|----------|
|        |        |         |           | 1-Aug  | 2-Aug  | 3-Aug    |
|        |        |         |           |  |  |          |
| 4-Aug  | 5-Aug  | 6-Aug   | 7-Aug     | 8-Aug  | 9-Aug  | 10-Aug   |
|        |        |         |           |  |  |          |
| 11-Aug | 12-Aug | 13-Aug  | 14-Aug    | 15-Aug   | 16-Aug   | 17-Aug   |
|        |        |         |           |  |  |          |
| 18-Aug | 19-Aug | 20-Aug  | 21-Aug    | 22-Aug   | 23-Aug   | 24-Aug   |
|        |        |         |           |  |  |          |
| 25-Aug | 26-Aug | 27-Aug  | 28-Aug    | 29-Aug   | 30-Aug   | 31-Aug   |
|        |        |         |           | *Land-based Dolphin Behaviour<br>and Movement Monitoring | *Land-based Dolphin Behaviour<br>and Movement Monitoring |          |

Remarks: \* Additional monitoring will be conducted subject to the detailed analysis of 30 days of Land-based Dolphin Behaviour and Movement Monitoring results

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**APPENDIX E**  
**1-HOUR TSP MONITORING RESULTS**  
**AND GRAPHICAL PRESENTATION**

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## Appendix E - 1-hour TSP Monitoring Results

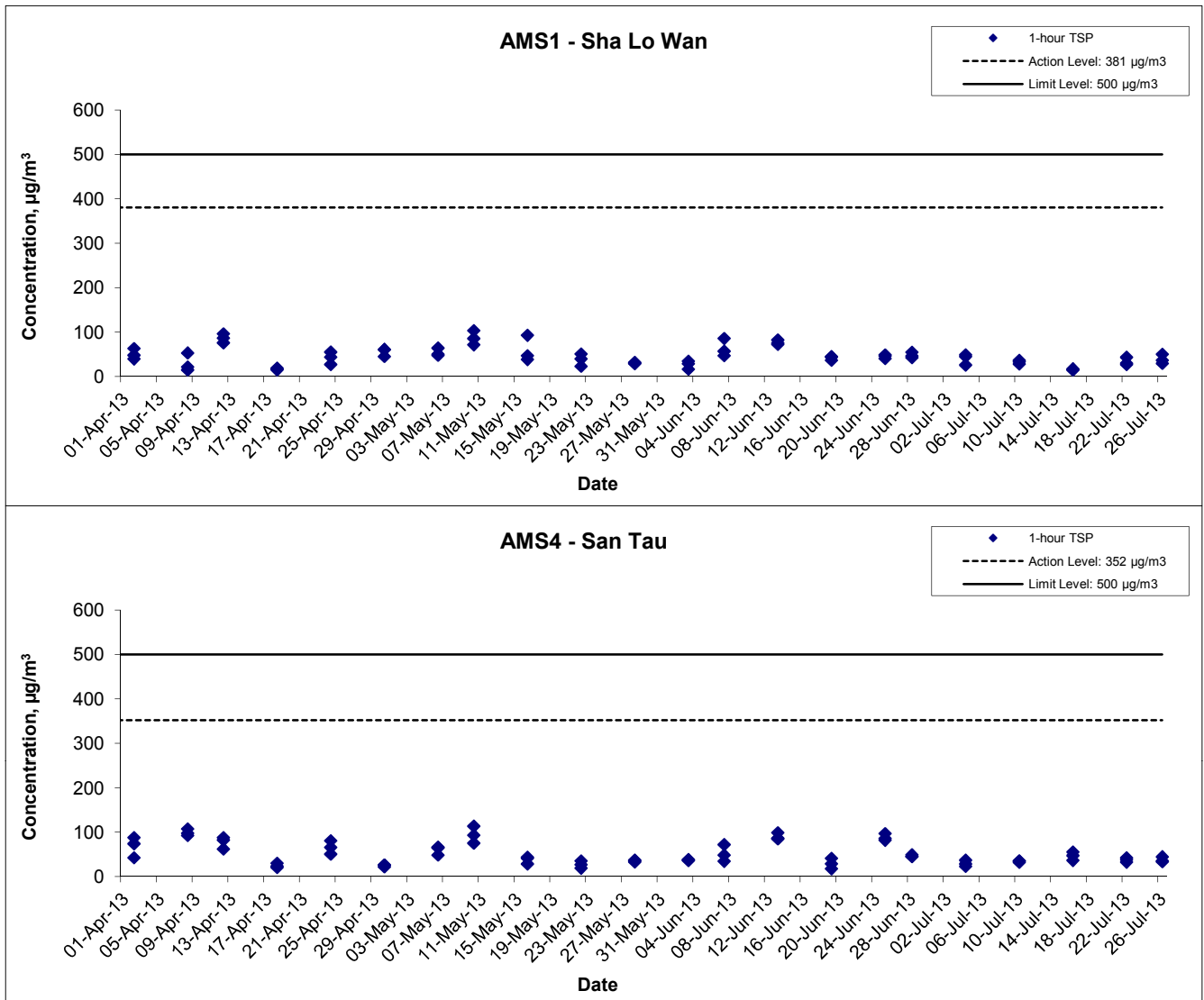
### Location AMS1 - Sha Lo Wan

| Sampling Date | Start Time | Weather Condition | Air Temp. (K) | Atmospheric Pressure, Pa (mmHg) | Filter Weight (g) |        | Particulate weight (g) | Elapse Time |        | Sampling Time(hrs.) | Flow Rate (m³/min.) |       | Av. flow (m³/min) | Total vol. (m³) | Conc. (µg/m³) |
|---------------|------------|-------------------|---------------|---------------------------------|-------------------|--------|------------------------|-------------|--------|---------------------|---------------------|-------|-------------------|-----------------|---------------|
|               |            |                   |               |                                 | Initial           | Final  |                        | Initial     | Final  |                     | Initial             | Final |                   |                 |               |
| 4-Jul-13      | 09:40      | Sunny             | 302.9         | 758.6                           | 2.7743            | 2.7776 | 0.0033                 | 1887.9      | 1888.9 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.0            | 45            |
| 4-Jul-13      | 10:45      | Sunny             | 303.1         | 758.5                           | 2.7560            | 2.7596 | 0.0036                 | 1888.9      | 1889.9 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.0            | 49            |
| 4-Jul-13      | 13:00      | Sunny             | 306.2         | 757.5                           | 2.7732            | 2.7751 | 0.0019                 | 1889.9      | 1890.9 | 1.0                 | 1.21                | 1.21  | 1.21              | 72.5            | 26            |
| 10-Jul-13     | 08:50      | Cloudy            | 300.1         | 758.5                           | 2.7628            | 2.7653 | 0.0025                 | 1914.9      | 1915.9 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.4            | 34            |
| 10-Jul-13     | 09:53      | Cloudy            | 300.3         | 758.3                           | 2.7743            | 2.7764 | 0.0021                 | 1915.9      | 1916.9 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.3            | 29            |
| 10-Jul-13     | 13:05      | Cloudy            | 299.7         | 758.0                           | 2.7806            | 2.7833 | 0.0027                 | 1916.9      | 1917.9 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.4            | 37            |
| 16-Jul-13     | 09:50      | Rainy             | 298.5         | 758.8                           | 2.7993            | 2.8006 | 0.0013                 | 1941.9      | 1942.9 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.6            | 18            |
| 16-Jul-13     | 10:50      | Rainy             | 298.7         | 758.7                           | 2.7809            | 2.7820 | 0.0011                 | 1942.9      | 1943.9 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.6            | 15            |
| 16-Jul-13     | 13:50      | Rainy             | 298.9         | 758.5                           | 2.7718            | 2.7730 | 0.0012                 | 1943.9      | 1944.9 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.5            | 16            |
| 22-Jul-13     | 09:30      | Cloudy            | 301.3         | 758.3                           | 2.7762            | 2.7794 | 0.0032                 | 1969.7      | 1970.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.2            | 44            |
| 22-Jul-13     | 11:00      | Sunny             | 301.7         | 758.0                           | 2.8140            | 2.8160 | 0.0020                 | 1970.7      | 1971.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.1            | 27            |
| 22-Jul-13     | 13:00      | Sunny             | 299.1         | 755.2                           | 2.7876            | 2.7898 | 0.0022                 | 1971.7      | 1972.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.3            | 30            |
| 26-Jul-13     | 10:55      | Rainy             | 298.4         | 754.9                           | 2.7614            | 2.7636 | 0.0022                 | 1996.7      | 1997.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.4            | 30            |
| 26-Jul-13     | 14:08      | Rainy             | 299.5         | 755.1                           | 2.7800            | 2.7827 | 0.0027                 | 1997.7      | 1998.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.3            | 37            |
| 26-Jul-13     | 15:10      | Rainy             | 299.7         | 754.9                           | 2.7844            | 2.7881 | 0.0037                 | 1998.7      | 1999.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.2            | 51            |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                     |       |                   | Min             | 15            |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                     |       |                   | Max             | 51            |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                     |       |                   | Average         | 33            |

### Location AMS4 - San Tau

| Sampling Date | Start Time | Weather Condition | Air Temp. (K) | Atmospheric Pressure, Pa (mmHg) | Filter Weight (g) |        | Particulate weight (g) | Elapse Time |        | Sampling Time(hrs.) | Flow Rate (m³/min.) |       | Av. flow (m³/min) | Total vol. (m³) | Conc. (µg/m³) |
|---------------|------------|-------------------|---------------|---------------------------------|-------------------|--------|------------------------|-------------|--------|---------------------|---------------------|-------|-------------------|-----------------|---------------|
|               |            |                   |               |                                 | Initial           | Final  |                        | Initial     | Final  |                     | Initial             | Final |                   |                 |               |
| 4-Jul-13      | 09:40      | Sunny             | 303.0         | 758.4                           | 2.7655            | 2.7672 | 0.0017                 | 1417.6      | 1418.6 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.0            | 23            |
| 4-Jul-13      | 10:45      | Sunny             | 303.2         | 758.2                           | 2.7567            | 2.7588 | 0.0021                 | 1418.6      | 1419.6 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.0            | 29            |
| 4-Jul-13      | 14:00      | Sunny             | 306.4         | 757.4                           | 2.7512            | 2.7539 | 0.0027                 | 1419.6      | 1420.6 | 1.0                 | 1.21                | 1.21  | 1.21              | 72.5            | 37            |
| 10-Jul-13     | 10:50      | Cloudy            | 302.2         | 757.9                           | 2.8151            | 2.8177 | 0.0026                 | 1444.6      | 1445.6 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.1            | 36            |
| 10-Jul-13     | 14:00      | Cloudy            | 299.9         | 757.8                           | 2.7488            | 2.7512 | 0.0024                 | 1445.6      | 1446.6 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.4            | 33            |
| 10-Jul-13     | 15:05      | Cloudy            | 300.1         | 757.6                           | 2.7789            | 2.7815 | 0.0026                 | 1446.6      | 1447.6 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.3            | 35            |
| 16-Jul-13     | 10:30      | Rainy             | 299.0         | 758.6                           | 2.7838            | 2.7879 | 0.0041                 | 1471.7      | 1472.7 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.6            | 56            |
| 16-Jul-13     | 13:25      | Rainy             | 298.3         | 758.1                           | 2.7795            | 2.7830 | 0.0035                 | 1472.7      | 1473.7 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.6            | 48            |
| 16-Jul-13     | 14:31      | Rainy             | 298.5         | 758.1                           | 2.7853            | 2.7880 | 0.0027                 | 1473.7      | 1474.7 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.6            | 37            |
| 22-Jul-13     | 08:40      | Cloudy            | 301.1         | 755.4                           | 2.7784            | 2.7808 | 0.0024                 | 1499.7      | 1500.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.1            | 33            |
| 22-Jul-13     | 10:05      | Sunny             | 301.3         | 755.2                           | 2.8197            | 2.8228 | 0.0031                 | 1500.7      | 1501.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.0            | 42            |
| 22-Jul-13     | 14:05      | Sunny             | 301.4         | 756.8                           | 2.7646            | 2.7674 | 0.0028                 | 1501.7      | 1502.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.1            | 38            |
| 26-Jul-13     | 08:50      | Rainy             | 298.0         | 755.7                           | 2.7861            | 2.7894 | 0.0033                 | 1526.7      | 1527.7 | 1.0                 | 1.23                | 1.23  | 1.23              | 73.5            | 45            |
| 26-Jul-13     | 09:52      | Rainy             | 298.1         | 755.5                           | 2.7960            | 2.7986 | 0.0026                 | 1527.7      | 1528.7 | 1.0                 | 1.23                | 1.22  | 1.22              | 73.5            | 35            |
| 26-Jul-13     | 10:54      | Rainy             | 298.3         | 755.3                           | 2.7845            | 2.7870 | 0.0025                 | 1528.7      | 1529.7 | 1.0                 | 1.22                | 1.22  | 1.22              | 73.5            | 34            |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                     |       |                   | Min             | 23            |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                     |       |                   | Max             | 56            |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                     |       |                   | Average         | 37            |

## 1-hour TSP Concentration Levels



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



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**APPENDIX F**  
**24-HOUR TSP MONITORING RESULTS**  
**AND GRAPHICAL PRESENTATION**

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## Appendix F - 24-hour TSP Monitoring Results

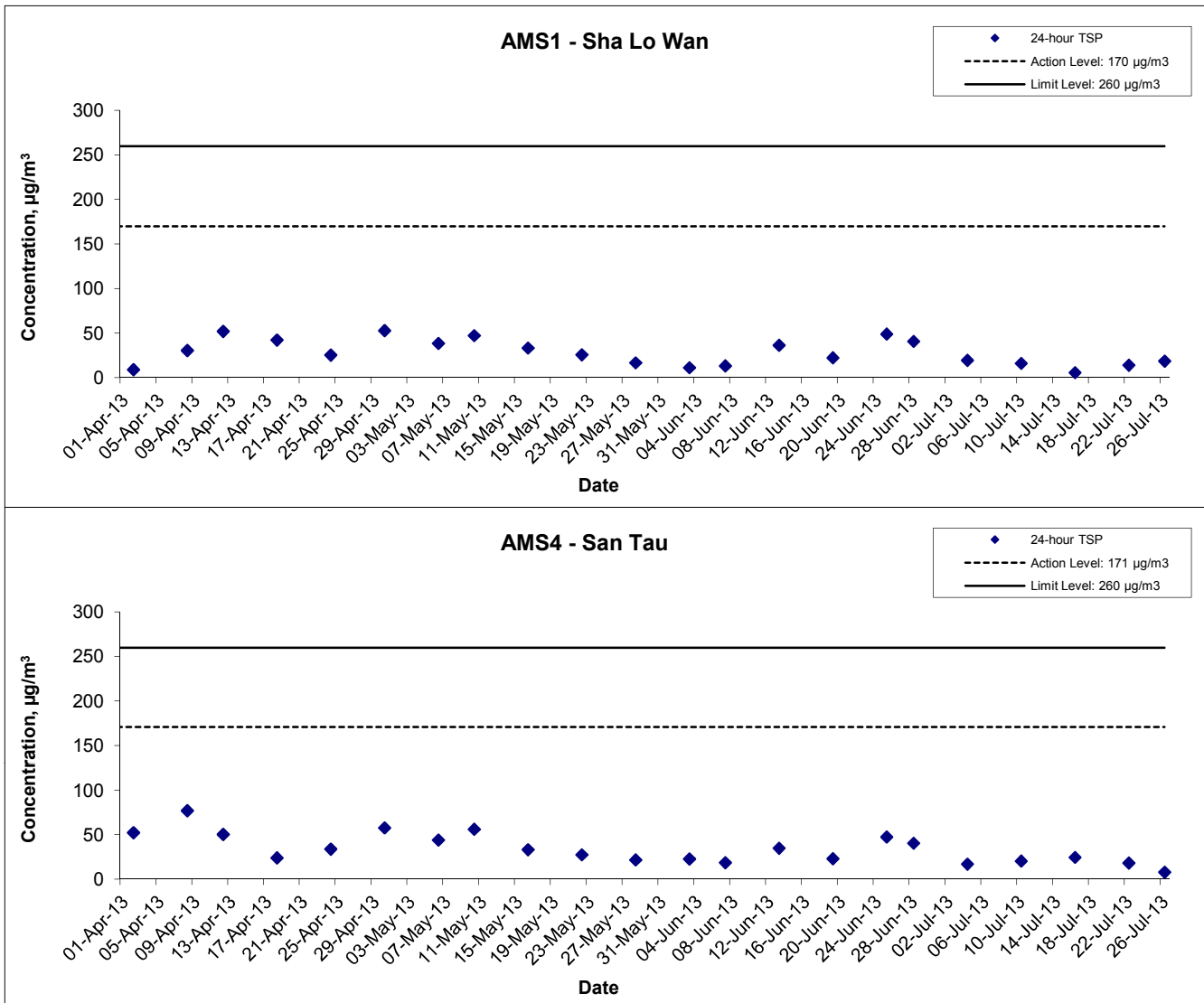
### Location AMS1 - Sha Lo Wan


| Sampling Date | Start Time | Weather Condition | Air Temp. (K) | Atmospheric Pressure, Pa (mmHg) | Filter Weight (g) |        | Particulate weight (g) | Elapse Time |        | Sampling Time(hrs.) | Flow Rate (m <sup>3</sup> /min.) |       | Av. flow (m <sup>3</sup> /min) | Total vol. (m <sup>3</sup> ) | Conc. (µg/m <sup>3</sup> ) |
|---------------|------------|-------------------|---------------|---------------------------------|-------------------|--------|------------------------|-------------|--------|---------------------|----------------------------------|-------|--------------------------------|------------------------------|----------------------------|
|               |            |                   |               |                                 | Initial           | Final  |                        | Initial     | Final  |                     | Initial                          | Final |                                |                              |                            |
| 4-Jul-13      | 17:00      | Cloudy            | 305.7         | 756.2                           | 2.7498            | 2.7839 | 0.0341                 | 1890.9      | 1914.9 | 24.0                | 1.21                             | 1.21  | 1.21                           | 1739.8                       | 20                         |
| 10-Jul-13     | 14:10      | Cloudy            | 300.0         | 757.8                           | 2.7856            | 2.8141 | 0.0285                 | 1917.9      | 1941.9 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1760.2                       | 16                         |
| 16-Jul-13     | 15:00      | Cloudy            | 299.4         | 758.1                           | 2.8064            | 2.8167 | 0.0103                 | 1944.9      | 1968.9 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1762.5                       | 6                          |
| 22-Jul-13     | 14:02      | Cloudy            | 299.3         | 755.0                           | 2.7880            | 2.8129 | 0.0249                 | 1972.7      | 1996.7 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1758.7                       | 14                         |
| 26-Jul-13     | 16:20      | Rainy             | 299.9         | 754.7                           | 2.7820            | 2.8149 | 0.0329                 | 1999.7      | 2023.7 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1756.4                       | 19                         |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                                  |       |                                | Min                          | 6                          |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                                  |       |                                | Max                          | 20                         |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                                  |       |                                | Average                      | 15                         |

### Location AMS4 - San Tau

| Sampling Date | Start Time | Weather Condition | Air Temp. (K) | Atmospheric Pressure, Pa (mmHg) | Filter Weight (g) |        | Particulate weight (g) | Elapse Time |        | Sampling Time(hrs.) | Flow Rate (m <sup>3</sup> /min.) |       | Av. flow (m <sup>3</sup> /min) | Total vol. (m <sup>3</sup> ) | Conc. (µg/m <sup>3</sup> ) |
|---------------|------------|-------------------|---------------|---------------------------------|-------------------|--------|------------------------|-------------|--------|---------------------|----------------------------------|-------|--------------------------------|------------------------------|----------------------------|
|               |            |                   |               |                                 | Initial           | Final  |                        | Initial     | Final  |                     | Initial                          | Final |                                |                              |                            |
| 4-Jul-13      | 16:15      | Cloudy            | 305.5         | 756.5                           | 2.7634            | 2.7931 | 0.0297                 | 1420.6      | 1444.6 | 24.0                | 1.21                             | 1.21  | 1.21                           | 1741.2                       | 17                         |
| 10-Jul-13     | 16:20      | Cloudy            | 300.2         | 757.4                           | 2.7878            | 2.8239 | 0.0361                 | 1447.6      | 1471.6 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1759.7                       | 21                         |
| 16-Jul-13     | 15:36      | Cloudy            | 298.7         | 757.9                           | 2.7988            | 2.8423 | 0.0435                 | 1474.7      | 1498.7 | 24.0                | 1.23                             | 1.23  | 1.23                           | 1765.1                       | 25                         |
| 22-Jul-13     | 15:06      | Cloudy            | 301.5         | 757.5                           | 2.7788            | 2.8110 | 0.0322                 | 1502.7      | 1526.7 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1755.4                       | 18                         |
| 26-Jul-13     | 11:56      | Rainy             | 298.5         | 755.1                           | 2.7905            | 2.8046 | 0.0141                 | 1529.7      | 1553.7 | 24.0                | 1.22                             | 1.22  | 1.22                           | 1762.1                       | 8                          |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                                  |       |                                | Min                          | 8                          |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                                  |       |                                | Max                          | 25                         |
|               |            |                   |               |                                 |                   |        |                        |             |        |                     |                                  |       |                                | Average                      | 18                         |

## 24-hour TSP Concentration Levels



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

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**APPENDIX G**  
**NOISE MONITORING RESULTS AND**  
**GRAPHICAL PRESENTATION**

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## Appendix G - Noise Monitoring Results

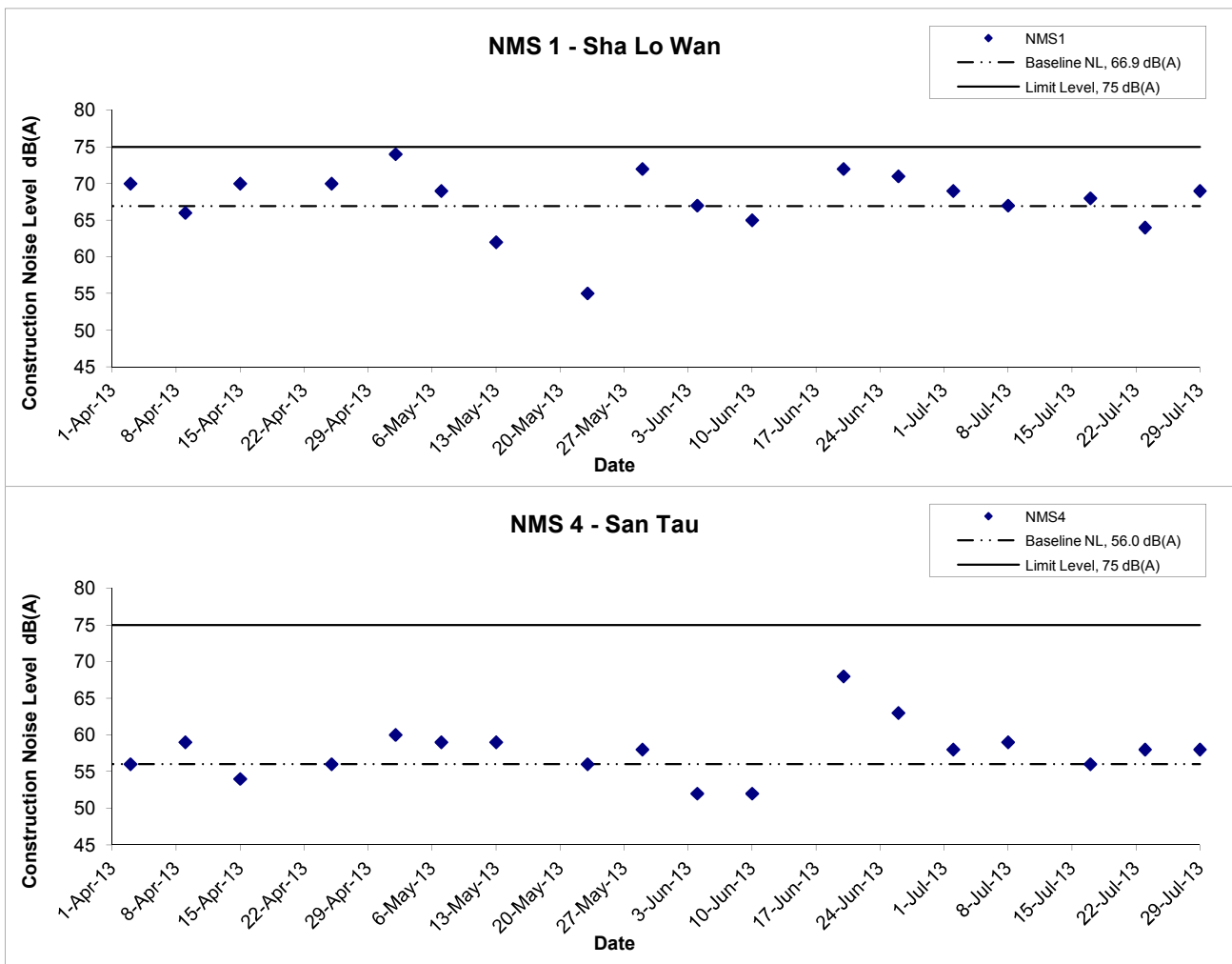
| Location NMS 1 - Sha Lo Wan |         |       |                      |                 |                 |                 |                 |                           |
|-----------------------------|---------|-------|----------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| Date                        | Weather | Time  | Unit: dB (A) (5-min) |                 |                 | Average         | Baseline Level  | Construction Noise Level  |
|                             |         |       | L <sub>eq</sub>      | L <sub>10</sub> | L <sub>90</sub> | L <sub>eq</sub> | L <sub>eq</sub> | L <sub>eq</sub>           |
| 2-Jul-13                    | Sunny   | 10:00 | 67.6                 | 77.5            | 55.7            | 69              | 66.9            | 69 Measured ≤ Limit Level |
|                             |         | 10:05 | 68.7                 | 80.5            | 56.0            |                 |                 |                           |
|                             |         | 10:10 | 70.5                 | 79.6            | 59.0            |                 |                 |                           |
|                             |         | 10:15 | 65.7                 | 74.8            | 59.4            |                 |                 |                           |
|                             |         | 10:20 | 67.6                 | 79.4            | 59.6            |                 |                 |                           |
|                             |         | 10:25 | 70.4                 | 78.4            | 60.6            |                 |                 |                           |
| 8-Jul-13                    | Cloudy  | 10:05 | 68.6                 | 77.5            | 55.8            | 67              |                 | 67 Measured ≤ Limit Level |
|                             |         | 10:10 | 67.6                 | 78.4            | 54.5            |                 |                 |                           |
|                             |         | 10:15 | 67.8                 | 79.8            | 60.2            |                 |                 |                           |
|                             |         | 10:20 | 65.0                 | 76.3            | 52.5            |                 |                 |                           |
|                             |         | 10:25 | 66.4                 | 69.2            | 61.3            |                 |                 |                           |
|                             |         | 10:30 | 65.4                 | 78.2            | 55.0            |                 |                 |                           |
| 17-Jul-13                   | Cloudy  | 17:30 | 66.3                 | 69.3            | 62.3            | 68              |                 | 68 Measured ≤ Limit Level |
|                             |         | 17:35 | 69.1                 | 73.0            | 64.6            |                 |                 |                           |
|                             |         | 17:40 | 68.2                 | 71.4            | 63.5            |                 |                 |                           |
|                             |         | 17:45 | 67.8                 | 71.2            | 62.9            |                 |                 |                           |
|                             |         | 17:50 | 68.4                 | 71.8            | 63.8            |                 |                 |                           |
|                             |         | 17:55 | 69.4                 | 73.5            | 65.1            |                 |                 |                           |
| 23-Jul-13                   | Cloudy  | 10:30 | 67.1                 | 74.6            | 57.4            | 64              |                 | 64 Measured ≤ Limit Level |
|                             |         | 10:35 | 59.0                 | 61.5            | 55.9            |                 |                 |                           |
|                             |         | 10:40 | 67.2                 | 70.4            | 62.5            |                 |                 |                           |
|                             |         | 10:45 | 64.1                 | 68.4            | 57.3            |                 |                 |                           |
|                             |         | 10:50 | 62.5                 | 67.0            | 56.2            |                 |                 |                           |
|                             |         | 10:55 | 60.6                 | 62.9            | 57.0            |                 |                 |                           |
| 29-Jul-13                   | Cloudy  | 10:20 | 67.6                 | 72.5            | 54.4            | 69              |                 | 69 Measured ≤ Limit Level |
|                             |         | 10:25 | 68.6                 | 74.2            | 53.0            |                 |                 |                           |
|                             |         | 10:30 | 70.6                 | 72.6            | 51.3            |                 |                 |                           |
|                             |         | 10:35 | 68.6                 | 72.6            | 53.6            |                 |                 |                           |
|                             |         | 10:40 | 69.4                 | 76.3            | 54.3            |                 |                 |                           |
|                             |         | 10:45 | 70.2                 | 76.5            | 54.6            |                 |                 |                           |

Remark: \* +3dB(A) Faade correction included

| Location NMS 4 - San Tau |         |       |                      |                 |                 |                 |                 |                           |
|--------------------------|---------|-------|----------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| Date                     | Weather | Time  | Unit: dB (A) (5-min) |                 |                 | Average         | Baseline Level  | Construction Noise Level  |
|                          |         |       | L <sub>eq</sub>      | L <sub>10</sub> | L <sub>90</sub> | L <sub>eq</sub> | L <sub>eq</sub> | L <sub>eq</sub>           |
| 2-Jul-13                 | Sunny   | 11:15 | 58.7                 | 60.9            | 56.7            | 58              | 56.0            | 58 Measured ≤ Limit Level |
|                          |         | 11:20 | 57.6                 | 59.7            | 54.8            |                 |                 |                           |
|                          |         | 11:25 | 57.3                 | 59.4            | 54.2            |                 |                 |                           |
|                          |         | 11:30 | 57.1                 | 60.8            | 56.1            |                 |                 |                           |
|                          |         | 11:35 | 57.4                 | 60.7            | 58.2            |                 |                 |                           |
|                          |         | 11:40 | 58.3                 | 60.5            | 56.3            |                 |                 |                           |
| 8-Jul-13                 | Cloudy  | 13:05 | 60.4                 | 61.9            | 58.8            | 59              |                 | 59 Measured ≤ Limit Level |
|                          |         | 13:10 | 59.2                 | 61.6            | 57.6            |                 |                 |                           |
|                          |         | 13:15 | 57.5                 | 59.7            | 55.8            |                 |                 |                           |
|                          |         | 13:20 | 58.9                 | 61.2            | 57.5            |                 |                 |                           |
|                          |         | 13:25 | 58.6                 | 60.9            | 55.2            |                 |                 |                           |
|                          |         | 13:30 | 59.4                 | 61.7            | 58.1            |                 |                 |                           |
| 17-Jul-13                | Cloudy  | 14:40 | 56.0                 | 59.2            | 50.3            | 56              |                 | 56 Measured ≤ Limit Level |
|                          |         | 14:45 | 53.7                 | 55.3            | 49.2            |                 |                 |                           |
|                          |         | 14:50 | 55.0                 | 57.6            | 49.5            |                 |                 |                           |
|                          |         | 14:55 | 56.8                 | 59.6            | 50.0            |                 |                 |                           |
|                          |         | 15:00 | 57.0                 | 60.2            | 49.8            |                 |                 |                           |
|                          |         | 15:05 | 56.9                 | 60.1            | 50.1            |                 |                 |                           |
| 23-Jul-13                | Cloudy  | 15:05 | 59.2                 | 62.6            | 52.8            | 58              |                 | 58 Measured ≤ Limit Level |
|                          |         | 15:10 | 58.5                 | 62.1            | 53.0            |                 |                 |                           |
|                          |         | 15:15 | 56.7                 | 58.5            | 54.5            |                 |                 |                           |
|                          |         | 15:20 | 58.0                 | 61.7            | 58.5            |                 |                 |                           |
|                          |         | 15:25 | 57.5                 | 61.5            | 52.3            |                 |                 |                           |
|                          |         | 15:30 | 59.8                 | 62.5            | 58.6            |                 |                 |                           |
| 29-Jul-13                | Cloudy  | 13:05 | 61.6                 | 59.6            | 50.4            | 58              |                 | 58 Measured ≤ Limit Level |
|                          |         | 13:10 | 53.3                 | 55.2            | 51.1            |                 |                 |                           |
|                          |         | 13:15 | 53.6                 | 53.8            | 51.0            |                 |                 |                           |
|                          |         | 13:20 | 62.0                 | 59.1            | 51.6            |                 |                 |                           |
|                          |         | 13:25 | 52.8                 | 53.8            | 51.1            |                 |                 |                           |
|                          |         | 13:30 | 54.3                 | 55.7            | 52.7            |                 |                 |                           |

Remark: \* +3dB(A) Faade correction included

## Noise Levels



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

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**APPENDIX H  
WATER QUALITY MONITORING  
RESULTS AND GRAPHICAL  
PRESENTATION**

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# Water Quality Monitoring Results at CS1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 08:27         | Surface   | 1   | 28.6<br>28.7     | 28.7    | 7.9<br>7.9 | 7.9     | 18.4<br>18.2 | 18.3    | 123.7<br>119.5    | 121.6   | 8.6<br>8.4              | 8.5     | 8.1 | 3.5<br>3.4      | 3.5     | 7.3  | 4.7<br>4.7              | 4.7     | 5.5 |
|           |                   |                 |               | Middle    | 5.5 | 28.3<br>28.3     | 28.3    | 7.9<br>7.9 | 7.9     | 22.9<br>23.1 | 23.0    | 111.7<br>111.3    | 111.5   | 7.7<br>7.6              | 7.7     |     | 6.5<br>6.9      | 6.7     |      | 5.0<br>5.5              | 5.3     |     |
|           |                   |                 |               | Bottom    | 10  | 28.4<br>28.4     | 28.4    | 7.9<br>8.0 | 8.0     | 23.9<br>23.7 | 23.8    | 111.2<br>110.0    | 110.6   | 7.6<br>7.5              | 7.6     |     | 10.4<br>12.8    | 11.6    |      | 6.5<br>6.2              | 6.4     |     |
| 4-Jul-13  | Sunny             | Calm            | 10:30         | Surface   | 1   | 30.0<br>30.0     | 30.0    | 8.0<br>8.0 | 8.0     | 7.4<br>7.3   | 7.4     | 116.6<br>116.6    | 116.6   | 8.4<br>8.4              | 8.4     | 7.2 | 4.0<br>4.0      | 4.0     | 6.7  | 2.5<br>3.3              | 2.9     | 3.1 |
|           |                   |                 |               | Middle    | 6   | 28.8<br>28.8     | 28.8    | 7.9<br>7.9 | 7.9     | 16.5<br>16.8 | 16.7    | 85.4<br>85.8      | 85.6    | 6.0<br>6.0              | 6.0     |     | 5.4<br>5.4      | 5.4     |      | 2.7<br>1.8              | 2.3     |     |
|           |                   |                 |               | Bottom    | 11  | 28.0<br>28.0     | 28.0    | 7.9<br>7.9 | 7.9     | 27.7<br>27.7 | 27.7    | 74.3<br>74.0      | 74.2    | 5.0<br>5.0              | 5.0     |     | 10.7<br>10.9    | 10.8    |      | 1.2<br>7.2              | 4.2     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 11:11         | Surface   | 1   | 29.5<br>29.5     | 29.5    | 8.5<br>8.5 | 8.5     | 10.6<br>10.7 | 10.7    | 126.6<br>126.1    | 126.4   | 9.1<br>9.1              | 9.1     | 7.8 | 4.5<br>4.8      | 4.7     | 5.0  | 6.0<br>4.7              | 5.4     | 4.9 |
|           |                   |                 |               | Middle    | 7   | 28.2<br>28.6     | 28.4    | 8.1<br>8.1 | 8.1     | 27.9<br>25.1 | 26.5    | 93.7<br>94.0      | 93.9    | 6.4<br>6.5              | 6.5     |     | 3.1<br>2.7      | 2.9     |      | 6.0<br>4.0              | 5.0     |     |
|           |                   |                 |               | Bottom    | 13  | 27.7<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 29.0<br>29.0 | 29.0    | 79.1<br>79.1      | 79.1    | 5.4<br>5.4              | 5.4     |     | 7.3<br>7.3      | 7.3     |      | 3.3<br>5.0              | 4.2     |     |
| 8-Jul-13  | Sunny             | Moderate        | 12:32         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 15.0<br>15.0 | 15.0    | 110.3<br>102.9    | 106.6   | 8.1<br>7.3              | 7.7     | 6.9 | 5.4<br>6.0      | 5.7     | 6.0  | 11.0<br>10.0            | 10.5    | 8.3 |
|           |                   |                 |               | Middle    | 5.5 | 27.3<br>27.4     | 27.4    | 8.1<br>8.1 | 8.1     | 30.1<br>30.2 | 30.2    | 91.8<br>90.3      | 91.1    | 6.1<br>6.1              | 6.1     |     | 5.2<br>5.3      | 5.3     |      | 9.7<br>5.7              | 7.7     |     |
|           |                   |                 |               | Bottom    | 10  | 27.2<br>27.2     | 27.2    | 8.1<br>8.1 | 8.1     | 30.6<br>30.6 | 30.6    | 78.6<br>79.5      | 79.1    | 5.5<br>5.6              | 5.6     |     | 7.4<br>6.8      | 7.1     |      | 7.3<br>6.0              | 6.7     |     |
| 10-Jul-13 | Fine              | Moderate        | 13:36         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 21.1<br>21.1 | 21.1    | 88.7<br>87.6      | 88.2    | 6.1<br>6.0              | 6.1     | 5.7 | 4.7<br>5.0      | 4.9     | 12.0 | 2.9<br>3.1              | 3.0     | 3.4 |
|           |                   |                 |               | Middle    | 6   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 26.4<br>26.5 | 26.5    | 72.0<br>74.0      | 73.0    | 5.1<br>5.2              | 5.2     |     | 8.7<br>8.7      | 8.7     |      | 2.8<br>3.3              | 3.1     |     |
|           |                   |                 |               | Bottom    | 11  | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 28.4<br>28.2 | 28.3    | 73.8<br>72.3      | 73.1    | 5.1<br>5.0              | 5.1     |     | 23.5<br>21.3    | 22.4    |      | 3.7<br>4.6              | 4.2     |     |
| 12-Jul-13 | Sunny             | Moderate        | 15:07         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.4<br>8.4 | 8.4     | 23.1<br>23.1 | 23.1    | 94.4<br>94.7      | 94.6    | 6.8<br>6.8              | 6.8     | 6.3 | 4.4<br>3.7      | 4.1     | 6.1  | 3.1<br>2.3              | 2.7     | 3.0 |
|           |                   |                 |               | Middle    | 6   | 27.8<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 25.9<br>25.9 | 25.9    | 79.8<br>82.0      | 80.9    | 5.7<br>5.9              | 5.8     |     | 4.7<br>4.4      | 4.6     |      | 1.8<br>3.1              | 2.5     |     |
|           |                   |                 |               | Bottom    | 11  | 26.4<br>26.5     | 26.5    | 8.2<br>8.2 | 8.2     | 30.7<br>30.7 | 30.7    | 94.0<br>76.8      | 85.4    | 6.8<br>5.6              | 6.2     |     | 9.4<br>9.7      | 9.6     |      | 2.6<br>5.2              | 3.9     |     |
| 15-Jul-13 | Rainy             | Calm            | 16:36         | Surface   | 1   | 28.4<br>28.4     | 28.4    | 8.2<br>8.2 | 8.2     | 17.0<br>17.2 | 17.1    | 95.9<br>95.7      | 95.8    | 6.6<br>6.5              | 6.6     | 6.0 | 4.7<br>4.9      | 4.8     | 7.5  | 2.0<br>2.0              | 2.0     | 2.2 |
|           |                   |                 |               | Middle    | 6   | 26.7<br>26.7     | 26.7    | 8.0<br>8.0 | 8.0     | 27.7<br>27.8 | 27.8    | 78.1<br>77.7      | 77.9    | 5.3<br>5.3              | 5.3     |     | 6.4<br>6.4      | 6.4     |      | 2.0<br>3.4              | 2.7     |     |
|           |                   |                 |               | Bottom    | 11  | 25.7<br>25.7     | 25.7    | 8.0<br>8.0 | 8.0     | 35.1<br>35.1 | 35.1    | 74.5<br>74.2      | 74.4    | 4.9<br>4.9              | 4.9     |     | 11.4<br>11.3    | 11.4    |      | 2.1<br>1.7              | 1.9     |     |
| 17-Jul-13 | Rainy             | Moderate        | 19:29         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 16.3<br>16.3 | 16.3    | 86.0<br>86.6      | 86.3    | 6.1<br>6.1              | 6.1     | 5.9 | 1.9<br>2.0      | 2.0     | 2.1  | 2.1<br>1.5              | 1.8     | 2.0 |
|           |                   |                 |               | Middle    | 6.5 | 27.4<br>27.4     | 27.4    | 8.1<br>8.1 | 8.1     | 23.8<br>23.9 | 23.9    | 82.2<br>81.4      | 81.8    | 5.7<br>5.7              | 5.7     |     | 1.8<br>1.8      | 1.8     |      | 2.0<br>1.8              | 1.9     |     |
|           |                   |                 |               | Bottom    | 12  | 26.5<br>26.8     | 26.7    | 8.0<br>8.1 | 8.1     | 27.8<br>27.3 | 27.6    | 69.9<br>70.6      | 70.3    | 4.9<br>4.9              | 4.9     |     | 2.7<br>2.2      | 2.5     |      | 2.6<br>2.2              | 2.4     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at CS1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |     | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|-----|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA* | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 08:53         | Surface   | 1   | 27.1<br>27.1     | 27.1    | 8.1<br>8.1 | 8.1     | 26.3<br>26.3 | 26.3    | 85.5<br>85.4      | 85.5    | 5.9<br>5.9              | 5.9     | 5.7 | 1.3<br>1.3     | 3.7     | 3.1 | 2.0<br>1.9              | 2.0     | 3.1 |
|           |                   |                 |               | Middle    | 6.5 | 26.8<br>26.8     | 26.8    | 8.1<br>8.1 | 8.1     | 27.8<br>27.8 | 27.8    | 79.0<br>79.0      | 79.0    | 5.4<br>5.4              | 5.4     |     | 2.2<br>2.3     |         |     | 2.9<br>1.8              |         |     |
|           |                   |                 |               | Bottom    | 12  | 26.3<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 29.1<br>29.1 | 29.1    | 71.4<br>70.9      | 71.2    | 5.0<br>5.0              | 5.0     |     | 7.4<br>7.6     |         |     | 5.4<br>4.1              |         |     |
| 22-Jul-13 | Cloudy            | Calm            | 12:09         | Surface   | 1   | 27.6<br>27.6     | 27.6    | 8.3<br>8.3 | 8.3     | 28.4<br>28.4 | 28.4    | 77.1<br>77.3      | 77.2    | 5.2<br>5.2              | 5.2     | 5.3 | 5.6<br>5.8     | 8.5     | 4.2 | 6.1<br>5.5              | 5.8     | 4.2 |
|           |                   |                 |               | Middle    | 3.5 | 27.5<br>27.5     | 27.5    | 8.3<br>8.3 | 8.3     | 29.5<br>29.5 | 29.5    | 78.1<br>79.5      | 78.8    | 5.2<br>5.3              | 5.3     |     | 6.9<br>5.7     |         |     | 4.1<br>2.8              |         |     |
|           |                   |                 |               | Bottom    | 6   | 27.4<br>27.4     | 27.4    | 8.3<br>8.3 | 8.3     | 29.6<br>29.6 | 29.6    | 76.5<br>76.4      | 76.5    | 5.1<br>5.1              | 5.1     |     | 13.5<br>13.5   |         |     | 3.7<br>3.0              |         |     |
| 24-Jul-13 | Rainy             | Moderate        | 13:30         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 27.0<br>27.0 | 27.0    | 95.5<br>95.5      | 95.5    | 6.5<br>6.5              | 6.5     | 6.3 | 4.9<br>4.8     | 15.5    | 6.0 | 5.9<br>5.2              | 5.6     | 6.0 |
|           |                   |                 |               | Middle    | 7   | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 28.7<br>28.7 | 28.7    | 90.7<br>91.2      | 91.0    | 6.1<br>6.1              | 6.1     |     | 12.3<br>12.3   |         |     | 5.6<br>5.5              |         |     |
|           |                   |                 |               | Bottom    | 13  | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 29.2<br>29.2 | 29.2    | 90.9<br>90.8      | 90.9    | 6.1<br>6.1              | 6.1     |     | 27.6<br>30.7   |         |     | 7.6<br>5.7              |         |     |
| 26-Jul-13 | Rainy             | Rough           | 15:29         | Surface   | 1   | 27.7<br>27.6     | 27.7    | 8.1<br>8.1 | 8.1     | 26.8<br>26.9 | 26.9    | 101.4<br>97.5     | 99.5    | 6.9<br>6.7              | 6.8     | 6.7 | 6.2<br>6.0     | 10.0    | 6.4 | 5.9<br>8.5              | 7.2     | 6.4 |
|           |                   |                 |               | Middle    | 6.5 | 27.6<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 27.0<br>25.9 | 26.5    | 97.2<br>95.1      | 96.2    | 6.6<br>6.5              | 6.6     |     | 5.0<br>4.8     |         |     | 6.1<br>6.1              |         |     |
|           |                   |                 |               | Bottom    | 12  | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 26.9<br>25.9 | 26.4    | 98.8<br>94.5      | 96.7    | 6.9<br>6.5              | 6.7     |     | 17.5<br>20.2   |         |     | 5.4<br>6.6              |         |     |
| 29-Jul-13 | Sunny             | Calm            | 17:25         | Surface   | 1   | 29.0<br>27.5     | 28.3    | 8.1<br>8.2 | 8.2     | 16.5<br>16.5 | 16.5    | 92.9<br>93.7      | 93.3    | 6.4<br>6.5              | 6.5     | 6.4 | 3.0<br>3.1     | 4.7     | 2.9 | 2.9<br>2.9              | 3.1     | 2.9 |
|           |                   |                 |               | Middle    | 6.5 | 27.5<br>30.3     | 28.9    | 8.2<br>8.2 | 8.2     | 18.4<br>18.6 | 18.5    | 90.9<br>90.8      | 90.9    | 6.2<br>6.3              | 6.3     |     | 4.8<br>4.7     |         |     | 2.9<br>3.2              |         |     |
|           |                   |                 |               | Bottom    | 12  | 28.9<br>30.4     | 29.7    | 8.1<br>8.2 | 8.2     | 27.0<br>27.1 | 27.1    | 78.6<br>78.8      | 78.7    | 5.3<br>5.4              | 5.4     |     | 6.0<br>6.2     |         |     | 2.7<br>2.7              |         |     |
| 31-Jul-13 | Sunny             | Calm            | 07:55         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 17.6<br>17.6 | 17.6    | 94.3<br>94.1      | 94.2    | 6.4<br>6.4              | 6.4     | 6.2 | 2.7<br>2.7     | 4.6     | 4.5 | 4.0<br>5.2              | 4.6     | 4.5 |
|           |                   |                 |               | Middle    | 6.5 | 28.3<br>28.3     | 28.3    | 8.2<br>8.2 | 8.2     | 22.1<br>21.2 | 21.7    | 87.6<br>88.7      | 88.2    | 5.9<br>6.0              | 6.0     |     | 2.5<br>2.5     |         |     | 5.0<br>3.2              |         |     |
|           |                   |                 |               | Bottom    | 12  | 27.1<br>27.1     | 27.1    | 8.2<br>8.2 | 8.2     | 29.4<br>29.4 | 29.4    | 78.0<br>77.2      | 77.6    | 5.2<br>5.1              | 5.2     |     | 8.8<br>8.6     |         |     | 4.6<br>5.0              |         |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at CS1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 14:48         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 15.4<br>15.3 | 15.4    | 107.9<br>106.2    | 107.1   | 7.6<br>7.5              | 7.6     | 7.4 | 7.2<br>7.8      | 7.5     | 8.3  | 5.5<br>5.3              | 5.4     | 5.3 |
|           |                   |                 |               | Middle    | 5   | 28.7<br>28.7     | 28.7    | 7.9<br>7.9 | 7.9     | 19.2<br>19.2 | 19.2    | 102.0<br>103.6    | 102.8   | 7.1<br>7.2              | 7.2     |     | 8.4<br>8.1      | 8.3     |      | 4.8<br>4.3              | 4.6     |     |
|           |                   |                 |               | Bottom    | 9   | 28.6<br>28.5     | 28.6    | 7.9<br>7.9 | 7.9     | 20.1<br>20.1 | 20.1    | 99.6<br>95.1      | 97.4    | 6.9<br>6.6              | 6.8     |     | 8.7<br>9.4      | 9.1     |      | 5.0<br>6.8              | 5.9     |     |
| 4-Jul-13  | Fine              | Calm            | 17:18         | Surface   | 1   | 30.8<br>30.8     | 30.8    | 8.0<br>8.1 | 8.1     | 7.1<br>7.0   | 7.1     | 101.5<br>101.1    | 101.3   | 7.3<br>7.3              | 7.3     | 7.1 | 4.8<br>4.8      | 4.8     | 7.2  | 2.3<br>2.0              | 2.2     | 3.2 |
|           |                   |                 |               | Middle    | 5   | 29.3<br>29.1     | 29.2    | 7.9<br>7.9 | 7.9     | 18.1<br>18.2 | 18.2    | 95.2<br>103.5     | 99.4    | 6.6<br>7.2              | 6.9     |     | 6.5<br>6.0      | 6.3     |      | 2.2<br>3.7              | 3.0     |     |
|           |                   |                 |               | Bottom    | 9   | 28.9<br>28.8     | 28.9    | 7.9<br>7.9 | 7.9     | 18.7<br>19.5 | 19.1    | 73.4<br>89.0      | 81.2    | 5.1<br>6.2              | 5.7     |     | 10.6<br>10.6    | 10.6    |      | 4.3<br>4.3              | 4.3     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 18:38         | Surface   | 1   | 29.7<br>28.8     | 29.3    | 8.6<br>8.1 | 8.4     | 15.3<br>15.3 | 15.3    | 131.7<br>127.3    | 129.5   | 9.5<br>9.4              | 9.5     | 8.2 | 7.2<br>7.3      | 7.3     | 7.4  | 6.7<br>6.7              | 6.7     | 7.9 |
|           |                   |                 |               | Middle    | 6.5 | 30.1<br>28.3     | 29.2    | 8.4<br>8.0 | 8.2     | 21.4<br>21.4 | 21.4    | 97.2<br>96.2      | 96.7    | 6.8<br>6.7              | 6.8     |     | 5.9<br>6.3      | 6.1     |      | 7.0<br>8.0              | 7.5     |     |
|           |                   |                 |               | Bottom    | 12  | 28.6<br>28.3     | 28.5    | 8.1<br>8.0 | 8.1     | 24.1<br>24.1 | 24.1    | 85.0<br>84.3      | 84.7    | 5.9<br>5.8              | 5.9     |     | 8.9<br>8.9      | 8.9     |      | 11.0<br>7.7             | 9.4     |     |
| 8-Jul-13  | Fine              | Moderate        | 19:33         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 8.3<br>8.3 | 8.3     | 13.4<br>13.7 | 13.6    | 111.4<br>104.4    | 107.9   | 7.9<br>7.4              | 7.7     | 7.1 | 6.8<br>7.4      | 7.1     | 10.9 | 1.7<br>2.7              | 2.2     | 8.3 |
|           |                   |                 |               | Middle    | 6   | 28.8<br>28.8     | 28.8    | 8.1<br>8.1 | 8.1     | 17.9<br>17.6 | 17.8    | 92.1<br>93.9      | 93.0    | 6.4<br>6.5              | 6.5     |     | 9.7<br>8.9      | 9.3     |      | 15.3<br>22.3            | 18.8    |     |
|           |                   |                 |               | Bottom    | 11  | 28.4<br>28.4     | 28.4    | 8.1<br>8.1 | 8.1     | 21.1<br>21.1 | 21.1    | 88.0<br>86.0      | 87.0    | 6.3<br>6.1              | 6.2     |     | 15.6<br>17.1    | 16.4    |      | 3.7<br>4.0              | 3.9     |     |
| 10-Jul-13 | Fine              | Moderate        | 06:59         | Surface   | 1   | 28.7<br>28.8     | 28.8    | 8.1<br>8.1 | 8.1     | 14.9<br>15.0 | 15.0    | 82.9<br>82.5      | 82.7    | 5.9<br>5.9              | 5.9     | 5.7 | 5.1<br>4.8      | 5.0     | 10.3 | 3.5<br>3.7              | 3.6     | 3.6 |
|           |                   |                 |               | Middle    | 5   | 28.6<br>28.6     | 28.6    | 8.0<br>8.1 | 8.1     | 18.7<br>18.8 | 18.8    | 76.1<br>76.9      | 76.5    | 5.5<br>5.5              | 5.5     |     | 6.7<br>6.5      | 6.6     |      | 2.8<br>3.5              | 3.2     |     |
|           |                   |                 |               | Bottom    | 9   | 27.9<br>27.7     | 27.8    | 8.0<br>8.0 | 8.0     | 23.9<br>25.3 | 24.6    | 73.3<br>73.0      | 73.2    | 5.1<br>5.1              | 5.1     |     | 19.4<br>19.2    | 19.3    |      | 4.1<br>3.9              | 4.0     |     |
| 12-Jul-13 | Sunny             | Moderate        | 08:02         | Surface   | 1   | 29.2<br>29.1     | 29.2    | 8.3<br>8.3 | 8.3     | 14.5<br>14.7 | 14.6    | 103.1<br>102.7    | 102.9   | 7.6<br>7.6              | 7.6     | 6.7 | 3.5<br>3.6      | 3.6     | 8.6  | 10.6<br>4.1             | 7.4     | 4.1 |
|           |                   |                 |               | Middle    | 5   | 27.5<br>27.4     | 27.5    | 8.2<br>8.2 | 8.2     | 26.0<br>25.8 | 25.9    | 78.0<br>80.4      | 79.2    | 5.7<br>5.9              | 5.8     |     | 9.9<br>9.5      | 9.7     |      | 2.3<br>2.1              | 2.2     |     |
|           |                   |                 |               | Bottom    | 9   | 27.0<br>27.0     | 27.0    | 8.2<br>8.2 | 8.2     | 28.1<br>28.1 | 28.1    | 72.2<br>70.5      | 71.4    | 5.3<br>5.2              | 5.3     |     | 12.5<br>12.3    | 12.4    |      | 2.9<br>2.5              | 2.7     |     |
| 15-Jul-13 | Rainy             | Calm            | 10:58         | Surface   | 1   | 29.2<br>29.2     | 29.2    | 8.0<br>8.0 | 8.0     | 13.5<br>13.4 | 13.5    | 81.1<br>80.8      | 81.0    | 5.7<br>5.7              | 5.7     | 5.6 | 3.9<br>3.9      | 3.9     | 6.2  | 1.9<br>2.1              | 2.0     | 2.1 |
|           |                   |                 |               | Middle    | 5.5 | 28.4<br>28.4     | 28.4    | 8.0<br>8.0 | 8.0     | 20.2<br>20.3 | 20.3    | 77.8<br>80.3      | 79.1    | 5.4<br>5.6              | 5.5     |     | 6.8<br>6.6      | 6.7     |      | 1.9<br>2.3              | 2.1     |     |
|           |                   |                 |               | Bottom    | 10  | 28.1<br>28.1     | 28.1    | 8.0<br>8.0 | 8.0     | 21.8<br>22.0 | 21.9    | 71.3<br>76.4      | 73.9    | 4.9<br>5.3              | 5.1     |     | 7.8<br>7.9      | 7.9     |      | 1.8<br>2.3              | 2.1     |     |
| 17-Jul-13 | Rainy             | Moderate        | 13:46         | Surface   | 1   | 28.8<br>28.8     | 28.8    | 8.0<br>8.0 | 8.0     | 15.5<br>15.6 | 15.6    | 93.0<br>92.7      | 92.9    | 6.6<br>6.6              | 6.6     | 6.1 | 2.5<br>2.5      | 2.5     | 5.6  | 2.1<br>1.8              | 2.0     | 2.1 |
|           |                   |                 |               | Middle    | 5.5 | 27.3<br>27.2     | 27.3    | 8.0<br>8.0 | 8.0     | 23.4<br>24.3 | 23.9    | 80.5<br>80.6      | 80.6    | 5.6<br>5.6              | 5.6     |     | 4.3<br>4.6      | 4.5     |      | 1.9<br>2.3              | 2.1     |     |
|           |                   |                 |               | Bottom    | 10  | 26.4<br>26.4     | 26.4    | 8.0<br>8.0 | 8.0     | 27.3<br>27.4 | 27.4    | 68.5<br>68.7      | 68.6    | 4.9<br>4.9              | 4.9     |     | 9.8<br>10.0     | 9.9     |      | 2.3<br>2.1              | 2.2     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at CS1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 16:28         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 24.3<br>24.3 | 24.3    | 83.9<br>83.8      | 83.9    | 5.8<br>5.8              | 5.8     | 5.6 | 3.0<br>3.1      | 3.1     | 5.6  | 4.7<br>3.0              | 3.9     | 4.9  |
|           |                   |                 |               | Middle    | 7   | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 24.6<br>24.6 | 24.6    | 77.1<br>77.3      | 77.2    | 5.4<br>5.4              | 5.4     |     | 3.9<br>3.9      | 3.9     |      | 8.0<br>3.0              | 5.5     |      |
|           |                   |                 |               | Bottom    | 13  | 26.9<br>26.9     | 26.9    | 8.1<br>8.1 | 8.1     | 26.4<br>26.4 | 26.4    | 75.8<br>75.7      | 75.8    | 5.1<br>5.1              | 5.1     |     | 9.2<br>10.1     | 9.7     |      | 6.5<br>4.3              | 5.4     |      |
| 22-Jul-13 | Rainy             | Moderate        | 19:21         | Surface   | 1   | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 22.6<br>22.7 | 22.7    | 78.6<br>78.5      | 78.6    | 5.4<br>5.4              | 5.4     | 5.4 | 8.8<br>7.6      | 8.2     | 9.0  | 11.2<br>10.2            | 10.7    | 11.7 |
|           |                   |                 |               | Middle    | 5.5 | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 23.3<br>23.4 | 23.4    | 78.2<br>78.6      | 78.4    | 5.4<br>5.4              | 5.4     |     | 8.8<br>8.5      | 8.7     |      | 11.7<br>11.0            | 11.4    |      |
|           |                   |                 |               | Bottom    | 10  | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 24.2<br>24.0 | 24.1    | 78.4<br>78.6      | 78.5    | 5.4<br>5.4              | 5.4     |     | 10.6<br>9.8     | 10.2    |      | 13.2<br>12.7            | 13.0    |      |
| 24-Jul-13 | Rainy             | Moderate        | 06:54         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.8<br>24.8 | 24.8    | 91.2<br>90.7      | 91.0    | 6.2<br>6.2              | 6.2     | 6.1 | 3.4<br>3.4      | 3.4     | 9.8  | 4.0<br>4.7              | 4.4     | 4.0  |
|           |                   |                 |               | Middle    | 7   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 26.4<br>26.6 | 26.5    | 88.9<br>89.1      | 89.0    | 6.0<br>6.0              | 6.0     |     | 6.4<br>6.9      | 6.7     |      | 3.8<br>3.7              | 3.8     |      |
|           |                   |                 |               | Bottom    | 13  | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 27.3<br>27.3 | 27.3    | 87.9<br>87.7      | 87.8    | 5.9<br>5.9              | 5.9     |     | 19.5<br>19.3    | 19.4    |      | 4.1<br>3.2              | 3.7     |      |
| 26-Jul-13 | Rainy             | Rough           | 07:52         | Surface   | 1   | 27.1<br>27.6     | 27.4    | 8.0<br>8.1 | 8.1     | 23.5<br>26.2 | 24.9    | 87.4<br>88.0      | 87.7    | 6.1<br>6.0              | 6.1     | 6.2 | 4.7<br>4.6      | 4.7     | 10.6 | 30.7<br>12.6            | 21.7    | 10.8 |
|           |                   |                 |               | Middle    | 7   | 27.1<br>27.5     | 27.3    | 8.0<br>8.1 | 8.1     | 23.5<br>26.0 | 24.8    | 86.9<br>90.7      | 88.8    | 6.1<br>6.2              | 6.2     |     | 10.2<br>10.0    | 10.1    |      | 4.6<br>6.2              | 5.4     |      |
|           |                   |                 |               | Bottom    | 13  | 27.5<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 26.0<br>26.2 | 26.1    | 92.0<br>88.5      | 90.3    | 6.3<br>6.1              | 6.2     |     | 17.1<br>16.7    | 16.9    |      | 5.9<br>4.6              | 5.3     |      |
| 29-Jul-13 | Sunny             | Calm            | 10:26         | Surface   | 1   | 28.2<br>28.4     | 28.3    | 8.1<br>8.1 | 8.1     | 20.5<br>18.6 | 19.6    | 84.4<br>87.2      | 85.8    | 5.9<br>6.1              | 6.0     | 6.1 | 3.4<br>3.5      | 3.5     | 3.6  | 2.1<br>2.5              | 2.3     | 2.7  |
|           |                   |                 |               | Middle    | 7   | 28.2<br>28.5     | 28.4    | 8.1<br>8.1 | 8.1     | 20.5<br>18.2 | 19.4    | 85.1<br>88.5      | 86.8    | 5.9<br>6.2              | 6.1     |     | 3.7<br>3.7      | 3.7     |      | 3.2<br>2.6              | 2.9     |      |
|           |                   |                 |               | Bottom    | 13  | 28.5<br>28.3     | 28.4    | 8.1<br>8.1 | 8.1     | 18.3<br>18.8 | 18.6    | 89.4<br>86.7      | 88.1    | 6.3<br>6.1              | 6.2     |     | 3.6<br>3.3      | 3.5     |      | 3.1<br>2.4              | 2.8     |      |
| 31-Jul-13 | Sunny             | Calm            | 14:45         | Surface   | 1   | 30.1<br>30.1     | 30.1    | 8.4<br>8.4 | 8.4     | 14.8<br>14.8 | 14.8    | 99.1<br>99.7      | 99.4    | 6.8<br>6.8              | 6.8     | 6.6 | 2.4<br>2.4      | 2.4     | 3.7  | 1.2<br>1.2              | 1.2     | 1.8  |
|           |                   |                 |               | Middle    | 5.5 | 29.5<br>29.6     | 29.6    | 8.3<br>8.3 | 8.3     | 16.0<br>16.0 | 16.0    | 92.6<br>92.5      | 92.6    | 6.3<br>6.3              | 6.3     |     | 2.0<br>2.1      | 2.1     |      | 2.4<br>2.4              | 2.4     |      |
|           |                   |                 |               | Bottom    | 10  | 29.3<br>29.3     | 29.3    | 8.3<br>8.3 | 8.3     | 16.4<br>16.8 | 16.6    | 81.8<br>81.8      | 81.8    | 5.6<br>5.6              | 5.6     |     | 7.0<br>6.3      | 6.7     |      | 1.7<br>1.7              | 1.7     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at CS2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 07:39         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.2<br>8.3 | 8.3     | 16.8<br>16.7 | 16.8    | 121.7<br>118.7    | 120.2   | 8.6<br>8.4              | 8.5     | 8.4 | 3.0<br>3.1      | 3.1     | 5.8  | 6.7<br>6.8              | 6.8     | 6.2  |
|           |                   |                 |               | Middle    | 3.5 | 28.5<br>28.6     | 28.6    | 8.2<br>8.3 | 8.3     | 17.2<br>16.9 | 17.1    | 115.8<br>116.7    | 116.3   | 8.2<br>8.2              | 8.2     |     | 2.7<br>3.1      |         |      | 6.5<br>6.3              |         |      |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.1     | 28.2    | 8.2<br>8.2 | 8.2     | 23.0<br>23.2 | 23.1    | 83.8<br>83.4      | 83.6    | 5.8<br>5.7              | 5.8     |     | 11.5<br>11.2    |         |      | 5.5<br>5.5              |         |      |
| 4-Jul-13  | Sunny             | Calm            | 09:03         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.0<br>8.0 | 8.0     | 10.5<br>10.4 | 10.5    | 97.6<br>97.5      | 97.6    | 7.0<br>7.0              | 7.0     | 6.2 | 4.6<br>4.7      | 4.7     | 4.8  | 10.3<br>8.8             | 9.6     | 11.5 |
|           |                   |                 |               | Middle    | 3   | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 20.4<br>19.8 | 20.1    | 75.7<br>76.2      | 76.0    | 5.2<br>5.3              | 5.3     |     | 4.2<br>4.3      |         |      | 13.8<br>16.0            |         |      |
|           |                   |                 |               | Bottom    | 5   | 28.1<br>28.1     | 28.1    | 8.1<br>8.1 | 8.1     | 27.7<br>27.7 | 27.7    | 82.7<br>82.3      | 82.5    | 5.7<br>5.7              | 5.7     |     | 5.2<br>5.8      |         |      | 14.2<br>5.5             |         |      |
| 6-Jul-13  | Cloudy            | Moderate        | 10:21         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.5<br>8.5 | 8.5     | 10.6<br>10.6 | 10.6    | 126.9<br>125.9    | 126.4   | 9.1<br>9.0              | 9.1     | 8.5 | 4.3<br>4.4      | 4.4     | 5.8  | 5.7<br>6.0              | 5.9     | 5.7  |
|           |                   |                 |               | Middle    | 3.5 | 29.3<br>29.2     | 29.3    | 8.2<br>8.2 | 8.2     | 16.7<br>17.2 | 17.0    | 103.1<br>102.7    | 102.9   | 7.8<br>7.8              | 7.8     |     | 5.0<br>5.0      |         |      | 6.0<br>4.3              |         |      |
|           |                   |                 |               | Bottom    | 6   | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 29.5<br>29.6 | 29.6    | 68.4<br>68.1      | 68.3    | 5.2<br>5.2              | 5.2     |     | 7.6<br>8.3      |         |      | 6.3<br>5.5              |         |      |
| 8-Jul-13  | Sunny             | Moderate        | 11:48         | Surface   | 1   | 29.3<br>29.4     | 29.4    | 8.2<br>8.2 | 8.2     | 13.0<br>13.0 | 13.0    | 100.2<br>97.3     | 98.8    | 7.1<br>6.9              | 7.0     | 6.6 | 5.8<br>5.8      | 5.8     | 10.3 | 6.3<br>7.3              | 6.8     | 7.9  |
|           |                   |                 |               | Middle    | 4   | 28.0<br>27.9     | 28.0    | 8.1<br>8.1 | 8.1     | 24.2<br>25.8 | 25.0    | 85.5<br>84.8      | 85.2    | 6.2<br>6.1              | 6.2     |     | 10.8<br>13.2    |         |      | 8.0<br>8.0              |         |      |
|           |                   |                 |               | Bottom    | 7   | 27.1<br>27.1     | 27.1    | 8.1<br>8.1 | 8.1     | 30.7<br>30.8 | 30.8    | 78.0<br>76.9      | 77.5    | 5.6<br>5.5              | 5.6     |     | 12.9<br>13.0    |         |      | 12.0<br>5.5             |         |      |
| 10-Jul-13 | Fine              | Moderate        | 12:38         | Surface   | 1   | 29.5<br>29.8     | 29.7    | 8.2<br>8.3 | 8.3     | 16.4<br>16.0 | 16.2    | 125.0<br>125.8    | 125.4   | 9.0<br>9.1              | 9.1     | 7.5 | 4.6<br>4.6      | 4.6     | 9.2  | 3.4<br>4.5              | 4.0     | 4.1  |
|           |                   |                 |               | Middle    | 3.5 | 27.7<br>27.6     | 27.7    | 8.1<br>8.1 | 8.1     | 25.8<br>26.2 | 26.0    | 78.5<br>79.7      | 79.1    | 5.7<br>5.8              | 5.8     |     | 8.8<br>10.8     |         |      | 3.8<br>3.2              |         |      |
|           |                   |                 |               | Bottom    | 6   | 26.9<br>26.9     | 26.9    | 8.1<br>8.1 | 8.1     | 29.1<br>29.1 | 29.1    | 73.9<br>72.7      | 73.3    | 5.3<br>5.2              | 5.3     |     | 13.1<br>13.0    |         |      | 4.3<br>5.5              |         |      |
| 12-Jul-13 | Sunny             | Moderate        | 13:40         | Surface   | 1   | 29.1<br>28.9     | 29.0    | 8.2<br>8.2 | 8.2     | 19.2<br>20.2 | 19.7    | 86.3<br>88.0      | 87.2    | 6.2<br>6.3              | 6.3     | 6.1 | 3.3<br>3.9      | 3.6     | 8.2  | 8.3<br>14.5             | 11.4    | 9.2  |
|           |                   |                 |               | Middle    | 3.5 | 27.3<br>27.2     | 27.3    | 8.0<br>8.1 | 8.1     | 26.7<br>27.2 | 27.0    | 80.3<br>79.7      | 80.0    | 5.8<br>5.8              | 5.8     |     | 7.9<br>7.0      |         |      | 16.8<br>6.8             |         |      |
|           |                   |                 |               | Bottom    | 6   | 26.4<br>26.3     | 26.4    | 8.0<br>8.0 | 8.0     | 30.0<br>30.2 | 30.1    | 71.8<br>71.2      | 71.5    | 5.2<br>5.2              | 5.2     |     | 13.2<br>13.6    |         |      | 3.3<br>5.5              |         |      |
| 15-Jul-13 | Rainy             | Calm            | 18:03         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.1 | 8.2     | 16.9<br>16.9 | 16.9    | 85.3<br>84.5      | 84.9    | 6.0<br>5.9              | 6.0     | 5.8 | 1.9<br>1.9      | 1.9     | 5.7  | 1.7<br>1.9              | 1.8     | 2.8  |
|           |                   |                 |               | Middle    | 5   | 28.2<br>26.6     | 27.4    | 8.1<br>8.0 | 8.1     | 20.9<br>25.5 | 23.2    | 82.4<br>80.8      | 81.6    | 5.7<br>5.5              | 5.6     |     | 4.3<br>4.9      |         |      | 3.0<br>2.2              |         |      |
|           |                   |                 |               | Bottom    | 9   | 25.8<br>25.8     | 25.8    | 8.0<br>8.0 | 8.0     | 30.2<br>30.3 | 30.3    | 72.2<br>72.7      | 72.5    | 4.9<br>4.9              | 4.9     |     | 10.3<br>10.6    |         |      | 2.3<br>5.5              |         |      |
| 17-Jul-13 | Rainy             | Moderate        | 17:54         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.1<br>17.3 | 17.2    | 91.5<br>91.0      | 91.3    | 6.5<br>6.4              | 6.5     | 6.1 | 1.8<br>1.9      | 1.9     | 4.1  | 1.6<br>1.8              | 1.7     | 2.7  |
|           |                   |                 |               | Middle    | 3.5 | 27.3<br>27.5     | 27.4    | 8.2<br>8.2 | 8.2     | 23.0<br>23.0 | 23.0    | 79.6<br>80.7      | 80.2    | 5.6<br>5.6              | 5.6     |     | 2.7<br>3.0      |         |      | 2.6<br>2.3              |         |      |
|           |                   |                 |               | Bottom    | 6   | 25.9<br>25.8     | 25.9    | 8.1<br>8.2 | 8.2     | 30.2<br>30.3 | 30.3    | 72.8<br>72.6      | 72.7    | 5.0<br>5.0              | 5.0     |     | 7.1<br>8.1      |         |      | 2.2<br>5.5              |         |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at CS2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 08:07         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 24.2<br>23.9 | 24.1    | 83.2<br>83.4      | 83.3    | 5.8<br>5.8              | 5.8     | 5.7 | 1.7<br>1.9      | 1.8     | 4.8  | 8.3<br>10.2             | 9.3     | 6.8  |
|           |                   |                 |               | Middle    | 3.5 | 26.6<br>26.6     | 26.6    | 8.2<br>8.2 | 8.2     | 28.6<br>28.7 | 28.7    | 80.5<br>79.4      | 80.0    | 5.5<br>5.4              | 5.5     |     | 3.8<br>3.5      | 3.7     |      | 8.7<br>4.0              | 6.4     |      |
|           |                   |                 |               | Bottom    | 6   | 26.3<br>26.3     | 26.3    | 8.2<br>8.2 | 8.2     | 29.7<br>29.7 | 29.7    | 72.6<br>72.2      | 72.4    | 4.9<br>4.9              | 4.9     |     | 8.9<br>9.0      | 9.0     |      | 4.0<br>5.5              | 4.8     |      |
| 22-Jul-13 | Cloudy            | Calm            | 13:10         | Surface   | 1   | 27.8<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 27.6<br>27.1 | 27.4    | 81.4<br>79.3      | 80.4    | 5.5<br>5.3              | 5.4     | 5.4 | 6.0<br>6.6      | 6.3     | 9.6  | 5.7<br>4.4              | 5.1     | 5.6  |
|           |                   |                 |               | Middle    | 4   | 27.4<br>27.3     | 27.4    | 8.2<br>8.2 | 8.2     | 28.7<br>28.8 | 28.8    | 81.9<br>78.8      | 80.4    | 5.5<br>5.3              | 5.4     |     | 7.3<br>7.7      | 7.5     |      | 5.2<br>5.5              | 5.4     |      |
|           |                   |                 |               | Bottom    | 7   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 29.0<br>29.0 | 29.0    | 79.5<br>77.2      | 78.4    | 5.4<br>5.2              | 5.3     |     | 15.0<br>14.9    | 15.0    |      | 7.3<br>5.5              | 6.4     |      |
| 24-Jul-13 | Rainy             | Moderate        | 12:23         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 27.0<br>27.0 | 27.0    | 95.0<br>94.9      | 95.0    | 6.4<br>6.4              | 6.4     | 6.3 | 5.7<br>5.6      | 5.7     | 17.6 | 5.7<br>44.0             | 24.9    | 11.0 |
|           |                   |                 |               | Middle    | 3   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.8<br>29.8 | 29.8    | 93.0<br>93.1      | 93.1    | 6.2<br>6.2              | 6.2     |     | 13.4<br>13.8    | 13.6    |      | 3.7<br>3.4              | 3.6     |      |
|           |                   |                 |               | Bottom    | 5   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.9<br>29.9 | 29.9    | 92.2<br>92.0      | 92.1    | 6.1<br>6.1              | 6.1     |     | 32.2<br>34.7    | 33.5    |      | 3.4<br>5.5              | 4.5     |      |
| 26-Jul-13 | Rainy             | Rough           | 14:06         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 25.1<br>25.1 | 25.1    | 90.1<br>90.0      | 90.1    | 6.2<br>6.2              | 6.2     | 6.1 | 7.5<br>7.9      | 7.7     | 10.5 | 5.5<br>6.0              | 5.8     | 5.8  |
|           |                   |                 |               | Middle    | 3.5 | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 27.3<br>27.1 | 27.2    | 86.4<br>86.4      | 86.4    | 5.9<br>5.9              | 5.9     |     | 12.1<br>10.3    | 11.2    |      | 6.6<br>6.5              | 6.6     |      |
|           |                   |                 |               | Bottom    | 6   | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 27.6<br>27.6 | 27.6    | 87.1<br>87.1      | 87.1    | 5.9<br>5.9              | 5.9     |     | 13.1<br>11.8    | 12.5    |      | 4.7<br>5.5              | 5.1     |      |
| 29-Jul-13 | Sunny             | Calm            | 16:02         | Surface   | 1   | 30.3<br>30.3     | 30.3    | 8.0<br>8.0 | 8.0     | 14.5<br>14.5 | 14.5    | 99.0<br>98.7      | 98.9    | 7.5<br>7.5              | 7.5     | 7.4 | 2.9<br>2.9      | 2.9     | 6.2  | 2.8<br>2.3              | 2.6     | 3.4  |
|           |                   |                 |               | Middle    | 3   | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 17.1<br>17.2 | 17.2    | 95.3<br>95.5      | 95.4    | 7.3<br>7.3              | 7.3     |     | 3.2<br>3.5      | 3.4     |      | 3.3<br>3.4              | 3.4     |      |
|           |                   |                 |               | Bottom    | 5   | 27.3<br>27.3     | 27.3    | 8.2<br>8.2 | 8.2     | 28.2<br>28.2 | 28.2    | 71.0<br>70.7      | 70.9    | 5.4<br>5.4              | 5.4     |     | 12.5<br>11.9    | 12.2    |      | 3.0<br>5.5              | 4.3     |      |
| 31-Jul-13 | Sunny             | Calm            | 06:58         | Surface   | 1   | 28.9<br>28.9     | 28.9    | 7.9<br>7.9 | 7.9     | 15.7<br>15.7 | 15.7    | 104.3<br>103.9    | 104.1   | 7.4<br>7.4              | 7.4     | 6.8 | 1.7<br>1.7      | 1.7     | 3.8  | 4.6<br>4.4              | 4.5     | 4.9  |
|           |                   |                 |               | Middle    | 4   | 28.7<br>28.6     | 28.7    | 8.0<br>8.0 | 8.0     | 18.5<br>21.2 | 19.9    | 89.2<br>90.0      | 89.6    | 6.2<br>6.2              | 6.2     |     | 2.6<br>2.5      | 2.6     |      | 5.0<br>5.2              | 5.1     |      |
|           |                   |                 |               | Bottom    | 7   | 27.0<br>27.0     | 27.0    | 8.0<br>8.0 | 8.0     | 29.2<br>29.2 | 29.2    | 78.2<br>77.3      | 77.8    | 5.3<br>5.2              | 5.3     |     | 7.0<br>7.0      | 7.0     |      | 4.4<br>5.5              | 5.0     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at CS2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 13:26         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.3<br>8.3 | 8.3     | 13.5<br>13.6 | 13.6    | 118.1<br>113.7    | 115.9   | 8.4<br>8.1              | 8.3     | 7.6 | 5.0<br>5.1      | 5.1     | 8.5  | 6.8<br>6.2              | 6.5     | 6.1  |
|           |                   |                 |               | Middle    | 3.5 | 28.8<br>28.8     | 28.8    | 8.2<br>8.2 | 8.2     | 16.1<br>16.3 | 16.2    | 98.8<br>96.5      | 97.7    | 7.0<br>6.8              | 6.9     |     | 7.3<br>8.8      |         |      | 7.0<br>6.8              | 6.9     |      |
|           |                   |                 |               | Bottom    | 6   | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 21.7<br>21.7 | 21.7    | 81.6<br>80.5      | 81.1    | 5.8<br>5.6              | 5.7     |     | 12.9<br>11.9    |         |      | 4.2<br>5.3              | 4.8     |      |
| 4-Jul-13  | Fine              | Calm            | 16:00         | Surface   | 1   | 30.6<br>30.6     | 30.6    | 8.1<br>8.1 | 8.1     | 9.4<br>9.5   | 9.5     | 128.2<br>128.7    | 128.5   | 9.1<br>9.2              | 9.2     | 8.1 | 6.3<br>6.2      | 6.3     | 15.4 | 7.8<br>5.3              | 6.6     | 9.7  |
|           |                   |                 |               | Middle    | 3.5 | 29.4<br>29.4     | 29.4    | 7.9<br>7.9 | 7.9     | 13.0<br>13.0 | 13.0    | 98.1<br>98.4      | 98.3    | 7.0<br>7.0              | 7.0     |     | 14.4<br>14.3    |         |      | 16.0<br>15.7            | 15.9    |      |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.0     | 28.0    | 8.0<br>8.0 | 8.0     | 26.8<br>26.8 | 26.8    | 83.2<br>82.5      | 82.9    | 5.8<br>5.8              | 5.8     |     | 23.3<br>27.8    |         |      | 6.8<br>6.5              | 6.7     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 17:24         | Surface   | 1   | 29.7<br>29.6     | 29.7    | 8.4<br>8.4 | 8.4     | 10.9<br>10.5 | 10.7    | 115.9<br>116.1    | 116.0   | 8.3<br>8.3              | 8.3     | 7.5 | 8.0<br>7.4      | 7.7     | 12.9 | 7.0<br>6.5              | 6.8     | 6.3  |
|           |                   |                 |               | Middle    | 3.5 | 29.2<br>29.2     | 29.2    | 8.2<br>8.2 | 8.2     | 14.4<br>16.0 | 15.2    | 92.6<br>91.9      | 92.3    | 6.6<br>6.5              | 6.6     |     | 12.5<br>13.2    |         |      | 3.7<br>6.7              | 5.2     |      |
|           |                   |                 |               | Bottom    | 6   | 28.6<br>28.2     | 28.4    | 8.1<br>8.1 | 8.1     | 21.5<br>25.7 | 23.6    | 73.1<br>75.3      | 74.2    | 5.7<br>5.7              | 5.7     |     | 18.3<br>17.8    |         |      | 7.3<br>6.3              | 6.8     |      |
| 8-Jul-13  | Fine              | Moderate        | 18:32         | Surface   | 1   | 29.1<br>29.0     | 29.1    | 8.0<br>8.0 | 8.0     | 13.9<br>14.0 | 14.0    | 90.1<br>94.2      | 92.2    | 6.4<br>6.7              | 6.6     | 6.2 | 7.9<br>8.0      | 8.0     | 15.3 | 16.3<br>18.0            | 17.2    | 34.6 |
|           |                   |                 |               | Middle    | 3.5 | 28.6<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 16.5<br>15.7 | 16.1    | 80.3<br>78.4      | 79.4    | 5.7<br>5.6              | 5.7     |     | 15.7<br>18.8    |         |      | 49.0<br>38.3            | 43.7    |      |
|           |                   |                 |               | Bottom    | 6   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 19.9<br>20.6 | 20.3    | 80.7<br>81.8      | 81.3    | 5.8<br>5.9              | 5.9     |     | 21.5<br>19.5    |         |      | 42.3<br>43.7            | 43.0    |      |
| 10-Jul-13 | Fine              | Moderate        | 05:38         | Surface   | 1   | 28.8<br>28.7     | 28.8    | 8.1<br>8.1 | 8.1     | 14.1<br>14.0 | 14.1    | 99.8<br>98.1      | 99.0    | 7.1<br>7.0              | 7.1     | 6.5 | 4.7<br>4.3      | 4.5     | 5.7  | 1.6<br>2.0              | 1.8     | 2.4  |
|           |                   |                 |               | Middle    | 3.5 | 28.7<br>28.6     | 28.7    | 8.1<br>8.1 | 8.1     | 17.9<br>17.7 | 17.8    | 83.6<br>80.9      | 82.3    | 5.9<br>5.7              | 5.8     |     | 6.2<br>5.7      |         |      | 2.4<br>3.4              | 2.9     |      |
|           |                   |                 |               | Bottom    | 6   | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 21.8<br>21.6 | 21.7    | 74.4<br>73.0      | 73.7    | 5.1<br>5.1              | 5.1     |     | 6.6<br>6.5      |         |      | 2.2<br>2.6              | 2.4     |      |
| 12-Jul-13 | Sunny             | Moderate        | 06:50         | Surface   | 1   | 29.5<br>29.4     | 29.5    | 8.2<br>8.2 | 8.2     | 14.3<br>14.4 | 14.4    | 92.1<br>89.1      | 90.6    | 6.8<br>6.6              | 6.7     | 6.2 | 3.2<br>3.3      | 3.3     | 7.7  | 2.1<br>2.9              | 2.5     | 8.6  |
|           |                   |                 |               | Middle    | 3.5 | 28.6<br>28.2     | 28.4    | 8.1<br>8.1 | 8.1     | 19.5<br>21.3 | 20.4    | 77.0<br>75.9      | 76.5    | 5.6<br>5.5              | 5.6     |     | 4.7<br>4.7      |         |      | 4.0<br>4.1              | 4.1     |      |
|           |                   |                 |               | Bottom    | 6   | 27.0<br>27.0     | 27.0    | 8.1<br>8.1 | 8.1     | 28.0<br>28.1 | 28.1    | 70.2<br>69.7      | 70.0    | 5.1<br>5.1              | 5.1     |     | 16.5<br>13.7    |         |      | 33.0<br>5.5             | 19.3    |      |
| 15-Jul-13 | Rainy             | Calm            | 12:19         | Surface   | 1   | 28.1<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 22.5<br>22.1 | 22.3    | 96.3<br>95.7      | 96.0    | 6.5<br>6.5              | 6.5     | 6.0 | 4.4<br>4.3      | 4.4     | 8.9  | 2.6<br>2.5              | 2.6     | 3.4  |
|           |                   |                 |               | Middle    | 4   | 26.6<br>26.9     | 26.8    | 8.0<br>8.0 | 8.0     | 27.8<br>26.9 | 27.4    | 81.0<br>80.1      | 80.6    | 5.4<br>5.4              | 5.4     |     | 7.1<br>7.3      |         |      | 4.2<br>4.2              | 4.2     |      |
|           |                   |                 |               | Bottom    | 7   | 26.3<br>26.2     | 26.3    | 8.0<br>8.0 | 8.0     | 28.7<br>29.1 | 28.9    | 72.1<br>72.8      | 72.5    | 4.8<br>4.9              | 4.9     |     | 14.3<br>16.0    |         |      | 3.3<br>3.3              | 3.3     |      |
| 17-Jul-13 | Rainy             | Moderate        | 15:27         | Surface   | 1   | 28.5<br>28.4     | 28.5    | 8.2<br>8.2 | 8.2     | 17.5<br>17.3 | 17.4    | 91.2<br>91.3      | 91.3    | 6.4<br>6.5              | 6.5     | 6.0 | 1.6<br>1.8      | 1.7     | 4.2  | 2.0<br>1.9              | 2.0     | 1.6  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>27.8     | 27.9    | 8.2<br>8.2 | 8.2     | 21.0<br>22.2 | 21.6    | 77.7<br>77.7      | 77.7    | 5.5<br>5.4              | 5.5     |     | 2.2<br>2.4      |         |      | 1.2<br>1.2              | 1.2     |      |
|           |                   |                 |               | Bottom    | 6   | 26.2<br>25.9     | 26.1    | 8.2<br>8.2 | 8.2     | 29.5<br>30.2 | 29.9    | 78.0<br>77.6      | 77.8    | 5.4<br>5.4              | 5.4     |     | 9.3<br>8.1      |         |      | 1.2<br>1.9              | 1.6     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at CS2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 15:20         | Surface   | 1   | 27.9<br>27.8     | 27.9    | 8.1<br>8.2 | 8.2     | 24.0<br>24.2 | 24.1    | 84.6<br>84.4      | 84.5    | 5.8<br>5.8              | 5.8     | 5.7 | 3.2<br>3.2      | 3.2     | 6.7  | 6.7<br>4.7              | 5.7     | 4.2  |
|           |                   |                 |               | Middle    | 3   | 27.6<br>27.6     | 27.6    | 8.1<br>8.2 | 8.2     | 24.3<br>24.2 | 24.3    | 80.8<br>80.5      | 80.7    | 5.6<br>5.5              | 5.6     |     | 3.7<br>3.8      | 3.8     |      | 3.8<br>4.7              | 4.3     |      |
|           |                   |                 |               | Bottom    | 5   | 26.7<br>26.7     | 26.7    | 8.1<br>8.1 | 8.1     | 27.3<br>27.4 | 27.4    | 73.0<br>72.0      | 72.5    | 5.0<br>4.9              | 5.0     |     | 12.5<br>13.5    | 13.0    |      | 2.8<br>2.2              | 2.5     |      |
| 22-Jul-13 | Rainy             | Moderate        | 20:13         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 21.5<br>21.6 | 21.6    | 74.9<br>71.8      | 73.4    | 5.2<br>5.0              | 5.1     | 5.1 | 9.0<br>9.5      | 9.3     | 12.2 | 8.8<br>8.2              | 8.5     | 9.3  |
|           |                   |                 |               | Middle    | 4   | 27.9<br>28.0     | 28.0    | 8.0<br>8.0 | 8.0     | 23.5<br>22.6 | 23.1    | 73.9<br>73.8      | 73.9    | 5.1<br>5.1              | 5.1     |     | 11.8<br>11.1    | 11.5    |      | 9.7<br>7.7              | 8.7     |      |
|           |                   |                 |               | Bottom    | 7   | 27.6<br>27.6     | 27.6    | 8.0<br>8.0 | 8.0     | 24.7<br>24.8 | 24.8    | 72.1<br>71.9      | 72.0    | 5.0<br>4.9              | 5.0     |     | 15.6<br>15.7    | 15.7    |      | 10.0<br>11.2            | 10.6    |      |
| 24-Jul-13 | Rainy             | Moderate        | 05:55         | Surface   | 1   | 27.9<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 22.8<br>23.0 | 22.9    | 87.2<br>87.1      | 87.2    | 6.0<br>6.0              | 6.0     | 6.1 | 3.8<br>4.0      | 3.9     | 7.4  | 4.0<br>62.0             | 33.0    | 13.4 |
|           |                   |                 |               | Middle    | 3.5 | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 24.7<br>24.7 | 24.7    | 89.4<br>89.3      | 89.4    | 6.1<br>6.1              | 6.1     |     | 3.6<br>3.7      | 3.7     |      | 4.5<br>2.7              | 3.6     |      |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 27.6<br>27.6 | 27.6    | 89.6<br>89.7      | 89.7    | 6.0<br>6.0              | 6.0     |     | 13.6<br>15.5    | 14.6    |      | 3.2<br>4.0              | 3.6     |      |
| 26-Jul-13 | Rainy             | Rough           | 07:36         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 23.7<br>23.7 | 23.7    | 87.9<br>87.8      | 87.9    | 6.1<br>6.1              | 6.1     | 6.0 | 5.9<br>5.8      | 5.9     | 9.6  | 6.0<br>5.2              | 5.6     | 6.1  |
|           |                   |                 |               | Middle    | 3.5 | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.1<br>26.2 | 26.2    | 86.4<br>86.6      | 86.5    | 5.9<br>5.9              | 5.9     |     | 8.4<br>8.6      | 8.5     |      | 7.0<br>6.8              | 6.9     |      |
|           |                   |                 |               | Bottom    | 6   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.7<br>26.6 | 26.7    | 85.3<br>85.2      | 85.3    | 5.8<br>5.8              | 5.8     |     | 14.6<br>14.1    | 14.4    |      | 5.1<br>6.6              | 5.9     |      |
| 29-Jul-13 | Sunny             | Calm            | 10:09         | Surface   | 1   | 28.4<br>28.3     | 28.4    | 8.1<br>8.1 | 8.1     | 19.3<br>19.4 | 19.4    | 85.9<br>85.7      | 85.8    | 6.5<br>6.5              | 6.5     | 6.4 | 5.7<br>5.7      | 5.7     | 9.8  | 3.2<br>4.6              | 3.9     | 3.2  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 20.3<br>20.4 | 20.4    | 81.7<br>82.1      | 81.9    | 6.2<br>6.3              | 6.3     |     | 10.9<br>11.0    | 11.0    |      | 2.9<br>2.7              | 2.8     |      |
|           |                   |                 |               | Bottom    | 6   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 23.1<br>23.1 | 23.1    | 76.0<br>75.6      | 75.8    | 5.8<br>5.8              | 5.8     |     | 12.9<br>12.6    | 12.8    |      | 3.3<br>2.7              | 3.0     |      |
| 31-Jul-13 | Sunny             | Calm            | 13:14         | Surface   | 1   | 30.1<br>30.1     | 30.1    | 8.3<br>8.3 | 8.3     | 13.7<br>13.7 | 13.7    | 114.5<br>114.9    | 114.7   | 7.8<br>7.9              | 7.9     | 7.1 | 2.7<br>2.7      | 2.7     | 4.3  | 1.7<br>2.5              | 2.1     | 2.6  |
|           |                   |                 |               | Middle    | 3.5 | 28.8<br>28.8     | 28.8    | 8.0<br>8.0 | 8.0     | 18.4<br>18.3 | 18.4    | 90.7<br>90.3      | 90.5    | 6.3<br>6.3              | 6.3     |     | 1.7<br>1.6      | 1.7     |      | 3.0<br>2.7              | 2.9     |      |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.0     | 28.0    | 8.0<br>8.0 | 8.0     | 23.5<br>23.5 | 23.5    | 82.3<br>80.8      | 81.6    | 5.3<br>5.2              | 5.3     |     | 8.4<br>8.8      | 8.6     |      | 2.7<br>3.0              | 2.9     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 09:07         | Surface   | 1   | 28.7<br>28.8     | 28.8    | 8.3<br>8.4 | 8.4     | 16.8<br>16.1 | 16.5    | 102.3<br>101.0    | 101.7   | 7.2<br>7.1              | 7.2     | 7.3 | 3.1<br>2.9      | 3.0     | 4.3  | 5.5<br>6.5              | 6.0     | 5.9  |
|           |                   |                 |               | Middle    | 5   | 28.7<br>28.7     | 28.7    | 8.3<br>8.3 | 8.3     | 16.8<br>16.6 | 16.7    | 103.5<br>102.9    | 103.2   | 7.3<br>7.3              | 7.3     |     | 3.0<br>2.8      | 2.9     |      | 5.5<br>5.7              | 5.6     |      |
|           |                   |                 |               | Bottom    | 9   | 28.4<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.5<br>16.9 | 17.2    | 79.4<br>81.2      | 80.3    | 5.6<br>5.6              | 5.6     |     | 7.4<br>6.4      | 6.9     |      | 4.8<br>7.3              | 6.1     |      |
| 4-Jul-13  | Sunny             | Calm            | 11:13         | Surface   | 1   | 30.3<br>30.3     | 30.3    | 8.1<br>8.1 | 8.1     | 8.4<br>8.4   | 8.4     | 129.5<br>128.9    | 129.2   | 9.3<br>9.3              | 9.3     | 8.3 | 4.1<br>4.2      | 4.2     | 7.3  | 2.3<br>1.7              | 2.0     | 2.9  |
|           |                   |                 |               | Middle    | 4   | 29.2<br>29.3     | 29.3    | 8.0<br>8.0 | 8.0     | 14.5<br>14.2 | 14.4    | 101.5<br>102.0    | 101.8   | 7.2<br>7.2              | 7.2     |     | 5.0<br>5.0      | 5.0     |      | 1.0<br>2.5              | 1.8     |      |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 27.1<br>27.1 | 27.1    | 84.7<br>84.5      | 84.6    | 5.9<br>5.9              | 5.9     |     | 11.4<br>14.0    | 12.7    |      | 2.3<br>7.7              | 5.0     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 12:11         | Surface   | 1   | 29.8<br>29.8     | 29.8    | 8.6<br>8.6 | 8.6     | 10.9<br>10.9 | 10.9    | 121.0<br>121.4    | 121.2   | 8.4<br>8.4              | 8.4     | 7.9 | 4.3<br>4.4      | 4.4     | 7.3  | 4.3<br>5.3              | 4.8     | 5.6  |
|           |                   |                 |               | Middle    | 5   | 28.6<br>28.8     | 28.7    | 8.2<br>8.2 | 8.2     | 23.9<br>20.7 | 22.3    | 93.6<br>94.7      | 94.2    | 7.3<br>7.5              | 7.4     |     | 3.8<br>4.4      | 4.1     |      | 5.0<br>4.7              | 4.9     |      |
|           |                   |                 |               | Bottom    | 9   | 27.7<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 29.5<br>29.4 | 29.5    | 75.8<br>76.9      | 76.4    | 6.1<br>6.1              | 6.1     |     | 12.6<br>14.2    | 13.4    |      | 5.0<br>9.3              | 7.2     |      |
| 8-Jul-13  | Sunny             | Moderate        | 13:35         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.3<br>8.3 | 8.3     | 13.2<br>13.2 | 13.2    | 103.8<br>104.3    | 104.1   | 7.4<br>7.4              | 7.4     | 7.2 | 5.5<br>6.0      | 5.8     | 10.5 | 3.0<br>5.3              | 4.2     | 10.3 |
|           |                   |                 |               | Middle    | 5   | 28.7<br>28.4     | 28.6    | 8.2<br>8.1 | 8.2     | 17.3<br>19.4 | 18.4    | 95.1<br>95.1      | 95.1    | 7.0<br>7.0              | 7.0     |     | 5.9<br>5.6      | 5.8     |      | 6.7<br>16.0             | 11.4    |      |
|           |                   |                 |               | Bottom    | 9   | 27.3<br>27.3     | 27.3    | 8.0<br>8.0 | 8.0     | 29.8<br>29.6 | 29.7    | 77.0<br>75.9      | 76.5    | 5.6<br>5.5              | 5.6     |     | 18.5<br>21.0    | 19.8    |      | 13.7<br>16.7            | 15.2    |      |
| 10-Jul-13 | Fine              | Moderate        | 14:29         | Surface   | 1   | 29.4<br>29.2     | 29.3    | 8.4<br>8.3 | 8.4     | 16.7<br>17.4 | 17.1    | 119.6<br>112.1    | 115.9   | 8.6<br>8.1              | 8.4     | 7.8 | 4.5<br>4.2      | 4.4     | 8.0  | 4.5<br>4.7              | 4.6     | 4.6  |
|           |                   |                 |               | Middle    | 5   | 28.0<br>28.6     | 28.3    | 8.3<br>8.3 | 8.3     | 23.8<br>21.3 | 22.6    | 99.3<br>99.1      | 99.2    | 7.1<br>7.1              | 7.1     |     | 3.0<br>3.7      | 3.4     |      | 4.7<br>4.2              | 4.5     |      |
|           |                   |                 |               | Bottom    | 9   | 26.9<br>27.0     | 27.0    | 8.2<br>8.2 | 8.2     | 29.0<br>28.9 | 29.0    | 73.1<br>73.2      | 73.2    | 5.3<br>5.3              | 5.3     |     | 16.8<br>15.8    | 16.3    |      | 4.3<br>4.8              | 4.6     |      |
| 12-Jul-13 | Sunny             | Moderate        | 15:34         | Surface   | 1   | 30.0<br>30.2     | 30.1    | 8.3<br>8.3 | 8.3     | 17.0<br>16.7 | 16.9    | 104.6<br>106.7    | 105.7   | 7.5<br>7.6              | 7.6     | 6.8 | 2.6<br>2.5      | 2.6     | 7.9  | 1.9<br>1.7              | 1.8     | 3.9  |
|           |                   |                 |               | Middle    | 5   | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 25.4<br>25.2 | 25.3    | 82.1<br>82.5      | 82.3    | 6.0<br>6.0              | 6.0     |     | 7.3<br>6.7      | 7.0     |      | 2.6<br>3.2              | 2.9     |      |
|           |                   |                 |               | Bottom    | 9   | 26.4<br>26.4     | 26.4    | 8.0<br>8.0 | 8.0     | 29.9<br>29.8 | 29.9    | 69.0<br>68.9      | 69.0    | 5.1<br>5.1              | 5.1     |     | 14.5<br>13.5    | 14.0    |      | 5.7<br>8.0              | 6.9     |      |
| 15-Jul-13 | Rainy             | Calm            | 16:27         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 16.9<br>16.9 | 16.9    | 91.3<br>90.2      | 90.8    | 6.4<br>6.3              | 6.4     | 6.0 | 1.5<br>1.5      | 1.5     | 7.8  | 2.0<br>1.6              | 1.8     | 2.1  |
|           |                   |                 |               | Middle    | 5   | 26.2<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 29.0<br>28.8 | 28.9    | 79.9<br>81.7      | 80.8    | 5.4<br>5.6              | 5.5     |     | 9.1<br>8.9      | 9.0     |      | 2.7<br>1.9              | 2.3     |      |
|           |                   |                 |               | Bottom    | 9   | 25.9<br>25.9     | 25.9    | 8.0<br>8.0 | 8.0     | 29.7<br>30.0 | 29.9    | 72.8<br>72.2      | 72.5    | 4.9<br>4.9              | 4.9     |     | 13.3<br>12.3    | 12.8    |      | 2.5<br>2.1              | 2.3     |      |
| 17-Jul-13 | Rainy             | Moderate        | 19:52         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.1<br>17.2 | 17.2    | 83.2<br>82.2      | 82.7    | 5.9<br>5.8              | 5.9     | 5.6 | 1.8<br>2.2      | 2.0     | 4.8  | 1.4<br>1.1              | 1.3     | 1.4  |
|           |                   |                 |               | Middle    | 5.5 | 27.5<br>25.7     | 26.6    | 8.2<br>8.2 | 8.2     | 24.0<br>24.8 | 24.4    | 76.0<br>75.5      | 75.8    | 5.3<br>5.2              | 5.3     |     | 2.7<br>2.8      | 2.8     |      | 1.8<br>1.2              | 1.5     |      |
|           |                   |                 |               | Bottom    | 10  | 25.7<br>25.7     | 25.7    | 8.2<br>8.2 | 8.2     | 30.8<br>30.8 | 30.8    | 72.0<br>71.2      | 71.6    | 5.0<br>4.9              | 5.0     |     | 9.6<br>9.6      | 9.6     |      | 1.1<br>1.4              | 1.3     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at IS1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 10:21         | Surface   | 1   | 28.1<br>28.0     | 28.1    | 8.2<br>8.2 | 8.2     | 21.0<br>21.1 | 21.1    | 83.4<br>83.2      | 83.3    | 5.8<br>5.8              | 5.8     | 5.7 | 2.1<br>1.8      | 2.0     | 5.0  | 2.5<br>2.5              | 2.5     | 2.0 |
|           |                   |                 |               | Middle    | 5   | 27.3<br>27.3     | 27.3    | 8.3<br>8.3 | 8.3     | 26.7<br>27.1 | 26.9    | 79.8<br>80.8      | 80.3    | 5.4<br>5.5              | 5.5     |     | 1.2<br>1.3      | 1.3     |      | 1.5<br>1.6              | 1.6     |     |
|           |                   |                 |               | Bottom    | 9   | 26.4<br>26.4     | 26.4    | 8.2<br>8.2 | 8.2     | 29.5<br>29.6 | 29.6    | 75.5<br>75.2      | 75.4    | 5.3<br>5.3              | 5.3     |     | 11.5<br>11.6    | 11.6    |      | 2.0<br>1.9              | 2.0     |     |
| 22-Jul-13 | Cloudy            | Calm            | 11:24         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.2 | 8.2     | 26.5<br>26.9 | 26.7    | 84.8<br>82.6      | 83.7    | 5.8<br>5.6              | 5.7     | 5.7 | 4.8<br>4.8      | 4.8     | 9.2  | 7.9<br>6.9              | 7.4     | 5.8 |
|           |                   |                 |               | Middle    | 5   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.7<br>28.8 | 28.8    | 83.0<br>83.2      | 83.1    | 5.6<br>5.6              | 5.6     |     | 7.2<br>7.1      | 7.2     |      | 5.0<br>6.4              | 5.7     |     |
|           |                   |                 |               | Bottom    | 9   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 29.0<br>29.0 | 29.0    | 82.4<br>81.1      | 81.8    | 5.5<br>5.5              | 5.5     |     | 16.0<br>15.2    | 15.6    |      | 4.4<br>4.3              | 4.4     |     |
| 24-Jul-13 | Rainy             | Moderate        | 14:32         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 27.6<br>27.6 | 27.6    | 89.7<br>89.7      | 89.7    | 6.0<br>6.0              | 6.0     | 5.9 | 4.9<br>5.2      | 5.1     | 14.0 | 6.3<br>7.1              | 6.7     | 8.8 |
|           |                   |                 |               | Middle    | 4   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.2<br>29.1 | 29.2    | 85.2<br>85.4      | 85.3    | 5.7<br>5.7              | 5.7     |     | 9.5<br>9.4      | 9.5     |      | 7.1<br>7.1              | 7.1     |     |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.9<br>29.9 | 29.9    | 85.7<br>85.7      | 85.7    | 5.7<br>5.7              | 5.7     | 5.7 | 26.4<br>28.3    | 27.4    |      | 12.9<br>12.2            | 12.6    |     |
| 26-Jul-13 | Rainy             | Rough           | 16:13         | Surface   | 1   | 27.7<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 24.6<br>24.6 | 24.6    | 90.9<br>91.0      | 91.0    | 6.2<br>6.2              | 6.2     | 6.2 | 6.6<br>6.1      | 6.4     | 11.8 | 7.7<br>6.6              | 7.2     | 6.2 |
|           |                   |                 |               | Middle    | 4   | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 25.9<br>25.8 | 25.9    | 88.5<br>89.1      | 88.8    | 6.0<br>6.1              | 6.1     |     | 12.3<br>10.8    | 11.6    |      | 6.5<br>6.1              | 6.3     |     |
|           |                   |                 |               | Bottom    | 7   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.4<br>26.4 | 26.4    | 87.5<br>87.0      | 87.3    | 6.0<br>5.9              | 6.0     | 6.0 | 19.4<br>15.6    | 17.5    |      | 4.9<br>5.5              | 5.2     |     |
| 29-Jul-13 | Sunny             | Calm            | 18:16         | Surface   | 1   | 30.4<br>30.1     | 30.3    | 8.0<br>8.0 | 8.0     | 14.2<br>15.3 | 14.8    | 99.0<br>99.3      | 99.2    | 7.5<br>7.6              | 7.6     | 6.7 | 2.6<br>2.6      | 2.6     | 10.5 | 3.0<br>2.6              | 2.8     | 3.4 |
|           |                   |                 |               | Middle    | 4   | 27.7<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.3<br>24.1 | 24.2    | 74.4<br>75.4      | 74.9    | 5.7<br>5.7              | 5.7     |     | 13.8<br>14.3    | 14.1    |      | 3.2<br>3.0              | 3.1     |     |
|           |                   |                 |               | Bottom    | 7   | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 26.6<br>26.6 | 26.6    | 69.0<br>68.6      | 68.8    | 5.3<br>5.2              | 5.3     | 5.3 | 14.3<br>15.1    | 14.7    |      | 5.6<br>2.9              | 4.3     |     |
| 31-Jul-13 | Sunny             | Calm            | 08:47         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 12.9<br>12.9 | 12.9    | 113.1<br>113.5    | 113.3   | 8.0<br>8.0              | 8.0     | 7.5 | 2.7<br>2.6      | 2.7     | 3.8  | 6.4<br>5.4              | 5.9     | 5.7 |
|           |                   |                 |               | Middle    | 4.5 | 29.0<br>29.0     | 29.0    | 7.9<br>7.9 | 7.9     | 16.3<br>16.3 | 16.3    | 98.7<br>97.9      | 98.3    | 6.9<br>6.8              | 6.9     |     | 2.3<br>2.2      | 2.3     |      | 5.8<br>6.0              | 5.9     |     |
|           |                   |                 |               | Bottom    | 8   | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 28.5<br>28.5 | 28.5    | 78.9<br>77.8      | 78.4    | 5.3<br>5.2              | 5.3     | 5.3 | 6.4<br>6.6      | 6.5     |      | 5.6<br>5.2              | 5.4     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 15:13         | Surface   | 1   | 29.5<br>29.5     | 29.5    | 8.4<br>8.4 | 8.4     | 14.5<br>14.5 | 14.5    | 107.1<br>106.8    | 107.0   | 7.5<br>7.5              | 7.5     | 6.5 | 4.3<br>4.3      | 4.3     | 8.6  | 4.8<br>6.5              | 5.7     | 5.6  |
|           |                   |                 |               | Middle    | 5   | 28.6<br>28.6     | 28.6    | 8.2<br>8.2 | 8.2     | 18.5<br>18.8 | 18.7    | 77.4<br>76.8      | 77.1    | 5.4<br>5.4              | 5.4     |     | 8.0<br>9.1      | 8.6     |      | 4.8<br>8.9              | 6.9     |      |
|           |                   |                 |               | Bottom    | 9   | 28.2<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 21.4<br>21.0 | 21.2    | 71.5<br>72.9      | 72.2    | 5.1<br>5.2              | 5.2     |     | 13.2<br>12.6    | 12.9    |      | 4.2<br>4.2              | 4.2     |      |
| 4-Jul-13  | Fine              | Calm            | 18:23         | Surface   | 1   | 30.9<br>31.0     | 31.0    | 8.0<br>8.0 | 8.0     | 6.0<br>6.0   | 6.0     | 119.0<br>118.7    | 118.9   | 8.6<br>8.5              | 8.6     | 8.6 | 5.5<br>5.4      | 5.5     | 6.1  | 4.3<br>4.5              | 4.4     | 5.4  |
|           |                   |                 |               | Middle    | 4.5 | 30.5<br>30.5     | 30.5    | 8.1<br>8.1 | 8.1     | 7.8<br>7.8   | 7.8     | 118.6<br>118.8    | 118.7   | 8.5<br>8.5              | 8.5     |     | 5.4<br>5.4      | 5.4     |      | 5.2<br>4.5              | 4.9     |      |
|           |                   |                 |               | Bottom    | 8   | 28.8<br>28.8     | 28.8    | 8.0<br>8.0 | 8.0     | 18.9<br>18.9 | 18.9    | 87.4<br>86.8      | 87.1    | 6.1<br>6.0              | 6.1     |     | 7.4<br>7.3      | 7.4     |      | 6.8<br>6.7              | 6.8     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 19:14         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 8.5<br>8.4 | 8.5     | 10.7<br>11.4 | 11.1    | 111.9<br>111.7    | 111.8   | 8.0<br>8.0              | 8.0     | 7.1 | 7.5<br>6.9      | 7.2     | 10.8 | 11.0<br>11.0            | 11.0    | 11.1 |
|           |                   |                 |               | Middle    | 5.5 | 29.1<br>28.9     | 29.0    | 8.3<br>8.2 | 8.3     | 16.0<br>18.5 | 17.3    | 87.6<br>87.5      | 87.6    | 6.1<br>6.1              | 6.1     |     | 11.8<br>12.1    | 12.0    |      | 12.7<br>11.7            | 12.2    |      |
|           |                   |                 |               | Bottom    | 10  | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 24.3<br>24.5 | 24.4    | 75.1<br>76.0      | 75.6    | 5.8<br>5.8              | 5.8     |     | 13.8<br>12.7    | 13.3    |      | 9.7<br>10.3             | 10.0    |      |
| 8-Jul-13  | Fine              | Moderate        | 20:11         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 12.1<br>12.2 | 12.2    | 93.2<br>92.2      | 92.7    | 6.7<br>6.6              | 6.7     | 6.2 | 6.7<br>6.7      | 6.7     | 13.6 | 4.3<br>2.3              | 3.3     | 12.1 |
|           |                   |                 |               | Middle    | 5   | 28.6<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 16.0<br>16.6 | 16.3    | 78.5<br>79.2      | 78.9    | 5.6<br>5.6              | 5.6     |     | 11.7<br>14.3    | 13.0    |      | 4.3<br>3.0              | 3.7     |      |
|           |                   |                 |               | Bottom    | 9   | 28.3<br>28.4     | 28.4    | 8.0<br>8.0 | 8.0     | 20.6<br>19.7 | 20.2    | 80.2<br>79.6      | 79.9    | 5.8<br>5.7              | 5.8     |     | 21.2<br>20.9    | 21.1    |      | 24.7<br>34.0            | 29.4    |      |
| 10-Jul-13 | Fine              | Moderate        | 07:18         | Surface   | 1   | 29.0<br>28.9     | 29.0    | 8.2<br>8.2 | 8.2     | 14.4<br>14.2 | 14.3    | 91.2<br>90.7      | 91.0    | 6.5<br>6.5              | 6.5     | 5.8 | 4.5<br>4.7      | 4.6     | 6.3  | 2.1<br>2.2              | 2.2     | 2.3  |
|           |                   |                 |               | Middle    | 5   | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 18.6<br>18.5 | 18.6    | 73.2<br>72.0      | 72.6    | 5.1<br>5.0              | 5.1     |     | 5.7<br>5.9      | 5.8     |      | 1.9<br>2.1              | 2.0     |      |
|           |                   |                 |               | Bottom    | 9   | 28.0<br>28.1     | 28.1    | 8.2<br>8.2 | 8.2     | 23.0<br>23.0 | 23.0    | 76.6<br>76.7      | 76.7    | 5.2<br>5.2              | 5.2     |     | 9.0<br>7.8      | 8.4     |      | 1.9<br>3.3              | 2.6     |      |
| 12-Jul-13 | Sunny             | Moderate        | 08:49         | Surface   | 1   | 28.7<br>28.6     | 28.7    | 8.1<br>8.1 | 8.1     | 20.6<br>20.9 | 20.8    | 73.0<br>71.8      | 72.4    | 5.3<br>5.2              | 5.3     | 5.3 | 3.6<br>4.0      | 3.8     | 8.6  | 2.0<br>4.0              | 3.0     | 4.1  |
|           |                   |                 |               | Middle    | 5   | 27.1<br>26.2     | 26.7    | 8.1<br>8.0 | 8.1     | 27.7<br>30.4 | 29.1    | 71.7<br>72.8      | 72.3    | 5.2<br>5.3              | 5.3     |     | 9.2<br>9.3      | 9.3     |      | 5.8<br>3.0              | 4.4     |      |
|           |                   |                 |               | Bottom    | 9   | 26.0<br>26.1     | 26.1    | 8.0<br>8.0 | 8.0     | 31.1<br>30.7 | 30.9    | 69.7<br>69.4      | 69.6    | 5.1<br>5.1              | 5.1     |     | 11.7<br>13.7    | 12.7    |      | 5.2<br>4.3              | 4.8     |      |
| 15-Jul-13 | Rainy             | Calm            | 10:29         | Surface   | 1   | 28.0<br>28.1     | 28.1    | 8.1<br>8.1 | 8.1     | 22.6<br>22.3 | 22.5    | 100.0<br>98.7     | 99.4    | 6.8<br>6.7              | 6.8     | 6.3 | 4.6<br>4.6      | 4.6     | 8.2  | 3.2<br>2.6              | 2.9     | 2.7  |
|           |                   |                 |               | Middle    | 5   | 27.1<br>27.0     | 27.1    | 8.0<br>8.0 | 8.0     | 26.3<br>26.4 | 26.4    | 84.2<br>83.0      | 83.6    | 5.7<br>5.6              | 5.7     |     | 7.1<br>7.3      | 7.2     |      | 1.7<br>2.5              | 2.1     |      |
|           |                   |                 |               | Bottom    | 9   | 26.2<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 29.4<br>29.0 | 29.2    | 74.2<br>72.8      | 73.5    | 5.0<br>4.9              | 5.0     |     | 11.6<br>13.7    | 12.7    |      | 3.1<br>2.8              | 3.0     |      |
| 17-Jul-13 | Rainy             | Moderate        | 13:21         | Surface   | 1   | 28.4<br>28.4     | 28.4    | 8.2<br>8.2 | 8.2     | 17.7<br>17.8 | 17.8    | 92.3<br>91.5      | 91.9    | 6.5<br>6.5              | 6.5     | 6.1 | 2.6<br>2.6      | 2.6     | 5.1  | 1.2<br>1.0              | 1.1     | 1.7  |
|           |                   |                 |               | Middle    | 5   | 27.5<br>27.4     | 27.5    | 8.2<br>8.2 | 8.2     | 23.6<br>23.8 | 23.7    | 81.2<br>81.6      | 81.4    | 5.6<br>5.7              | 5.7     |     | 4.2<br>4.2      | 4.2     |      | 1.5<br>1.4              | 1.5     |      |
|           |                   |                 |               | Bottom    | 9   | 26.1<br>26.1     | 26.1    | 8.1<br>8.1 | 8.1     | 29.3<br>29.2 | 29.3    | 72.5<br>71.4      | 72.0    | 5.0<br>4.9              | 5.0     |     | 8.6<br>8.6      | 8.6     |      | 2.1<br>2.8              | 2.5     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 17:13         | Surface   | 1   | 28.1<br>28.2     | 28.2    | 8.3<br>8.3 | 8.3     | 22.9<br>22.8 | 22.9    | 95.5<br>95.7      | 95.6    | 6.6<br>6.6              | 6.6     | 6.3 | 2.4<br>2.4      | 2.4     | 6.0  | 4.7<br>4.2              | 4.5     | 4.5 |
|           |                   |                 |               | Middle    | 5   | 28.0<br>28.0     | 28.0    | 8.3<br>8.3 | 8.3     | 23.9<br>23.7 | 23.8    | 85.7<br>83.8      | 84.8    | 5.9<br>5.8              | 5.9     |     | 3.3<br>2.9      | 3.1     |      | 4.2<br>4.2              | 4.2     |     |
|           |                   |                 |               | Bottom    | 9   | 26.8<br>26.8     | 26.8    | 8.2<br>8.2 | 8.2     | 27.3<br>27.2 | 27.3    | 74.3<br>74.1      | 74.2    | 5.1<br>5.1              | 5.1     |     | 11.9<br>12.8    | 12.4    |      | 5.3<br>4.5              | 4.9     |     |
| 22-Jul-13 | Rainy             | Moderate        | 18:37         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 7.9<br>8.0 | 8.0     | 21.4<br>21.3 | 21.4    | 76.3<br>75.9      | 76.1    | 5.3<br>5.3              | 5.3     | 5.4 | 6.3<br>6.5      | 6.4     | 9.6  | 9.5<br>9.4              | 9.5     | 9.1 |
|           |                   |                 |               | Middle    | 5   | 28.2<br>28.1     | 28.2    | 7.9<br>8.0 | 8.0     | 21.7<br>21.9 | 21.8    | 77.4<br>76.6      | 77.0    | 5.4<br>5.3              | 5.4     |     | 9.6<br>9.2      | 9.4     |      | 8.7<br>9.0              | 8.9     |     |
|           |                   |                 |               | Bottom    | 9   | 27.6<br>27.6     | 27.6    | 8.0<br>8.0 | 8.0     | 24.9<br>25.0 | 25.0    | 72.7<br>72.5      | 72.6    | 5.0<br>5.0              | 5.0     |     | 13.0<br>13.1    | 13.1    |      | 9.7<br>8.0              | 8.9     |     |
| 24-Jul-13 | Rainy             | Moderate        | 08:06         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 25.8<br>25.8 | 25.8    | 87.8<br>87.7      | 87.8    | 6.0<br>6.0              | 6.0     | 5.9 | 3.9<br>3.8      | 3.9     | 13.5 | 10.8<br>9.0             | 9.9     | 8.4 |
|           |                   |                 |               | Middle    | 4.5 | 28.1<br>28.1     | 28.1    | 8.3<br>8.3 | 8.3     | 27.8<br>27.8 | 27.8    | 85.2<br>85.6      | 85.4    | 5.7<br>5.7              | 5.7     |     | 14.8<br>15.0    | 14.9    |      | 7.5<br>9.0              | 8.3     |     |
|           |                   |                 |               | Bottom    | 8   | 28.1<br>28.1     | 28.1    | 8.3<br>8.3 | 8.3     | 27.9<br>27.9 | 27.9    | 84.4<br>84.2      | 84.3    | 5.7<br>5.6              | 5.7     |     | 23.0<br>20.3    | 21.7    |      | 4.4<br>9.7              | 7.1     |     |
| 26-Jul-13 | Rainy             | Rough           | 09:46         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 23.2<br>23.2 | 23.2    | 90.9<br>91.4      | 91.2    | 6.3<br>6.4              | 6.4     | 6.3 | 9.0<br>7.8      | 8.4     | 8.8  | 5.8<br>5.5              | 5.7     | 5.5 |
|           |                   |                 |               | Middle    | 4.5 | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 25.5<br>25.0 | 25.3    | 90.2<br>90.3      | 90.3    | 6.2<br>6.2              | 6.2     |     | 7.2<br>7.3      | 7.3     |      | 4.8<br>6.1              | 5.5     |     |
|           |                   |                 |               | Bottom    | 8   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.6<br>26.5 | 26.6    | 89.7<br>89.2      | 89.5    | 6.1<br>6.1              | 6.1     |     | 10.1<br>11.3    | 10.7    |      | 5.2<br>5.6              | 5.4     |     |
| 29-Jul-13 | Sunny             | Calm            | 12:31         | Surface   | 1   | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 18.8<br>19.8 | 19.3    | 84.9<br>84.0      | 84.5    | 6.5<br>6.4              | 6.5     | 6.3 | 4.5<br>4.6      | 4.6     | 5.2  | 3.5<br>3.0              | 3.3     | 3.2 |
|           |                   |                 |               | Middle    | 4.5 | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 20.8<br>20.9 | 20.9    | 79.0<br>79.5      | 79.3    | 6.0<br>6.1              | 6.1     |     | 5.4<br>5.1      | 5.3     |      | 3.7<br>3.3              | 3.5     |     |
|           |                   |                 |               | Bottom    | 8   | 28.0<br>28.0     | 28.0    | 8.2<br>8.1 | 8.2     | 21.1<br>21.1 | 21.1    | 78.7<br>78.6      | 78.7    | 6.0<br>6.0              | 6.0     |     | 5.9<br>5.2      | 5.6     |      | 3.2<br>2.6              | 2.9     |     |
| 31-Jul-13 | Sunny             | Calm            | 15:13         | Surface   | 1   | 30.4<br>30.5     | 30.5    | 8.3<br>8.3 | 8.3     | 10.9<br>10.8 | 10.9    | 99.9<br>98.8      | 99.4    | 7.0<br>6.9              | 7.0     | 6.6 | 3.7<br>3.6      | 3.7     | 6.0  | 2.3<br>1.7              | 2.0     | 2.2 |
|           |                   |                 |               | Middle    | 4.5 | 28.9<br>28.9     | 28.9    | 8.0<br>8.0 | 8.0     | 17.7<br>17.7 | 17.7    | 91.0<br>90.4      | 90.7    | 6.2<br>6.2              | 6.2     |     | 4.8<br>4.8      | 4.8     |      | 2.9<br>2.7              | 2.8     |     |
|           |                   |                 |               | Bottom    | 8   | 27.2<br>27.2     | 27.2    | 8.0<br>8.0 | 8.0     | 27.8<br>27.9 | 27.9    | 72.8<br>72.1      | 72.5    | 4.9<br>4.9              | 4.9     |     | 9.5<br>9.7      | 9.6     |      | 1.8<br>1.8              | 1.8     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 09:53         | Surface   | 1   | 28.8<br>28.8     | 28.8    | 8.3<br>8.3 | 8.3     | 18.8<br>18.5 | 18.7    | 108.1<br>106.3    | 107.2   | 7.5<br>7.4              | 7.5     | 6.6 | 3.6<br>3.4      | 3.5     | 8.7  | 5.3<br>4.5              | 4.9     | 5.4 |
|           |                   |                 |               | Middle    | 3.5 | 28.2<br>28.4     | 28.3    | 8.2<br>8.2 | 8.2     | 22.9<br>20.6 | 21.8    | 81.7<br>81.7      | 81.7    | 5.6<br>5.6              | 5.6     |     | 10.0<br>8.8     | 9.4     |      | 6.3<br>6.0              | 6.2     |     |
|           |                   |                 |               | Bottom    | 6   | 28.2<br>28.1     | 28.2    | 8.2<br>8.2 | 8.2     | 23.3<br>23.1 | 23.2    | 72.5<br>72.3      | 72.4    | 5.0<br>5.0              | 5.0     |     | 14.4<br>12.1    | 13.3    |      | 5.8<br>4.5              | 5.2     |     |
| 4-Jul-13  | Sunny             | Calm            | 11:32         | Surface   | 1   | 30.2<br>30.2     | 30.2    | 8.1<br>8.1 | 8.1     | 8.7<br>8.7   | 8.7     | 120.2<br>120.3    | 120.3   | 8.6<br>8.6              | 8.6     | 8.6 | 4.6<br>4.5      | 4.6     | 6.3  | 2.2<br>2.0              | 2.1     | 2.4 |
|           |                   |                 |               | Middle    | 3.5 | 30.1<br>30.1     | 30.1    | 8.1<br>8.1 | 8.1     | 8.7<br>8.7   | 8.7     | 119.0<br>119.4    | 119.2   | 8.6<br>8.6              | 8.6     |     | 4.7<br>4.5      | 4.6     |      | 2.8<br>2.2              | 2.5     |     |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.0     | 28.0    | 8.0<br>8.1 | 8.1     | 26.0<br>26.5 | 26.3    | 82.9<br>76.4      | 79.7    | 5.6<br>5.2              | 5.4     |     | 8.8<br>10.7     | 9.8     |      | 2.2<br>3.2              | 2.7     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 12:43         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 8.5<br>8.6 | 8.6     | 13.0<br>12.6 | 12.8    | 107.6<br>105.2    | 106.4   | 7.3<br>7.2              | 7.3     | 7.0 | 4.7<br>4.8      | 4.8     | 9.5  | 5.3<br>6.7              | 6.0     | 5.7 |
|           |                   |                 |               | Middle    | 3.5 | 28.4<br>28.2     | 28.3    | 8.2<br>8.2 | 8.2     | 25.2<br>26.5 | 25.9    | 85.0<br>84.3      | 84.7    | 6.7<br>6.7              | 6.7     |     | 10.3<br>10.8    | 10.6    |      | 4.7<br>5.3              | 5.0     |     |
|           |                   |                 |               | Bottom    | 6   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 28.9<br>29.0 | 29.0    | 76.8<br>76.3      | 76.6    | 6.1<br>6.1              | 6.1     |     | 12.7<br>13.7    | 13.2    |      | 5.7<br>6.3              | 6.0     |     |
| 8-Jul-13  | Sunny             | Moderate        | 13:57         | Surface   | 1   | 29.5<br>29.6     | 29.6    | 8.3<br>8.4 | 8.4     | 13.1<br>13.1 | 13.1    | 116.4<br>115.4    | 115.9   | 8.3<br>8.2              | 8.3     | 8.0 | 5.1<br>5.1      | 5.1     | 10.5 | 5.3<br>4.7              | 5.0     | 4.0 |
|           |                   |                 |               | Middle    | 4   | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 18.1<br>17.7 | 17.9    | 105.1<br>105.6    | 105.4   | 7.7<br>7.7              | 7.7     |     | 4.9<br>5.2      | 5.1     |      | 3.0<br>4.3              | 3.7     |     |
|           |                   |                 |               | Bottom    | 7   | 27.5<br>27.5     | 27.5    | 8.0<br>8.0 | 8.0     | 29.1<br>28.5 | 28.8    | 76.5<br>75.0      | 75.8    | 5.5<br>5.4              | 5.5     |     | 20.4<br>22.3    | 21.4    |      | 3.7<br>3.0              | 3.4     |     |
| 10-Jul-13 | Fine              | Moderate        | 14:57         | Surface   | 1   | 29.1<br>29.0     | 29.1    | 8.2<br>8.2 | 8.2     | 20.9<br>21.9 | 21.4    | 94.0<br>94.0      | 94.0    | 6.8<br>6.7              | 6.8     | 6.3 | 6.9<br>7.6      | 7.3     | 8.8  | 3.5<br>4.2              | 3.9     | 3.9 |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 24.2<br>24.4 | 24.3    | 77.7<br>79.1      | 78.4    | 5.6<br>5.7              | 5.7     |     | 7.8<br>8.2      | 8.0     |      | 4.8<br>3.2              | 4.0     |     |
|           |                   |                 |               | Bottom    | 6   | 27.2<br>27.2     | 27.2    | 8.2<br>8.2 | 8.2     | 28.1<br>27.2 | 27.7    | 76.0<br>75.7      | 75.9    | 5.4<br>5.4              | 5.4     |     | 11.9<br>10.4    | 11.2    |      | 3.7<br>4.0              | 3.9     |     |
| 12-Jul-13 | Sunny             | Moderate        | 15:55         | Surface   | 1   | 29.2<br>29.4     | 29.3    | 8.2<br>8.2 | 8.2     | 21.1<br>20.7 | 20.9    | 89.1<br>88.4      | 88.8    | 6.4<br>6.3              | 6.4     | 6.4 | 5.9<br>5.7      | 5.8     | 7.8  | 2.5<br>3.0              | 2.8     | 6.0 |
|           |                   |                 |               | Middle    | 3.5 | 27.7<br>27.9     | 27.8    | 8.1<br>8.1 | 8.1     | 25.6<br>25.2 | 25.4    | 87.2<br>90.0      | 88.6    | 6.3<br>6.5              | 6.4     |     | 6.2<br>6.2      | 6.2     |      | 8.3<br>7.5              | 7.9     |     |
|           |                   |                 |               | Bottom    | 6   | 26.6<br>26.9     | 26.8    | 8.0<br>8.1 | 8.1     | 29.3<br>28.4 | 28.9    | 73.7<br>71.6      | 72.7    | 5.4<br>5.2              | 5.3     |     | 12.0<br>10.7    | 11.4    |      | 7.3<br>7.2              | 7.3     |     |
| 15-Jul-13 | Rainy             | Calm            | 16:04         | Surface   | 1   | 29.0<br>29.1     | 29.1    | 8.2<br>8.2 | 8.2     | 16.9<br>16.9 | 16.9    | 90.3<br>90.0      | 90.2    | 6.3<br>6.3              | 6.3     | 5.9 | 1.6<br>1.4      | 1.5     | 5.4  | 2.1<br>2.0              | 2.1     | 2.0 |
|           |                   |                 |               | Middle    | 3.5 | 28.7<br>27.6     | 28.2    | 8.1<br>8.0 | 8.1     | 19.8<br>19.2 | 19.5    | 79.5<br>79.5      | 79.5    | 5.5<br>5.4              | 5.5     |     | 2.2<br>2.2      | 2.2     |      | 2.2<br>1.8              | 2.0     |     |
|           |                   |                 |               | Bottom    | 6   | 25.9<br>25.8     | 25.9    | 8.0<br>8.0 | 8.0     | 29.8<br>30.2 | 30.0    | 73.9<br>71.4      | 72.7    | 5.0<br>4.9              | 5.0     |     | 12.7<br>12.5    | 12.6    |      | 1.9<br>1.8              | 1.9     |     |
| 17-Jul-13 | Rainy             | Moderate        | 20:18         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.1<br>17.1 | 17.1    | 80.1<br>79.6      | 79.9    | 5.7<br>5.6              | 5.7     | 5.6 | 2.6<br>2.6      | 2.6     | 5.1  | 0.8<br>1.0              | 0.9     | 1.4 |
|           |                   |                 |               | Middle    | 3.5 | 27.4<br>26.7     | 27.1    | 8.2<br>8.2 | 8.2     | 26.6<br>24.7 | 25.7    | 75.1<br>74.0      | 74.6    | 5.4<br>5.4              | 5.4     |     | 3.1<br>3.6      | 3.4     |      | 2.5<br>1.5              | 2.0     |     |
|           |                   |                 |               | Bottom    | 6   | 25.6<br>25.6     | 25.6    | 8.2<br>8.2 | 8.2     | 30.9<br>30.9 | 30.9    | 75.6<br>74.7      | 75.2    | 5.2<br>5.1              | 5.2     |     | 9.5<br>9.2      | 9.4     |      | 1.4<br>1.1              | 1.3     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 10:44         | Surface   | 1   | 27.0<br>27.0     | 27.0    | 8.2<br>8.2 | 8.2     | 26.6<br>26.8 | 26.7    | 92.1<br>87.2      | 89.7    | 6.5<br>6.1              | 6.3     | 6.0 | 3.4<br>3.2      | 3.3     | 6.4  | 5.6<br>2.2              | 3.9     | 2.6 |
|           |                   |                 |               | Middle    | 3.5 | 26.6<br>26.6     | 26.6    | 8.2<br>8.2 | 8.2     | 28.5<br>28.7 | 28.6    | 80.0<br>79.6      | 79.8    | 5.6<br>5.6              | 5.6     |     | 6.4<br>5.2      | 5.8     |      | 2.3<br>1.5              | 1.9     |     |
|           |                   |                 |               | Bottom    | 6   | 26.4<br>26.4     | 26.4    | 8.2<br>8.2 | 8.2     | 29.3<br>29.3 | 29.3    | 77.8<br>77.4      | 77.6    | 5.5<br>5.4              | 5.5     |     | 10.2<br>9.8     | 10.0    |      | 1.8<br>2.0              | 1.9     |     |
| 22-Jul-13 | Cloudy            | Calm            | 11:03         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 26.4<br>26.5 | 26.5    | 93.7<br>86.4      | 90.1    | 6.4<br>5.9              | 6.2     | 6.0 | 3.4<br>3.6      | 3.5     | 5.9  | 5.7<br>4.5              | 5.1     | 4.6 |
|           |                   |                 |               | Middle    | 3.5 | 27.4<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 28.6<br>28.4 | 28.5    | 85.2<br>87.8      | 86.5    | 5.7<br>5.9              | 5.8     |     | 5.7<br>5.2      | 5.5     |      | 4.4<br>4.1              | 4.3     |     |
|           |                   |                 |               | Bottom    | 6   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.9<br>28.9 | 28.9    | 84.8<br>84.0      | 84.4    | 5.7<br>5.7              | 5.7     |     | 9.0<br>8.6      | 8.8     |      | 4.4<br>4.3              | 4.4     |     |
| 24-Jul-13 | Rainy             | Moderate        | 14:55         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 28.6<br>28.6 | 28.6    | 85.9<br>85.7      | 85.8    | 5.7<br>5.7              | 5.7     | 5.7 | 8.4<br>8.6      | 8.5     | 17.5 | 2.1<br>6.7              | 4.4     | 6.2 |
|           |                   |                 |               | Middle    | 3   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.0<br>29.1 | 29.1    | 85.4<br>85.4      | 85.4    | 5.7<br>5.7              | 5.7     |     | 12.2<br>11.7    | 12.0    |      | 5.6<br>7.6              | 6.6     |     |
|           |                   |                 |               | Bottom    | 5   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.6<br>29.6 | 29.6    | 85.4<br>85.5      | 85.5    | 5.7<br>5.7              | 5.7     |     | 31.9<br>31.9    | 31.9    |      | 7.3<br>7.9              | 7.6     |     |
| 26-Jul-13 | Rainy             | Rough           | 16:36         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 24.6<br>24.5 | 24.6    | 90.5<br>90.5      | 90.5    | 6.2<br>6.2              | 6.2     | 6.2 | 6.5<br>6.4      | 6.5     | 8.7  | 4.4<br>4.0              | 4.2     | 4.6 |
|           |                   |                 |               | Middle    | 3   | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 25.4<br>25.4 | 25.4    | 89.1<br>89.1      | 89.1    | 6.1<br>6.1              | 6.1     |     | 8.6<br>8.7      | 8.7     |      | 2.9<br>6.2              | 4.6     |     |
|           |                   |                 |               | Bottom    | 5   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.3<br>26.3 | 26.3    | 87.1<br>86.6      | 86.9    | 5.9<br>5.9              | 5.9     |     | 10.0<br>11.5    | 10.8    |      | 4.4<br>5.4              | 4.9     |     |
| 29-Jul-13 | Sunny             | Calm            | 18:36         | Surface   | 1   | 30.5<br>30.2     | 30.4    | 8.1<br>8.1 | 8.1     | 14.1<br>14.7 | 14.4    | 99.3<br>99.9      | 99.6    | 7.6<br>7.6              | 7.6     | 6.7 | 2.8<br>2.7      | 2.8     | 10.9 | 2.9<br>2.5              | 2.7     | 3.4 |
|           |                   |                 |               | Middle    | 3   | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 24.3<br>24.3 | 24.3    | 75.6<br>76.4      | 76.0    | 5.8<br>5.8              | 5.8     |     | 13.9<br>13.3    | 13.6    |      | 4.1<br>3.3              | 3.7     |     |
|           |                   |                 |               | Bottom    | 5   | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 26.6<br>26.6 | 26.6    | 68.9<br>68.5      | 68.7    | 5.2<br>5.2              | 5.2     |     | 17.2<br>15.3    | 16.3    |      | 3.1<br>4.2              | 3.7     |     |
| 31-Jul-13 | Sunny             | Calm            | 09:13         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 12.8<br>12.8 | 12.8    | 113.1<br>113.4    | 113.3   | 8.0<br>8.0              | 8.0     | 7.2 | 2.6<br>2.7      | 2.7     | 3.3  | 5.0<br>5.4              | 5.2     | 5.4 |
|           |                   |                 |               | Middle    | 3.5 | 28.6<br>28.6     | 28.6    | 7.9<br>7.9 | 7.9     | 18.6<br>18.6 | 18.6    | 90.8<br>90.3      | 90.6    | 6.3<br>6.3              | 6.3     |     | 2.1<br>2.1      | 2.1     |      | 5.0<br>5.6              | 5.3     |     |
|           |                   |                 |               | Bottom    | 6   | 27.2<br>27.1     | 27.2    | 8.0<br>8.0 | 8.0     | 28.1<br>28.2 | 28.2    | 80.3<br>80.1      | 80.2    | 5.4<br>5.4              | 5.4     |     | 4.9<br>5.5      | 5.2     |      | 6.2<br>5.2              | 5.7     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

## Water Quality Monitoring Results at IS2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 15:40         | Surface   | 1   | 29.2<br>29.4     | 29.3    | 8.4<br>8.4 | 8.4     | 16.1<br>14.7 | 15.4    | 120.2<br>119.8    | 120.0   | 8.4<br>8.4              | 8.4     | 8.2 | 4.3<br>4.3      | 4.3     | 9.0  | 5.5<br>5.8              | 5.7     | 6.7  |
|           |                   |                 |               | Middle    | 3.5 | 29.0<br>29.0     | 29.0    | 8.3<br>8.3 | 8.3     | 17.2<br>16.9 | 17.1    | 113.8<br>111.1    | 112.5   | 8.0<br>7.8              | 7.9     |     | 13.7<br>13.1    | 13.4    |      | 11.5<br>6.0             | 8.8     |      |
|           |                   |                 |               | Bottom    | 6   | 28.8<br>28.7     | 28.8    | 8.3<br>8.3 | 8.3     | 18.6<br>18.9 | 18.8    | 102.2<br>99.1     | 100.7   | 7.1<br>6.9              | 7.0     |     | 9.8<br>9.0      | 9.4     |      | 5.2<br>5.8              | 5.5     |      |
| 4-Jul-13  | Fine              | Calm            | 18:40         | Surface   | 1   | 30.9<br>31.0     | 31.0    | 8.1<br>8.1 | 8.1     | 6.1<br>6.1   | 6.1     | 115.1<br>115.4    | 115.3   | 8.3<br>8.3              | 8.3     | 8.2 | 5.5<br>5.5      | 5.5     | 7.5  | 5.5<br>6.0              | 5.5     | 5.5  |
|           |                   |                 |               | Middle    | 3.5 | 30.3<br>30.3     | 30.3    | 8.1<br>8.1 | 8.1     | 9.3<br>9.0   | 9.2     | 113.6<br>113.1    | 113.4   | 8.1<br>8.1              | 8.1     |     | 6.5<br>6.5      | 6.5     |      | 6.5<br>6.5              | 6.3     |      |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.4     | 28.4    | 8.0<br>8.0 | 8.0     | 22.2<br>22.1 | 22.2    | 80.2<br>74.7      | 77.5    | 5.5<br>5.1              | 5.3     |     | 11.1<br>9.7     | 10.4    |      | 4.0<br>5.3              | 4.7     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 19:42         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.6<br>8.6 | 8.6     | 15.4<br>15.5 | 15.5    | 125.4<br>126.3    | 125.9   | 8.5<br>8.6              | 8.6     | 8.5 | 7.4<br>8.6      | 8.0     | 10.9 | 13.7<br>12.7            | 13.2    | 12.9 |
|           |                   |                 |               | Middle    | 3.5 | 29.3<br>29.2     | 29.3    | 8.5<br>8.5 | 8.5     | 17.0<br>17.2 | 17.1    | 119.3<br>121.0    | 120.2   | 8.3<br>8.4              | 8.4     |     | 10.0<br>11.3    | 10.7    |      | 14.3<br>13.7            | 14.0    |      |
|           |                   |                 |               | Bottom    | 6   | 28.9<br>29.0     | 29.0    | 8.3<br>8.3 | 8.3     | 19.9<br>19.6 | 19.8    | 88.3<br>90.5      | 89.4    | 6.1<br>6.2              | 6.2     |     | 13.8<br>14.4    | 14.1    |      | 11.7<br>11.0            | 11.4    |      |
| 8-Jul-13  | Fine              | Moderate        | 20:42         | Surface   | 1   | 29.2<br>29.1     | 29.2    | 8.1<br>8.2 | 8.2     | 16.2<br>17.0 | 16.6    | 93.3<br>93.8      | 93.6    | 6.5<br>6.6              | 6.6     | 6.4 | 12.2<br>12.9    | 12.6    | 17.3 | 23.7<br>22.3            | 23.0    | 17.5 |
|           |                   |                 |               | Middle    | 3.5 | 29.1<br>29.0     | 29.1    | 8.1<br>8.2 | 8.2     | 17.6<br>18.5 | 18.1    | 90.3<br>88.4      | 89.4    | 6.3<br>6.1              | 6.2     |     | 15.7<br>17.9    | 16.8    |      | 6.3<br>14.7             | 10.5    |      |
|           |                   |                 |               | Bottom    | 6   | 27.9<br>28.3     | 28.1    | 8.0<br>8.1 | 8.1     | 26.1<br>23.3 | 24.7    | 74.1<br>71.5      | 72.8    | 5.2<br>5.1              | 5.2     |     | 22.8<br>22.1    | 22.5    |      | 19.7<br>18.3            | 19.0    |      |
| 10-Jul-13 | Fine              | Moderate        | 07:43         | Surface   | 1   | 28.7<br>28.8     | 28.8    | 8.2<br>8.2 | 8.2     | 15.5<br>16.0 | 15.8    | 92.3<br>90.5      | 91.4    | 6.6<br>6.4              | 6.5     | 6.1 | 4.6<br>4.7      | 4.7     | 5.9  | 2.8<br>2.4              | 2.6     | 2.4  |
|           |                   |                 |               | Middle    | 3.5 | 28.8<br>28.8     | 28.8    | 8.2<br>8.2 | 8.2     | 17.8<br>18.0 | 17.9    | 80.7<br>78.8      | 79.8    | 5.6<br>5.5              | 5.6     |     | 5.3<br>5.7      | 5.5     |      | 3.0<br>1.4              | 2.2     |      |
|           |                   |                 |               | Bottom    | 6   | 28.5<br>28.6     | 28.6    | 8.2<br>8.2 | 8.2     | 20.0<br>19.8 | 19.9    | 74.4<br>74.8      | 74.6    | 5.2<br>5.2              | 5.2     |     | 7.5<br>7.2      | 7.4     |      | 2.9<br>2.0              | 2.5     |      |
| 12-Jul-13 | Sunny             | Moderate        | 09:23         | Surface   | 1   | 29.1<br>29.1     | 29.1    | 8.2<br>8.2 | 8.2     | 16.3<br>16.1 | 16.2    | 91.1<br>88.3      | 89.7    | 6.7<br>6.5              | 6.6     | 6.5 | 4.1<br>4.6      | 4.4     | 9.5  | 3.5<br>5.9              | 4.7     | 6.0  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>27.7     | 27.9    | 8.1<br>8.1 | 8.1     | 23.8<br>25.3 | 24.6    | 86.9<br>85.5      | 86.2    | 6.3<br>6.2              | 6.3     |     | 5.9<br>6.8      | 6.4     |      | 5.2<br>8.2              | 6.7     |      |
|           |                   |                 |               | Bottom    | 6   | 26.8<br>26.8     | 26.8    | 8.0<br>8.0 | 8.0     | 28.9<br>29.0 | 29.0    | 68.1<br>68.2      | 68.2    | 5.0<br>5.0              | 5.0     |     | 16.7<br>18.9    | 17.8    |      | 8.2<br>5.2              | 6.7     |      |
| 15-Jul-13 | Rainy             | Calm            | 10:02         | Surface   | 1   | 28.1<br>28.0     | 28.1    | 8.0<br>8.1 | 8.1     | 22.4<br>22.6 | 22.5    | 99.4<br>100.8     | 100.1   | 6.7<br>6.8              | 6.8     | 6.3 | 4.7<br>4.2      | 4.5     | 6.5  | 3.3<br>2.9              | 3.1     | 3.5  |
|           |                   |                 |               | Middle    | 3.5 | 27.3<br>27.3     | 27.3    | 8.0<br>8.0 | 8.0     | 25.2<br>25.3 | 25.3    | 87.9<br>85.0      | 86.5    | 5.9<br>5.7              | 5.8     |     | 6.3<br>6.4      | 6.4     |      | 2.8<br>3.1              | 3.0     |      |
|           |                   |                 |               | Bottom    | 6   | 26.2<br>26.2     | 26.2    | 8.0<br>8.0 | 8.0     | 29.2<br>29.0 | 29.1    | 74.8<br>74.4      | 74.6    | 5.0<br>5.0              | 5.0     |     | 9.0<br>8.2      | 8.6     |      | 5.2<br>3.5              | 4.4     |      |
| 17-Jul-13 | Rainy             | Moderate        | 12:49         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.3<br>17.3 | 17.3    | 91.8<br>90.9      | 91.4    | 6.5<br>6.4              | 6.5     | 6.4 | 1.6<br>1.7      | 1.7     | 3.2  | 0.7<br>1.1              | 0.9     | 0.9  |
|           |                   |                 |               | Middle    | 3.5 | 28.2<br>28.2     | 28.2    | 8.2<br>8.2 | 8.2     | 19.8<br>19.8 | 19.8    | 89.6<br>89.9      | 89.8    | 6.3<br>6.3              | 6.3     |     | 1.2<br>1.1      | 1.2     |      | 1.1<br>0.9              | 1.0     |      |
|           |                   |                 |               | Bottom    | 6   | 27.8<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 21.8<br>21.2 | 21.5    | 86.1<br>85.9      | 86.0    | 6.0<br>6.0              | 6.0     |     | 6.6<br>6.9      | 6.8     |      | 0.8<br>1.0              | 0.9     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 17:43         | Surface   | 1   | 28.0<br>28.0     | 28.0    | 8.3<br>8.3 | 8.3     | 24.1<br>24.2 | 24.2    | 90.1<br>90.4      | 90.3    | 6.2<br>6.2              | 6.2     | 6.2 | 4.0<br>5.0      | 4.5     | 8.1  | 3.0<br>3.5              | 3.3     | 3.2 |
|           |                   |                 |               | Middle    | 3.5 | 27.8<br>28.0     | 27.9    | 8.2<br>8.3 | 8.3     | 24.5<br>24.2 | 24.4    | 89.5<br>89.5      | 89.5    | 6.1<br>6.1              | 6.1     |     | 13.1<br>12.3    |         |      | 2.7<br>2.5              | 2.6     |     |
|           |                   |                 |               | Bottom    | 6   | 27.6<br>27.5     | 27.6    | 8.2<br>8.2 | 8.2     | 25.4<br>25.4 | 25.4    | 78.7<br>76.5      | 77.6    | 5.4<br>5.2              | 5.3     |     | 6.6<br>7.6      |         |      | 5.0<br>2.4              | 3.7     |     |
| 22-Jul-13 | Rainy             | Moderate        | 18:17         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 7.7<br>7.9 | 7.8     | 21.2<br>21.3 | 21.3    | 78.1<br>78.7      | 78.4    | 5.4<br>5.5              | 5.5     | 5.6 | 9.6<br>9.4      | 9.5     | 11.7 | 9.7<br>8.2              | 9.0     | 9.2 |
|           |                   |                 |               | Middle    | 3.5 | 28.2<br>28.2     | 28.2    | 7.9<br>7.9 | 7.9     | 21.5<br>21.6 | 21.6    | 80.7<br>78.7      | 79.7    | 5.6<br>5.5              | 5.6     |     | 10.6<br>10.2    |         |      | 9.7<br>8.8              | 9.3     |     |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>27.9     | 28.0    | 7.9<br>8.0 | 8.0     | 22.7<br>23.3 | 23.0    | 79.7<br>75.9      | 77.8    | 5.5<br>5.2              | 5.4     |     | 15.7<br>14.9    |         |      | 8.8<br>9.9              | 9.4     |     |
| 24-Jul-13 | Rainy             | Moderate        | 08:24         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 25.8<br>25.8 | 25.8    | 86.1<br>86.1      | 86.1    | 5.9<br>5.9              | 5.9     | 5.8 | 3.9<br>3.8      | 3.9     | 9.9  | 2.9<br>9.8              | 6.4     | 7.6 |
|           |                   |                 |               | Middle    | 3.5 | 28.1<br>28.1     | 28.1    | 8.3<br>8.3 | 8.3     | 27.8<br>27.8 | 27.8    | 83.9<br>84.1      | 84.0    | 5.6<br>5.6              | 5.6     |     | 7.7<br>7.7      |         |      | 3.1<br>9.6              | 6.4     |     |
|           |                   |                 |               | Bottom    | 6   | 28.1<br>28.1     | 28.1    | 8.3<br>8.3 | 8.3     | 28.0<br>28.0 | 28.0    | 83.3<br>83.1      | 83.2    | 5.6<br>5.6              | 5.6     |     | 18.1<br>18.0    |         |      | 9.7<br>10.2             | 10.0    |     |
| 26-Jul-13 | Rainy             | Rough           | 10:05         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 23.2<br>23.2 | 23.2    | 91.2<br>91.7      | 91.5    | 6.3<br>6.4              | 6.4     | 6.4 | 7.1<br>6.4      | 6.8     | 7.4  | 5.3<br>4.7              | 5.0     | 5.3 |
|           |                   |                 |               | Middle    | 3.5 | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 23.7<br>23.8 | 23.8    | 90.4<br>90.7      | 90.6    | 6.3<br>6.3              | 6.3     |     | 5.6<br>5.6      |         |      | 4.8<br>5.5              | 5.2     |     |
|           |                   |                 |               | Bottom    | 6   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.4<br>26.4 | 26.4    | 90.1<br>89.6      | 89.9    | 6.1<br>6.1              | 6.1     |     | 9.8<br>9.8      |         |      | 5.4<br>5.7              | 5.6     |     |
| 29-Jul-13 | Sunny             | Calm            | 12:48         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 18.8<br>18.6 | 18.7    | 84.6<br>84.4      | 84.5    | 6.4<br>6.4              | 6.4     | 6.2 | 4.0<br>4.0      | 4.0     | 4.8  | 3.7<br>3.5              | 3.6     | 3.8 |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 20.8<br>20.8 | 20.8    | 77.4<br>77.5      | 77.5    | 5.9<br>5.9              | 5.9     |     | 4.9<br>4.8      |         |      | 4.7<br>4.2              | 4.5     |     |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 20.8<br>20.8 | 20.8    | 77.9<br>77.9      | 77.9    | 5.9<br>5.9              | 5.9     |     | 5.5<br>5.2      |         |      | 3.2<br>3.3              | 3.3     |     |
| 31-Jul-13 | Sunny             | Calm            | 15:37         | Surface   | 1   | 30.4<br>30.4     | 30.4    | 8.3<br>8.3 | 8.3     | 10.7<br>10.7 | 10.7    | 97.3<br>97.5      | 97.4    | 6.7<br>6.7              | 6.7     | 6.5 | 1.7<br>1.8      | 1.8     | 2.7  | 2.7<br>2.5              | 2.6     | 3.0 |
|           |                   |                 |               | Middle    | 3.5 | 29.0<br>29.0     | 29.0    | 8.0<br>8.0 | 8.0     | 17.6<br>17.7 | 17.7    | 92.1<br>91.6      | 91.9    | 6.3<br>6.2              | 6.3     |     | 2.6<br>2.6      |         |      | 3.8<br>4.6              | 4.2     |     |
|           |                   |                 |               | Bottom    | 6   | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 19.3<br>19.3 | 19.3    | 80.9<br>80.1      | 80.5    | 5.3<br>5.3              | 5.3     |     | 3.7<br>3.6      |         |      | 2.4<br>2.2              | 2.3     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS3 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 08:09         | Surface   | 1   | 28.5<br>28.6     | 28.6    | 7.9<br>7.9 | 7.9     | 20.5<br>20.5 | 20.5    | 117.4<br>112.0    | 114.7   | 8.1<br>7.8              | 8.0     | 8.0 | 5.9<br>6.9      | 6.4     | 7.7  | 4.5<br>3.3              | 3.9     | 4.4 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.9 | 28.5<br>28.5     | 28.5    | 8.0<br>7.9 | 8.0     | 21.8<br>21.8 | 21.8    | 113.8<br>112.4    | 113.1   | 7.8<br>7.7              | 7.8     |     | 8.4<br>9.4      | 8.9     |      | 4.5<br>5.0              | 4.8     |     |
| 4-Jul-13  | Sunny             | Calm            | 09:56         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 7.9<br>7.9 | 7.9     | 8.9<br>8.9   | 8.9     | 102.4<br>101.8    | 102.1   | 7.4<br>7.4              | 7.4     | 7.4 | 4.7<br>4.7      | 4.7     | 6.5  | 4.8<br>8.7              | 6.8     | 5.7 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.1 | 28.6<br>28.6     | 28.6    | 7.8<br>7.8 | 7.8     | 20.4<br>21.4 | 20.9    | 82.7<br>82.7      | 82.7    | 5.7<br>5.7              | 5.7     |     | 8.4<br>8.1      | 8.3     |      | 4.0<br>5.2              | 4.6     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 10:51         | Surface   | 1   | 29.2<br>29.2     | 29.2    | 8.2<br>8.2 | 8.2     | 15.6<br>16.6 | 16.1    | 107.4<br>105.6    | 106.5   | 7.6<br>7.4              | 7.5     | 7.5 | 6.8<br>7.7      | 7.3     | 8.7  | 5.3<br>4.3              | 4.8     | 5.3 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 3.7 | 28.5<br>28.5     | 28.5    | 8.1<br>8.1 | 8.1     | 24.4<br>24.4 | 24.4    | 85.3<br>85.8      | 85.6    | 5.9<br>5.9              | 5.9     |     | 10.2<br>10.0    | 10.1    |      | 6.3<br>5.3              | 5.8     |     |
| 8-Jul-13  | Sunny             | Moderate        | 12:09         | Surface   | 1   | 28.9<br>28.9     | 28.9    | 8.2<br>8.2 | 8.2     | 16.2<br>15.0 | 15.6    | 102.6<br>91.8     | 97.2    | 7.2<br>6.5              | 6.9     | 6.9 | 9.2<br>8.5      | 8.9     | 10.5 | 9.3<br>8.7              | 9.0     | 8.9 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.7 | 27.6<br>27.6     | 27.6    | 8.0<br>8.0 | 8.0     | 28.9<br>29.0 | 29.0    | 75.9<br>75.7      | 75.8    | 5.2<br>5.1              | 5.2     |     | 12.8<br>11.3    | 12.1    |      | 8.3<br>9.3              | 8.8     |     |
| 10-Jul-13 | Fine              | Moderate        | 14:05         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.2<br>8.2 | 8.2     | 19.3<br>19.2 | 19.3    | 100.1<br>98.2     | 99.2    | 6.9<br>6.8              | 6.9     | 6.9 | 7.2<br>7.1      | 7.2     | 8.4  | 3.1<br>2.2              | 2.7     | 2.6 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.1 | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 19.3<br>19.3 | 19.3    | 95.0<br>94.0      | 94.5    | 6.5<br>6.5              | 6.5     |     | 9.3<br>9.8      | 9.6     |      | 2.4<br>2.6              | 2.5     |     |
| 12-Jul-13 | Sunny             | Moderate        | 15:32         | Surface   | 1   | 28.6<br>29.2     | 28.9    | 8.3<br>8.3 | 8.3     | 23.6<br>22.0 | 22.8    | 92.7<br>91.6      | 92.2    | 6.6<br>6.5              | 6.6     | 6.6 | 6.4<br>6.4      | 6.4     | 14.9 | 9.2<br>10.2             | 9.7     | 7.9 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.2 | 27.8<br>27.6     | 27.7    | 8.3<br>8.2 | 8.3     | 26.2<br>27.0 | 26.6    | 73.0<br>72.3      | 72.7    | 5.3<br>5.2              | 5.3     |     | 22.3<br>24.3    | 23.3    |      | 3.7<br>8.2              | 6.0     |     |
| 15-Jul-13 | Rainy             | Calm            | 16:19         | Surface   | 1   | 28.7<br>28.6     | 28.7    | 8.2<br>8.1 | 8.2     | 14.7<br>15.4 | 15.1    | 88.9<br>88.8      | 88.9    | 6.1<br>6.1              | 6.1     | 6.1 | 5.8<br>5.7      | 5.8     | 7.6  | 3.1<br>3.3              | 3.2     | 3.2 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 3.9 | 26.4<br>26.4     | 26.4    | 8.0<br>8.0 | 8.0     | 29.8<br>30.2 | 30.0    | 75.0<br>74.7      | 74.9    | 5.1<br>5.1              | 5.1     |     | 9.5<br>9.2      | 9.4     |      | 3.3<br>3.1              | 3.2     |     |
| 17-Jul-13 | Rainy             | Moderate        | 20:04         | Surface   | 1   | 28.3<br>28.4     | 28.4    | 8.0<br>8.0 | 8.0     | 19.0<br>18.7 | 18.9    | 79.5<br>79.4      | 79.5    | 5.6<br>5.6              | 5.6     | 5.6 | 3.1<br>3.1      | 3.1     | 10.4 | 2.7<br>2.7              | 2.7     | 2.8 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.5 | 26.5<br>26.5     | 26.5    | 7.9<br>7.9 | 7.9     | 27.2<br>27.2 | 27.2    | 69.5<br>70.1      | 69.8    | 4.9<br>5.0              | 5.0     |     | 17.6<br>17.7    | 17.7    |      | 3.1<br>2.6              | 2.9     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at IS3 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 08:21         | Surface   | 1   | 27.1<br>27.1     | 27.1    | 8.1<br>8.1 | 8.1     | 25.8<br>25.6 | 25.7    | 82.9<br>83.5      | 83.2    | 5.7<br>5.8              | 5.8     | 5.8 | 2.6<br>2.5      | 2.6     | 5.9  | 1.4<br>6.8              | 4.1     | 5.0 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.3 | 26.5<br>26.5     | 26.5    | 8.0<br>8.0 | 8.0     | 28.2<br>28.2 | 28.2    | 71.2<br>71.4      | 71.3    | 4.9<br>4.9              | 4.9     |     | 9.2<br>9.2      | 9.2     |      | 6.3<br>5.3              | 5.8     |     |
| 22-Jul-13 | Cloudy            | Calm            | 11:31         | Surface   | 1   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.4<br>28.4 | 28.4    | 83.2<br>83.5      | 83.4    | 5.6<br>5.6              | 5.6     | 5.6 | 10.4<br>9.6     | 10.0    | 11.8 | 3.5<br>4.0              | 3.8     | 4.6 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.8 | 27.3<br>27.4     | 27.4    | 8.3<br>8.3 | 8.3     | 29.2<br>29.5 | 29.4    | 76.5<br>76.8      | 76.7    | 5.3<br>5.3              | 5.3     |     | 13.6<br>13.3    | 13.5    |      | 5.8<br>4.8              | 5.3     |     |
| 24-Jul-13 | Rainy             | Moderate        | 13:51         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 26.3<br>26.3 | 26.3    | 92.4<br>92.3      | 92.4    | 6.3<br>6.3              | 6.3     | 6.3 | 5.0<br>5.1      | 5.1     | 11.1 | 6.0<br>5.8              | 5.9     | 5.6 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 3   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 29.2<br>29.2 | 29.2    | 91.2<br>91.2      | 91.2    | 6.1<br>6.1              | 6.1     |     | 18.3<br>15.9    | 17.1    |      | 5.4<br>5.1              | 5.3     |     |
| 26-Jul-13 | Rainy             | Rough           | 15:01         | Surface   | 1   | 27.6<br>27.6     | 27.6    | 8.2<br>8.1 | 8.2     | 27.3<br>26.5 | 26.9    | 94.8<br>96.4      | 95.6    | 6.5<br>6.6              | 6.6     | 6.6 | 9.0<br>8.7      | 8.9     | 12.7 | 17.2<br>6.4             | 11.8    | 8.6 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.3 | 27.7<br>27.6     | 27.7    | 8.1<br>8.2 | 8.2     | 25.8<br>27.3 | 26.6    | 95.8<br>94.8      | 95.3    | 6.6<br>6.5              | 6.6     |     | 15.6<br>17.1    | 16.4    |      | 5.6<br>5.0              | 5.3     |     |
| 29-Jul-13 | Sunny             | Calm            | 17:05         | Surface   | 1   | 27.5<br>28.0     | 27.8    | 8.2<br>8.2 | 8.2     | 16.6<br>16.7 | 16.7    | 98.5<br>99.2      | 98.9    | 6.8<br>6.9              | 6.9     | 6.9 | 5.4<br>6.1      | 5.8     | 13.7 | 3.1<br>2.7              | 2.9     | 3.0 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.4 | 29.6<br>27.5     | 28.6    | 8.1<br>8.2 | 8.2     | 27.9<br>27.8 | 27.9    | 75.2<br>75.4      | 75.3    | 5.1<br>5.1              | 5.1     |     | 21.5<br>21.6    | 21.6    |      | 3.3<br>2.7              | 3.0     |     |
| 31-Jul-13 | Sunny             | Calm            | 07:25         | Surface   | 1   | 28.7<br>28.7     | 28.7    | 8.2<br>8.2 | 8.2     | 18.8<br>19.6 | 19.2    | 99.4<br>99.1      | 99.3    | 6.8<br>6.7              | 6.8     | 6.8 | 2.4<br>2.4      | 2.4     | 4.1  | 2.6<br>2.0              | 2.3     | 3.5 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.8 | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 25.1<br>24.0 | 24.6    | 87.1<br>85.7      | 86.4    | 5.8<br>5.8              | 5.8     |     | 5.6<br>5.9      | 5.8     |      | 4.8<br>4.6              | 4.7     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS3 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA*   |         | Turbidity(NTU) |         | DA*   |         | Suspended Solids (mg/L) |         | DA*   |         |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-------|---------|----------------|---------|-------|---------|-------------------------|---------|-------|---------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | Value | Average | Value          | Average | Value | Average | Value                   | Average | Value | Average |
| 2-Jul-13  | Sunny             | Moderate        | 15:14         | Surface   | 1   | 29.3<br>29.2     | 29.3    | 8.2<br>8.2 | 8.2     | 16.2<br>16.2 | 16.2    | 126.5<br>118.6    | 122.6   | 8.9<br>8.3              | 8.6     | 8.6   | 8.6     | 4.4<br>4.4     | 4.4     | 5.2   | 5.2     | 4.3<br>4.7              | 4.5     | 5.2   | 5.2     |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 4.7 | 29.1<br>29.2     | 29.2    | 8.1<br>8.2 | 8.2     | 17.3<br>17.1 | 17.2    | 122.7<br>118.9    | 120.8   | 8.6<br>8.3              | 8.5     |       |         | 6.6<br>5.3     | 6.0     |       |         | 5.8<br>5.7              | 5.8     |       |         |
| 4-Jul-13  | Fine              | Calm            | 16:53         | Surface   | 1   | 30.9<br>30.9     | 30.9    | 8.1<br>8.1 | 8.1     | 7.3<br>7.4   | 7.4     | 113.7<br>112.4    | 113.1   | 8.1<br>8.0              | 8.1     | 8.1   | 8.1     | 8.5<br>9.7     | 9.1     | 12.0  | 12.0    | 3.3<br>2.0              | 2.7     | 5.8   | 5.8     |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 4.5 | 29.8<br>29.9     | 29.9    | 8.0<br>8.0 | 8.0     | 13.7<br>13.8 | 13.8    | 111.4<br>113.9    | 112.7   | 7.8<br>8.0              | 7.9     |       |         | 15.2<br>14.4   | 14.8    |       |         | 9.7<br>8.0              | 8.9     |       |         |
| 6-Jul-13  | Cloudy            | Moderate        | 19:05         | Surface   | 1   | 29.4<br>28.5     | 29.0    | 8.4<br>8.1 | 8.3     | 13.2<br>14.6 | 13.9    | 129.9<br>129.6    | 129.8   | 9.2<br>9.1              | 9.2     | 9.2   | 9.2     | 11.0<br>10.6   | 10.8    | 10.6  | 10.6    | 6.7<br>9.7              | 8.2     | 7.0   | 7.0     |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 3.5 | 29.6<br>28.5     | 29.1    | 8.6<br>8.1 | 8.4     | 22.9<br>23.4 | 23.2    | 94.3<br>94.3      | 94.3    | 6.5<br>6.5              | 6.5     |       |         | 9.9<br>10.7    | 10.3    |       |         | 4.3<br>7.0              | 5.7     |       |         |
| 8-Jul-13  | Fine              | Moderate        | 19:16         | Surface   | 1   | 29.4<br>29.5     | 29.5    | 8.2<br>8.2 | 8.2     | 16.4<br>17.0 | 16.7    | 97.5<br>96.7      | 97.1    | 6.8<br>6.7              | 6.8     | 6.8   | 6.8     | 10.2<br>10.5   | 10.4    | 12.5  | 12.5    | 8.0<br>21.7             | 14.9    | 17.4  | 17.4    |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 4.1 | 27.9<br>28.1     | 28.0    | 8.1<br>8.1 | 8.1     | 25.7<br>25.2 | 25.5    | 77.1<br>77.3      | 77.2    | 5.2<br>5.3              | 5.3     |       |         | 15.7<br>13.5   | 14.6    |       |         | 15.0<br>24.7            | 19.9    |       |         |
| 10-Jul-13 | Fine              | Moderate        | 06:27         | Surface   | 1   | 28.7<br>28.8     | 28.8    | 8.1<br>8.1 | 8.1     | 17.2<br>17.7 | 17.5    | 80.6<br>78.7      | 79.7    | 5.7<br>5.5              | 5.6     | 5.6   | 5.6     | 6.7<br>6.3     | 6.5     | 6.5   | 6.5     | 4.5<br>3.7              | 4.1     | 3.8   | 3.8     |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 4.5 | 28.7<br>28.7     | 28.7    | 8.1<br>8.1 | 8.1     | 18.6<br>19.1 | 18.9    | 75.5<br>75.1      | 75.3    | 5.3<br>5.2              | 5.3     |       |         | 6.3<br>6.5     | 6.4     |       |         | 3.5<br>3.4              | 3.5     |       |         |
| 12-Jul-13 | Sunny             | Moderate        | 07:35         | Surface   | 1   | 29.0<br>28.9     | 29.0    | 8.2<br>8.2 | 8.2     | 16.1<br>16.5 | 16.3    | 99.0<br>98.2      | 98.6    | 7.3<br>7.2              | 7.3     | 7.3   | 7.3     | 12.7<br>11.9   | 12.3    | 18.5  | 18.5    | 2.5<br>4.2              | 3.4     | 3.0   | 3.0     |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 4.5 | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 25.5<br>25.5 | 25.5    | 75.5<br>77.2      | 76.4    | 5.5<br>5.6              | 5.6     |       |         | 22.9<br>26.4   | 24.7    |       |         | 2.1<br>3.1              | 2.6     |       |         |
| 15-Jul-13 | Rainy             | Calm            | 10:43         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.1<br>8.1 | 8.1     | 14.8<br>14.9 | 14.9    | 90.6<br>90.0      | 90.3    | 6.4<br>6.3              | 6.4     | 6.4   | 6.4     | 10.2<br>10.7   | 10.5    | 11.0  | 11.0    | 28.7<br>25.0            | 26.9    | 14.5  | 14.5    |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 3.8 | 28.6<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 19.4<br>19.3 | 19.4    | 86.7<br>87.4      | 87.1    | 6.0<br>6.1              | 6.1     |       |         | 11.3<br>11.4   | 11.4    |       |         | 2.5<br>1.5              | 2.0     |       |         |
| 17-Jul-13 | Rainy             | Moderate        | 13:09         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 18.5<br>18.3 | 18.4    | 83.2<br>83.3      | 83.3    | 5.8<br>5.8              | 5.8     | 5.8   | 5.8     | 1.6<br>1.6     | 1.6     | 3.4   | 3.4     | 2.0<br>2.1              | 2.1     | 2.2   | 2.2     |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |       |         | -              | -       |       |         | -                       | -       |       |         |
|           |                   |                 |               | Bottom    | 4.3 | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 18.4<br>18.4 | 18.4    | 82.9<br>82.9      | 82.9    | 5.8<br>5.8              | 5.8     |       |         | 5.2<br>5.1     | 5.2     |       |         | 2.1<br>2.4              | 2.3     |       |         |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS3 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 17:02         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 24.1<br>24.1 | 24.1    | 88.8<br>88.7      | 88.8    | 6.1<br>6.1              | 6.1     | 6.1 | 4.1<br>3.9      | 4.0     | 8.9  | 5.8<br>4.2              | 5.0     | 4.4  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 4.7 | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 25.1<br>25.1 | 25.1    | 76.6<br>77.0      | 76.8    | 5.3<br>5.3              | 5.3     |     | 13.7<br>13.7    | 13.7    |      | 2.6<br>4.8              | 3.7     |      |
| 22-Jul-13 | Rainy             | Moderate        | 19:54         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.2<br>8.2 | 8.2     | 25.3<br>25.4 | 25.4    | 83.5<br>82.5      | 83.0    | 5.7<br>5.6              | 5.7     | 5.7 | 7.3<br>7.3      | 7.3     | 9.2  | 9.8<br>10.4             | 10.1    | 10.2 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 4.2 | 28.3<br>28.4     | 28.4    | 8.2<br>8.2 | 8.2     | 26.1<br>25.9 | 26.0    | 83.7<br>83.8      | 83.8    | 5.6<br>5.6              | 5.6     |     | 11.7<br>10.5    | 11.1    |      | 9.5<br>11.0             | 10.3    |      |
| 24-Jul-13 | Rainy             | Moderate        | 06:32         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 25.8<br>25.8 | 25.8    | 86.7<br>85.6      | 86.2    | 5.9<br>5.8              | 5.9     | 5.9 | 5.2<br>4.8      | 5.0     | 19.4 | 6.8<br>5.6              | 6.2     | 5.9  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 3   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 26.9<br>26.9 | 26.9    | 83.0<br>82.6      | 82.8    | 5.6<br>5.6              | 5.6     |     | 30.0<br>37.5    | 33.8    |      | 5.1<br>5.9              | 5.5     |      |
| 26-Jul-13 | Rainy             | Rough           | 08:30         | Surface   | 1   | 27.4<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 25.3<br>26.6 | 26.0    | 91.7<br>88.1      | 89.9    | 6.3<br>6.0              | 6.2     | 6.2 | 15.6<br>15.7    | 15.7    | 16.2 | 19.4<br>17.8            | 18.6    | 15.8 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 4.7 | 27.5<br>27.4     | 27.5    | 8.1<br>8.1 | 8.1     | 26.1<br>25.0 | 25.6    | 90.5<br>91.5      | 91.0    | 6.2<br>6.3              | 6.3     |     | 16.0<br>17.3    | 16.7    |      | 12.0<br>14.0            | 13.0    |      |
| 29-Jul-13 | Sunny             | Calm            | 10:57         | Surface   | 1   | 29.1<br>28.3     | 28.7    | 8.0<br>8.1 | 8.1     | 15.2<br>15.5 | 15.4    | 83.9<br>82.5      | 83.2    | 5.9<br>5.8              | 5.9     | 5.9 | 9.7<br>9.3      | 9.5     | 14.4 | 2.3<br>2.1              | 2.2     | 4.4  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 4.7 | 28.3<br>28.9     | 28.6    | 8.0<br>8.0 | 8.0     | 19.2<br>18.2 | 18.7    | 81.2<br>82.9      | 82.1    | 5.7<br>5.9              | 5.8     |     | 17.1<br>21.3    | 19.2    |      | 2.4<br>10.5             | 6.5     |      |
| 31-Jul-13 | Sunny             | Calm            | 15:17         | Surface   | 1   | 30.2<br>30.2     | 30.2    | 8.4<br>8.4 | 8.4     | 14.7<br>14.7 | 14.7    | 107.7<br>107.7    | 107.7   | 7.4<br>7.4              | 7.4     | 7.4 | 3.0<br>3.0      | 3.0     | 2.8  | 3.2<br>3.2              | 3.2     | 3.1  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 4.3 | 30.0<br>30.0     | 30.0    | 8.4<br>8.4 | 8.4     | 15.0<br>15.1 | 15.1    | 108.8<br>109.0    | 108.9   | 7.4<br>7.5              | 7.5     |     | 2.4<br>2.5      | 2.5     |      | 2.8<br>3.0              | 2.9     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS4 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 10:21         | Surface   | 1   | 28.8<br>28.8     | 28.8    | 8.3<br>8.3 | 8.3     | 18.4<br>18.3 | 18.4    | 104.6<br>104.1    | 104.4   | 7.3<br>7.3              | 7.3     | 6.9 | 4.9<br>4.9      | 4.9     | 7.3  | 7.0<br>7.7              | 7.4     | 6.2  |
|           |                   |                 |               | Middle    | 3.5 | 28.5<br>28.5     | 28.5    | 8.3<br>8.3 | 8.3     | 20.3<br>20.0 | 20.2    | 91.6<br>91.8      | 91.7    | 6.4<br>6.4              | 6.4     |     | 6.8<br>6.7      | 6.8     |      | 5.8<br>5.3              | 5.6     |      |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.1     | 28.1    | 8.1<br>8.1 | 8.1     | 23.4<br>23.0 | 23.2    | 83.6<br>82.6      | 83.1    | 5.7<br>5.7              | 5.7     |     | 10.7<br>9.9     | 10.3    |      | 5.7<br>5.5              | 5.6     |      |
| 4-Jul-13  | Sunny             | Calm            | 11:53         | Surface   | 1   | 29.8<br>29.7     | 29.8    | 8.0<br>8.0 | 8.0     | 11.8<br>12.1 | 12.0    | 124.6<br>123.5    | 124.1   | 8.9<br>8.8              | 8.9     | 7.8 | 4.9<br>4.9      | 4.9     | 8.5  | 3.0<br>3.8              | 3.4     | 3.1  |
|           |                   |                 |               | Middle    | 4.5 | 28.7<br>28.8     | 28.8    | 8.0<br>8.0 | 8.0     | 18.1<br>18.1 | 18.1    | 93.6<br>93.8      | 93.7    | 6.5<br>6.6              | 6.6     |     | 8.8<br>8.6      | 8.7     |      | 4.0<br>3.2              | 3.6     |      |
|           |                   |                 |               | Bottom    | 8   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 27.0<br>27.0 | 27.0    | 80.0<br>79.3      | 79.7    | 5.4<br>5.4              | 5.4     |     | 12.0<br>11.9    | 12.0    |      | 2.3<br>2.0              | 2.2     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 13:02         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 8.6<br>8.7 | 8.7     | 12.0<br>12.0 | 12.0    | 123.0<br>125.0    | 124.0   | 8.5<br>8.6              | 8.6     | 7.5 | 4.6<br>4.8      | 4.7     | 11.5 | 5.7<br>4.7              | 5.2     | 5.4  |
|           |                   |                 |               | Middle    | 4   | 28.2<br>28.2     | 28.2    | 8.2<br>8.2 | 8.2     | 26.6<br>26.9 | 26.8    | 80.9<br>79.3      | 80.1    | 6.4<br>6.3              | 6.4     |     | 11.2<br>12.0    | 11.6    |      | 5.3<br>4.7              | 5.0     |      |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 28.6<br>28.5 | 28.6    | 76.0<br>75.0      | 75.5    | 6.1<br>6.0              | 6.1     |     | 17.3<br>18.9    | 18.1    |      | 6.0<br>6.0              | 6.0     |      |
| 8-Jul-13  | Sunny             | Moderate        | 11:23         | Surface   | 1   | 29.1<br>29.0     | 29.1    | 8.2<br>8.2 | 8.2     | 15.3<br>16.2 | 15.8    | 95.1<br>93.6      | 94.4    | 6.7<br>6.6              | 6.7     | 6.2 | 10.3<br>10.1    | 10.2    | 17.8 | 11.0<br>9.3             | 10.2    | 11.8 |
|           |                   |                 |               | Middle    | 3.5 | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 28.1<br>27.9 | 28.0    | 78.3<br>77.4      | 77.9    | 5.7<br>5.6              | 5.7     |     | 18.0<br>19.1    | 18.6    |      | 8.3<br>7.3              | 7.8     |      |
|           |                   |                 |               | Bottom    | 6   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 29.3<br>29.3 | 29.3    | 75.6<br>74.3      | 75.0    | 5.5<br>5.4              | 5.5     |     | 22.2<br>27.0    | 24.6    |      | 18.0<br>17.0            | 17.5    |      |
| 10-Jul-13 | Fine              | Moderate        | 15:24         | Surface   | 1   | 28.7<br>29.4     | 29.1    | 8.2<br>8.2 | 8.2     | 21.6<br>20.5 | 21.1    | 92.8<br>96.2      | 94.5    | 6.7<br>6.9              | 6.8     | 6.2 | 7.7<br>7.4      | 7.6     | 9.4  | 3.7<br>5.7              | 4.7     | 4.5  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>27.8     | 27.9    | 8.2<br>8.2 | 8.2     | 24.0<br>25.5 | 24.8    | 77.0<br>76.4      | 76.7    | 5.6<br>5.5              | 5.6     |     | 7.5<br>8.5      | 8.0     |      | 3.8<br>3.8              | 3.8     |      |
|           |                   |                 |               | Bottom    | 6   | 27.2<br>27.1     | 27.2    | 8.2<br>8.2 | 8.2     | 28.2<br>28.4 | 28.3    | 74.9<br>71.3      | 73.1    | 5.4<br>5.1              | 5.3     |     | 12.4<br>12.5    | 12.5    |      | 4.1<br>6.1              | 5.1     |      |
| 12-Jul-13 | Sunny             | Moderate        | 16:18         | Surface   | 1   | 29.4<br>29.5     | 29.5    | 8.2<br>8.2 | 8.2     | 20.9<br>20.5 | 20.7    | 90.6<br>90.4      | 90.5    | 6.4<br>6.4              | 6.4     | 6.0 | 5.9<br>5.4      | 5.7     | 7.7  | 4.5<br>3.7              | 4.1     | 5.1  |
|           |                   |                 |               | Middle    | 4   | 27.5<br>28.1     | 27.8    | 8.1<br>8.1 | 8.1     | 27.0<br>24.8 | 25.9    | 74.6<br>76.8      | 75.7    | 5.4<br>5.6              | 5.5     |     | 9.1<br>7.8      | 8.5     |      | 5.5<br>3.3              | 4.4     |      |
|           |                   |                 |               | Bottom    | 7   | 27.2<br>27.6     | 27.4    | 8.1<br>8.1 | 8.1     | 27.6<br>26.5 | 27.1    | 74.1<br>73.4      | 73.8    | 5.4<br>5.3              | 5.4     |     | 9.0<br>9.0      | 9.0     |      | 6.3<br>7.3              | 6.8     |      |
| 15-Jul-13 | Rainy             | Calm            | 15:32         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.1<br>8.1 | 8.1     | 16.8<br>16.8 | 16.8    | 93.0<br>92.2      | 92.6    | 6.5<br>6.5              | 6.5     | 6.1 | 1.5<br>1.3      | 1.4     | 6.4  | 2.4<br>2.3              | 2.4     | 2.3  |
|           |                   |                 |               | Middle    | 3.5 | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 19.9<br>20.0 | 20.0    | 80.5<br>79.1      | 79.8    | 5.6<br>5.5              | 5.6     |     | 2.1<br>2.1      | 2.1     |      | 2.0<br>2.3              | 2.2     |      |
|           |                   |                 |               | Bottom    | 6   | 25.9<br>25.9     | 25.9    | 8.0<br>8.0 | 8.0     | 29.7<br>29.9 | 29.8    | 74.0<br>73.5      | 73.8    | 5.0<br>5.0              | 5.0     |     | 15.8<br>15.6    | 15.7    |      | 2.3<br>2.1              | 2.2     |      |
| 17-Jul-13 | Rainy             | Moderate        | 20:53         | Surface   | 1   | 28.8<br>28.7     | 28.8    | 8.1<br>8.1 | 8.1     | 14.2<br>14.0 | 14.1    | 93.7<br>98.1      | 95.9    | 6.7<br>7.0              | 6.9     | 6.3 | 4.4<br>4.3      | 4.4     | 5.6  | 0.9<br>0.5              | 0.7     | 1.2  |
|           |                   |                 |               | Middle    | 3.5 | 28.6<br>28.7     | 28.7    | 8.1<br>8.1 | 8.1     | 17.7<br>17.1 | 17.4    | 80.9<br>76.7      | 78.8    | 5.7<br>5.4              | 5.6     |     | 5.7<br>5.6      | 5.7     |      | 1.5<br>1.1              | 1.3     |      |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.2     | 28.3    | 8.1<br>8.1 | 8.1     | 21.5<br>21.6 | 21.6    | 72.7<br>75.0      | 73.9    | 5.1<br>5.3              | 5.2     |     | 6.7<br>6.5      | 6.6     |      | 1.4<br>1.6              | 1.5     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS4 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 11:08         | Surface   | 1   | 27.0<br>27.0     | 27.0    | 8.2<br>8.2 | 8.2     | 26.9<br>26.8 | 26.9    | 84.9<br>85.1      | 85.0    | 6.0<br>6.0              | 6.0     | 5.8 | 3.0<br>3.1     | 3.1     | 6.1  | 2.1<br>1.8              | 2.0     | 3.1 |
|           |                   |                 |               | Middle    | 3.5 | 26.7<br>26.7     | 26.7    | 8.2<br>8.2 | 8.2     | 28.5<br>28.6 | 28.6    | 79.6<br>79.3      | 79.5    | 5.6<br>5.6              | 5.6     |     | 4.8<br>4.9     | 4.9     |      | 3.3<br>1.5              | 2.4     |     |
|           |                   |                 |               | Bottom    | 6   | 26.5<br>26.4     | 26.5    | 8.2<br>8.2 | 8.2     | 29.2<br>29.2 | 29.2    | 75.4<br>75.3      | 75.4    | 5.3<br>5.3              | 5.3     |     | 9.5<br>11.3    | 10.4    |      | 5.4<br>4.4              | 4.9     |     |
| 22-Jul-13 | Cloudy            | Calm            | 10:39         | Surface   | 1   | 27.6<br>27.5     | 27.6    | 7.9<br>8.2 | 8.1     | 28.0<br>28.3 | 28.2    | 103.0<br>88.7     | 95.9    | 7.0<br>6.0              | 6.5     | 6.3 | 11.8<br>11.5   | 11.7    | 13.4 | 5.7<br>5.7              | 5.7     | 4.9 |
|           |                   |                 |               | Middle    | 3.5 | 27.4<br>27.4     | 27.4    | 8.1<br>8.1 | 8.1     | 28.3<br>28.5 | 28.4    | 94.1<br>86.0      | 90.1    | 6.4<br>5.8              | 6.1     |     | 10.4<br>11.8   | 11.1    |      | 4.8<br>3.9              | 4.4     |     |
|           |                   |                 |               | Bottom    | 6   | 27.3<br>27.3     | 27.3    | 8.2<br>8.2 | 8.2     | 28.9<br>28.9 | 28.9    | 90.9<br>85.9      | 88.4    | 6.1<br>5.8              | 6.0     |     | 19.3<br>15.5   | 17.4    |      | 5.2<br>3.7              | 4.5     |     |
| 24-Jul-13 | Rainy             | Moderate        | 15:13         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 28.5<br>28.5 | 28.5    | 86.4<br>86.2      | 86.3    | 5.8<br>5.8              | 5.8     | 5.8 | 8.1<br>8.3     | 8.2     | 13.3 | 6.8<br>7.6              | 7.2     | 6.2 |
|           |                   |                 |               | Middle    | 4   | 27.9<br>28.0     | 28.0    | 8.3<br>8.3 | 8.3     | 28.7<br>28.8 | 28.8    | 85.6<br>85.7      | 85.7    | 5.7<br>5.7              | 5.7     |     | 10.0<br>10.0   | 10.0    |      | 7.7<br>5.6              | 6.7     |     |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.5<br>29.5 | 29.5    | 85.5<br>85.5      | 85.5    | 5.7<br>5.7              | 5.7     |     | 21.1<br>22.1   | 21.6    |      | 6.5<br>2.9              | 4.7     |     |
| 26-Jul-13 | Rainy             | Rough           | 16:56         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 25.9<br>25.9 | 25.9    | 97.5<br>96.9      | 97.2    | 6.6<br>6.6              | 6.6     | 6.5 | 6.1<br>6.0     | 6.1     | 9.1  | 5.5<br>6.4              | 6.0     | 6.2 |
|           |                   |                 |               | Middle    | 4   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 26.0<br>26.0 | 26.0    | 93.9<br>94.3      | 94.1    | 6.4<br>6.4              | 6.4     |     | 8.9<br>8.2     | 8.6     |      | 5.5<br>6.8              | 6.2     |     |
|           |                   |                 |               | Bottom    | 7   | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 26.4<br>26.4 | 26.4    | 92.4<br>91.3      | 91.9    | 6.3<br>6.2              | 6.3     |     | 12.1<br>13.3   | 12.7    |      | 5.6<br>7.1              | 6.4     |     |
| 29-Jul-13 | Sunny             | Calm            | 18:56         | Surface   | 1   | 30.1<br>29.9     | 30.0    | 8.1<br>8.1 | 8.1     | 15.0<br>15.3 | 15.2    | 97.5<br>97.4      | 97.5    | 7.4<br>7.4              | 7.4     | 6.7 | 3.1<br>2.9     | 3.0     | 11.1 | 2.8<br>2.8              | 2.8     | 2.9 |
|           |                   |                 |               | Middle    | 4   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.0<br>24.0 | 24.0    | 76.6<br>77.5      | 77.1    | 5.8<br>5.9              | 5.9     |     | 12.4<br>12.3   | 12.4    |      | 2.5<br>3.0              | 2.8     |     |
|           |                   |                 |               | Bottom    | 7   | 27.5<br>27.4     | 27.5    | 8.2<br>8.1 | 8.2     | 26.8<br>26.8 | 26.8    | 69.0<br>68.2      | 68.6    | 5.3<br>5.2              | 5.3     |     | 18.2<br>17.5   | 17.9    |      | 3.2<br>3.0              | 3.1     |     |
| 31-Jul-13 | Sunny             | Calm            | 09:37         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 12.8<br>12.8 | 12.8    | 112.0<br>112.5    | 112.3   | 7.9<br>7.9              | 7.9     | 7.1 | 2.7<br>2.7     | 2.7     | 4.1  | 5.4<br>5.2              | 5.3     | 5.3 |
|           |                   |                 |               | Middle    | 3.5 | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 21.9<br>21.9 | 21.9    | 91.1<br>90.9      | 91.0    | 6.2<br>6.2              | 6.2     |     | 2.7<br>2.7     | 2.7     |      | 5.6<br>5.4              | 5.5     |     |
|           |                   |                 |               | Bottom    | 6   | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 28.5<br>28.5 | 28.5    | 75.4<br>74.9      | 75.2    | 5.1<br>5.0              | 5.1     |     | 7.1<br>6.7     | 6.9     |      | 5.0<br>5.2              | 5.1     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS4 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 16:01         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.4<br>8.4 | 8.4     | 14.5<br>14.7 | 14.6    | 109.5<br>109.4    | 109.5   | 7.7<br>7.7              | 7.7     | 7.5 | 3.4<br>3.3      | 3.4     | 8.0  | 5.8<br>5.2              | 5.5     | 5.6  |
|           |                   |                 |               | Middle    | 3.5 | 28.9<br>29.3     | 29.1    | 8.3<br>8.4 | 8.4     | 17.5<br>15.2 | 16.4    | 101.5<br>103.8    | 102.7   | 7.1<br>7.3              | 7.2     |     | 14.4<br>13.7    | 14.1    |      | 5.0<br>5.0              | 5.0     |      |
|           |                   |                 |               | Bottom    | 6   | 28.8<br>28.8     | 28.8    | 8.3<br>8.3 | 8.3     | 18.4<br>18.9 | 18.7    | 96.2<br>94.5      | 95.4    | 6.7<br>6.6              | 6.7     |     | 6.2<br>6.7      | 6.5     |      | 5.2<br>7.2              | 6.2     |      |
| 4-Jul-13  | Fine              | Calm            | 18:54         | Surface   | 1   | 30.7<br>30.7     | 30.7    | 8.2<br>8.2 | 8.2     | 7.7<br>7.7   | 7.7     | 132.1<br>132.1    | 132.1   | 9.5<br>9.5              | 9.5     | 9.3 | 6.4<br>6.4      | 6.4     | 10.9 | 7.8<br>8.8              | 8.3     | 7.7  |
|           |                   |                 |               | Middle    | 4.5 | 30.6<br>30.5     | 30.6    | 8.2<br>8.2 | 8.2     | 8.2<br>8.3   | 8.3     | 127.0<br>127.1    | 127.1   | 9.1<br>9.1              | 9.1     |     | 7.5<br>7.7      | 7.6     |      | 6.0<br>6.3              | 6.2     |      |
|           |                   |                 |               | Bottom    | 8   | 29.5<br>29.5     | 29.5    | 8.1<br>8.1 | 8.1     | 13.8<br>14.2 | 14.0    | 101.2<br>101.3    | 101.3   | 7.2<br>7.1              | 7.2     |     | 18.3<br>19.0    | 18.7    |      | 9.8<br>7.5              | 8.7     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 20:00         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.6<br>8.6 | 8.6     | 15.7<br>15.9 | 15.8    | 127.9<br>126.2    | 127.1   | 8.7<br>8.5              | 8.6     | 8.0 | 7.2<br>7.3      | 7.3     | 12.7 | 13.3<br>13.0            | 13.2    | 12.9 |
|           |                   |                 |               | Middle    | 3.5 | 29.1<br>29.2     | 29.2    | 8.4<br>8.4 | 8.4     | 18.4<br>17.5 | 18.0    | 105.4<br>106.5    | 106.0   | 7.3<br>7.4              | 7.4     |     | 13.1<br>12.0    | 12.6    |      | 13.3<br>12.3            | 12.8    |      |
|           |                   |                 |               | Bottom    | 6   | 28.9<br>28.9     | 28.9    | 8.3<br>8.3 | 8.3     | 19.4<br>21.7 | 20.6    | 73.0<br>73.6      | 73.3    | 5.1<br>5.0              | 5.1     |     | 17.8<br>18.4    | 18.1    |      | 13.7<br>11.7            | 12.7    |      |
| 8-Jul-13  | Fine              | Moderate        | 20:59         | Surface   | 1   | 29.1<br>29.1     | 29.1    | 8.2<br>8.2 | 8.2     | 17.1<br>16.9 | 17.0    | 92.8<br>92.8      | 92.8    | 6.5<br>6.5              | 6.5     | 6.4 | 10.8<br>11.6    | 11.2    | 17.8 | 18.7<br>17.7            | 18.2    | 14.2 |
|           |                   |                 |               | Middle    | 3.5 | 29.0<br>29.1     | 29.1    | 8.2<br>8.2 | 8.2     | 18.2<br>17.7 | 18.0    | 87.0<br>89.6      | 88.3    | 6.1<br>6.3              | 6.2     |     | 17.2<br>16.8    | 17.0    |      | 16.0<br>7.3             | 11.7    |      |
|           |                   |                 |               | Bottom    | 6   | 28.4<br>28.5     | 28.5    | 8.1<br>8.1 | 8.1     | 22.6<br>20.5 | 21.6    | 83.5<br>82.4      | 83.0    | 5.9<br>5.9              | 5.9     |     | 24.2<br>26.1    | 25.2    |      | 14.0<br>11.3            | 12.7    |      |
| 10-Jul-13 | Fine              | Moderate        | 08:02         | Surface   | 1   | 28.8<br>28.9     | 28.9    | 8.2<br>8.2 | 8.2     | 16.0<br>15.6 | 15.8    | 88.4<br>89.2      | 88.8    | 6.2<br>6.3              | 6.3     | 5.9 | 4.8<br>4.7      | 4.8     | 5.7  | 3.2<br>2.5              | 2.9     | 2.3  |
|           |                   |                 |               | Middle    | 4   | 28.8<br>28.8     | 28.8    | 8.2<br>8.2 | 8.2     | 18.2<br>18.1 | 18.2    | 78.6<br>79.4      | 79.0    | 5.5<br>5.5              | 5.5     |     | 5.6<br>5.6      | 5.6     |      | 1.0<br>1.9              | 1.5     |      |
|           |                   |                 |               | Bottom    | 7   | 28.6<br>28.7     | 28.7    | 8.2<br>8.2 | 8.2     | 20.4<br>20.0 | 20.2    | 75.0<br>75.9      | 75.5    | 5.2<br>5.3              | 5.3     |     | 7.1<br>6.5      | 6.8     |      | 2.5<br>2.2              | 2.4     |      |
| 12-Jul-13 | Sunny             | Moderate        | 09:41         | Surface   | 1   | 29.0<br>29.2     | 29.1    | 8.2<br>8.2 | 8.2     | 16.9<br>16.0 | 16.5    | 86.4<br>86.9      | 86.7    | 6.3<br>6.4              | 6.4     | 6.3 | 4.4<br>4.2      | 4.3     | 9.9  | 2.7<br>2.9              | 2.8     | 3.7  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>27.8     | 27.9    | 8.1<br>8.1 | 8.1     | 23.8<br>25.2 | 24.5    | 86.7<br>84.5      | 85.6    | 6.3<br>6.1              | 6.2     |     | 7.4<br>8.0      | 7.7     |      | 5.0<br>4.4              | 4.7     |      |
|           |                   |                 |               | Bottom    | 6   | 26.8<br>26.7     | 26.8    | 8.0<br>8.0 | 8.0     | 28.9<br>29.2 | 29.1    | 68.6<br>66.4      | 67.5    | 5.0<br>4.9              | 5.0     |     | 17.3<br>17.9    | 17.6    |      | 4.6<br>2.6              | 3.6     |      |
| 15-Jul-13 | Rainy             | Calm            | 09:31         | Surface   | 1   | 28.1<br>27.9     | 28.0    | 8.0<br>8.0 | 8.0     | 22.2<br>22.9 | 22.6    | 97.8<br>97.2      | 97.5    | 6.6<br>6.6              | 6.6     | 6.4 | 4.3<br>5.0      | 4.7     | 7.4  | 2.7<br>2.9              | 2.8     | 3.3  |
|           |                   |                 |               | Middle    | 3.5 | 27.4<br>27.5     | 27.5    | 8.0<br>8.0 | 8.0     | 25.1<br>24.6 | 24.9    | 90.8<br>90.6      | 90.7    | 6.1<br>6.1              | 6.1     |     | 6.2<br>5.8      | 6.0     |      | 3.4<br>4.0              | 3.7     |      |
|           |                   |                 |               | Bottom    | 6   | 26.2<br>26.1     | 26.2    | 7.9<br>8.0 | 8.0     | 29.1<br>29.4 | 29.3    | 76.8<br>75.5      | 76.2    | 5.2<br>5.1              | 5.2     |     | 10.8<br>12.0    | 11.4    |      | 3.7<br>3.1              | 3.4     |      |
| 17-Jul-13 | Rainy             | Moderate        | 12:22         | Surface   | 1   | 28.1<br>28.1     | 28.1    | 8.2<br>8.2 | 8.2     | 21.1<br>21.0 | 21.1    | 83.7<br>83.6      | 83.7    | 5.9<br>5.9              | 5.9     | 5.9 | 2.3<br>2.5      | 2.4     | 8.7  | 1.1<br>1.1              | 1.1     | 1.1  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 22.0<br>22.0 | 22.0    | 83.6<br>85.0      | 84.3    | 5.8<br>5.9              | 5.9     |     | 11.1<br>10.1    | 10.6    |      | 1.2<br>1.0              | 1.1     |      |
|           |                   |                 |               | Bottom    | 6   | 27.8<br>28.0     | 27.9    | 8.2<br>8.2 | 8.2     | 22.8<br>22.3 | 22.6    | 79.9<br>79.1      | 79.5    | 5.6<br>5.5              | 5.6     |     | 12.5<br>13.8    | 13.2    |      | 1.0<br>1.2              | 1.1     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at IS4 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 18:16         | Surface   | 1   | 28.0<br>28.1     | 28.1    | 8.3<br>8.3 | 8.3     | 24.1<br>24.0 | 24.1    | 91.0<br>90.7      | 90.9    | 6.2<br>6.2              | 6.2     | 5.8 | 4.0<br>3.6     | 3.8     | 7.2  | 2.5<br>3.5              | 3.0     | 3.6 |
|           |                   |                 |               | Middle    | 3.5 | 27.9<br>27.6     | 27.8    | 8.3<br>8.2 | 8.3     | 24.2<br>24.7 | 24.5    | 78.9<br>78.0      | 78.5    | 5.4<br>5.4              | 5.4     |     | 7.0<br>6.2     | 6.6     |      | 4.5<br>3.6              | 4.1     |     |
|           |                   |                 |               | Bottom    | 6   | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 25.2<br>25.5 | 25.4    | 74.7<br>74.5      | 74.6    | 5.1<br>5.1              | 5.1     |     | 12.2<br>10.2   | 11.2    |      | 4.2<br>2.9              | 3.6     |     |
| 22-Jul-13 | Rainy             | Moderate        | 17:49         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 7.7<br>8.0 | 7.9     | 22.4<br>22.8 | 22.6    | 72.1<br>77.8      | 75.0    | 5.0<br>5.4              | 5.2     | 5.3 | 10.5<br>10.7   | 10.6    | 12.9 | 9.5<br>8.7              | 9.1     | 8.5 |
|           |                   |                 |               | Middle    | 3.5 | 28.2<br>28.2     | 28.2    | 7.9<br>8.0 | 8.0     | 22.9<br>23.4 | 23.2    | 77.4<br>77.6      | 77.5    | 5.3<br>5.3              | 5.3     |     | 10.8<br>11.9   | 11.4    |      | 9.3<br>9.7              | 9.5     |     |
|           |                   |                 |               | Bottom    | 6   | 28.1<br>28.1     | 28.1    | 8.0<br>8.1 | 8.1     | 25.3<br>25.6 | 25.5    | 79.1<br>78.3      | 78.7    | 5.4<br>5.3              | 5.4     |     | 16.8<br>16.3   | 16.6    |      | 3.7<br>10.2             | 7.0     |     |
| 24-Jul-13 | Rainy             | Moderate        | 08:40         | Surface   | 1   | 28.0<br>28.0     | 28.0    | 8.3<br>8.2 | 8.3     | 26.8<br>26.8 | 26.8    | 81.7<br>80.8      | 81.3    | 5.5<br>5.5              | 5.5     | 5.4 | 11.2<br>11.4   | 11.3    | 18.2 | 6.8<br>10.0             | 8.4     | 8.4 |
|           |                   |                 |               | Middle    | 4.5 | 28.0<br>28.0     | 28.0    | 8.3<br>8.3 | 8.3     | 27.2<br>27.2 | 27.2    | 78.9<br>78.8      | 78.9    | 5.3<br>5.3              | 5.3     |     | 15.3<br>16.0   | 15.7    |      | 10.2<br>10.2            | 10.2    |     |
|           |                   |                 |               | Bottom    | 8   | 28.0<br>28.0     | 28.0    | 8.3<br>8.3 | 8.3     | 27.3<br>27.3 | 27.3    | 78.7<br>78.6      | 78.7    | 5.3<br>5.3              | 5.3     |     | 26.6<br>28.3   | 27.5    |      | 10.0<br>3.4             | 6.7     |     |
| 26-Jul-13 | Rainy             | Rough           | 10:20         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 24.2<br>24.2 | 24.2    | 93.2<br>92.4      | 92.8    | 6.4<br>6.4              | 6.4     | 6.3 | 5.0<br>4.9     | 5.0     | 9.8  | 5.5<br>8.4              | 7.0     | 5.9 |
|           |                   |                 |               | Middle    | 4.5 | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 25.2<br>25.3 | 25.3    | 90.2<br>90.6      | 90.4    | 6.2<br>6.2              | 6.2     |     | 6.5<br>6.7     | 6.6     |      | 5.2<br>4.5              | 4.9     |     |
|           |                   |                 |               | Bottom    | 8   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 25.9<br>25.8 | 25.9    | 87.9<br>87.5      | 87.7    | 6.0<br>6.0              | 6.0     |     | 18.1<br>17.7   | 17.9    |      | 5.9<br>5.7              | 5.8     |     |
| 29-Jul-13 | Sunny             | Calm            | 13:05         | Surface   | 1   | 28.6<br>28.7     | 28.7    | 8.1<br>8.2 | 8.2     | 18.4<br>18.3 | 18.4    | 84.8<br>84.5      | 84.7    | 6.5<br>6.4              | 6.5     | 6.2 | 4.0<br>3.8     | 3.9     | 8.1  | 2.8<br>2.7              | 2.8     | 3.1 |
|           |                   |                 |               | Middle    | 4.5 | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 20.5<br>20.5 | 20.5    | 77.5<br>77.9      | 77.7    | 5.9<br>5.9              | 5.9     |     | 4.5<br>4.6     | 4.6     |      | 3.1<br>3.3              | 3.2     |     |
|           |                   |                 |               | Bottom    | 8   | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 22.6<br>22.6 | 22.6    | 76.5<br>76.2      | 76.4    | 5.8<br>5.8              | 5.8     |     | 15.3<br>16.4   | 15.9    |      | 3.5<br>3.3              | 3.4     |     |
| 31-Jul-13 | Sunny             | Calm            | 16:01         | Surface   | 1   | 30.3<br>30.3     | 30.3    | 8.3<br>8.3 | 8.3     | 10.6<br>10.6 | 10.6    | 102.8<br>102.0    | 102.4   | 7.4<br>7.4              | 7.4     | 7.0 | 8.7<br>8.7     | 8.7     | 5.6  | 2.4<br>2.1              | 2.3     | 2.3 |
|           |                   |                 |               | Middle    | 4   | 29.0<br>29.0     | 29.0    | 8.1<br>8.1 | 8.1     | 17.3<br>17.4 | 17.4    | 97.3<br>96.6      | 97.0    | 6.6<br>6.6              | 6.6     |     | 2.4<br>2.2     | 2.3     |      | 2.8<br>2.5              | 2.7     |     |
|           |                   |                 |               | Bottom    | 7   | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 20.1<br>20.1 | 20.1    | 85.6<br>85.4      | 85.5    | 5.9<br>5.9              | 5.9     |     | 5.4<br>5.9     | 5.7     |      | 1.8<br>1.8              | 1.8     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | Turbidity(NTU) |            |         | Suspended Solids (mg/L) |            |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|----------------|------------|---------|-------------------------|------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA*            | Value      | Average | DA*                     | Value      | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 09:09         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.8            | -          | -       | 4.9                     | -          | -       | 5.0 |
|           |                   |                 |               | Middle    | 0.9 | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 18.2<br>18.2 | 18.2    | 109.2<br>112.9    | 111.1   | 7.6<br>7.9              | 7.8     |                | 4.8<br>4.9 | 4.9     |                         | 4.3<br>5.7 | 5.0     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 4-Jul-13  | Sunny             | Calm            | 11:25         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.5            | -          | -       | 4.1                     | -          | -       | 6.5 |
|           |                   |                 |               | Middle    | 0.8 | 30.0<br>30.0     | 30.0    | 8.0<br>8.0 | 8.0     | 7.2<br>7.3   | 7.3     | 102.4<br>102.5    | 102.5   | 7.4<br>7.5              | 7.5     |                | 4.1<br>4.1 | 4.1     |                         | 4.8<br>8.2 | 6.5     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 6-Jul-13  | Cloudy            | Moderate        | 12:15         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.8            | -          | -       | 4.8                     | -          | -       | 5.4 |
|           |                   |                 |               | Middle    | 1.2 | 29.4<br>29.4     | 29.4    | 8.4<br>8.5 | 8.5     | 12.2<br>12.1 | 12.2    | 121.4<br>124.0    | 122.7   | 8.7<br>8.9              | 8.8     |                | 4.8<br>4.7 | 4.8     |                         | 5.0<br>5.7 | 5.4     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 8-Jul-13  | Sunny             | Moderate        | 13:19         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.4            | -          | -       | 5.5                     | -          | -       | 8.5 |
|           |                   |                 |               | Middle    | 0.8 | 29.5<br>29.3     | 29.4    | 8.3<br>8.3 | 8.3     | 13.8<br>12.9 | 13.4    | 102.6<br>105.1    | 103.9   | 7.3<br>7.5              | 7.4     |                | 5.5<br>5.5 | 5.5     |                         | 7.3<br>9.7 | 8.5     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 10-Jul-13 | Fine              | Moderate        | 12:41         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.0            | -          | -       | 4.7                     | -          | -       | 2.8 |
|           |                   |                 |               | Middle    | 0.8 | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 20.6<br>21.1 | 20.9    | 88.2<br>85.8      | 87.0    | 6.1<br>5.9              | 6.0     |                | 4.6<br>4.7 | 4.7     |                         | 2.8<br>2.8 | 2.8     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 12-Jul-13 | Sunny             | Moderate        | 14:12         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.1            | -          | -       | 3.2                     | -          | -       | 3.7 |
|           |                   |                 |               | Middle    | 0.8 | 28.2<br>28.5     | 28.4    | 8.3<br>8.3 | 8.3     | 24.3<br>23.4 | 23.9    | 98.5<br>98.9      | 98.7    | 7.0<br>7.1              | 7.1     |                | 3.3<br>3.1 | 3.2     |                         | 3.6<br>3.8 | 3.7     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 15-Jul-13 | Rainy             | Calm            | 17:29         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.5            | -          | -       | 7.4                     | -          | -       | 2.2 |
|           |                   |                 |               | Middle    | 1   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 20.3<br>20.4 | 20.4    | 82.0<br>82.2      | 82.1    | 5.5<br>5.5              | 5.5     |                | 7.4<br>7.3 | 7.4     |                         | 2.5<br>1.9 | 2.2     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |
| 17-Jul-13 | Rainy             | Moderate        | 18:34         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.8            | -          | -       | 4.5                     | -          | -       | 3.6 |
|           |                   |                 |               | Middle    | 1.4 | 26.9<br>26.9     | 26.9    | 8.0<br>8.0 | 8.0     | 26.2<br>26.2 | 26.2    | 84.8<br>84.0      | 84.4    | 5.8<br>5.8              | 5.8     |                | 4.2<br>4.7 | 4.5     |                         | 4.0<br>3.1 | 3.6     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -          | -       |                         | -          | -       |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at SR1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA* | Turbidity (NTU) |         |     | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|-----|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average |     | Value           | Average | DA* | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 09:51         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.5 | -               | -       | 1.4 | -                       | -       | 3.9 |
|           |                   |                 |               | Middle    | 0.9 | 27.1<br>27.1     | 27.1    | 8.1<br>8.1 | 8.1     | 26.7<br>26.6 | 26.7    | 79.9<br>80.2      | 80.1    | 5.5<br>5.5              | 5.5     |     | 1.4<br>1.3      | 1.4     |     | 5.1<br>2.7              | 3.9     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 22-Jul-13 | Cloudy            | Calm            | 13:03         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.5 | -               | -       | 4.8 | -                       | -       | 4.0 |
|           |                   |                 |               | Middle    | 0.7 | 27.7<br>27.7     | 27.7    | 8.3<br>8.3 | 8.3     | 29.1<br>29.1 | 29.1    | 81.8<br>82.4      | 82.1    | 5.5<br>5.5              | 5.5     |     | 4.7<br>4.8      | 4.8     |     | 4.4<br>3.5              | 4.0     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 24-Jul-13 | Rainy             | Moderate        | 12:40         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.4 | -               | -       | 5.0 | -                       | -       | 5.5 |
|           |                   |                 |               | Middle    | 1.4 | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 27.0<br>27.0 | 27.0    | 94.0<br>94.2      | 94.1    | 6.4<br>6.4              | 6.4     |     | 5.1<br>4.8      | 5.0     |     | 5.0<br>5.9              | 5.5     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 26-Jul-13 | Rainy             | Rough           | 14:08         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.8 | -               | -       | 6.0 | -                       | -       | 5.8 |
|           |                   |                 |               | Middle    | 0.8 | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 25.9<br>25.9 | 25.9    | 99.0<br>98.7      | 98.9    | 6.8<br>6.8              | 6.8     |     | 5.8<br>6.1      | 6.0     |     | 6.3<br>5.2              | 5.8     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 29-Jul-13 | Sunny             | Calm            | 16:19         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.1 | -               | -       | 3.2 | -                       | -       | 3.1 |
|           |                   |                 |               | Middle    | 0.7 | 29.8<br>29.6     | 29.7    | 8.1<br>8.1 | 8.1     | 16.2<br>16.8 | 16.5    | 88.4<br>84.4      | 86.4    | 6.2<br>5.9              | 6.1     |     | 3.2<br>3.2      | 3.2     |     | 2.9<br>3.2              | 3.1     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 31-Jul-13 | Sunny             | Calm            | 08:52         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.5 | -               | -       | 2.9 | -                       | -       | 4.0 |
|           |                   |                 |               | Middle    | 1.2 | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 17.7<br>17.7 | 17.7    | 94.5<br>94.7      | 94.6    | 6.5<br>6.5              | 6.5     |     | 2.8<br>2.9      | 2.9     |     | 4.0<br>4.0              | 4.0     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | Turbidity(NTU) |              |         | Suspended Solids (mg/L) |             |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|----------------|--------------|---------|-------------------------|-------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA*            | Value        | Average | DA*                     | Value       | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 14:07         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.6            | -            | -       | 6.9                     | -           | -       | 4.6  |
|           |                   |                 |               | Middle    | 0.9 | 29.4<br>29.4     | 29.4    | 8.0<br>8.0 | 8.0     | 15.4<br>15.4 | 15.4    | 122.4<br>122.9    | 122.7   | 8.6<br>8.6              | 8.6     |                | 7.5<br>6.2   | 6.9     |                         | 4.5<br>4.7  | 4.6     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 4-Jul-13  | Fine              | Calm            | 17:57         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.3            | -            | -       | 4.9                     | -           | -       | 9.3  |
|           |                   |                 |               | Middle    | 0.6 | 30.9<br>30.9     | 30.9    | 8.1<br>8.1 | 8.1     | 7.0<br>7.1   | 7.1     | 101.4<br>101.7    | 101.6   | 7.3<br>7.3              | 7.3     |                | 4.9<br>4.8   | 4.9     |                         | 10.3<br>8.3 | 9.3     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 6-Jul-13  | Cloudy            | Moderate        | 17:34         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.5            | -            | -       | 8.0                     | -           | -       | 6.7  |
|           |                   |                 |               | Middle    | 1.2 | 29.6<br>29.5     | 29.6    | 8.5<br>8.4 | 8.5     | 11.5<br>12.5 | 12.0    | 119.4<br>119.2    | 119.3   | 8.5<br>8.5              | 8.5     |                | 7.7<br>8.2   | 8.0     |                         | 7.3<br>6.0  | 6.7     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 8-Jul-13  | Fine              | Moderate        | 20:23         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.8            | -            | -       | 18.5                    | -           | -       | 14.0 |
|           |                   |                 |               | Middle    | 0.8 | 29.9<br>29.9     | 29.9    | 8.5<br>8.5 | 8.5     | 15.6<br>15.5 | 15.6    | 113.2<br>112.6    | 112.9   | 7.8<br>7.8              | 7.8     |                | 18.7<br>18.3 | 18.5    |                         | 25.3<br>2.7 | 14.0    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 10-Jul-13 | Fine              | Moderate        | 08:03         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.0            | -            | -       | 4.5                     | -           | -       | 3.7  |
|           |                   |                 |               | Middle    | 0.6 | 28.7<br>28.7     | 28.7    | 8.1<br>8.1 | 8.1     | 14.6<br>14.6 | 14.6    | 83.5<br>84.4      | 84.0    | 6.0<br>6.0              | 6.0     |                | 4.5<br>4.4   | 4.5     |                         | 3.5<br>3.8  | 3.7     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 12-Jul-13 | Sunny             | Moderate        | 08:54         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.4            | -            | -       | 3.6                     | -           | -       | 2.7  |
|           |                   |                 |               | Middle    | 0.8 | 29.2<br>29.1     | 29.2    | 8.3<br>8.3 | 8.3     | 14.5<br>14.6 | 14.6    | 99.3<br>101.6     | 100.5   | 7.3<br>7.5              | 7.4     |                | 3.7<br>3.5   | 3.6     |                         | 2.7<br>2.6  | 2.7     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 15-Jul-13 | Rainy             | Calm            | 11:53         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.8            | -            | -       | 4.7                     | -           | -       | 2.0  |
|           |                   |                 |               | Middle    | 0.8 | 29.3<br>29.3     | 29.3    | 8.1<br>8.0 | 8.1     | 12.8<br>12.9 | 12.9    | 81.9<br>82.0      | 82.0    | 5.8<br>5.8              | 5.8     |                | 4.6<br>4.7   | 4.7     |                         | 1.9<br>2.1  | 2.0     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |
| 17-Jul-13 | Rainy             | Moderate        | 14:50         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.9            | -            | -       | 1.4                     | -           | -       | 1.6  |
|           |                   |                 |               | Middle    | 0.9 | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 17.5<br>17.6 | 17.6    | 83.6<br>83.6      | 83.6    | 5.9<br>5.9              | 5.9     |                | 1.3<br>1.4   | 1.4     |                         | 1.7<br>1.4  | 1.6     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | -              | -            | -       |                         | -           | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | Turbidity(NTU) |            |         | Suspended Solids (mg/L) |             |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|----------------|------------|---------|-------------------------|-------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA*            | Value      | Average | DA*                     | Value       | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 15:27         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.6            | -          | -       | 3.1                     | -           | -       | 4.9  |
|           |                   |                 |               | Middle    | 1.3 | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 24.3<br>24.3 | 24.3    | 81.0<br>81.2      | 81.1    | 5.6<br>5.6              | 5.6     |                | 3.0<br>3.1 | 3.1     |                         | 5.0<br>4.7  | 4.9     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -       |                         | -           | -       |      |
| 22-Jul-13 | Rainy             | Moderate        | 18:16         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.4            | -          | -       | 8.1                     | -           | -       | 10.5 |
|           |                   |                 |               | Middle    | 0.9 | 28.3<br>28.2     | 28.3    | 8.1<br>8.1 | 8.1     | 22.6<br>23.3 | 23.0    | 78.3<br>78.4      | 78.4    | 5.4<br>5.4              | 5.4     |                | 7.8<br>8.4 | 8.1     |                         | 11.2<br>9.8 | 10.5    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -       |                         | -           | -       |      |
| 24-Jul-13 | Rainy             | Moderate        | 07:53         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.1            | -          | -       | 8.3                     | -           | -       | 3.9  |
|           |                   |                 |               | Middle    | 1.4 | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.8<br>24.9 | 24.9    | 88.3<br>89.1      | 88.7    | 6.0<br>6.1              | 6.1     |                | 8.5<br>8.0 | 8.3     |                         | 3.9<br>3.8  | 3.9     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -       |                         | -           | -       |      |
| 26-Jul-13 | Rainy             | Rough           | 09:23         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.3            | -          | -       | 5.3                     | -           | -       | 19.3 |
|           |                   |                 |               | Middle    | 0.9 | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 24.7<br>24.7 | 24.7    | 90.7<br>90.1      | 90.4    | 6.3<br>6.2              | 6.3     |                | 5.2<br>5.3 | 5.3     |                         | 8.6<br>30.0 | 19.3    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -       |                         | -           | -       |      |
| 29-Jul-13 | Sunny             | Calm            | 11:41         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.9            | -          | -       | 3.5                     | -           | -       | 2.2  |
|           |                   |                 |               | Middle    | 0.9 | 29.1<br>29.1     | 29.1    | 8.0<br>8.0 | 8.0     | 15.3<br>15.3 | 15.3    | 83.1<br>84.1      | 83.6    | 5.9<br>5.9              | 5.9     |                | 3.6<br>3.3 | 3.5     |                         | 2.4<br>2.0  | 2.2     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -       |                         | -           | -       |      |
| 31-Jul-13 | Sunny             | Calm            | 13:35         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.0            | -          | -       | 2.8                     | -           | -       | 2.3  |
|           |                   |                 |               | Middle    | 0.8 | 30.1<br>30.1     | 30.1    | 8.4<br>8.4 | 8.4     | 14.6<br>14.5 | 14.6    | 102.3<br>102.1    | 102.2   | 7.0<br>7.0              | 7.0     |                | 2.7<br>2.9 | 2.8     |                         | 2.4<br>2.2  | 2.3     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -       |                         | -           | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA* | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average |     | Value          | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 07:59         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.1 | -              | -       | 9.8  | -                       | -       | 4.9 |
|           |                   |                 |               | Middle    | 0.6 | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 17.5<br>17.5 | 17.5    | 115.4<br>115.7    | 115.6   | 8.1<br>8.1              | 8.1     |     | 9.8<br>9.8     | 9.8     |      | 4.0<br>5.7              | 4.9     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 4-Jul-13  | Sunny             | Calm            | 09:36         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.3 | -              | -       | 5.9  | -                       | -       | 4.3 |
|           |                   |                 |               | Middle    | 0.6 | 29.7<br>29.7     | 29.7    | 8.0<br>8.0 | 8.0     | 10.7<br>10.7 | 10.7    | 101.7<br>101.6    | 101.7   | 7.3<br>7.3              | 7.3     |     | 5.8<br>5.9     | 5.9     |      | 4.5<br>4.0              | 4.3     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 6-Jul-13  | Cloudy            | Moderate        | 10:45         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.4 | -              | -       | 8.7  | -                       | -       | 6.2 |
|           |                   |                 |               | Middle    | 1   | 29.7<br>29.7     | 29.7    | 8.3<br>8.3 | 8.3     | 13.2<br>13.3 | 13.3    | 103.8<br>104.9    | 104.4   | 7.3<br>7.4              | 7.4     |     | 8.6<br>8.8     | 8.7     |      | 6.3<br>6.0              | 6.2     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 8-Jul-13  | Sunny             | Moderate        | 11:58         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.5 | -              | -       | 10.1 | -                       | -       | 7.0 |
|           |                   |                 |               | Middle    | 1.1 | 28.9<br>28.9     | 28.9    | 8.2<br>8.2 | 8.2     | 14.7<br>14.7 | 14.7    | 91.0<br>92.0      | 91.5    | 6.5<br>6.5              | 6.5     |     | 10.1<br>10.0   | 10.1    |      | 6.3<br>7.7              | 7.0     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 10-Jul-13 | Fine              | Moderate        | 14:13         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.5 | -              | -       | 12.5 | -                       | -       | 2.7 |
|           |                   |                 |               | Middle    | 0.7 | 28.9<br>29.5     | 29.2    | 8.1<br>8.2 | 8.2     | 20.5<br>18.4 | 19.5    | 86.9<br>101.4     | 94.2    | 6.0<br>7.0              | 6.5     |     | 13.2<br>11.7   | 12.5    |      | 3.0<br>2.4              | 2.7     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 12-Jul-13 | Sunny             | Moderate        | 15:40         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.8 | -              | -       | 12.4 | -                       | -       | 3.4 |
|           |                   |                 |               | Middle    | 0.7 | 29.6<br>29.4     | 29.5    | 8.4<br>8.3 | 8.4     | 20.6<br>21.0 | 20.8    | 95.2<br>94.8      | 95.0    | 6.8<br>6.8              | 6.8     |     | 11.2<br>13.5   | 12.4    |      | 3.7<br>3.0              | 3.4     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 15-Jul-13 | Rainy             | Calm            | 16:03         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.8 | -              | -       | 5.9  | -                       | -       | 4.6 |
|           |                   |                 |               | Middle    | 0.9 | 28.4<br>28.4     | 28.4    | 8.2<br>8.2 | 8.2     | 17.3<br>17.3 | 17.3    | 86.3<br>85.8      | 86.1    | 5.8<br>5.8              | 5.8     |     | 5.8<br>5.9     | 5.9     |      | 4.7<br>4.5              | 4.6     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |
| 17-Jul-13 | Rainy             | Moderate        | 20:12         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.6 | -              | -       | 5.6  | -                       | -       | 4.4 |
|           |                   |                 |               | Middle    | 0.8 | 28.2<br>28.1     | 28.2    | 8.0<br>8.0 | 8.0     | 18.3<br>18.1 | 18.2    | 78.0<br>79.3      | 78.7    | 5.5<br>5.6              | 5.6     |     | 5.3<br>5.9     | 5.6     |      | 4.1<br>4.6              | 4.4     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 08:16         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.6 | -              | -       | 11.0 | -                       | -       | 1.8  |
|           |                   |                 |               | Middle    | 0.7 | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 25.5<br>25.5 | 25.5    | 80.7<br>80.1      | 80.4    | 5.6<br>5.6              | 5.6     |     | 11.2<br>10.8   | 11.0    |      | 2.0<br>1.6              | 1.8     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 22-Jul-13 | Cloudy            | Calm            | 11:24         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.3 | -              | -       | 16.5 | -                       | -       | 3.7  |
|           |                   |                 |               | Middle    | 1.1 | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.2<br>28.2 | 28.2    | 76.5<br>77.2      | 76.9    | 5.2<br>5.3              | 5.3     |     | 16.3<br>16.6   | 16.5    |      | 3.9<br>3.4              | 3.7     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 24-Jul-13 | Rainy             | Moderate        | 13:59         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.3 | -              | -       | 4.6  | -                       | -       | 5.4  |
|           |                   |                 |               | Middle    | 0.9 | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 26.3<br>26.3 | 26.3    | 93.4<br>92.7      | 93.1    | 6.3<br>6.3              | 6.3     |     | 4.1<br>5.0     | 4.6     |      | 5.7<br>5.0              | 5.4     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 26-Jul-13 | Rainy             | Rough           | 15:00         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.6 | -              | -       | 14.1 | -                       | -       | 13.1 |
|           |                   |                 |               | Middle    | 0.7 | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 25.9<br>26.5 | 26.2    | 96.0<br>96.5      | 96.3    | 6.6<br>6.6              | 6.6     |     | 14.2<br>13.9   | 14.1    |      | 9.2<br>17.0             | 13.1    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 29-Jul-13 | Sunny             | Calm            | 17:04         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.0 | -              | -       | 10.0 | -                       | -       | 3.4  |
|           |                   |                 |               | Middle    | 0.6 | 29.6<br>28.0     | 28.8    | 8.1<br>8.2 | 8.2     | 22.9<br>23.1 | 23.0    | 85.6<br>87.2      | 86.4    | 5.9<br>6.0              | 6.0     |     | 10.5<br>9.4    | 10.0    |      | 3.2<br>3.5              | 3.4     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 31-Jul-13 | Sunny             | Calm            | 07:13         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.0 | -              | -       | 4.5  | -                       | -       | 4.2  |
|           |                   |                 |               | Middle    | 0.7 | 29.0<br>29.1     | 29.1    | 8.2<br>8.2 | 8.2     | 17.4<br>16.0 | 16.7    | 101.3<br>101.1    | 101.2   | 6.9<br>7.0              | 7.0     |     | 4.5<br>4.4     | 4.5     |      | 3.8<br>4.6              | 4.2     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA* | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average |     | Value          | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 15:27         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.8 | -              | -       | 14.8 | -                       | -       | 4.5  |
|           |                   |                 |               | Middle    | 0.6 | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 18.5<br>18.5 | 18.5    | 112.5<br>112.6    | 112.6   | 7.8<br>7.8              | 7.8     |     | 15.3<br>14.3   | 14.8    |      | 4.8<br>4.2              | 4.5     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 4-Jul-13  | Fine              | Calm            | 16:32         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.5 | -              | -       | 12.8 | -                       | -       | 2.6  |
|           |                   |                 |               | Middle    | 0.5 | 30.6<br>30.6     | 30.6    | 8.2<br>8.2 | 8.2     | 13.1<br>13.1 | 13.1    | 120.6<br>122.1    | 121.4   | 8.4<br>8.5              | 8.5     |     | 13.5<br>12.1   | 12.8    |      | 2.7<br>2.5              | 2.6     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 6-Jul-13  | Cloudy            | Moderate        | 19:15         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.8 | -              | -       | 8.3  | -                       | -       | 5.7  |
|           |                   |                 |               | Middle    | 1   | 30.1<br>30.1     | 30.1    | 8.4<br>8.4 | 8.4     | 15.3<br>15.3 | 15.3    | 111.1<br>112.2    | 111.7   | 7.7<br>7.8              | 7.8     |     | 8.5<br>8.0     | 8.3     |      | 6.7<br>4.7              | 5.7     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 8-Jul-13  | Fine              | Moderate        | 19:07         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.3 | -              | -       | 14.4 | -                       | -       | 19.5 |
|           |                   |                 |               | Middle    | 0.7 | 30.3<br>30.3     | 30.3    | 8.3<br>8.3 | 8.3     | 15.4<br>15.4 | 15.4    | 119.4<br>119.9    | 119.7   | 8.3<br>8.3              | 8.3     |     | 15.5<br>13.3   | 14.4    |      | 23.0<br>16.0            | 19.5    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 10-Jul-13 | Fine              | Moderate        | 06:19         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.5 | -              | -       | 7.7  | -                       | -       | 4.2  |
|           |                   |                 |               | Middle    | 0.6 | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 16.7<br>16.7 | 16.7    | 76.8<br>77.4      | 77.1    | 5.4<br>5.5              | 5.5     |     | 8.0<br>7.4     | 7.7     |      | 3.8<br>4.5              | 4.2     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 12-Jul-13 | Sunny             | Moderate        | 07:24         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.6 | -              | -       | 6.4  | -                       | -       | 3.8  |
|           |                   |                 |               | Middle    | 0.6 | 29.2<br>29.2     | 29.2    | 8.2<br>8.2 | 8.2     | 18.0<br>18.0 | 18.0    | 104.6<br>104.6    | 104.6   | 7.6<br>7.6              | 7.6     |     | 5.8<br>6.9     | 6.4     |      | 2.6<br>5.0              | 3.8     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 15-Jul-13 | Rainy             | Calm            | 10:29         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.7 | -              | -       | 9.9  | -                       | -       | 2.5  |
|           |                   |                 |               | Middle    | 0.5 | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 18.7<br>18.7 | 18.7    | 96.2<br>96.7      | 96.5    | 6.6<br>6.7              | 6.7     |     | 10.2<br>9.5    | 9.9     |      | 2.4<br>2.6              | 2.5     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 17-Jul-13 | Rainy             | Moderate        | 13:05         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.6 | -              | -       | 11.6 | -                       | -       | 8.2  |
|           |                   |                 |               | Middle    | 0.6 | 28.2<br>28.3     | 28.3    | 8.0<br>8.0 | 8.0     | 20.4<br>20.4 | 20.4    | 80.3<br>79.5      | 79.9    | 5.6<br>5.5              | 5.6     |     | 11.7<br>11.5   | 11.6    |      | 8.4<br>7.9              | 8.2     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA* | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average |     | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 17:09         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.9 | -               | -       | 15.6 | -                       | -       | 4.8  |
|           |                   |                 |               | Middle    | 0.9 | 28.7<br>28.7     | 28.7    | 8.1<br>8.1 | 8.1     | 24.1<br>24.1 | 24.1    | 86.3<br>86.0      | 86.2    | 5.9<br>5.9              | 5.9     |     | 15.6<br>15.6    | 15.6    |      | 5.0<br>4.5              | 4.8     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 22-Jul-13 | Rainy             | Moderate        | 20:05         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.0 | -               | -       | 16.6 | -                       | -       | 9.7  |
|           |                   |                 |               | Middle    | 0.2 | 28.5<br>28.5     | 28.5    | 8.1<br>8.1 | 8.1     | 25.5<br>25.6 | 25.6    | 88.7<br>88.7      | 88.7    | 6.0<br>6.0              | 6.0     |     | 16.6<br>16.6    | 16.6    |      | 9.4<br>9.9              | 9.7     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 24-Jul-13 | Rainy             | Moderate        | 06:25         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.6 | -               | -       | 8.2  | -                       | -       | 7.4  |
|           |                   |                 |               | Middle    | 0.7 | 27.9<br>27.9     | 27.9    | 8.0<br>8.0 | 8.0     | 24.6<br>24.6 | 24.6    | 82.5<br>80.3      | 81.4    | 5.6<br>5.5              | 5.6     |     | 8.4<br>7.9      | 8.2     |      | 7.4<br>7.4              | 7.4     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 26-Jul-13 | Rainy             | Rough           | 08:32         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.1 | -               | -       | 13.9 | -                       | -       | 14.2 |
|           |                   |                 |               | Middle    | 0.9 | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 26.2<br>26.5 | 26.4    | 90.8<br>88.0      | 89.4    | 6.2<br>6.0              | 6.1     |     | 13.8<br>14.0    | 13.9    |      | 14.6<br>13.8            | 14.2    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 29-Jul-13 | Sunny             | Calm            | 10:59         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.8 | -               | -       | 19.3 | -                       | -       | 2.1  |
|           |                   |                 |               | Middle    | 0.9 | 28.3<br>28.2     | 28.3    | 8.0<br>8.1 | 8.1     | 18.1<br>19.5 | 18.8    | 79.7<br>84.6      | 82.2    | 5.6<br>5.9              | 5.8     |     | 19.5<br>19.0    | 19.3    |      | 2.3<br>1.9              | 2.1     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 31-Jul-13 | Sunny             | Calm            | 15:39         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.7 | -               | -       | 15.4 | -                       | -       | 3.1  |
|           |                   |                 |               | Middle    | 0.5 | 29.9<br>29.9     | 29.9    | 8.2<br>8.2 | 8.2     | 17.9<br>17.9 | 17.9    | 99.3<br>99.3      | 99.3    | 6.7<br>6.7              | 6.7     |     | 15.1<br>15.6    | 15.4    |      | 3.7<br>2.4              | 3.1     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR3 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA* | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average |     | Value          | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 07:40         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.2 | -              | -       | 9.1  | -                       | -       | 5.5  |
|           |                   |                 |               | Middle    | 0.6 | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 17.8<br>17.8 | 17.8    | 117.1<br>116.0    | 116.6   | 8.2<br>8.1              | 8.2     |     | 9.2<br>8.9     | 9.1     |      | 6.2<br>4.7              | 5.5     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 4-Jul-13  | Sunny             | Calm            | 09:13         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.5 | -              | -       | 6.5  | -                       | -       | 9.1  |
|           |                   |                 |               | Middle    | 0.8 | 29.9<br>29.8     | 29.9    | 8.0<br>8.0 | 8.0     | 11.6<br>11.6 | 11.6    | 119.2<br>119.6    | 119.4   | 8.5<br>8.5              | 8.5     |     | 6.6<br>6.4     | 6.5     |      | 8.6<br>9.6              | 9.1     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 6-Jul-13  | Cloudy            | Moderate        | 10:34         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.0 | -              | -       | 13.4 | -                       | -       | 7.9  |
|           |                   |                 |               | Middle    | 1.1 | 30.2<br>30.2     | 30.2    | 8.3<br>8.3 | 8.3     | 12.9<br>12.9 | 12.9    | 113.4<br>112.9    | 113.2   | 8.0<br>7.9              | 8.0     |     | 13.4<br>13.4   | 13.4    |      | 8.0<br>7.7              | 7.9     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 8-Jul-13  | Sunny             | Moderate        | 11:42         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.4 | -              | -       | 7.3  | -                       | -       | 9.8  |
|           |                   |                 |               | Middle    | 1.3 | 29.2<br>29.3     | 29.3    | 8.2<br>8.2 | 8.2     | 14.8<br>14.8 | 14.8    | 102.8<br>104.2    | 103.5   | 7.3<br>7.4              | 7.4     |     | 7.4<br>7.1     | 7.3     |      | 10.3<br>9.3             | 9.8     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 10-Jul-13 | Fine              | Moderate        | 14:42         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.9 | -              | -       | 20.2 | -                       | -       | 3.6  |
|           |                   |                 |               | Middle    | 0.8 | 29.4<br>29.4     | 29.4    | 8.2<br>8.2 | 8.2     | 18.1<br>18.1 | 18.1    | 99.1<br>98.5      | 98.8    | 6.9<br>6.8              | 6.9     |     | 22.1<br>18.2   | 20.2    |      | 3.8<br>3.3              | 3.6     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 12-Jul-13 | Sunny             | Moderate        | 16:03         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.7 | -              | -       | 9.9  | -                       | -       | 10.6 |
|           |                   |                 |               | Middle    | 0.7 | 30.2<br>30.3     | 30.3    | 8.5<br>8.5 | 8.5     | 19.3<br>19.3 | 19.3    | 91.3<br>95.1      | 93.2    | 6.5<br>6.8              | 6.7     |     | 9.5<br>10.2    | 9.9     |      | 14.8<br>6.3             | 10.6    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 15-Jul-13 | Rainy             | Calm            | 15:36         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.7 | -              | -       | 4.2  | -                       | -       | 7.8  |
|           |                   |                 |               | Middle    | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 16.5<br>17.2 | 16.9    | 98.7<br>98.5      | 98.6    | 6.7<br>6.7              | 6.7     |     | 4.2<br>4.1     | 4.2     |      | 8.8<br>6.8              | 7.8     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 17-Jul-13 | Rainy             | Moderate        | 20:35         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.3 | -              | -       | 5.1  | -                       | -       | 5.4  |
|           |                   |                 |               | Middle    | 0.8 | 28.1<br>28.1     | 28.1    | 8.1<br>8.1 | 8.1     | 19.9<br>19.9 | 19.9    | 89.6<br>88.9      | 89.3    | 6.3<br>6.2              | 6.3     |     | 5.1<br>5.1     | 5.1     |      | 5.4<br>5.4              | 5.4     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at SR3 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |     | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|-----|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA* | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 08:04         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.8 | -               | -       | 5.1 | -                       | -       | 3.2 |
|           |                   |                 |               | Middle    | 0.7 | 27.6<br>27.6     | 27.6    | 7.9<br>7.9 | 7.9     | 22.8<br>22.8 | 22.8    | 83.8<br>83.5      | 83.7    | 5.8<br>5.8              | 5.8     |     | 5.0<br>5.1      | 5.1     |     | 4.2<br>2.2              | 3.2     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 22-Jul-13 | Cloudy            | Calm            | 11:10         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.7 | -               | -       | 3.7 | -                       | -       | 2.8 |
|           |                   |                 |               | Middle    | 1   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 24.9<br>25.0 | 25.0    | 84.3<br>84.1      | 84.2    | 5.7<br>5.7              | 5.7     |     | 3.4<br>4.0      | 3.7     |     | 2.3<br>3.3              | 2.8     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 24-Jul-13 | Rainy             | Moderate        | 14:18         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.5 | -               | -       | 5.8 | -                       | -       | 5.1 |
|           |                   |                 |               | Middle    | 0.8 | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 26.4<br>26.4 | 26.4    | 96.2<br>95.4      | 95.8    | 6.5<br>6.5              | 6.5     |     | 5.8<br>5.7      | 5.8     |     | 5.3<br>4.9              | 5.1     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 26-Jul-13 | Rainy             | Rough           | 15:59         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.8 | -               | -       | 7.5 | -                       | -       | 8.6 |
|           |                   |                 |               | Middle    | 0.9 | 27.5<br>27.5     | 27.5    | 8.0<br>8.0 | 8.0     | 23.4<br>23.4 | 23.4    | 97.0<br>96.1      | 96.6    | 6.8<br>6.7              | 6.8     |     | 7.4<br>7.6      | 7.5     |     | 8.0<br>9.2              | 8.6     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 29-Jul-13 | Sunny             | Calm            | 17:41         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.3 | -               | -       | 9.7 | -                       | -       | 3.1 |
|           |                   |                 |               | Middle    | 0.9 | 29.7<br>29.6     | 29.7    | 8.2<br>8.2 | 8.2     | 19.9<br>19.9 | 19.9    | 91.9<br>91.9      | 91.9    | 6.3<br>6.3              | 6.3     |     | 9.6<br>9.7      | 9.7     |     | 3.6<br>2.6              | 3.1     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |
| 31-Jul-13 | Sunny             | Calm            | 06:52         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.6 | -               | -       | 5.7 | -                       | -       | 3.6 |
|           |                   |                 |               | Middle    | 1.1 | 29.8<br>29.8     | 29.8    | 8.2<br>8.2 | 8.2     | 17.0<br>17.0 | 17.0    | 111.6<br>111.0    | 111.3   | 7.6<br>7.6              | 7.6     |     | 5.7<br>5.6      | 5.7     |     | 4.2<br>3.0              | 3.6     |     |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |     | -                       | -       |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR3 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | DA* | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average |     | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 15:42         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.3 | -               | -       | 8.3  | -                       | -       | 5.0  |
|           |                   |                 |               | Middle    | 0.7 | 29.2<br>29.2     | 29.2    | 8.2<br>8.2 | 8.2     | 19.3<br>19.3 | 19.3    | 104.7<br>105.9    | 105.3   | 7.2<br>7.3              | 7.3     |     | 8.4<br>8.1      | 8.3     |      | 4.0<br>6.0              | 5.0     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 4-Jul-13  | Fine              | Calm            | 16:18         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.2 | -               | -       | 13.2 | -                       | -       | 14.5 |
|           |                   |                 |               | Middle    | 0.7 | 30.7<br>30.7     | 30.7    | 8.0<br>8.0 | 8.0     | 13.6<br>13.6 | 13.6    | 123.2<br>122.0    | 122.6   | 8.2<br>8.1              | 8.2     |     | 13.4<br>13.0    | 13.2    |      | 13.0<br>16.0            | 14.5    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 6-Jul-13  | Cloudy            | Moderate        | 19:45         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.9 | -               | -       | 11.9 | -                       | -       | 7.0  |
|           |                   |                 |               | Middle    | 1   | 30.1<br>30.1     | 30.1    | 8.2<br>8.2 | 8.2     | 15.3<br>15.3 | 15.3    | 113.0<br>113.5    | 113.3   | 7.8<br>7.9              | 7.9     |     | 12.6<br>11.1    | 11.9    |      | 5.7<br>8.3              | 7.0     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 8-Jul-13  | Fine              | Moderate        | 18:45         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.2 | -               | -       | 11.0 | -                       | -       | 20.9 |
|           |                   |                 |               | Middle    | 1   | 29.6<br>29.6     | 29.6    | 8.0<br>8.0 | 8.0     | 15.7<br>15.7 | 15.7    | 117.3<br>116.3    | 116.8   | 8.2<br>8.1              | 8.2     |     | 10.9<br>11.0    | 11.0    |      | 23.0<br>18.7            | 20.9    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 10-Jul-13 | Fine              | Moderate        | 06:04         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.9 | -               | -       | 10.8 | -                       | -       | 3.6  |
|           |                   |                 |               | Middle    | 0.7 | 29.1<br>29.1     | 29.1    | 8.0<br>8.0 | 8.0     | 17.1<br>17.3 | 17.2    | 84.2<br>82.5      | 83.4    | 5.9<br>5.8              | 5.9     |     | 10.8<br>10.7    | 10.8    |      | 2.9<br>4.3              | 3.6     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 12-Jul-13 | Sunny             | Moderate        | 07:08         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.2 | -               | -       | 6.7  | -                       | -       | 4.3  |
|           |                   |                 |               | Middle    | 0.7 | 29.0<br>29.0     | 29.0    | 8.1<br>8.1 | 8.1     | 20.2<br>20.1 | 20.2    | 99.6<br>98.6      | 99.1    | 7.2<br>7.1              | 7.2     |     | 6.7<br>6.6      | 6.7     |      | 4.2<br>4.3              | 4.3     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 15-Jul-13 | Rainy             | Calm            | 10:13         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.3 | -               | -       | 8.0  | -                       | -       | 6.1  |
|           |                   |                 |               | Middle    | 0.7 | 29.4<br>29.4     | 29.4    | 8.0<br>8.0 | 8.0     | 19.3<br>19.3 | 19.3    | 92.2<br>91.7      | 92.0    | 6.3<br>6.3              | 6.3     |     | 8.0<br>8.0      | 8.0     |      | 6.7<br>5.5              | 6.1     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |
| 17-Jul-13 | Rainy             | Moderate        | 12:47         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.6 | -               | -       | 8.8  | -                       | -       | 10.0 |
|           |                   |                 |               | Middle    | 0.6 | 28.4<br>28.4     | 28.4    | 8.1<br>8.1 | 8.1     | 20.5<br>20.5 | 20.5    | 94.9<br>95.0      | 95.0    | 6.6<br>6.6              | 6.6     |     | 8.8<br>8.8      | 8.8     |      | 8.8<br>11.2             | 10.0    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR3 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 17:23         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.2 | -              | -       | 9.0  | -                       | -       | 4.6  |
|           |                   |                 |               | Middle    | 0.9 | 28.4<br>28.4     | 28.4    | 8.1<br>8.2 | 8.2     | 23.6<br>23.6 | 23.6    | 105.0<br>104.8    | 104.9   | 7.2<br>7.2              | 7.2     |     | 9.2<br>8.7     | 9.0     |      | 4.1<br>5.0              | 4.6     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 22-Jul-13 | Rainy             | Moderate        | 20:19         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 7.0 | -              | -       | 8.9  | -                       | -       | 11.0 |
|           |                   |                 |               | Middle    | 0.7 | 28.5<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 24.8<br>24.8 | 24.8    | 103.7<br>102.6    | 103.2   | 7.0<br>6.9              | 7.0     |     | 8.5<br>9.2     | 8.9     |      | 10.7<br>11.3            | 11.0    |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 24-Jul-13 | Rainy             | Moderate        | 06:09         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 5.8 | -              | -       | 11.0 | -                       | -       | 9.8  |
|           |                   |                 |               | Middle    | 1.1 | 27.9<br>27.9     | 27.9    | 7.9<br>8.0 | 8.0     | 24.0<br>24.0 | 24.0    | 84.5<br>84.0      | 84.3    | 5.8<br>5.8              | 5.8     |     | 11.0<br>10.9   | 11.0    |      | 9.8<br>9.8              | 9.8     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 26-Jul-13 | Rainy             | Rough           | 07:37         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.2 | -              | -       | 13.7 | -                       | -       | 8.2  |
|           |                   |                 |               | Middle    | 1.3 | 27.3<br>27.3     | 27.3    | 7.8<br>7.9 | 7.9     | 24.0<br>24.0 | 24.0    | 89.9<br>86.3      | 88.1    | 6.3<br>6.0              | 6.2     |     | 14.0<br>13.3   | 13.7    |      | 4.9<br>11.4             | 8.2     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 29-Jul-13 | Sunny             | Calm            | 10:14         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 6.2 | -              | -       | 16.0 | -                       | -       | 3.5  |
|           |                   |                 |               | Middle    | 1.3 | 28.3<br>28.3     | 28.3    | 8.0<br>8.0 | 8.0     | 20.5<br>20.5 | 20.5    | 87.4<br>90.0      | 88.7    | 6.1<br>6.3              | 6.2     |     | 16.0<br>16.0   | 16.0    |      | 4.5<br>2.5              | 3.5     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |
| 31-Jul-13 | Sunny             | Calm            | 15:55         | Surface   | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       | 8.1 | -              | -       | 5.3  | -                       | -       | 3.3  |
|           |                   |                 |               | Middle    | 0.6 | 30.0<br>30.0     | 30.0    | 7.5<br>7.5 | 7.5     | 18.3<br>18.4 | 18.4    | 119.2<br>120.2    | 119.7   | 8.1<br>8.1              | 8.1     |     | 5.2<br>5.3     | 5.3     |      | 3.2<br>3.3              | 3.3     |      |
|           |                   |                 |               | Bottom    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -              | -       |      | -                       | -       |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR6 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         | Turbidity(NTU) |            |            | Suspended Solids (mg/L) |            |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|----------------|------------|------------|-------------------------|------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA*            | Value      | Average    | DA*                     | Value      | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 08:05         | Surface   | 1   | 28.6<br>28.7     | 28.7    | 8.3<br>8.3 | 8.3     | 16.8<br>16.7 | 16.8    | 115.8<br>114.7    | 115.3   | 8.2<br>8.1              | 8.2     | 8.2            | 3.3<br>2.9 | 3.1        | 4.8                     | 6.7<br>4.5 | 5.6     | 6.0 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          |         |     |
|           |                   |                 |               | Bottom    | 3.1 | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.4<br>17.4 | 17.4    | 103.1<br>103.7    | 103.4   | 7.3<br>7.3              | 7.3     | 6.2<br>6.8     | 6.5        | 5.5<br>7.0 |                         | 6.3        |         |     |
| 4-Jul-13  | Sunny             | Calm            | 09:33         | Surface   | 1   | 29.9<br>29.9     | 29.9    | 8.2<br>8.2 | 8.2     | 6.4<br>6.4   | 6.4     | 122.6<br>123.4    | 123.0   | 9.0<br>9.0              | 9.0     | 9.0            | 4.8<br>4.8 | 4.8        | 4.6                     | 1.8<br>2.0 | 1.9     | 2.1 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          |         |     |
|           |                   |                 |               | Bottom    | 4.1 | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 18.5<br>18.6 | 18.6    | 93.5<br>92.1      | 92.8    | 6.5<br>6.4              | 6.5     | 4.4<br>4.3     | 4.4        | 1.2<br>3.3 |                         | 2.3        |         |     |
| 6-Jul-13  | Cloudy            | Moderate        | 10:54         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.5<br>8.5 | 8.5     | 10.7<br>10.7 | 10.7    | 125.0<br>125.6    | 125.3   | 9.0<br>9.0              | 9.0     | 9.0            | 4.4<br>4.4 | 4.4        | 3.8                     | 7.0<br>7.7 | 7.4     | 6.8 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          | -       |     |
|           |                   |                 |               | Bottom    | 3.3 | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 26.7<br>26.9 | 26.8    | 77.9<br>77.4      | 77.7    | 5.9<br>5.9              | 5.9     | 3.0<br>3.1     | 3.1        | 5.0<br>7.3 |                         | 6.2        |         |     |
| 8-Jul-13  | Sunny             | Moderate        | 12:22         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.2<br>8.2 | 8.2     | 12.8<br>12.8 | 12.8    | 98.3<br>98.0      | 98.2    | 7.0<br>7.0              | 7.0     | 7.0            | 5.4<br>5.6 | 5.5        | 6.2                     | 8.0<br>8.0 | 8.0     | 6.9 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          | -       |     |
|           |                   |                 |               | Bottom    | 3.4 | 28.3<br>28.6     | 28.5    | 8.1<br>8.2 | 8.2     | 21.3<br>17.3 | 19.3    | 81.4<br>83.0      | 82.2    | 5.8<br>6.0              | 5.9     | 7.4<br>6.4     | 6.9        | 6.7<br>4.7 |                         | 5.7        |         |     |
| 10-Jul-13 | Fine              | Moderate        | 13:09         | Surface   | 1   | 29.6<br>29.9     | 29.8    | 8.3<br>8.4 | 8.4     | 16.8<br>15.2 | 16.0    | 129.3<br>129.9    | 129.6   | 9.3<br>9.3              | 9.3     | 9.3            | 4.5<br>4.5 | 4.5        | 8.2                     | 3.8<br>4.3 | 4.1     | 3.9 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          | -       |     |
|           |                   |                 |               | Bottom    | 3.3 | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 26.2<br>26.3 | 26.3    | 70.0<br>69.2      | 69.6    | 5.1<br>5.0              | 5.1     | 12.1<br>11.4   | 11.8       | 4.3<br>2.8 |                         | 3.6        |         |     |
| 12-Jul-13 | Sunny             | Moderate        | 14:09         | Surface   | 1   | 29.7<br>29.6     | 29.7    | 8.2<br>8.2 | 8.2     | 17.2<br>18.8 | 18.0    | 90.7<br>89.3      | 90.0    | 6.6<br>6.4              | 6.5     | 6.5            | 3.6<br>3.7 | 3.7        | 5.9                     | 3.7<br>3.0 | 3.4     | 6.4 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          | -       |     |
|           |                   |                 |               | Bottom    | 4   | 26.5<br>26.6     | 26.6    | 8.0<br>8.1 | 8.1     | 29.6<br>28.9 | 29.3    | 67.2<br>67.6      | 67.4    | 4.9<br>5.0              | 5.0     | 7.5<br>8.7     | 8.1        | 8.8<br>9.7 |                         | 9.3        |         |     |
| 15-Jul-13 | Rainy             | Calm            | 17:40         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.1<br>8.1 | 8.1     | 16.9<br>16.9 | 16.9    | 84.9<br>84.1      | 84.5    | 6.0<br>5.9              | 6.0     | 6.0            | 1.5<br>1.6 | 1.6        | 3.7                     | 2.0<br>2.3 | 2.2     | 2.2 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          | -       |     |
|           |                   |                 |               | Bottom    | 4.5 | 26.4<br>26.4     | 26.4    | 8.0<br>8.0 | 8.0     | 28.3<br>28.3 | 28.3    | 75.2<br>70.6      | 72.9    | 5.1<br>4.8              | 5.0     | 5.5<br>5.8     | 5.7        | 2.3<br>2.1 |                         | 2.2        |         |     |
| 17-Jul-13 | Rainy             | Moderate        | 18:23         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.2<br>17.2 | 17.2    | 90.3<br>90.0      | 90.2    | 6.4<br>6.4              | 6.4     | 6.4            | 2.2<br>2.0 | 2.1        | 2.7                     | 1.9<br>1.9 | 1.9     | 2.2 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |                | -          | -          |                         | -          | -       |     |
|           |                   |                 |               | Bottom    | 2.9 | 26.8<br>27.3     | 27.1    | 8.2<br>8.2 | 8.2     | 27.1<br>24.6 | 25.9    | 88.9<br>85.7      | 87.3    | 6.1<br>5.9              | 6.0     | 3.4<br>3.1     | 3.3        | 2.3<br>2.5 |                         | 2.4        |         |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR6 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 08:42         | Surface   | 1   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 23.8<br>24.1 | 24.0    | 81.6<br>81.0      | 81.3    | 5.6<br>5.6              | 5.6     | 5.6 | 2.0<br>2.0      | 2.0     | 3.8  | 3.5<br>5.1              | 4.3     | 4.9 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 3.3 | 26.4<br>26.4     | 26.4    | 8.2<br>8.2 | 8.2     | 29.3<br>29.2 | 29.3    | 72.6<br>72.7      | 72.7    | 4.9<br>4.9              | 4.9     |     | 5.9<br>5.3      | 5.6     |      | 7.7<br>3.1              | 5.4     |     |
| 22-Jul-13 | Cloudy            | Calm            | 12:43         | Surface   | 1   | 27.8<br>27.7     | 27.8    | 8.2<br>8.2 | 8.2     | 27.1<br>27.8 | 27.5    | 79.9<br>80.3      | 80.1    | 5.4<br>5.4              | 5.4     | 5.4 | 7.5<br>6.5      | 7.0     | 7.2  | 5.2<br>4.0              | 4.6     | 5.0 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.1 | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.6<br>28.7 | 28.7    | 81.7<br>80.9      | 81.3    | 5.5<br>5.5              | 5.5     |     | 7.1<br>7.4      | 7.3     |      | 5.5<br>5.3              | 5.4     |     |
| 24-Jul-13 | Rainy             | Moderate        | 12:58         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 26.9<br>27.0 | 27.0    | 91.2<br>90.9      | 91.1    | 6.2<br>6.1              | 6.2     | 6.2 | 5.4<br>5.3      | 5.4     | 11.3 | 3.8<br>4.6              | 4.2     | 3.7 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.4 | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.9<br>29.9 | 29.9    | 89.3<br>89.4      | 89.4    | 5.9<br>5.9              | 5.9     |     | 17.2<br>17.0    | 17.1    |      | 2.7<br>3.7              | 3.2     |     |
| 26-Jul-13 | Rainy             | Rough           | 14:37         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 25.2<br>25.2 | 25.2    | 89.4<br>89.3      | 89.4    | 6.1<br>6.1              | 6.1     | 6.1 | 8.8<br>8.5      | 8.7     | 9.0  | 3.6<br>4.0              | 3.8     | 4.2 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.5 | 27.7<br>27.7     | 27.7    | 8.3<br>8.3 | 8.3     | 27.4<br>27.4 | 27.4    | 86.7<br>85.7      | 86.2    | 5.9<br>5.8              | 5.9     |     | 9.3<br>9.2      | 9.3     |      | 4.6<br>4.6              | 4.6     |     |
| 29-Jul-13 | Sunny             | Calm            | 16:36         | Surface   | 1   | 30.2<br>30.2     | 30.2    | 8.1<br>8.1 | 8.1     | 14.6<br>14.6 | 14.6    | 95.9<br>95.9      | 95.9    | 7.3<br>7.3              | 7.3     | 7.3 | 2.9<br>2.9      | 2.9     | 4.5  | 3.1<br>2.8              | 3.0     | 3.1 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.2 | 27.7<br>27.6     | 27.7    | 8.2<br>8.2 | 8.2     | 25.8<br>24.8 | 25.3    | 76.1<br>77.3      | 76.7    | 5.8<br>5.9              | 5.9     |     | 6.1<br>5.8      | 6.0     |      | 3.2<br>3.0              | 3.1     |     |
| 31-Jul-13 | Sunny             | Calm            | 07:31         | Surface   | 1   | 28.9<br>28.9     | 28.9    | 8.0<br>8.0 | 8.0     | 15.6<br>15.5 | 15.6    | 101.6<br>101.3    | 101.5   | 7.2<br>7.2              | 7.2     | 7.2 | 2.1<br>2.2      | 2.2     | 2.2  | 4.4<br>5.0              | 4.7     | 5.1 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |     | -               | -       |      | -                       | -       |     |
|           |                   |                 |               | Bottom    | 4.8 | 27.8<br>28.1     | 28.0    | 8.0<br>8.0 | 8.0     | 24.2<br>21.8 | 23.0    | 79.5<br>79.0      | 79.3    | 5.5<br>5.5              | 5.5     |     | 2.0<br>2.2      | 2.1     |      | 6.6<br>4.4              | 5.5     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR6 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |              | Turbidity(NTU) |              |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|--------------|----------------|--------------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA*          | Value          | Average      | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 13:56         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.3<br>8.3 | 8.3     | 13.6<br>13.6 | 13.6    | 111.4<br>109.6    | 110.5   | 7.9<br>7.8              | 7.9     | 7.9          | 5.0<br>5.0     | 5.0          | 7.1  | 6.3<br>6.8              | 6.6     | 6.1  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       | -       |      |
|           |                   |                 |               | Bottom    | 3.5 | 28.7<br>28.7     | 28.7    | 8.2<br>8.2 | 8.2     | 17.2<br>17.6 | 17.4    | 84.9<br>84.9      | 84.9    | 6.0<br>6.0              | 6.0     | 10.0<br>8.3  | 9.2            | 5.2<br>6.0   |      | 5.6                     |         |      |
| 4-Jul-13  | Fine              | Calm            | 16:34         | Surface   | 1   | 30.1<br>30.1     | 30.1    | 8.1<br>8.1 | 8.1     | 11.1<br>11.1 | 11.1    | 110.6<br>110.5    | 110.6   | 7.9<br>7.9              | 7.9     | 7.9          | 8.6<br>8.5     | 8.6          | 12.1 | 5.7<br>5.0              | 5.4     | 7.0  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 4.9 | 29.1<br>29.2     | 29.2    | 8.0<br>8.0 | 8.0     | 14.6<br>14.3 | 14.5    | 87.3<br>87.4      | 87.4    | 6.2<br>6.2              | 6.2     | 15.6<br>15.6 | 15.6           | 6.8<br>10.2  |      | 8.5                     |         |      |
| 6-Jul-13  | Cloudy            | Moderate        | 17:52         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.4<br>8.5 | 8.5     | 10.4<br>10.5 | 10.5    | 118.9<br>117.7    | 118.3   | 8.5<br>8.5              | 8.5     | 8.5          | 7.1<br>7.3     | 7.2          | 10.0 | 6.7<br>5.7              | 6.2     | 7.1  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 3.4 | 28.5<br>28.5     | 28.5    | 8.1<br>8.1 | 8.1     | 20.8<br>22.8 | 21.8    | 83.7<br>84.5      | 84.1    | 6.4<br>6.4              | 6.4     | 13.4<br>12.2 | 12.8           | 7.3<br>8.7   |      | 8.0                     |         |      |
| 8-Jul-13  | Fine              | Moderate        | 19:01         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.1<br>8.0 | 8.1     | 14.0<br>14.0 | 14.0    | 94.8<br>93.0      | 93.9    | 6.8<br>6.6              | 6.7     | 6.7          | 7.6<br>8.2     | 7.9          | 8.8  | 16.7<br>14.3            | 15.5    | 28.9 |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 3.1 | 28.5<br>28.4     | 28.5    | 8.0<br>8.0 | 8.0     | 17.0<br>19.2 | 18.1    | 82.2<br>82.5      | 82.4    | 5.8<br>5.8              | 5.8     | 9.2<br>10.1  | 9.7            | 32.0<br>52.3 |      | 42.2                    |         |      |
| 10-Jul-13 | Fine              | Moderate        | 06:04         | Surface   | 1   | 28.8<br>28.7     | 28.8    | 8.1<br>8.2 | 8.2     | 14.0<br>13.9 | 14.0    | 96.7<br>95.9      | 96.3    | 6.9<br>6.9              | 6.9     | 6.9          | 4.2<br>4.2     | 4.2          | 5.1  | 2.1<br>1.3              | 1.7     | 2.3  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 3.1 | 28.6<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 17.7<br>17.9 | 17.8    | 78.0<br>77.7      | 77.9    | 5.5<br>5.5              | 5.5     | 5.9<br>6.1   | 6.0            | 3.0<br>2.6   |      | 2.8                     |         |      |
| 12-Jul-13 | Sunny             | Moderate        | 07:20         | Surface   | 1   | 29.4<br>29.3     | 29.4    | 8.2<br>8.2 | 8.2     | 14.6<br>14.8 | 14.7    | 88.3<br>87.9      | 88.1    | 6.5<br>6.5              | 6.5     | 6.5          | 3.2<br>3.4     | 3.3          | 3.9  | 4.6<br>24.7             | 14.7    | 8.9  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 3.2 | 28.7<br>28.6     | 28.7    | 8.2<br>8.1 | 8.2     | 16.9<br>18.0 | 17.5    | 80.9<br>77.9      | 79.4    | 6.0<br>5.7              | 5.9     | 4.4<br>4.5   | 4.5            | 2.7<br>3.5   |      | 3.1                     |         |      |
| 15-Jul-13 | Rainy             | Calm            | 11:56         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 22.1<br>22.0 | 22.1    | 87.1<br>89.1      | 88.1    | 5.9<br>6.0              | 6.0     | 6.0          | 5.9<br>5.5     | 5.7          | 9.2  | 3.1<br>3.1              | 3.1     | 3.4  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 4.7 | 26.3<br>26.5     | 26.4    | 8.0<br>8.0 | 8.0     | 28.9<br>27.9 | 28.4    | 77.0<br>76.9      | 77.0    | 5.2<br>5.2              | 5.2     | 13.1<br>12.1 | 12.6           | 3.9<br>3.4   |      | 3.7                     |         |      |
| 17-Jul-13 | Rainy             | Moderate        | 14:52         | Surface   | 1   | 28.5<br>28.1     | 28.3    | 8.2<br>8.2 | 8.2     | 17.4<br>20.4 | 18.9    | 91.9<br>92.2      | 92.1    | 6.5<br>6.5              | 6.5     | 6.5          | 1.8<br>1.9     | 1.9          | 2.1  | 2.0<br>1.1              | 1.6     | 1.7  |
|           |                   |                 |               | Middle    | -   | -                | -       | -          | -       | -            | -       | -                 | -       | -                       | -       |              | -              | -            |      | -                       |         |      |
|           |                   |                 |               | Bottom    | 3.1 | 28.0<br>28.1     | 28.1    | 8.2<br>8.2 | 8.2     | 20.8<br>21.0 | 20.9    | 87.9<br>87.1      | 87.5    | 6.2<br>6.1              | 6.2     | 2.1<br>2.2   | 2.2            | 1.4<br>1.9   |      | 1.7                     |         |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SR6 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 15:52         | Surface   | 1   | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 24.2<br>24.2 | 24.2    | 82.5<br>82.2      | 82.4    | 5.7<br>5.7              | 5.7     | 5.7 | 3.9<br>3.4      | 3.7     | 6.3  | 3.7<br>2.5              | 3.1     | 3.5  |
|           |                   |                 |               | Middle    | -   | -<br>-           | -       | -<br>-     | -       | -<br>-       | -       | -<br>-            | -       | -<br>-                  | -       |     | -<br>-          | -       |      | -<br>-                  | -       |      |
|           |                   |                 |               | Bottom    | 3.1 | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 24.2<br>24.2 | 24.2    | 79.5<br>79.6      | 79.6    | 5.5<br>5.5              | 5.5     |     | 8.8<br>8.9      | 8.9     |      | 3.3<br>4.5              | 3.9     |      |
| 22-Jul-13 | Rainy             | Moderate        | 19:47         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 21.4<br>21.4 | 21.4    | 73.8<br>73.6      | 73.7    | 5.1<br>5.1              | 5.1     | 5.1 | 8.3<br>8.1      | 8.2     | 10.3 | 11.5<br>9.8             | 10.7    | 10.7 |
|           |                   |                 |               | Middle    | -   | -<br>-           | -       | -<br>-     | -       | -<br>-       | -       | -<br>-            | -       | -<br>-                  | -       |     | -<br>-          | -       |      | -<br>-                  | -       |      |
|           |                   |                 |               | Bottom    | 4   | 27.8<br>27.8     | 27.8    | 8.0<br>8.0 | 8.0     | 22.9<br>23.5 | 23.2    | 72.8<br>72.4      | 72.6    | 5.0<br>5.0              | 5.0     |     | 13.5<br>11.3    | 12.4    |      | 10.5<br>10.7            | 10.6    |      |
| 24-Jul-13 | Rainy             | Moderate        | 06:29         | Surface   | 1   | 28.0<br>27.9     | 28.0    | 8.1<br>8.1 | 8.1     | 23.0<br>23.0 | 23.0    | 86.1<br>86.0      | 86.1    | 5.9<br>5.9              | 5.9     | 5.9 | 3.4<br>3.5      | 3.5     | 3.6  | 2.9<br>3.4              | 3.2     | 3.2  |
|           |                   |                 |               | Middle    | -   | -<br>-           | -       | -<br>-     | -       | -<br>-       | -       | -<br>-            | -       | -<br>-                  | -       |     | -<br>-          | -       |      | -<br>-                  | -       |      |
|           |                   |                 |               | Bottom    | 4.8 | 27.9<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 25.8<br>26.1 | 26.0    | 88.7<br>88.9      | 88.8    | 6.0<br>6.0              | 6.0     |     | 3.5<br>3.6      | 3.6     |      | 3.3<br>3.0              | 3.2     |      |
| 26-Jul-13 | Rainy             | Rough           | 08:06         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 23.6<br>23.6 | 23.6    | 87.8<br>88.1      | 88.0    | 6.1<br>6.1              | 6.1     | 6.1 | 7.2<br>6.3      | 6.8     | 9.2  | 5.6<br>5.5              | 5.6     | 5.9  |
|           |                   |                 |               | Middle    | -   | -<br>-           | -       | -<br>-     | -       | -<br>-       | -       | -<br>-            | -       | -<br>-                  | -       |     | -<br>-          | -       |      | -<br>-                  | -       |      |
|           |                   |                 |               | Bottom    | 4.6 | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.2<br>26.3 | 26.3    | 86.3<br>86.7      | 86.5    | 5.9<br>5.9              | 5.9     |     | 11.9<br>11.2    | 11.6    |      | 5.8<br>6.3              | 6.1     |      |
| 29-Jul-13 | Sunny             | Calm            | 10:45         | Surface   | 1   | 28.3<br>28.2     | 28.3    | 8.1<br>8.1 | 8.1     | 19.4<br>19.7 | 19.6    | 83.4<br>83.4      | 83.4    | 6.4<br>6.4              | 6.4     | 6.4 | 7.2<br>7.1      | 7.2     | 12.5 | 3.9<br>3.2              | 3.6     | 3.4  |
|           |                   |                 |               | Middle    | -   | -<br>-           | -       | -<br>-     | -       | -<br>-       | -       | -<br>-            | -       | -<br>-                  | -       |     | -<br>-          | -       |      | -<br>-                  | -       |      |
|           |                   |                 |               | Bottom    | 4.6 | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 23.0<br>23.1 | 23.1    | 75.3<br>74.6      | 75.0    | 5.7<br>5.7              | 5.7     |     | 17.7<br>17.9    | 17.8    |      | 3.3<br>3.1              | 3.2     |      |
| 31-Jul-13 | Sunny             | Calm            | 13:45         | Surface   | 1   | 30.1<br>30.1     | 30.1    | 8.3<br>8.3 | 8.3     | 13.7<br>13.7 | 13.7    | 105.8<br>106.4    | 106.1   | 7.5<br>7.5              | 7.5     | 7.5 | 3.4<br>3.2      | 3.3     | 2.6  | 3.1<br>3.0              | 3.1     | 3.0  |
|           |                   |                 |               | Middle    | -   | -<br>-           | -       | -<br>-     | -       | -<br>-       | -       | -<br>-            | -       | -<br>-                  | -       |     | -<br>-          | -       |      | -<br>-                  | -       |      |
|           |                   |                 |               | Bottom    | 4   | 28.8<br>28.8     | 28.8    | 8.0<br>8.0 | 8.0     | 18.1<br>18.0 | 18.1    | 91.1<br>90.7      | 90.9    | 6.3<br>6.2              | 6.3     |     | 1.8<br>1.7      | 1.8     |      | 2.2<br>3.5              | 2.9     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SRA - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 07:48         | Surface   | 1   | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 17.7<br>17.6 | 17.7    | 122.0<br>113.9    | 118.0   | 8.6<br>8.0              | 8.3     | 8.1 | 9.6<br>9.4      | 9.5     | 9.1  | 7.0<br>5.7              | 6.4     | 5.3 |
|           |                   |                 |               | Middle    | 3.5 | 28.4<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 21.4<br>22.6 | 22.0    | 112.7<br>114.9    | 113.8   | 7.8<br>7.9              | 7.9     |     | 7.9<br>9.0      | 8.5     |      | 4.7<br>5.2              | 5.0     |     |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.3     | 28.3    | 8.0<br>8.0 | 8.0     | 23.2<br>23.3 | 23.3    | 104.5<br>106.1    | 105.3   | 7.2<br>7.3              | 7.3     |     | 9.2<br>9.3      | 9.3     |      | 4.8<br>4.0              | 4.4     |     |
| 4-Jul-13  | Sunny             | Calm            | 09:19         | Surface   | 1   | 29.8<br>29.8     | 29.8    | 8.0<br>8.0 | 8.0     | 12.1<br>12.2 | 12.2    | 120.1<br>120.1    | 120.1   | 8.5<br>8.5              | 8.5     | 7.6 | 6.1<br>6.3      | 6.2     | 11.9 | 7.3<br>7.2              | 7.3     | 6.1 |
|           |                   |                 |               | Middle    | 4   | 29.0<br>29.0     | 29.0    | 7.9<br>7.9 | 7.9     | 17.7<br>18.0 | 17.9    | 94.2<br>93.9      | 94.1    | 6.6<br>6.6              | 6.6     |     | 10.1<br>10.4    | 10.3    |      | 4.8<br>6.5              | 5.7     |     |
|           |                   |                 |               | Bottom    | 7   | 28.3<br>28.3     | 28.3    | 7.8<br>7.8 | 7.8     | 22.6<br>23.0 | 22.8    | 74.9<br>74.4      | 74.7    | 5.2<br>5.1              | 5.2     |     | 18.8<br>19.6    | 19.2    |      | 5.0<br>5.3              | 5.2     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 10:38         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.3<br>8.3 | 8.3     | 13.3<br>13.4 | 13.4    | 102.9<br>102.8    | 102.9   | 7.3<br>7.3              | 7.3     | 7.0 | 6.1<br>6.1      | 6.1     | 19.4 | 5.7<br>7.7              | 6.7     | 5.8 |
|           |                   |                 |               | Middle    | 4   | 28.7<br>28.7     | 28.7    | 8.1<br>8.1 | 8.1     | 22.4<br>21.8 | 22.1    | 95.8<br>97.9      | 96.9    | 6.6<br>6.8              | 6.7     |     | 11.5<br>10.8    | 11.2    |      | 7.3<br>5.0              | 6.2     |     |
|           |                   |                 |               | Bottom    | 7   | 28.1<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 26.7<br>26.2 | 26.5    | 82.8<br>81.1      | 82.0    | 5.7<br>5.6              | 5.7     |     | 45.1<br>36.6    | 40.9    |      | 4.0<br>5.0              | 4.5     |     |
| 8-Jul-13  | Sunny             | Moderate        | 11:45         | Surface   | 1   | 29.0<br>28.9     | 29.0    | 8.2<br>8.1 | 8.2     | 14.0<br>14.2 | 14.1    | 107.4<br>102.1    | 104.8   | 7.9<br>7.3              | 7.6     | 7.1 | 7.4<br>7.8      | 7.6     | 11.4 | 11.3<br>9.3             | 10.3    | 8.6 |
|           |                   |                 |               | Middle    | 4   | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 19.5<br>20.6 | 20.1    | 92.9<br>93.2      | 93.1    | 6.5<br>6.5              | 6.5     |     | 13.0<br>12.9    | 13.0    |      | 8.0<br>9.3              | 8.7     |     |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>28.0     | 28.0    | 8.0<br>8.0 | 8.0     | 25.9<br>25.7 | 25.8    | 78.8<br>78.2      | 78.5    | 5.6<br>5.5              | 5.6     |     | 13.5<br>13.5    | 13.5    |      | 6.0<br>7.7              | 6.9     |     |
| 10-Jul-13 | Fine              | Moderate        | 14:33         | Surface   | 1   | 29.5<br>28.6     | 29.1    | 8.2<br>8.1 | 8.2     | 18.3<br>20.7 | 19.5    | 92.9<br>93.3      | 93.1    | 6.4<br>6.4              | 6.4     | 6.1 | 7.7<br>7.8      | 7.8     | 15.8 | 2.5<br>1.9              | 2.2     | 2.5 |
|           |                   |                 |               | Middle    | 4   | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 22.9<br>23.2 | 23.1    | 81.8<br>79.4      | 80.6    | 5.8<br>5.7              | 5.8     |     | 13.5<br>13.8    | 13.7    |      | 2.9<br>2.7              | 2.8     |     |
|           |                   |                 |               | Bottom    | 7   | 27.3<br>27.3     | 27.3    | 8.0<br>8.0 | 8.0     | 27.6<br>27.6 | 27.6    | 71.7<br>71.3      | 71.5    | 5.1<br>5.0              | 5.1     |     | 26.3<br>25.3    | 25.8    |      | 2.5<br>2.4              | 2.5     |     |
| 12-Jul-13 | Sunny             | Moderate        | 15:47         | Surface   | 1   | 30.0<br>30.0     | 30.0    | 8.3<br>8.3 | 8.3     | 19.8<br>19.8 | 19.8    | 89.6<br>88.5      | 89.1    | 6.4<br>6.3              | 6.4     | 6.1 | 6.5<br>6.6      | 6.6     | 15.5 | 8.8<br>6.0              | 7.4     | 7.4 |
|           |                   |                 |               | Middle    | 4   | 28.0<br>28.1     | 28.1    | 8.3<br>8.3 | 8.3     | 25.1<br>25.1 | 25.1    | 78.6<br>79.8      | 79.2    | 5.8<br>5.8              | 5.8     |     | 9.1<br>8.7      | 8.9     |      | 8.2<br>8.2              | 8.2     |     |
|           |                   |                 |               | Bottom    | 7   | 27.2<br>27.2     | 27.2    | 8.2<br>8.2 | 8.2     | 28.5<br>28.5 | 28.5    | 67.2<br>68.7      | 68.0    | 5.0<br>5.1              | 5.1     |     | 30.0<br>32.1    | 31.1    |      | 4.2<br>9.0              | 6.6     |     |
| 15-Jul-13 | Rainy             | Calm            | 15:47         | Surface   | 1   | 28.7<br>28.7     | 28.7    | 8.1<br>8.1 | 8.1     | 16.3<br>16.9 | 16.6    | 94.9<br>95.0      | 95.0    | 6.4<br>6.4              | 6.4     | 6.0 | 4.3<br>4.4      | 4.4     | 10.1 | 5.0<br>4.7              | 4.9     | 4.5 |
|           |                   |                 |               | Middle    | 4   | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 26.6<br>26.7 | 26.7    | 82.1<br>81.3      | 81.7    | 5.6<br>5.5              | 5.6     |     | 9.3<br>9.7      | 9.5     |      | 4.5<br>3.8              | 4.2     |     |
|           |                   |                 |               | Bottom    | 7   | 26.5<br>26.5     | 26.5    | 7.9<br>7.9 | 7.9     | 28.7<br>30.0 | 29.4    | 74.1<br>73.9      | 74.0    | 5.0<br>4.9              | 5.0     |     | 16.2<br>16.8    | 16.5    |      | 4.8<br>3.7              | 4.3     |     |
| 17-Jul-13 | Rainy             | Moderate        | 20:19         | Surface   | 1   | 28.1<br>28.1     | 28.1    | 8.0<br>8.0 | 8.0     | 20.0<br>20.1 | 20.1    | 89.7<br>89.2      | 89.5    | 6.3<br>6.3              | 6.3     | 5.8 | 5.1<br>5.4      | 5.3     | 13.6 | 3.1<br>3.2              | 3.2     | 3.2 |
|           |                   |                 |               | Middle    | 4   | 27.5<br>27.4     | 27.5    | 8.0<br>8.0 | 8.0     | 23.3<br>23.4 | 23.4    | 73.9<br>73.2      | 73.6    | 5.2<br>5.1              | 5.2     |     | 10.0<br>10.4    | 10.2    |      | 3.0<br>3.2              | 3.1     |     |
|           |                   |                 |               | Bottom    | 7   | 26.9<br>27.0     | 27.0    | 7.9<br>7.9 | 7.9     | 25.8<br>25.6 | 25.7    | 70.3<br>69.6      | 70.0    | 5.0<br>4.9              | 5.0     |     | 24.1<br>26.2    | 25.2    |      | 4.0<br>2.8              | 3.4     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at SRA - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 08:07         | Surface   | 1   | 27.4<br>27.4     | 27.4    | 8.0<br>8.0 | 8.0     | 23.5<br>23.5 | 23.5    | 81.8<br>81.4      | 81.6    | 5.7<br>5.7              | 5.7     | 5.6 | 3.1<br>3.1     | 3.1     | 12.9 | 2.6<br>3.2              | 2.9     | 2.7  |
|           |                   |                 |               | Middle    | 3.5 | 26.9<br>27.0     | 27.0    | 8.0<br>8.0 | 8.0     | 26.1<br>25.9 | 26.0    | 79.2<br>79.6      | 79.4    | 5.5<br>5.5              | 5.5     |     | 15.0<br>12.3   |         |      | 3.3<br>2.1              | 2.7     |      |
|           |                   |                 |               | Bottom    | 6   | 26.8<br>26.8     | 26.8    | 8.0<br>8.0 | 8.0     | 27.3<br>27.3 | 27.3    | 76.6<br>76.5      | 76.6    | 5.3<br>5.3              | 5.3     |     | 21.7<br>22.3   | 22.0    |      | 1.9<br>3.3              | 2.6     |      |
| 22-Jul-13 | Cloudy            | Calm            | 11:14         | Surface   | 1   | 27.7<br>27.6     | 27.7    | 8.1<br>8.1 | 8.1     | 26.6<br>26.8 | 26.7    | 81.1<br>80.3      | 80.7    | 5.5<br>5.5              | 5.5     | 5.3 | 5.0<br>5.8     | 5.4     | 10.0 | 3.2<br>3.5              | 3.4     | 3.9  |
|           |                   |                 |               | Middle    | 3.5 | 27.5<br>27.4     | 27.5    | 8.2<br>8.2 | 8.2     | 27.6<br>27.7 | 27.7    | 75.7<br>75.0      | 75.4    | 5.1<br>5.1              | 5.1     |     | 8.6<br>9.4     |         |      | 3.5<br>3.4              | 3.5     |      |
|           |                   |                 |               | Bottom    | 6   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.0<br>27.9 | 28.0    | 73.6<br>73.2      | 73.4    | 5.0<br>5.0              | 5.0     |     | 15.0<br>16.2   | 15.6    |      | 5.1<br>4.6              | 4.9     |      |
| 24-Jul-13 | Rainy             | Moderate        | 14:08         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 26.4<br>26.4 | 26.4    | 94.3<br>93.8      | 94.1    | 6.4<br>6.4              | 6.4     | 6.3 | 5.6<br>5.5     | 5.6     | 14.2 | 5.1<br>5.5              | 5.3     | 14.1 |
|           |                   |                 |               | Middle    | 4   | 27.9<br>27.8     | 27.9    | 8.2<br>8.2 | 8.2     | 29.0<br>29.1 | 29.1    | 91.6<br>91.8      | 91.7    | 6.1<br>6.1              | 6.1     |     | 14.3<br>14.7   |         |      | 4.7<br>59.0             | 31.9    |      |
|           |                   |                 |               | Bottom    | 7   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 29.3<br>29.3 | 29.3    | 91.3<br>91.2      | 91.3    | 6.1<br>6.1              | 6.1     |     | 21.4<br>23.5   | 22.5    |      | 4.9<br>5.2              | 5.1     |      |
| 26-Jul-13 | Rainy             | Rough           | 15:48         | Surface   | 1   | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 23.4<br>23.4 | 23.4    | 101.0<br>100.6    | 100.8   | 7.0<br>7.0              | 7.0     | 6.9 | 10.5<br>10.7   | 10.6    | 13.5 | 12.6<br>10.2            | 11.4    | 13.4 |
|           |                   |                 |               | Middle    | 6.5 | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 24.6<br>24.5 | 24.6    | 97.6<br>98.5      | 98.1    | 6.8<br>6.8              | 6.8     |     | 12.5<br>10.4   |         |      | 9.8<br>13.8             | 11.8    |      |
|           |                   |                 |               | Bottom    | 12  | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 24.6<br>24.6 | 24.6    | 96.8<br>95.7      | 96.3    | 6.7<br>6.6              | 6.7     |     | 18.7<br>17.9   | 18.3    |      | 16.6<br>17.2            | 16.9    |      |
| 29-Jul-13 | Sunny             | Calm            | 17:34         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.1<br>8.1 | 8.1     | 18.0<br>17.9 | 18.0    | 87.2<br>83.9      | 85.6    | 6.0<br>5.8              | 5.9     | 5.8 | 5.3<br>5.9     | 5.6     | 8.3  | 2.7<br>2.8              | 2.8     | 3.0  |
|           |                   |                 |               | Middle    | 6.5 | 28.9<br>28.9     | 28.9    | 8.1<br>8.1 | 8.1     | 18.9<br>18.9 | 18.9    | 81.0<br>81.3      | 81.2    | 5.6<br>5.7              | 5.7     |     | 8.1<br>8.3     |         |      | 3.1<br>3.1              | 3.1     |      |
|           |                   |                 |               | Bottom    | 12  | 28.9<br>28.8     | 28.9    | 8.1<br>8.1 | 8.1     | 19.1<br>19.4 | 19.3    | 79.3<br>78.7      | 79.0    | 5.5<br>5.5              | 5.5     |     | 10.9<br>11.0   | 11.0    |      | 3.0<br>3.1              | 3.1     |      |
| 31-Jul-13 | Sunny             | Calm            | 06:53         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.2<br>8.2 | 8.2     | 16.1<br>16.1 | 16.1    | 107.3<br>107.1    | 107.2   | 7.4<br>7.4              | 7.4     | 6.8 | 4.1<br>4.1     | 4.1     | 6.3  | 4.8<br>3.2              | 4.0     | 5.1  |
|           |                   |                 |               | Middle    | 4   | 28.1<br>28.0     | 28.1    | 8.2<br>8.2 | 8.2     | 24.0<br>24.2 | 24.1    | 91.4<br>91.2      | 91.3    | 6.2<br>6.1              | 6.2     |     | 6.2<br>6.3     |         |      | 3.8<br>9.2              | 6.5     |      |
|           |                   |                 |               | Bottom    | 7   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.6<br>26.6 | 26.6    | 86.8<br>86.6      | 86.7    | 5.8<br>5.8              | 5.8     |     | 8.6<br>8.4     | 8.5     |      | 5.4<br>4.4              | 4.9     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SRA - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 15:34         | Surface   | 1   | 29.2<br>29.2     | 29.2    | 8.2<br>8.2 | 8.2     | 19.0<br>19.0 | 19.0    | 105.6<br>103.3    | 104.5   | 7.3<br>7.1              | 7.2     | 7.1 | 6.8<br>6.5      | 6.7     | 10.1 | 5.7<br>6.3              | 6.0     | 6.1  |
|           |                   |                 |               | Middle    | 4   | 28.7<br>28.8     | 28.8    | 8.1<br>8.1 | 8.1     | 20.3<br>20.2 | 20.3    | 98.5<br>99.9      | 99.2    | 6.8<br>6.9              | 6.9     |     | 8.8<br>8.4      | 8.6     |      | 5.7<br>5.3              | 5.5     |      |
|           |                   |                 |               | Bottom    | 7   | 28.2<br>28.6     | 28.4    | 7.9<br>8.0 | 8.0     | 23.1<br>22.5 | 22.8    | 83.4<br>97.2      | 90.3    | 5.7<br>6.7              | 6.2     |     | 15.9<br>14.3    | 15.1    |      | 6.8<br>6.8              | 6.8     |      |
| 4-Jul-13  | Fine              | Calm            | 16:24         | Surface   | 1   | 31.1<br>31.2     | 31.2    | 8.3<br>8.3 | 8.3     | 13.3<br>13.3 | 13.3    | 140.8<br>128.8    | 134.8   | 9.7<br>8.9              | 9.3     | 8.0 | 4.3<br>3.5      | 3.9     | 9.1  | 20.3<br>14.3            | 17.3    | 10.8 |
|           |                   |                 |               | Middle    | 4   | 28.9<br>29.0     | 29.0    | 7.9<br>7.9 | 7.9     | 20.8<br>20.5 | 20.7    | 102.0<br>93.2     | 97.6    | 7.0<br>6.4              | 6.7     |     | 9.8<br>9.8      | 9.8     |      | 13.0<br>2.3             | 7.7     |      |
|           |                   |                 |               | Bottom    | 7   | 28.3<br>28.3     | 28.3    | 7.8<br>7.9 | 7.9     | 24.3<br>24.1 | 24.2    | 80.5<br>79.3      | 79.9    | 5.5<br>5.4              | 5.5     |     | 15.2<br>12.2    | 13.7    |      | 12.0<br>2.7             | 7.4     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 19:31         | Surface   | 1   | 30.1<br>29.1     | 29.6    | 8.3<br>8.1 | 8.2     | 15.5<br>16.3 | 15.9    | 106.0<br>101.1    | 103.6   | 7.3<br>7.0              | 7.2     | 6.8 | 14.0<br>12.1    | 13.1    | 17.4 | 10.0<br>7.3             | 8.7     | 7.2  |
|           |                   |                 |               | Middle    | 4   | 30.0<br>28.5     | 29.3    | 8.3<br>8.0 | 8.2     | 19.8<br>20.3 | 20.1    | 93.5<br>89.2      | 91.4    | 6.4<br>6.1              | 6.3     |     | 16.1<br>15.5    | 15.8    |      | 7.0<br>7.0              | 7.0     |      |
|           |                   |                 |               | Bottom    | 7   | 29.3<br>28.7     | 29.0    | 8.1<br>8.0 | 8.1     | 23.0<br>23.7 | 23.4    | 82.8<br>80.3      | 81.6    | 5.7<br>5.6              | 5.7     |     | 22.4<br>24.4    | 23.4    |      | 5.3<br>6.7              | 6.0     |      |
| 8-Jul-13  | Fine              | Moderate        | 18:50         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.1<br>8.2 | 8.2     | 15.6<br>15.7 | 15.7    | 118.2<br>116.8    | 117.5   | 8.3<br>8.0              | 8.2     | 7.4 | 7.3<br>6.9      | 7.1     | 8.9  | 18.0<br>21.3            | 19.7    | 17.8 |
|           |                   |                 |               | Middle    | 4   | 29.1<br>28.7     | 28.9    | 8.0<br>8.0 | 8.0     | 21.4<br>20.6 | 21.0    | 97.6<br>95.3      | 96.5    | 6.7<br>6.5              | 6.6     |     | 9.4<br>8.8      | 9.1     |      | 18.0<br>7.0             | 12.5    |      |
|           |                   |                 |               | Bottom    | 7   | 28.3<br>28.2     | 28.3    | 7.9<br>7.9 | 7.9     | 23.9<br>24.0 | 24.0    | 86.7<br>85.9      | 86.3    | 6.0<br>5.8              | 5.9     |     | 11.0<br>10.2    | 10.6    |      | 24.3<br>18.0            | 21.2    |      |
| 10-Jul-13 | Fine              | Moderate        | 06:09         | Surface   | 1   | 29.1<br>29.1     | 29.1    | 8.1<br>8.1 | 8.1     | 17.3<br>17.3 | 17.3    | 92.1<br>89.8      | 91.0    | 6.4<br>6.2              | 6.3     | 6.0 | 7.8<br>8.3      | 8.1     | 14.7 | 5.2<br>4.7              | 5.0     | 4.4  |
|           |                   |                 |               | Middle    | 4   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 22.5<br>22.5 | 22.5    | 80.3<br>81.9      | 81.1    | 5.6<br>5.7              | 5.7     |     | 12.6<br>12.7    | 12.7    |      | 3.6<br>3.7              | 3.7     |      |
|           |                   |                 |               | Bottom    | 7   | 28.0<br>28.1     | 28.1    | 8.0<br>8.0 | 8.0     | 23.5<br>23.2 | 23.4    | 72.1<br>73.2      | 72.7    | 5.0<br>5.1              | 5.1     |     | 22.2<br>24.2    | 23.2    |      | 4.0<br>4.7              | 4.4     |      |
| 12-Jul-13 | Sunny             | Moderate        | 07:13         | Surface   | 1   | 29.3<br>29.2     | 29.3    | 8.1<br>8.1 | 8.1     | 19.7<br>19.8 | 19.8    | 105.3<br>104.7    | 105.0   | 7.5<br>7.5              | 7.5     | 7.1 | 4.3<br>4.5      | 4.4     | 9.1  | 5.4<br>5.9              | 5.7     | 6.8  |
|           |                   |                 |               | Middle    | 4   | 28.9<br>28.9     | 28.9    | 8.1<br>8.1 | 8.1     | 20.4<br>20.5 | 20.5    | 91.0<br>92.1      | 91.6    | 6.6<br>6.7              | 6.7     |     | 8.1<br>6.7      | 7.4     |      | 9.3<br>6.3              | 7.8     |      |
|           |                   |                 |               | Bottom    | 7   | 28.2<br>28.1     | 28.2    | 8.1<br>8.1 | 8.1     | 24.0<br>24.1 | 24.1    | 77.7<br>76.9      | 77.3    | 5.6<br>5.6              | 5.6     |     | 15.1<br>15.7    | 15.4    |      | 9.8<br>3.8              | 6.8     |      |
| 15-Jul-13 | Rainy             | Calm            | 10:19         | Surface   | 1   | 29.5<br>29.5     | 29.5    | 8.1<br>8.1 | 8.1     | 19.3<br>19.3 | 19.3    | 102.1<br>98.1     | 100.1   | 7.2<br>7.0              | 7.1     | 6.5 | 10.0<br>9.6     | 9.8     | 11.8 | 10.0<br>9.2             | 9.6     | 9.5  |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>28.0     | 28.0    | 7.8<br>7.9 | 7.9     | 24.8<br>24.6 | 24.7    | 87.0<br>84.1      | 85.6    | 6.0<br>5.8              | 5.9     |     | 12.5<br>12.3    | 12.4    |      | 12.0<br>9.4             | 10.7    |      |
|           |                   |                 |               | Bottom    | 6   | 27.0<br>26.9     | 27.0    | 7.7<br>7.7 | 7.7     | 29.0<br>29.1 | 29.1    | 75.3<br>74.7      | 75.0    | 5.1<br>5.1              | 5.1     |     | 13.5<br>12.7    | 13.1    |      | 10.0<br>6.6             | 8.3     |      |
| 17-Jul-13 | Rainy             | Moderate        | 12:53         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 19.8<br>19.8 | 19.8    | 84.0<br>84.2      | 84.1    | 5.8<br>5.9              | 5.9     | 5.6 | 7.3<br>7.3      | 7.3     | 10.1 | 6.8<br>6.2              | 6.5     | 6.2  |
|           |                   |                 |               | Middle    | 3.5 | 27.3<br>27.3     | 27.3    | 8.0<br>8.0 | 8.0     | 23.9<br>23.9 | 23.9    | 72.3<br>72.8      | 72.6    | 5.2<br>5.2              | 5.2     |     | 8.7<br>9.3      | 9.0     |      | 6.2<br>5.6              | 5.9     |      |
|           |                   |                 |               | Bottom    | 6   | 26.5<br>26.5     | 26.5    | 8.0<br>8.0 | 8.0     | 27.6<br>27.5 | 27.6    | 69.2<br>68.6      | 68.9    | 5.1<br>5.1              | 5.1     |     | 13.9<br>14.2    | 14.1    |      | 5.4<br>7.0              | 6.2     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at SRA - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 17:17         | Surface   | 1   | 28.4<br>28.4     | 28.4    | 8.2<br>8.2 | 8.2     | 23.6<br>23.7 | 23.7    | 106.0<br>106.1    | 106.1   | 7.3<br>7.3              | 7.3     | 7.1 | 9.6<br>9.6      | 9.6     | 10.9 | 11.0<br>4.9             | 8.0     | 6.5 |
|           |                   |                 |               | Middle    | 3.5 | 28.3<br>28.3     | 28.3    | 8.2<br>8.2 | 8.2     | 23.8<br>23.8 | 23.8    | 100.7<br>100.4    | 100.6   | 6.9<br>6.9              | 6.9     |     | 10.7<br>10.6    | 10.7    |      | 7.8<br>5.6              | 6.7     |     |
|           |                   |                 |               | Bottom    | 6   | 28.0<br>28.2     | 28.1    | 8.1<br>8.1 | 8.1     | 24.2<br>24.1 | 24.2    | 92.8<br>91.4      | 92.1    | 6.4<br>6.3              | 6.4     |     | 12.5<br>12.4    | 12.5    |      | 5.3<br>4.5              | 4.9     |     |
| 22-Jul-13 | Rainy             | Moderate        | 20:07         | Surface   | 1   | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 24.9<br>25.0 | 25.0    | 92.4<br>92.2      | 92.3    | 6.3<br>6.3              | 6.3     | 6.3 | 11.4<br>10.9    | 11.2    | 13.7 | 10.9<br>10.0            | 10.5    | 9.7 |
|           |                   |                 |               | Middle    | 3.5 | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 25.0<br>25.0 | 25.0    | 91.7<br>91.6      | 91.7    | 6.2<br>6.2              | 6.2     |     | 13.9<br>14.0    | 14.0    |      | 10.4<br>9.3             | 9.9     |     |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 25.0<br>25.0 | 25.0    | 91.1<br>91.0      | 91.1    | 6.2<br>6.2              | 6.2     |     | 15.9<br>16.1    | 16.0    |      | 8.6<br>8.5              | 8.6     |     |
| 24-Jul-13 | Rainy             | Moderate        | 06:13         | Surface   | 1   | 28.0<br>28.0     | 28.0    | 8.0<br>8.0 | 8.0     | 24.1<br>24.1 | 24.1    | 86.2<br>83.9      | 85.1    | 5.9<br>5.8              | 5.9     | 5.7 | 5.8<br>5.8      | 5.8     | 14.4 | 7.2<br>6.8              | 7.0     | 7.0 |
|           |                   |                 |               | Middle    | 4.5 | 28.0<br>28.0     | 28.0    | 8.0<br>8.0 | 8.0     | 24.1<br>24.1 | 24.1    | 78.6<br>78.8      | 78.7    | 5.4<br>5.4              | 5.4     |     | 8.2<br>7.6      | 7.9     |      | 6.5<br>7.6              | 7.1     |     |
|           |                   |                 |               | Bottom    | 8   | 28.0<br>28.0     | 28.0    | 7.9<br>8.0 | 8.0     | 24.1<br>24.1 | 24.1    | 77.4<br>77.4      | 77.4    | 5.3<br>5.3              | 5.3     |     | 30.7<br>28.4    | 29.6    |      | 6.8<br>6.9              | 6.9     |     |
| 26-Jul-13 | Rainy             | Rough           | 07:43         | Surface   | 1   | 27.1<br>27.2     | 27.2    | 8.0<br>8.0 | 8.0     | 22.7<br>22.8 | 22.8    | 89.5<br>88.7      | 89.1    | 6.3<br>6.2              | 6.3     | 6.2 | 11.6<br>11.6    | 11.6    | 12.9 | 16.2<br>11.7            | 14.0    | 9.7 |
|           |                   |                 |               | Middle    | 7.5 | 27.3<br>27.2     | 27.3    | 8.0<br>8.0 | 8.0     | 23.9<br>23.9 | 23.9    | 85.0<br>85.5      | 85.3    | 5.9<br>6.0              | 6.0     |     | 12.8<br>12.7    | 12.8    |      | 5.4<br>5.0              | 5.2     |     |
|           |                   |                 |               | Bottom    | 14  | 27.3<br>27.3     | 27.3    | 8.0<br>8.0 | 8.0     | 24.2<br>24.2 | 24.2    | 83.9<br>83.3      | 83.6    | 5.8<br>5.8              | 5.8     |     | 14.2<br>14.6    | 14.4    |      | 6.6<br>13.2             | 9.9     |     |
| 29-Jul-13 | Sunny             | Calm            | 10:18         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.1<br>8.1 | 8.1     | 19.7<br>19.8 | 19.8    | 89.3<br>90.6      | 90.0    | 6.2<br>6.3              | 6.3     | 6.2 | 7.1<br>6.3      | 6.7     | 10.9 | 2.8<br>2.6              | 2.7     | 2.5 |
|           |                   |                 |               | Middle    | 7.5 | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 20.9<br>20.9 | 20.9    | 86.7<br>86.8      | 86.8    | 6.0<br>6.0              | 6.0     |     | 8.7<br>8.4      | 8.6     |      | 2.4<br>1.8              | 2.1     |     |
|           |                   |                 |               | Bottom    | 14  | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.0<br>24.0 | 24.0    | 81.1<br>79.9      | 80.5    | 5.6<br>5.5              | 5.6     |     | 17.3<br>17.6    | 17.5    |      | 2.7<br>2.8              | 2.8     |     |
| 31-Jul-13 | Sunny             | Calm            | 15:47         | Surface   | 1   | 30.5<br>30.5     | 30.5    | 7.9<br>7.9 | 7.9     | 17.7<br>17.7 | 17.7    | 113.9<br>114.1    | 114.0   | 7.7<br>7.7              | 7.7     | 6.8 | 5.3<br>5.4      | 5.4     | 7.0  | 4.2<br>3.0              | 3.6     | 3.5 |
|           |                   |                 |               | Middle    | 3.5 | 28.8<br>28.8     | 28.8    | 7.7<br>7.7 | 7.7     | 22.1<br>22.2 | 22.2    | 88.3<br>88.0      | 88.2    | 5.9<br>5.9              | 5.9     |     | 6.6<br>6.8      | 6.7     |      | 3.2<br>2.8              | 3.0     |     |
|           |                   |                 |               | Bottom    | 6   | 27.7<br>27.7     | 27.7    | 7.7<br>7.7 | 7.7     | 26.7<br>26.7 | 26.7    | 78.0<br>77.6      | 77.8    | 5.2<br>5.2              | 5.2     |     | 8.7<br>8.8      | 8.8     |      | 3.2<br>4.6              | 3.9     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 08:46         | Surface   | 1   | 28.7<br>28.6     | 28.7    | 8.3<br>8.3 | 8.3     | 16.8<br>16.8 | 16.8    | 107.3<br>104.7    | 106.0   | 7.6<br>7.4              | 7.5     | 6.6 | 2.9<br>3.0      | 3.0     | 5.7  | 8.5<br>6.8              | 7.7     | 6.8 |
|           |                   |                 |               | Middle    | 5   | 28.6<br>28.6     | 28.6    | 8.3<br>8.3 | 8.3     | 16.9<br>16.8 | 16.9    | 83.1<br>79.9      | 81.5    | 5.8<br>5.5              | 5.7     |     | 2.9<br>3.0      |         |      | 7.5<br>6.5              | 7.0     |     |
|           |                   |                 |               | Bottom    | 9   | 28.2<br>28.4     | 28.3    | 8.2<br>8.2 | 8.2     | 22.4<br>21.1 | 21.8    | 80.8<br>75.5      | 78.2    | 5.6<br>5.3              | 5.5     |     | 11.4<br>10.9    |         |      | 4.8<br>6.3              | 5.6     |     |
| 4-Jul-13  | Sunny             | Calm            | 10:54         | Surface   | 1   | 30.0<br>30.0     | 30.0    | 8.2<br>8.2 | 8.2     | 6.1<br>6.1   | 6.1     | 119.2<br>119.5    | 119.4   | 8.7<br>8.7              | 8.7     | 7.7 | 5.2<br>5.2      | 5.2     | 4.8  | 6.7<br>4.2              | 5.5     | 4.7 |
|           |                   |                 |               | Middle    | 4.5 | 29.1<br>29.1     | 29.1    | 8.0<br>8.0 | 8.0     | 14.5<br>14.5 | 14.5    | 94.5<br>94.6      | 94.6    | 6.7<br>6.7              | 6.7     |     | 4.8<br>4.8      |         |      | 4.8<br>3.5              | 4.2     |     |
|           |                   |                 |               | Bottom    | 8   | 28.7<br>28.7     | 28.7    | 8.1<br>8.0 | 8.1     | 19.4<br>19.3 | 19.4    | 85.8<br>86.1      | 86.0    | 6.0<br>6.0              | 6.0     |     | 4.3<br>4.3      |         |      | 5.2<br>3.5              | 4.4     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 11:49         | Surface   | 1   | 29.8<br>29.8     | 29.8    | 8.6<br>8.6 | 8.6     | 10.9<br>10.8 | 10.9    | 119.7<br>119.4    | 119.6   | 8.3<br>8.2              | 8.3     | 8.1 | 4.4<br>4.2      | 4.3     | 6.5  | 8.0<br>7.7              | 7.9     | 7.5 |
|           |                   |                 |               | Middle    | 5.5 | 28.9<br>28.8     | 28.9    | 8.2<br>8.2 | 8.2     | 21.3<br>22.1 | 21.7    | 99.2<br>99.8      | 99.5    | 7.7<br>7.8              | 7.8     |     | 4.2<br>4.4      |         |      | 8.7<br>7.3              | 8.0     |     |
|           |                   |                 |               | Bottom    | 10  | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 29.5<br>29.5 | 29.5    | 76.9<br>76.2      | 76.6    | 6.1<br>6.1              | 6.1     |     | 10.2<br>11.4    |         |      | 7.7<br>5.7              | 6.7     |     |
| 8-Jul-13  | Sunny             | Moderate        | 13:19         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.4<br>8.4 | 8.4     | 12.3<br>12.3 | 12.3    | 120.2<br>117.7    | 119.0   | 8.5<br>8.4              | 8.5     | 8.2 | 5.2<br>5.0      | 5.1     | 10.0 | 8.0<br>7.3              | 7.7     | 6.6 |
|           |                   |                 |               | Middle    | 5.5 | 28.3<br>28.5     | 28.4    | 8.1<br>8.1 | 8.1     | 19.4<br>20.2 | 19.8    | 107.6<br>107.4    | 107.5   | 7.8<br>7.8              | 7.8     |     | 4.3<br>4.2      |         |      | 6.3<br>8.0              | 7.2     |     |
|           |                   |                 |               | Bottom    | 10  | 27.1<br>27.1     | 27.1    | 8.0<br>8.1 | 8.1     | 30.6<br>30.5 | 30.6    | 76.6<br>75.3      | 76.0    | 5.5<br>5.4              | 5.5     |     | 18.9<br>22.1    |         |      | 5.3<br>4.3              | 4.8     |     |
| 10-Jul-13 | Fine              | Moderate        | 14:05         | Surface   | 1   | 29.0<br>29.3     | 29.2    | 8.3<br>8.3 | 8.3     | 17.3<br>16.9 | 17.1    | 111.2<br>112.2    | 111.7   | 8.1<br>8.1              | 8.1     | 7.2 | 3.7<br>4.1      | 3.9     | 7.1  | 5.0<br>4.3              | 4.7     | 3.9 |
|           |                   |                 |               | Middle    | 5   | 27.7<br>28.0     | 27.9    | 8.2<br>8.3 | 8.3     | 26.9<br>24.6 | 25.8    | 86.8<br>86.0      | 86.4    | 6.2<br>6.2              | 6.2     |     | 3.1<br>3.1      |         |      | 4.2<br>3.2              | 3.7     |     |
|           |                   |                 |               | Bottom    | 9   | 26.9<br>26.9     | 26.9    | 8.1<br>8.2 | 8.2     | 29.1<br>29.1 | 29.1    | 70.4<br>70.5      | 70.5    | 5.1<br>5.1              | 5.1     |     | 15.2<br>13.3    |         |      | 3.2<br>3.6              | 3.4     |     |
| 12-Jul-13 | Sunny             | Moderate        | 15:10         | Surface   | 1   | 30.6<br>29.8     | 30.2    | 8.3<br>8.3 | 8.3     | 16.1<br>17.3 | 16.7    | 104.3<br>101.6    | 103.0   | 7.4<br>7.3              | 7.4     | 6.6 | 2.5<br>2.9      | 2.7     | 8.3  | 3.9<br>2.2              | 3.1     | 4.1 |
|           |                   |                 |               | Middle    | 5   | 27.6<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 25.7<br>25.4 | 25.6    | 79.5<br>80.6      | 80.1    | 5.8<br>5.8              | 5.8     |     | 9.6<br>8.3      |         |      | 3.2<br>2.7              | 3.0     |     |
|           |                   |                 |               | Bottom    | 9   | 26.4<br>26.4     | 26.4    | 8.0<br>8.0 | 8.0     | 30.0<br>29.8 | 29.9    | 70.2<br>69.2      | 69.7    | 5.2<br>5.1              | 5.2     |     | 13.3<br>13.0    |         |      | 6.6<br>5.7              | 6.2     |     |
| 15-Jul-13 | Rainy             | Calm            | 16:50         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 16.9<br>16.9 | 16.9    | 85.9<br>87.2      | 86.6    | 6.0<br>6.1              | 6.1     | 5.9 | 1.8<br>1.9      | 1.9     | 6.9  | 2.4<br>2.2              | 2.3     | 2.3 |
|           |                   |                 |               | Middle    | 5   | 26.7<br>26.6     | 26.7    | 8.0<br>8.0 | 8.0     | 26.4<br>28.4 | 27.4    | 81.5<br>83.4      | 82.5    | 5.6<br>5.7              | 5.7     |     | 6.6<br>6.6      |         |      | 2.7<br>2.0              | 2.4     |     |
|           |                   |                 |               | Bottom    | 9   | 25.9<br>25.8     | 25.9    | 8.0<br>8.0 | 8.0     | 29.9<br>30.1 | 30.0    | 72.9<br>72.7      | 72.8    | 4.9<br>4.9              | 4.9     |     | 12.8<br>11.4    |         |      | 2.2<br>2.0              | 2.1     |     |
| 17-Jul-13 | Rainy             | Moderate        | 19:28         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.2<br>17.1 | 17.2    | 83.6<br>82.8      | 83.2    | 5.9<br>5.9              | 5.9     | 5.7 | 1.9<br>2.2      | 2.1     | 4.9  | 1.2<br>1.3              | 1.3     | 1.7 |
|           |                   |                 |               | Middle    | 5   | 27.1<br>27.0     | 27.1    | 8.2<br>8.2 | 8.2     | 26.1<br>23.9 | 25.0    | 75.1<br>74.6      | 74.9    | 5.4<br>5.4              | 5.4     |     | 3.3<br>3.3      |         |      | 3.0<br>1.9              | 2.5     |     |
|           |                   |                 |               | Bottom    | 9   | 25.7<br>25.7     | 25.7    | 8.2<br>8.2 | 8.2     | 30.6<br>30.6 | 30.6    | 73.8<br>74.9      | 74.4    | 5.1<br>5.2              | 5.2     |     | 9.2<br>9.5      |         |      | 1.4<br>1.4              | 1.4     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST1 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 09:58         | Surface   | 1   | 28.1<br>28.1     | 28.1    | 8.2<br>8.2 | 8.2     | 21.0<br>21.0 | 21.0    | 84.2<br>82.1      | 83.2    | 5.9<br>5.7              | 5.8     | 5.6 | 1.8<br>1.9      | 1.9     | 6.5  | 2.6<br>2.3              | 2.5     | 2.0 |
|           |                   |                 |               | Middle    | 5   | 26.9<br>27.3     | 27.1    | 8.3<br>8.3 | 8.3     | 28.3<br>27.4 | 27.9    | 78.6<br>79.1      | 78.9    | 5.4<br>5.4              | 5.4     |     | 2.0<br>2.1      |         |      | 1.6<br>1.4              | 1.5     |     |
|           |                   |                 |               | Bottom    | 9   | 26.2<br>26.2     | 26.2    | 8.2<br>8.2 | 8.2     | 29.8<br>29.8 | 29.8    | 71.2<br>71.6      | 71.4    | 5.0<br>5.0              | 5.0     |     | 16.0<br>14.8    |         |      | 2.2<br>1.7              | 2.0     |     |
| 22-Jul-13 | Cloudy            | Calm            | 11:45         | Surface   | 1   | 27.8<br>27.7     | 27.8    | 8.1<br>8.2 | 8.2     | 27.3<br>26.8 | 27.1    | 83.7<br>80.3      | 82.0    | 5.7<br>5.4              | 5.6     | 5.6 | 4.4<br>5.1      | 4.8     | 7.5  | 6.7<br>7.3              | 7.0     | 5.6 |
|           |                   |                 |               | Middle    | 5   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.8<br>28.8 | 28.8    | 80.8<br>81.1      | 81.0    | 5.4<br>5.5              | 5.5     |     | 7.7<br>7.5      |         |      | 4.7<br>5.9              | 5.3     |     |
|           |                   |                 |               | Bottom    | 9   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 29.0<br>28.9 | 29.0    | 80.1<br>80.2      | 80.2    | 5.4<br>5.4              | 5.4     |     | 11.2<br>9.2     |         |      | 3.9<br>5.2              | 4.6     |     |
| 24-Jul-13 | Rainy             | Moderate        | 13:13         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 27.6<br>27.6 | 27.6    | 90.0<br>89.9      | 90.0    | 6.1<br>6.1              | 6.1     | 5.9 | 4.8<br>4.6      | 4.7     | 17.2 | 9.3<br>11.5             | 10.4    | 9.1 |
|           |                   |                 |               | Middle    | 4.5 | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.3<br>29.4 | 29.4    | 85.4<br>85.5      | 85.5    | 5.7<br>5.7              | 5.7     |     | 11.3<br>12.0    |         |      | 8.5<br>6.7              | 7.6     |     |
|           |                   |                 |               | Bottom    | 8   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.9<br>29.9 | 29.9    | 86.0<br>86.0      | 86.0    | 5.7<br>5.7              | 5.7     |     | 34.5<br>35.6    |         |      | 5.1<br>13.2             | 9.2     |     |
| 26-Jul-13 | Rainy             | Rough           | 14:52         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 24.5<br>24.5 | 24.5    | 91.4<br>91.6      | 91.5    | 6.3<br>6.3              | 6.3     | 6.3 | 8.7<br>8.0      | 8.4     | 10.3 | 7.2<br>5.0              | 6.1     | 6.8 |
|           |                   |                 |               | Middle    | 4.5 | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 25.1<br>25.2 | 25.2    | 90.7<br>90.5      | 90.6    | 6.2<br>6.2              | 6.2     |     | 7.3<br>7.6      |         |      | 8.0<br>8.1              | 8.1     |     |
|           |                   |                 |               | Bottom    | 8   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.3<br>26.4 | 26.4    | 87.6<br>87.5      | 87.6    | 6.0<br>6.0              | 6.0     |     | 14.8<br>15.1    |         |      | 6.0<br>6.3              | 6.2     |     |
| 29-Jul-13 | Sunny             | Calm            | 18:00         | Surface   | 1   | 30.3<br>30.3     | 30.3    | 8.1<br>8.1 | 8.1     | 14.7<br>14.7 | 14.7    | 98.7<br>99.1      | 98.9    | 7.5<br>7.5              | 7.5     | 6.8 | 2.9<br>2.9      | 2.9     | 5.8  | 4.3<br>5.0              | 4.7     | 3.7 |
|           |                   |                 |               | Middle    | 4.5 | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 23.2<br>23.2 | 23.2    | 79.1<br>79.8      | 79.5    | 6.0<br>6.1              | 6.1     |     | 5.2<br>4.5      |         |      | 3.6<br>3.0              | 3.3     |     |
|           |                   |                 |               | Bottom    | 8   | 27.2<br>27.2     | 27.2    | 8.2<br>8.2 | 8.2     | 28.8<br>28.7 | 28.8    | 69.3<br>68.2      | 68.8    | 5.3<br>5.2              | 5.3     |     | 9.3<br>9.6      |         |      | 3.0<br>3.0              | 3.0     |     |
| 31-Jul-13 | Sunny             | Calm            | 08:16         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.0<br>8.0 | 8.0     | 12.9<br>12.9 | 12.9    | 112.8<br>113.3    | 113.1   | 8.0<br>8.0              | 8.0     | 7.4 | 2.7<br>2.7      | 2.7     | 3.5  | 6.2<br>5.0              | 5.6     | 5.5 |
|           |                   |                 |               | Middle    | 4.5 | 28.8<br>28.8     | 28.8    | 7.9<br>7.9 | 7.9     | 17.2<br>17.6 | 17.4    | 96.4<br>95.5      | 96.0    | 6.7<br>6.6              | 6.7     |     | 2.0<br>2.0      |         |      | 5.6<br>5.4              | 5.5     |     |
|           |                   |                 |               | Bottom    | 8   | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 28.3<br>28.2 | 28.3    | 75.5<br>75.2      | 75.4    | 5.1<br>5.1              | 5.1     |     | 6.0<br>5.8      |         |      | 5.8<br>5.2              | 5.5     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 14:49         | Surface   | 1   | 29.4<br>29.5     | 29.5    | 8.4<br>8.4 | 8.4     | 13.7<br>14.2 | 14.0    | 106.7<br>107.8    | 107.3   | 7.6<br>7.6              | 7.6     | 6.6 | 2.4<br>2.6      | 2.5     | 5.8  | 8.2<br>5.5              | 6.9     | 6.1  |
|           |                   |                 |               | Middle    | 5.5 | 28.6<br>28.7     | 28.7    | 8.2<br>8.2 | 8.2     | 18.7<br>18.4 | 18.6    | 78.7<br>80.8      | 79.8    | 5.5<br>5.7              | 5.6     |     | 5.3<br>5.6      | 5.5     |      | 4.2<br>5.2              | 4.7     |      |
|           |                   |                 |               | Bottom    | 10  | 28.1<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 21.6<br>21.6 | 21.6    | 72.8<br>71.3      | 72.1    | 5.2<br>5.2              | 5.2     |     | 10.0<br>8.7     | 9.4     |      | 6.5<br>7.0              | 6.8     |      |
| 4-Jul-13  | Fine              | Calm            | 18:04         | Surface   | 1   | 30.8<br>30.8     | 30.8    | 8.0<br>8.0 | 8.0     | 5.9<br>5.8   | 5.9     | 102.4<br>102.1    | 102.3   | 7.4<br>7.4              | 7.4     | 7.4 | 6.4<br>6.3      | 6.4     | 6.1  | 5.2<br>4.7              | 5.0     | 5.5  |
|           |                   |                 |               | Middle    | 5   | 30.6<br>30.6     | 30.6    | 8.0<br>8.0 | 8.0     | 6.4<br>6.4   | 6.4     | 101.9<br>102.2    | 102.1   | 7.4<br>7.4              | 7.4     |     | 6.1<br>6.1      | 6.1     |      | 5.3<br>8.2              | 6.8     |      |
|           |                   |                 |               | Bottom    | 9   | 30.5<br>30.5     | 30.5    | 8.0<br>8.0 | 8.0     | 7.7<br>7.6   | 7.7     | 102.2<br>102.0    | 102.1   | 7.4<br>7.3              | 7.4     |     | 5.7<br>5.6      | 5.7     |      | 6.2<br>3.3              | 4.8     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 18:50         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 8.4<br>8.4 | 8.4     | 11.4<br>10.4 | 10.9    | 112.9<br>113.6    | 113.3   | 8.1<br>8.2              | 8.2     | 7.3 | 7.3<br>7.9      | 7.6     | 11.2 | 11.0<br>11.7            | 11.4    | 10.5 |
|           |                   |                 |               | Middle    | 6   | 29.1<br>29.1     | 29.1    | 8.3<br>8.3 | 8.3     | 15.6<br>16.7 | 16.2    | 90.8<br>92.0      | 91.4    | 6.4<br>6.4              | 6.4     |     | 11.9<br>12.0    | 12.0    |      | 10.7<br>12.7            | 11.7    |      |
|           |                   |                 |               | Bottom    | 11  | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 24.1<br>23.5 | 23.8    | 75.8<br>76.0      | 75.9    | 5.8<br>5.8              | 5.8     |     | 14.3<br>13.7    | 14.0    |      | 8.7<br>8.0              | 8.4     |      |
| 8-Jul-13  | Fine              | Moderate        | 19:54         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.1<br>8.1 | 8.1     | 11.8<br>12.1 | 12.0    | 93.7<br>92.0      | 92.9    | 6.7<br>6.6              | 6.7     | 6.4 | 6.3<br>7.2      | 6.8     | 13.5 | 5.0<br>1.7              | 3.4     | 9.3  |
|           |                   |                 |               | Middle    | 5   | 29.1<br>28.7     | 28.9    | 8.0<br>8.0 | 8.0     | 14.3<br>15.6 | 15.0    | 85.7<br>81.8      | 83.8    | 6.1<br>5.8              | 6.0     |     | 9.5<br>9.2      | 9.4     |      | 15.7<br>16.3            | 16.0    |      |
|           |                   |                 |               | Bottom    | 9   | 28.2<br>28.3     | 28.3    | 8.0<br>8.0 | 8.0     | 20.9<br>20.3 | 20.6    | 78.2<br>78.6      | 78.4    | 5.6<br>5.6              | 5.6     |     | 23.9<br>24.5    | 24.2    |      | 5.3<br>11.7             | 8.5     |      |
| 10-Jul-13 | Fine              | Moderate        | 06:57         | Surface   | 1   | 29.0<br>28.9     | 29.0    | 8.2<br>8.2 | 8.2     | 14.6<br>14.1 | 14.4    | 93.4<br>93.6      | 93.5    | 6.6<br>6.7              | 6.7     | 6.0 | 4.8<br>4.4      | 4.6     | 5.7  | 2.6<br>1.6              | 2.1     | 2.3  |
|           |                   |                 |               | Middle    | 5.5 | 28.5<br>28.6     | 28.6    | 8.1<br>8.1 | 8.1     | 18.9<br>18.7 | 18.8    | 74.6<br>73.1      | 73.9    | 5.2<br>5.1              | 5.2     |     | 5.9<br>5.9      | 5.9     |      | 2.4<br>2.2              | 2.3     |      |
|           |                   |                 |               | Bottom    | 10  | 28.1<br>28.1     | 28.1    | 8.2<br>8.2 | 8.2     | 22.6<br>22.8 | 22.7    | 73.4<br>72.5      | 73.0    | 5.1<br>5.0              | 5.1     |     | 5.8<br>7.2      | 6.5     |      | 2.2<br>2.5              | 2.4     |      |
| 12-Jul-13 | Sunny             | Moderate        | 08:26         | Surface   | 1   | 28.7<br>28.6     | 28.7    | 8.1<br>8.1 | 8.1     | 19.5<br>20.2 | 19.9    | 78.1<br>77.5      | 77.8    | 5.7<br>5.6              | 5.7     | 5.3 | 3.8<br>4.1      | 4.0     | 7.5  | 3.0<br>3.5              | 3.3     | 7.7  |
|           |                   |                 |               | Middle    | 5.5 | 26.2<br>26.4     | 26.3    | 8.0<br>8.1 | 8.1     | 30.4<br>29.8 | 30.1    | 68.3<br>66.1      | 67.2    | 5.0<br>4.8              | 4.9     |     | 5.6<br>5.4      | 5.5     |      | 4.4<br>5.0              | 4.7     |      |
|           |                   |                 |               | Bottom    | 10  | 26.0<br>26.0     | 26.0    | 8.0<br>8.0 | 8.0     | 31.2<br>31.1 | 31.2    | 67.4<br>66.8      | 67.1    | 5.0<br>4.9              | 5.0     |     | 12.9<br>13.2    | 13.1    |      | 16.0<br>14.3            | 15.2    |      |
| 15-Jul-13 | Rainy             | Calm            | 10:55         | Surface   | 1   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 22.8<br>22.9 | 22.9    | 96.4<br>93.7      | 95.1    | 6.5<br>6.3              | 6.4     | 5.9 | 4.5<br>4.5      | 4.5     | 8.9  | 4.1<br>0.5              | 2.3     | 2.5  |
|           |                   |                 |               | Middle    | 5   | 26.7<br>26.7     | 26.7    | 8.0<br>8.0 | 8.0     | 27.6<br>27.7 | 27.7    | 80.4<br>80.3      | 80.4    | 5.4<br>5.4              | 5.4     |     | 7.5<br>7.3      | 7.4     |      | 2.4<br>2.1              | 2.3     |      |
|           |                   |                 |               | Bottom    | 9   | 26.2<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 29.2<br>28.9 | 29.1    | 73.4<br>72.3      | 72.9    | 4.9<br>4.8              | 4.9     |     | 14.0<br>15.4    | 14.7    |      | 2.5<br>3.3              | 2.9     |      |
| 17-Jul-13 | Rainy             | Moderate        | 13:44         | Surface   | 1   | 28.4<br>28.4     | 28.4    | 8.2<br>8.2 | 8.2     | 17.3<br>17.9 | 17.6    | 91.1<br>92.4      | 91.8    | 6.5<br>6.5              | 6.5     | 6.1 | 2.6<br>2.6      | 2.6     | 3.1  | 3.1<br>2.2              | 2.7     | 2.1  |
|           |                   |                 |               | Middle    | 5   | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 20.9<br>20.9 | 20.9    | 81.1<br>80.7      | 80.9    | 5.7<br>5.7              | 5.7     |     | 2.3<br>2.3      | 2.3     |      | 2.2<br>1.3              | 1.8     |      |
|           |                   |                 |               | Bottom    | 9   | 27.5<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 23.6<br>23.0 | 23.3    | 73.3<br>73.5      | 73.4    | 5.1<br>5.1              | 5.1     |     | 4.3<br>4.5      | 4.4     |      | 1.5<br>1.8              | 1.7     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST1 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 16:53         | Surface   | 1   | 28.1<br>28.0     | 28.1    | 8.3<br>8.3 | 8.3     | 22.8<br>23.1 | 23.0    | 97.2<br>95.1      | 96.2    | 6.7<br>6.5              | 6.6     | 6.2 | 2.5<br>2.6      | 2.6     | 5.4  | 4.5<br>2.1              | 3.3     | 5.1  |
|           |                   |                 |               | Middle    | 5.5 | 27.9<br>27.8     | 27.9    | 8.2<br>8.2 | 8.2     | 23.5<br>24.5 | 24.0    | 83.2<br>82.3      | 82.8    | 5.7<br>5.6              | 5.7     |     | 2.7<br>2.8      | 2.8     |      | 10.7<br>5.3             | 8.0     |      |
|           |                   |                 |               | Bottom    | 10  | 26.8<br>26.8     | 26.8    | 8.2<br>8.2 | 8.2     | 27.3<br>27.3 | 27.3    | 75.5<br>74.4      | 75.0    | 5.2<br>5.1              | 5.2     |     | 10.3<br>11.1    | 10.7    |      | 4.2<br>3.6              | 3.9     |      |
| 22-Jul-13 | Rainy             | Moderate        | 18:57         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 21.4<br>21.4 | 21.4    | 76.0<br>74.7      | 75.4    | 5.3<br>5.2              | 5.3     | 5.3 | 9.6<br>9.7      | 9.7     | 10.8 | 8.2<br>10.2             | 9.2     | 9.0  |
|           |                   |                 |               | Middle    | 5   | 28.2<br>28.1     | 28.2    | 7.9<br>8.0 | 8.0     | 21.7<br>21.9 | 21.8    | 76.3<br>75.7      | 76.0    | 5.3<br>5.2              | 5.3     |     | 9.0<br>9.5      | 9.3     |      | 8.5<br>8.7              | 8.6     |      |
|           |                   |                 |               | Bottom    | 9   | 27.6<br>27.9     | 27.8    | 8.0<br>8.0 | 8.0     | 25.0<br>24.4 | 24.7    | 74.1<br>75.0      | 74.6    | 5.1<br>5.1              | 5.1     |     | 13.9<br>13.1    | 13.5    |      | 9.2<br>9.2              | 9.2     |      |
| 24-Jul-13 | Rainy             | Moderate        | 07:46         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 23.1<br>23.0 | 23.1    | 83.5<br>83.4      | 83.5    | 5.8<br>5.8              | 5.8     | 5.8 | 3.7<br>3.4      | 3.6     | 9.9  | 9.0<br>8.7              | 8.9     | 15.9 |
|           |                   |                 |               | Middle    | 5   | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 25.0<br>25.1 | 25.1    | 85.5<br>85.4      | 85.5    | 5.8<br>5.8              | 5.8     |     | 3.5<br>3.5      | 3.5     |      | 37.0<br>3.4             | 20.2    |      |
|           |                   |                 |               | Bottom    | 9   | 28.0<br>28.0     | 28.0    | 8.3<br>8.3 | 8.3     | 27.8<br>27.7 | 27.8    | 85.6<br>85.7      | 85.7    | 5.7<br>5.8              | 5.8     |     | 24.0<br>20.9    | 22.5    |      | 32.0<br>5.4             | 18.7    |      |
| 26-Jul-13 | Rainy             | Rough           | 09:25         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 23.3<br>23.3 | 23.3    | 93.0<br>93.3      | 93.2    | 6.5<br>6.5              | 6.5     | 6.4 | 6.4<br>5.8      | 6.1     | 8.7  | 6.0<br>3.8              | 4.9     | 5.3  |
|           |                   |                 |               | Middle    | 5   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 24.7<br>24.7 | 24.7    | 91.3<br>92.1      | 91.7    | 6.3<br>6.3              | 6.3     |     | 5.8<br>5.5      | 5.7     |      | 5.6<br>5.8              | 5.7     |      |
|           |                   |                 |               | Bottom    | 9   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.5<br>26.6 | 26.6    | 90.4<br>89.9      | 90.2    | 6.1<br>6.1              | 6.1     |     | 13.7<br>14.9    | 14.3    |      | 5.6<br>5.2              | 5.4     |      |
| 29-Jul-13 | Sunny             | Calm            | 12:09         | Surface   | 1   | 28.2<br>28.1     | 28.2    | 8.2<br>8.2 | 8.2     | 20.6<br>20.8 | 20.7    | 84.0<br>84.2      | 84.1    | 6.4<br>6.4              | 6.4     | 6.3 | 4.4<br>4.6      | 4.5     | 6.7  | 3.2<br>3.0              | 3.1     | 3.3  |
|           |                   |                 |               | Middle    | 4.5 | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 22.4<br>22.4 | 22.4    | 79.2<br>79.5      | 79.4    | 6.0<br>6.1              | 6.1     |     | 5.8<br>6.0      | 5.9     |      | 3.8<br>3.3              | 3.6     |      |
|           |                   |                 |               | Bottom    | 8   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 25.1<br>25.2 | 25.2    | 74.1<br>73.3      | 73.7    | 5.6<br>5.6              | 5.6     |     | 9.7<br>9.7      | 9.7     |      | 3.0<br>3.3              | 3.2     |      |
| 31-Jul-13 | Sunny             | Calm            | 14:40         | Surface   | 1   | 30.6<br>30.6     | 30.6    | 8.3<br>8.3 | 8.3     | 10.7<br>10.7 | 10.7    | 104.5<br>105.0    | 104.8   | 7.3<br>7.3              | 7.3     | 6.8 | 3.4<br>3.5      | 3.5     | 4.7  | 2.5<br>1.9              | 2.2     | 2.5  |
|           |                   |                 |               | Middle    | 4.5 | 29.0<br>29.0     | 29.0    | 8.0<br>8.0 | 8.0     | 17.5<br>17.5 | 17.5    | 91.6<br>90.8      | 91.2    | 6.2<br>6.1              | 6.2     |     | 1.7<br>1.6      | 1.7     |      | 2.6<br>3.4              | 3.0     |      |
|           |                   |                 |               | Bottom    | 8   | 27.3<br>27.3     | 27.3    | 8.0<br>8.0 | 8.0     | 27.8<br>27.8 | 27.8    | 5.0<br>5.1        | 5.1     | 5.0<br>5.1              | 5.1     |     | 8.5<br>9.3      | 8.9     |      | 2.1<br>2.3              | 2.2     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU)          |         |     | Suspended Solids (mg/L)  |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|--------------------------|---------|-----|--------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value                    | Average | DA* | Value                    | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 08:29         | Surface   | 1   | 28.7<br>28.7     | 28.7    | 8.3<br>8.3 | 8.3     | 16.7<br>16.8 | 16.8    | 113.9<br>112.6    | 113.3   | 8.0<br>7.9              | 8.0     | 7.9 | 3.0<br>3.0<br>2.9<br>3.1 | 3.0     | 6.0 | 6.0<br>6.3<br>6.2<br>5.0 | 6.2     | 5.9 |
|           |                   |                 |               | Middle    | 4   | 28.6<br>28.6     | 28.6    | 8.3<br>8.3 | 8.3     | 16.8<br>16.8 | 16.8    | 110.0<br>109.9    | 110.0   | 7.8<br>7.8              | 7.8     |     | 12.6<br>11.3             | 12.0    |     | 6.0<br>5.7               | 5.9     |     |
|           |                   |                 |               | Bottom    | 7   | 28.2<br>28.2     | 28.2    | 8.2<br>8.2 | 8.2     | 21.5<br>21.4 | 21.5    | 80.0<br>79.3      | 79.7    | 5.6<br>5.5              | 5.6     |     |                          |         |     |                          |         |     |
| 4-Jul-13  | Sunny             | Calm            | 10:20         | Surface   | 1   | 29.9<br>29.9     | 29.9    | 8.1<br>8.1 | 8.1     | 6.0<br>6.0   | 6.0     | 126.8<br>126.4    | 126.6   | 9.3<br>9.3              | 9.3     | 8.0 | 5.2<br>5.2<br>4.6<br>4.6 | 5.2     | 4.6 | 4.3<br>4.2<br>6.2<br>4.0 | 4.3     | 4.5 |
|           |                   |                 |               | Middle    | 4   | 28.9<br>28.9     | 28.9    | 7.9<br>7.9 | 7.9     | 15.1<br>15.8 | 15.5    | 92.4<br>92.1      | 92.3    | 6.6<br>6.5              | 6.6     |     | 4.1<br>4.0               | 4.1     |     | 4.2<br>4.2               | 5.1     |     |
|           |                   |                 |               | Bottom    | 7   | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 18.4<br>19.8 | 19.1    | 84.1<br>83.5      | 83.8    | 5.9<br>5.8              | 5.9     |     |                          |         |     |                          |         |     |
| 6-Jul-13  | Cloudy            | Moderate        | 11:24         | Surface   | 1   | 29.7<br>29.7     | 29.7    | 8.5<br>8.5 | 8.5     | 15.7<br>15.4 | 15.6    | 121.1<br>121.4    | 121.3   | 8.7<br>8.5              | 8.6     | 7.7 | 4.4<br>4.6               | 4.5     | 5.8 | 7.3<br>8.3               | 7.8     | 8.0 |
|           |                   |                 |               | Middle    | 4   | 29.0<br>28.8     | 28.9    | 8.2<br>8.2 | 8.2     | 20.4<br>22.1 | 21.3    | 90.8<br>89.3      | 90.1    | 6.9<br>6.7              | 6.8     |     | 4.3<br>4.1               | 4.2     |     | 8.3<br>9.3               | 8.8     |     |
|           |                   |                 |               | Bottom    | 7   | 27.7<br>27.7     | 27.7    | 8.1<br>8.1 | 8.1     | 29.5<br>29.6 | 29.6    | 67.4<br>66.5      | 67.0    | 5.2<br>5.1              | 5.2     |     | 8.6<br>8.7               | 8.7     |     | 7.3<br>7.7               | 7.5     |     |
| 8-Jul-13  | Sunny             | Moderate        | 12:54         | Surface   | 1   | 29.8<br>29.8     | 29.8    | 8.3<br>8.4 | 8.4     | 11.8<br>11.8 | 11.8    | 127.7<br>121.7    | 124.7   | 9.1<br>8.7              | 8.9     | 8.4 | 5.2<br>5.4               | 5.3     | 7.9 | 7.0<br>6.3               | 6.7     | 7.2 |
|           |                   |                 |               | Middle    | 4   | 28.9<br>28.7     | 28.8    | 8.2<br>8.1 | 8.2     | 14.3<br>14.6 | 14.5    | 106.1<br>105.1    | 105.6   | 7.7<br>7.8              | 7.8     |     | 4.5<br>4.4               | 4.5     |     | 8.3<br>7.0               | 7.7     |     |
|           |                   |                 |               | Bottom    | 7   | 27.2<br>27.2     | 27.2    | 8.1<br>8.1 | 8.1     | 30.6<br>30.3 | 30.5    | 78.2<br>77.7      | 78.0    | 5.6<br>5.6              | 5.6     |     | 13.8<br>14.0             | 13.9    |     | 4.7<br>9.7               | 7.2     |     |
| 10-Jul-13 | Fine              | Moderate        | 13:40         | Surface   | 1   | 30.0<br>29.9     | 30.0    | 8.4<br>8.4 | 8.4     | 15.1<br>15.4 | 15.3    | 134.6<br>132.3    | 133.5   | 9.7<br>9.5              | 9.6     | 8.0 | 4.4<br>4.6               | 4.5     | 8.5 | 3.4<br>5.0               | 4.2     | 4.2 |
|           |                   |                 |               | Middle    | 5   | 28.3<br>28.1     | 28.2    | 8.2<br>8.2 | 8.2     | 21.6<br>22.2 | 21.9    | 87.6<br>85.9      | 86.8    | 6.4<br>6.3              | 6.4     |     | 5.1<br>5.2               | 5.2     |     | 4.2<br>4.2               | 4.2     |     |
|           |                   |                 |               | Bottom    | 9   | 27.0<br>27.0     | 27.0    | 8.1<br>8.1 | 8.1     | 28.6<br>28.6 | 28.6    | 70.9<br>70.5      | 70.7    | 5.1<br>5.1              | 5.1     |     | 15.5<br>16.1             | 15.8    |     | 4.2<br>4.3               | 4.3     |     |
| 12-Jul-13 | Sunny             | Moderate        | 14:40         | Surface   | 1   | 29.8<br>29.2     | 29.5    | 8.2<br>8.2 | 8.2     | 19.4<br>17.9 | 18.7    | 105.4<br>100.8    | 103.1   | 7.5<br>7.3              | 7.4     | 6.3 | 3.5<br>4.1               | 3.8     | 8.7 | 2.5<br>2.2               | 2.4     | 7.9 |
|           |                   |                 |               | Middle    | 3.5 | 26.4<br>26.5     | 26.5    | 8.0<br>8.0 | 8.0     | 30.0<br>29.2 | 29.6    | 69.5<br>68.7      | 69.1    | 5.1<br>5.0              | 5.1     |     | 9.7<br>8.2               | 9.0     |     | 7.6<br>18.9              | 13.3    |     |
|           |                   |                 |               | Bottom    | 6   | 26.3<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 30.3<br>30.3 | 30.3    | 70.3<br>69.4      | 69.9    | 5.2<br>5.1              | 5.2     |     | 14.7<br>11.9             | 13.3    |     | 8.1<br>8.0               | 8.1     |     |
| 15-Jul-13 | Rainy             | Calm            | 17:19         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 16.9<br>16.9 | 16.9    | 87.1<br>85.4      | 86.3    | 6.1<br>6.0              | 6.1     | 5.8 | 1.3<br>1.5               | 1.4     | 5.9 | 2.4<br>3.1               | 2.8     | 2.2 |
|           |                   |                 |               | Middle    | 4   | 26.8<br>26.8     | 26.8    | 8.0<br>8.0 | 8.0     | 27.4<br>27.4 | 27.4    | 80.0<br>78.4      | 79.2    | 5.5<br>5.4              | 5.5     |     | 5.3<br>6.3               | 5.8     |     | 2.0<br>2.0               | 2.0     |     |
|           |                   |                 |               | Bottom    | 7   | 25.9<br>25.8     | 25.9    | 8.0<br>8.0 | 8.0     | 30.0<br>30.3 | 30.2    | 73.3<br>73.0      | 73.2    | 5.0<br>5.0              | 5.0     |     | 10.6<br>10.3             | 10.5    |     | 2.0<br>1.8               | 1.9     |     |
| 17-Jul-13 | Rainy             | Moderate        | 18:49         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.2<br>8.2 | 8.2     | 17.3<br>17.4 | 17.4    | 86.6<br>86.6      | 86.6    | 6.1<br>6.1              | 6.1     | 5.7 | 1.8<br>1.9               | 1.9     | 4.3 | 2.6<br>1.2               | 1.9     | 1.6 |
|           |                   |                 |               | Middle    | 3.5 | 27.8<br>27.7     | 27.8    | 8.2<br>8.2 | 8.2     | 21.5<br>21.1 | 21.3    | 73.6<br>73.4      | 73.5    | 5.2<br>5.2              | 5.2     |     | 2.6<br>2.7               | 2.7     |     | 1.6<br>1.4               | 1.5     |     |
|           |                   |                 |               | Bottom    | 6   | 25.8<br>25.7     | 25.8    | 8.2<br>8.2 | 8.2     | 30.5<br>30.5 | 30.5    | 72.0<br>72.5      | 72.3    | 4.9<br>5.0              | 5.0     |     | 8.1<br>8.5               | 8.3     |     | 1.2<br>1.6               | 1.4     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.



# Water Quality Monitoring Results at ST2 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity(NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value          | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 09:20         | Surface   | 1   | 27.6<br>28.1     | 27.9    | 8.2<br>8.2 | 8.2     | 24.0<br>21.0 | 22.5    | 82.4<br>82.4      | 82.4    | 5.7<br>5.7              | 5.7     | 5.6 | 1.6<br>1.9     | 1.8     | 5.4  | 1.7<br>1.5              | 1.6     | 2.9  |
|           |                   |                 |               | Middle    | 4   | 26.4<br>26.4     | 26.4    | 8.2<br>8.2 | 8.2     | 29.1<br>29.1 | 29.1    | 76.9<br>77.0      | 77.0    | 5.4<br>5.4              | 5.4     |     | 5.2<br>5.1     | 5.2     |      | 1.8<br>5.2              | 3.5     |      |
|           |                   |                 |               | Bottom    | 7   | 26.3<br>26.3     | 26.3    | 8.2<br>8.2 | 8.2     | 29.7<br>29.7 | 29.7    | 75.9<br>75.9      | 75.9    | 5.3<br>5.3              | 5.3     |     | 9.3<br>9.2     | 9.3     |      | 3.9<br>3.2              | 3.6     |      |
| 22-Jul-13 | Cloudy            | Calm            | 12:15         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 27.4<br>27.4 | 27.4    | 81.0<br>80.6      | 80.8    | 5.5<br>5.4              | 5.5     | 5.6 | 6.0<br>6.6     | 6.3     | 6.4  | 3.7<br>6.7              | 5.2     | 5.1  |
|           |                   |                 |               | Middle    | 3.5 | 27.4<br>27.5     | 27.5    | 8.2<br>8.2 | 8.2     | 28.6<br>28.6 | 28.6    | 82.1<br>83.6      | 82.9    | 5.5<br>5.6              | 5.6     |     | 6.5<br>6.2     | 6.4     |      | 4.5<br>5.7              | 5.1     |      |
|           |                   |                 |               | Bottom    | 6   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 29.0<br>28.9 | 29.0    | 80.0<br>80.2      | 80.1    | 5.4<br>5.4              | 5.4     |     | 6.8<br>6.3     | 6.6     |      | 4.8<br>5.2              | 5.0     |      |
| 24-Jul-13 | Rainy             | Moderate        | 13:41         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 27.1<br>27.1 | 27.1    | 89.6<br>89.6      | 89.6    | 6.0<br>6.0              | 6.0     | 6.0 | 5.6<br>5.5     | 5.6     | 18.2 | 41.0<br>46.3            | 43.7    | 38.1 |
|           |                   |                 |               | Middle    | 4   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 29.5<br>29.6 | 29.6    | 88.1<br>88.5      | 88.3    | 5.9<br>5.9              | 5.9     |     | 10.5<br>10.6   | 10.6    |      | 40.3<br>40.3            | 40.3    |      |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>27.9     | 27.9    | 8.3<br>8.3 | 8.3     | 30.0<br>30.0 | 30.0    | 88.7<br>88.6      | 88.7    | 5.9<br>5.9              | 5.9     |     | 38.9<br>38.1   | 38.5    |      | 30.0<br>30.8            | 30.4    |      |
| 26-Jul-13 | Rainy             | Rough           | 15:20         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.5<br>24.6 | 24.6    | 96.8<br>96.0      | 96.4    | 6.6<br>6.6              | 6.6     | 6.4 | 6.5<br>6.5     | 6.5     | 8.5  | 5.2<br>7.4              | 6.3     | 5.8  |
|           |                   |                 |               | Middle    | 4   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.0<br>26.1 | 26.1    | 89.6<br>89.9      | 89.8    | 6.1<br>6.1              | 6.1     |     | 8.6<br>7.0     | 7.8     |      | 5.3<br>6.0              | 5.7     |      |
|           |                   |                 |               | Bottom    | 7   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.4<br>26.4 | 26.4    | 88.2<br>88.1      | 88.2    | 6.0<br>6.0              | 6.0     |     | 11.0<br>11.3   | 11.2    |      | 5.7<br>4.8              | 5.3     |      |
| 29-Jul-13 | Sunny             | Calm            | 17:19         | Surface   | 1   | 29.5<br>29.8     | 29.7    | 8.1<br>8.1 | 8.1     | 15.3<br>14.9 | 15.1    | 100.7<br>99.3     | 100.0   | 7.7<br>7.6              | 7.7     | 7.1 | 3.0<br>2.9     | 3.0     | 5.1  | 3.4<br>3.0              | 3.2     | 3.3  |
|           |                   |                 |               | Middle    | 4   | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 20.3<br>21.1 | 20.7    | 84.5<br>84.8      | 84.7    | 6.4<br>6.5              | 6.5     |     | 3.5<br>3.5     | 3.5     |      | 3.0<br>2.8              | 2.9     |      |
|           |                   |                 |               | Bottom    | 7   | 27.2<br>27.2     | 27.2    | 8.2<br>8.2 | 8.2     | 28.7<br>28.5 | 28.6    | 68.9<br>68.3      | 68.6    | 5.2<br>5.2              | 5.2     |     | 8.6<br>9.0     | 8.8     |      | 2.9<br>4.5              | 3.7     |      |
| 31-Jul-13 | Sunny             | Calm            | 07:52         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 7.9<br>8.0 | 8.0     | 13.3<br>13.2 | 13.3    | 110.3<br>110.9    | 110.6   | 7.8<br>7.8              | 7.8     | 7.0 | 2.7<br>2.8     | 2.8     | 3.8  | 3.7<br>5.0              | 4.4     | 5.0  |
|           |                   |                 |               | Middle    | 4   | 28.1<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 22.4<br>22.1 | 22.3    | 90.2<br>88.8      | 89.5    | 6.2<br>6.1              | 6.2     |     | 2.3<br>2.2     | 2.3     |      | 5.2<br>5.0              | 5.1     |      |
|           |                   |                 |               | Bottom    | 7   | 27.1<br>27.1     | 27.1    | 8.0<br>8.0 | 8.0     | 28.3<br>28.3 | 28.3    | 80.8<br>78.3      | 79.6    | 5.4<br>5.3              | 5.4     |     | 6.0<br>6.4     | 6.2     |      | 5.6<br>5.2              | 5.4     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 14:29         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.4<br>8.4 | 8.4     | 13.6<br>13.7 | 13.7    | 107.6<br>107.6    | 107.6   | 7.6<br>7.6              | 7.6     | 6.7 | 4.9<br>4.8      | 4.9     | 8.6  | 5.5<br>6.0              | 5.8     | 5.9  |
|           |                   |                 |               | Middle    | 3.5 | 28.6<br>28.7     | 28.7    | 8.2<br>8.2 | 8.2     | 18.2<br>17.9 | 18.1    | 82.7<br>81.9      | 82.3    | 5.8<br>5.7              | 5.8     |     | 8.6<br>9.2      | 8.9     |      | 5.5<br>5.8              | 5.7     |      |
|           |                   |                 |               | Bottom    | 6   | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 21.4<br>21.6 | 21.5    | 78.0<br>72.1      | 75.1    | 5.5<br>5.2              | 5.4     |     | 11.1<br>12.7    | 11.9    |      | 6.5<br>5.7              | 6.1     |      |
| 4-Jul-13  | Fine              | Calm            | 17:18         | Surface   | 1   | 30.7<br>30.7     | 30.7    | 8.0<br>8.0 | 8.0     | 5.8<br>5.8   | 5.8     | 111.7<br>111.5    | 111.6   | 8.1<br>8.1              | 8.1     | 8.2 | 6.3<br>6.4      | 6.4     | 5.8  | 4.3<br>4.7              | 4.5     | 4.0  |
|           |                   |                 |               | Middle    | 4.5 | 30.5<br>30.5     | 30.5    | 8.0<br>8.0 | 8.0     | 6.9<br>7.0   | 7.0     | 113.1<br>113.3    | 113.2   | 8.2<br>8.2              | 8.2     |     | 5.9<br>5.9      | 5.9     |      | 3.8<br>3.8              | 3.8     |      |
|           |                   |                 |               | Bottom    | 8   | 30.4<br>30.4     | 30.4    | 8.1<br>8.1 | 8.1     | 8.0<br>8.0   | 8.0     | 114.6<br>114.5    | 114.6   | 8.2<br>8.2              | 8.2     |     | 5.1<br>5.1      | 5.1     |      | 3.2<br>4.0              | 3.6     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 18:24         | Surface   | 1   | 29.6<br>29.6     | 29.6    | 8.4<br>8.4 | 8.4     | 10.5<br>10.0 | 10.3    | 112.9<br>112.0    | 112.5   | 8.1<br>8.1              | 8.1     | 7.3 | 7.7<br>7.7      | 7.7     | 12.0 | 8.0<br>10.0             | 9.0     | 7.4  |
|           |                   |                 |               | Middle    | 3.5 | 29.1<br>29.1     | 29.1    | 8.3<br>8.3 | 8.3     | 14.9<br>15.3 | 15.1    | 91.1<br>92.8      | 92.0    | 6.4<br>6.6              | 6.5     |     | 14.2<br>12.5    | 13.4    |      | 6.7<br>1.3              | 4.0     |      |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 23.9<br>23.9 | 23.9    | 77.0<br>76.4      | 76.7    | 5.9<br>5.8              | 5.9     |     | 14.8<br>15.0    | 14.9    |      | 9.7<br>8.7              | 9.2     |      |
| 8-Jul-13  | Fine              | Moderate        | 19:29         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.1<br>8.0 | 8.1     | 14.0<br>14.1 | 14.1    | 91.2<br>88.9      | 90.1    | 6.5<br>6.3              | 6.4     | 6.2 | 9.3<br>8.3      | 8.8     | 12.4 | 17.3<br>18.0            | 17.7    | 28.6 |
|           |                   |                 |               | Middle    | 4   | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 16.1<br>16.4 | 16.3    | 85.3<br>83.4      | 84.4    | 6.0<br>5.9              | 6.0     |     | 10.5<br>9.8     | 10.2    |      | 26.7<br>31.7            | 29.2    |      |
|           |                   |                 |               | Bottom    | 7   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 20.8<br>20.2 | 20.5    | 83.6<br>82.1      | 82.9    | 6.0<br>5.9              | 6.0     |     | 17.2<br>18.9    | 18.1    |      | 38.3<br>39.7            | 39.0    |      |
| 10-Jul-13 | Fine              | Moderate        | 06:36         | Surface   | 1   | 28.8<br>28.8     | 28.8    | 8.1<br>8.2 | 8.2     | 14.2<br>14.0 | 14.1    | 93.7<br>93.5      | 93.6    | 6.7<br>6.7              | 6.7     | 6.1 | 4.4<br>4.3      | 4.4     | 5.6  | 2.8<br>2.2              | 2.5     | 2.5  |
|           |                   |                 |               | Middle    | 3.5 | 28.7<br>28.8     | 28.8    | 8.1<br>8.1 | 8.1     | 17.1<br>16.8 | 17.0    | 76.7<br>76.0      | 76.4    | 5.4<br>5.3              | 5.4     |     | 5.6<br>5.8      | 5.7     |      | 3.0<br>2.3              | 2.7     |      |
|           |                   |                 |               | Bottom    | 6   | 28.3<br>28.3     | 28.3    | 8.1<br>8.1 | 8.1     | 21.5<br>21.5 | 21.5    | 78.7<br>78.1      | 78.4    | 5.4<br>5.3              | 5.4     |     | 6.7<br>6.9      | 6.8     |      | 2.2<br>2.2              | 2.2     |      |
| 12-Jul-13 | Sunny             | Moderate        | 07:50         | Surface   | 1   | 29.3<br>29.4     | 29.4    | 8.2<br>8.2 | 8.2     | 14.9<br>14.8 | 14.9    | 88.5<br>87.0      | 87.8    | 6.5<br>6.4              | 6.5     | 6.3 | 3.4<br>3.4      | 3.4     | 7.1  | 2.4<br>2.8              | 2.6     | 4.1  |
|           |                   |                 |               | Middle    | 4   | 28.8<br>28.8     | 28.8    | 8.2<br>8.2 | 8.2     | 16.7<br>16.5 | 16.6    | 80.1<br>81.3      | 80.7    | 5.9<br>6.0              | 6.0     |     | 4.4<br>4.1      | 4.3     |      | 5.8<br>8.2              | 7.0     |      |
|           |                   |                 |               | Bottom    | 7   | 27.0<br>27.0     | 27.0    | 8.1<br>8.1 | 8.1     | 28.2<br>28.2 | 28.2    | 67.3<br>67.2      | 67.3    | 4.9<br>4.9              | 4.9     |     | 13.9<br>13.4    | 13.7    |      | 2.7<br>2.5              | 2.6     |      |
| 15-Jul-13 | Rainy             | Calm            | 11:23         | Surface   | 1   | 28.1<br>28.1     | 28.1    | 8.1<br>8.1 | 8.1     | 22.5<br>22.6 | 22.6    | 96.7<br>96.0      | 96.4    | 6.5<br>6.5              | 6.5     | 6.0 | 4.4<br>4.4      | 4.4     | 8.6  | 2.7<br>2.3              | 2.5     | 2.9  |
|           |                   |                 |               | Middle    | 3.5 | 26.7<br>26.6     | 26.7    | 8.0<br>8.0 | 8.0     | 27.6<br>27.8 | 27.7    | 80.2<br>79.2      | 79.7    | 5.4<br>5.3              | 5.4     |     | 7.4<br>6.3      | 6.9     |      | 3.2<br>3.9              | 3.6     |      |
|           |                   |                 |               | Bottom    | 6   | 26.2<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 29.2<br>28.9 | 29.1    | 72.8<br>72.4      | 72.6    | 4.9<br>4.8              | 4.9     |     | 14.5<br>14.3    | 14.4    |      | 2.7<br>2.6              | 2.7     |      |
| 17-Jul-13 | Rainy             | Moderate        | 14:32         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.2<br>8.2 | 8.2     | 16.1<br>17.4 | 16.8    | 93.3<br>93.5      | 93.4    | 6.6<br>6.6              | 6.6     | 6.2 | 2.2<br>2.1      | 2.2     | 6.7  | 2.1<br>2.1              | 2.1     | 5.3  |
|           |                   |                 |               | Middle    | 4   | 27.9<br>27.8     | 27.9    | 8.2<br>8.2 | 8.2     | 21.2<br>21.5 | 21.4    | 80.9<br>80.2      | 80.6    | 5.7<br>5.6              | 5.7     |     | 1.8<br>2.0      | 1.9     |      | 4.5<br>2.3              | 3.4     |      |
|           |                   |                 |               | Bottom    | 7   | 25.7<br>25.7     | 25.7    | 8.1<br>8.1 | 8.1     | 30.9<br>31.0 | 31.0    | 71.3<br>71.1      | 71.2    | 5.0<br>5.0              | 5.0     |     | 15.8<br>16.1    | 16.0    |      | 17.6<br>3.1             | 10.4    |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST2 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 16:20         | Surface   | 1   | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 24.2<br>24.1 | 24.2    | 82.7<br>81.4      | 82.1    | 5.7<br>5.6              | 5.7     | 5.6 | 3.3<br>3.7      | 3.5     | 6.7  | 4.3<br>3.0              | 3.7     | 4.8  |
|           |                   |                 |               | Middle    | 3.5 | 27.7<br>27.7     | 27.7    | 8.2<br>8.2 | 8.2     | 24.2<br>24.1 | 24.2    | 80.2<br>79.6      | 79.9    | 5.5<br>5.5              | 5.5     |     | 3.5<br>3.7      | 3.6     |      | 9.0<br>4.2              | 6.6     |      |
|           |                   |                 |               | Bottom    | 6   | 26.7<br>26.7     | 26.7    | 8.1<br>8.1 | 8.1     | 27.4<br>27.5 | 27.5    | 71.4<br>71.1      | 71.3    | 4.9<br>4.9              | 4.9     |     | 12.6<br>13.3    | 13.0    |      | 3.8<br>4.2              | 4.0     |      |
| 22-Jul-13 | Rainy             | Moderate        | 19:22         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.0<br>8.0 | 8.0     | 21.4<br>21.4 | 21.4    | 73.7<br>72.7      | 73.2    | 5.1<br>5.0              | 5.1     | 5.2 | 11.4<br>14.2    | 12.8    | 11.4 | 9.8<br>8.5              | 9.2     | 9.7  |
|           |                   |                 |               | Middle    | 3.5 | 28.1<br>28.0     | 28.1    | 8.0<br>8.0 | 8.0     | 21.9<br>22.5 | 22.2    | 75.2<br>73.9      | 74.6    | 5.2<br>5.1              | 5.2     |     | 9.9<br>11.8     | 10.9    |      | 9.7<br>9.0              | 9.4     |      |
|           |                   |                 |               | Bottom    | 6   | 27.6<br>27.7     | 27.7    | 8.0<br>8.0 | 8.0     | 24.9<br>24.8 | 24.9    | 71.7<br>73.3      | 72.5    | 4.9<br>5.0              | 5.0     |     | 10.5<br>10.3    | 10.4    |      | 10.2<br>10.8            | 10.5    |      |
| 24-Jul-13 | Rainy             | Moderate        | 07:04         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 22.9<br>23.0 | 23.0    | 84.1<br>84.0      | 84.1    | 5.8<br>5.8              | 5.8     | 5.9 | 3.6<br>3.5      | 3.6     | 9.4  | 3.6<br>3.0              | 3.3     | 25.5 |
|           |                   |                 |               | Middle    | 4.5 | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 25.7<br>25.7 | 25.7    | 87.4<br>87.2      | 87.3    | 5.9<br>5.9              | 5.9     |     | 4.1<br>4.6      | 4.4     |      | 4.0<br>27.7             | 15.9    |      |
|           |                   |                 |               | Bottom    | 8   | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 27.7<br>27.6 | 27.7    | 86.9<br>87.0      | 87.0    | 5.8<br>5.8              | 5.8     |     | 20.4<br>19.7    | 20.1    |      | 60.0<br>54.7            | 57.4    |      |
| 26-Jul-13 | Rainy             | Rough           | 08:42         | Surface   | 1   | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 23.4<br>23.4 | 23.4    | 96.2<br>95.6      | 95.9    | 6.7<br>6.6              | 6.7     | 6.6 | 5.9<br>5.9      | 5.9     | 10.1 | 6.1<br>6.2              | 6.2     | 6.1  |
|           |                   |                 |               | Middle    | 4.5 | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 24.2<br>24.3 | 24.3    | 92.6<br>93.0      | 92.8    | 6.4<br>6.4              | 6.4     |     | 6.0<br>5.7      | 5.9     |      | 6.1<br>6.3              | 6.2     |      |
|           |                   |                 |               | Bottom    | 8   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.6<br>26.5 | 26.6    | 91.1<br>91.0      | 91.1    | 6.2<br>6.2              | 6.2     |     | 18.6<br>18.2    | 18.4    |      | 5.2<br>6.3              | 5.8     |      |
| 29-Jul-13 | Sunny             | Calm            | 11:32         | Surface   | 1   | 28.1<br>28.3     | 28.2    | 8.2<br>8.2 | 8.2     | 21.0<br>20.4 | 20.7    | 85.3<br>85.6      | 85.5    | 6.5<br>6.5              | 6.5     | 6.4 | 4.6<br>3.7      | 4.2     | 7.6  | 4.2<br>1.7              | 3.0     | 3.4  |
|           |                   |                 |               | Middle    | 4.5 | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 22.5<br>22.5 | 22.5    | 80.4<br>81.0      | 80.7    | 6.1<br>6.2              | 6.2     |     | 5.7<br>5.9      | 5.8     |      | 3.2<br>3.9              | 3.6     |      |
|           |                   |                 |               | Bottom    | 8   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 25.3<br>25.3 | 25.3    | 74.5<br>73.6      | 74.1    | 5.7<br>5.6              | 5.7     |     | 12.1<br>13.4    | 12.8    |      | 3.2<br>3.7              | 3.5     |      |
| 31-Jul-13 | Sunny             | Calm            | 14:09         | Surface   | 1   | 30.2<br>30.2     | 30.2    | 8.4<br>8.4 | 8.4     | 13.6<br>13.6 | 13.6    | 110.6<br>111.0    | 110.8   | 7.6<br>7.6              | 7.6     | 6.9 | 2.8<br>2.9      | 2.9     | 5.4  | 1.5<br>2.5              | 2.0     | 2.4  |
|           |                   |                 |               | Middle    | 4   | 28.9<br>28.9     | 28.9    | 8.0<br>8.0 | 8.0     | 17.9<br>17.9 | 17.9    | 90.9<br>90.5      | 90.7    | 6.2<br>6.2              | 6.2     |     | 1.6<br>1.7      | 1.7     |      | 2.1<br>4.2              | 3.2     |      |
|           |                   |                 |               | Bottom    | 7   | 27.9<br>27.9     | 27.9    | 8.0<br>8.0 | 8.0     | 24.1<br>24.2 | 24.2    | 85.1<br>84.5      | 84.8    | 5.8<br>5.8              | 5.8     |     | 11.6<br>11.7    | 11.7    |      | 1.7<br>2.0              | 1.9     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST3 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 2-Jul-13  | Sunny             | Moderate        | 08:49         | Surface   | 1   | 28.7<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 18.2<br>18.1 | 18.2    | 116.3<br>116.6    | 116.5   | 8.1<br>8.2              | 8.2     | 8.0 | 7.4<br>8.3      | 7.9     | 12.2 | 7.3<br>6.2              | 6.8     | 6.4 |
|           |                   |                 |               | Middle    | 5   | 28.4<br>28.4     | 28.4    | 8.0<br>7.9 | 8.0     | 23.7<br>23.7 | 23.7    | 112.3<br>116.5    | 114.4   | 7.7<br>7.9              | 7.8     |     | 11.6<br>12.2    | 11.9    |      | 7.2<br>5.5              | 6.4     |     |
|           |                   |                 |               | Bottom    | 9   | 28.4<br>28.4     | 28.4    | 8.0<br>8.0 | 8.0     | 23.8<br>23.8 | 23.8    | 109.3<br>107.9    | 108.6   | 7.5<br>7.4              | 7.5     |     | 16.9<br>16.5    | 16.7    |      | 6.3<br>5.7              | 6.0     |     |
| 4-Jul-13  | Sunny             | Calm            | 10:56         | Surface   | 1   | 30.0<br>30.0     | 30.0    | 8.0<br>8.0 | 8.0     | 7.4<br>7.4   | 7.4     | 115.0<br>115.5    | 115.3   | 8.3<br>8.4              | 8.4     | 7.5 | 4.3<br>4.3      | 4.3     | 12.8 | 11.8<br>4.2             | 8.0     | 4.8 |
|           |                   |                 |               | Middle    | 5.5 | 29.0<br>29.1     | 29.1    | 7.9<br>7.9 | 7.9     | 16.1<br>16.1 | 16.1    | 93.6<br>94.3      | 94.0    | 6.6<br>6.6              | 6.6     |     | 4.9<br>4.9      | 4.9     |      | 4.2<br>2.0              | 3.1     |     |
|           |                   |                 |               | Bottom    | 10  | 28.0<br>28.0     | 28.0    | 7.9<br>7.9 | 7.9     | 27.6<br>27.6 | 27.6    | 74.8<br>74.4      | 74.6    | 5.1<br>5.0              | 5.1     |     | 29.8<br>28.8    | 29.3    |      | 3.7<br>2.8              | 3.3     |     |
| 6-Jul-13  | Cloudy            | Moderate        | 11:36         | Surface   | 1   | 29.5<br>29.5     | 29.5    | 8.5<br>8.5 | 8.5     | 11.0<br>11.1 | 11.1    | 122.2<br>124.3    | 123.3   | 8.8<br>8.9              | 8.9     | 7.8 | 4.6<br>4.6      | 4.6     | 5.3  | 8.3<br>8.0              | 8.2     | 6.8 |
|           |                   |                 |               | Middle    | 8   | 28.5<br>28.5     | 28.5    | 8.2<br>8.1 | 8.2     | 25.9<br>24.8 | 25.4    | 96.0<br>98.0      | 97.0    | 6.6<br>6.7              | 6.7     |     | 2.5<br>3.0      | 2.8     |      | 6.7<br>6.7              | 6.7     |     |
|           |                   |                 |               | Bottom    | 15  | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 29.4<br>29.4 | 29.4    | 79.4<br>75.8      | 77.6    | 5.4<br>5.2              | 5.3     |     | 8.7<br>8.5      | 8.6     |      | 5.0<br>5.7              | 5.4     |     |
| 8-Jul-13  | Sunny             | Moderate        | 12:53         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.3 | 8.3     | 14.2<br>14.2 | 14.2    | 103.0<br>100.4    | 101.7   | 7.6<br>7.2              | 7.4     | 7.1 | 5.7<br>5.4      | 5.6     | 7.1  | 7.0<br>7.7              | 7.4     | 7.7 |
|           |                   |                 |               | Middle    | 5   | 27.7<br>28.0     | 27.9    | 8.1<br>8.1 | 8.1     | 27.6<br>28.0 | 27.8    | 95.8<br>104.6     | 100.2   | 6.5<br>7.1              | 6.8     |     | 4.9<br>5.2      | 5.1     |      | 8.0<br>8.7              | 8.4     |     |
|           |                   |                 |               | Bottom    | 9   | 27.3<br>27.3     | 27.3    | 8.1<br>8.1 | 8.1     | 29.3<br>30.6 | 30.0    | 86.1<br>90.0      | 88.1    | 6.0<br>6.3              | 6.2     |     | 9.8<br>11.5     | 10.7    |      | 8.7<br>5.7              | 7.2     |     |
| 10-Jul-13 | Fine              | Moderate        | 13:04         | Surface   | 1   | 28.5<br>28.5     | 28.5    | 8.1<br>8.1 | 8.1     | 21.6<br>21.6 | 21.6    | 90.6<br>90.4      | 90.5    | 6.2<br>6.2              | 6.2     | 6.0 | 4.6<br>4.6      | 4.6     | 9.5  | 4.4<br>3.9              | 4.2     | 4.4 |
|           |                   |                 |               | Middle    | 5.5 | 27.7<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 25.4<br>25.4 | 25.4    | 85.7<br>83.1      | 84.4    | 5.9<br>5.7              | 5.8     |     | 6.2<br>7.2      | 6.7     |      | 5.1<br>4.3              | 4.7     |     |
|           |                   |                 |               | Bottom    | 10  | 27.0<br>27.0     | 27.0    | 8.0<br>8.0 | 8.0     | 29.0<br>29.0 | 29.0    | 76.3<br>75.3      | 75.8    | 5.3<br>5.2              | 5.3     |     | 16.4<br>17.7    | 17.1    |      | 4.3<br>4.0              | 4.2     |     |
| 12-Jul-13 | Sunny             | Moderate        | 14:42         | Surface   | 1   | 28.6<br>28.5     | 28.6    | 8.4<br>8.3 | 8.4     | 21.9<br>23.1 | 22.5    | 100.2<br>97.7     | 99.0    | 7.2<br>7.0              | 7.1     | 6.4 | 3.1<br>3.2      | 3.2     | 7.2  | 6.6<br>3.1              | 4.9     | 3.1 |
|           |                   |                 |               | Middle    | 5.5 | 27.9<br>27.8     | 27.9    | 8.3<br>8.3 | 8.3     | 25.8<br>25.8 | 25.8    | 78.8<br>79.4      | 79.1    | 5.7<br>5.7              | 5.7     |     | 4.9<br>5.0      | 5.0     |      | 2.5<br>1.0              | 1.8     |     |
|           |                   |                 |               | Bottom    | 10  | 26.4<br>26.4     | 26.4    | 8.2<br>8.2 | 8.2     | 30.9<br>30.9 | 30.9    | 77.9<br>75.1      | 76.5    | 5.7<br>5.5              | 5.6     |     | 13.2<br>13.6    | 13.4    |      | 2.6<br>2.8              | 2.7     |     |
| 15-Jul-13 | Rainy             | Calm            | 16:57         | Surface   | 1   | 28.3<br>28.3     | 28.3    | 8.2<br>8.2 | 8.2     | 17.9<br>17.9 | 17.9    | 92.8<br>92.9      | 92.9    | 6.3<br>6.3              | 6.3     | 5.9 | 4.9<br>4.9      | 4.9     | 9.1  | 2.2<br>2.2              | 2.2     | 2.3 |
|           |                   |                 |               | Middle    | 6.5 | 26.8<br>26.8     | 26.8    | 8.0<br>8.0 | 8.0     | 27.4<br>27.4 | 27.4    | 80.6<br>79.1      | 79.9    | 5.5<br>5.4              | 5.5     |     | 5.2<br>5.4      | 5.3     |      | 1.9<br>2.4              | 2.2     |     |
|           |                   |                 |               | Bottom    | 12  | 25.8<br>25.7     | 25.8    | 8.0<br>8.0 | 8.0     | 34.2<br>34.0 | 34.1    | 74.2<br>73.4      | 73.8    | 4.9<br>4.9              | 4.9     |     | 16.9<br>17.0    | 17.0    |      | 3.0<br>2.0              | 2.5     |     |
| 17-Jul-13 | Rainy             | Moderate        | 19:01         | Surface   | 1   | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 16.5<br>16.6 | 16.6    | 90.8<br>90.8      | 90.8    | 6.4<br>6.4              | 6.4     | 5.8 | 1.9<br>1.8      | 1.9     | 2.5  | 1.5<br>1.8              | 1.7     | 1.5 |
|           |                   |                 |               | Middle    | 5.5 | 26.8<br>26.8     | 26.8    | 8.0<br>8.1 | 8.1     | 27.2<br>27.1 | 27.2    | 75.6<br>74.8      | 75.2    | 5.2<br>5.2              | 5.2     |     | 2.2<br>2.2      | 2.2     |      | 1.9<br>0.9              | 1.4     |     |
|           |                   |                 |               | Bottom    | 10  | 26.1<br>26.1     | 26.1    | 8.0<br>8.0 | 8.0     | 29.4<br>29.3 | 29.4    | 69.3<br>69.1      | 69.2    | 5.0<br>5.0              | 5.0     |     | 3.4<br>3.1      | 3.3     |      | 1.3<br>1.2              | 1.3     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST3 - Mid-Ebb Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |     |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|-----|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA* |
| 19-Jul-13 | Cloudy            | Calm            | 09:25         | Surface   | 1   | 27.1<br>27.1     | 27.1    | 8.1<br>8.1 | 8.1     | 26.6<br>26.6 | 26.6    | 85.8<br>85.9      | 85.9    | 6.0<br>6.0              | 6.0     | 5.8 | 1.3<br>1.2      | 1.3     | 3.5  | 3.6<br>2.5              | 3.1     | 2.6 |
|           |                   |                 |               | Middle    | 6.5 | 26.8<br>26.8     | 26.8    | 8.1<br>8.1 | 8.1     | 27.8<br>27.8 | 27.8    | 79.7<br>79.8      | 79.8    | 5.6<br>5.6              | 5.6     |     | 2.3<br>2.4      | 2.4     |      | 2.1<br>2.0              | 2.1     |     |
|           |                   |                 |               | Bottom    | 12  | 26.3<br>26.3     | 26.3    | 8.0<br>8.0 | 8.0     | 29.1<br>29.1 | 29.1    | 72.6<br>71.6      | 72.1    | 5.1<br>5.1              | 5.1     |     | 6.7<br>6.9      | 6.8     |      | 3.2<br>1.8              | 2.5     |     |
| 22-Jul-13 | Cloudy            | Calm            | 12:41         | Surface   | 1   | 27.6<br>27.6     | 27.6    | 8.3<br>8.3 | 8.3     | 28.4<br>28.4 | 28.4    | 77.9<br>78.1      | 78.0    | 5.2<br>5.3              | 5.3     | 5.4 | 5.4<br>5.3      | 5.4     | 9.0  | 6.6<br>3.9              | 5.3     | 4.5 |
|           |                   |                 |               | Middle    | 3.5 | 27.6<br>27.6     | 27.6    | 8.3<br>8.3 | 8.3     | 29.5<br>29.4 | 29.5    | 80.0<br>79.9      | 80.0    | 5.4<br>5.4              | 5.4     |     | 5.6<br>5.5      | 5.6     |      | 5.5<br>3.8              | 4.7     |     |
|           |                   |                 |               | Bottom    | 6   | 27.4<br>27.4     | 27.4    | 8.3<br>8.3 | 8.3     | 29.6<br>29.6 | 29.6    | 76.7<br>76.4      | 76.6    | 5.1<br>5.1              | 5.1     |     | 15.8<br>16.4    | 16.1    |      | 3.6<br>3.3              | 3.5     |     |
| 24-Jul-13 | Rainy             | Moderate        | 13:06         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 27.0<br>27.0 | 27.0    | 94.6<br>94.8      | 94.7    | 6.4<br>6.4              | 6.4     | 6.2 | 4.6<br>4.8      | 4.7     | 14.1 | 6.3<br>8.1              | 7.2     | 6.3 |
|           |                   |                 |               | Middle    | 7.5 | 27.9<br>27.9     | 27.9    | 8.2<br>8.2 | 8.2     | 28.5<br>28.5 | 28.5    | 89.8<br>89.8      | 89.8    | 6.0<br>6.0              | 6.0     |     | 10.6<br>10.8    | 10.7    |      | 5.4<br>4.9              | 5.2     |     |
|           |                   |                 |               | Bottom    | 14  | 27.8<br>27.8     | 27.8    | 8.2<br>8.2 | 8.2     | 29.2<br>29.3 | 29.3    | 90.3<br>90.3      | 90.3    | 6.0<br>6.0              | 6.0     |     | 25.6<br>28.2    | 26.9    |      | 7.2<br>5.5              | 6.4     |     |
| 26-Jul-13 | Rainy             | Rough           | 14:34         | Surface   | 1   | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 25.9<br>25.9 | 25.9    | 98.0<br>97.8      | 97.9    | 6.7<br>6.7              | 6.7     | 6.7 | 5.9<br>6.0      | 6.0     | 11.3 | 6.6<br>9.1              | 7.9     | 6.8 |
|           |                   |                 |               | Middle    | 3.5 | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 26.9<br>27.0 | 27.0    | 98.7<br>98.3      | 98.5    | 6.7<br>6.7              | 6.7     |     | 4.5<br>5.3      | 4.9     |      | 8.5<br>6.4              | 7.5     |     |
|           |                   |                 |               | Bottom    | 6   | 27.6<br>27.6     | 27.6    | 8.2<br>8.2 | 8.2     | 27.4<br>27.4 | 27.4    | 95.4<br>95.4      | 95.4    | 6.5<br>6.5              | 6.5     |     | 23.9<br>22.1    | 23.0    |      | 5.3<br>4.9              | 5.1     |     |
| 29-Jul-13 | Sunny             | Calm            | 16:39         | Surface   | 1   | 29.8<br>29.8     | 29.8    | 8.1<br>8.1 | 8.1     | 16.2<br>16.3 | 16.3    | 95.2<br>91.9      | 93.6    | 6.5<br>6.4              | 6.5     | 6.2 | 3.1<br>3.0      | 3.1     | 6.9  | 3.6<br>2.8              | 3.2     | 3.1 |
|           |                   |                 |               | Middle    | 3.5 | 28.0<br>28.0     | 28.0    | 8.1<br>8.1 | 8.1     | 23.1<br>23.1 | 23.1    | 86.0<br>85.1      | 85.6    | 5.9<br>5.9              | 5.9     |     | 5.3<br>5.4      | 5.4     |      | 3.0<br>3.2              | 3.1     |     |
|           |                   |                 |               | Bottom    | 6   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 28.4<br>28.5 | 28.5    | 74.1<br>73.4      | 73.8    | 5.0<br>5.0              | 5.0     |     | 11.8<br>12.6    | 12.2    |      | 2.9<br>3.2              | 3.1     |     |
| 31-Jul-13 | Sunny             | Calm            | 08:26         | Surface   | 1   | 29.0<br>29.0     | 29.0    | 8.2<br>8.2 | 8.2     | 17.5<br>16.8 | 17.2    | 93.8<br>94.0      | 93.9    | 6.4<br>6.4              | 6.4     | 6.3 | 2.7<br>2.7      | 2.7     | 5.4  | 5.8<br>5.0              | 5.4     | 5.4 |
|           |                   |                 |               | Middle    | 7   | 28.3<br>28.3     | 28.3    | 8.2<br>8.2 | 8.2     | 22.7<br>21.8 | 22.3    | 90.9<br>90.7      | 90.8    | 6.1<br>6.1              | 6.1     |     | 2.3<br>2.4      | 2.4     |      | 4.6<br>4.8              | 4.7     |     |
|           |                   |                 |               | Bottom    | 13  | 27.1<br>27.1     | 27.1    | 8.2<br>8.2 | 8.2     | 29.4<br>28.1 | 28.8    | 80.1<br>79.1      | 79.6    | 5.3<br>5.3              | 5.3     |     | 10.0<br>12.2    | 11.1    |      | 6.2<br>6.0              | 6.1     |     |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

# Water Quality Monitoring Results at ST3 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 2-Jul-13  | Sunny             | Moderate        | 14:24         | Surface   | 1   | 29.4<br>29.4     | 29.4    | 8.0<br>8.0 | 8.0     | 15.5<br>15.4 | 15.5    | 119.6<br>113.5    | 116.6   | 8.4<br>8.0              | 8.2     | 8.0 | 4.5<br>5.3      | 4.9     | 6.8  | 5.2<br>5.0              | 5.1     | 5.5  |
|           |                   |                 |               | Middle    | 5   | 28.7<br>28.7     | 28.7    | 7.9<br>7.9 | 7.9     | 18.9<br>18.9 | 18.9    | 114.9<br>105.4    | 110.2   | 8.0<br>7.3              | 7.7     |     | 7.9<br>7.1      |         |      | 7.2<br>5.8              | 6.5     |      |
|           |                   |                 |               | Bottom    | 9   | 28.6<br>28.6     | 28.6    | 7.9<br>7.9 | 7.9     | 19.2<br>19.5 | 19.4    | 103.1<br>96.4     | 99.8    | 7.2<br>6.7              | 7.0     |     | 8.1<br>7.6      |         |      | 5.0<br>4.8              | 4.9     |      |
| 4-Jul-13  | Fine              | Calm            | 17:38         | Surface   | 1   | 30.8<br>30.8     | 30.8    | 8.1<br>8.1 | 8.1     | 7.3<br>7.2   | 7.3     | 101.3<br>100.4    | 100.9   | 7.3<br>7.2              | 7.3     | 7.0 | 5.0<br>4.9      | 5.0     | 5.9  | 4.5<br>5.0              | 4.8     | 6.3  |
|           |                   |                 |               | Middle    | 5.5 | 29.4<br>29.6     | 29.5    | 8.0<br>8.0 | 8.0     | 15.2<br>16.5 | 15.9    | 92.1<br>97.6      | 94.9    | 6.5<br>6.8              | 6.7     |     | 6.2<br>5.7      |         |      | 4.8<br>8.2              | 6.5     |      |
|           |                   |                 |               | Bottom    | 10  | 28.9<br>29.0     | 29.0    | 7.9<br>7.9 | 7.9     | 19.2<br>19.5 | 19.4    | 85.4<br>94.5      | 90.0    | 5.9<br>6.5              | 6.2     |     | 7.0<br>6.6      |         |      | 7.3<br>7.8              | 7.6     |      |
| 6-Jul-13  | Cloudy            | Moderate        | 17:58         | Surface   | 1   | 29.6<br>29.2     | 29.4    | 8.4<br>8.2 | 8.3     | 11.6<br>12.0 | 11.8    | 118.9<br>118.6    | 118.8   | 8.5<br>8.5              | 8.5     | 7.6 | 8.2<br>9.3      | 8.8     | 8.9  | 9.0<br>10.0             | 9.5     | 11.2 |
|           |                   |                 |               | Middle    | 7   | 29.6<br>28.3     | 29.0    | 8.4<br>8.0 | 8.2     | 18.2<br>18.6 | 18.4    | 96.0<br>95.9      | 96.0    | 6.7<br>6.6              | 6.7     |     | 8.2<br>8.5      |         |      | 10.3<br>8.7             | 9.5     |      |
|           |                   |                 |               | Bottom    | 13  | 29.2<br>28.3     | 28.8    | 8.2<br>8.0 | 8.1     | 24.0<br>24.0 | 24.0    | 88.1<br>85.7      | 86.9    | 6.1<br>5.9              | 6.0     |     | 9.1<br>9.8      |         |      | 15.7<br>13.3            | 14.5    |      |
| 8-Jul-13  | Fine              | Moderate        | 19:58         | Surface   | 1   | 29.5<br>29.4     | 29.5    | 8.2<br>8.2 | 8.2     | 13.0<br>13.3 | 13.2    | 89.2<br>79.6      | 84.4    | 6.3<br>5.7              | 6.0     | 6.2 | 7.5<br>8.5      | 8.0     | 12.1 | 3.3<br>3.3              | 3.3     | 7.2  |
|           |                   |                 |               | Middle    | 6   | 28.6<br>28.4     | 28.5    | 8.1<br>8.1 | 8.1     | 21.4<br>21.6 | 21.5    | 91.9<br>93.3      | 92.6    | 6.3<br>6.5              | 6.4     |     | 10.5<br>11.8    |         |      | 10.0<br>3.7             | 6.9     |      |
|           |                   |                 |               | Bottom    | 11  | 28.2<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 23.3<br>22.9 | 23.1    | 85.8<br>81.1      | 83.5    | 6.1<br>5.8              | 6.0     |     | 18.4<br>15.8    |         |      | 11.0<br>11.7            | 11.4    |      |
| 10-Jul-13 | Fine              | Moderate        | 07:28         | Surface   | 1   | 28.9<br>28.9     | 28.9    | 8.1<br>8.1 | 8.1     | 15.2<br>15.2 | 15.2    | 79.9<br>80.8      | 80.4    | 5.7<br>5.7              | 5.7     | 5.6 | 5.4<br>4.9      | 5.2     | 10.9 | 3.3<br>4.3              | 3.8     | 3.5  |
|           |                   |                 |               | Middle    | 5.5 | 28.6<br>28.6     | 28.6    | 8.0<br>8.0 | 8.0     | 18.6<br>18.6 | 18.6    | 74.1<br>74.8      | 74.5    | 5.3<br>5.4              | 5.4     |     | 7.0<br>7.1      |         |      | 3.5<br>3.5              | 3.5     |      |
|           |                   |                 |               | Bottom    | 10  | 27.8<br>27.9     | 27.9    | 8.0<br>8.0 | 8.0     | 24.5<br>24.8 | 24.7    | 72.8<br>71.3      | 72.1    | 5.1<br>5.0              | 5.1     |     | 18.7<br>22.3    |         |      | 2.9<br>3.2              | 3.1     |      |
| 12-Jul-13 | Sunny             | Moderate        | 08:29         | Surface   | 1   | 29.3<br>29.3     | 29.3    | 8.3<br>8.3 | 8.3     | 14.2<br>14.3 | 14.3    | 102.1<br>102.9    | 102.5   | 7.5<br>7.6              | 7.6     | 6.6 | 3.5<br>3.4      | 3.5     | 15.1 | 2.7<br>2.6              | 2.7     | 4.3  |
|           |                   |                 |               | Middle    | 5.5 | 27.2<br>27.2     | 27.2    | 8.2<br>8.2 | 8.2     | 27.6<br>26.7 | 27.2    | 72.8<br>74.8      | 73.8    | 5.4<br>5.5              | 5.5     |     | 13.2<br>13.4    |         |      | 3.1<br>3.3              | 3.2     |      |
|           |                   |                 |               | Bottom    | 10  | 27.0<br>27.0     | 27.0    | 8.2<br>8.2 | 8.2     | 28.3<br>28.3 | 28.3    | 70.1<br>69.8      | 70.0    | 5.2<br>5.2              | 5.2     |     | 27.5<br>29.3    |         |      | 10.8<br>3.3             | 7.1     |      |
| 15-Jul-13 | Rainy             | Calm            | 11:23         | Surface   | 1   | 29.2<br>29.2     | 29.2    | 8.0<br>8.0 | 8.0     | 13.1<br>13.1 | 13.1    | 81.3<br>81.1      | 81.2    | 5.7<br>5.7              | 5.7     | 5.6 | 5.6<br>5.6      | 5.6     | 6.9  | 2.7<br>1.8              | 2.3     | 2.0  |
|           |                   |                 |               | Middle    | 6.5 | 28.5<br>28.5     | 28.5    | 8.0<br>8.0 | 8.0     | 19.1<br>19.0 | 19.1    | 77.0<br>78.7      | 77.9    | 5.4<br>5.5              | 5.5     |     | 7.1<br>6.9      |         |      | 1.9<br>2.3              | 2.1     |      |
|           |                   |                 |               | Bottom    | 12  | 27.7<br>27.7     | 27.7    | 8.0<br>8.0 | 8.0     | 24.8<br>24.9 | 24.9    | 72.2<br>75.1      | 73.7    | 5.0<br>5.1              | 5.1     |     | 8.1<br>7.8      |         |      | 1.7<br>1.6              | 1.7     |      |
| 17-Jul-13 | Rainy             | Moderate        | 14:26         | Surface   | 1   | 28.6<br>28.7     | 28.7    | 8.0<br>8.0 | 8.0     | 16.5<br>16.4 | 16.5    | 81.3<br>81.8      | 81.6    | 5.7<br>5.8              | 5.8     | 5.7 | 2.3<br>2.3      | 2.3     | 8.1  | 2.0<br>2.4              | 2.2     | 2.3  |
|           |                   |                 |               | Middle    | 6   | 27.5<br>27.5     | 27.5    | 8.0<br>8.0 | 8.0     | 22.4<br>22.5 | 22.5    | 78.8<br>77.9      | 78.4    | 5.5<br>5.4              | 5.5     |     | 4.8<br>4.9      |         |      | 2.4<br>2.6              | 2.5     |      |
|           |                   |                 |               | Bottom    | 11  | 25.9<br>26.0     | 26.0    | 8.0<br>8.0 | 8.0     | 28.8<br>28.6 | 28.7    | 73.2<br>73.1      | 73.2    | 5.1<br>5.1              | 5.1     |     | 17.3<br>16.8    |         |      | 2.1<br>2.3              | 2.2     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

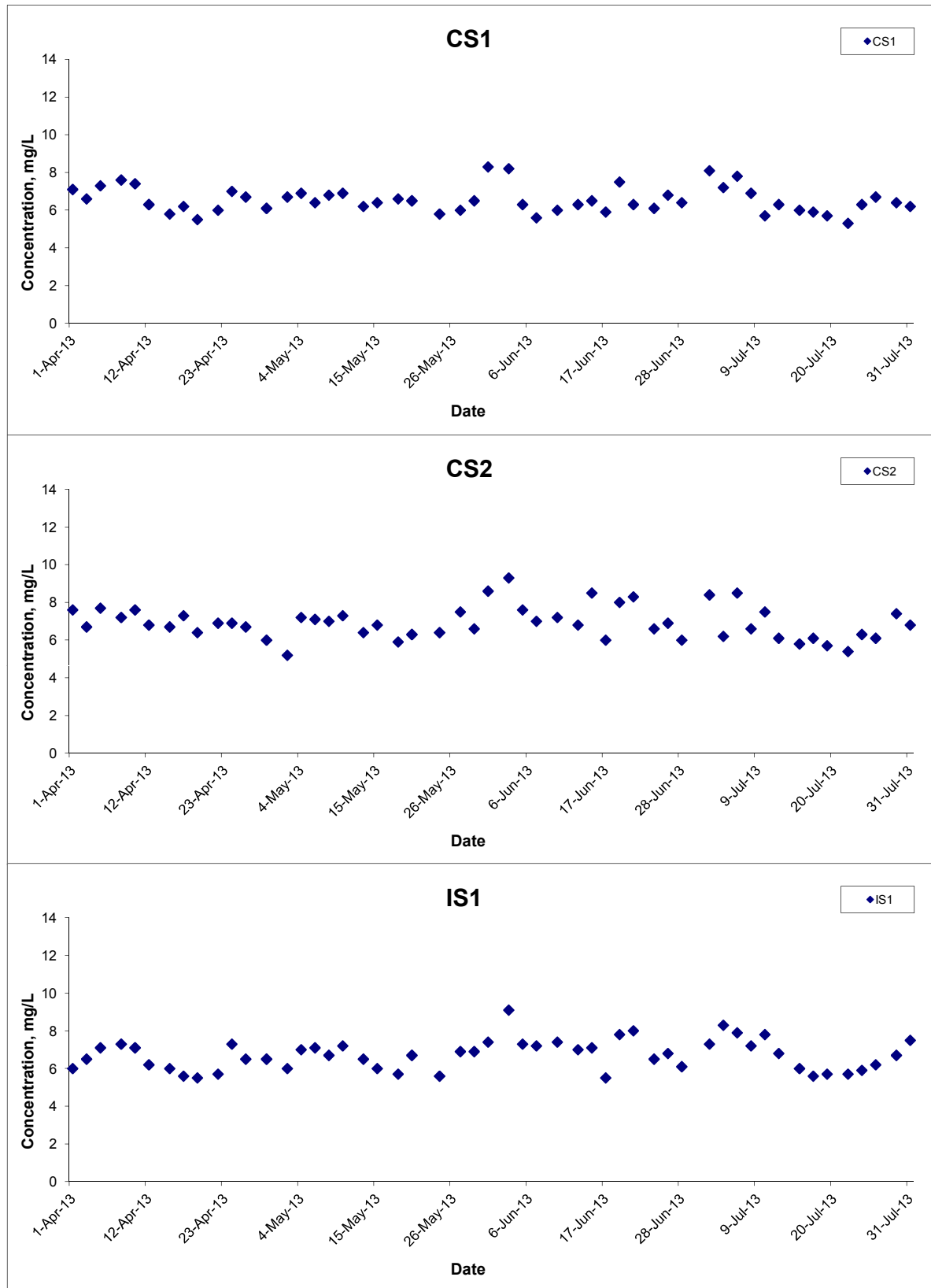
# Water Quality Monitoring Results at ST3 - Mid-Flood Tide

| Date      | Weather Condition | Sea Condition** | Sampling Time | Depth (m) |     | Temperature (°C) |         | pH         |         | Salinity ppt |         | DO Saturation (%) |         | Dissolved Oxygen (mg/L) |         |     | Turbidity (NTU) |         |      | Suspended Solids (mg/L) |         |      |
|-----------|-------------------|-----------------|---------------|-----------|-----|------------------|---------|------------|---------|--------------|---------|-------------------|---------|-------------------------|---------|-----|-----------------|---------|------|-------------------------|---------|------|
|           |                   |                 |               |           |     | Value            | Average | Value      | Average | Value        | Average | Value             | Average | Value                   | Average | DA* | Value           | Average | DA*  | Value                   | Average | DA*  |
| 19-Jul-13 | Cloudy            | Calm            | 16:00         | Surface   | 1   | 27.9<br>27.9     | 27.9    | 8.1<br>8.1 | 8.1     | 24.3<br>24.3 | 24.3    | 81.9<br>82.0      | 82.0    | 5.7<br>5.7              | 5.7     | 5.5 | 3.2<br>3.0      | 3.1     | 4.3  | 7.0<br>2.6              | 4.8     | 6.3  |
|           |                   |                 |               | Middle    | 7.5 | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 24.5<br>24.5 | 24.5    | 76.1<br>76.4      | 76.3    | 5.3<br>5.3              | 5.3     |     | 3.8<br>3.8      | 3.8     |      | 2.5<br>4.2              | 3.4     |      |
|           |                   |                 |               | Bottom    | 14  | 27.4<br>27.3     | 27.4    | 8.1<br>8.1 | 8.1     | 25.4<br>25.1 | 25.3    | 72.7<br>72.0      | 72.4    | 5.0<br>5.0              | 5.0     |     | 5.6<br>6.5      | 6.1     |      | 12.5<br>9.0             | 10.8    |      |
| 22-Jul-13 | Rainy             | Moderate        | 18:47         | Surface   | 1   | 28.2<br>28.2     | 28.2    | 8.1<br>8.2 | 8.2     | 23.9<br>25.5 | 24.7    | 78.6<br>83.0      | 80.8    | 5.4<br>5.6              | 5.5     | 5.5 | 7.8<br>7.6      | 7.7     | 9.4  | 13.0<br>10.2            | 11.6    | 12.0 |
|           |                   |                 |               | Middle    | 5   | 28.2<br>28.2     | 28.2    | 8.1<br>8.2 | 8.2     | 23.5<br>25.5 | 24.5    | 78.3<br>82.7      | 80.5    | 5.4<br>5.6              | 5.5     |     | 8.5<br>8.3      | 8.4     |      | 10.8<br>12.3            | 11.6    |      |
|           |                   |                 |               | Bottom    | 9   | 27.4<br>27.4     | 27.4    | 8.2<br>8.2 | 8.2     | 27.9<br>28.6 | 28.3    | 73.1<br>72.2      | 72.7    | 5.0<br>4.9              | 5.0     |     | 12.5<br>11.4    | 12.0    |      | 11.8<br>13.8            | 12.8    |      |
| 24-Jul-13 | Rainy             | Moderate        | 07:17         | Surface   | 1   | 27.8<br>27.8     | 27.8    | 8.1<br>8.1 | 8.1     | 24.8<br>24.8 | 24.8    | 88.5<br>89.2      | 88.9    | 6.1<br>6.1              | 6.1     | 6.0 | 6.0<br>5.6      | 5.8     | 11.1 | 3.0<br>4.1              | 3.6     | 3.7  |
|           |                   |                 |               | Middle    | 7.5 | 28.0<br>27.8     | 27.9    | 8.1<br>8.1 | 8.1     | 27.1<br>25.8 | 26.5    | 87.9<br>88.2      | 88.1    | 5.9<br>5.9              | 5.9     |     | 11.0<br>11.5    | 11.3    |      | 3.7<br>3.9              | 3.8     |      |
|           |                   |                 |               | Bottom    | 14  | 28.0<br>28.0     | 28.0    | 8.2<br>8.2 | 8.2     | 27.4<br>27.4 | 27.4    | 87.3<br>87.1      | 87.2    | 5.9<br>5.9              | 5.9     |     | 16.3<br>16.0    | 16.2    |      | 3.9<br>3.7              | 3.8     |      |
| 26-Jul-13 | Rainy             | Rough           | 08:59         | Surface   | 1   | 27.4<br>27.4     | 27.4    | 8.1<br>8.1 | 8.1     | 24.6<br>24.6 | 24.6    | 90.2<br>90.1      | 90.2    | 6.3<br>6.3              | 6.3     | 6.3 | 8.1<br>8.5      | 8.3     | 13.6 | 4.6<br>4.5              | 4.6     | 6.0  |
|           |                   |                 |               | Middle    | 3.5 | 27.5<br>27.5     | 27.5    | 8.1<br>8.1 | 8.1     | 26.2<br>26.2 | 26.2    | 89.7<br>90.0      | 89.9    | 6.2<br>6.2              | 6.2     |     | 9.0<br>8.4      | 8.7     |      | 6.1<br>7.3              | 6.7     |      |
|           |                   |                 |               | Bottom    | 6   | 27.6<br>27.6     | 27.6    | 8.1<br>8.1 | 8.1     | 26.7<br>26.7 | 26.7    | 87.6<br>87.1      | 87.4    | 6.0<br>6.0              | 6.0     |     | 22.7<br>25.0    | 23.9    |      | 5.6<br>7.7              | 6.7     |      |
| 29-Jul-13 | Sunny             | Calm            | 11:17         | Surface   | 1   | 28.8<br>29.0     | 28.9    | 8.0<br>8.0 | 8.0     | 15.9<br>15.4 | 15.7    | 82.8<br>83.6      | 83.2    | 5.9<br>5.9              | 5.9     | 5.8 | 3.5<br>3.4      | 3.5     | 4.0  | 2.5<br>2.3              | 2.4     | 2.6  |
|           |                   |                 |               | Middle    | 3.5 | 28.3<br>28.3     | 28.3    | 8.0<br>8.0 | 8.0     | 18.3<br>18.1 | 18.2    | 80.9<br>81.0      | 81.0    | 5.7<br>5.7              | 5.7     |     | 3.6<br>3.5      | 3.6     |      | 3.1<br>2.5              | 2.8     |      |
|           |                   |                 |               | Bottom    | 6   | 28.1<br>28.2     | 28.2    | 8.1<br>8.1 | 8.1     | 19.2<br>19.0 | 19.1    | 82.4<br>83.8      | 83.1    | 5.8<br>5.9              | 5.9     |     | 4.7<br>4.9      | 4.8     |      | 2.3<br>2.8              | 2.6     |      |
| 31-Jul-13 | Sunny             | Calm            | 14:07         | Surface   | 1   | 30.0<br>30.0     | 30.0    | 8.4<br>8.4 | 8.4     | 14.7<br>14.7 | 14.7    | 98.8<br>99.0      | 98.9    | 6.8<br>6.8              | 6.8     | 6.7 | 2.6<br>2.5      | 2.6     | 2.3  | 2.4<br>4.2              | 3.3     | 3.5  |
|           |                   |                 |               | Middle    | 6   | 29.7<br>29.7     | 29.7    | 8.3<br>8.3 | 8.3     | 15.3<br>15.3 | 15.3    | 95.5<br>95.1      | 95.3    | 6.5<br>6.5              | 6.5     |     | 2.3<br>2.3      | 2.3     |      | 2.6<br>3.4              | 3.0     |      |
|           |                   |                 |               | Bottom    | 11  | 29.3<br>29.3     | 29.3    | 8.3<br>8.3 | 8.3     | 16.5<br>16.5 | 16.5    | 89.2<br>89.8      | 89.5    | 6.1<br>6.1              | 6.1     |     | 2.0<br>2.0      | 2.0     |      | 5.0<br>3.4              | 4.2     |      |

Remarks: \*DA: Depth-Averaged

\*\*Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

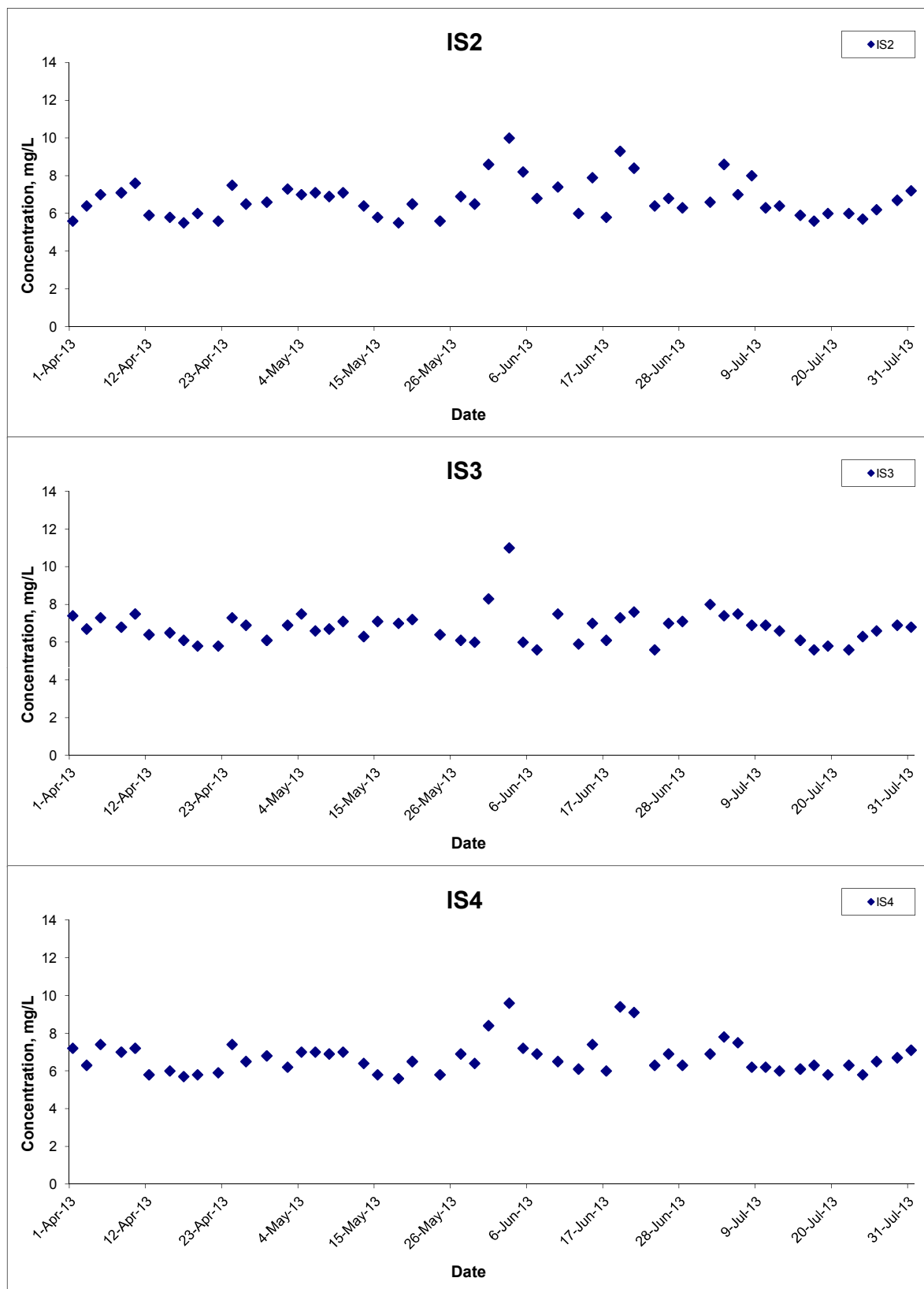
## Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



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

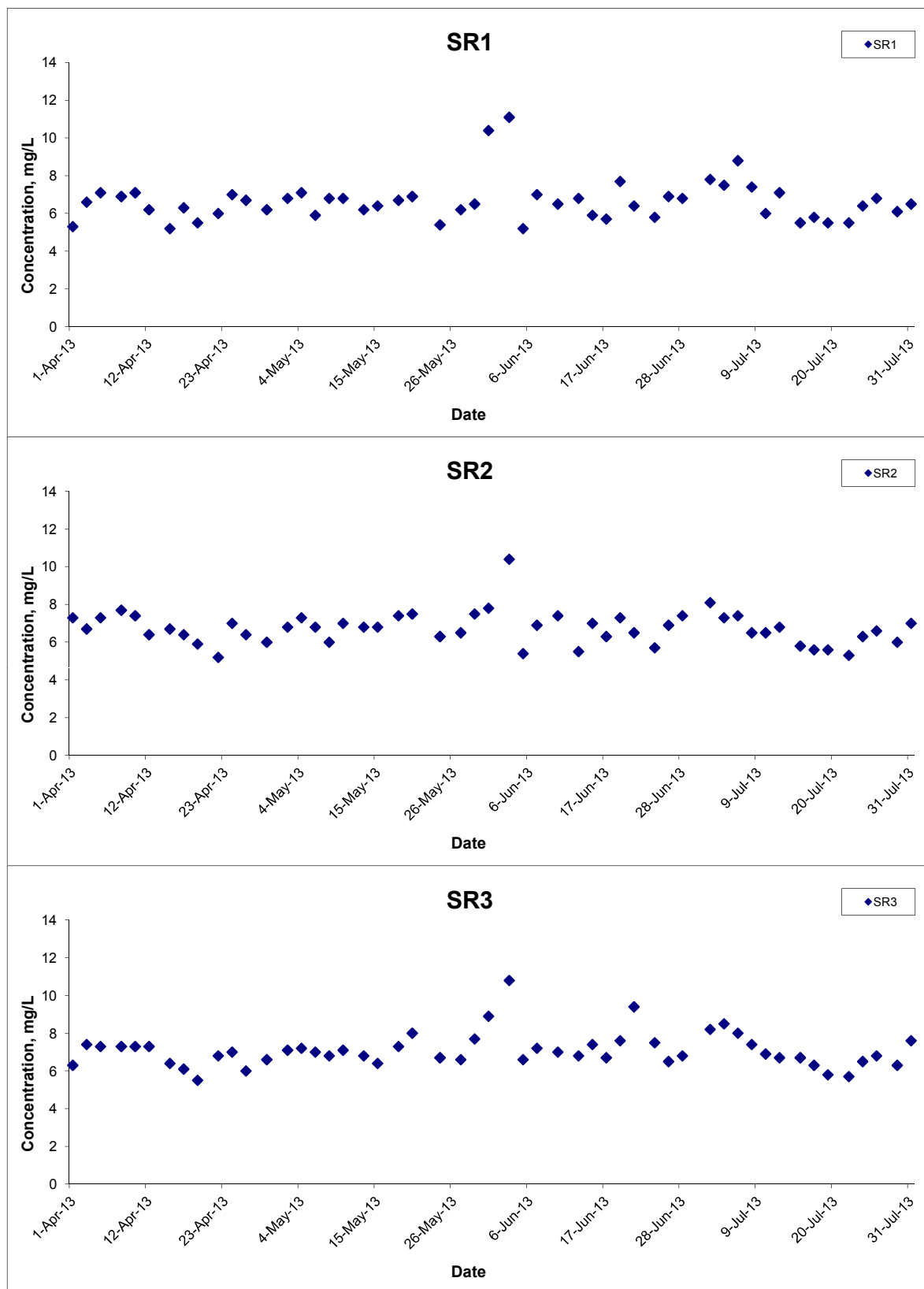


## Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



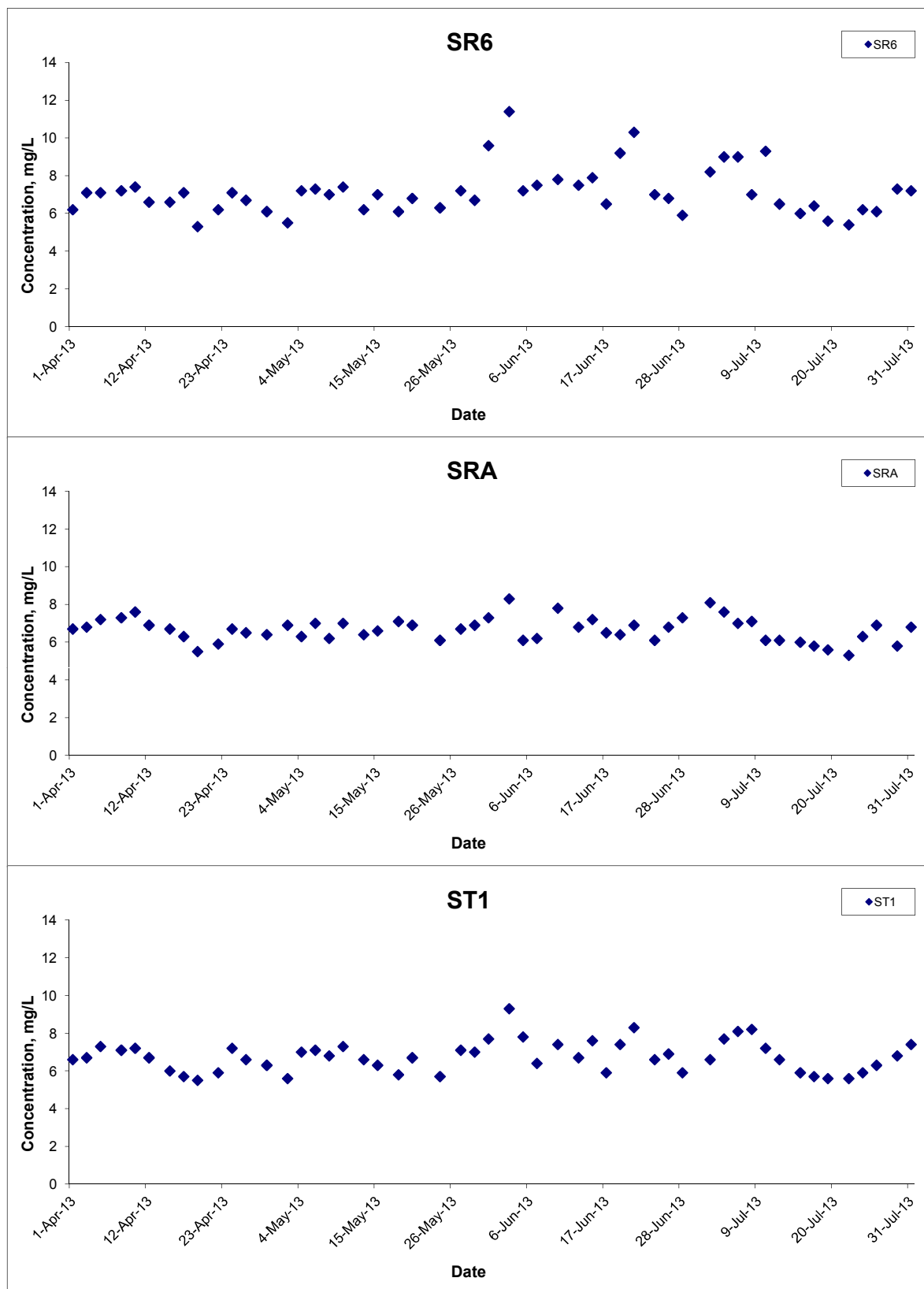
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|-------|---|--------|-------------|----------|
| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill<br><br>Graphical Presentation of Water Quality Monitoring<br>Results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

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



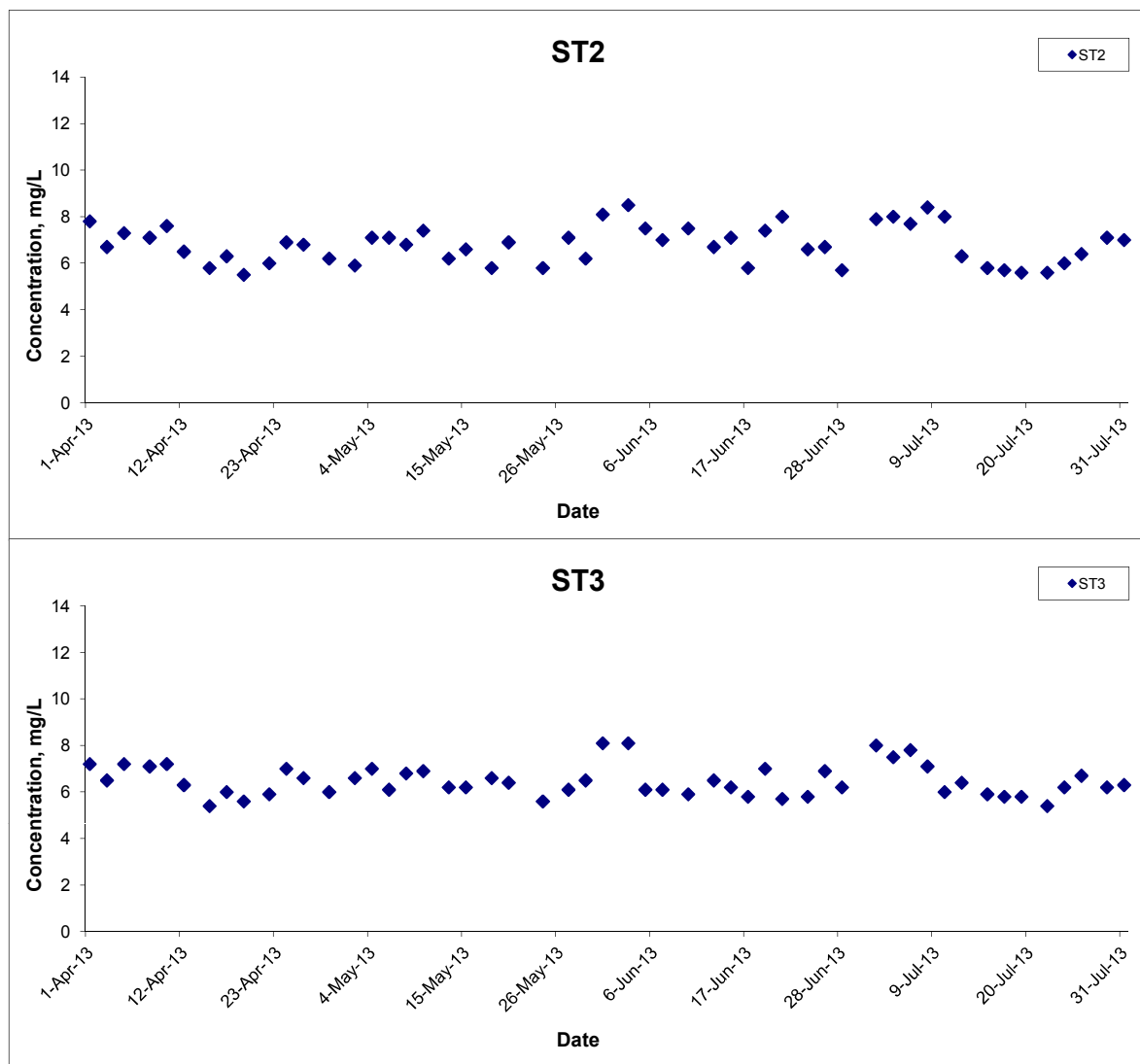
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| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill<br><br>Graphical Presentation of Water Quality Monitoring<br>Results | Scale  | Project     | CINOTECH |
|       |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

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



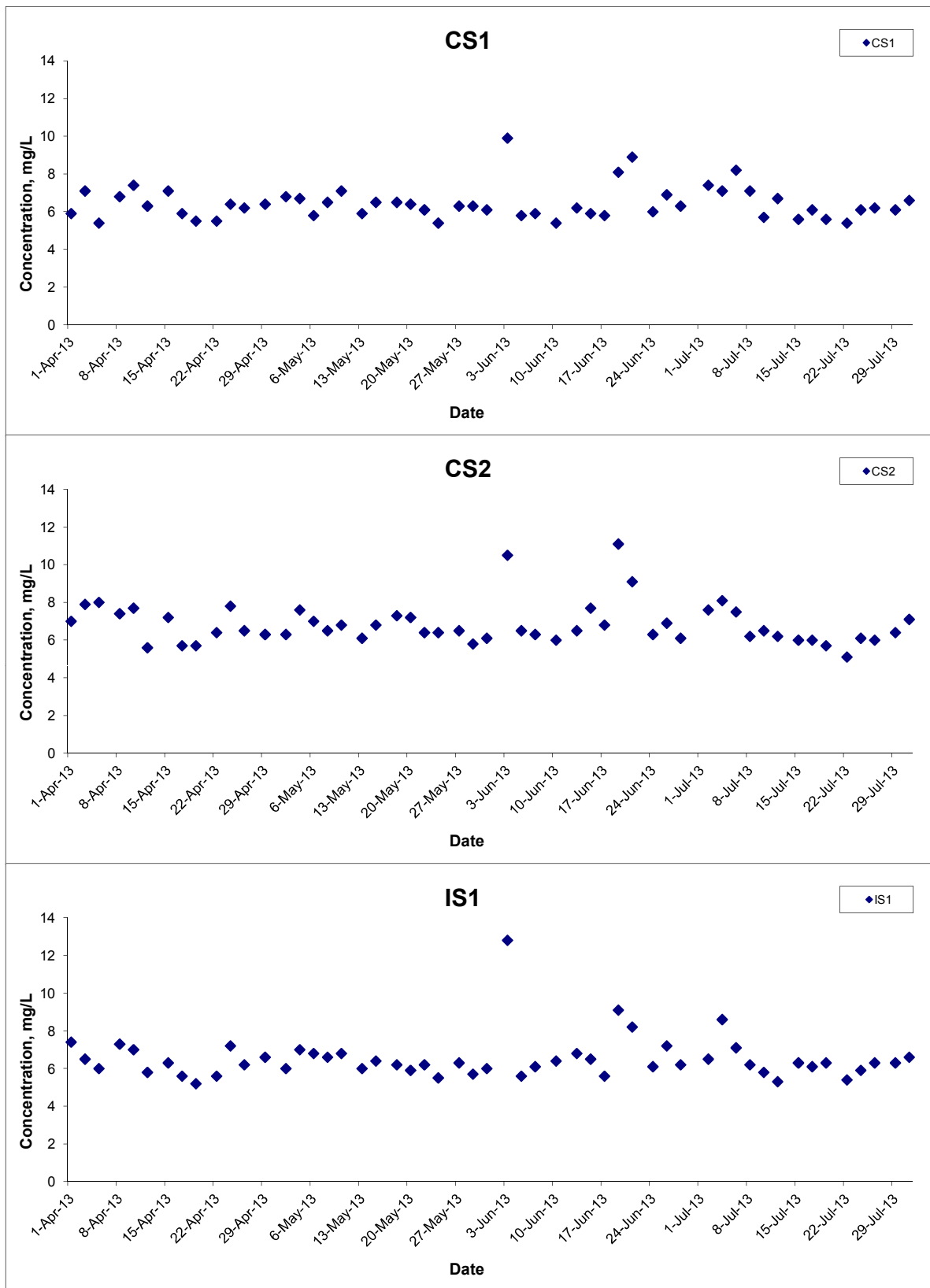
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|-------|--|-------|--------|------------------------|----------|
| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill | Scale | N.T.S  | Project<br>No. MA12014 | CINOTECH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

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



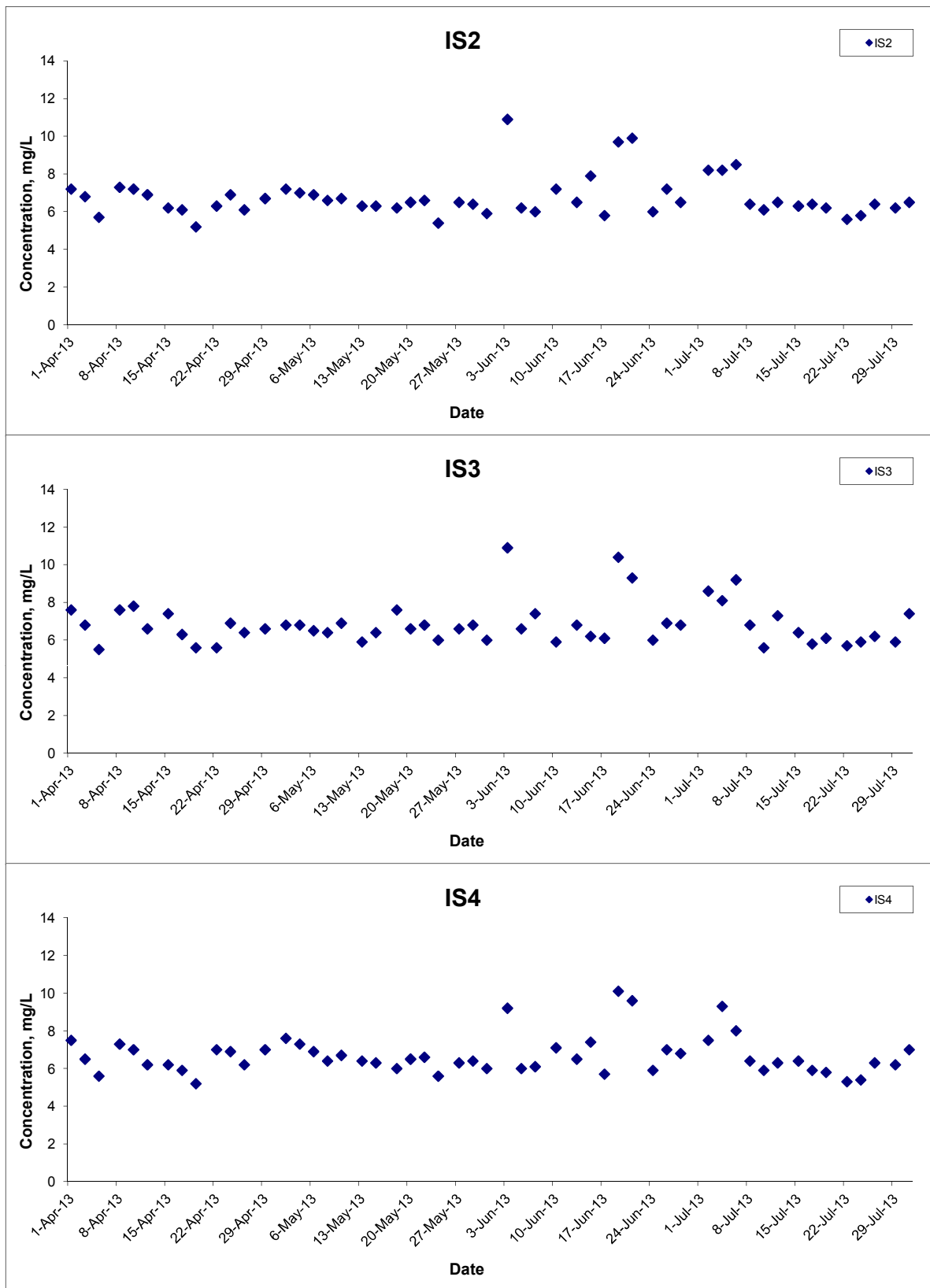
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|-------|---|--------|-------------|----------|
| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill<br><br>Graphical Presentation of Water Quality Monitoring<br>Results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

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



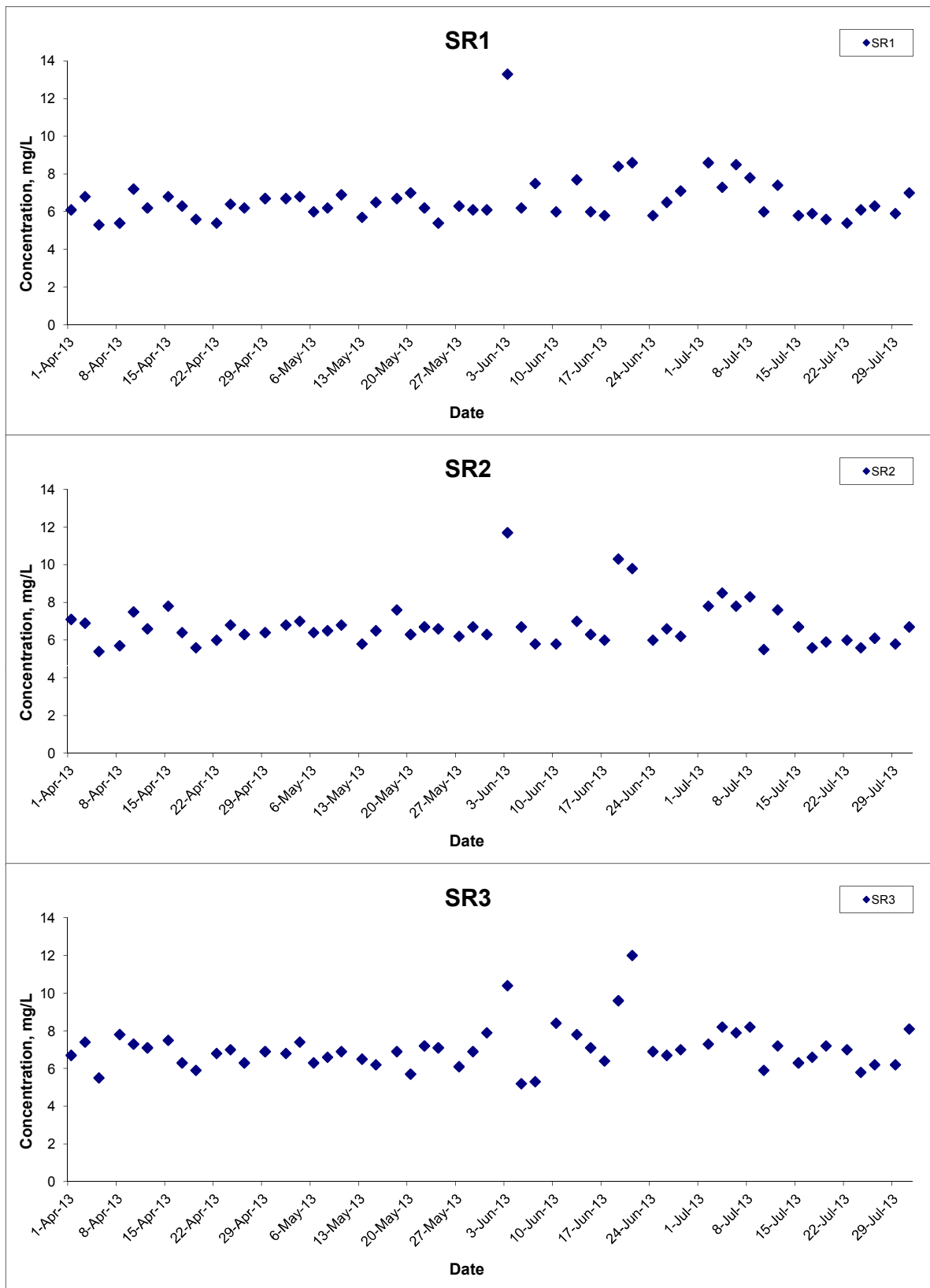
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|-------|---|--------|-------------|----------|
| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill<br><br>Graphical Presentation of Water Quality Monitoring<br>Results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

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



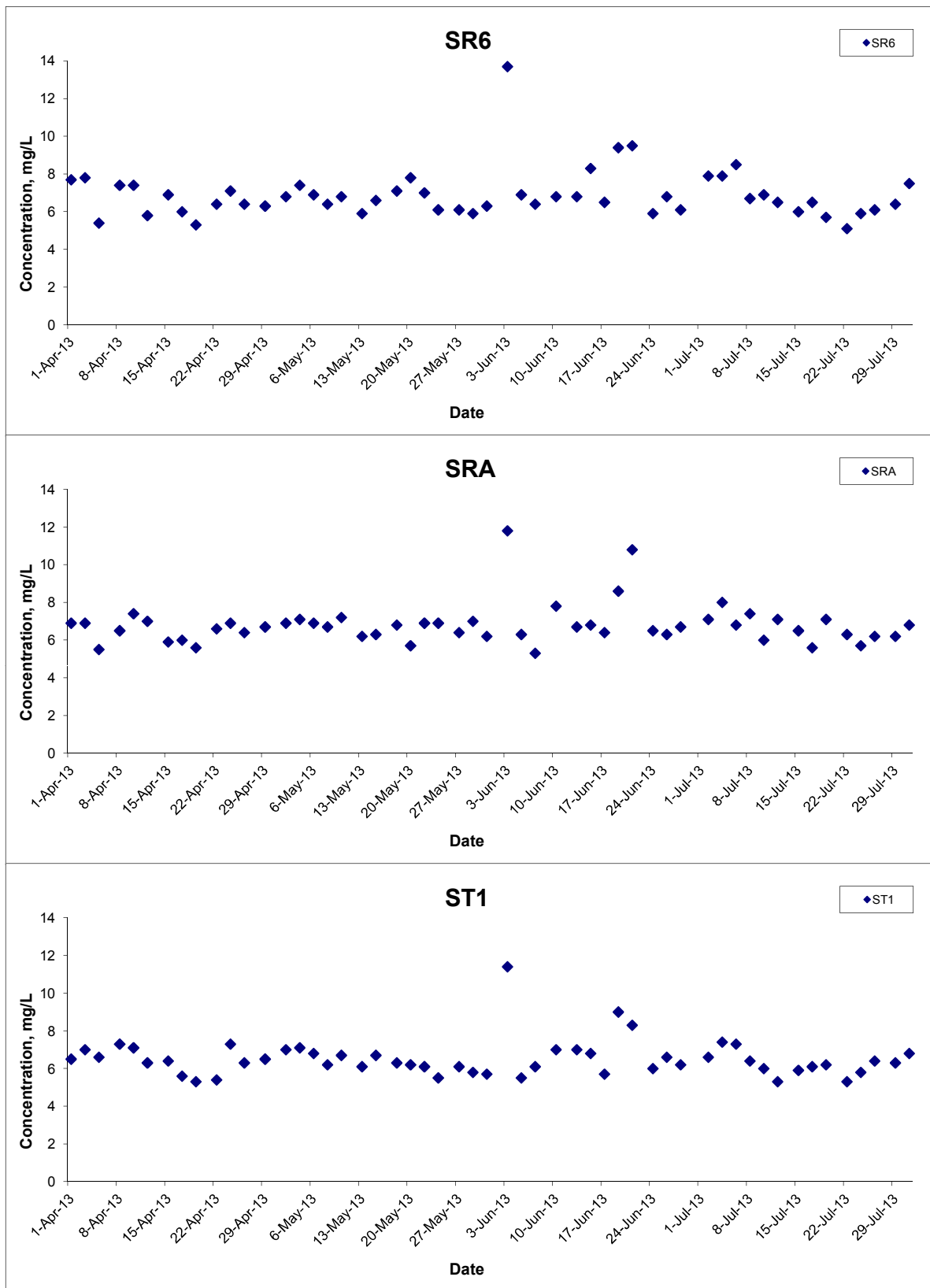
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|-------|--|-------|--------|------------------------|----------|
| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill | Scale | N.T.S  | Project<br>No. MA12014 | CINOTECH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

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



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

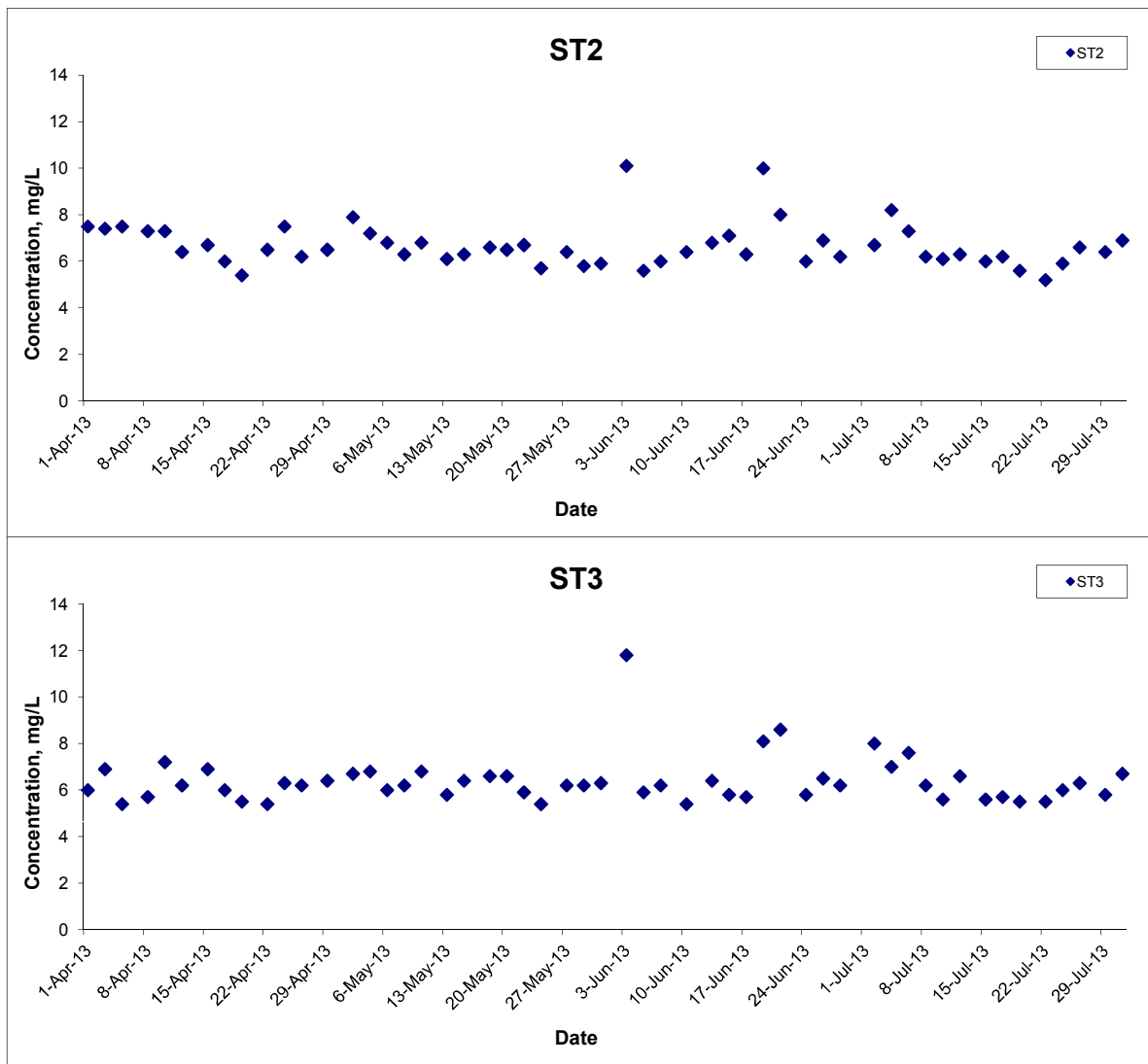
## Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



|       |   |        |             |          |
|-------|---|--------|-------------|----------|
| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill<br><br>Graphical Presentation of Water Quality Monitoring<br>Results | Scale  | Project     | CINOTECH |
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|       |   | Date   | Appendix    |          |
|       |   | Jul 13 | H           |          |

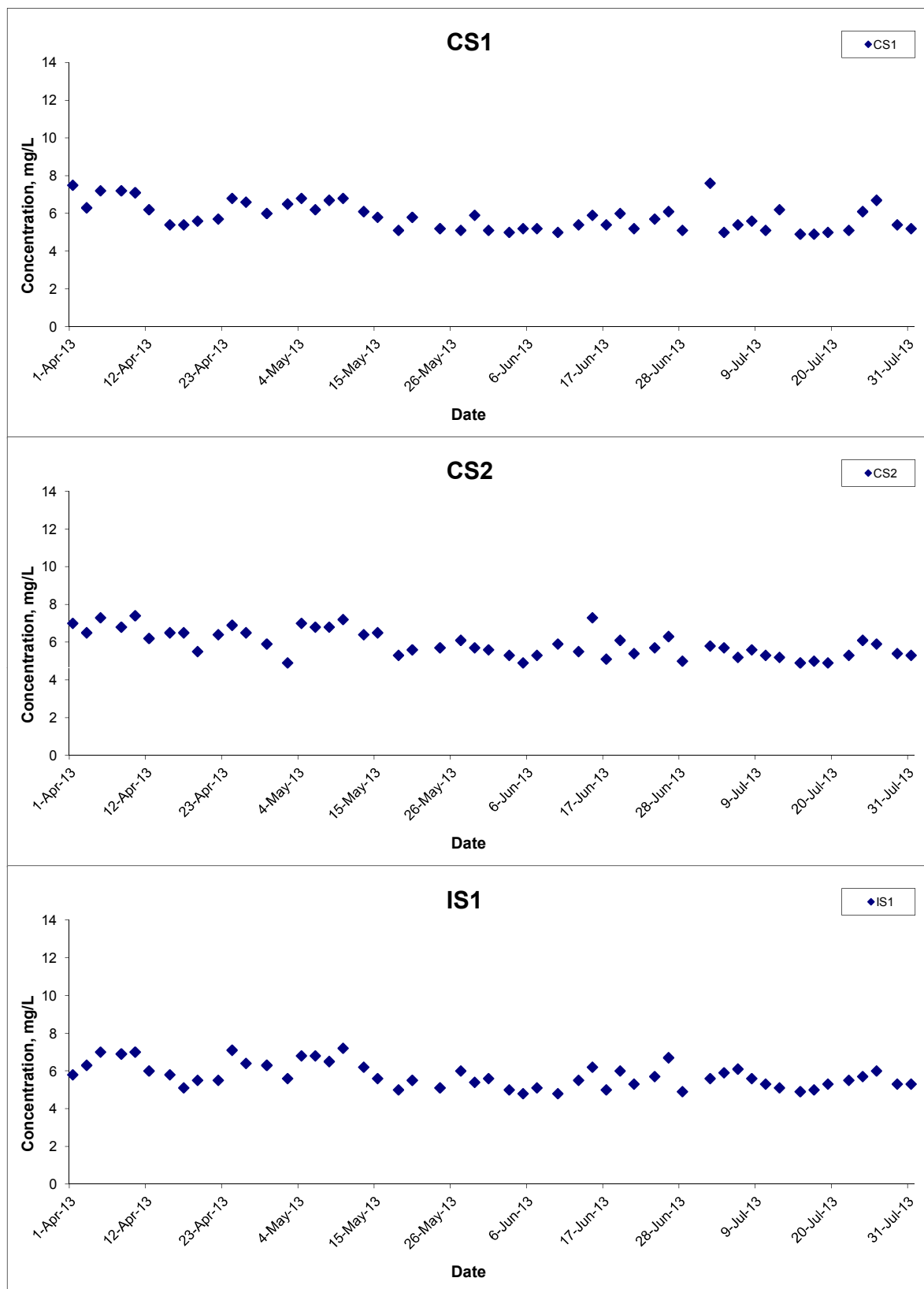


## Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



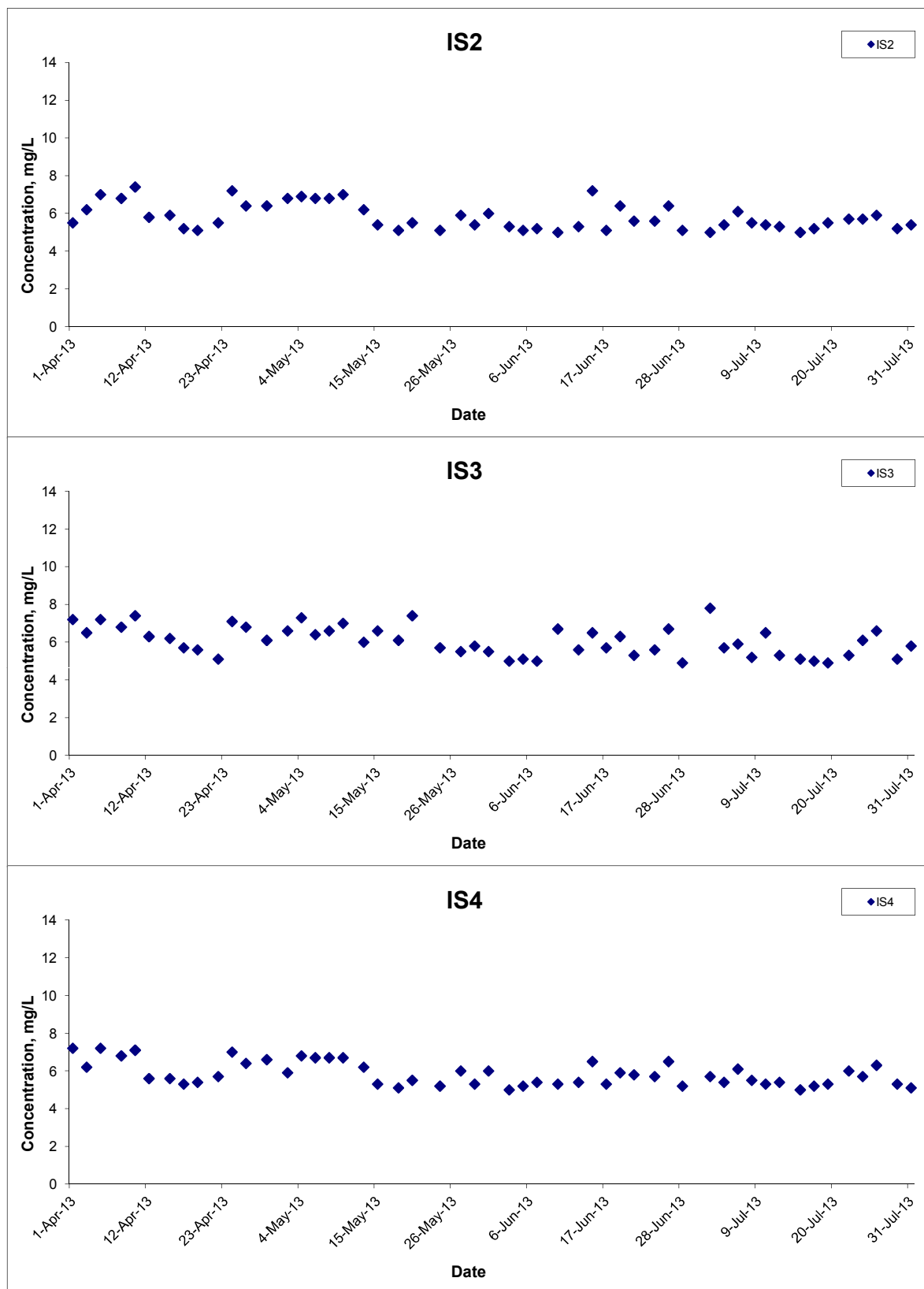
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|       |   | N.T.S  | No. MA12014 |          |
|       |   | Date   | Appendix    |          |
|       |   | Jul 13 | H           |          |

## Dissolved Oxygen (Bottom) at Mid-Ebb Tide



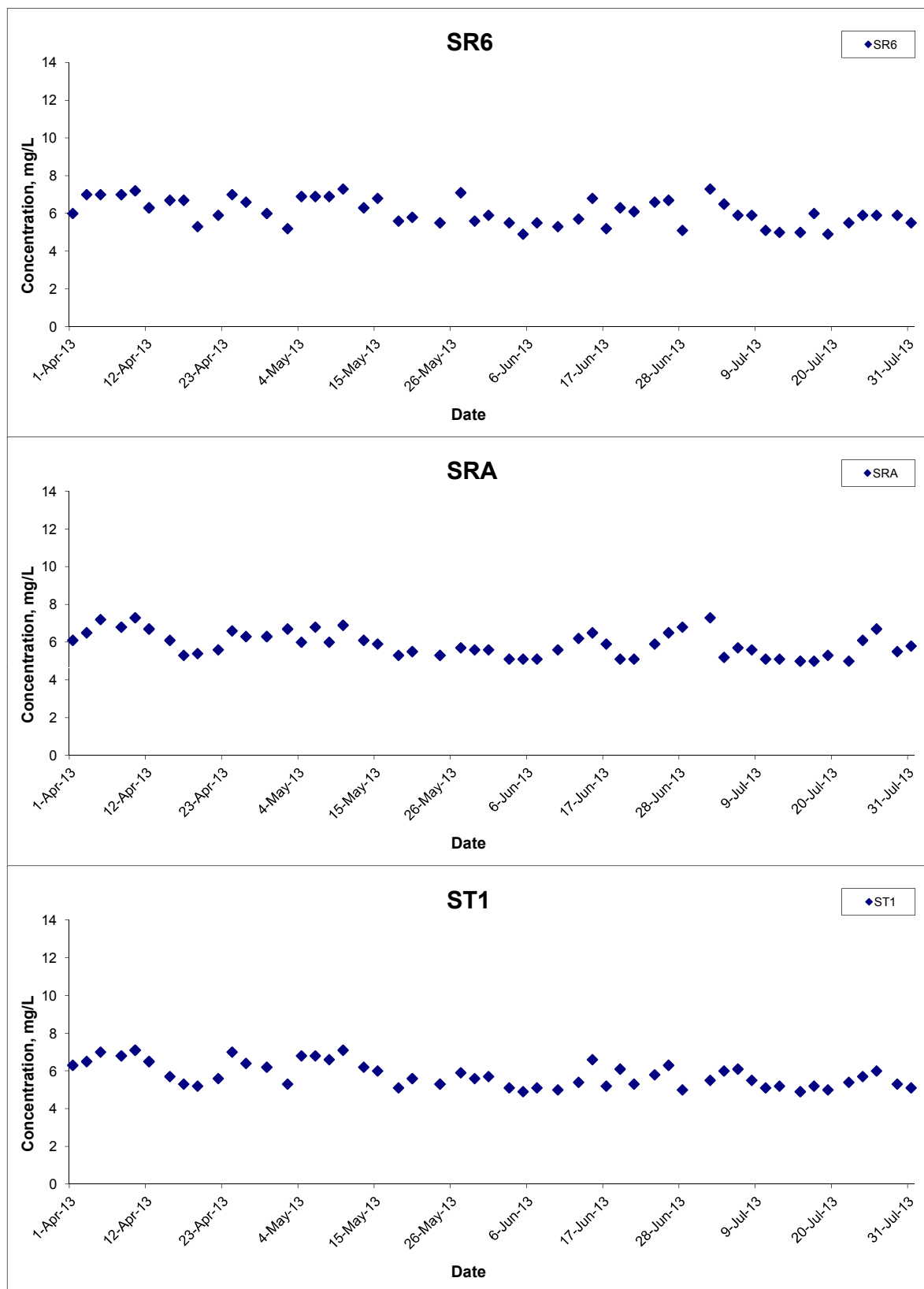
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|       |   | Date  | Jul 13 | Appendix<br>H          |          |

## Dissolved Oxygen (Bottom) at Mid-Ebb Tide



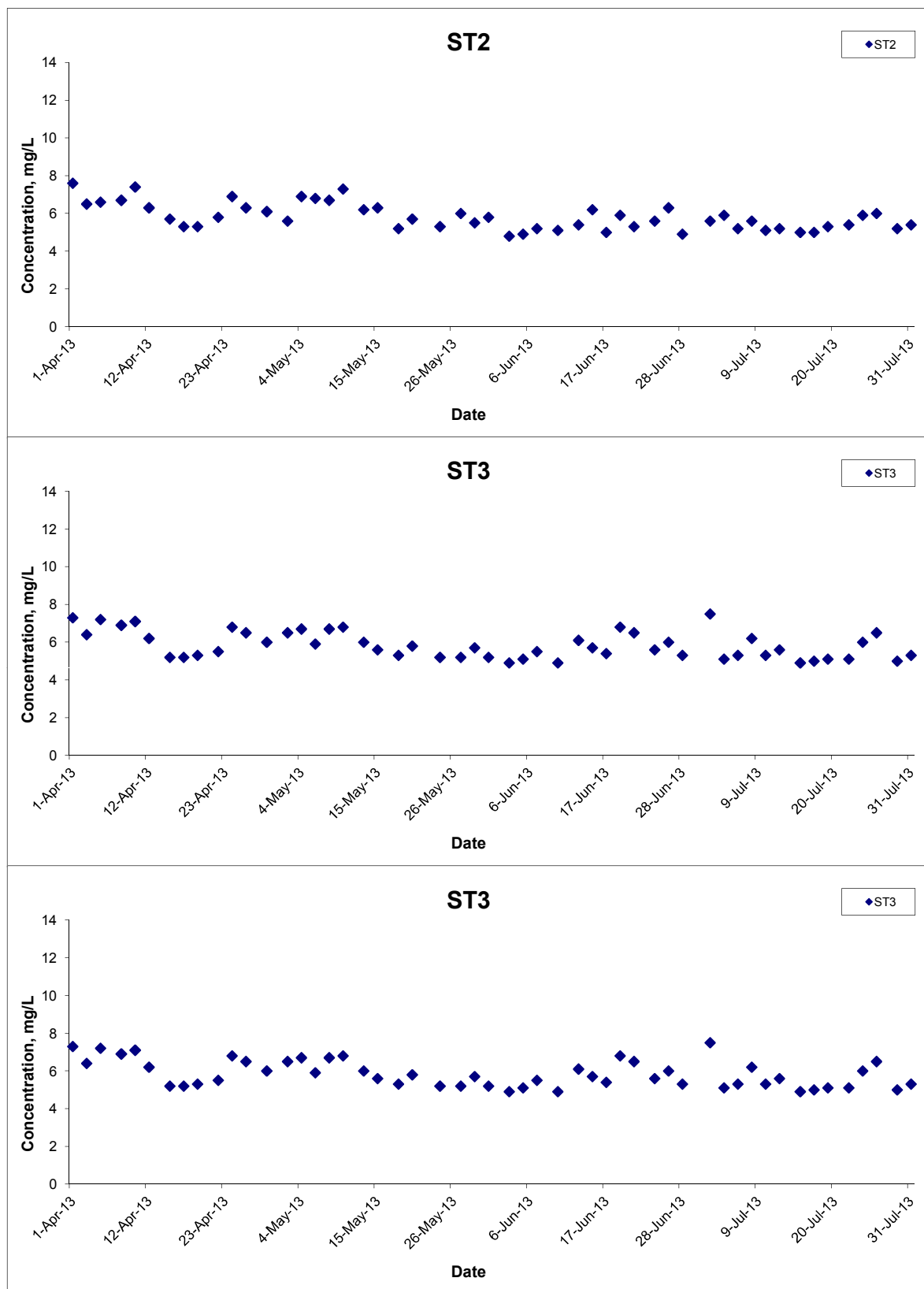
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|       |   | N.T.S  | No. MA12014 |          |
|       |   | Date   | Appendix    |          |
|       |   | Jul 13 | H           |          |

## Dissolved Oxygen (Bottom) at Mid-Ebb Tide



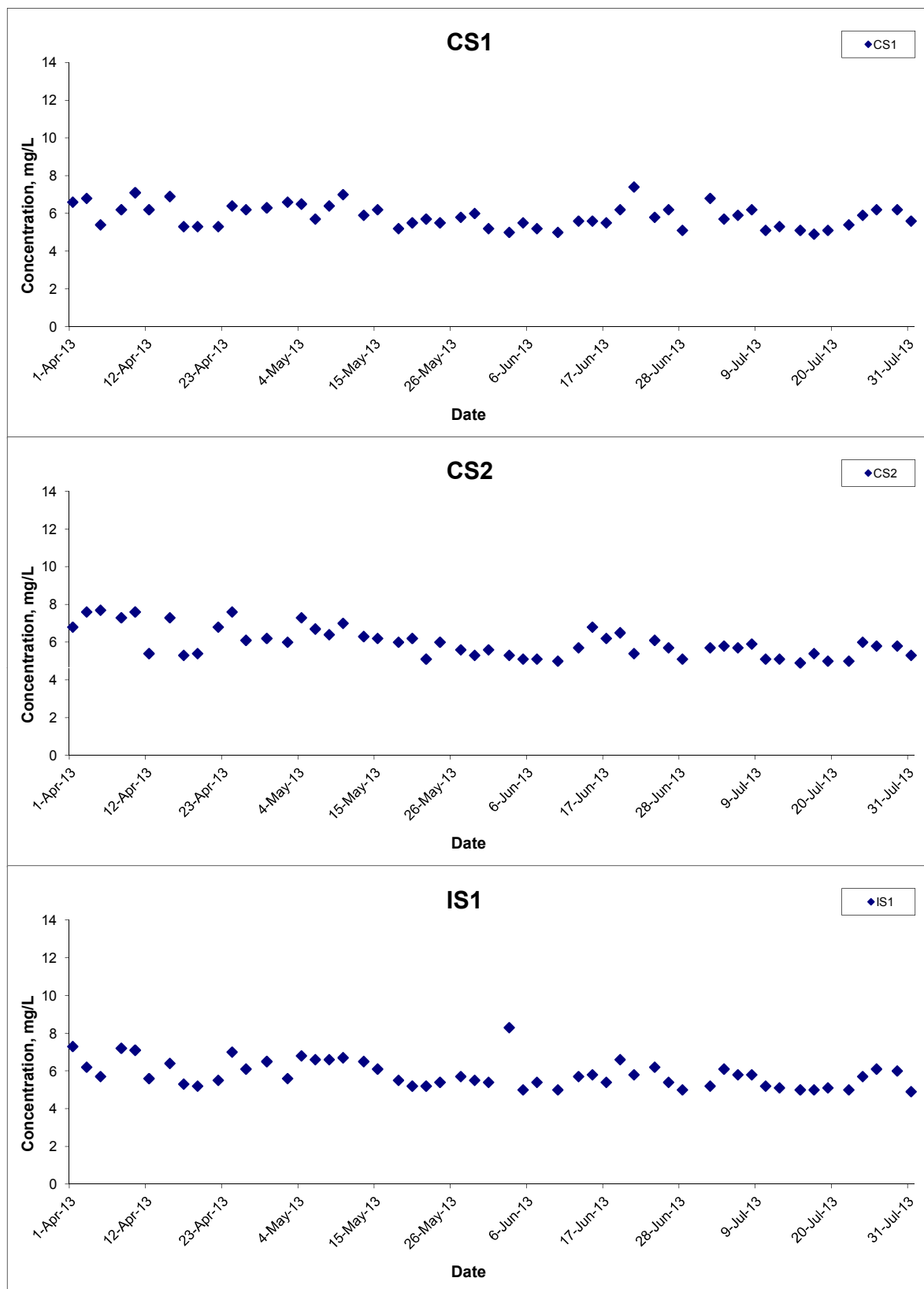
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## Dissolved Oxygen (Bottom) at Mid-Ebb Tide



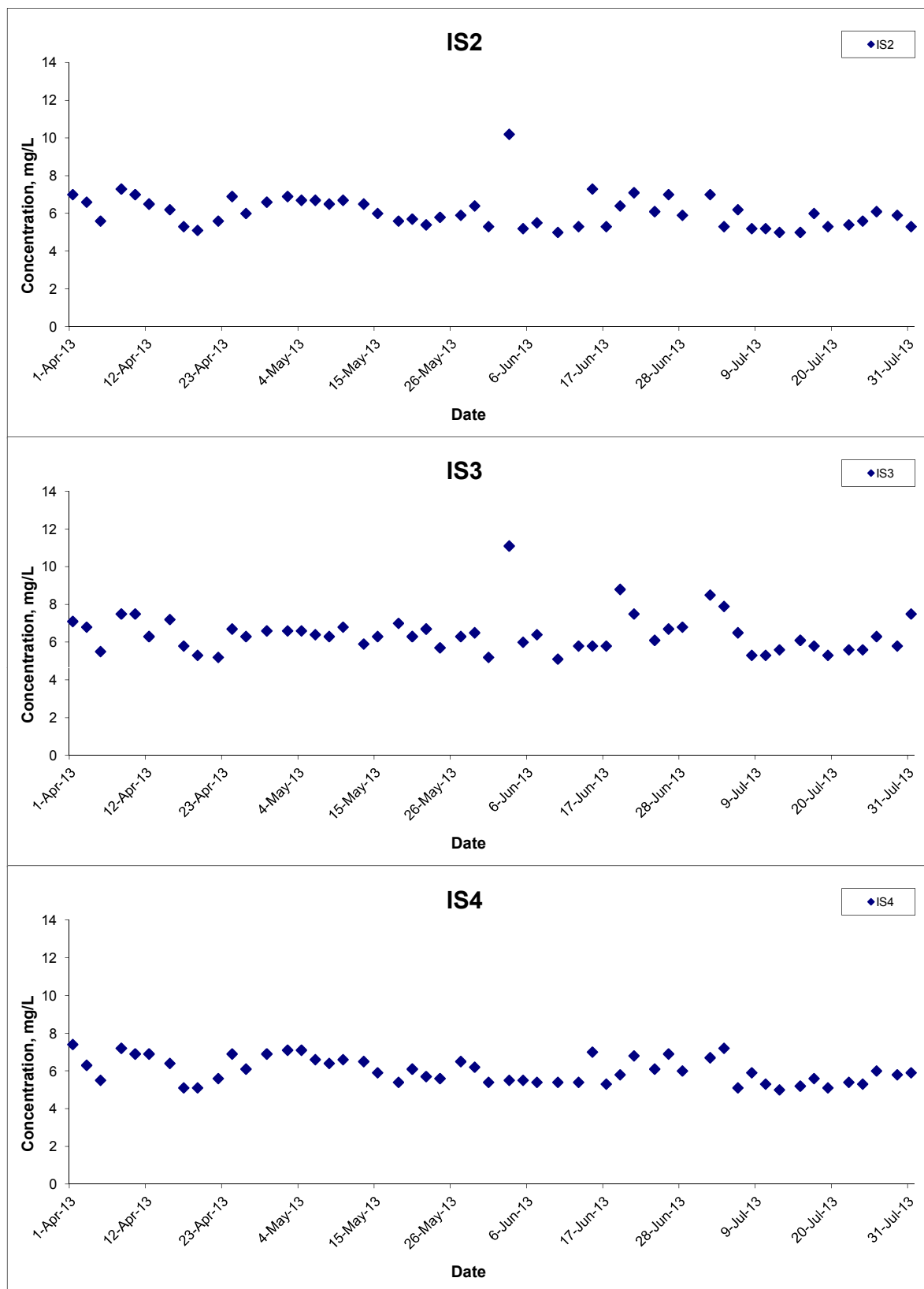
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## Dissolved Oxygen (Bottom) at Mid-Flood Tide



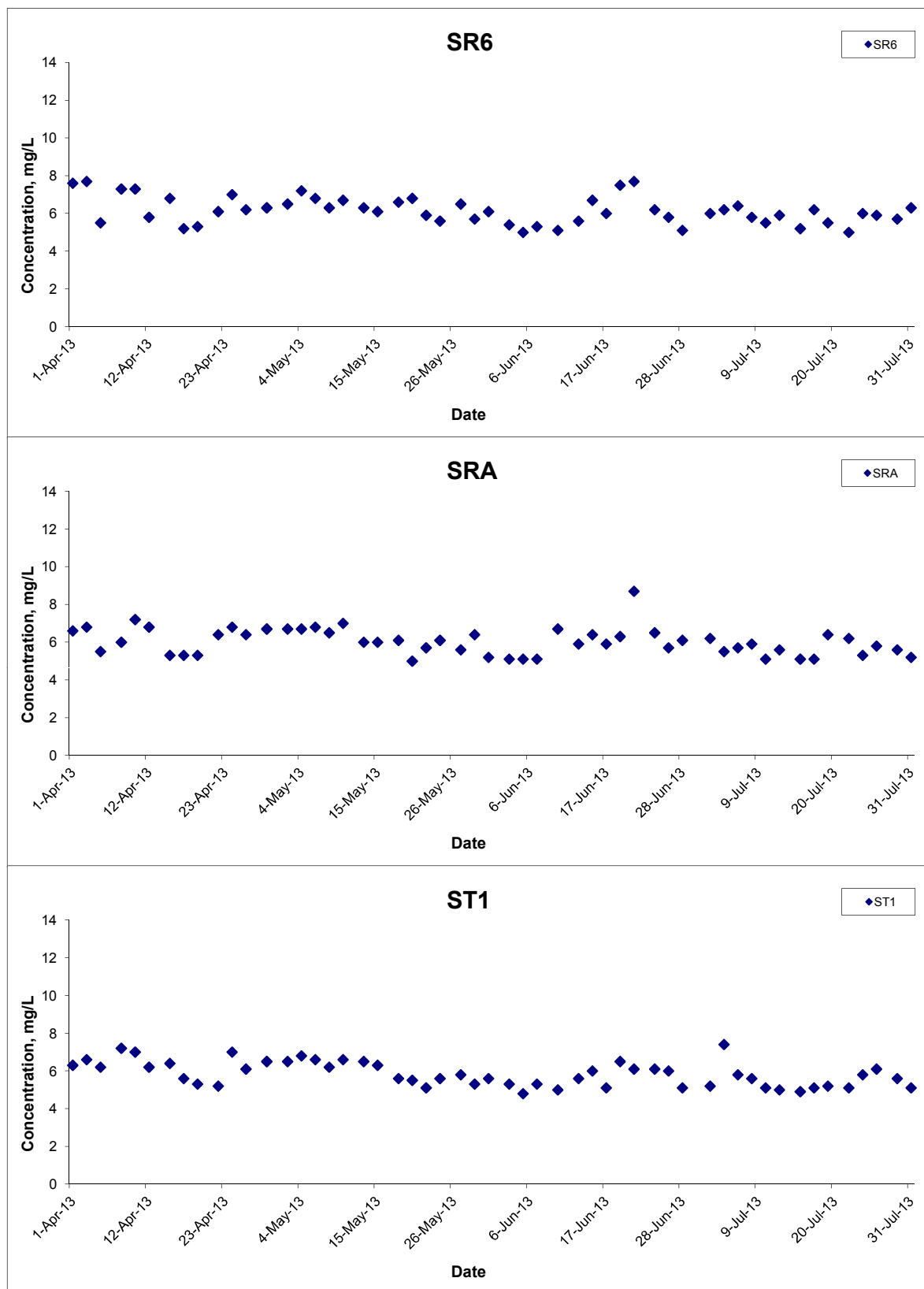
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  | Date  | Jul 13 | Appendix<br>H          |          |

## Dissolved Oxygen (Bottom) at Mid-Flood Tide



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

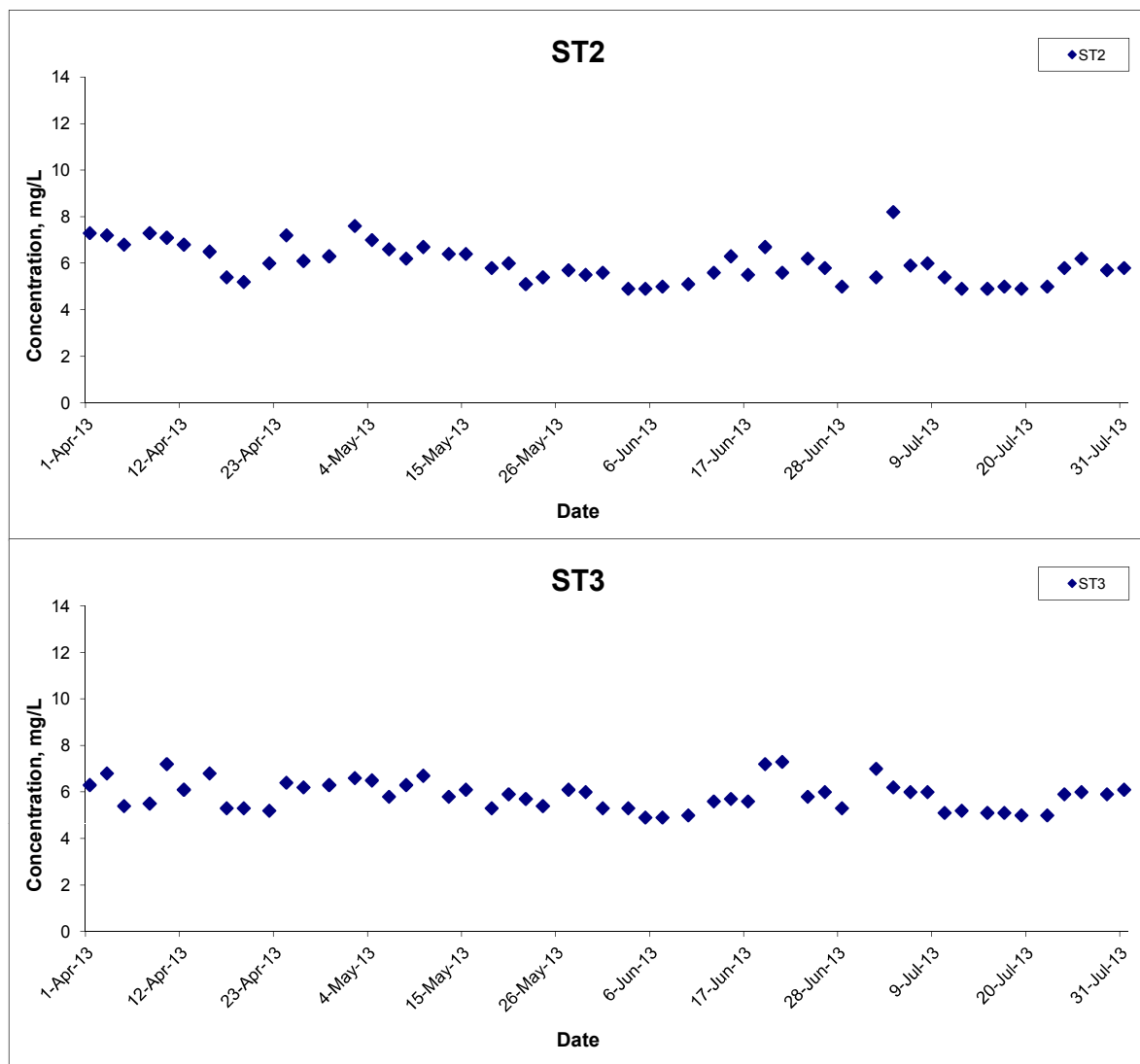
## Dissolved Oxygen (Bottom) at Mid-Flood Tide



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|       |   | Date  | Jul 13 | Appendix<br>H          |          |

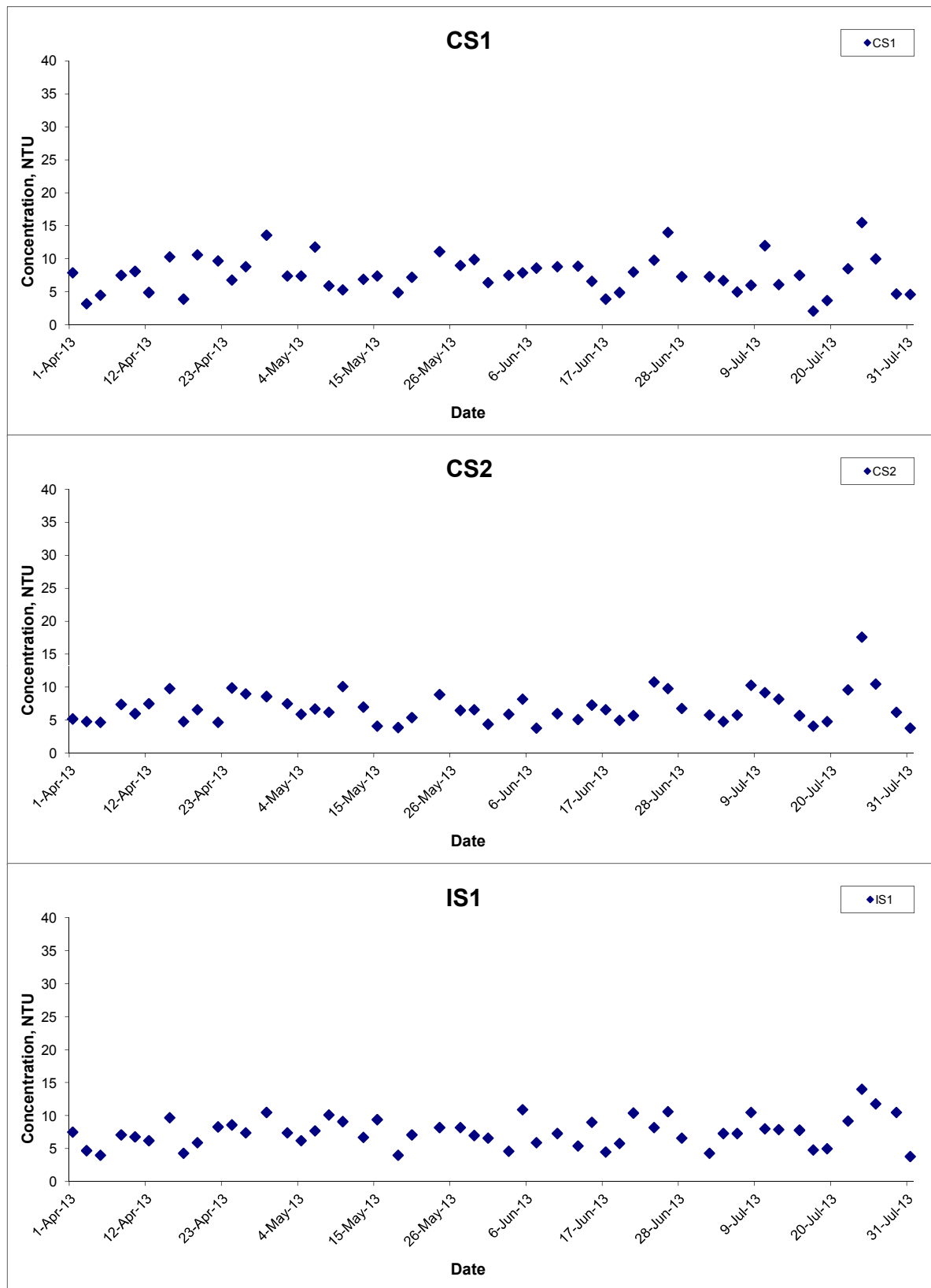


## Dissolved Oxygen (Bottom) at Mid-Flood Tide



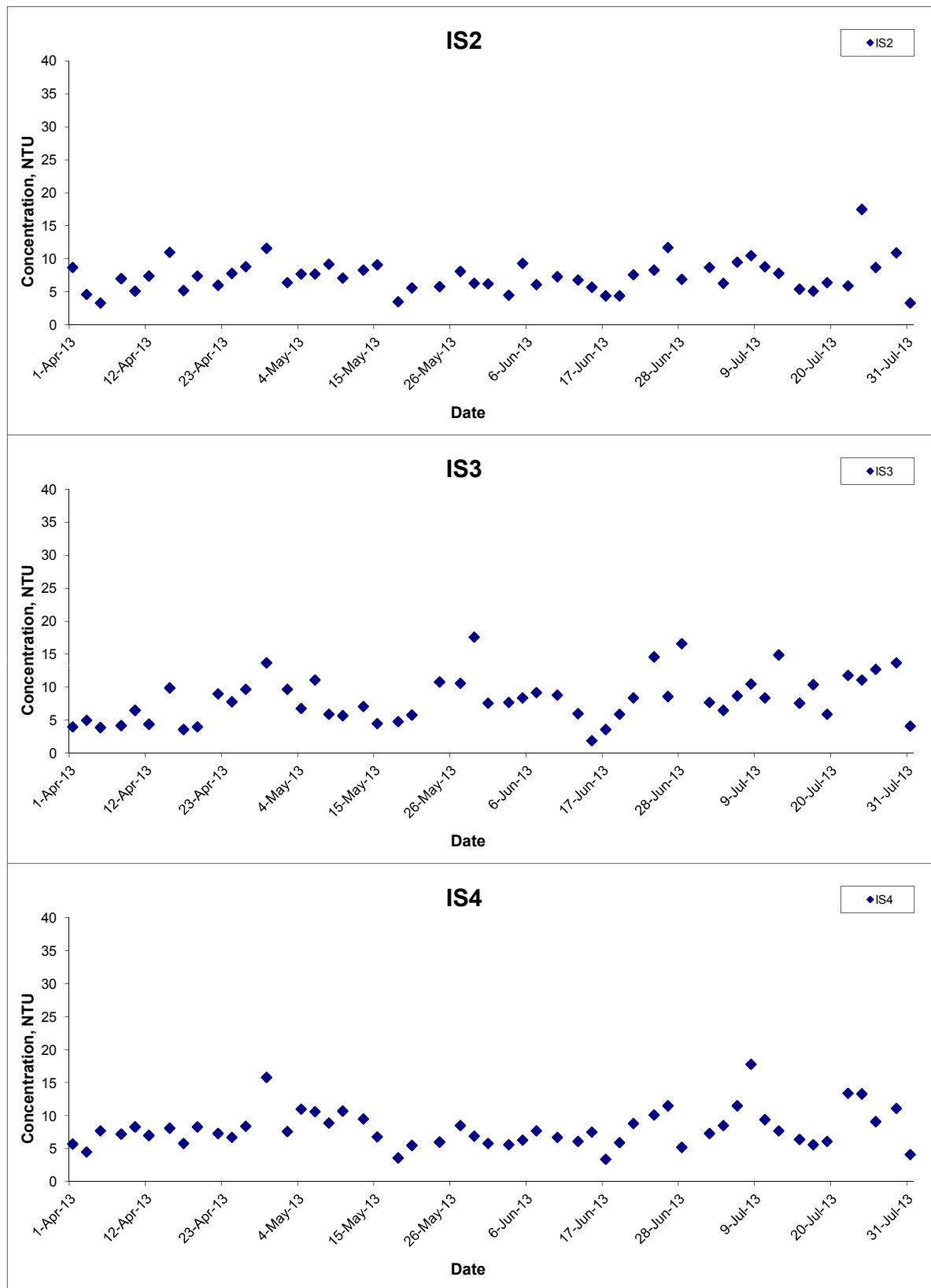
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|       |   | N.T.S  | No. MA12014 |          |
|       |   | Date   | Appendix    |          |
|       |   | Jul 13 | H           |          |

## Turbidity (Depth-averaged) at Mid-Ebb Tide



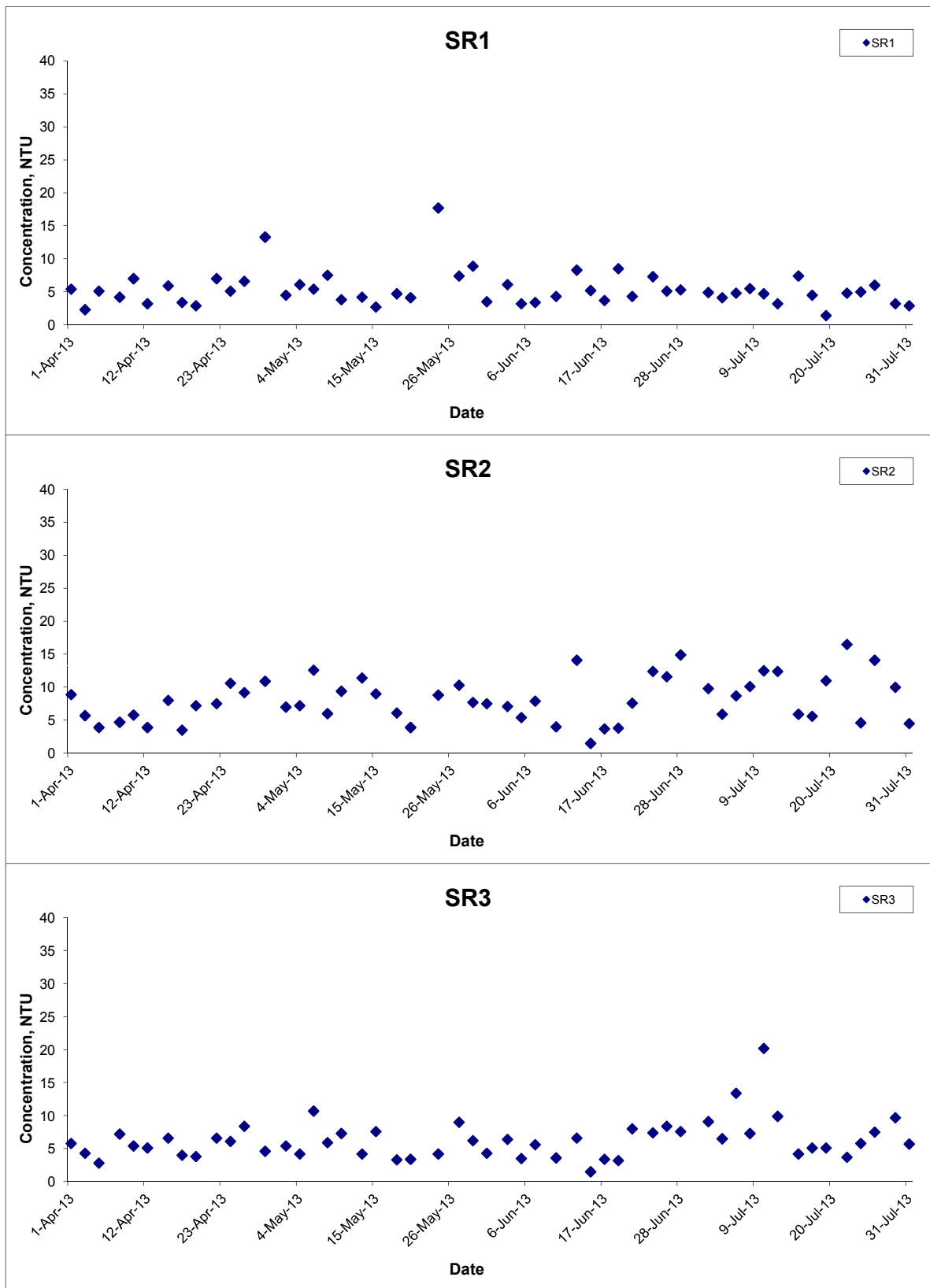
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

## Turbidity (Depth-averaged) at Mid-Ebb Tide



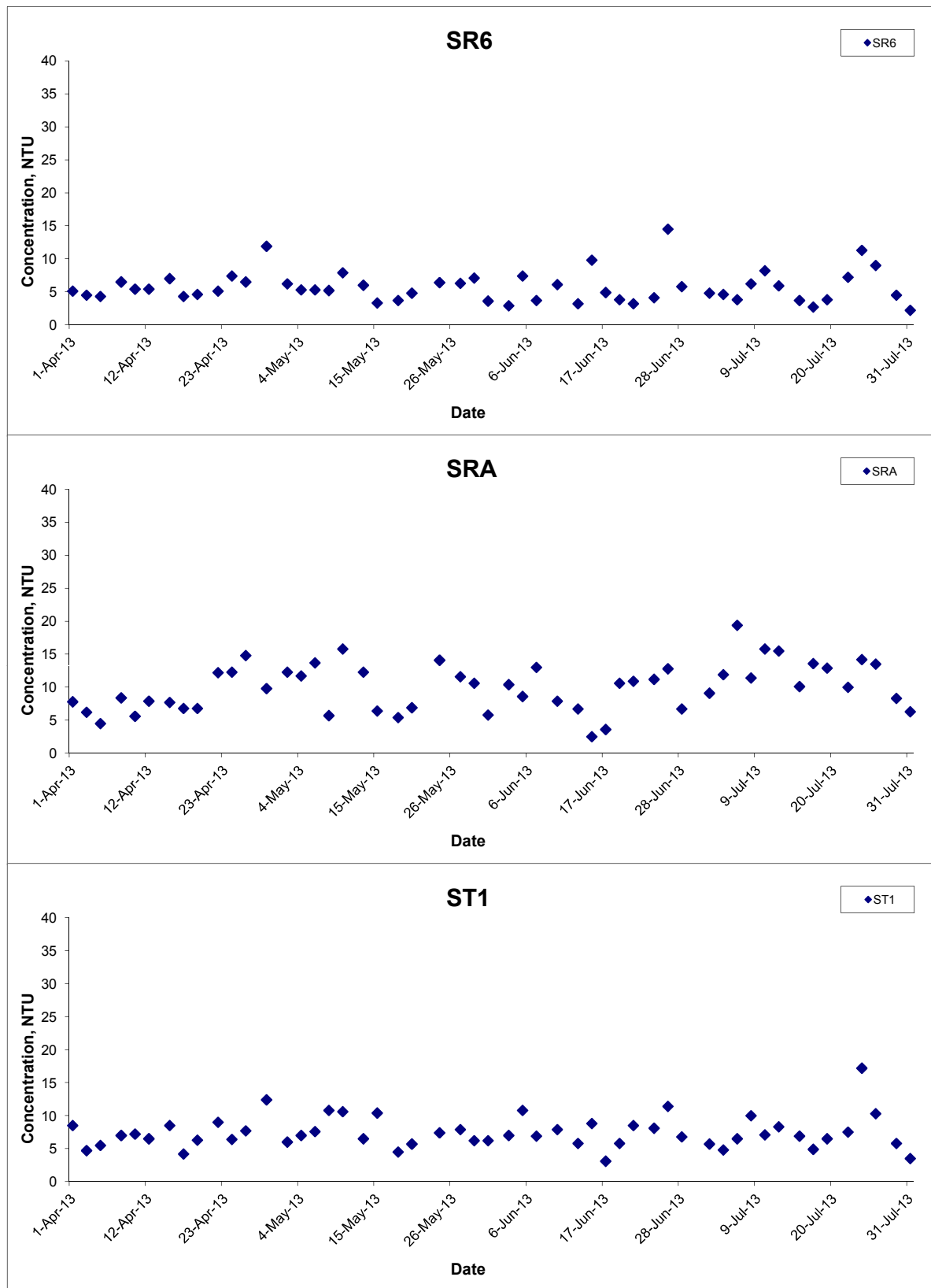
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

## Turbidity (Depth-averaged) at Mid-Ebb Tide



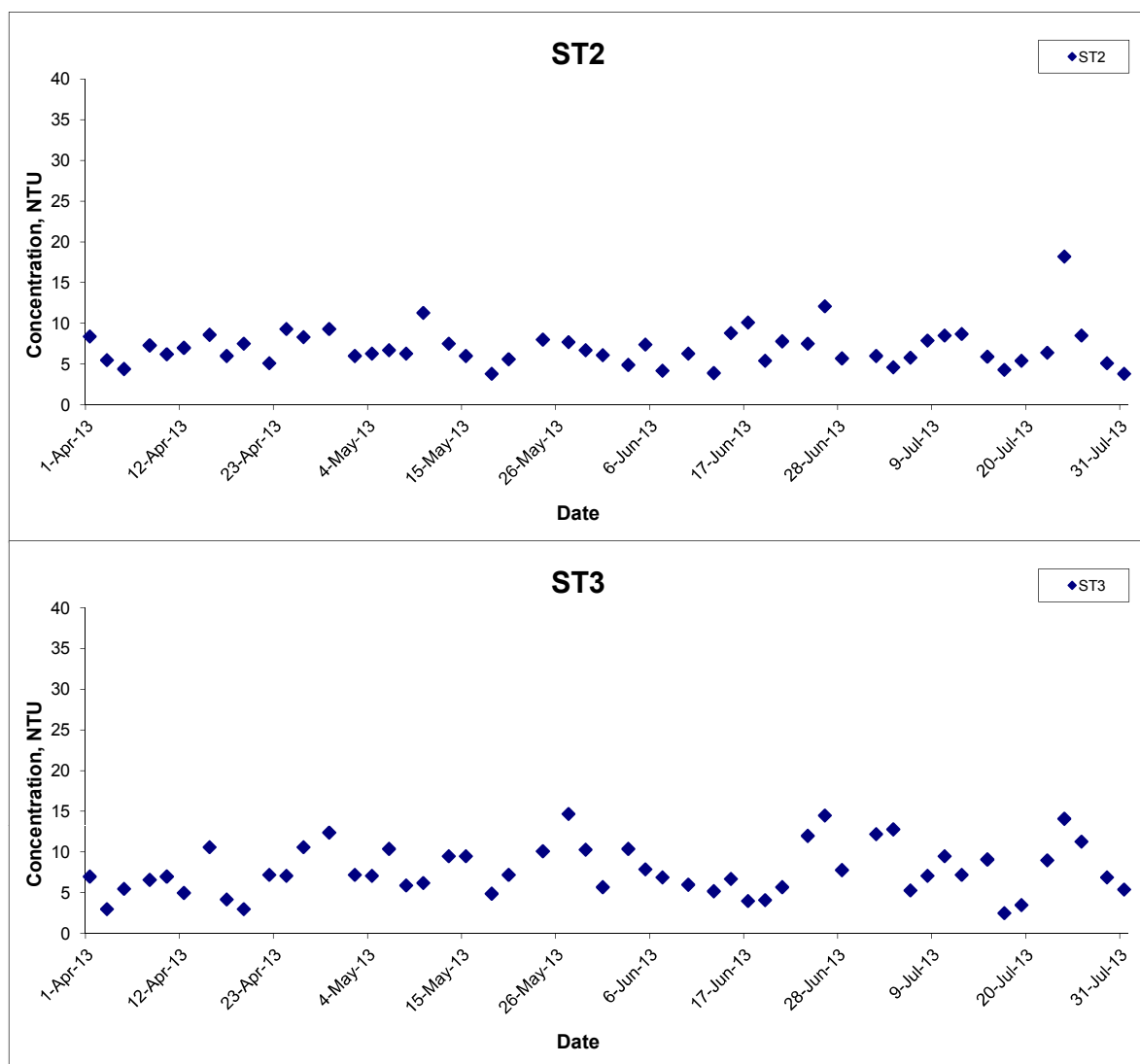
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  | Date  | Jul 13 | Appendix<br>H          |          |

## Turbidity (Depth-averaged) at Mid-Ebb Tide



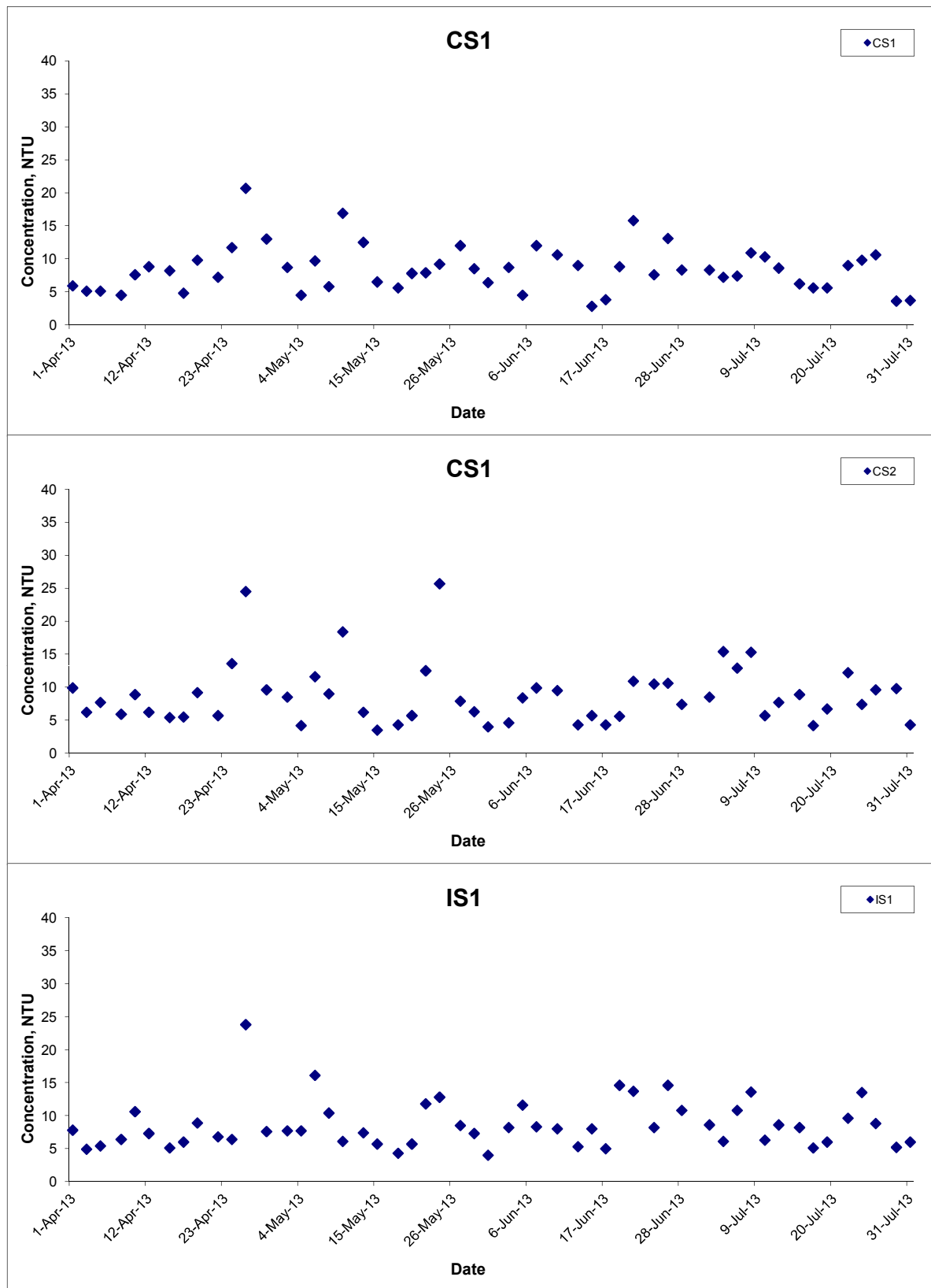
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

## Turbidity (Depth-averaged) at Mid-Ebb Tide



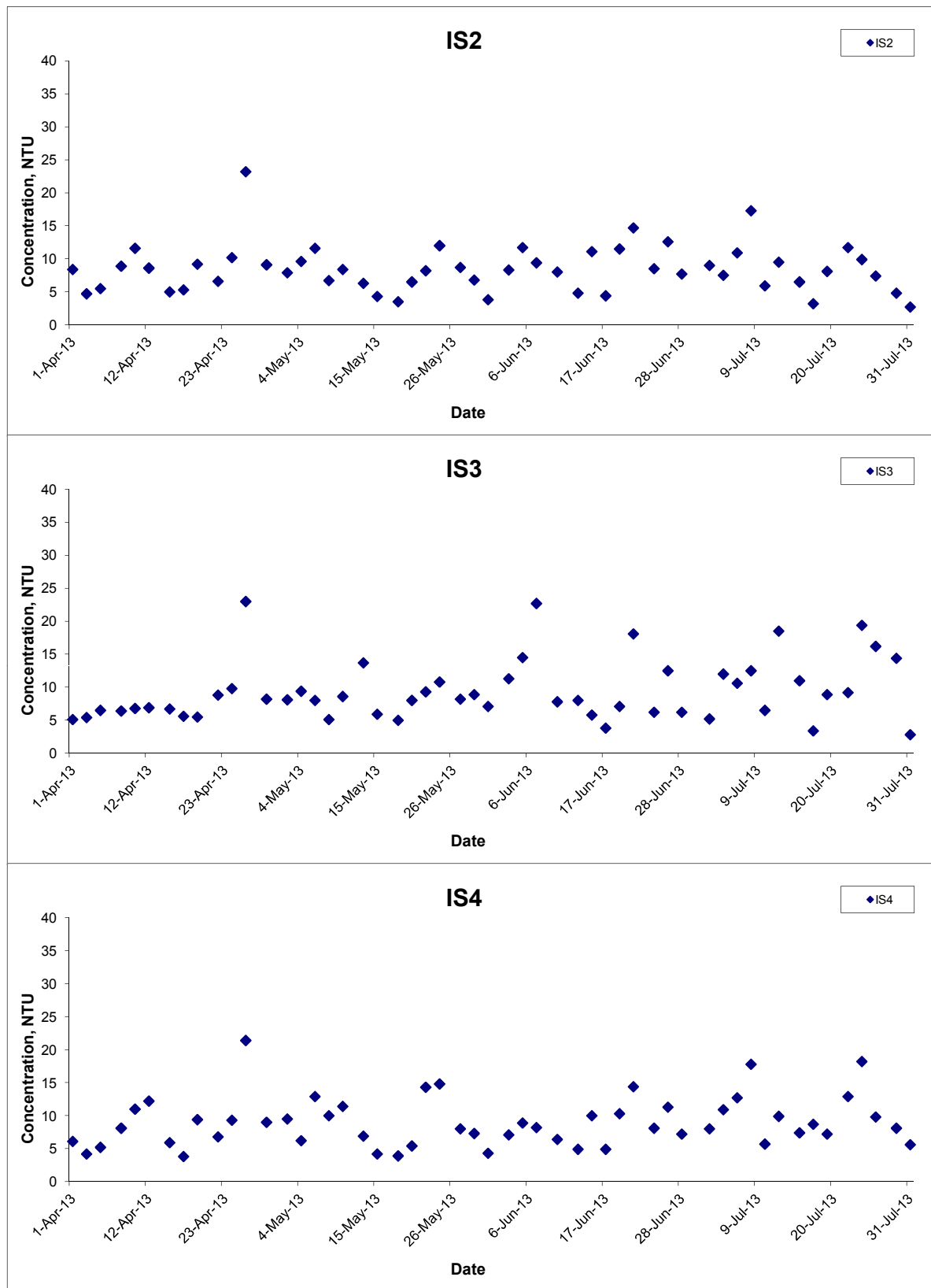
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## Turbidity (Depth-averaged) at Mid-Flood Tide



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

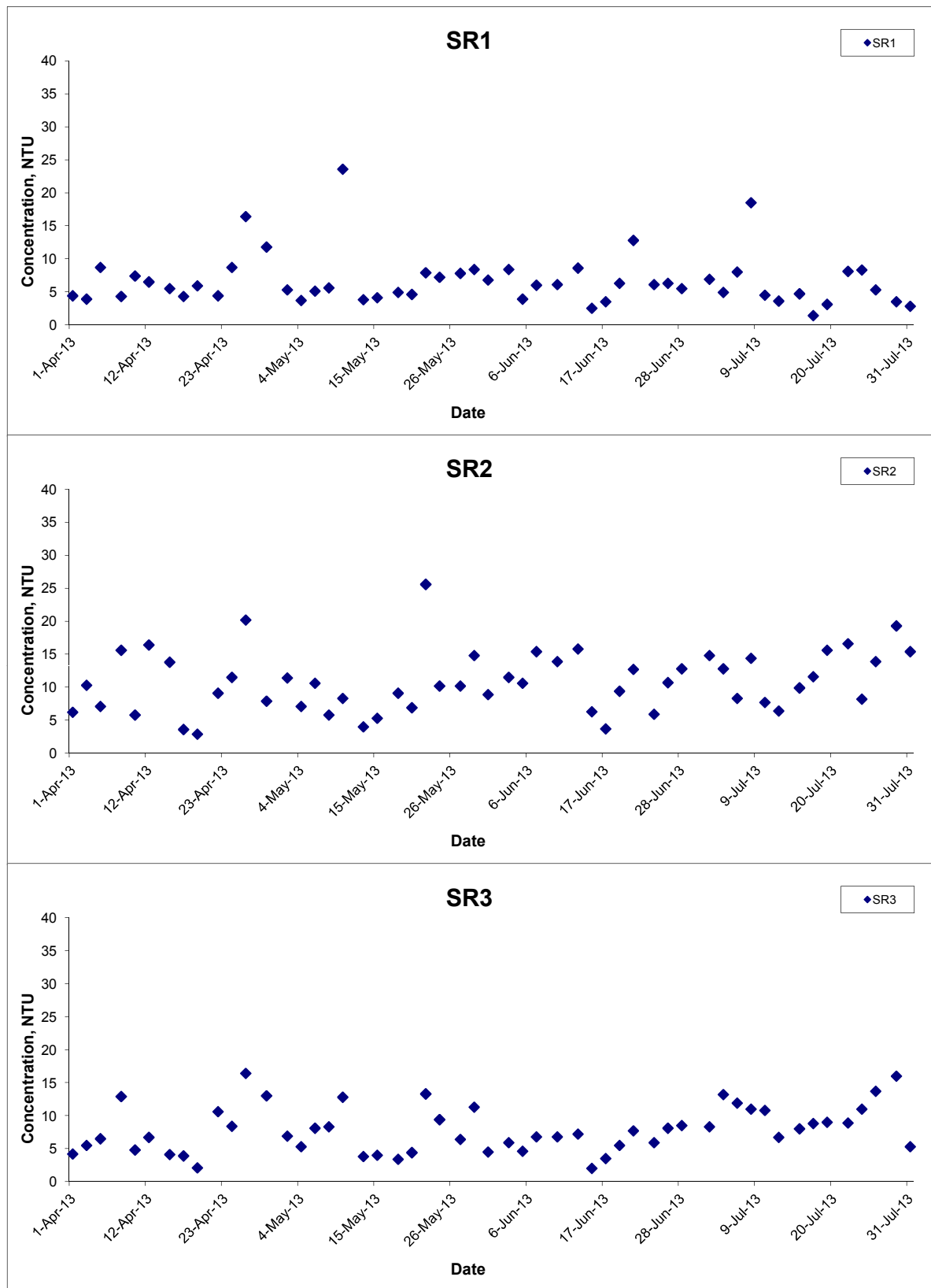
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

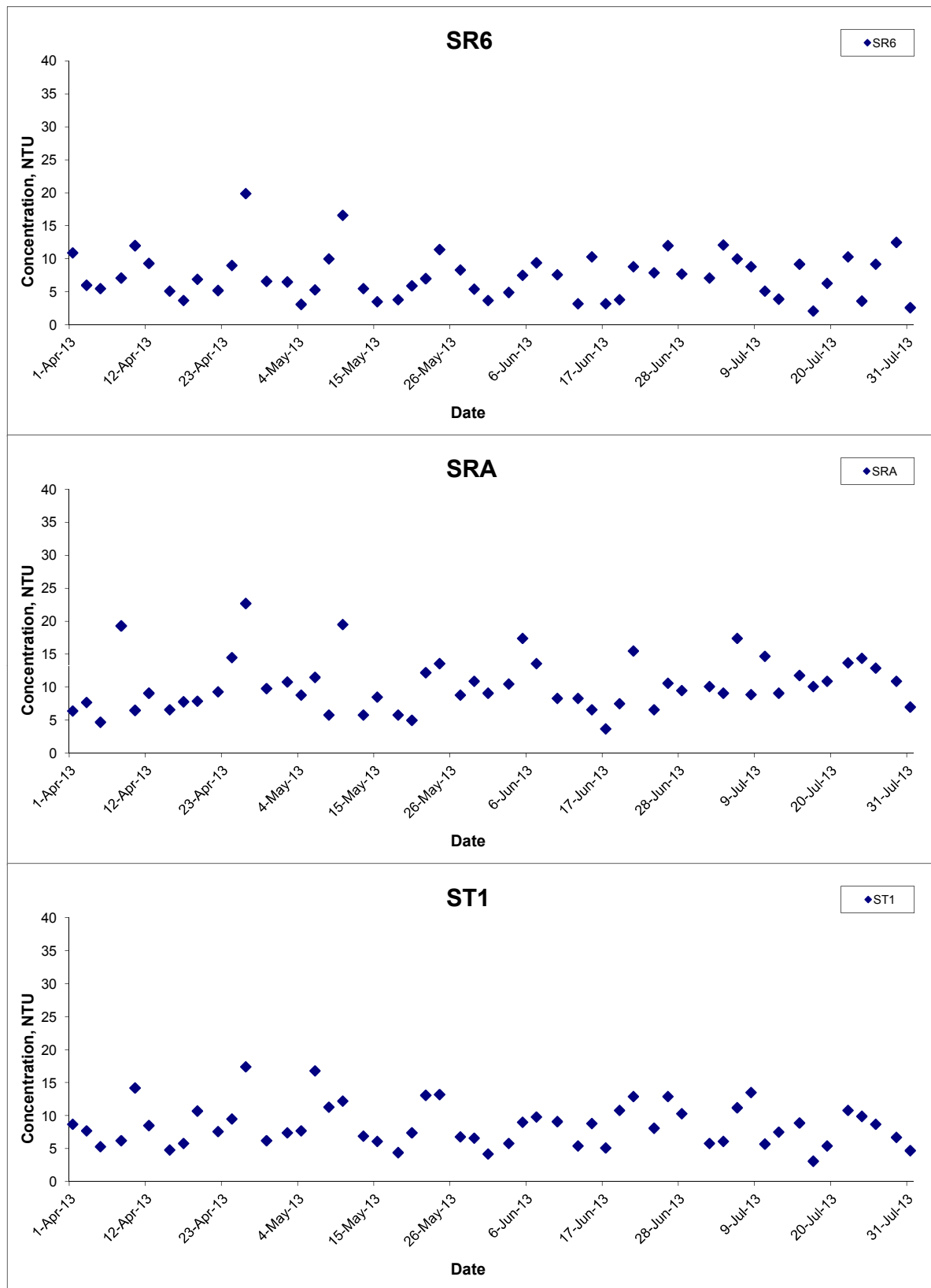


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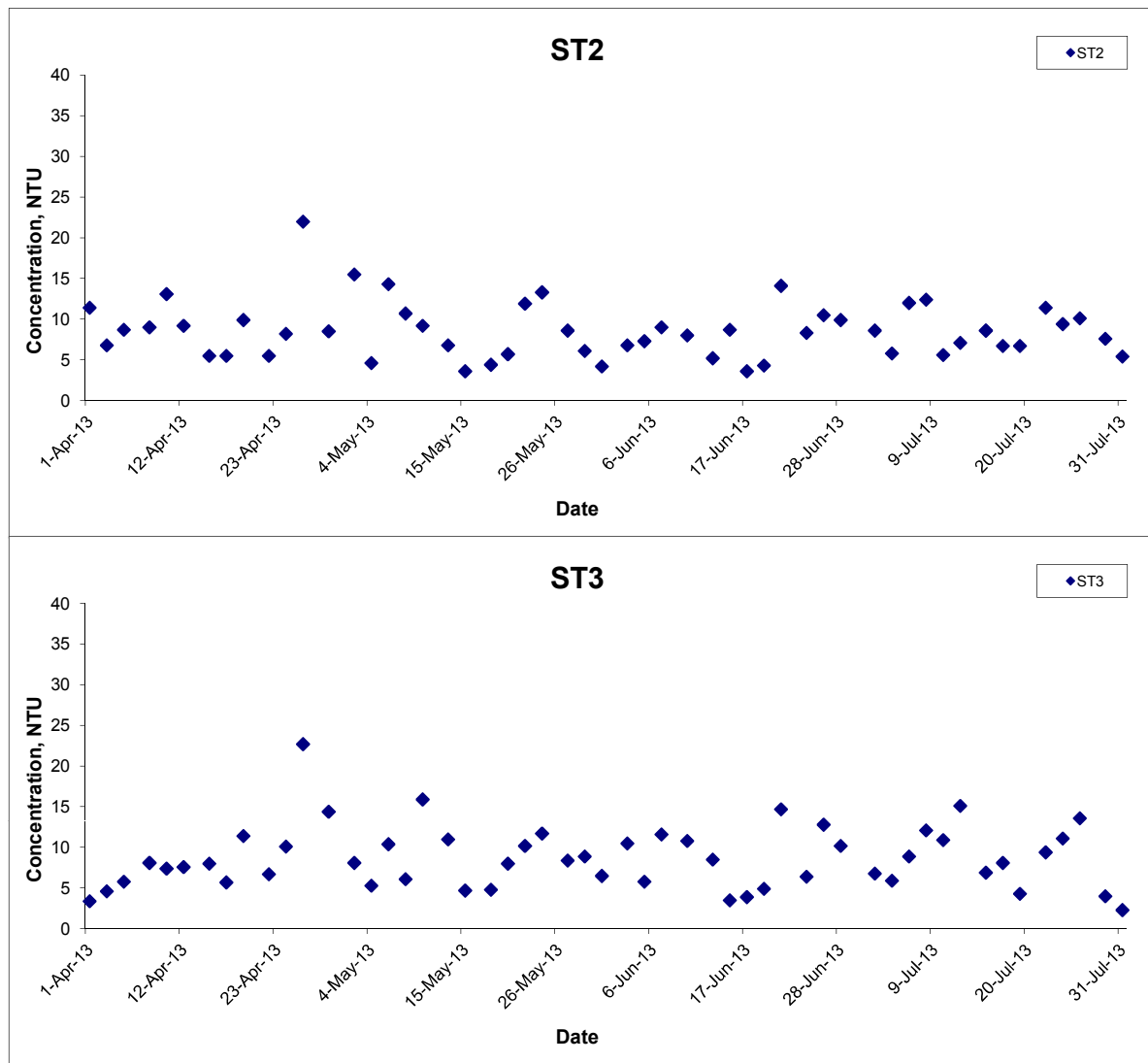
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|       |   | Date  | Jul 13 | Appendix<br>H          |          |

## Turbidity (Depth-averaged) at Mid-Flood Tide



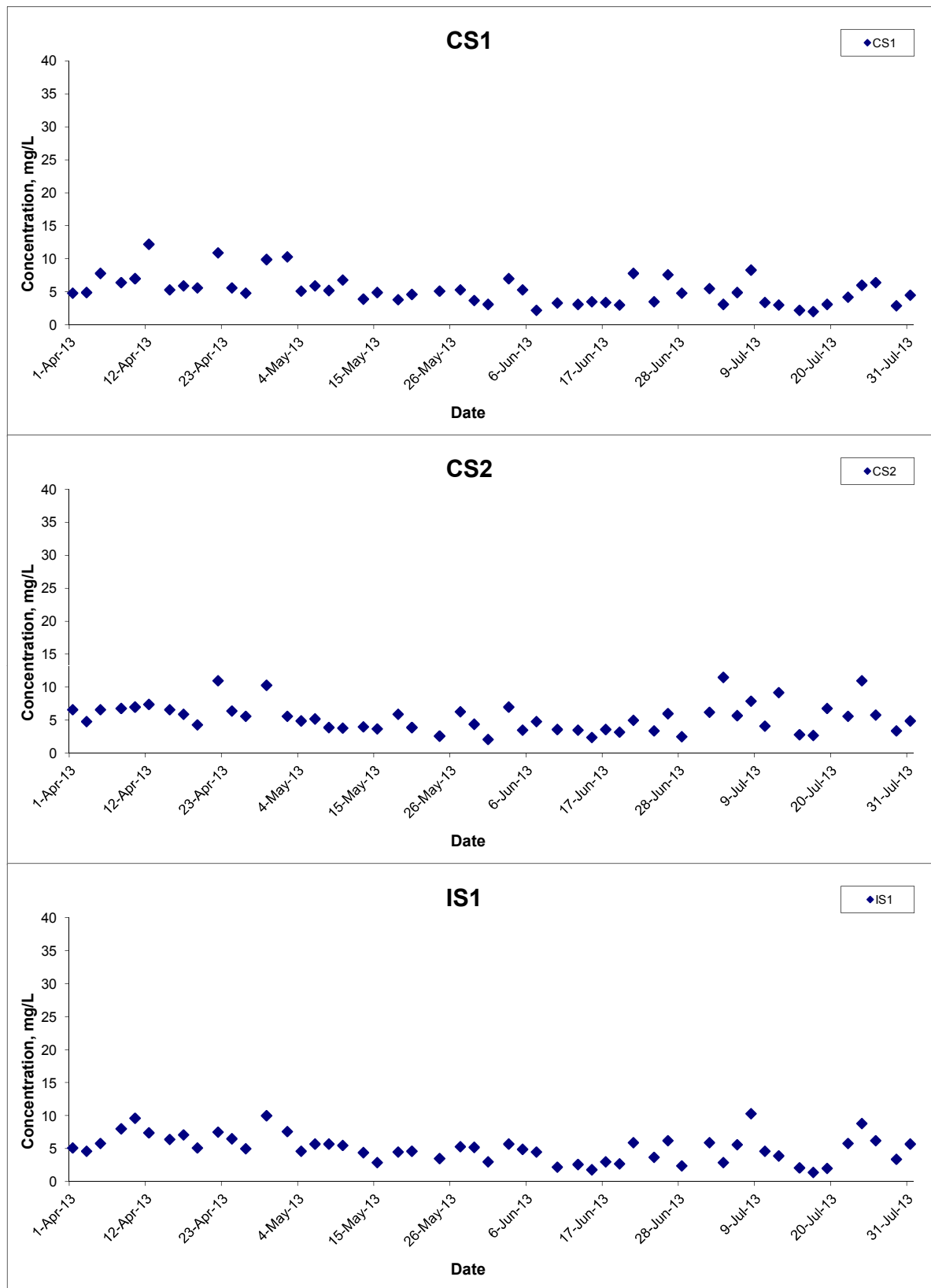
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

## Turbidity (Depth-averaged) at Mid-Flood Tide



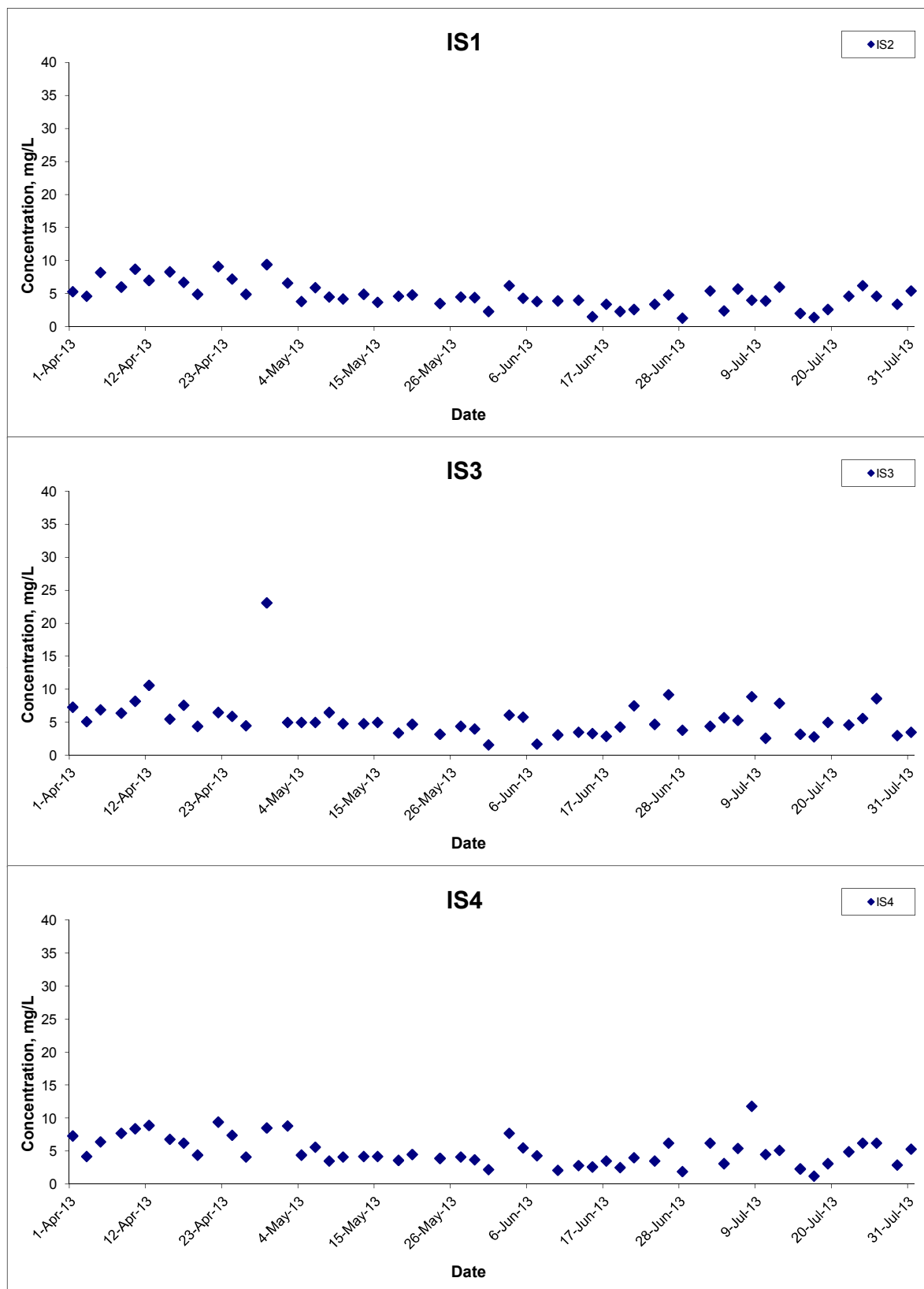
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|       |   | Date  | Jul 13 | Appendix       | H       |          |

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



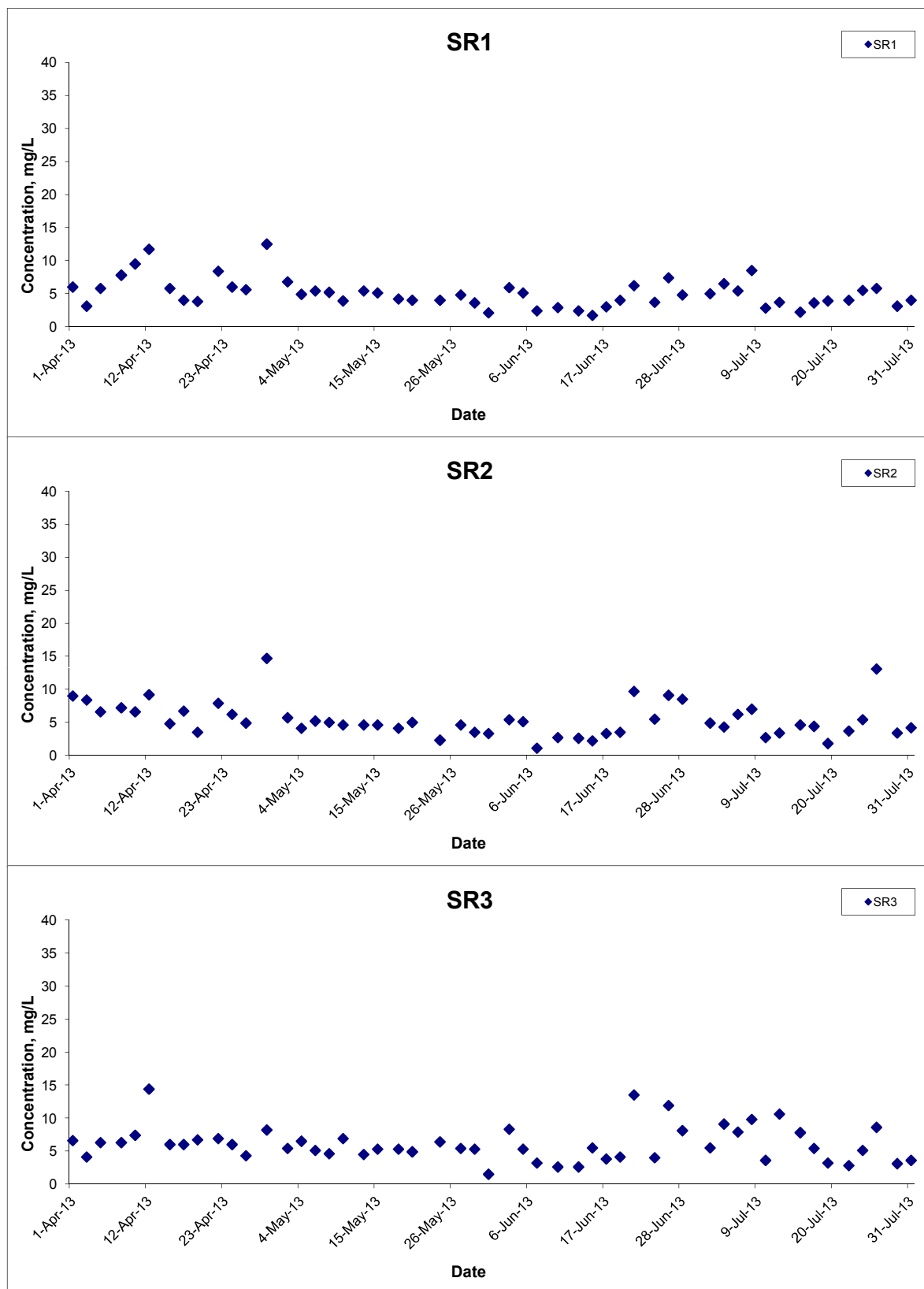
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

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



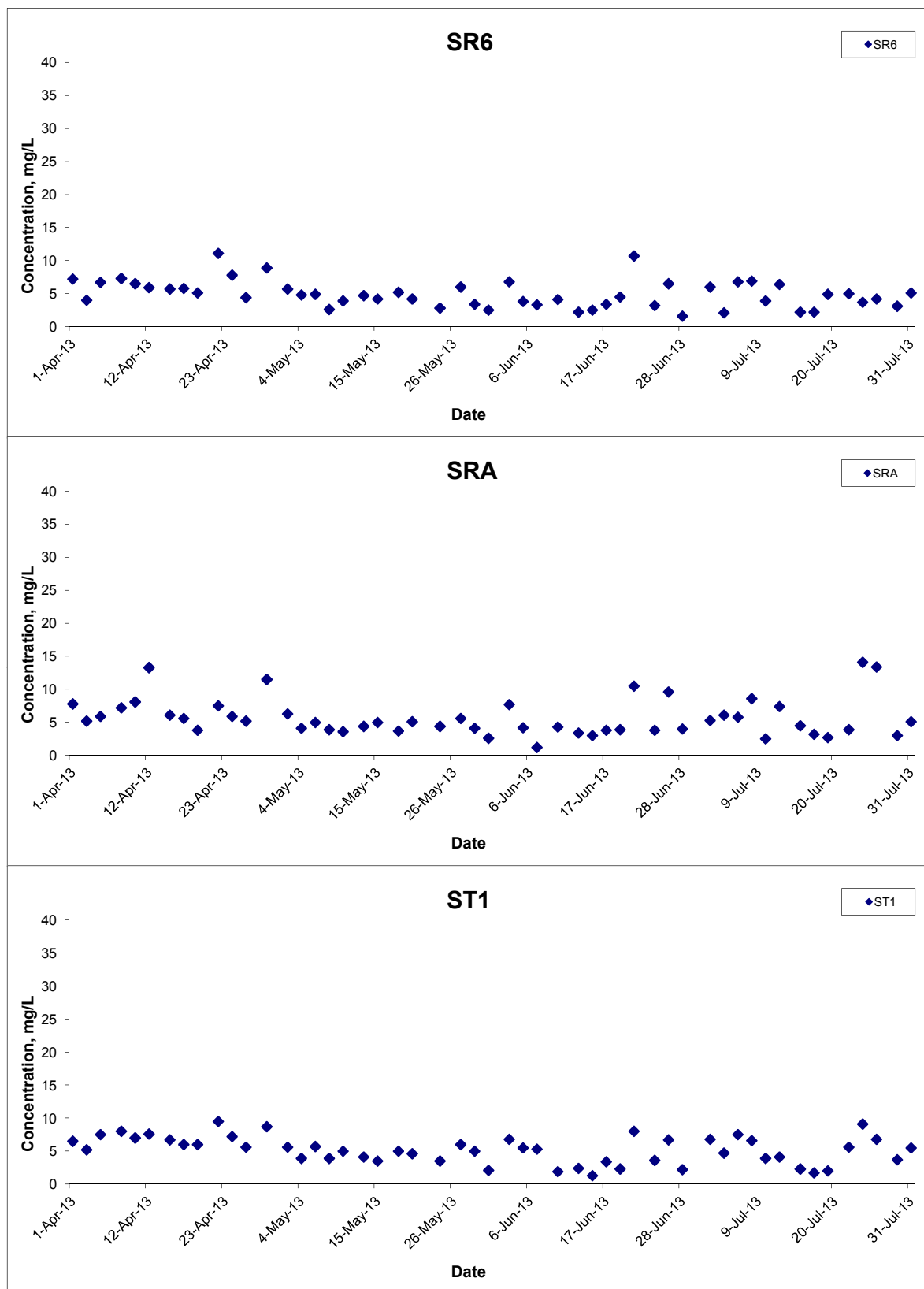
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|       |   | Date  | Jul 13 | Appendix<br>H          |          |

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



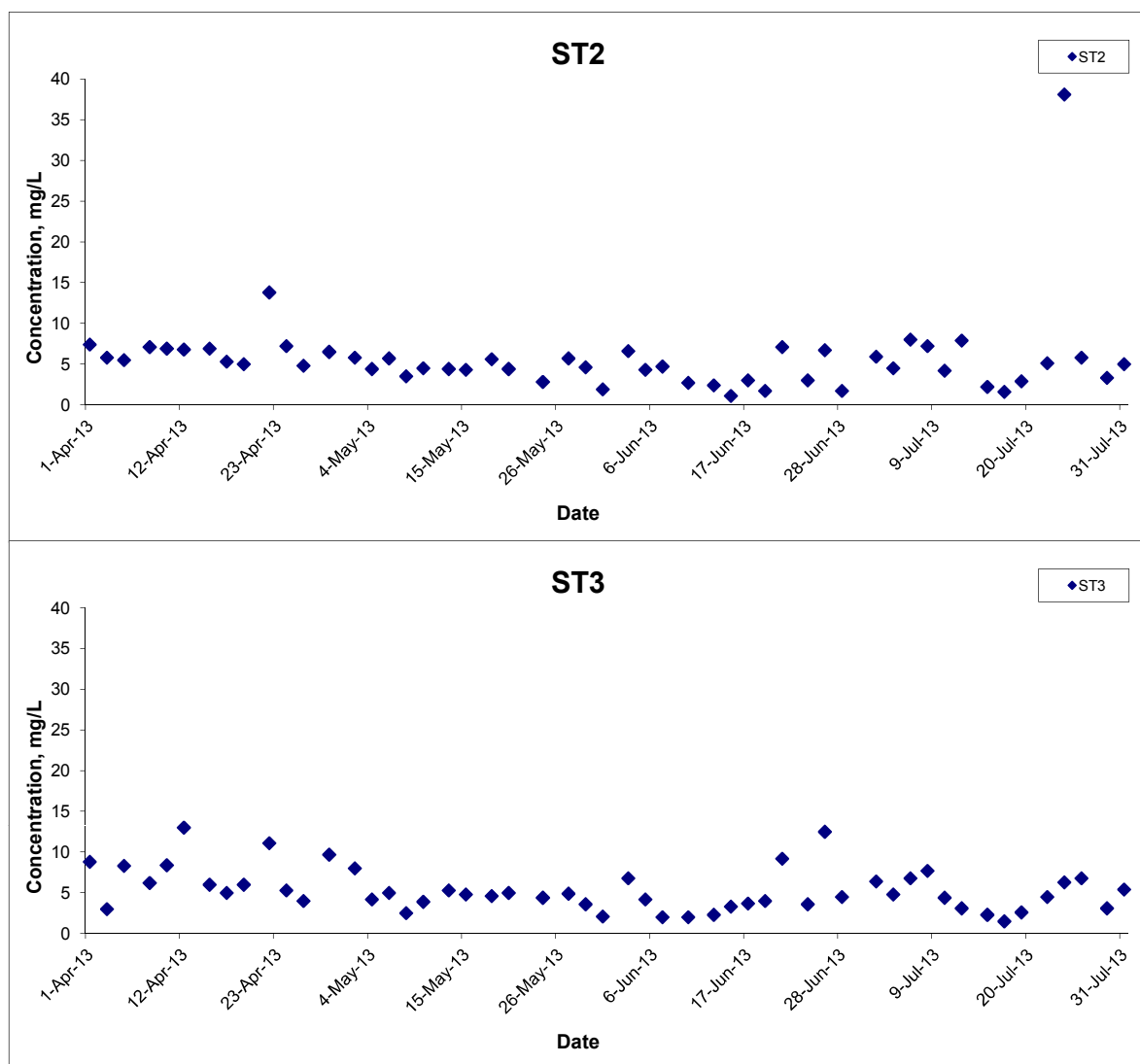
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

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



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

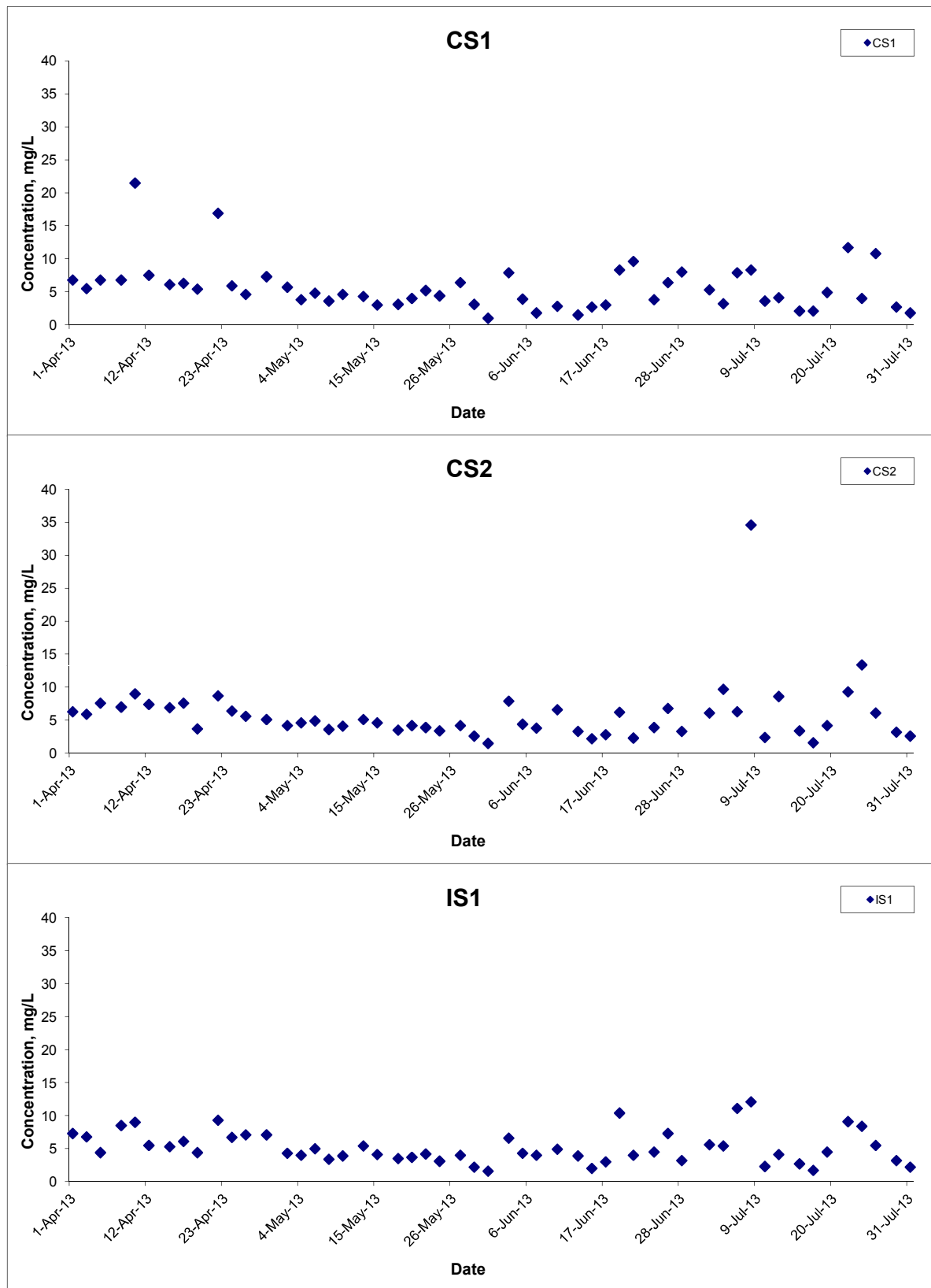
## Suspended Solids (Depth-averaged) at Mid-Ebb Tide



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|       |   | Date  | Jul 13 | Appendix<br>H          |          |

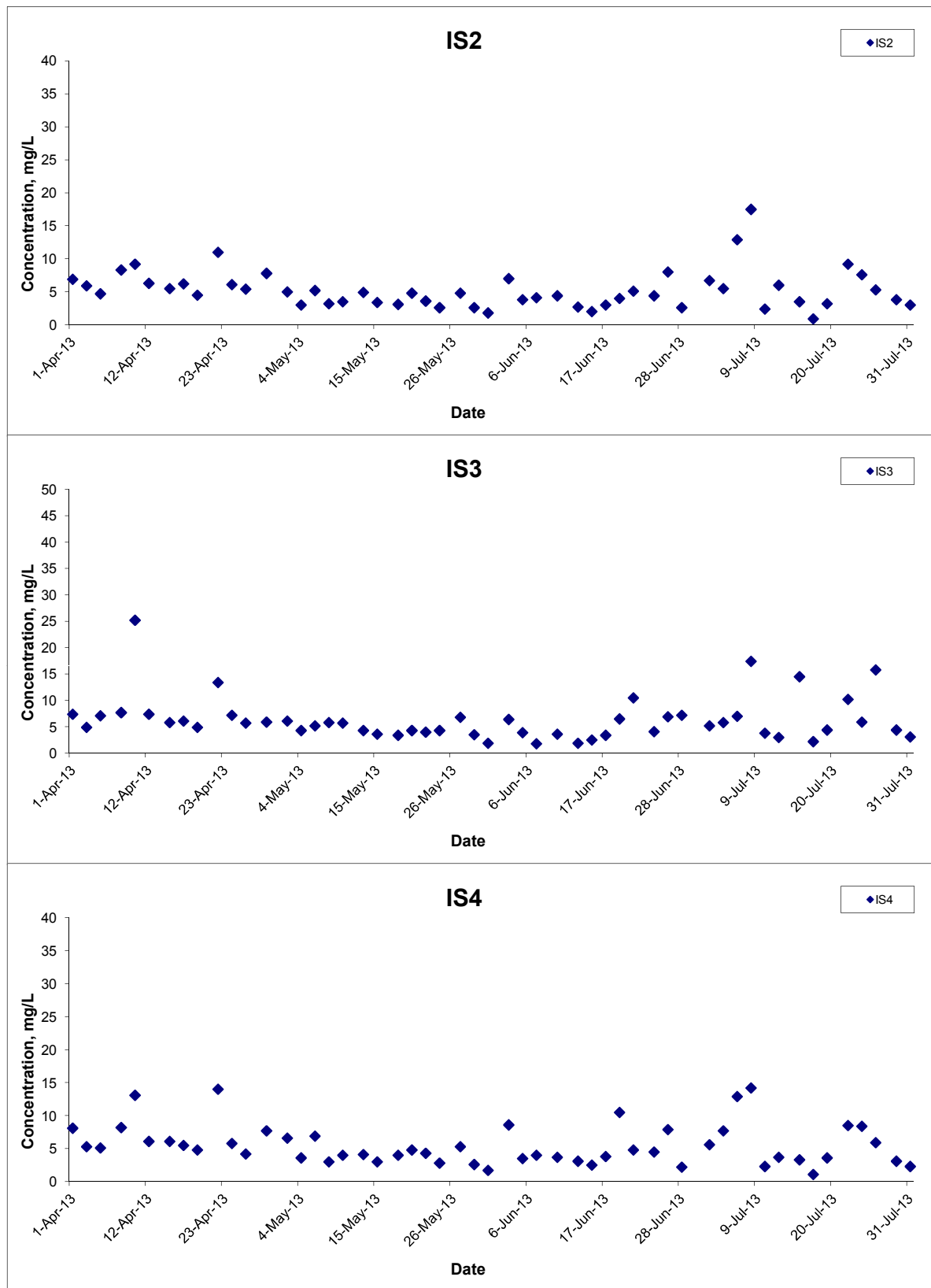


## Suspended Solids (Depth-averaged) at Mid-Flood Tide



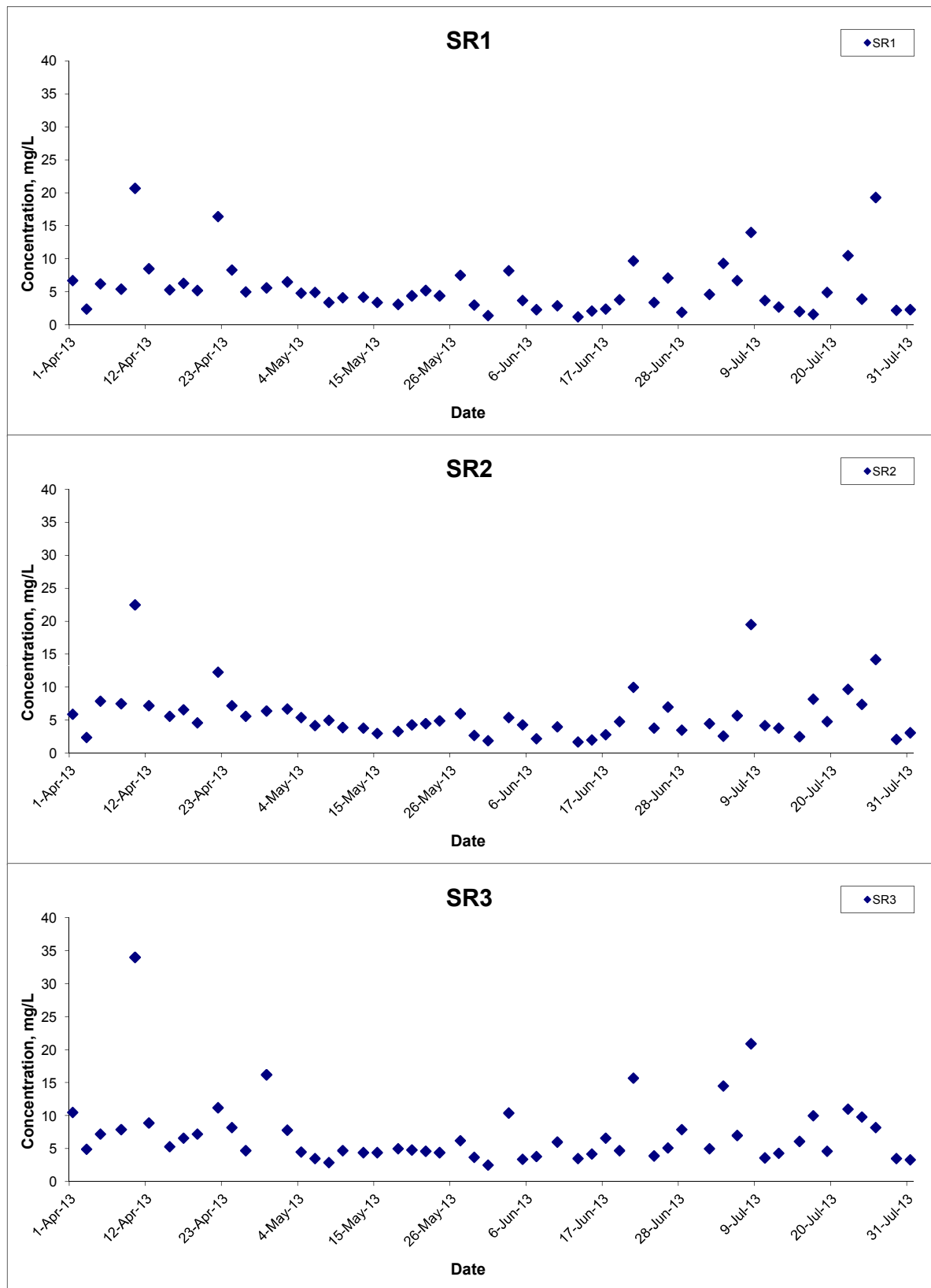
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|       |   | Date  | Jul 13 | Appendix       | H       |          |

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



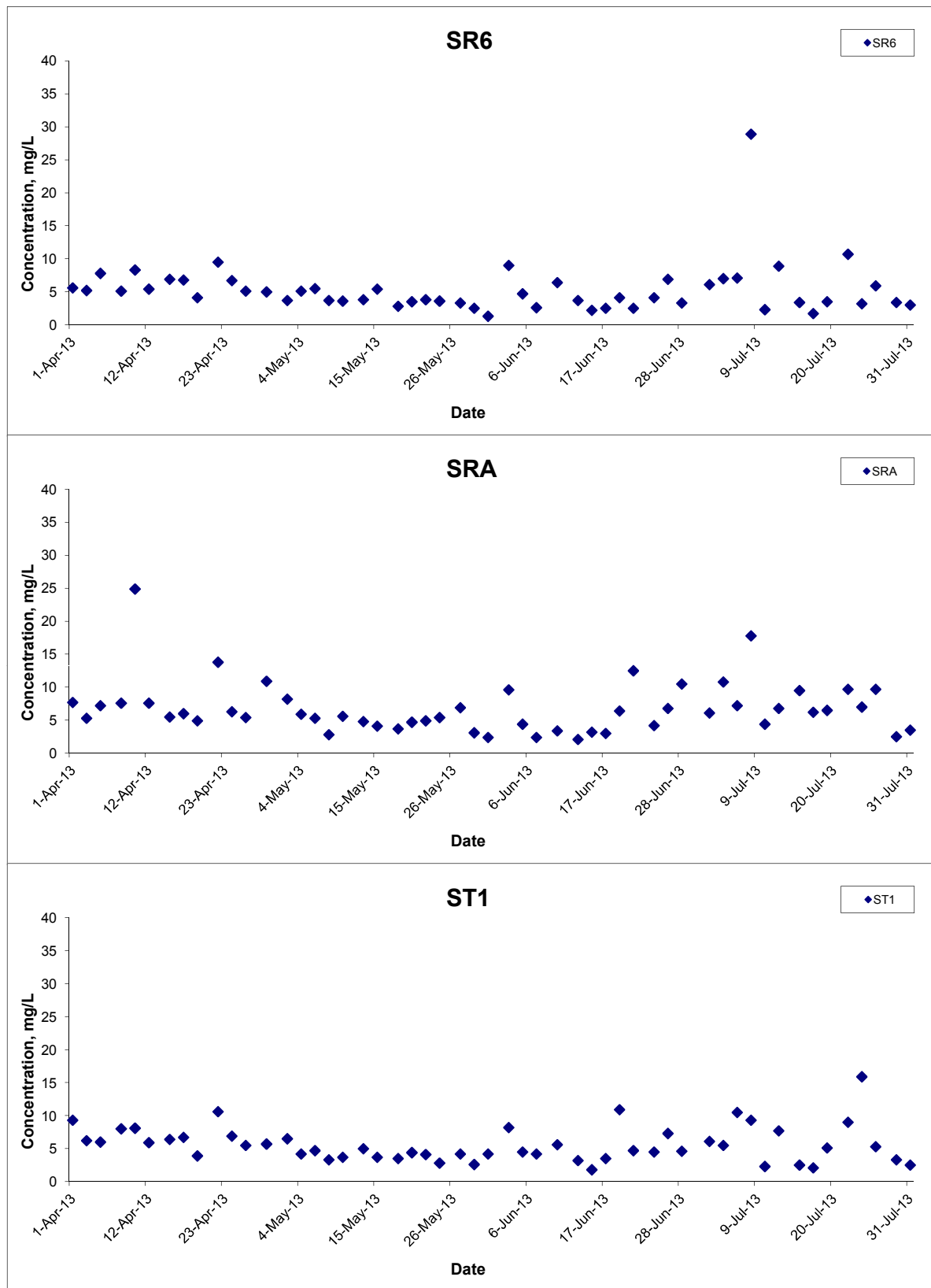
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|       | Graphical Presentation of Water Quality Monitoring<br>Results  |  | Date  | Jul 13 | Appendix<br>H          |          |

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



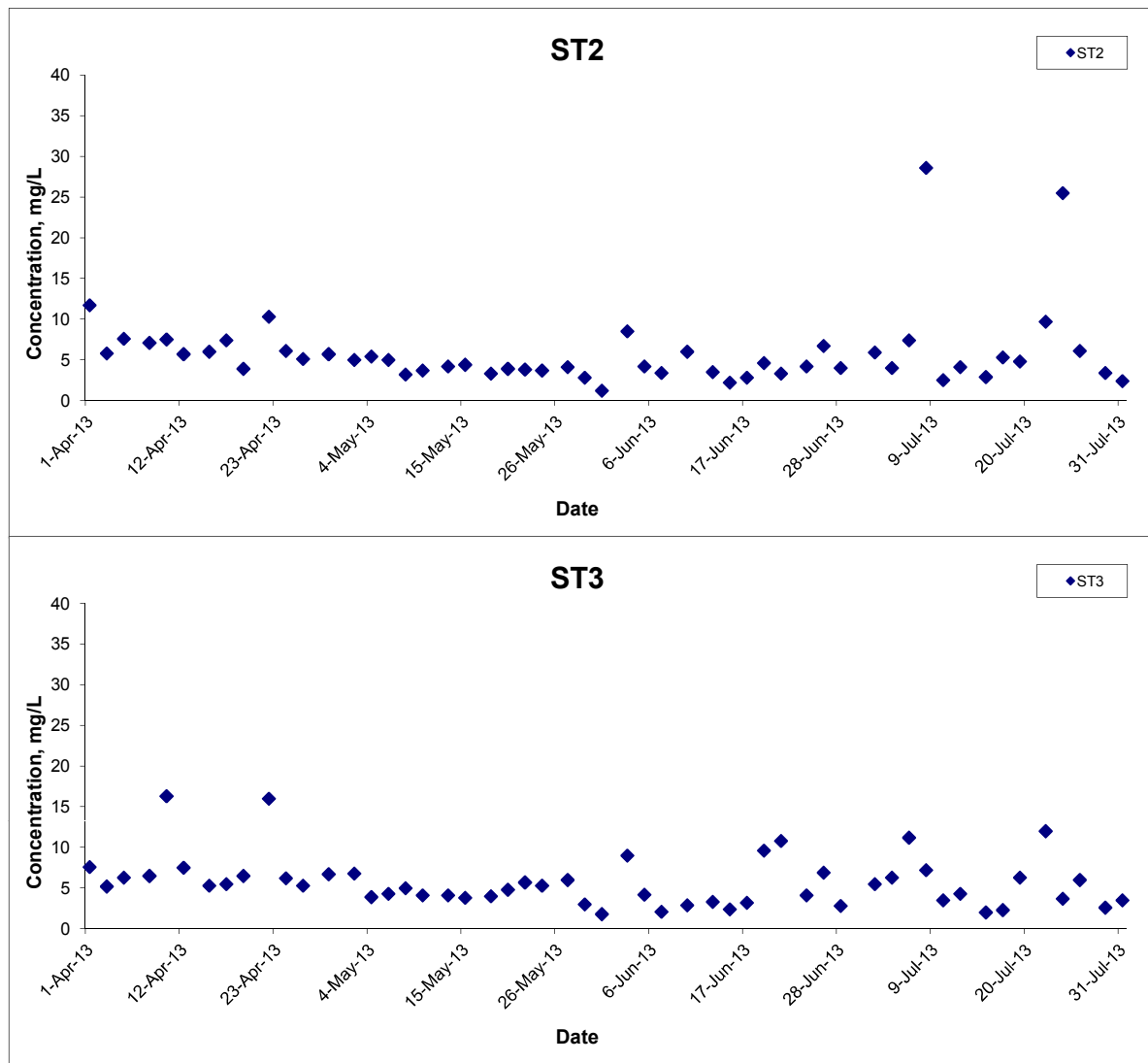
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## Suspended Solids (Depth-averaged) at Mid-Flood Tide



|       |   |        |             |          |
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| Title | Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge<br>Hong Kong Link Road-Section between<br>HKSAR Boundary and Scenic Hill<br><br>Graphical Presentation of Water Quality Monitoring<br>Results | Scale  | Project     | CINOTECH |
|       |   | N.T.S  | No. MA12014 |          |
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## Suspended Solids (Depth-averaged) at Mid-Flood Tide



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

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

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

*Sixth Monthly Progress Report (July 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 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 sixth monthly progress report under the HKLR09 construction phase dolphin monitoring programme, summarizing the results of the surveys findings during the month of July 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. Therefore, primary and secondary survey effort were both presented as on-effort survey effort in this report.

- 2.1.8. Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort) were calculated in WL survey area in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. Dolphin encounter rates were calculated using primary survey effort alone, as well as the combined survey effort from both primary and secondary lines.

## 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.

### **3. Monitoring Results**

#### *3.1. Vessel-based Line-transect Survey*

- 3.1.1. During the month of July 2013, two complete sets of systematic line-transect vessel surveys were conducted on the 5<sup>th</sup> and 10<sup>th</sup>, to cover all transect lines in WL survey area twice. The survey routes of each survey day were presented in Figures 2-3.
- 3.1.2. From these surveys, a total of 60.3 km of survey effort was collected, with 100.0% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) (Appendix I). Moreover, the total survey effort conducted on primary lines (the vertical lines perpendicular to the coastlines) was 40.2 km, while the effort on secondary lines (the lines connecting the primary lines) was 20.1 km.
- 3.1.3. During the monitoring surveys in July 2013, a total of 23 groups of 89 Chinese White Dolphins were sighted (Appendix II). All except three sightings were made during on-effort search. Among the 20 on-effort sightings, 15 of them were made on primary lines, while the other five were made on secondary lines. None of the dolphin groups was associated with any operating fishing vessel.
- 3.1.4. Distribution of all dolphin sightings made during July's surveys was shown in Figure 4. These sightings were evenly distributed throughout the WL survey area, which was very different from previous months of monitoring when most sightings were made at the middle and southern portions of the survey area. Notably, two dolphin sightings were made near the HKLR09 alignment (Figure 4).
- 3.1.5. During July's surveys, encounter rates of Chinese white dolphins deduced from the survey effort and on-effort sighting data made under favourable

conditions (Beaufort 3 or below) are shown in Tables 2 & 3.

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) per set during July's surveys

|           |                              | <b>Encounter rate (STG)</b><br>(no. of on-effort dolphin sightings<br>per 100 km of survey effort) | <b>Encounter rate (ANI)</b><br>(no. of dolphins from all on-effort<br>sightings per 100 km of survey effort) |
|-----------|------------------------------|--|--|
|           |                              | <b>Primary Lines Only</b>  | <b>Primary Lines Only</b>  |
| <b>WL</b> | Set 1: July 5 <sup>th</sup>  | 38.7   | 159.5  |
|           | Set 2: July 10 <sup>th</sup> | 35.8   | 153.5  |

Table 3. Overall dolphin encounter rates (sightings per 100 km of survey effort) in July's surveys on primary lines only as well as both primary lines and secondary lines

|                    |  | <b>Encounter rate (STG)</b><br>(no. of on-effort dolphin sightings<br>per 100 km of survey effort) |   | <b>Encounter rate (ANI)</b><br>(no. of dolphins from all on-effort<br>sightings per 100 km of survey effort) |   |
|--------------------|--|--|---|--|---|
|                    |  | <b>Primary<br/>Lines Only</b>  | <b>Both Primary<br/>and Secondary<br/>Lines</b> | <b>Primary<br/>Lines Only</b>  | <b>Both Primary<br/>and Secondary<br/>Lines</b> |
| <b>West Lantau</b> |  | 37.3   | 33.1  | 156.6  | 134.2   |

- 3.1.6. The average group size of Chinese White Dolphins was 3.9 individuals per group during July's surveys, which was higher than the averages in previous months of monitoring. Most groups comprised of a few dolphins only, but two large groups of 16 and 8 animals were sighted respectively near the HKLR09 alignment.

### 3.2. Photo-identification Work

- 3.2.1. A total of 28 re-sightings of known individual Chinese White Dolphins were made during the July's surveys (Appendices III and IV). Among these 28 re-sightings, 26 individuals were identified.
- 3.2.2. Notably, two individuals (WL25 and WL124) were re-sighted twice during the two sets of monitoring surveys in July 2013.

### *3.3. Conclusion*

- 3.3.1. During this month of dolphin monitoring, marine construction activities have continued under this contract. However, no adverse impact on Chinese white dolphins was noticeable from general observations.
- 3.3.2. Due to the monthly variation in dolphin occurrence within the study area, it would be more appropriate to draw conclusion on whether any impacts on dolphins have been detected related to the construction activities of this project in the quarterly EM&A report, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period and baseline monitoring period will be made.

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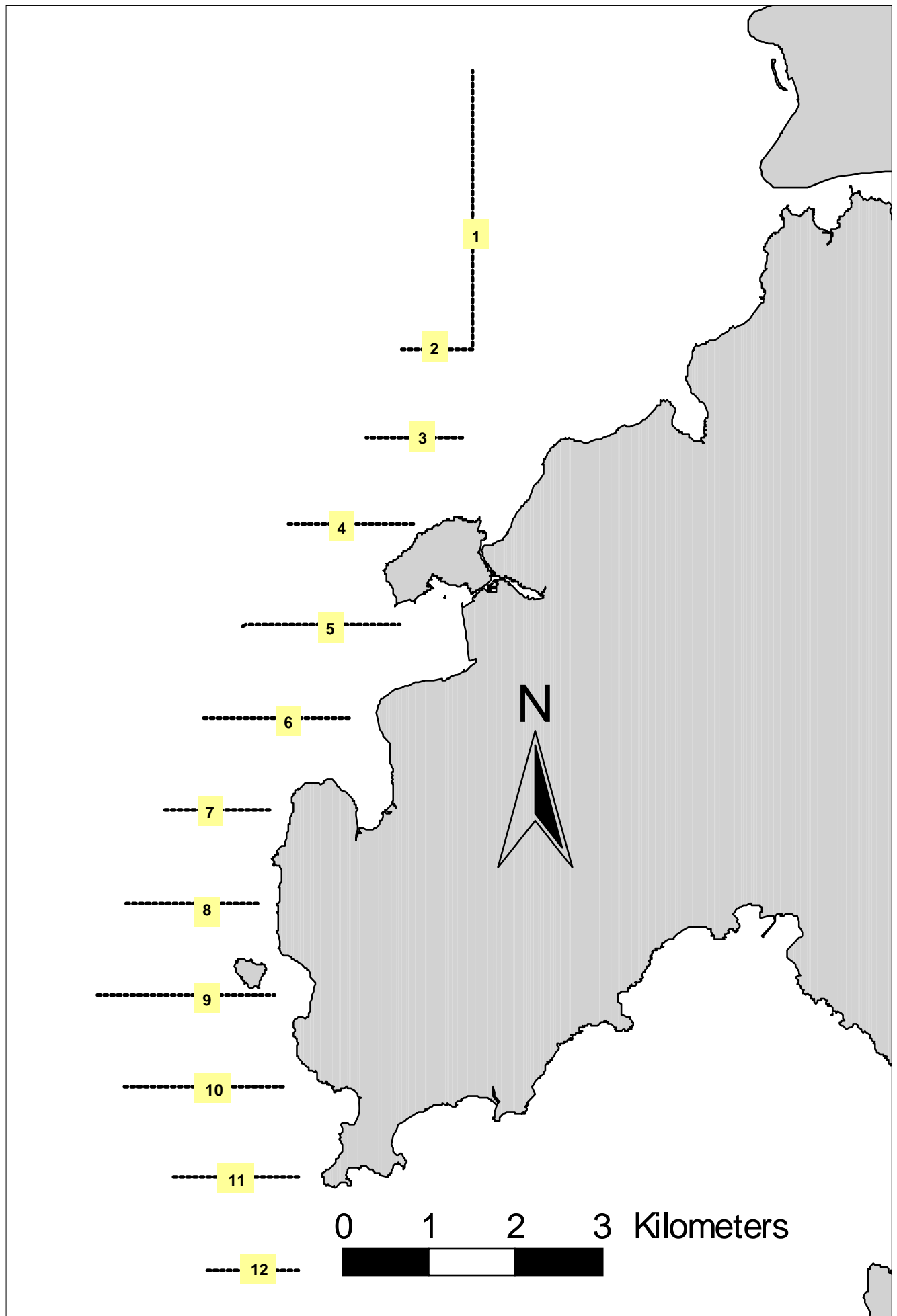


Figure 1. Transect Line Layout in West Lantau Survey Areas

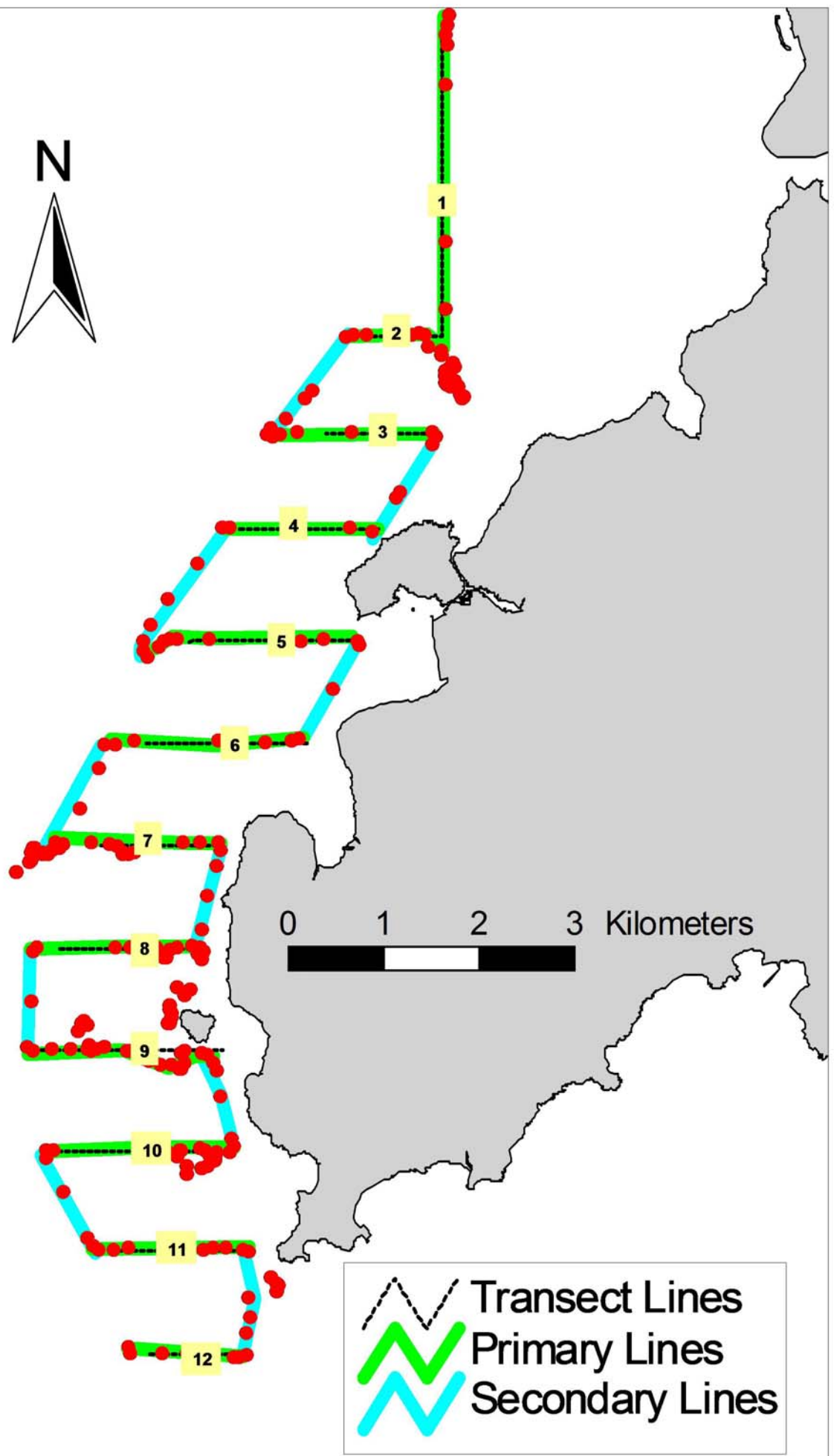


Figure 2. Survey Route on July 5<sup>th</sup>, 2013 (note: red dots represent the tracked positions of survey boat logged continuously by GPS throughout the course of the survey)

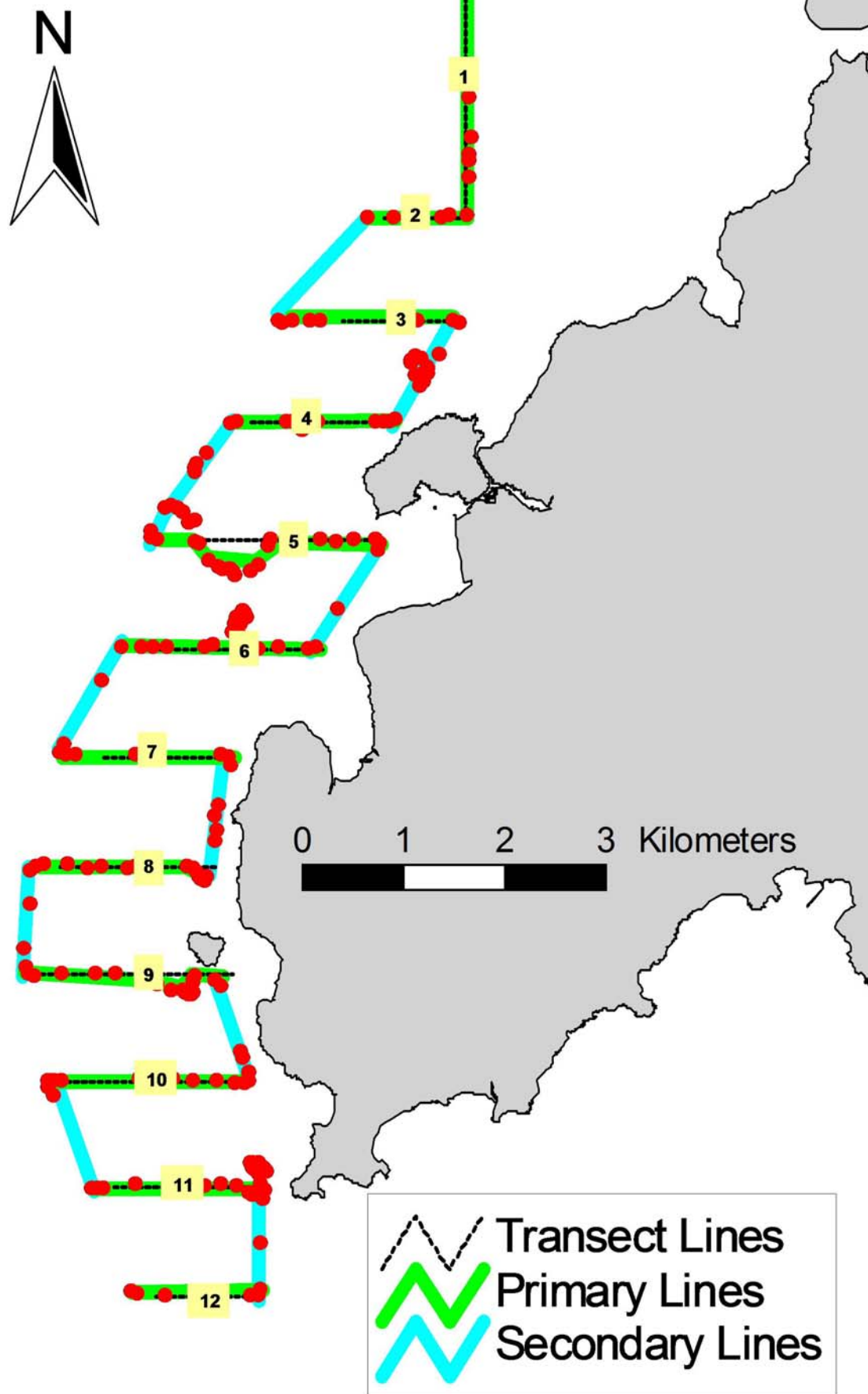


Figure 3. Survey Route on July 10<sup>th</sup>, 2013 (note: red dots represent the tracked positions of survey boat logged continuously by GPS throughout the course of the survey)





## Appendix I. HKLR09 Survey Effort Database (July 2013)

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

| DATE      | AREA     | BEAU | EFFORT | SEASON | VESSEL        | TYPE | P/S |
|-----------|----------|------|--------|--------|---------------|------|-----|
| 5-Jul-13  | W LANTAU | 2    | 7.3    | SUMMER | STANDARD31516 | HKLR | P   |
| 5-Jul-13  | W LANTAU | 3    | 13.4   | SUMMER | STANDARD31516 | HKLR | P   |
| 5-Jul-13  | W LANTAU | 2    | 2.9    | SUMMER | STANDARD31516 | HKLR | S   |
| 5-Jul-13  | W LANTAU | 3    | 7.8    | SUMMER | STANDARD31516 | HKLR | S   |
| 10-Jul-13 | W LANTAU | 1    | 3.4    | SUMMER | STANDARD31516 | HKLR | P   |
| 10-Jul-13 | W LANTAU | 2    | 11.3   | SUMMER | STANDARD31516 | HKLR | P   |
| 10-Jul-13 | W LANTAU | 3    | 4.9    | SUMMER | STANDARD31516 | HKLR | P   |
| 10-Jul-13 | W LANTAU | 1    | 1.0    | SUMMER | STANDARD31516 | HKLR | S   |
| 10-Jul-13 | W LANTAU | 2    | 8.5    | SUMMER | STANDARD31516 | HKLR | S   |

## Appendix II. HKLR09 Chinese White Dolphin Sighting Database (July 2013)

(Abbreviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; ND = Not Determined; 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 |
|-----------|-------|------|--------|----------|------|------|--------|------|----------|---------|--------|-------------|-----|
| 05-Jul-13 | 1     | 1047 | 16     | W LANTAU | 2    | 149  | ON     | HKLR | 815804   | 803786  | SUMMER | NONE        | P   |
| 05-Jul-13 | 2     | 1131 | 2      | W LANTAU | 3    | ND   | OFF    | HKLR | 814033   | 803391  | SUMMER | NONE        | N/A |
| 05-Jul-13 | 3     | 1216 | 1      | W LANTAU | 3    | 49   | ON     | HKLR | 811448   | 800437  | SUMMER | NONE        | P   |
| 05-Jul-13 | 4     | 1222 | 6      | W LANTAU | 3    | 187  | ON     | HKLR | 810541   | 799826  | SUMMER | NONE        | S   |
| 05-Jul-13 | 5     | 1238 | 1      | W LANTAU | 3    | 20   | ON     | HKLR | 810452   | 800321  | SUMMER | NONE        | P   |
| 05-Jul-13 | 6     | 1249 | 3      | W LANTAU | 3    | 263  | ON     | HKLR | 809464   | 801226  | SUMMER | NONE        | S   |
| 05-Jul-13 | 7     | 1304 | 1      | W LANTAU | 3    | 43   | ON     | HKLR | 809420   | 800947  | SUMMER | NONE        | P   |
| 05-Jul-13 | 8     | 1318 | 5      | W LANTAU | 3    | 13   | ON     | HKLR | 808437   | 799759  | SUMMER | NONE        | P   |
| 05-Jul-13 | 9     | 1328 | 6      | W LANTAU | 2    | 246  | ON     | HKLR | 808425   | 800409  | SUMMER | NONE        | P   |
| 05-Jul-13 | 10    | 1347 | 2      | W LANTAU | 2    | 182  | ON     | HKLR | 807426   | 801397  | SUMMER | NONE        | P   |
| 05-Jul-13 | 11    | 1357 | 2      | W LANTAU | 2    | ND   | OFF    | HKLR | 807438   | 801005  | SUMMER | NONE        | N/A |
| 05-Jul-13 | 12    | 1417 | 1      | W LANTAU | 3    | 105  | ON     | HKLR | 806395   | 801786  | SUMMER | NONE        | P   |
| 10-Jul-13 | 1     | 1008 | 4      | W LANTAU | 1    | ND   | OFF    | HKLR | 817317   | 805325  | SUMMER | NONE        | N/A |
| 10-Jul-13 | 2     | 1037 | 8      | W LANTAU | 3    | 1085 | ON     | HKLR | 816047   | 803787  | SUMMER | NONE        | P   |
| 10-Jul-13 | 3     | 1130 | 4      | W LANTAU | 2    | 29   | ON     | HKLR | 814265   | 803556  | SUMMER | NONE        | S   |
| 10-Jul-13 | 4     | 1143 | 3      | W LANTAU | 3    | 839  | ON     | HKLR | 813548   | 802256  | SUMMER | NONE        | P   |
| 10-Jul-13 | 5     | 1152 | 2      | W LANTAU | 2    | 284  | ON     | HKLR | 813174   | 801121  | SUMMER | NONE        | S   |
| 10-Jul-13 | 6     | 1201 | 3      | W LANTAU | 2    | 236  | ON     | HKLR | 812465   | 801058  | SUMMER | NONE        | P   |
| 10-Jul-13 | 7     | 1224 | 3      | W LANTAU | 2    | 163  | ON     | HKLR | 811467   | 801787  | SUMMER | NONE        | P   |
| 10-Jul-13 | 8     | 1235 | 1      | W LANTAU | 2    | 1079 | ON     | HKLR | 811459   | 800550  | SUMMER | NONE        | P   |
| 10-Jul-13 | 9     | 1251 | 3      | W LANTAU | 2    | 47   | ON     | HKLR | 810239   | 801393  | SUMMER | NONE        | S   |
| 10-Jul-13 | 10    | 1318 | 4      | W LANTAU | 3    | 491  | ON     | HKLR | 808446   | 800646  | SUMMER | NONE        | P   |
| 10-Jul-13 | 11    | 1359 | 8      | W LANTAU | 2    | 53   | ON     | HKLR | 806429   | 801590  | SUMMER | NONE        | P   |

**Appendix III. Individual dolphins identified during HKLR09 monitoring surveys in July 2013**

| <b>ID#</b> | <b>DATE</b> | <b>STG#</b> | <b>AREA</b> |
|------------|-------------|-------------|-------------|
| CH12       | 10/07/13    | 10          | WL          |
| CH38       | 10/07/13    | 11          | WL          |
| CH108      | 10/07/13    | 6           | WL          |
| NL80       | 10/07/13    | 2           | WL          |
| NL103      | 10/07/13    | 2           | WL          |
| NL293      | 10/07/13    | 11          | WL          |
| SL40       | 10/07/13    | 11          | WL          |
| SL47       | 05/07/13    | 1           | WL          |
| SL49       | 05/07/13    | 1           | WL          |
| WL04       | 05/07/13    | 8           | WL          |
| WL25       | 05/07/13    | 9           | WL          |
|            | 10/07/13    | 11          | WL          |
| WL46       | 05/07/13    | 1           | WL          |
| WL60       | 05/07/13    | 1           | WL          |
| WL61       | 10/07/13    | 11          | WL          |
| WL86       | 10/07/13    | 10          | WL          |
| WL100      | 10/07/13    | 6           | WL          |
| WL118      | 05/07/13    | 9           | WL          |
| WL123      | 10/07/13    | 11          | WL          |
| WL124      | 05/07/13    | 6           | WL          |
|            | 10/07/13    | 2           | WL          |
| WL131      | 10/07/13    | 10          | WL          |
| WL145      | 05/07/13    | 4           | WL          |
| WL152      | 10/07/13    | 10          | WL          |
| WL159      | 05/07/13    | 1           | WL          |
| WL178      | 05/07/13    | 10          | WL          |
| WL179      | 05/07/13    | 4           | WL          |
| WL213      | 05/07/13    | 1           | WL          |

SL47\_20130705\_1

SL49\_20130705\_1

WL46\_20130705\_1

WL60\_20130705\_1

WL159\_20130705\_1

WL213\_20130705\_1

WL145\_20130705\_4

WL179\_20130705\_4

WL124\_20130705\_6



WL04\_20130705\_8



WL25\_20130705\_9



WL118\_20130705\_9



WL178\_20130705\_10



NL80\_20130710\_2



NL103\_20130710\_2



WL124\_20130710\_2



CH108\_20130710\_6



WL100\_20130710\_6





CH12\_20130710\_10



WL86\_20130710\_10



WL131\_20130710\_10



WL152\_20130710\_10



CH38\_20130710\_11



NL293\_20130710\_11



SL40\_20130710\_11



WL25\_20130710\_11



WL61\_20130710\_11





Appendix IV. (cont'd)



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**APPENDIX I-2  
UNDERWATER NOISE MONIITORING  
RESULTS**

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## Underwater Noise Monitoring in July 2013

| Date      | Station | Underwater Noise (dB re 1µPa) |         |       |
|-----------|---------|-------------------------------|---------|-------|
|           |         | Max                           | Average | Min   |
| 11-Jul-13 | R3      | 156.8                         | 139.8   | 117.7 |
| 12-Jul-13 | R3      | 164.6                         | 139.7   | 115.4 |
| 15-Jul-13 | R3      | 161.6                         | 135.3   | 119.7 |
| 16-Jul-13 | R3      | 153.9                         | 133.6   | 120.5 |
| 17-Jul-13 | R3      | 149.8                         | 134.4   | 120.1 |
| 18-Jul-13 | R3      | 149.9                         | 138.4   | 122.5 |
| 19-Jul-13 | R3      | 159.1                         | 138.8   | 120.3 |
| 22-Jul-13 | R3      | 155.2                         | 140.0   | 122.2 |
| 23-Jul-13 | R3      | 154.8                         | 141.9   | 122.4 |
| 24-Jul-13 | R3      | 155.1                         | 141.2   | 120.8 |

Frequency: 70 Hz - 125 kHz

## Underwater Noise Monitoring in July 2013

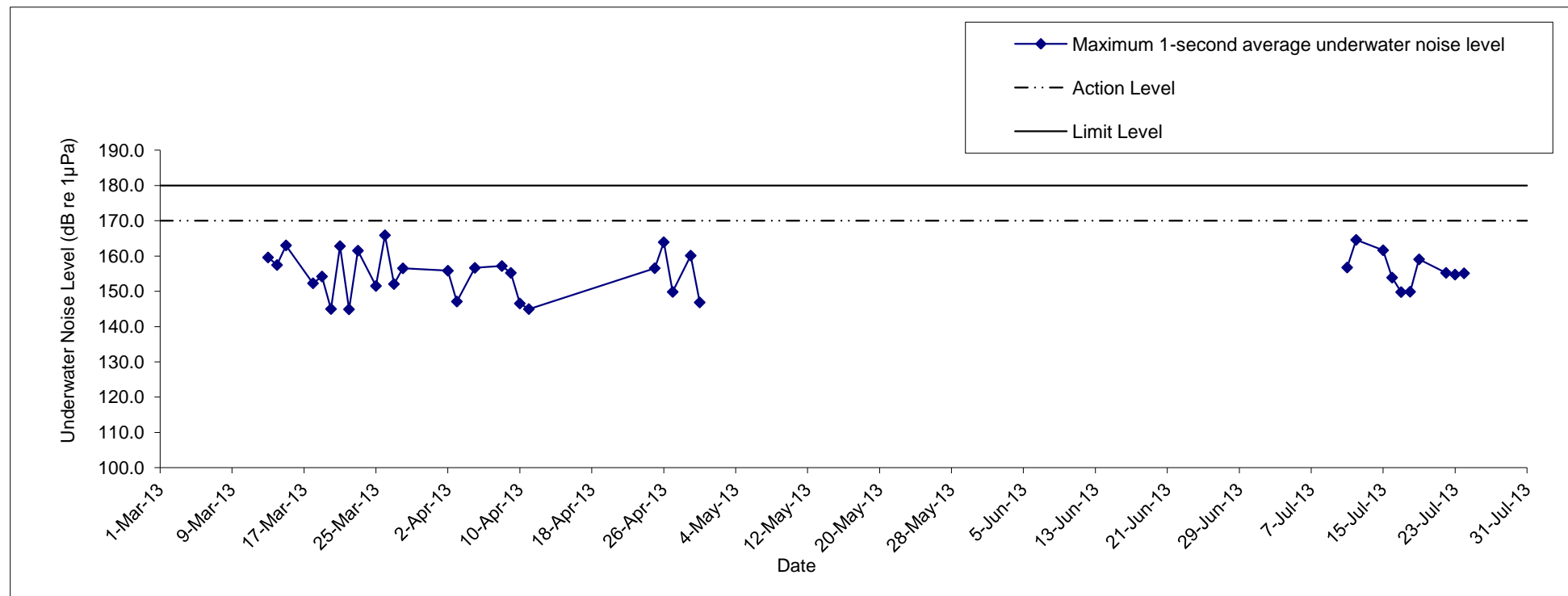
| Date      | Station | Hourly Average Underwater Noise (dB re 1µPa) |       |       |       |       |       |       |       |       | Daily Average<br>(dB re 1µPa) |
|-----------|---------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------------|
|           |         | 9  | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    |                               |
| 11-Jul-13 | R3      | -  | 139.5 | 129.0 | 138.3 | 141.4 | 141.4 | 141.4 | 142.9 | 144.8 | 139.8                         |
| 12-Jul-13 | R3      | 142.1  | 142.7 | 138.0 | 131.0 | 137.7 | 140.9 | 142.7 | 141.4 | 140.9 | 139.7                         |
| 15-Jul-13 | R3      | 131.4  | 132.7 | 137.8 | 138.7 | 132.0 | 126.0 | 137.4 | 141.7 | 140.3 | 135.3                         |
| 16-Jul-13 | R3      | 140.0  | 133.7 | 131.8 | 139.7 | 134.6 | 132.3 | 126.6 | 128.3 | 135.4 | 133.6                         |
| 17-Jul-13 | R3      | 145.1  | 143.2 | 137.8 | 129.5 | 136.0 | 134.9 | 129.0 | 126.9 | 127.1 | 134.4                         |
| 18-Jul-13 | R3      | 144.3  | 143.2 | 143.1 | 142.6 | 136.9 | 136.1 | 135.2 | 133.2 | 131.5 | 138.4                         |
| 19-Jul-13 | R3      | 141.2  | 143.5 | 143.3 | 141.6 | 139.9 | 132.0 | 131.8 | 137.7 | 138.2 | 138.8                         |
| 22-Jul-13 | R3      | 135.6  | 140.0 | 141.4 | 141.8 | 144.3 | 144.7 | 143.8 | 138.9 | 129.7 | 140.0                         |
| 23-Jul-13 | R3      | 140.3  | 137.2 | 140.7 | 142.0 | 143.1 | 144.9 | 146.6 | 144.3 | 138.0 | 141.9                         |
| 24-Jul-13 | R3      | 142.4  | 136.9 | 135.6 | 140.2 | 141.4 | 143.8 | 144.3 | 144.3 | 141.8 | 141.2                         |

Frequency: 70 Hz - 125 kHz

| Station | Pier No. |
|---------|----------|
| R3      | 0        |

\* 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<br>Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill<br>Graphical Presentation of Construction Underwater Noise Monitoring Results | Scale | Project No. | CINOTECH |
|       |   | N.T.S | MA12014     |          |
|       |   | Date  | Appendix    |          |
|       |   | Jul13 | I-2         |          |

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**APPENDIX I-3  
DOLPHIN ACOUSTIC BEHAVIOUR  
MONITORING**

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**Contract No. HY/2011/09**

**Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between  
HKSAR Boundary and Scenic Hill Dolphin Monthly Monitoring on  
Dolphin Acoustic Behaviour Monitoring**

***Monthly Progress Report (July 2013)***

Submitted by

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

August 5<sup>th</sup>, 2013

## **1. INTRODUCTION**

The Hong Kong Link Road (HKLR) comprises a 9.4 km long viaduct section from the HKSAR boundary to Scenic Hill on the Airport Island; a 1-km tunnel section to the reclamation formed along the east coast of the Airport Island, and a 1.6-km long at-grade road section on the reclamation connecting to the Hong Kong Boundary Crossing Facilities (HKBCF). Dragages – China Harbour – VSL JV (hereinafter called the “Contractor”) was awarded as the main contractor of “Contract No. HY/2011/09 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill”.

According to the HKLR EM&A Manual, a number of environmental monitoring and audit works related to Chinese White Dolphins (a.k.a. Indo-Pacific humpback dolphins, *Sousa chinensis*) shall be conducted during baseline, construction and post-construction phases, including dolphin acoustic behaviour monitoring in relation to bored piling activities. Such monitoring is being undertaken by qualified dolphin specialist(s), who have sufficient (at least 5-10 years) relevant post-graduate experience and publication in the respective aspects. Approval of the specialists responsible for the dolphin acoustic behaviour monitoring was sought from AFCD and EPD, and Drs. Bernd Würsig, Marc Lammers, and Lisa Munger were selected and approved.

This progress report of dolphin acoustic behaviour monitoring details the methodology and monthly progress of July 2013 during the construction phase.

## **2. METHODS AND MATERIALS**

### ***2.1. Monitoring Location***

The dedicated acoustic surveys with calibrated hydrophone deployment were conducted in the western side of Lantau Island during the construction phase. The research vessel followed a predefined route for systematic search effort in West Lantau waters to cover the HKLR alignment in Northwest and West Lantau waters (in particular the area near the first three bored piling sites), where dolphins will be potentially disturbed by the bored piling works.

The EARs were deployed at two locations: 1) near the bridge alignment (N22°17.222, E113°53.016), about 500 m from the first three bored piling sites (Site B2), and 2) at a less disturbed site away from the bridge alignment as control site, off Fan Lau (N22°11.827, 113°50.648; Site B1). EAR B2 was in water depth 4 m, and EAR B1 in 7 m.

### ***2.2. Monitoring Methodology***

#### **2.2.1. Acoustic survey using calibrated hydrophone**

During dedicated acoustic surveys, the survey team of two (an experienced sound operator and another HKCRP research assistant) conducted systematic search for dolphins within the study area on a predefined route. The survey protocol to search for dolphins was similar to the line-transect survey methodology adopted in the vessel survey under the HKLR09 EM&A programme. For each survey, a 15-m inboard vessel with an open upper deck (The vessel 32816) was used to make observations from the flying bridge area, at a visual height of 4-5 m above water surface. Two observers searched with unaided eyes and 7 x 50 marine binoculars ahead of the vessel (between 270° and 90° in relation to the bow, which is defined as 0°). The survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance travelled in each series (a continuous period of search effort) with the assistance of a handheld GPS.

When dolphins were sighted, the survey team ended the search effort, and the research vessel was diverted from its course to slowly approach the animals for group size estimation, assessment of group composition, and behavioural observations in the initial 5-10 minutes. The calibrated hydrophone was then deployed 3 to 7 metres below the sea surface by 2-metre long spar buoy from the stern of the research vessel, with vessel engine noise off and the vessel drifting. Broadband dolphin recordings

were made with a Cetacean Research Technology spot-calibrated hydrophone (model: CR1; sensitivity: -197.7 dB, re. 1 V/ $\mu$ Pa; usable frequency response listed as 4 Hz-68 kHz  $\pm 3$  dB) connected to a 1 M $\Omega$  input impedance; linear frequency range: 0.2-48 kHz  $\pm 3$  dB). The spar buoy acted to prevent excessive hydrophone movement from wave and boat motion. The recordings were streamed into a digital memory field recorder (model: Fostex FR-2; frequency response: 20 Hz-80kHz  $\pm 3$  dB) with a pre-amplified signal conditioner (model: PC200-ICP; precision gain:  $\times 0.1$ - $\times 100$ ; frequency range:  $>100$  kHz; system response: 1 Hz-100 kHz  $\pm 3$  dB) to prevent overloading and minimize cable noise. The recordings were then stored on a 4 GB Compact Flash Card, and downloaded for further analysis. The above acoustic data collection setup has been used in the long-term monitoring study on Chinese White Dolphins in Hong Kong since April 2010 (Sims et al. 2011, 2012; also see Hung 2012).

During hydrophone deployment, the date, start and end times, hydrophone and water depths, Beaufort sea state, survey area, locations, ICP gain, event, and notes were taken for each recording in five-minute intervals. Within each corresponding five-minute interval, observers also noted variables including the dolphin group size, group composition and their general behaviour during the 5-minute period (i.e. feeding, socializing, travelling, resting, milling and any aerial activity). The number of vessels that passed within 500 m of the dolphin group were recorded during the same 5-minute interval, with special notes on close approaches by vessels within 100 m of dolphins, including the time of closest approach and any behavioural reaction noted. Distances of vessels were gathered by hand-held laser rangefinder (*Bushnell* Yardage Pro 800; maximum range of detection for most objects: 720 metres; ranging accuracy  $\pm 2$  metres under most circumstances). Also, notes were made on the approximate distance (i.e. 0-250m, 250-500m,  $>500$  m) of the dolphin group to the hydrophone during the 5-minute interval. Notably, positions of dolphin group were recorded continuously during the entire focal follow session to examine their movement in details, especially when they occurred in the vicinity of the HKLR alignment (in particular the area near the first three bored piling sites).

#### 2.3.2. Passive acoustic monitoring using EARs

Two sets of EARs were deployed at two sites in West Lantau, one near the bored piling site and another at the control site off Fan Lau, as mentioned above. The EARs were deployed and recovered by a professional dive team from Oceanway Corporation Limited. During each deployment, the EAR serial number, as well as the time and date of deployment were recorded. Moreover, the GPS position, water depth



and type of substrate at the deployment location were also recorded.

The EARs were programmed to record on a 20% duty cycle (1 minute “on” for every 5 minutes). Recording was from approximately 20 Hz at the low end to 32 kHz at the high end, which effectively covers a major part of the acoustic channel of the Chinese White Dolphins (Sims et al. 2011). Data from the EARs were downloaded onto a computer hard disk at the conclusion of the construction phase of the project.

### **3. SUMMARY OF DOLPHIN ACOUSTIC BEHAVIOUR MONITORING IN JULY 2013**

In July 2013, a total of 12 days of acoustic monitoring surveys were conducted on the 9<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 22<sup>th</sup>, 23<sup>th</sup>, 24<sup>th</sup>, 25<sup>th</sup> and 26<sup>th</sup>, when bored piling activities were concurrently conducted. During those dates, 783.8 km of survey effort were conducted to search for dolphins in the western and northwestern waters of Lantau. A total of 46 groups, numbering 170 dolphins, were sighted during these surveys. In addition, 52 sound samples with 4.2 hours of recordings were taken from some of these dolphin groups. Moreover, the EARs were deployed since early July 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.

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**APPENDIX I-4  
LAND-BASED DOLPHIN BEAHVOUR  
AND MOVEMENT MONITORING  
REPORT**

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**Contract No. HY/2011/09**

**Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between  
HKSAR Boundary and Scenic Hill Dolphin Monthly Monitoring on  
Land-based Dolphin Behaviour and Movement Monitoring**

***Monthly Progress Report (July 2013)***

Submitted by

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

August 5<sup>th</sup>, 2013

## **1. INTRODUCTION**

The Hong Kong Link Road (HKLR) comprises a 9.4 km long viaduct section from the HKSAR boundary to Scenic Hill on the Airport Island; a 1-km tunnel section to the reclamation formed along the east coast of the Airport Island, and a 1.6-km long at-grade road section on the reclamation connecting to the Hong Kong Boundary Crossing Facilities (HKBCF). Dragages – China Harbour – VSL JV (hereinafter called the “Contractor”) was awarded as the main contractor of “Contract No. HY/2011/09 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill”.

According to the HKLR EM&A Manual, a number of environmental monitoring and audit works related to Chinese White Dolphins (a.k.a. Indo-Pacific humpback dolphins, *Sousa chinensis*) are to be conducted during baseline, construction and post-construction phases, including land-based dolphin behaviour and movement monitoring. Such monitoring is being undertaken by qualified dolphin specialists, who have sufficient (at least 5-10 years) relevant post-graduate experience and publication in the respective aspects. The specialists approved for the land-based work are Drs. Bernd Würsig and David Lundquist.

This progress report of land-based dolphin behaviour and movement monitoring details the methodology and monthly progress of July 2013, at a location hereafter termed Sham Wat Station.

## **2. METHODS AND MATERIALS**

### *2.1. Monitoring Station*

Based on requirements under the EM&A Manual as described in the proposal for this work, the Sham Wat Station is located along the northwest coast of Lantau Island (GPS position: 22°16.10' N. and 113°52.32' E, Figure 1). The station was selected based on its height above sea level (minimum requirement of over 20 metres; Würsig et al. 1991), close proximity to shore, and relatively unobstructed views of the HKLR alignment to the west of the airport extending toward the HKSAR Boundary (Figure 2). The height of the Sham Wat Station established by the HKCRP team is 55.70 m high at mean low water, 66 m from shore, and only a few hundred metres to the closest point of the HKLR alignment, which is ideal for the purpose of the present behavioural and movement monitoring in relation to the HKLR bored piling works.

### *2.2. Monitoring Frequency*

Thirty days of monitoring were planned for each of the baseline and initial construction phases. When adverse weather conditions (e.g. heavy rain or otherwise poor visibility <3 km, Beaufort Sea State >3) were forecast, monitoring surveys were postponed, and frequency of monitoring is detailed in Section 3.

### *2.3. Monitoring Methodology*

The methodology of the present monitoring programme generally follows the one established under the Piwetz et al. (2012) study that is part of the AFCD long-term marine mammal monitoring programme (Hung 2012). On each survey day from Sham Wat Station, observers searched continuously for Chinese white dolphins using unaided eyes and 7x50 handheld binoculars. A theodolite tracking session was initiated when an individual dolphin or group of dolphins was located, and focal follow methods were used to track the dolphins (Lundquist 2012, Lundquist et al. 2012a and 2012b, Piwetz et al. 2012).

Within a group, a focal individual was selected for the purposes of tracking behaviour and movement of the group, based on its distinctive feature such as colouration or severe injury mark. The focal individual or group were then tracked continuously via the theodolite, with positions recorded whenever a known or unknown dolphin surfaced. If an individual could not be positively distinguished from other members, the group would be tracked by recording positions based on a central point within the group when the dolphins surfaced.

Tracking continued until animals were lost from view, moved beyond the range of reliable visibility (generally >3 km but up to >5 km under excellent conditions), or when environmental conditions obstructed visibility (e.g. intense haze). Behavioural state data were also recorded every 5 minutes for the focal individual or group. This interval is long enough to allow for determination of the behavioural state, and short enough to capture behavioural responses to the bored piling activities. Moreover, when multiple groups or individuals were present in the study area, attempts were made to record the behaviours of all groups/individuals every 10 minutes, with spotters assisting in determining behaviour of the dolphins.

Positions of dolphins, boats and construction activities were measured using a Sokkisha DT5 digital theodolite with  $\pm 5$ -sec precision and 30-power magnification connected to a laptop computer running the program *Pythagoras* Version 1.2 (Gailey and Ortega-Ortiz 2002). This program calculates a real-time conversion of horizontal and vertical angles collected by the theodolite into geographic positions of latitude and longitude each time a fix is initiated. *Pythagoras* also displays positions, movements, and distances in real-time. When possible, the position of the focal dolphin was recorded at every surfacing with use of *Pythagoras*. The position, type, and activity of all vessels within 5 km of the focal dolphin were also recorded. An effort was made to obtain at least several positions for each vessel, and additional positions were acquired when vessels changed course or speed.

While the primary source of human disturbance to dolphins of interest in this study is bored piling works for the Hong Kong Link Road Project, the presence of vessels may also have an effect on the behaviour and movement patterns of dolphins. During the construction phase, the simultaneous tracking of dolphins and boats over time provides information on the speed and orientation of dolphins, as well as their movements in relation to vessel activities. These data are used to compare with the baseline data. Other construction activities in relation to the bored piling works were recorded during the construction phase monitoring, and for overall consistency and reliability the same theodolite tracking and behavioural procedures were followed as during the baseline phase, with the same primary observers/theodolite operators.

### **3. SUMMARY OF THEODOLITE TRACKING EFFORT IN JULY 2013**

In July 2013, a total of 13 sessions with 74.1 hours of theodolite tracking were conducted from Shum Wat shore-based station on the 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>,

17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 23<sup>rd</sup>, 24<sup>th</sup> and 29<sup>th</sup>, when bored piling activities were concurrently conducted. More than 93% of effort was conducted in favourable weather conditions during those days. Dolphins were successfully tracked from shore on 12 of the 13 days of efforts, and a total of 57 dolphin groups were tracked. A total of 1,536 fixes of their positions were collected, and another 2,174 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. At the end of the construction phase monitoring period, the data will be used for the analyses on movement pattern, speed, reorientation rate, linearity, inter-breath interval, and north-south movement of Chinese White Dolphins.

#### 4. REFERENCES

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## **APPENDIX J**

### **WIND DATA**

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## Appendix J - Wind Data

| Date       | Time  | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 1-Jul-2013 | 00:00 | 1.9            | WNW       |
| 1-Jul-2013 | 01:00 | 1.9            | W         |
| 1-Jul-2013 | 02:00 | 1.9            | WSW       |
| 1-Jul-2013 | 03:00 | 2.2            | WSW       |
| 1-Jul-2013 | 04:00 | 1.6            | WNW       |
| 1-Jul-2013 | 05:00 | 1.5            | NW        |
| 1-Jul-2013 | 06:00 | 1.9            | WNW       |
| 1-Jul-2013 | 07:00 | 1.6            | WSW       |
| 1-Jul-2013 | 08:00 | 1.3            | WSW       |
| 1-Jul-2013 | 09:00 | 1.7            | WSW       |
| 1-Jul-2013 | 10:00 | 1.6            | WSW       |
| 1-Jul-2013 | 11:00 | 1.9            | WSW       |
| 1-Jul-2013 | 12:00 | 1.8            | W         |
| 1-Jul-2013 | 13:00 | 2              | WSW       |
| 1-Jul-2013 | 14:00 | 1.9            | W         |
| 1-Jul-2013 | 15:00 | 1.8            | WSW       |
| 1-Jul-2013 | 16:00 | 1.7            | W         |
| 1-Jul-2013 | 17:00 | 1.8            | W         |
| 1-Jul-2013 | 18:00 | 2.1            | SW        |
| 1-Jul-2013 | 19:00 | 1.7            | WSW       |
| 1-Jul-2013 | 20:00 | 2              | NNE       |
| 1-Jul-2013 | 21:00 | 1.9            | WSW       |
| 1-Jul-2013 | 22:00 | 1.8            | WSW       |
| 1-Jul-2013 | 23:00 | 2.2            | WSW       |
| 2-Jul-2013 | 00:00 | 2.1            | SW        |
| 2-Jul-2013 | 01:00 | 2              | SSW       |
| 2-Jul-2013 | 02:00 | 2.2            | SW        |
| 2-Jul-2013 | 03:00 | 1.9            | SW        |
| 2-Jul-2013 | 04:00 | 1.3            | SW        |
| 2-Jul-2013 | 05:00 | 1.3            | SW        |
| 2-Jul-2013 | 06:00 | 1              | SW        |
| 2-Jul-2013 | 07:00 | 1              | SW        |
| 2-Jul-2013 | 08:00 | 1.3            | SSW       |
| 2-Jul-2013 | 09:00 | 1.8            | WSW       |
| 2-Jul-2013 | 10:00 | 2.4            | W         |
| 2-Jul-2013 | 11:00 | 2.8            | WNW       |
| 2-Jul-2013 | 12:00 | 2.2            | W         |
| 2-Jul-2013 | 13:00 | 2.3            | W         |
| 2-Jul-2013 | 14:00 | 2.1            | WNW       |
| 2-Jul-2013 | 15:00 | 2              | WNW       |
| 2-Jul-2013 | 16:00 | 1.9            | W         |
| 2-Jul-2013 | 17:00 | 2.2            | W         |
| 2-Jul-2013 | 18:00 | 2              | NNE       |
| 2-Jul-2013 | 19:00 | 1.5            | NE        |
| 2-Jul-2013 | 20:00 | 1.9            | ENE       |
| 2-Jul-2013 | 21:00 | 2              | ESE       |
| 2-Jul-2013 | 22:00 | 1.6            | WSW       |
| 2-Jul-2013 | 23:00 | 2.8            | WSW       |
| 3-Jul-2013 | 00:00 | 1.8            | SSW       |
| 3-Jul-2013 | 01:00 | 1.7            | SW        |
| 3-Jul-2013 | 02:00 | 1.7            | SW        |
| 3-Jul-2013 | 03:00 | 1.5            | WSW       |
| 3-Jul-2013 | 04:00 | 1.3            | W         |
| 3-Jul-2013 | 05:00 | 1.1            | WNW       |



## Appendix J - Wind Data

| Date       | Time  | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 3-Jul-2013 | 06:00 | 1              | W         |
| 3-Jul-2013 | 07:00 | 1              | WNW       |
| 3-Jul-2013 | 08:00 | 1.1            | NW        |
| 3-Jul-2013 | 09:00 | 1.7            | WNW       |
| 3-Jul-2013 | 10:00 | 2.1            | WNW       |
| 3-Jul-2013 | 11:00 | 1.9            | WNW       |
| 3-Jul-2013 | 12:00 | 1.7            | W         |
| 3-Jul-2013 | 13:00 | 1.7            | W         |
| 3-Jul-2013 | 14:00 | 1.4            | WNW       |
| 3-Jul-2013 | 15:00 | 1.4            | WNW       |
| 3-Jul-2013 | 16:00 | 1.5            | W         |
| 3-Jul-2013 | 17:00 | 1.9            | W         |
| 3-Jul-2013 | 18:00 | 1.7            | SSW       |
| 3-Jul-2013 | 19:00 | 1.3            | WSW       |
| 3-Jul-2013 | 20:00 | 1.3            | SW        |
| 3-Jul-2013 | 21:00 | 1.5            | WSW       |
| 3-Jul-2013 | 22:00 | 1.4            | WNW       |
| 3-Jul-2013 | 23:00 | 1.6            | W         |
| 4-Jul-2013 | 00:00 | 1.6            | WSW       |
| 4-Jul-2013 | 01:00 | 1.7            | WSW       |
| 4-Jul-2013 | 02:00 | 1.9            | WNW       |
| 4-Jul-2013 | 03:00 | 1.8            | NW        |
| 4-Jul-2013 | 04:00 | 1              | WNW       |
| 4-Jul-2013 | 05:00 | 1.1            | WSW       |
| 4-Jul-2013 | 06:00 | 1.2            | WSW       |
| 4-Jul-2013 | 07:00 | 1              | WSW       |
| 4-Jul-2013 | 08:00 | 1.4            | WSW       |
| 4-Jul-2013 | 09:00 | 1.6            | WSW       |
| 4-Jul-2013 | 10:00 | 2.3            | W         |
| 4-Jul-2013 | 11:00 | 2.1            | WSW       |
| 4-Jul-2013 | 12:00 | 1.8            | W         |
| 4-Jul-2013 | 13:00 | 1.8            | WSW       |
| 4-Jul-2013 | 14:00 | 1.4            | W         |
| 4-Jul-2013 | 15:00 | 1.8            | W         |
| 4-Jul-2013 | 16:00 | 1.5            | SW        |
| 4-Jul-2013 | 17:00 | 1.2            | WSW       |
| 4-Jul-2013 | 18:00 | 1.8            | NNE       |
| 4-Jul-2013 | 19:00 | 1.2            | WSW       |
| 4-Jul-2013 | 20:00 | 1.2            | WSW       |
| 4-Jul-2013 | 21:00 | 1.8            | WSW       |
| 4-Jul-2013 | 22:00 | 2.2            | SSW       |
| 4-Jul-2013 | 23:00 | 1.6            | SSW       |
| 5-Jul-2013 | 00:00 | 1.8            | S         |
| 5-Jul-2013 | 01:00 | 1.9            | SW        |
| 5-Jul-2013 | 02:00 | 2              | WNW       |
| 5-Jul-2013 | 03:00 | 2.2            | WNW       |
| 5-Jul-2013 | 04:00 | 2              | WNW       |
| 5-Jul-2013 | 05:00 | 1.9            | SSW       |
| 5-Jul-2013 | 06:00 | 1.9            | WSW       |
| 5-Jul-2013 | 07:00 | 2.1            | WSW       |
| 5-Jul-2013 | 08:00 | 1.5            | SW        |
| 5-Jul-2013 | 09:00 | 1.7            | SW        |
| 5-Jul-2013 | 10:00 | 1.9            | WSW       |
| 5-Jul-2013 | 11:00 | 1.5            | WSW       |

## Appendix J - Wind Data

| Date       | Time  | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 5-Jul-2013 | 12:00 | 2.1            | WSW       |
| 5-Jul-2013 | 13:00 | 1.9            | WSW       |
| 5-Jul-2013 | 14:00 | 2.3            | SW        |
| 5-Jul-2013 | 15:00 | 1.9            | WSW       |
| 5-Jul-2013 | 16:00 | 1.7            | WSW       |
| 5-Jul-2013 | 17:00 | 1.5            | WSW       |
| 5-Jul-2013 | 18:00 | 2              | WSW       |
| 5-Jul-2013 | 19:00 | 1.3            | WSW       |
| 5-Jul-2013 | 20:00 | 1.9            | SW        |
| 5-Jul-2013 | 21:00 | 1.9            | WSW       |
| 5-Jul-2013 | 22:00 | 1.7            | SW        |
| 5-Jul-2013 | 23:00 | 1.8            | W         |
| 6-Jul-2013 | 00:00 | 1.7            | WNW       |
| 6-Jul-2013 | 01:00 | 1.6            | W         |
| 6-Jul-2013 | 02:00 | 1.8            | WNW       |
| 6-Jul-2013 | 03:00 | 1.8            | WNW       |
| 6-Jul-2013 | 04:00 | 1.8            | WNW       |
| 6-Jul-2013 | 05:00 | 1.2            | W         |
| 6-Jul-2013 | 06:00 | 1.5            | WNW       |
| 6-Jul-2013 | 07:00 | 1.1            | WNW       |
| 6-Jul-2013 | 08:00 | 1.4            | NW        |
| 6-Jul-2013 | 09:00 | 1.8            | W         |
| 6-Jul-2013 | 10:00 | 2.1            | SSW       |
| 6-Jul-2013 | 11:00 | 2.7            | N         |
| 6-Jul-2013 | 12:00 | 2              | NNE       |
| 6-Jul-2013 | 13:00 | 2.5            | WNW       |
| 6-Jul-2013 | 14:00 | 2.1            | W         |
| 6-Jul-2013 | 15:00 | 1.8            | WNW       |
| 6-Jul-2013 | 16:00 | 1.8            | WNW       |
| 6-Jul-2013 | 17:00 | 1.6            | WNW       |
| 6-Jul-2013 | 18:00 | 1.4            | WNW       |
| 6-Jul-2013 | 19:00 | 1.8            | WNW       |
| 6-Jul-2013 | 20:00 | 1.8            | WNW       |
| 6-Jul-2013 | 21:00 | 2              | WNW       |
| 6-Jul-2013 | 22:00 | 1.9            | WNW       |
| 6-Jul-2013 | 23:00 | 1.6            | WNW       |
| 7-Jul-2013 | 00:00 | 2              | WNW       |
| 7-Jul-2013 | 01:00 | 1.5            | W         |
| 7-Jul-2013 | 02:00 | 1.3            | W         |
| 7-Jul-2013 | 03:00 | 1.5            | SW        |
| 7-Jul-2013 | 04:00 | 1.4            | WSW       |
| 7-Jul-2013 | 05:00 | 1.3            | SW        |
| 7-Jul-2013 | 06:00 | 1.2            | SW        |
| 7-Jul-2013 | 07:00 | 1.1            | WNW       |
| 7-Jul-2013 | 08:00 | 1.3            | WNW       |
| 7-Jul-2013 | 09:00 | 1.4            | WNW       |
| 7-Jul-2013 | 10:00 | 1.3            | SW        |
| 7-Jul-2013 | 11:00 | 1.4            | WSW       |
| 7-Jul-2013 | 12:00 | 1.9            | SW        |
| 7-Jul-2013 | 13:00 | 1.9            | W         |
| 7-Jul-2013 | 14:00 | 1.5            | W         |
| 7-Jul-2013 | 15:00 | 1.5            | WNW       |
| 7-Jul-2013 | 16:00 | 2              | WNW       |
| 7-Jul-2013 | 17:00 | 2.2            | SW        |

## Appendix J - Wind Data

| Date       | Time  | Wind Speed m/s | Direction |
|------------|-------|----------------|-----------|
| 7-Jul-2013 | 18:00 | 2              | W         |
| 7-Jul-2013 | 19:00 | 2.1            | WSW       |
| 7-Jul-2013 | 20:00 | 1.9            | WNW       |
| 7-Jul-2013 | 21:00 | 1.8            | SW        |
| 7-Jul-2013 | 22:00 | 1.7            | WNW       |
| 7-Jul-2013 | 23:00 | 2.2            | WNW       |
| 8-Jul-2013 | 00:00 | 1.4            | SW        |
| 8-Jul-2013 | 01:00 | 1.4            | SW        |
| 8-Jul-2013 | 02:00 | 1.1            | SSW       |
| 8-Jul-2013 | 03:00 | 1.2            | WNW       |
| 8-Jul-2013 | 04:00 | 1.5            | WSW       |
| 8-Jul-2013 | 05:00 | 1.5            | WSW       |
| 8-Jul-2013 | 06:00 | 1.9            | WNW       |
| 8-Jul-2013 | 07:00 | 1.8            | W         |
| 8-Jul-2013 | 08:00 | 1.4            | W         |
| 8-Jul-2013 | 09:00 | 1.8            | W         |
| 8-Jul-2013 | 10:00 | 1.8            | W         |
| 8-Jul-2013 | 11:00 | 1.5            | W         |
| 8-Jul-2013 | 12:00 | 1.7            | WSW       |
| 8-Jul-2013 | 13:00 | 2.1            | WSW       |
| 8-Jul-2013 | 14:00 | 2.6            | W         |
| 8-Jul-2013 | 15:00 | 2.7            | SW        |
| 8-Jul-2013 | 16:00 | 2.8            | NE        |
| 8-Jul-2013 | 17:00 | 2.2            | NE        |
| 8-Jul-2013 | 18:00 | 2              | N         |
| 8-Jul-2013 | 19:00 | 1.9            | NNE       |
| 8-Jul-2013 | 20:00 | 2              | NNE       |
| 8-Jul-2013 | 21:00 | 2.4            | NNE       |
| 8-Jul-2013 | 22:00 | 2.1            | N         |
| 8-Jul-2013 | 23:00 | 1.8            | W         |
| 9-Jul-2013 | 00:00 | 2              | W         |
| 9-Jul-2013 | 01:00 | 1.8            | W         |
| 9-Jul-2013 | 02:00 | 1.9            | W         |
| 9-Jul-2013 | 03:00 | 1.9            | W         |
| 9-Jul-2013 | 04:00 | 1.7            | W         |
| 9-Jul-2013 | 05:00 | 1.6            | WSW       |
| 9-Jul-2013 | 06:00 | 1.4            | W         |
| 9-Jul-2013 | 07:00 | 1.4            | WNW       |
| 9-Jul-2013 | 08:00 | 1.3            | W         |
| 9-Jul-2013 | 09:00 | 1.9            | SW        |
| 9-Jul-2013 | 10:00 | 1.9            | W         |
| 9-Jul-2013 | 11:00 | 1.9            | W         |
| 9-Jul-2013 | 12:00 | 2.3            | W         |
| 9-Jul-2013 | 13:00 | 2.4            | W         |
| 9-Jul-2013 | 14:00 | 2.1            | SW        |
| 9-Jul-2013 | 15:00 | 2.2            | SW        |
| 9-Jul-2013 | 16:00 | 2.2            | SW        |
| 9-Jul-2013 | 17:00 | 2.7            | SW        |
| 9-Jul-2013 | 18:00 | 1.9            | W         |
| 9-Jul-2013 | 19:00 | 1.6            | SW        |
| 9-Jul-2013 | 20:00 | 1.6            | W         |
| 9-Jul-2013 | 21:00 | 1.6            | WSW       |
| 9-Jul-2013 | 22:00 | 1.3            | SW        |
| 9-Jul-2013 | 23:00 | 1              | SSW       |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 10-Jul-2013 | 00:00 | 1.4            | SW        |
| 10-Jul-2013 | 01:00 | 1.2            | W         |
| 10-Jul-2013 | 02:00 | 1.2            | W         |
| 10-Jul-2013 | 03:00 | 0.9            | WSW       |
| 10-Jul-2013 | 04:00 | 0.7            | W         |
| 10-Jul-2013 | 05:00 | 0.7            | WSW       |
| 10-Jul-2013 | 06:00 | 0.6            | WNW       |
| 10-Jul-2013 | 07:00 | 0.7            | WNW       |
| 10-Jul-2013 | 08:00 | 0.8            | W         |
| 10-Jul-2013 | 09:00 | 1              | N         |
| 10-Jul-2013 | 10:00 | 1.4            | N         |
| 10-Jul-2013 | 11:00 | 1.9            | E         |
| 10-Jul-2013 | 12:00 | 2              | SSW       |
| 10-Jul-2013 | 13:00 | 2.3            | SW        |
| 10-Jul-2013 | 14:00 | 2.2            | W         |
| 10-Jul-2013 | 15:00 | 1.7            | W         |
| 10-Jul-2013 | 16:00 | 2              | SW        |
| 10-Jul-2013 | 17:00 | 2.7            | W         |
| 10-Jul-2013 | 18:00 | 2.5            | W         |
| 10-Jul-2013 | 19:00 | 1.8            | W         |
| 10-Jul-2013 | 20:00 | 1.6            | WSW       |
| 10-Jul-2013 | 21:00 | 1.4            | W         |
| 10-Jul-2013 | 22:00 | 1.4            | W         |
| 10-Jul-2013 | 23:00 | 1              | W         |
| 11-Jul-2013 | 00:00 | 0.9            | W         |
| 11-Jul-2013 | 01:00 | 0.5            | W         |
| 11-Jul-2013 | 02:00 | 0.6            | W         |
| 11-Jul-2013 | 03:00 | 0.5            | N         |
| 11-Jul-2013 | 04:00 | 0.6            | N         |
| 11-Jul-2013 | 05:00 | 0.5            | N         |
| 11-Jul-2013 | 06:00 | 0.5            | NNE       |
| 11-Jul-2013 | 07:00 | 0.5            | NNE       |
| 11-Jul-2013 | 08:00 | 0.6            | NNE       |
| 11-Jul-2013 | 09:00 | 0.8            | NNE       |
| 11-Jul-2013 | 10:00 | 1              | NNE       |
| 11-Jul-2013 | 11:00 | 1              | NE        |
| 11-Jul-2013 | 12:00 | 1              | ENE       |
| 11-Jul-2013 | 13:00 | 1.1            | NE        |
| 11-Jul-2013 | 14:00 | 1              | W         |
| 11-Jul-2013 | 15:00 | 1              | NNE       |
| 11-Jul-2013 | 16:00 | 0.9            | ENE       |
| 11-Jul-2013 | 17:00 | 1.3            | ENE       |
| 11-Jul-2013 | 18:00 | 1.7            | ENE       |
| 11-Jul-2013 | 19:00 | 1.6            | E         |
| 11-Jul-2013 | 20:00 | 1.6            | N         |
| 11-Jul-2013 | 21:00 | 1.3            | N         |
| 11-Jul-2013 | 22:00 | 1.2            | N         |
| 11-Jul-2013 | 23:00 | 1              | N         |
| 12-Jul-2013 | 00:00 | 1              | N         |
| 12-Jul-2013 | 01:00 | 0.7            | NNE       |
| 12-Jul-2013 | 02:00 | 0.7            | NNE       |
| 12-Jul-2013 | 03:00 | 0.6            | NNE       |
| 12-Jul-2013 | 04:00 | 0.7            | NNE       |
| 12-Jul-2013 | 05:00 | 0.7            | NNE       |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 12-Jul-2013 | 06:00 | 0.6            | NNE       |
| 12-Jul-2013 | 07:00 | 0.6            | NNE       |
| 12-Jul-2013 | 08:00 | 0.6            | N         |
| 12-Jul-2013 | 09:00 | 0.7            | NNE       |
| 12-Jul-2013 | 10:00 | 0.7            | NNE       |
| 12-Jul-2013 | 11:00 | 1.1            | N         |
| 12-Jul-2013 | 12:00 | 1.3            | NNE       |
| 12-Jul-2013 | 13:00 | 1.6            | N         |
| 12-Jul-2013 | 14:00 | 1.3            | NNE       |
| 12-Jul-2013 | 15:00 | 1.9            | NNE       |
| 12-Jul-2013 | 16:00 | 1.7            | NE        |
| 12-Jul-2013 | 17:00 | 1.8            | NE        |
| 12-Jul-2013 | 18:00 | 1.5            | N         |
| 12-Jul-2013 | 19:00 | 1.3            | NE        |
| 12-Jul-2013 | 20:00 | 1              | NE        |
| 12-Jul-2013 | 21:00 | 1.5            | NNE       |
| 12-Jul-2013 | 22:00 | 1.1            | NNE       |
| 12-Jul-2013 | 23:00 | 0.7            | N         |
| 13-Jul-2013 | 00:00 | 0.6            | N         |
| 13-Jul-2013 | 01:00 | 0.8            | NE        |
| 13-Jul-2013 | 02:00 | 0.7            | N         |
| 13-Jul-2013 | 03:00 | 0.7            | NE        |
| 13-Jul-2013 | 04:00 | 0.9            | NNE       |
| 13-Jul-2013 | 05:00 | 1.2            | NE        |
| 13-Jul-2013 | 06:00 | 1.1            | N         |
| 13-Jul-2013 | 07:00 | 1.5            | NNE       |
| 13-Jul-2013 | 08:00 | 1.3            | ENE       |
| 13-Jul-2013 | 09:00 | 1.7            | N         |
| 13-Jul-2013 | 10:00 | 2.1            | N         |
| 13-Jul-2013 | 11:00 | 1.8            | NNE       |
| 13-Jul-2013 | 12:00 | 2              | N         |
| 13-Jul-2013 | 13:00 | 1.6            | SW        |
| 13-Jul-2013 | 14:00 | 1.3            | SSW       |
| 13-Jul-2013 | 15:00 | 2.2            | S         |
| 13-Jul-2013 | 16:00 | 2              | SSW       |
| 13-Jul-2013 | 17:00 | 1.7            | SSW       |
| 13-Jul-2013 | 18:00 | 2.2            | S         |
| 13-Jul-2013 | 19:00 | 1.8            | SSW       |
| 13-Jul-2013 | 20:00 | 1.3            | S         |
| 13-Jul-2013 | 21:00 | 1              | SSW       |
| 13-Jul-2013 | 22:00 | 1.1            | SSW       |
| 13-Jul-2013 | 23:00 | 1.1            | WNW       |
| 14-Jul-2013 | 00:00 | 1.1            | WNW       |
| 14-Jul-2013 | 01:00 | 1              | W         |
| 14-Jul-2013 | 02:00 | 0.9            | W         |
| 14-Jul-2013 | 03:00 | 1.2            | W         |
| 14-Jul-2013 | 04:00 | 1.3            | W         |
| 14-Jul-2013 | 05:00 | 1.1            | WNW       |
| 14-Jul-2013 | 06:00 | 1.2            | WNW       |
| 14-Jul-2013 | 07:00 | 1.4            | WNW       |
| 14-Jul-2013 | 08:00 | 1.4            | W         |
| 14-Jul-2013 | 09:00 | 1.7            | WNW       |
| 14-Jul-2013 | 10:00 | 1.4            | NW        |
| 14-Jul-2013 | 11:00 | 1.4            | ENE       |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 14-Jul-2013 | 12:00 | 1.5            | E         |
| 14-Jul-2013 | 13:00 | 2              | NNE       |
| 14-Jul-2013 | 14:00 | 1.2            | NE        |
| 14-Jul-2013 | 15:00 | 1.6            | NE        |
| 14-Jul-2013 | 16:00 | 1.5            | NE        |
| 14-Jul-2013 | 17:00 | 1.6            | SSW       |
| 14-Jul-2013 | 18:00 | 1.5            | WSW       |
| 14-Jul-2013 | 19:00 | 0.8            | WNW       |
| 14-Jul-2013 | 20:00 | 0.9            | W         |
| 14-Jul-2013 | 21:00 | 0.8            | W         |
| 14-Jul-2013 | 22:00 | 1              | E         |
| 14-Jul-2013 | 23:00 | 1.3            | E         |
| 15-Jul-2013 | 00:00 | 1.3            | ENE       |
| 15-Jul-2013 | 01:00 | 1.1            | ESE       |
| 15-Jul-2013 | 02:00 | 0.9            | ESE       |
| 15-Jul-2013 | 03:00 | 0.7            | E         |
| 15-Jul-2013 | 04:00 | 0.7            | NNE       |
| 15-Jul-2013 | 05:00 | 0.9            | NNE       |
| 15-Jul-2013 | 06:00 | 0.9            | N         |
| 15-Jul-2013 | 07:00 | 1.1            | NNE       |
| 15-Jul-2013 | 08:00 | 1.2            | N         |
| 15-Jul-2013 | 09:00 | 1.4            | NNE       |
| 15-Jul-2013 | 10:00 | 1.7            | N         |
| 15-Jul-2013 | 11:00 | 2.3            | NE        |
| 15-Jul-2013 | 12:00 | 2              | ENE       |
| 15-Jul-2013 | 13:00 | 1.4            | ESE       |
| 15-Jul-2013 | 14:00 | 1.2            | SE        |
| 15-Jul-2013 | 15:00 | 1.4            | SE        |
| 15-Jul-2013 | 16:00 | 1.5            | SE        |
| 15-Jul-2013 | 17:00 | 1.8            | E         |
| 15-Jul-2013 | 18:00 | 1.8            | E         |
| 15-Jul-2013 | 19:00 | 1.3            | NW        |
| 15-Jul-2013 | 20:00 | 1.4            | WSW       |
| 15-Jul-2013 | 21:00 | 1.2            | WSW       |
| 15-Jul-2013 | 22:00 | 1.1            | WSW       |
| 15-Jul-2013 | 23:00 | 1.1            | SW        |
| 16-Jul-2013 | 00:00 | 0.8            | SSE       |
| 16-Jul-2013 | 01:00 | 0.6            | WSW       |
| 16-Jul-2013 | 02:00 | 0.5            | WSW       |
| 16-Jul-2013 | 03:00 | 0.5            | SE        |
| 16-Jul-2013 | 04:00 | 0.6            | SE        |
| 16-Jul-2013 | 05:00 | 0.6            | ESE       |
| 16-Jul-2013 | 06:00 | 1              | ESE       |
| 16-Jul-2013 | 07:00 | 1.4            | E         |
| 16-Jul-2013 | 08:00 | 1.1            | E         |
| 16-Jul-2013 | 09:00 | 1.1            | E         |
| 16-Jul-2013 | 10:00 | 1.4            | ENE       |
| 16-Jul-2013 | 11:00 | 1.6            | E         |
| 16-Jul-2013 | 12:00 | 1.8            | E         |
| 16-Jul-2013 | 13:00 | 1.8            | E         |
| 16-Jul-2013 | 14:00 | 1.7            | E         |
| 16-Jul-2013 | 15:00 | 1.7            | E         |
| 16-Jul-2013 | 16:00 | 1.6            | E         |
| 16-Jul-2013 | 17:00 | 1.8            | E         |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 16-Jul-2013 | 18:00 | 1.6            | E         |
| 16-Jul-2013 | 19:00 | 1.5            | S         |
| 16-Jul-2013 | 20:00 | 1.1            | N         |
| 16-Jul-2013 | 21:00 | 1.4            | ESE       |
| 16-Jul-2013 | 22:00 | 1.2            | ESE       |
| 16-Jul-2013 | 23:00 | 0.9            | ESE       |
| 17-Jul-2013 | 00:00 | 1.1            | SE        |
| 17-Jul-2013 | 01:00 | 0.7            | SE        |
| 17-Jul-2013 | 02:00 | 0.5            | E         |
| 17-Jul-2013 | 03:00 | 0.6            | E         |
| 17-Jul-2013 | 04:00 | 0.4            | ESE       |
| 17-Jul-2013 | 05:00 | 0.5            | SE        |
| 17-Jul-2013 | 06:00 | 0.5            | E         |
| 17-Jul-2013 | 07:00 | 0.6            | NE        |
| 17-Jul-2013 | 08:00 | 0.9            | ENE       |
| 17-Jul-2013 | 09:00 | 1.3            | E         |
| 17-Jul-2013 | 10:00 | 1.5            | ENE       |
| 17-Jul-2013 | 11:00 | 1.7            | E         |
| 17-Jul-2013 | 12:00 | 1.8            | E         |
| 17-Jul-2013 | 13:00 | 2.1            | E         |
| 17-Jul-2013 | 14:00 | 2.4            | NNE       |
| 17-Jul-2013 | 15:00 | 2.7            | NNE       |
| 17-Jul-2013 | 16:00 | 2.8            | NNE       |
| 17-Jul-2013 | 17:00 | 2.9            | SW        |
| 17-Jul-2013 | 18:00 | 2.6            | NE        |
| 17-Jul-2013 | 19:00 | 2.9            | SE        |
| 17-Jul-2013 | 20:00 | 3              | NNE       |
| 17-Jul-2013 | 21:00 | 2.4            | NE        |
| 17-Jul-2013 | 22:00 | 2.3            | SSE       |
| 17-Jul-2013 | 23:00 | 2.2            | SE        |
| 18-Jul-2013 | 00:00 | 1.6            | SE        |
| 18-Jul-2013 | 01:00 | 2.1            | SE        |
| 18-Jul-2013 | 02:00 | 2              | SE        |
| 18-Jul-2013 | 03:00 | 2.1            | ENE       |
| 18-Jul-2013 | 04:00 | 2.3            | ENE       |
| 18-Jul-2013 | 05:00 | 1.9            | ENE       |
| 18-Jul-2013 | 06:00 | 1.7            | ENE       |
| 18-Jul-2013 | 07:00 | 1.4            | ENE       |
| 18-Jul-2013 | 08:00 | 1.2            | ENE       |
| 18-Jul-2013 | 09:00 | 0.9            | ESE       |
| 18-Jul-2013 | 10:00 | 0.9            | W         |
| 18-Jul-2013 | 11:00 | 0.8            | WSW       |
| 18-Jul-2013 | 12:00 | 1.1            | SW        |
| 18-Jul-2013 | 13:00 | 1.5            | W         |
| 18-Jul-2013 | 14:00 | 2.1            | W         |
| 18-Jul-2013 | 15:00 | 2.2            | SSW       |
| 18-Jul-2013 | 16:00 | 2.2            | SW        |
| 18-Jul-2013 | 17:00 | 2.2            | ESE       |
| 18-Jul-2013 | 18:00 | 2.3            | W         |
| 18-Jul-2013 | 19:00 | 2.5            | ENE       |
| 18-Jul-2013 | 20:00 | 2.7            | NE        |
| 18-Jul-2013 | 21:00 | 2.3            | NE        |
| 18-Jul-2013 | 22:00 | 1.9            | SW        |
| 18-Jul-2013 | 23:00 | 1.5            | ENE       |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 19-Jul-2013 | 00:00 | 1.6            | ENE       |
| 19-Jul-2013 | 01:00 | 1.7            | ESE       |
| 19-Jul-2013 | 02:00 | 1.4            | NE        |
| 19-Jul-2013 | 03:00 | 1.5            | ENE       |
| 19-Jul-2013 | 04:00 | 1.4            | NNE       |
| 19-Jul-2013 | 05:00 | 1.5            | ENE       |
| 19-Jul-2013 | 06:00 | 1.4            | NE        |
| 19-Jul-2013 | 07:00 | 1.4            | NE        |
| 19-Jul-2013 | 08:00 | 1.5            | NE        |
| 19-Jul-2013 | 09:00 | 1.6            | NE        |
| 19-Jul-2013 | 10:00 | 1.4            | NE        |
| 19-Jul-2013 | 11:00 | 1.6            | W         |
| 19-Jul-2013 | 12:00 | 2.1            | W         |
| 19-Jul-2013 | 13:00 | 2.3            | ENE       |
| 19-Jul-2013 | 14:00 | 3              | SSW       |
| 19-Jul-2013 | 15:00 | 2.8            | W         |
| 19-Jul-2013 | 16:00 | 2.4            | W         |
| 19-Jul-2013 | 17:00 | 2.5            | ESE       |
| 19-Jul-2013 | 18:00 | 2.6            | WSW       |
| 19-Jul-2013 | 19:00 | 2.3            | SW        |
| 19-Jul-2013 | 20:00 | 2.2            | W         |
| 19-Jul-2013 | 21:00 | 2.3            | SW        |
| 19-Jul-2013 | 22:00 | 1.9            | SSW       |
| 19-Jul-2013 | 23:00 | 1.7            | WNW       |
| 20-Jul-2013 | 00:00 | 1.7            | WSW       |
| 20-Jul-2013 | 01:00 | 1.8            | WSW       |
| 20-Jul-2013 | 02:00 | 1.7            | W         |
| 20-Jul-2013 | 03:00 | 1.6            | W         |
| 20-Jul-2013 | 04:00 | 1.8            | ENE       |
| 20-Jul-2013 | 05:00 | 1.9            | SSW       |
| 20-Jul-2013 | 06:00 | 2              | W         |
| 20-Jul-2013 | 07:00 | 1.9            | WSW       |
| 20-Jul-2013 | 08:00 | 2              | W         |
| 20-Jul-2013 | 09:00 | 2.3            | ESE       |
| 20-Jul-2013 | 10:00 | 2.2            | NNW       |
| 20-Jul-2013 | 11:00 | 2              | ENE       |
| 20-Jul-2013 | 12:00 | 2.3            | W         |
| 20-Jul-2013 | 13:00 | 2.5            | SW        |
| 20-Jul-2013 | 14:00 | 2.7            | NE        |
| 20-Jul-2013 | 15:00 | 2.9            | WSW       |
| 20-Jul-2013 | 16:00 | 3              | ENE       |
| 20-Jul-2013 | 17:00 | 2.8            | NNE       |
| 20-Jul-2013 | 18:00 | 2.7            | N         |
| 20-Jul-2013 | 19:00 | 2.7            | SW        |
| 20-Jul-2013 | 20:00 | 2.5            | S         |
| 20-Jul-2013 | 21:00 | 2.2            | W         |
| 20-Jul-2013 | 22:00 | 2.1            | SE        |
| 20-Jul-2013 | 23:00 | 2              | NE        |
| 21-Jul-2013 | 00:00 | 1.9            | ESE       |
| 21-Jul-2013 | 01:00 | 1.9            | SSE       |
| 21-Jul-2013 | 02:00 | 1.9            | NNE       |
| 21-Jul-2013 | 03:00 | 1.8            | NE        |
| 21-Jul-2013 | 04:00 | 1.8            | ENE       |
| 21-Jul-2013 | 05:00 | 2              | ENE       |



## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 21-Jul-2013 | 06:00 | 1.9            | NE        |
| 21-Jul-2013 | 07:00 | 1.4            | NE        |
| 21-Jul-2013 | 08:00 | 1.6            | NE        |
| 21-Jul-2013 | 09:00 | 1.6            | NE        |
| 21-Jul-2013 | 10:00 | 1.5            | NE        |
| 21-Jul-2013 | 11:00 | 1.5            | SSE       |
| 21-Jul-2013 | 12:00 | 1.7            | N         |
| 21-Jul-2013 | 13:00 | 2.2            | ENE       |
| 21-Jul-2013 | 14:00 | 2.3            | ENE       |
| 21-Jul-2013 | 15:00 | 2.3            | E         |
| 21-Jul-2013 | 16:00 | 2.5            | NE        |
| 21-Jul-2013 | 17:00 | 2.5            | NE        |
| 21-Jul-2013 | 18:00 | 2.5            | NNE       |
| 21-Jul-2013 | 19:00 | 2.1            | NE        |
| 21-Jul-2013 | 20:00 | 2              | NE        |
| 21-Jul-2013 | 21:00 | 2              | NE        |
| 21-Jul-2013 | 22:00 | 1.7            | NNE       |
| 21-Jul-2013 | 23:00 | 1.6            | NNE       |
| 22-Jul-2013 | 00:00 | 1.5            | NE        |
| 22-Jul-2013 | 01:00 | 1.3            | NE        |
| 22-Jul-2013 | 02:00 | 1.4            | NE        |
| 22-Jul-2013 | 03:00 | 1.3            | NE        |
| 22-Jul-2013 | 04:00 | 1.6            | NE        |
| 22-Jul-2013 | 05:00 | 1.4            | NNE       |
| 22-Jul-2013 | 06:00 | 1.4            | NNE       |
| 22-Jul-2013 | 07:00 | 1.3            | ENE       |
| 22-Jul-2013 | 08:00 | 1.4            | ENE       |
| 22-Jul-2013 | 09:00 | 1.5            | NNE       |
| 22-Jul-2013 | 10:00 | 1.4            | NNE       |
| 22-Jul-2013 | 11:00 | 1.2            | N         |
| 22-Jul-2013 | 12:00 | 1.2            | NE        |
| 22-Jul-2013 | 13:00 | 1.5            | ESE       |
| 22-Jul-2013 | 14:00 | 1.7            | NE        |
| 22-Jul-2013 | 15:00 | 1.6            | ENE       |
| 22-Jul-2013 | 16:00 | 1.7            | SE        |
| 22-Jul-2013 | 17:00 | 1.9            | SSE       |
| 22-Jul-2013 | 18:00 | 1.8            | NE        |
| 22-Jul-2013 | 19:00 | 1.8            | NNE       |
| 22-Jul-2013 | 20:00 | 1.8            | SSW       |
| 22-Jul-2013 | 21:00 | 1.8            | SW        |
| 22-Jul-2013 | 22:00 | 2              | SSE       |
| 22-Jul-2013 | 23:00 | 1.9            | SSW       |
| 23-Jul-2013 | 00:00 | 1.9            | ENE       |
| 23-Jul-2013 | 01:00 | 2.1            | SSW       |
| 23-Jul-2013 | 02:00 | 2.2            | SSW       |
| 23-Jul-2013 | 03:00 | 2.1            | WSW       |
| 23-Jul-2013 | 04:00 | 1.3            | WSW       |
| 23-Jul-2013 | 05:00 | 1.4            | WNW       |
| 23-Jul-2013 | 06:00 | 1.2            | SW        |
| 23-Jul-2013 | 07:00 | 1.2            | W         |
| 23-Jul-2013 | 08:00 | 1.1            | SW        |
| 23-Jul-2013 | 09:00 | 1.3            | W         |
| 23-Jul-2013 | 10:00 | 1.4            | NNE       |
| 23-Jul-2013 | 11:00 | 1.4            | W         |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 23-Jul-2013 | 12:00 | 1.6            | W         |
| 23-Jul-2013 | 13:00 | 1.3            | SSW       |
| 23-Jul-2013 | 14:00 | 1.3            | W         |
| 23-Jul-2013 | 15:00 | 1.5            | NNE       |
| 23-Jul-2013 | 16:00 | 2.1            | NNE       |
| 23-Jul-2013 | 17:00 | 1.5            | NNE       |
| 23-Jul-2013 | 18:00 | 1.5            | NE        |
| 23-Jul-2013 | 19:00 | 1.2            | NE        |
| 23-Jul-2013 | 20:00 | 1.3            | NE        |
| 23-Jul-2013 | 21:00 | 1.4            | ENE       |
| 23-Jul-2013 | 22:00 | 1.6            | NE        |
| 23-Jul-2013 | 23:00 | 1.8            | ENE       |
| 24-Jul-2013 | 00:00 | 1.9            | NNE       |
| 24-Jul-2013 | 01:00 | 1.9            | N         |
| 24-Jul-2013 | 02:00 | 2.1            | NNE       |
| 24-Jul-2013 | 03:00 | 1.9            | N         |
| 24-Jul-2013 | 04:00 | 1.8            | ENE       |
| 24-Jul-2013 | 05:00 | 2              | E         |
| 24-Jul-2013 | 06:00 | 1.7            | ENE       |
| 24-Jul-2013 | 07:00 | 1.3            | ENE       |
| 24-Jul-2013 | 08:00 | 1.5            | NNE       |
| 24-Jul-2013 | 09:00 | 1.6            | ENE       |
| 24-Jul-2013 | 10:00 | 1.9            | NE        |
| 24-Jul-2013 | 11:00 | 1.7            | ENE       |
| 24-Jul-2013 | 12:00 | 1.7            | ENE       |
| 24-Jul-2013 | 13:00 | 1.7            | NE        |
| 24-Jul-2013 | 14:00 | 1.8            | ENE       |
| 24-Jul-2013 | 15:00 | 1.7            | NNE       |
| 24-Jul-2013 | 16:00 | 1.8            | NE        |
| 24-Jul-2013 | 17:00 | 1.8            | ENE       |
| 24-Jul-2013 | 18:00 | 1.3            | SSW       |
| 24-Jul-2013 | 19:00 | 1.8            | ENE       |
| 24-Jul-2013 | 20:00 | 1.5            | ENE       |
| 24-Jul-2013 | 21:00 | 1.7            | ENE       |
| 24-Jul-2013 | 22:00 | 1.7            | NNE       |
| 24-Jul-2013 | 23:00 | 1.5            | NNE       |
| 25-Jul-2013 | 00:00 | 1.6            | NE        |
| 25-Jul-2013 | 01:00 | 1.3            | NNE       |
| 25-Jul-2013 | 02:00 | 1.5            | NNE       |
| 25-Jul-2013 | 03:00 | 1.1            | ENE       |
| 25-Jul-2013 | 04:00 | 1.2            | SE        |
| 25-Jul-2013 | 05:00 | 1.1            | WSW       |
| 25-Jul-2013 | 06:00 | 1.6            | SW        |
| 25-Jul-2013 | 07:00 | 1.3            | WNW       |
| 25-Jul-2013 | 08:00 | 1.3            | ESE       |
| 25-Jul-2013 | 09:00 | 1.4            | WNW       |
| 25-Jul-2013 | 10:00 | 1.4            | WNW       |
| 25-Jul-2013 | 11:00 | 1.9            | W         |
| 25-Jul-2013 | 12:00 | 2.3            | WNW       |
| 25-Jul-2013 | 13:00 | 2.3            | WNW       |
| 25-Jul-2013 | 14:00 | 2.1            | W         |
| 25-Jul-2013 | 15:00 | 1.9            | WSW       |
| 25-Jul-2013 | 16:00 | 1.9            | E         |
| 25-Jul-2013 | 17:00 | 2.2            | ESE       |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 25-Jul-2013 | 18:00 | 2.1            | ENE       |
| 25-Jul-2013 | 19:00 | 1.5            | SE        |
| 25-Jul-2013 | 20:00 | 1.4            | SE        |
| 25-Jul-2013 | 21:00 | 1.3            | SSE       |
| 25-Jul-2013 | 22:00 | 1.4            | SSE       |
| 25-Jul-2013 | 23:00 | 1.5            | ESE       |
| 26-Jul-2013 | 00:00 | 1.3            | SSE       |
| 26-Jul-2013 | 01:00 | 1.2            | ESE       |
| 26-Jul-2013 | 02:00 | 1              | E         |
| 26-Jul-2013 | 03:00 | 1              | WSW       |
| 26-Jul-2013 | 04:00 | 1.2            | N         |
| 26-Jul-2013 | 05:00 | 0.8            | N         |
| 26-Jul-2013 | 06:00 | 1              | ENE       |
| 26-Jul-2013 | 07:00 | 1.4            | SSE       |
| 26-Jul-2013 | 08:00 | 1.5            | SSE       |
| 26-Jul-2013 | 09:00 | 1.8            | SSE       |
| 26-Jul-2013 | 10:00 | 2              | SSE       |
| 26-Jul-2013 | 11:00 | 2.2            | ESE       |
| 26-Jul-2013 | 12:00 | 2.3            | NE        |
| 26-Jul-2013 | 13:00 | 2.4            | SSE       |
| 26-Jul-2013 | 14:00 | 2.2            | ESE       |
| 26-Jul-2013 | 15:00 | 2.4            | ESE       |
| 26-Jul-2013 | 16:00 | 2.5            | ESE       |
| 26-Jul-2013 | 17:00 | 2              | NE        |
| 26-Jul-2013 | 18:00 | 1.9            | ENE       |
| 26-Jul-2013 | 19:00 | 1.8            | SE        |
| 26-Jul-2013 | 20:00 | 1.3            | SW        |
| 26-Jul-2013 | 21:00 | 1.7            | W         |
| 26-Jul-2013 | 22:00 | 1.7            | WNW       |
| 26-Jul-2013 | 23:00 | 1.7            | ENE       |
| 27-Jul-2013 | 00:00 | 1.9            | ESE       |
| 27-Jul-2013 | 01:00 | 1.5            | N         |
| 27-Jul-2013 | 02:00 | 1.4            | N         |
| 27-Jul-2013 | 03:00 | 1.2            | E         |
| 27-Jul-2013 | 04:00 | 1              | SSE       |
| 27-Jul-2013 | 05:00 | 0.8            | ESE       |
| 27-Jul-2013 | 06:00 | 0.7            | ESE       |
| 27-Jul-2013 | 07:00 | 0.7            | ENE       |
| 27-Jul-2013 | 08:00 | 0.9            | ESE       |
| 27-Jul-2013 | 09:00 | 1.3            | ESE       |
| 27-Jul-2013 | 10:00 | 1.7            | E         |
| 27-Jul-2013 | 11:00 | 1.8            | NNE       |
| 27-Jul-2013 | 12:00 | 1.8            | NNE       |
| 27-Jul-2013 | 13:00 | 1.8            | SSE       |
| 27-Jul-2013 | 14:00 | 1.9            | SSE       |
| 27-Jul-2013 | 15:00 | 2.1            | NE        |
| 27-Jul-2013 | 16:00 | 2.2            | NW        |
| 27-Jul-2013 | 17:00 | 1.9            | NW        |
| 27-Jul-2013 | 18:00 | 1.6            | SW        |
| 27-Jul-2013 | 19:00 | 1.2            | S         |
| 27-Jul-2013 | 20:00 | 1.3            | WSW       |
| 27-Jul-2013 | 21:00 | 1.4            | S         |
| 27-Jul-2013 | 22:00 | 1.1            | WNW       |
| 27-Jul-2013 | 23:00 | 1.2            | NE        |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 28-Jul-2013 | 00:00 | 1.1            | SE        |
| 28-Jul-2013 | 01:00 | 1.2            | ESE       |
| 28-Jul-2013 | 02:00 | 1.1            | ENE       |
| 28-Jul-2013 | 03:00 | 1.1            | NE        |
| 28-Jul-2013 | 04:00 | 1.3            | SE        |
| 28-Jul-2013 | 05:00 | 1.4            | ENE       |
| 28-Jul-2013 | 06:00 | 1.2            | W         |
| 28-Jul-2013 | 07:00 | 1.4            | SW        |
| 28-Jul-2013 | 08:00 | 1.8            | SSW       |
| 28-Jul-2013 | 09:00 | 1.9            | ESE       |
| 28-Jul-2013 | 10:00 | 2.5            | SE        |
| 28-Jul-2013 | 11:00 | 2.3            | SW        |
| 28-Jul-2013 | 12:00 | 2              | SW        |
| 28-Jul-2013 | 13:00 | 2.1            | ESE       |
| 28-Jul-2013 | 14:00 | 2.2            | ESE       |
| 28-Jul-2013 | 15:00 | 1.9            | ESE       |
| 28-Jul-2013 | 16:00 | 1.8            | SE        |
| 28-Jul-2013 | 17:00 | 1.9            | SE        |
| 28-Jul-2013 | 18:00 | 1.6            | SE        |
| 28-Jul-2013 | 19:00 | 1.4            | SE        |
| 28-Jul-2013 | 20:00 | 1.4            | SSE       |
| 28-Jul-2013 | 21:00 | 1.5            | ESE       |
| 28-Jul-2013 | 22:00 | 1.4            | ESE       |
| 28-Jul-2013 | 23:00 | 1.4            | SSE       |
| 29-Jul-2013 | 00:00 | 1.5            | WSW       |
| 29-Jul-2013 | 01:00 | 1.6            | SW        |
| 29-Jul-2013 | 02:00 | 1.7            | NE        |
| 29-Jul-2013 | 03:00 | 1.6            | SE        |
| 29-Jul-2013 | 04:00 | 1.7            | SSE       |
| 29-Jul-2013 | 05:00 | 1.9            | ENE       |
| 29-Jul-2013 | 06:00 | 1.8            | SSE       |
| 29-Jul-2013 | 07:00 | 1.7            | SE        |
| 29-Jul-2013 | 08:00 | 1.9            | ESE       |
| 29-Jul-2013 | 09:00 | 2.1            | ESE       |
| 29-Jul-2013 | 10:00 | 2.2            | NE        |
| 29-Jul-2013 | 11:00 | 2.4            | ENE       |
| 29-Jul-2013 | 12:00 | 2.5            | ENE       |
| 29-Jul-2013 | 13:00 | 2.3            | NE        |
| 29-Jul-2013 | 14:00 | 2.3            | NE        |
| 29-Jul-2013 | 15:00 | 2.2            | NNE       |
| 29-Jul-2013 | 16:00 | 2.1            | NE        |
| 29-Jul-2013 | 17:00 | 1.8            | ENE       |
| 29-Jul-2013 | 18:00 | 1.8            | NE        |
| 29-Jul-2013 | 19:00 | 1.7            | ENE       |
| 29-Jul-2013 | 20:00 | 1.6            | SSE       |
| 29-Jul-2013 | 21:00 | 1.6            | ESE       |
| 29-Jul-2013 | 22:00 | 1.6            | ENE       |
| 29-Jul-2013 | 23:00 | 1.5            | NNE       |
| 30-Jul-2013 | 00:00 | 1.5            | ENE       |
| 30-Jul-2013 | 01:00 | 1.6            | SE        |
| 30-Jul-2013 | 02:00 | 1.5            | SSE       |
| 30-Jul-2013 | 03:00 | 1.1            | WNW       |
| 30-Jul-2013 | 04:00 | 1.3            | W         |
| 30-Jul-2013 | 05:00 | 1.3            | WSW       |

## Appendix J - Wind Data

| Date        | Time  | Wind Speed m/s | Direction |
|-------------|-------|----------------|-----------|
| 30-Jul-2013 | 06:00 | 1.2            | WSW       |
| 30-Jul-2013 | 07:00 | 1.3            | WNW       |
| 30-Jul-2013 | 08:00 | 1.4            | SE        |
| 30-Jul-2013 | 09:00 | 1.8            | SSE       |
| 30-Jul-2013 | 10:00 | 1.9            | ESE       |
| 30-Jul-2013 | 11:00 | 1.9            | WNW       |
| 30-Jul-2013 | 12:00 | 2.1            | ENE       |
| 30-Jul-2013 | 13:00 | 2.1            | W         |
| 30-Jul-2013 | 14:00 | 2.1            | WNW       |
| 30-Jul-2013 | 15:00 | 1.8            | N         |
| 30-Jul-2013 | 16:00 | 1.7            | W         |
| 30-Jul-2013 | 17:00 | 1.6            | W         |
| 30-Jul-2013 | 18:00 | 1.4            | W         |
| 30-Jul-2013 | 19:00 | 1.3            | WNW       |
| 30-Jul-2013 | 20:00 | 1.3            | SE        |
| 30-Jul-2013 | 21:00 | 1.1            | NNE       |
| 30-Jul-2013 | 22:00 | 1.1            | ESE       |
| 30-Jul-2013 | 23:00 | 1.1            | WNW       |
| 31-Jul-2013 | 00:00 | 1.4            | WSW       |
| 31-Jul-2013 | 01:00 | 1.2            | N         |
| 31-Jul-2013 | 02:00 | 1.1            | N         |
| 31-Jul-2013 | 03:00 | 1.1            | W         |
| 31-Jul-2013 | 04:00 | 1.1            | ENE       |
| 31-Jul-2013 | 05:00 | 1.2            | WNW       |
| 31-Jul-2013 | 06:00 | 1.2            | NNW       |
| 31-Jul-2013 | 07:00 | 1              | NNW       |
| 31-Jul-2013 | 08:00 | 1              | SSE       |
| 31-Jul-2013 | 09:00 | 1.3            | NNE       |
| 31-Jul-2013 | 10:00 | 1.4            | NE        |
| 31-Jul-2013 | 11:00 | 1.4            | ESE       |
| 31-Jul-2013 | 12:00 | 1.4            | ESE       |
| 31-Jul-2013 | 13:00 | 1.5            | SSW       |
| 31-Jul-2013 | 14:00 | 1.5            | WNW       |
| 31-Jul-2013 | 15:00 | 1.5            | ESE       |
| 31-Jul-2013 | 16:00 | 1.5            | NE        |
| 31-Jul-2013 | 17:00 | 1.5            | ESE       |
| 31-Jul-2013 | 18:00 | 1.7            | NNE       |
| 31-Jul-2013 | 19:00 | 1.6            | NE        |
| 31-Jul-2013 | 20:00 | 1.6            | ESE       |
| 31-Jul-2013 | 21:00 | 1.7            | ESE       |
| 31-Jul-2013 | 22:00 | 1.8            | ENE       |
| 31-Jul-2013 | 23:00 | 1.7            | ENE       |

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**APPENDIX K**  
**EVENT ACTION PLANS**

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## Event / Action Plan for Air Quality

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

## LIMIT LEVEL

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



|  |  |           |  |         |
|--|--|-----------|--|---------|
|  | <p>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> | measures. | <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> | abated. |
|--|--|-----------|--|---------|

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"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Notify IEC and Contractor;</li> <li>3. Report the results of investigation to the IEC, SO and Contractor;</li> <li>4. Discuss with the Contractor and formulate remedial measures;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol> | <ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the SO accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>                                    | <ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem;</li> <li>4. Ensure remedial measures are properly implemented</li> </ol> | <ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC;</li> <li>2. Implement noise mitigation proposals.</li> </ol>   |
| Limit Level  | <ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC, SO, EPD and Contractor;</li> <li>3. Repeat measurements to confirm findings;</li> <li>4. Increase monitoring frequency;</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>6. Inform IEC, SO and EPD</li> </ol>  | <ol style="list-style-type: none"> <li>1. Discuss amongst SO, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly;</li> <li>3. Supervise the implementation of</li> </ol> | <ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Require Contractor to propose remedial measures for the analysed noise</li> </ol>  | <ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> </ol> |

| EVENT | ACTION   |                    |   |  |
|-------|--|--------------------|---|--|
|       | ET   | IEC                | SO  | CONTRACTOR   |
|       | <p>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> | remedial measures. | <p>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>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, IEC and SO.</p>  |

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

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**APPENDIX L**  
**SUMMARY OF EXCEEDANCE**

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**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**

**(NIL in the reporting period)**

**(D) Exceedance Report for Water Quality**

| <b>Environmental<br/>Monitoring</b> | <b>Parameter</b>                            | <b>No. of Exceedance</b> |                        | <b>No. of Exceedance<br/>related to the<br/>Construction<br/>Activities of this<br/>Contract</b> |                        |
|-------------------------------------|---|--------------------------|------------------------|--|------------------------|
|                                     |   | <b>Action<br/>Level</b>  | <b>Limit<br/>Level</b> | <b>Action<br/>Level</b>  | <b>Limit<br/>Level</b> |
| Water Quality                       | Dissolved Oxygen (DO)<br>(Surface & Middle) | 0                        | 0                      | 0  | 0                      |
|                                     | Dissolved Oxygen (DO)<br>(Bottom)           | 0                        | 0                      | 0  | 0                      |
|                                     | Turbidity                                   | 0                        | 0                      | 0  | 0                      |
|                                     | Suspended Solids (SS)                       | 3                        | 1                      | 0  | 0                      |

**(E) Exceedance Report for Underwater Construction Noise**

**(NIL in the reporting period)**



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**APPENDIX M**  
**SITE AUDIT SUMMARY**

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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 | 130702                |
| Date                       | 2 July 2013 (Tuesday) |
| Time                       | 9:30 – 11:15          |




| Ref. No.   | Non-Compliance   | Related Item No. |
|------------|--|------------------|
| -          | None identified  | -                |
| Ref. No.   | Remarks/Observations   | Related Item No. |
|            | <b>A. Water Quality</b>  |                  |
| 130702-R01 | • To review the sedimentation process of the surface runoff at Portion C.  | B3               |
|            | <b>B. Ecology</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>C. Air Quality</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>D. Noise</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>E. Waste / Chemical Management</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>F. Permits/Licences</b>   |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>G. Others</b>   |                  |
|            | • Follow-up on previous site audit session (Ref. No. 130628), all environmental deficiencies were improved/rectified by contractor during the site inspection. |                  |

|             |                    |   |             |
|-------------|--------------------|---|-------------|
|             | Name               | Signature   | Date        |
| Recorded by | Ivy Tam            |  | 2 July 2013 |
| Checked by  | Dr. Priscilla Choy |  | 2 July 2013 |

**Environmental Observations Identified during the Environmental Site Inspection**  
**(2 July 2013)**

|   |  |
|---|--|
|  | <p><b>Ref No:</b> 130702-R01</p> <p><b>Impact:</b><br/>Water Quality (B3)</p> <p><b>Details:</b><br/>To review the sedimentation process of the surface runoff at Portion C.</p> |
|---|--|

**Rectification Actions taken by the Contractor for Environmental Deficiencies  
Identified during Previous Audit Session**

|   |   |
|---|---|
|    | <p><b>Ref No:</b> 130628-R01</p> <p><b>Impact:</b><br/>Air Quality (D19)</p> <p><b>Details:</b><br/>To check the air compressor at Pier 73 to avoid emitting dark smoke.</p> <p><b>Follow Up:-</b><br/>No dark smoke was observed from the air compressor.</p>  |
|   | <p><b>Ref No:</b> 130628-R02</p> <p><b>Impact:</b><br/>Water Quality (B22)</p> <p><b>Details:</b><br/>To seal the gap at the platform at Pier 74 to avoid leakage of muddy water to the sea.</p> <p><b>Follow Up:-</b><br/>No leakage of muddy water to the sea was observed.</p>                                       |
|  | <p><b>Ref No:</b> 130628-R03</p> <p><b>Impact:</b><br/>Noise (E7)</p> <p><b>Details:</b><br/>To implement acoustic decoupling measures for the air compressor at Pier 74.</p> <p><b>Follow Up:-</b><br/>Acoustic decoupling measures were observed to be implemented for the air compressor which was in operation.</p> |

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 | 130709                |
| Date                       | 9 July 2013 (Tuesday) |
| Time                       | 9:30 – 11:20          |



| Ref. No.   | Non-Compliance   | Related Item No. |
|------------|--|------------------|
| -          | None identified  | -                |
| Ref. No.   | Remarks/Observations   | Related Item No. |
|            | <b>A. Water Quality</b>  |                  |
| 130709-R01 | • To clear the water at wheel washing bay at Portion C.  | B10iv.           |
| 130709-R02 | • To clear the sand and silt settled at the drain at Portion C.  | B4               |
|            |  |                  |
|            | <b>B. Ecology</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            |  |                  |
|            | <b>C. Air Quality</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            |  |                  |
|            | <b>D. Noise</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            |  |                  |
|            | <b>E. Waste / Chemical Management</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            |  |                  |
|            | <b>F. Permits/Licences</b>   |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            |  |                  |
|            | <b>G. Others</b>   |                  |
|            | • Follow-up on previous site audit session (Ref. No. 130702), all environmental deficiencies were improved/rectified by contractor during the site inspection. |                  |

|             |                    |   |             |
|-------------|--------------------|---|-------------|
|             | Name               | Signature   | Date        |
| Recorded by | Ivy Tam            |  | 9 July 2013 |
| Checked by  | Dr. Priscilla Choy |  | 9 July 2013 |

*Hong Kong-Zhuhai-Macao Bridge*


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

**Environmental Observations Identified during the Environmental Site Inspection**  
**(9 July 2013)**

|  |  |
|--|--|
|   | <p><b>Ref No:</b> 130709-R01</p> <p><b>Impact:</b><br/>Water Quality (B10iv.)</p> <p><b>Details:</b><br/>To clear the water at wheel washing bay at Portion C.</p>     |
|  | <p><b>Ref No:</b> 130709-R02</p> <p><b>Impact:</b><br/>Water Quality (B4)</p> <p><b>Details:</b><br/>To clear the sand and silt settled at the drain at Portion C.</p> |



**Rectification Actions taken by the Contractor for Environmental Deficiencies  
Identified during Previous Audit Session**

|   |   |
|---|---|
|  | <p><b>Ref No:</b> 130702-R01</p> <p><b>Impact:</b><br/>Water Quality (B3)</p> <p><b>Details:</b><br/>To review the sedimentation process of the surface runoff at Portion C.</p> <p><b>Follow Up:-</b><br/>Sedimentation facility was observed on site for settling runoff prior to disposal.</p> |
|---|---|

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 | 130716                 |
| Date                       | 16 July 2013 (Tuesday) |
| Time                       | 9:30 – 11:30           |

| Ref. No.   | Non-Compliance   | Related Item No. |
|------------|--|------------------|
| -          | None identified  | -                |
| Ref. No.   | Remarks/Observations   | Related Item No. |
|            | <b>A. Water Quality</b>  |                  |
| 130716-R03 | • To clear the sediment at the deck of flap-top work barge at P50.   | B20              |
|            | <b>B. Ecology</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>C. Air Quality</b>  |                  |
| 130716-R02 | • To check the air compressor at P50 to avoid emitting grey smoke.   | D19              |
|            | <b>D. Noise</b>  |                  |
| 130716-R01 | • To close the door of air compressor which is in operation at P50.  | E9               |
|            | <b>E. Waste / Chemical Management</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>F. Permits/Licences</b>   |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>G. Others</b>   |                  |
|            | • Follow-up on previous site audit session (Ref. No. 130709), all environmental deficiencies were improved/rectified by contractor during the site inspection. |                  |

|             | Name               | Signature   | Date         |
|-------------|--------------------|---|--------------|
| Recorded by | Ivy Tam            |  | 16 July 2013 |
| Checked by  | Dr. Priscilla Choy |  | 16 July 2013 |





*Hong Kong-Zhuhai-Macao Bridge*

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

**Environmental Observations Identified during the Environmental Site Inspection**  
**(16 July 2013)**

|   |  |
|---|--|
|    | <p><b>Ref No:</b> 130716-R01</p> <p><b>Impact:</b><br/>Noise (E9)</p> <p><b>Details:</b><br/>To close the door of air compressor which is in operation at P50.</p>         |
|   | <p><b>Ref No:</b> 130716-R02</p> <p><b>Impact:</b><br/>Air Quality (D19)</p> <p><b>Details:</b><br/>To check the air compressor at P50 to avoid emitting grey smoke.</p>   |
|  | <p><b>Ref No:</b> 130716-R03</p> <p><b>Impact:</b><br/>Water Quality (B20)</p> <p><b>Details:</b><br/>To clear the sediment at the deck of flap-top work barge at P50.</p> |

**Rectification Actions taken by the Contractor for Environmental Deficiencies  
Identified during Previous Audit Session**

|  |  |
|--|--|
|   | <p><b>Ref No:</b> 130709-R01</p> <p><b>Impact:</b><br/>Water Quality (B10iv.)</p> <p><b>Details:</b><br/>To clear the water at wheel washing bay at Portion C.</p> <p><b>Follow Up:-</b><br/>The water inside the wheel washing bay was clear.</p>                     |
|  | <p><b>Ref No:</b> 130709-R02</p> <p><b>Impact:</b><br/>Water Quality (B4)</p> <p><b>Details:</b><br/>To clear the sand and silt settled at the drain at Portion C.</p> <p><b>Follow Up:-</b><br/>The sand and silt settled at the drain at Portion C were cleared.</p> |

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 | 130723                 |
| Date                       | 23 July 2013 (Tuesday) |
| Time                       | 9:30 – 11:45           |

| Ref. No.   | Non-Compliance   | Related Item No. |
|------------|--|------------------|
| -          | None identified  | -                |
| Ref. No.   | Remarks/Observations   | Related Item No. |
|            | <b>A. Water Quality</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>B. Ecology</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>C. Air Quality</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>D. Noise</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>E. Waste / Chemical Management</b>  |                  |
| 130723-R01 | • To seal the hole of the drip tray near the office containers at Portion C.   | F9               |
| 130723-R02 | • To remove the construction materials which were placed at near the tree at Portion C.  | F4ii.            |
| 130723-R03 | • Clear the deposit silt and sediment at the site exit and drainage channel at Portion C.  | F6               |
| 130723-R04 | • Clear the oil stain at near the Pontoon at WA4.  | F8               |
|            | <b>F. Permits/Licences</b>   |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>G. Others</b>   |                  |
|            | • Follow-up on previous site audit session (Ref. No. 130716), all environmental deficiencies were improved/rectified by contractor during the site inspection. |                  |

|             |                    |  |                      |
|-------------|--------------------|--|----------------------|
| Recorded by | Name<br>Ivy Tam    | Signature<br> | Date<br>23 July 2013 |
| Checked by  | Dr. Priscilla Choy | Signature<br> | Date<br>23 July 2013 |

*Hong Kong-Zhuhai-Macao Bridge*

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

**Environmental Observations Identified during the Environmental Site Inspection**  
**(23 July 2013)**

|  |   |
|--|---|
|   | <p><b>Ref No:</b> 130723-R01</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F9)</p> <p><b>Details:</b><br/>To seal the hole of the drip tray near the office containers at Portion C.</p>               |
|  | <p><b>Ref No:</b> 130723-R02</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F4ii.)</p> <p><b>Details:</b><br/>To remove the construction materials which were placed at near the tree at Portion C.</p> |



*Hong Kong-Zhuhai-Macao Bridge*

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

|   |  |
|---|--|
|    | <p><b>Ref No:</b> 130723-R03</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F6)</p> <p><b>Details:</b><br/>Clear the deposit silt and sediment at the site exit and drainage channel at Portion C.</p> |
|   | <p><b>Ref No:</b> 130723-R04</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F8)</p> <p><b>Details:</b><br/>Clear the oil stain at near the Pontoon at WA4.</p>   |
|  |  |

**Rectification Actions taken by the Contractor for Environmental Deficiencies  
Identified during Previous Audit Session**

|   |  |
|---|--|
|    | <p><b>Ref No:</b> 130716-R01</p> <p><b>Impact:</b><br/>Noise (E9)</p> <p><b>Details:</b><br/>To close the door of air compressor which is in operation at P50.</p> <p><b>Follow Up:-</b><br/>The door of the air compressor was closed.</p>                  |
|   | <p><b>Ref No:</b> 130716-R02</p> <p><b>Impact:</b><br/>Air Quality (D19)</p> <p><b>Details:</b><br/>To check the air compressor at P50 to avoid emitting grey smoke.</p> <p><b>Follow Up:-</b><br/>No dark/grey smoke was emitted from air compressor.</p>   |
|  | <p><b>Ref No:</b> 130716-R03</p> <p><b>Impact:</b><br/>Water Quality (B20)</p> <p><b>Details:</b><br/>To clear the sediment at the deck of flap-top work barge at P50.</p> <p><b>Follow Up:-</b><br/>The deck of flap-top work barge was observed clear.</p> |

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge


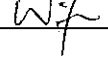
Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

|                            |                        |
|----------------------------|------------------------|
| Checklist Reference Number | 130730                 |
| Date                       | 30 July 2013 (Tuesday) |
| Time                       | 13:30 – 15:00          |

| Ref. No.   | Non-Compliance   | Related Item No. |
|------------|--|------------------|
| -          | None identified  | -                |
| Ref. No.   | Remarks/Observations   | Related Item No. |
|            | <b>A. Water Quality</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>B. Ecology</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>C. Air Quality</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>D. Noise</b>  |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>E. Waste / Chemical Management</b>  |                  |
| 130730-R01 | • To remove the construction materials which were placed at near the tree at Portion C.  | F4ii.            |
| 130730-R02 | • Clear the deposit silt and sediment at the drainage channel at Portion C.  | F6               |
| 130730-R03 | • To seal the hole of the drip tray near the office containers at Portion C.   | F9               |
|            | <b>F. Permits/Licences</b>   |                  |
|            | • No environmental deficiency was identified during site inspection.   |                  |
|            | <b>G. Others</b>   |                  |
|            | • Follow-up on previous site audit session (Ref. No. 130723), follow up action is needed for the item 130723-R01 and 130723-R02 and renamed as 130730-R03 and 130730-R01 respectively. |                  |




|             | Name               | Signature   | Date         |
|-------------|--------------------|---|--------------|
| Recorded by | Ivy Tam            |  | 30 July 2013 |
| Checked by  | Dr. Priscilla Choy |  | 30 July 2013 |



*Hong Kong-Zhuhai-Macao Bridge*

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

**Environmental Observations Identified during the Environmental Site Inspection**  
**(30 July 2013)**

|   |   |
|---|---|
|    | <p><b>Ref No:</b> 130730-R01</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F4ii.)</p> <p><b>Details:</b><br/>To remove the construction materials which were placed at near the tree at Portion C.</p> |
|   | <p><b>Ref No:</b> 130730-R02</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F6)</p> <p><b>Details:</b><br/>Clear the deposit silt and sediment at the drainage channel at Portion C.</p>                |
|  | <p><b>Ref No:</b> 130730-R03</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F9)</p> <p><b>Details:</b><br/>To seal the hole of the drip tray near the office containers at Portion C.</p>               |



**Rectification Actions taken by the Contractor for Environmental Deficiencies  
Identified during Previous Audit Session**

|  |  |
|--|--|
|   | <p><b>Ref No:</b> 130723-R03</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F6)</p> <p><b>Details:</b><br/>Clear the deposit silt and sediment at the site exit and drainage channel at Portion C.</p> <p><b>Follow Up:</b><br/>The silt and sediment at the site exit was cleared by the workers.</p> |
|  | <p><b>Ref No:</b> 130723-R04</p> <p><b>Impact:</b><br/>Waste / Chemical Management (F8)</p> <p><b>Details:</b><br/>Clear the oil stain at near the Pontoon at WA4.</p> <p><b>Follow Up:</b><br/>The oil stain was cleared.</p>   |

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

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| 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                 |
|--------------------|--------------|---|--|--------------------------------|--------------------------|---------------------------------|---------------------------------------|
| <b>Air Quality</b> |              |   |  |                                |                          |                                 |                                       |
| 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"> <li>• 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;</li> <li>• Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;</li> <li>• A stockpile of dusty material should not extend beyond the pedestrian barriers, fencing or traffic cones.</li> <li>• 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;</li> <li>• 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;</li> </ul> | 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              | ^<br><br>^<br><br>^<br><br>^<br><br>^ |
| S5.5.6.2           | A2           | <ul style="list-style-type: none"> <li>• When there are open excavation and reinstatement works, hoarding</li> </ul>  | Good construction site   | Contractor                     | All construction         | Construction                    | ^                                     |

| EIA Ref. | EM&A<br>Log Ref | Recommended Mitigation Measures   | Objectives of the<br>recommended Measures &<br>Main Concerns to address  | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>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"> <li>• 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;</li> <li>• 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;</li> <li>• 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;</li> <li>• 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;</li> <li>• Any skip hoist for material transport should be totally enclosed by impervious sheeting;</li> <li>• 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;</li> </ul> | <p>practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.</p> |                                      | sites                       | stage                                 | <p>^</p> <p>^</p> <p>^</p> <p>N/A</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 |
|----------|--------------|---|---|--------------------------------|---|---------------------------------|-----------------------|
| S5.5.6.2 | A2           | <ul style="list-style-type: none"> <li>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;</li> <li>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</li> <li>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.</li> </ul> | 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<br><br>^<br><br>^ |
| 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"> <li>Loading, unloading, handling, transfer or storage of any dusty</li> </ul>   | Monitor the 24 hr and 1hr TSP levels at the representative dust   | Contractor                     | Selected representative dust                    | Construction stage              | N/A                   |

| EIA Ref.                              | EM&A<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address                             | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>Status  |
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|                                       |                 | <p>materials should be carried out in totally enclosed system;</p> <ul style="list-style-type: none"> <li>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;</li> <li>Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system;</li> <li>The materials which may generate airborne dusty emissions should be wetted by water spray system;</li> <li>All receiving hoppers should be enclosed on three sides up to 3m above unloading point;</li> <li>All conveyor transfer points should be totally enclosed;</li> <li>All access and route roads within the premises should be paved and wetted; and</li> <li>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.</li> </ul> | monitoring stations to ensure compliance with relevant criteria throughout the construction period. |                                      | 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"> <li>All road surface within the barging facilities will be paved;</li> <li>Dust enclosures will be provided for the loading ramp;</li> <li>Vehicles will be required to pass through designated wheels wash facilities; and</li> <li>Continuous water spray at the loading points.</li> </ul>   | 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>                       |
| <b>Construction Noise (Air borne)</b> |                 |  |   |                                      |                             |                                       |   |
| 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<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address                   | Who to<br>implement the<br>measures? | Location of the<br>measures   | When to<br>Implement the<br>measures? | Implementation<br>Status                              |
|----------|-----------------|--|---|--------------------------------------|---|---------------------------------------|---|
|          |                 | <p>following:</p> <ul style="list-style-type: none"> <li>only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;</li> <li>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;</li> <li>plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;</li> <li>silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works;</li> <li>mobile plant should be sited as far away from NSRs as possible and practicable;</li> <li>material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.</li> </ul> | noise by means of good site practices   |                                      | sites   | stage                                 | <p>*</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> |
| 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 <sup>2</sup> ), 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<br>Log Ref | Recommended Mitigation Measures   | Objectives of the<br>recommended Measures &<br>Main Concerns to address  | Who to<br>implement the<br>measures? | Location of the<br>measures  | When to<br>Implement the<br>measures? | Implementation<br>Status              |
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|  |                 | standards.  | plant items  |                                      | listed in Appendix<br>6D of the EIA<br>report at all<br>construction sites | stage                                 |                                       |
| S6.4.14                                      | N5              | 5) Sequencing operation of construction plants where practicable.   | Operate sequentially within<br>the same work site to reduce<br>the construction airborne<br>noise  | Contractor                           | All construction<br>sites where<br>practicable                             | Construction<br>stage                 | ^                                     |
|  | N6              | 6) Implement a noise monitoring under EM&A programme.   | Monitor the construction<br>noise levels at the selected<br>representative locations   | Contractor                           | Selected<br>representative<br>noise monitoring<br>station                  | Construction<br>stage                 | ^                                     |
| <b>Waste Management (Construction Waste)</b> |                 |   |  |                                      |  |                                       |                                       |
| S8.3.8                                       | WM1             | <u>Construction and Demolition Material</u><br>The following mitigation measures should be implemented in handling the waste: <ul style="list-style-type: none"> <li>Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement;</li> <li>Carry out on-site sorting;</li> <li>Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate;</li> <li>Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible;</li> <li>Implement a trip-ticket system for each works contract to ensure that</li> </ul> | Good site practice to<br>minimize the waste<br>generation and recycle the<br>C&D materials as far as<br>practicable so as to reduce<br>the amount for final disposal | Contractor                           | All construction<br>sites  | Construction<br>stage                 | ^<br><br>^<br><br>^<br><br>^<br><br>^ |



| EIA Ref.            | EM&A<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address  | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>Status |
|---------------------|-----------------|--|--|--------------------------------------|-----------------------------|---------------------------------------|--------------------------|
|                     |                 | <p>the disposal of C&amp;D materials are properly documented and verified;<br/>and</p> <ul style="list-style-type: none"> <li>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&amp;D materials and to minimize their generation during the course of construction.</li> <li>In addition, disposal of the C&amp;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</li> </ul>   |  |                                      |                             |                                       | <p>^</p> <p>^</p>        |
| S8.3.9 -<br>S8.3.11 | WM2             | <p><u>C&amp;D Waste</u></p> <ul style="list-style-type: none"> <li>Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&amp;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.</li> <li>The Contractor should recycle as much of the C&amp;D materials as possible on-site. Public fill and C&amp;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</li> </ul> | <p>Good site practice to minimize the waste generation and recycle the C&amp;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<br>Log Ref | Recommended Mitigation Measures   | Objectives of the<br>recommended Measures &<br>Main Concerns to address      | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>Status            |
|---------------------|-----------------|---|--|--------------------------------------|-----------------------------|---------------------------------------|-------------------------------------|
|                     |                 | areas of the sites should be considered for such segregation and storage.   |  |                                      |                             |                                       |                                     |
| S8.2.12-<br>S8.3.15 | WM3             | <p><u>Chemical Waste</u></p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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</li> </ul> | 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                                     |
|---|--------------|--|---|--------------------------------|-------------------------------------|---------------------------------|---|
|   |              | <p>plastic bottles etc., should be provided.</p> <ul style="list-style-type: none"> <li>Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.</li> </ul>   |   |                                |                                     |                                 | ^   |
| <b>Water Quality (Construction Phase)</b> |              |  |   |                                |                                     |                                 |   |
| S9.11.1 – S9.11.1.2                       | W1           | <ul style="list-style-type: none"> <li>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&amp;A Manual.</li> <li>Export for dredged spoils from NWWCZ avoiding exerting high demand on the disposal facilities in the NWWCZ and, hence, minimise potential cumulative impacts;</li> <li>For the marine viaducts of HKLR, the bored piling will be undertaken within a metal casing;</li> <li>where public fill is proposed for filling below -2.5mPD, the fine content in the public fill will be controlled to 25%;</li> <li>single layer silt curtains will be applied around all works;</li> <li>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,</li> </ul> | To control construction water quality                             | Contractor                     | During seawall dredging and filling | Construction stage              | <p>^</p> <p>^</p> <p>^</p> <p>N/A</p> <p>^</p> <p>N/A</p> |

| EIA Ref. | EM&A<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>Status   |
|----------|-----------------|--|---|--------------------------------------|-----------------------------|---------------------------------------|--|
|          |                 | <p>taking account of the Contractor's proposed actual locations of his initial period of dredging work.</p> <ul style="list-style-type: none"> <li>silt curtain shall be fully maintained throughout the works.</li> </ul> <p>In addition, dredging operations should be undertaken in such a manner as to minimise resuspension of sediments. Standard good dredging practice measures should, therefore, be implemented including the following requirements which should be written into the dredging contract.</p> <ul style="list-style-type: none"> <li>trailer suction hopper dredgers shall not allow mud to overflow;</li> <li>use of Lean Material Overboard (LMOB) systems shall be prohibited;</li> <li>mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted;</li> <li>barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material;</li> <li>any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes;</li> <li>loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation;</li> <li>excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved;</li> <li>adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;</li> </ul> |   |                                      |                             |                                       | <p>^</p> <p>N/A</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>*</p> <p>^</p> |

| EIA Ref.  | EM&A<br>Log Ref | Recommended Mitigation Measures   | Objectives of the<br>recommended Measures &<br>Main Concerns to address | Who to<br>implement the<br>measures? | Location of the<br>measures         | When to<br>Implement the<br>measures? | Implementation<br>Status              |
|-----------|-----------------|---|---|--------------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|
|           |                 | <ul style="list-style-type: none"> <li>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</li> <li>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.</li> </ul>  |   |                                      |                                     |                                       | <p>^</p> <p>^</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"> <li>wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters;</li> <li>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;</li> <li>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;</li> <li>silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including</li> </ul> | To control construction water quality                                   | Contractor                           | During seawall dredging and filling | Construction stage                    | <p>^</p> <p>N/A</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  |
|----------|--------------|---|---|--------------------------------|--------------------------|---------------------------------|--|
|          |              | <p>specifically at the onset of and after each rainstorm;</p> <ul style="list-style-type: none"> <li>temporary access roads should be surfaced with crushed stone or gravel;</li> <li>rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities;</li> <li>measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system;</li> <li>open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms;</li> <li>manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers;</li> <li>discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system;</li> <li>all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit;</li> <li>wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain;</li> <li>the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel;</li> </ul> |   |                                |                          |                                 | <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>*</p> <p>^</p> <p>^</p> |

| EIA Ref.                            | EM&A<br>Log Ref | Recommended Mitigation Measures   | Objectives of the<br>recommended Measures &<br>Main Concerns to address | Who to<br>implement the<br>measures? | Location of the<br>measures             | When to<br>Implement the<br>measures? | Implementation<br>Status                              |
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|                                     |                 | <ul style="list-style-type: none"> <li>wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects;</li> <li>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;</li> <li>the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately;</li> <li>waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance;</li> <li>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</li> <li>surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.</li> </ul> |   |                                      |   |                                       | <p>^</p> <p>^</p> <p>*</p> <p>^</p> <p>^</p> <p>^</p> |
| S9.14                               | W3              | Implement a water quality monitoring programme  | Control water quality   | Contractor                           | At identified<br>monitoring<br>location | During<br>construction period         | ^   |
| <b>Ecology (Construction Phase)</b> |                 |   |   |                                      |   |                                       |   |
| S10.7                               | E1              | <ul style="list-style-type: none"> <li>Good site practices to avoid runoff entering woodland habitats in Scenic Hill</li> </ul>   | Avoid potential disturbance<br>on habitat of Romer's Tree               | Designer;<br>Contractor              | Scenic Hill                             | During<br>construction                | ^   |



| EIA Ref. | EM&A<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures?       | Implementation<br>Status        |
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|          |                 | <ul style="list-style-type: none"> <li>Reinstate works areas in Scenic Hill</li> <li>Avoid stream modification in Scenic Hill</li> </ul>   | Frog in Scenic Hill   |                                      |                             |   | N/A<br>^                        |
| S10.7    | E2              | <ul style="list-style-type: none"> <li>Use closed grab in dredging works.</li> <li>Install silt curtain during the construction.</li> <li>Limit dredging and works fronts.</li> <li>Good site practices</li> <li>Strict enforcement of no marine dumping.</li> <li>Site runoff control</li> <li>Spill response plan</li> </ul> | Minimise marine water<br>quality impacts                                | Contractor                           | Seawall,                    | During<br>construction                      | ^<br>^<br>^<br>^<br>^<br>^<br>^ |
| S10.7    | E3              | <ul style="list-style-type: none"> <li>Reprovision of replacement Artificial Reefs (of the same volume as the existing ARs inside Marine Exclusion Zone)</li> </ul>  | Mitigate water quality<br>impacts on the existing ARs                   | Project<br>proponent                 | To be determined            | Construction<br>phase or operation<br>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<br>Land-based works areas                    | Contractor                           | Land-based works<br>areas   | During<br>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<br>terrestrial fauna and habitats                | Contractor                           | Land-based works<br>areas   | During<br>construction                      | ^                               |
| S10.7    | E6              | <ul style="list-style-type: none"> <li>Dolphin Exclusion Zone;</li> <li>Dolphin watching plan</li> </ul>   | Minimize temporary marine<br>habitat loss impact to<br>dolphins         | Contractor                           | Marine works                | During marine<br>works                      | ^<br>^                          |
| S10.7    | E7              | <ul style="list-style-type: none"> <li>Decouple compressors and other equipment on working vessels</li> <li>Avoidance of percussive piling</li> <li>Marine underwater noise monitoring</li> </ul>  | Minimise marine noise<br>impacts on dolphins                            | Contractor                           | Marine works                | During marine<br>works                      | ^<br>^<br>^                     |

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

| EIA Ref.  | EM&A<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>Status  |
|-----------|-----------------|--|---|--------------------------------------|-----------------------------|---------------------------------------|---|
|           |                 | <ul style="list-style-type: none"> <li>G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic.</li> <li>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.</li> <li>G5. Vegetation reinstatement and upgrading to disturbed areas.</li> <li>G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed.</li> <li>G7. Provide planting area around peripheral of and within HKLR for tree screening buffer effect.</li> <li>G8. Plant salt tolerant native tree and shrubs etc along the planter strip at affected seawall.</li> <li>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).</li> </ul> |   |                                      |                             |                                       | <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             | <u>Mitigate Visual Impacts</u> <ul style="list-style-type: none"> <li>V1.Minimize time for construction activities during construction period.</li> <li>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.</li> </ul>   |   |                                      |                             |                                       | <p>^</p> <p>^</p>   |

| EIA Ref.         | EM&A<br>Log Ref | Recommended Mitigation Measures  | Objectives of the<br>recommended Measures &<br>Main Concerns to address | Who to<br>implement the<br>measures? | Location of the<br>measures | When to<br>Implement the<br>measures? | Implementation<br>Status |
|------------------|-----------------|--|---|--------------------------------------|-----------------------------|---------------------------------------|--------------------------|
| <b>EM&amp;A</b>  |                 |  |   |                                      |                             |                                       |                          |
| S15.2.2          | EM1             | An Independent Environmental Checker needs to be employed as per the EM&A Manual.  | Control EM&A Performance  | Project<br>Proponent                 | All construction<br>sites   | Construction<br>stage                 | ^                        |
| S15.5 -<br>S15.6 | EM2             | 1) An Environmental Team needs to be employed as per the EM&A Manual.<br><br>2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures.<br><br>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<br>monitoring & auditing                          | Contractor                           | All construction<br>sites   | Construction<br>stage                 | ^<br><br>^<br><br>^      |

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)

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**APPENDIX O**  
**WASTE GENERATION IN THE**  
**REPORTING MONTH**

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

## 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 <sup>6</sup> | Reused in the Contract <sup>8,9</sup> | Reused in other Projects <sup>5,8,9</sup> | Disposed as Public Fill <sup>7</sup> | Imported Fill <sup>6,7,8,9</sup> | Metals  | Paper/ cardboard packaging | Plastics <sup>3</sup> | Chemical Waste | Others, e.g. general refuse <sup>8,9</sup> |
|           | ( in '000 m <sup>3</sup> )                                 | ( in '000 m <sup>3</sup> )                       | ( in '000 m <sup>3</sup> )            | ( in '000 m <sup>3</sup> )                | ( in '000 m <sup>3</sup> )           | ( in '000 m <sup>3</sup> )       | ( in '000 m <sup>3</sup> )                        | ( in '000 kg )             | ( in '000 kg )        | ( in '000 kg ) | ( in '000 m <sup>3</sup> )                 |
| 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       | 5.335  | 0.000  | 0.000                                 | 0.000                                     | 5.335                                | 0.000                            | 0.000   | 0.426                      | 0.000                 | 0.000          | 0.111                                      |
| Sub-Total | 6.771  | 0.000  | 0.000                                 | 0.000                                     | 6.771                                | 0.000                            | 0.000   | 1.676                      | 0.000                 | 0.000          | 0.637                                      |
| Jul       | 12.438   | 0.000  | 0.280                                 | 0.000                                     | 5.896                                | 6.262                            | 0.000   | 0.447                      | 0.000                 | 0.000          | 0.117                                      |
| Aug       |  |  |                                       |   |                                      |                                  |   |                            |                       |                |  |
| Sep       |  |  |                                       |   |                                      |                                  |   |                            |                       |                |  |
| Oct       |  |  |                                       |   |                                      |                                  |   |                            |                       |                |  |
| Nov       |  |  |                                       |   |                                      |                                  |   |                            |                       |                |  |
| Dec       |  |  |                                       |   |                                      |                                  |   |                            |                       |                |  |
| Total     | 19.209   | 0.000  | 0.280                                 | 0.000                                     | 12.667                               | 6.262                            | 0.000   | 2.123                      | 0.000                 | 0.000          | 0.754                                      |



Forecast of Total Quantities of C&D Materials to be Generated from the Contract<sup>10</sup>

| Total Quantity Generated   | Hard Rock and Large Broken Concrete <sup>6</sup> | Reused in the Contract <sup>8,9</sup> | Reused in other Projects <sup>5,8,9</sup> | Disposed as Public Fill <sup>7</sup> | Imported Fill <sup>6,7,8,9</sup> | Metals                     | Paper/ cardboard packaging | Plastics <sup>3</sup> | Chemical Waste | Others, e.g. general refuse <sup>8,9</sup> |
|----------------------------|--|---------------------------------------|---|--------------------------------------|----------------------------------|----------------------------|----------------------------|-----------------------|----------------|--|
| ( in '000 m <sup>3</sup> ) | ( in '000 m <sup>3</sup> )                       | ( in '000 m <sup>3</sup> )            | ( in '000 m <sup>3</sup> )                | ( in '000 m <sup>3</sup> )           | ( in '000 m <sup>3</sup> )       | ( in '000 m <sup>3</sup> ) | ( in '000 kg )             | ( in '000 kg )        | ( in '000 kg ) | ( in '000 m <sup>3</sup> )                 |
| 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 m<sup>3</sup>. (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/m<sup>3</sup>.
- (7) According to the EIA Appendix 8B, the density of soil (bulked) is 1.8 tonnes/m<sup>3</sup>.
- (8) Assuming the loading quantities of a 30-tonne truck is 8.0m<sup>3</sup>.
- (9) Assuming the loading quantities of a 24-tonne truck is 6.5m<sup>3</sup>.
- (10) The forecast of C&D materials to be generated from the Contract is sourced from the works program in December 2012.

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**APPENDIX P**  
**COMPLAINT LOG**

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## Appendix P - 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.<br>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.<br>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.<br>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:-<br><ul style="list-style-type: none"> <li>• To place wooden planks or rubber</li> </ul> | Closed |

|                 |                                      |             |  |  |        |
|-----------------|--------------------------------------|-------------|--|--|--------|
|                 |                                      |             |  | <p>mats on ground for loading and unloading heavy or metal objects; and</p> <ul style="list-style-type: none"> <li>• To deploy professional personnel to supervise the works.</li> </ul>   |        |
| 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"> <li>• 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.</li> <li>• Provide training to the vessel skippers for prevention of pollution</li> </ul> | Closed |

|                 |   |              |  |   |             |
|-----------------|---|--------------|--|---|-------------|
|                 |   |              |  | <p>from ships.</p> <ul style="list-style-type: none"> <li>• DCVJV requested vessel skippers to provide engine oil disposal records</li> </ul> <p>The vessel skippers assured to us that all waste lubricants were sent to waste collectors regularly and no oil discharge into seawater.</p>  |             |
| Com-2013-07-001 | Southeast Quay of Chek Lap Kok near the junction of Chek Lap Kok South Road and Scenic Road | 17 July 2013 | <p>The complaint was received by EPD on 17<sup>th</sup> July 2013. According to the EPD's letter, the complainant was concerned for the noise nuisance generated from the operation of concrete lorry mixers during evening and night-time period at Southeast Quay of Chek Lap Kok.</p> | <p>In response to the complaint, ET conducted two times site inspections at Southeast Quay at Chek Lap Kok between 18:45 and 20:30 hours on 23 July 2013 and 20:30 to 22:30 hours on 30 July 2013.</p> <p>During the inspections, the Ro-Ro barge was observed anchored off Southeast Quay at Chek Lap Kok but no concrete lorry mixer was observed throughout the inspection.</p> <p>On 23 July 2013, at about 19:35, one tug boat was observed travelling to Southeast Quay, Chek Lap Kok and left at about 19:40.</p> <p>On 30 July 2013, no tug boat and concrete lorry mixers were observed during the inspection.</p> | In progress |

|  |  |  |  |   |  |
|--|--|--|--|---|--|
|  |  |  |  | <p>According to the Contractor, there was no concreting works for the pier sites on 23 July 2013 and therefore no loading and unloading operation at Southeast Quay at Chek Lap Kok.</p> <p>Concreting works were performed at Pier 0 on 30 July 2013. As the Contractor anticipated the arrival time of tug boat and flap-top barge at Southeast Quay will exceed 23:00 hours after the concreting works, they decided to arrange the tug boat and flap-top barge with concrete lorry mixers anchored off around Pier 66 after 23:00 hours. So, no loading and unloading operation at Southeast Quay at Chek Lap Kok was observed.</p> <p>Further night time site inspection will be conducted during the loading and unloading operation at Southeast Quay of Chek Lap Kok to check whether the Contractor comply with the condition of CNP No. GW-RS0426-13.</p> |  |
|--|--|--|--|---|--|