

東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong

Tel : 2695 8318

E-mail : etl@ets-testconsult.com

Fax : 2695 3944

Web site : www.ets-testconsult.com

## ***HKPFH Joint Venture***

**Contract No.: CV/2013/06  
Handling of Surplus Public Fill  
(2014-2016)**

**TSEUNG KWAN O AREA 137 FILL BANK**

**MONTHLY EM&A REPORT NO.1**

**(21 TO 31 JANUARY 2014)**

Prepared by:

LAW, Sau Yee  
Senior Environmental Officer

Checked by:

LAU, Chi Leung  
Environmental Team Leader

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21 February 2014

By E-mail and Fax No.: 2695 3944

ETS-Testconsult Limited  
8/F, Block B  
Veristrong Industrial Centre  
34-36 Au Pui Wan Street  
Fo Tan, Hong Kong

Attention: Mr. C. L. Lau

Dear Mr. Lau,

**Re: Contract No. CV/2013/06  
Handling of Surplus Public Fill (2014 – 2016)  
Monthly EM&A Report (No. 01) for the period of 21 January to 31 January 2014  
for the Tseung Kwan O Area 137 Fill Bank**

Reference is made to your submission of the revised draft Monthly EM&A Report for the period of 21 January to 31 January 2014 for the TKO Area 137 Fill Bank received by E-mail on 21 February 2014.

We are pleased to inform you that we have no further comment on the captioned report.

Thank you very much for your attention and please do not hesitate to contact our Jason Lai or the undersigned should you have any queries.

Yours sincerely,



Tony Cheng  
Independent Environmental Checker

c.c. CEDD Attn: Mr. Jason Wong / Mr. Terry Chock / Mr. Samson Kwong Fax No.: 2714 0113  
HKPFHJV Attn: Mr. Jerry Siu / Mr. Eric Wan Fax No.: 2744 6937

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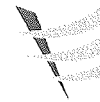


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Marine Water Quality Monitoring Report for Contract No. HY/2010/02 Hong Kong – Zhuhai – Macao Bridge, Hong Kong Boundary Crossing Facilities – Reclamation Works

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## **EXECUTIVE SUMMARY**

This monthly Environmental Monitoring and Audit (EM&A) report No.1 was prepared by ETS-Testconsult Ltd (ET) for the "Contract No: CV/2013/06 – Handling of Surplus Public Fill (2014-2016) – Tseung Kwan O (TKO) Area 137 Fill Bank" (The Project).

This report documented the findings of EM&A Works conducted during the operation phase of Fill Bank at TKO Area 137 from 21 to 31 January 2014.

### **Site Activities**

As informed by the Contractor, the site activities in this reporting month were as below:

- Construction of Contractor's and Engineer's site office;
- Transferring filling material to barge; and
- Operation of derrick barge for unloading filling material.

### **Environmental Monitoring Progress**

The summary of the monitoring activities in this monitoring month is listed below:

- Noise Monitoring (Day-time): 1 Occasion at 1 designated location
- 24-hour TSP Monitoring: 2 Occasions at 2 designated locations
- 1-hour TSP Monitoring: 6 Occasions at 2 designated locations
- Marine Water Quality Monitoring: 4 Occasions at 2 designated locations
- Weekly-site inspection: 2 Occasions

### **Noise Monitoring**

No exceedance of Action and Limit levels for noise monitoring was recorded in the reporting month.

### **Air Monitoring**

No exceedance of Action and Limit levels was recorded for 1-hr and 24-hr TSP monitoring in the reporting month.

### **Marine Water Quality Monitoring**

According to the summary of marine water monitoring results, no exceedance of Action and Limit levels was recorded in this reporting month.

### **Weekly Site Inspections**

In general, performance on environmental mitigation measures implemented was found to be satisfactory in this reporting month. The major findings observed during site inspections are presented in the Section 7.0.

### **Environmental Complaints, Notification of summons and successful prosecutions**

No complaint, notification of summons or successful prosecutions with respect to environmental issues was received in this reporting month.

### **Future Key Issues**

Based on site inspections and forecast of engineering works in coming month, key issues to be considered are as follows:

- Noise and air quality impact due to site works;
- Maintain wheel washing facilities properly;
- Maintain all drainage and desilting facilities properly;
- Use and maintain silt curtain properly;
- Clean up the fill material on concrete pavement along the BHA frequently;
- Sufficient drip trays for all oil drums / chemical containers;
- Implement all necessary preventive measures to avoid oil leakage. In the event an oil leakage happens, the Contractor should properly remove the leaked oil and handle the contaminated soil and all materials using for this cleaning works as chemical waste;
- Maintain good site practice and waste management to minimize environmental impacts at the site; and
- Follow-up improvements on waste management issues.



## 1.0 INTRODUCTION

HKPFH Joint Venture (HKPFH-JV) appointed Environmental Team (ET) of ETS-Testconsult Limited (ETL) to undertake the Environmental Monitoring and Audit (EM&A) for the "Contract No: CV/2013/06 – Handling of Surplus Public Fill (2014-2016) – Tseung Kwan O (TKO) Area 137 Fill Bank" (The Project).

In accordance with the Environmental Permit (No.: EP-134/2002/K) (the EP), an EM&A programme should be implemented in accordance with the procedures and requirements in the EM&A Manual of the approved EIA report (Registration No. AEIAR-060/2002). The EM&A programme for this study as stated in Section 2.3.1 of the EM&A Manual covers the following environmental aspects during the establishment, operation and removal phases of the Fill Bank at Tseung Kwan O Area 137:

- *Fugitive Dust;*
- *Noise generation from onsite activities;*
- *Water Quality; and*
- *Landscape and Visual.*

The EM&A programme requires environmental monitoring for air quality, noise and water quality and environmental site inspections for air quality, noise, water quality, landscape and visual, and waste management. The EM&A requirements for each parameter described in the following sections include:

- *All monitoring parameters;*
- *Monitoring schedules for the reporting month and forthcoming months;*
- *Action and Limit levels for all environmental parameters;*
- *Event/Action Plans;*
- *Environmental mitigation measures, as recommended in the Project EIA study final report; and*
- *Environmental requirements in contract documents.*

Baseline monitoring was completed in August and September 2002 by MateriaLab. Action and Limit Levels were established for air and water quality parameters based on the baseline monitoring results.

This report documented the findings of EM&A Works conducted during the operation phase of Fill Bank at Tseung Kwan O Area 137 from 21 to 31 January 2014.

## 2.0 PROJECT INFORMATION

### 2.1 Scope of the Project

The scale and scope of the Project as stated in the EP include:

- Site clearance;
- Construction of a temporary storm water system;
- Stockpiling of 6 million m<sup>3</sup> of public fill;
- Setting up two barging points: one at the TKO Basin and one at the Construction and Demolition Material Sorting Facility (C&DMSF) for transporting the stockpiled public fill by barges;
- Setting up a temporary barging point at the existing Explosive Off-loading Barging Point located in the south-eastern part of Area 137 for the month of May 2004 to December 2004 for transporting the stockpiled public fill by barge;
- Construction and operation of a Construction and Demolition Material Sorting Facility (C&DMSF);
- Setting up a Construction and Demolition Material Crushing Facility at the TKO Basin; and
- Remove the temporary fill bank.

### 2.2 Site Description

TKO Area 137 Fill Bank is located at the southern end of Wan Po Road. In the vicinity of the site are other industrial uses such as SENT landfill, TKO Industrial Estate, etc. Both Island Resort and Fullview Garden are also situated at more than 1.8km from the site. Other existing ASRs and NSRs, including resident developments and schools, are located at a further distance away from TKO Area 137.



### 2.3 Work Programme

Details of work programme are shown in Appendix I G.

### 2.4 Project Organization and Management Structure

The project organization chart is shown in Appendix I A.

### 2.5 Contact Details of Key Personnel

The key personnel contact names and telephone numbers are shown in Table 2.1.

Table 2.1 Contact Details of Key Personnel

Organization	Name of Key Staff	Project Role	Tel. No.	Fax No.
CEDD	Mr. P C Mok Mr. K C Wong Mr. C T Chock Mr. Y F Kwong	Engineer's Representative	2762 5514	2714 0113
IEC (ENVIRON)	Mr Tony Cheng	IEC	3465 2888	3465 2899
Contractor (HKPFH-JV)	Mr. K W Li	Project Manager	9750 6438	2744 6937
ET (ETL)	Mr C. L. Lau	ET Leader	2946 7791	2695 3944

### 3.0 WORK PROGRESS IN THIS REPORTING MONTH

As informed by the Contractor, the activities in the reporting month include:

- Construction of Contractor's and Engineer's site office;
- Transferring filling material to barge; and
- Operation of derrick barge for unloading filling material.

### 4.0 AIR QUALITY MONITORING

#### 4.1 Monitoring Requirement

TSP levels were monitored in the reporting month in accordance with the EM&A Manual. Table 4.4 shows the Action and Limit Levels for the environmental monitoring works.

#### 4.2 Monitoring Equipment

Both 1-hour and 24-hour TSP air quality monitoring was performed using a GMWS2310 High Volume Air Sampler (HVS) located at each of the designated monitoring station. Table 4.1 summarizes the equipment used in the air quality monitoring programme. A copy of the calibration certificates for the HVS and calibrator are attached in Appendix I B1.

Table 4.1 Air Quality Monitoring Equipment

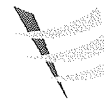
Equipment	Model and Make
HVS	Greasby GMWS2310
Calibrator	Tisch TE-5025A

#### 4.3 Monitoring Parameters, Frequency and Duration

Table 4.2 summarizes the monitoring parameters, monitoring duration and frequencies of air quality monitoring.

Table 4.2 Monitoring parameters, duration, frequency of air quality monitoring

Parameter	Duration	Frequency
24-hr TSP	24 hr	Once every six days
1-hr TSP	1 hr	Three times per day every six days



#### 4.4 Monitoring Locations

Table 4.3 tabulates the air quality monitoring locations of this project.

Table 4.3 Air quality monitoring locations

Monitoring station	Location
TKO-A1	Site Egress
TKO-A2a	CREO

#### 4.5 Monitoring Methodology

##### **Both 1-hr and 24-hr air quality monitoring (High Volume Sampler)**

##### Instrumentation

High volume sampler, as HVS, (Greasby GMWS2310) complete with appropriate sampling inlets were employed for both 1-hour and 24-hour TSP monitoring. The sampler is 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).

##### Installation

The installation of HVS refers to the requirement stated in EM&A Manual.

##### Operation/Analytical Procedures

Operating/analytical procedures for the operation of HVS are as below:

- Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 0.6m<sup>3</sup>/min and 1.7m<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 flow rate was indicated on the flow rate chart.
- For TSP sampling, fiberglass filters (GA-55) were used.
- The power supply was checked to ensure the sampler worked properly.
- On sampling, the sampler was operated 5 minutes to establish thermal equilibrium before placing any filter media at designated air 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 air-tight seal on the outer edges of the filter. Then the filter holder frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- The programmable timer will be set for a sampling month of 1 hour or 24 hours. 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 transferred from the filter holder of the HVS to a sealed plastic bag and sent to the laboratory for weighting. The elapsed time was also recorded.
- Before weighting, all filters were equilibrated in a desiccator for 24 hour with the temperature of 25°C ± 3°C and the relative humidity (RH) <50% ±5%.
- All measurement procedures in Section 2.3 of the EM&A Manual were followed during the reporting month.

##### Maintenance & Calibration

- HVS and their accessories should be maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVS should be calibrated at bi-monthly intervals.

##### **Wind Data Monitoring**

Wind data (wind speed and wind direction) were directly extracted from Tseung Kwan O Station of Hong Kong Observatory. All wind data during this reporting month are shown in Appendix I E.





#### 4.6 Action and Limit Levels

Table 4.4 shows the Action and Limit levels for 24-hr TSP and 1-hr TSP monitoring.

Table 4.4 Action and Limit Levels for 24-hr TSP and 1-hr TSP

Monitoring Location	24-hr TSP ( $\mu\text{g}/\text{m}^3$ )		1-hr TSP ( $\mu\text{g}/\text{m}^3$ )	
	Action Level	Limit Level	Action Level	Limit Level
TKO-A1	210	260	376	500
TKO-A2a *	210	260	376	500

Remark (\*): Since dust monitoring stations TKO-A2 and TKO-A2a are located close to the major dust emission sources and also close to the same sensitive receptor and no significant difference between them on the prevailing meteorological conditions, the baseline data from TKO-A2 (August and September 2002 by Materialab) can also be valid in the case of TKO-A2a.

#### 4.7 Event-Action Plans

Please refer to Appendix I F for details.

#### 4.8 Results and Observation

##### 4.8.1 1-hour and 24-hour TSP Monitoring results

Monitoring data of both 1-hour and 24-hour TSP monitoring carried out in this reporting month are summarized in Appendix I B2. Graphical presentation of 1-hour and 24-hour TSP monitoring results for the reporting month is shown in Appendix I B3. Wind data included wind speed and wind direction was extracted from Tseung Kwan O Station of Hong Kong Observatory during this reporting month and is presented in Appendix I E.

No exceedance of Action and Limit Level of 1-hr TSP and 24-hour TSP monitoring results was recorded during the reporting month.

##### 4.8.2 Observation

Generally, the Contractor implemented sufficient dust mitigation measures, including operation of the mist spraying systems at the CEDD Combined Reception Office and the site egress area, wheel washing facilities, road dampening by water bowsers and automatic water sprinklers on the main haul roads. Furthermore, hydroseeded slopes on the stockpiling areas was maintained properly in order to prevent dust generation from wind erosion of the exposed surfaces. Other dust sources near TKO Area 137 also included operation of the temporary CWSF and dumping activities at the SENT Landfill.

#### 5.0 Noise Monitoring

##### 5.1 Monitoring Requirements

Noise monitoring was conducted at 1 monitoring station as specified in the approved EM&A Monitoring Proposal for good site practice. The equipment, parameter, frequency, duration, methodology, calibration details, results and observations of the noise monitoring for the reporting month are presented in this section.

##### 5.2 Monitoring Equipment

An Integrating Sound Level Meter was used for noise monitoring. It was a Type 1 sound level meter capable of giving a continuous readout of the noise level reading including equivalent continuous sound pressure level ( $L_{eq}$ ) and percentile sound pressure level ( $L_x$ ). It complies with International Electro Technical Commission Publications 651:1979 (Type1) and 804:1985 (Type1), and speed in m/s was used to monitor the wind speed.

Table 5.1 summarizes noise monitoring equipment model being used. A copy of the calibration certificate for noise meter and calibrator are attached in Appendix I C1.



Table 5.1 Noise Monitoring Equipment

Equipment	Model
Sound Level Meter	Rion NL-31 / Rion NL-52
Sound Level Calibrator	Rion NC-73 / Castle GA607

### 5.3 Monitoring Parameters, Duration and Frequency

Duration, frequencies and parameters of noise measurement are presented in Table 5.2.

Table 5.2 Duration, Frequencies and Parameters of Noise Monitoring

Time month	Duration/min	Parameters	Frequency
Day-time: 0700-1900 hrs on normal weekday	30	$L_{eq}$ , $L_{10}$ , $L_{90}$	Once per month

### 5.4 Monitoring Locations

One Noise monitoring was conducted at the noise monitoring location, TKO-N1 as shown in Figure 2 during the reporting month. Table 5.3 describes the location of the monitoring station.

Table 5.3 Noise Monitoring Location

Monitoring station	Location	Type of Measurement
TKO-N1	Outside site Egress along Wan Po Road	Free Field

### 5.5 Monitoring Procedures and Calibration Details

#### Operation/Analysis Procedures

- The Sound Level Meter was set on a tripod at a height of 1.2m above the ground.
- For free field measurement, the meter was positioned away from any nearby reflective surfaces.
- 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 : 30 mins
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000HZ. If the difference in the calibration level before and after measurement was more than 1dB(A), the measurement would be considered invalid and repeat measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with a portable wind meter.
- During the monitoring month, the  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Correction factor of +3dB(A) should be made to the free Field measurements.
- Noise monitoring would be cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind gusts exceeding 10m/s.

#### Maintenance and Calibration

- The microphone head of the sound level meter and calibrator are cleaned with soft cloth in quarterly intervals.
- The meter is sent to the supplier or HOKLAS laboratory to check and calibrated in yearly intervals.

### 5.6 Action and Limit Levels

The Action and Limit levels for noise levels derived as illustrated in Table 5.4.

Table 5.4 Action and Limit Levels for noise monitoring

Time Month	Time Month	Action	Limit
Normal hours	0700-1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A)



## 5.7 Event-Action Plans

Please refer to the Appendix I F for details.

## 5.8 Results and Observation

### 5.8.1 Results

Only Day-time noise monitoring was carried out at monitoring station TKO-N1 in this reporting month. The detail of the noise monitoring is provided in Appendix I C2. Graphical presentation of the monitoring result for the reporting month is shown in Appendix I C3.

Since no documented complaints on noise issue were received in this reporting month, no Action Level exceedances were recorded. Besides, no exceedances in Limit Level were recorded according to the result from Day-time monitoring.

### 5.8.2 Observation

The major noise source during the monitoring event was the dump truck traffic. Operation of the Fill Bank was from 08:00 to 21:00 from Monday to Sunday in the reporting month. Whereas the operation hours for barge activities in the TKO Basin was from 08:00 to 21:00. The monitoring result complied with the noise limit of 75dB(A).

## 6.0 MARINE WATER QUALITY MONITORING

### 6.1 Monitoring Requirements

In accordance with the EM&A Manual, impact marine water quality monitoring was conducted three days per week. Measurements were taken at both mid-flood and mid-ebb tides at three depths (i.e. 1m below surface, mid depth and 1m from seabed) at Control Station, C1 and Monitoring Station, M4.

### 6.2 Monitoring Locations

For the Reclamation Project, there were 4 Designated Monitoring Stations and 2 Designated Control Stations specified in the EM&A Manual. Upon the completion of the monitoring programme under Stage 2 reclamation works, the ET started monitoring events at the impact station M4 and the control station C1 from 18 May 2004 onwards. Figure 1 shows the location of the marine water quality monitoring stations. Table 6.1 describes the locations of the monitoring stations in the reporting month.

Table 6.1 Locations of Marine Water Monitoring Stations

Station Description	Code	HK Metric Grid E	HK Metric Grid N
Control Station (Ebb tide)	TKO-C1	844 740.208	815 371.502
Monitoring Station, Tung Lung Chau Fish Culture Zone	TKO-M4	847 741.029	812 977.878

### 6.3 Monitoring Parameters

Monitoring of the marine water quality parameters are listed in Table 6.2.

Table 6.2 Marine Water Quality Monitoring Parameters

In-situ measurement	Laboratory analysis
Depth (m)	Suspended solids (mg/L)
Temperature (°C)	
Dissolved Oxygen (mg/L and % saturation)	
Turbidity (NTU)	
Salinity (ppt)	



#### 6.4 Monitoring Frequency

The monitoring frequency of the marine water monitoring is summarized in Table 6.3.

Table 6.3 Monitoring frequency of the marine water

Parameter	Frequency	No. of Location	No. of Depths
Temperature	3 days/week, 2 tides/day	2 (TKO-C1 and TKO-M4)	3 (Surface, mid-depth & bottom)
Salinity			
DO			
Turbidity			
Suspended solids			

#### 6.5 Monitoring Methodology and Equipment Used

##### For Location of the monitoring stations

##### **Global Positioning System (GPS)**

A hand-held digital GPS was used to identify the designated monitoring stations prior to water sampling.

##### For Water Depth measurement

##### Echo Sounder

A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station.

##### For In-situ Water Quality Measurement

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

##### **Dissolved Oxygen, Salinity and Temperature Measuring Equipment**

A portable, weatherproof dissolved oxygen & salinity measuring instrument, which complete with cable, sensor and DC power source (e.g. YSI 85 or equivalent) was used for measuring:

- a dissolved oxygen level in the range of 0-20 mg/L and 0-200 % saturation;
- a salinity in range 0-40 ppt; and
- a temperature of 0-45 degree Celsius

A membrane electrode with automatic temperature compensation complete with a cable was installed.

##### **Turbidity Measurement Instrument**

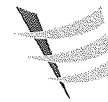
A portable and weatherproof turbidity meter (HACH model 2100Q) was used during impact monitoring. It has a photoelectric sensor capable of measuring turbidity between 0-1000 NTU. Response of the sensor was checked with certified standard Turbidity solutions before the start of measurement.

##### For Water Sampling and Sample Analysis

In-situ monitoring was carried out at three depths: 1 meter below water surface, at mid-depth and 1 meter above the seabed. If the water depth is less than 6 m, the mid-depth station shall be omitted and if the water depth is below 3 m, only the mid depth station shall be monitored.

##### **Water Sampler**

A water sampler comprising a transparent PVC cylinder, with a capacity of not less than 2 liters, was lowered into the water body at the predetermined depth. The both opening ends of the sampler were then closed accordingly by dead weight and water samples were collected.



**Water Container**

The sample container, made by high-density polythene, was rinsed with a portion of the water sample. The water sample was then transferred to the container, labelled with a unique sample ID and sealed with a screw cap. The water samples were stored in a cool box maintained at 4°C. The water samples were then delivered to a local HOKLAS-accredited laboratory (Environmental Laboratory, ETS-Testconsult Ltd, HOKLAS Registration No. 022) on the same day for analysis.

The summary of testing method of testing parameter as recommended by EIA or required by EPD, with the QA/QC results in accordance with the requirement of HOKLAS or international accredited scheme is shown in Table 6.4.

Table 6.4 Summary of testing procedures

Laboratory Analysis	Testing Procedure	Detection Limit
Total suspended solids	In house method based on APHA 19 <sup>th</sup> ed 2540D	1.0 mg/L

**In-situ measurement**

All in-situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use. 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 the start of measurement.

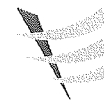
At each measurement/sampling depth, two consecutive measurements of dissolved oxygen (DO), dissolved oxygen saturation (DOS), turbidity and salinity were taken. For turbidity measurement, the sample was collected by using sampler and then transferred to the cell. The reading of turbidity of the sample was directly recorded from the Turbidimeter (HACH 2100Q) after inserting the cell to the Turbidimeter. For DO, DOS and Salinity, duplicate measurements were performed by dropping the calibrated probes of the corresponding monitoring equipments to the designated depths of the water column and taking readings after stabilized. The duplicate measurements were averaged if the difference was not greater than 25%. If the difference is greater than 25%, repeat measurement will be required.

Table 6.5 shows the equipment used for in-situ monitoring of water quality. The calibration certificates are attached in Appendix I D1.

Table 6.5 Details of Marine Water Quality Monitoring Equipment (In-site measurement)

Parameter	Model	Date of Calibration	Due Date	Equipment No.
Coordinate of Monitoring stations	Garmin eTrex 10	-----	-----	ET/EW/005/04
Dissolved Oxygen (Saturation), Temperature, Salinity	YSI Dissolved Oxygen, Salinity & Temperature Meter, YSI Pro2030	29/10/13 29/01/14	28/01/14 28/04/14	ET/EW/008/004 *
Turbidity	HACH Model 2100Q Turbid Meter	07/01/14	06/04/14	ET/0505/010 *
Water Depth	Speedtech SM-5	-----	-----	ET/EW/002/06

Remark:(\*) indicates the instrument should be calibrated on use.



## 6.6 Action and Limit Level

The water quality criteria, namely Action and Limit (A/L) levels are presented in the table below.

Table 6.6 Water Quality Action and Limit Levels

Parameter	Action Level	Limit Level
DO (mg/L)	<i>Surface &amp; Middle</i> <5.45 mg/L (5%-ile of baseline data) <i>Bottom</i> <4.72 mg/L (5%-ile of baseline data)	<i>Surface &amp; Middle</i> <5.10 mg/L (1%-ile of baseline data) <i>Bottom</i> <2.00 mg/L
SS (mg/L) (Depth-averaged)	>6.74 mg/L (95%-ile of baseline data) or >120% of the upstream control station's SS at the same tide on the same day	>7.67 mg/L (99%-ile of baseline data) or >130% of the upstream control station's SS at the same tide on the same day
Turbidity (NTU) (Depth-averaged)	>4.28 NTU (95%-ile of baseline data) or >120% of the upstream control station's turbidity at the same tide on the same day	>4.58 NTU (99%-ile of baseline data) or >130% of the upstream control station's turbidity at the same tide on the same day

## 6.7 Event and Action Plan

Please refer to the Appendix I F for details.

## 6.8 Monitoring Duration and Month in this reporting month

Totally 4 occasions of marine water quality monitoring were carried out in this reporting month. Below is the time schedule for the marine water quality monitoring events that were conducted in this reporting month:

Table 6.7 Time Schedule of Impact Marine Water Quality Monitoring

January 2014						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		21	22	23	24	25
			▼		▼	
26	27	28	29	30	31	
	▼		▼			

Remarks: (▼) = Marine water quality monitoring carried out by ET.

The daily marine water quality monitoring duration are detailed in Appendix I D2.

## 6.9 Marine Water Quality Monitoring Results

The impact water quality measurement results are detailed in Appendix I D2. Appendix I D3 presents the water quality monitoring data and graphical presentations of monitoring results respectively.

The summary of marine water quality exceedances is shown in Table 6.8.

Table 6.8 Summary of Impact Marine Water Quality Exceedances in this reporting month

Station	Exceedance Level	DO		Turbidity		SS		Total	
		Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
TKO-C1	Action	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0
TKO-M4	Action	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0

According to the summary of marine water monitoring results, no exceedance of Action and limit levels was recorded for this reporting month.



## 7.0 ENVIRONMENTAL AUDIT

### 7.1 Weekly ET Site Inspections

Weekly ET site inspections were carried out by ET to monitor the timely implementation of proper environmental pollution control and mitigation measures for the Project. In this reporting month, two weekly site inspections were conducted (22 and 27 January 2014). Table 7.1 presents the key findings of weekly ET site audit in this reporting month.

Table 7.1 Key Findings of Weekly ET Site Audits in this reporting month

Date	Key Findings	Action(s) Taken recommended by ET	Action(s) Taken by the Contractor during the ET weekly site audit	Rectification Status by ET
22 January 2014	The floating booms of silt curtain near the tipping hall No.1 were found damaged. (New item)	To repair the silt curtain as soon as possible.	---	Follow-up
	Mosquito killer at CEDD site office was found out of order. (New item)	To repair the defect mosquito killer as soon as possible.	---	Follow-up
27 January 2014	The floating booms of silt curtain near the tipping hall No.1 were found damaged. (Previous item)	To repair the silt curtain as soon as possible.	Silt curtain near the tipping hall No.1 was repaired properly.	Closed
	Mosquito killer at CEDD site office was found out of order. (Previous item)	To repair the defect mosquito killer as soon as possible.	New mosquito killer at CEDD site office was used.	Closed
	C&D wastes, such as paper, plastic bag and wood, were discarded near site entrance. (New item)	To collect and dispose of the waste properly.	---	Follow-up
	Haul road to wet soil disposition area was found dry. (New item)	To water the haul road frequently especially during dry season.	---	Follow-up

### 7.2 Review of Environmental Monitoring Procedures

The monitoring works conducted by the Environmental Team were inspected regularly. The observations for the monitoring works were recorded and summarized as follows:

#### **Air Quality Monitoring**

- The monitoring team recorded the observations around the monitoring stations within and outside of the site.
- The monitoring team recorded the temperature, air pressure and general weather condition on the monitoring day.

#### **Noise Monitoring**

- The monitoring team recorded the observations around the monitoring station, which might affect the results.
- Major noise sources were identified and recorded.

#### **Water Quality Monitoring**

- The monitoring team recorded the observations around the monitoring stations, which might affect the results.

### 7.3 Assessment of Environmental Monitoring Results

All monitoring results were audited against the Action and Limit levels and any exceedance would be validated.

No exceedance was recorded in water quality, air quality and noise monitoring in this month.

The monitoring results in this reporting month were comparable with those of baseline month. Detailed discussions were given in Section 4, 5 and 6 of this Report.



#### 7.4 Advice on the Solid and Liquid Waste Management Status

The Contractor usually disposed of non-inert waste, including general refuse and materials segregated from the existing stockpiles, to SENT landfill. Table 7.2 summarizes data on offsite waste disposal in this reporting month.

Table 7.2 Actual amounts of Waste generated in this reporting month

Waste Type	Actual Amount	Disposal Locations
Public Fill (m <sup>3</sup> )	0	---
C&D Waste (general refuse) (kg)	7200	SENT Landfill
Chemical Waste (kg/L)	0	---

The Contractor should provide sufficient preventive measures during equipment maintenance works so as to avoid oil leakage on the ground. In the event of any oil leakage, the Contractor should clean up the polluted soil and handle all the materials used for this cleaning works as chemical waste.

Concrete bunding has erected outside the CEDD combined reception office and near the automatic wheel washing facilities for storing generator sets and oil drums. The drain outlet of all the bunded areas should be plugged properly. Besides, pre-cast drip trays were provided for oil drums at several areas, such as workshop and chemical storage area. The Contractor should collect and dispose of any stagnant water accumulated in the concrete bunding and drip trays and handle them as chemical waste.

The Contractor should use suitable containers with proper labels to store chemical wastes in accordance with Code of Practice on the Packaging, Labeling and Storage of Chemical Waste. The Contractor should also advise their workers of the proper procedures in handling the chemical waste. All the trip tickets for chemical waste disposal were properly kept in the site office.

The Contractor was reminded to increase the frequency of inspection and cleaning of the site drainage system, including permanent desilting chambers, desilting facilities, oil interceptor bypass tank, DP3 and DP4 and all the trapezoidal channels. Moreover, the Contractor should apply approved pesticides in the stagnant water ponds.

All the runoff from the parking area should be pumped to the desilting facilities and oil interceptors to remove suspended solids and oil & grease prior to discharge.

#### 8.0 Status of Environmental Licensing and Permitting

All permits/licenses valid in this reporting month are summarized in Table 8.1.

Table 8.1 Summary of environmental licensing and permit status

Description	Permit No.	Valid Month		Section
		From	To	
Amended Environmental Permit	EP-134/2002/K	04/02/13	---	<ul style="list-style-type: none"> <li>▪ Site clearance</li> <li>▪ Construction of a temporary storm water system</li> <li>▪ Stockpiling of 6 million m<sup>3</sup> of public fill</li> <li>▪ Setting up two barging points for transporting the stockpiled public fill by barges</li> <li>▪ Setting up a temporary barging point at the existing Explosive Off-loading Barging Point for the month of May 2004 to December 2004 for transporting the stockpiled public fill by barge</li> <li>▪ Construction of operation of a construction and Demolition Material Sorting Facility (C&amp;DMSF)</li> <li>▪ Setting up a Construction and Demolition Material Crushing Facility at the TKO Basin</li> <li>▪ Remove the temporary fill bank</li> </ul>
Chemical Waste Producer	5213-839-H3552-01	21/01/14	---	Spent Lubricating Oil and Spent Battery





Description	Permit No.	Valid Month		Section
		From	To	
Marine Dumping Permit	EP/MD/14-119	21/01/14	31/03/14	Approval for dumping 2,800,000 tons (approximately equal to 1,555,555 cu.m. bulked quantity) of Public Fill (Reclamation Materials) from Tseung Kwan O Area 137 Fill Bank and Tuen Mun Area 38 Fill Bank to designated dumping area at Guanghaiwan of Taishan
Billing Account for Waste Disposal	7018998	---	---	---
Effluent Discharge License	Application in progress			

## 9.0 ENVIRONMENTAL NON-CONFORMANCE

### 9.1 Summary of air quality, noise and marine water quality

No Action and Limit level exceedance of 1-hour and 24-hr TSP monitoring was recorded in this reporting month.

Since no documented complaints on noise issue were received in this reporting month, no Action Level exceedance was recorded. Besides, no exceedance in Limit Level was recorded according to the result from Day-time monitoring.

According to the summary of marine water monitoring results, no exceedance of Action and Limit levels was recorded for this reporting month.

### 9.2 Summary of Environmental Complaints

No complaint was received in this reporting month.

### 9.3 Summary of Notification of Summons and successful Prosecution

There was no notification of summons and successful prosecution respect to environmental issues registered in this reporting month.

## 10.0 IMPLEMENTATION STATUS

### 10.1 Implementation Status of Environmental Mitigation Measures

An updated summary of the Environmental Mitigation Implementation Schedule (EMIS) is presented in Appendix I I. Most of the necessary mitigation measures were implemented properly. Any deficiencies were noted in the remarks of the schedule.

### 10.2 Implementation Status of Event and Action Plan

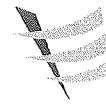
Since no exceedance of Action and Limit level of air, noise and marine water monitoring results was recorded for this reporting month, no further action was required.

### 10.3 Implementation Status of Environmental Complaint, Notifications of Summons and Successful Prosecutions Handling

No complaint, notification of summon and successful prosecution was received in this reporting month. A summary of environmental complaints, notifications of summons and successful prosecutions was given in Table 10.1 and further details of the complaint could be found in the Complaint Log (Appendix I L).

Table 10.1 Summary of Environmental Complaints and Prosecutions

Complaints logged		Summons served		Successful prosecution received	
January 2014	Cumulative	January 2014	Cumulative	January 2014	Cumulative
0	0	0	0	0	0



## 11.0 CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

Impact monitoring of air quality, noise and water quality were carried out at designated locations in accordance with the EM&A Manual in this reporting month.

No Action and Limit level exceedance of 1-hour and 24-hr TSP monitoring was recorded in this reporting month.

Since no documented complaints on noise issue were received in this reporting month, no Action Level exceedance was recorded. Besides, no exceedance in Limit Level was recorded according to the result from Day-time monitoring.

According to the summary of marine water monitoring results, no exceedance of Action and Limit levels was recorded for this reporting month.

No complaint, prosecutions and notifications of summons were received in this reporting month.

According to the ET weekly site inspections carried out in this reporting month, the Contractor generally implemented sufficient dust mitigation measures, including operation of the mist spraying systems and automatic wheel washing facilities, dampening of haul roads and stockpiling areas.

### Recommendations

According to the environmental site inspections performed in the reporting month, the following recommendations were provided:

#### ***Air Quality***

- Ensure the frequency of water spraying on haul roads, unloading areas and stockpiles to be sufficient to suppress the dust sources;
- Provide proper maintenance for the powered mechanical equipment and barges to avoid emission of dark smoke;
- Provide water spraying onto the truckloads during inspection of fill material;
- Conduct road sweeping on all paved haul roads and public roads especially outside and near the site egress by the road sweeper. Undertake water spraying on stockpiling area by water bowsers;
- Erect adequate speed limit signs to advise the truck drivers of the speed limit;
- Operate mist spraying systems and automatic water sprinklers in the Fill Bank;
- Implement the dust mitigation measures for the site activities;
- Designate proper haul roads to ensure effective water spraying; and
- Ensure all vehicles to be washed before leaving the site egress by provision, operation and maintenance of automatic wheel washing facilities.

#### ***Noise***

- Conduct noisy activities at a farther location from the NSRs.

#### ***Water Quality***

- Maintain the drainage system, including the trapezoidal channels, permanent desilting chambers, regularly;
- Operate and maintain the silt curtains regularly;
- Operate the cleaning vessel within the TKO Basin regularly;
- Clean up the fill material on the concrete pavement at BHA frequently; and
- Remove the stagnant water or provide approved pesticides for the stagnant water in the permanent desilting chambers, if any.

#### ***Landscape and Visual***

- Provide hydroseeding on the exposed slopes, on which the final profile has been formed;
- Erect all the site hoarding/chaining fences in accordance with agreed design at proper location;
- Maintain the hydroseeded slopes in accordance with the Landscape Plan.



### **Chemical and Waste Management**

- Remove waste materials from the site to avoid accumulation regularly;
- Handle and store chemical wastes properly;
- Remove unwanted material in the existing stockpiles and avoid further dumping of such material;
- Provide and maintain sufficient drip trays for diesel drums, chemical containers, chemical waste storage drums and diesel operated generator set;
- Maintain mesh screen on top of the additional drainage to avoid improper dumping of rubbish;
- Maintain good housekeeping at the workshop area;
- Ensure sufficient tarpaulin sheets are provided to cover drip trays; and
- Avoid soil being polluted during oil filling and equipment maintenance; hence, properly remove and store the contaminated soil, if any.

## **12.0 FUTURE KEY ISSUES**

### **12.1 Work Programme for the Coming Month**

As informed by the Contractor, the activities to be conducted by them in the next month included:

- Construction of contractor and Engineer Principle Site Office
- Transferring filling material to barge
- Operation and installation of crushing plant
- Maintenance of haul road

### **12.2 Key Issues for the Coming Month**

**Key issues to be considered in the coming month include:**

- *Chemical and waste management;*
- *Treatment of runoff and wastewater prior to discharge;*
- *Dust generated from loading and unloading activities; and*
- *Dust generated from dump trucks traffic.*

**Mitigation measures to be required in the coming month:**

#### Air Quality Impact

- To provide adequate water spraying on haul roads and working platform;
- To operate and maintain automatic wheel washing facilities properly;
- To dampen the fill material prior to unloading or movement;
- To provide road sweeping on haul road near site egress and public roads outside site egress;
- To ensure implementation of the dust mitigation measures for the site activities;
- To maintain proper operation of the mist spraying system;
- To provide proper maintenance for vehicles and machines on site; and
- To investigate any other dust sources around the air sensitive receivers

#### Noise

- To switch off equipment if not in use;
- To operate silent equipment;
- To identify the noise sources inside and outside of the site;
- To follow up any exceedance caused by the Fill Bank operation; and
- To re-schedule the work activities in the event of valid noise exceedance.

#### Water Quality Impact

- To maintain the drainage system in the Fill Bank;
- To ensure the cleanliness of oil interceptor bypass tanks and all the drainage channels;
- To maintain the existing silt trap to ensure good efficiency of wheel wash facilities;
- To repair, inspect and maintain the silt curtains regularly;
- To provide covers for the drip trays to avoid stagnant water pond due to rainfall;
- To provide proper treatment for oily water discharged from the area around air monitoring station TKO-A1;
- To deploy a cleaning vessel to remove floating rubbish in the TKO Basin;
- To clean up the concrete paved area at Portion I every night to avoid fill materials from being washed into the sea; and
- To avoid any stagnant water or provide insecticide to avoid mosquito breeding in the Fill Bank.



Chemical and Waste Management

- To remove waste from the site regularly;
- To properly store and handle chemical wastes on site;
- To implement trip ticket system for all the imported public fill and general refuse disposal;
- To provide and manage sufficiently sized drip trays for diesel drums or chemical containers;
- To remove existing unwanted material in the stockpiles and avoid improper disposal at the Fill Bank through inspection of imported truckloads;
- To maintain proper housekeeping at the workshop area;
- To remove the oil stains in the event of leakage and handle all materials using for this cleaning works as chemical waste;
- To maintain mesh screen on top of the additional drainage, DP3 opening to avoid improper dumping of rubbish into this channel; and
- To identify C&D material by packaging, labeling, storage, transportation and disposal in accordance with statutory regulations.

**12.3 Monitoring Schedule for the Coming Month**

The proposed EM&A program of the coming month is attached in Appendix I M.

- END OF REPORT -

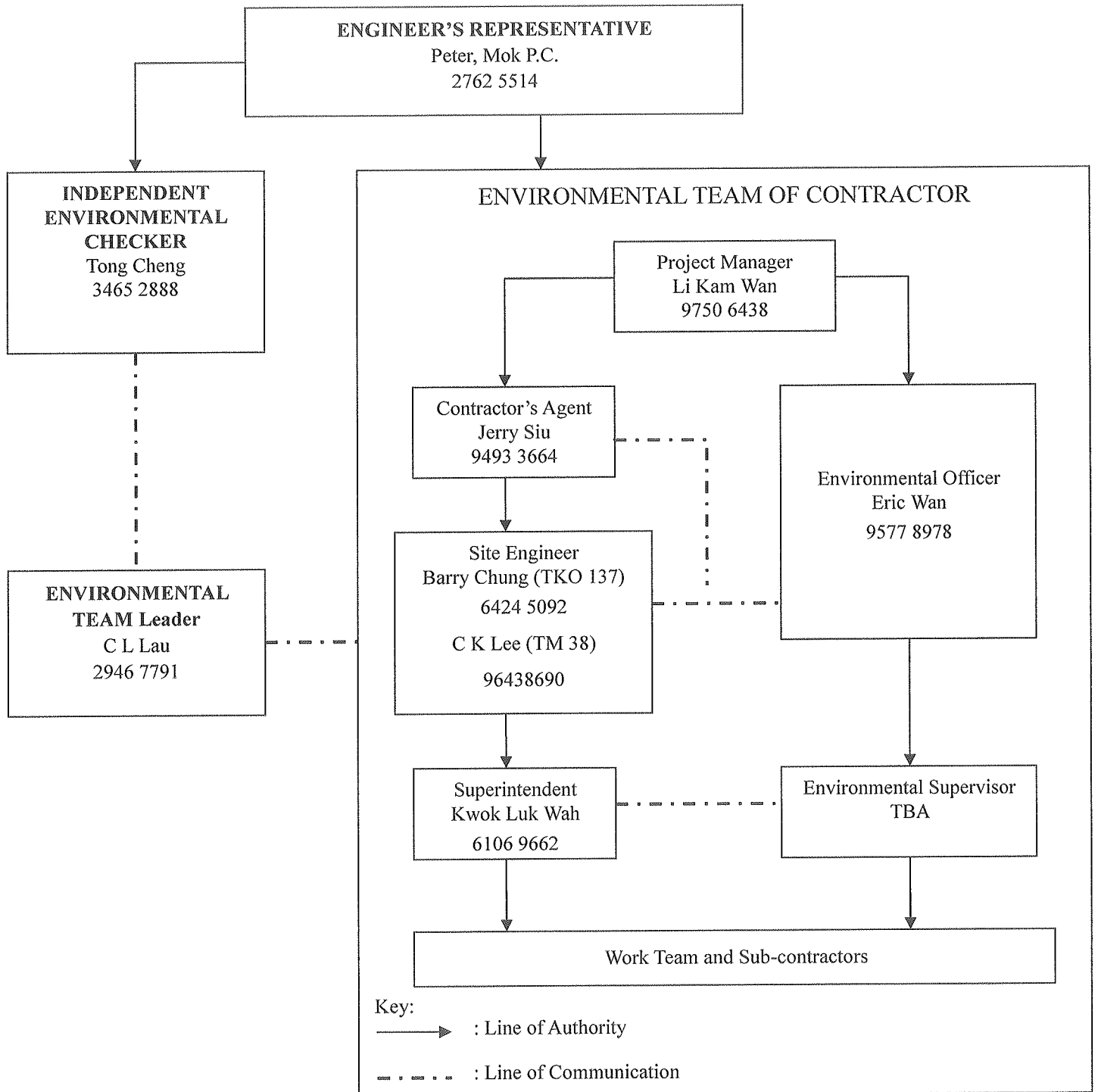


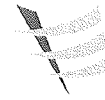
## Appendix I

### A

## Project Organization Chart

Appendix A: Organization Chart and Contact List for Environmental Management Team of Contractor

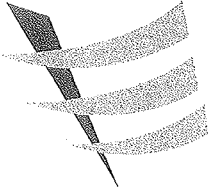




## Appendix I

### B1

## Calibration Certificates for Impact Air Quality Monitoring Equipment



東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong  
Tel : 2695 8318 E-mail : etl@ets-testconsult.com  
Fax : 2695 3944 Web site : www.ets-testconsult.com

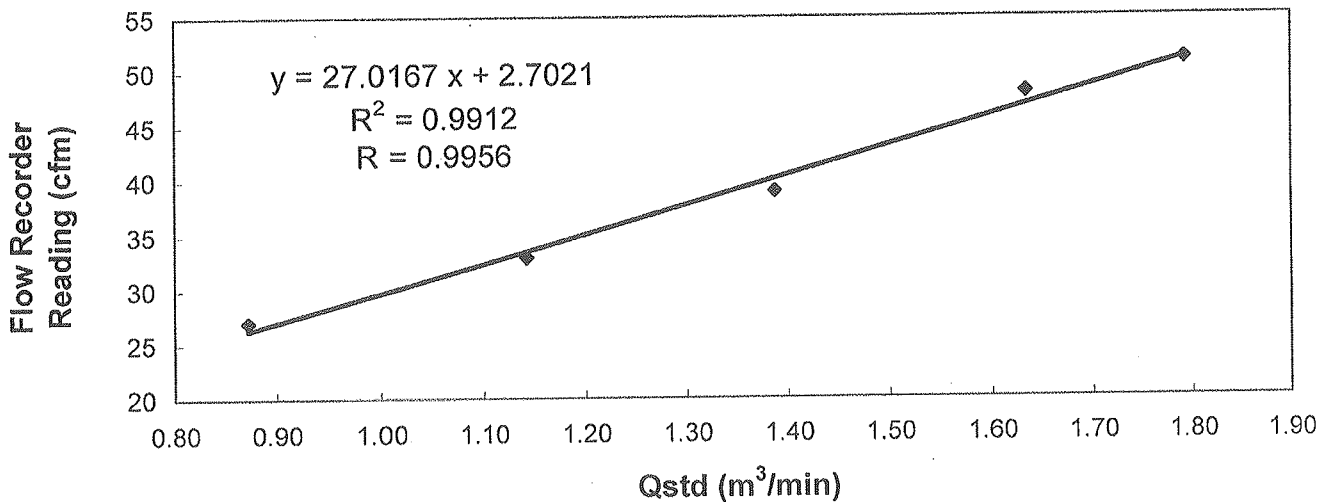
**Calibration Report**  
of  
**High Volume Air Sampler**

**Manufacturer** : Graseby GMW **Date of Calibration** : 03 January 2014  
**Serial No.** : 1172 (ET / EA / 003 / 11) **Calibration Due Date** : 02 March 2014  
**Method** : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

**Results** :

Flow recorder reading (cfm)	51	48	39	33	27
Qstd (Actual flow rate, m <sup>3</sup> /min)	1.79	1.63	1.39	1.14	0.87
Pressure :	763.56	mm Hg	Temp. :	290	K


**Sampler 1172 Calibration Curve**  
Site: Tseung Kwan O A-2



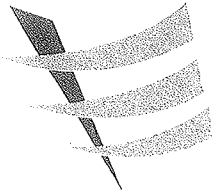
Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration.

The high volume sampler complies\* / ~~does not comply\*~~ with the specified requirements and is deemed acceptable\* / unacceptable\* for use.

Calibrated by :   
TANG Chung Hang  
(Site Technician)

Checked by :   
LAW, Sau Yee  
(Senior Environmental Officer)





東業德勤測試顧問有限公司  
ETS-TESTCONSULT LIMITED

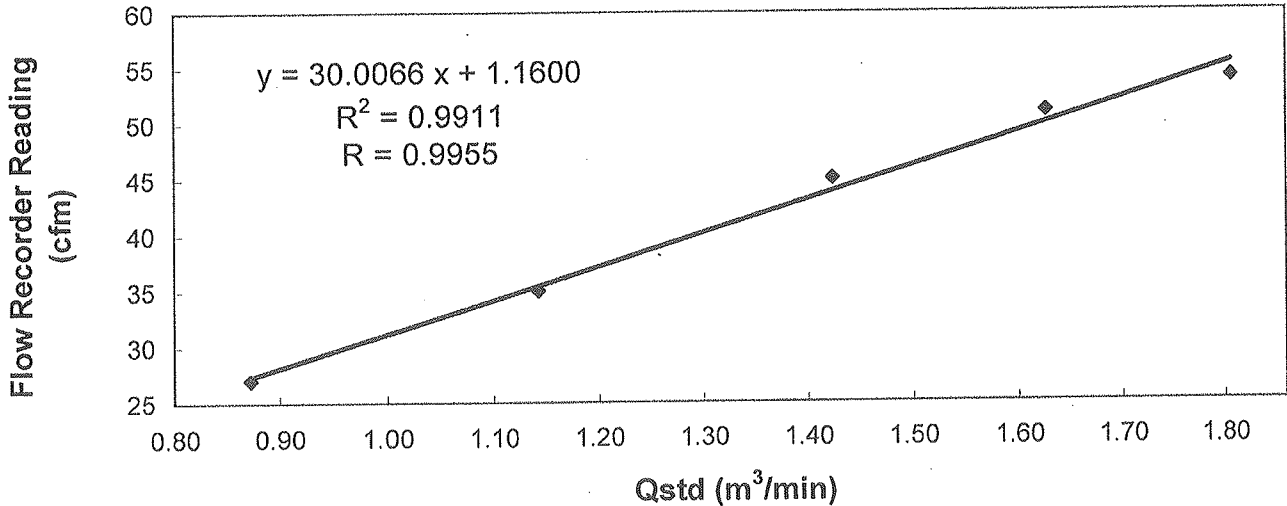
8/F, Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan Street, Fotan, Hong Kong  
Tel : 2695 8318 E-mail : etl@ets-testconsult.com  
Fax : 2695 3944 Web site : www.ets-testconsult.com

**Calibration Report**  
**of**  
**High Volume Air Sampler**

**Manufacturer** : Graseby GMW Date of Calibration : 03 January 2014  
**Serial No.** : 10581 ( ET / EA / 003 / 22 ) Calibration Due Date : 02 March 2014  
**Method** : Five-point calibration by using standard calibration kit Tisch TE-5025A refer to the Operations Manual

<b>Results</b> :	Flow recorder reading (cfm)	54	51	45	35	27
	Qstd (Actual flow rate, m <sup>3</sup> /min)	1.81	1.63	1.42	1.14	0.87
	Pressure :	763.56	mm Hg	Temp. :	290	K


**Sampler 10581 Calibration Curve**  
**Site: Tseung Kwan O A-1**



Acceptance Criteria : Correlation coefficient (r) of the calibration curve greater than 0.990 after a 5-point calibration.

The high volume sampler complies\* / ~~does not comply\*~~ with the specified requirements and is deemed acceptable\* / unacceptable\* for use.

Calibrated by :   
TANG Chung Hang  
(Site Technician)

Checked by :   
LAW, Sau Yee  
(Senior Environmental Officer)



TISCH ENVIRONMENTAL, INC.  
 145 SOUTH MIAMI AVE.  
 VILLAGE OF CLEVELAND, OH 45002  
 513.467.9000  
 877.263.7610 TOLL FREE  
 513.467.9009 FAX  
 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT  
 ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 13, 2013 Rootsometer S/N 0438320 Ta (K) - 296  
 Operator Tisch Orifice I.D. - 2511 Pa (mm) - 753.11

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4400	3.2	2.00
2	NA	NA	1.00	1.0110	6.4	4.00
3	NA	NA	1.00	0.9030	7.9	5.00
4	NA	NA	1.00	0.8630	8.8	5.50
5	NA	NA	1.00	0.7110	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9934	0.6898	1.4125	0.9957	0.6915	0.8866
0.9892	0.9784	1.9976	0.9915	0.9807	1.2539
0.9871	1.0931	2.2334	0.9894	1.0957	1.4019
0.9860	1.1425	2.3424	0.9883	1.1452	1.4703
0.9808	1.3794	2.8251	0.9831	1.3827	1.7732
Qstd slope (m) = 2.05038			Qa slope (m) = 1.28391		
intercept (b) = -0.00442			intercept (b) = -0.00277		
coefficient (r) = 0.99995			coefficient (r) = 0.99995		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol} \left[ \frac{(Pa - \text{Diff. Hg})}{760} \right] \left( \frac{298}{Ta} \right)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} \left[ \frac{(Pa - \text{Diff Hg})}{Pa} \right]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

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

$$Qa = 1/m \{ [\text{SQRT} H2O(Ta/Pa)] - b \}$$



## Appendix I

### B2

## Impact Air Quality Monitoring Results

## Summary of 24-hr TSP Monitoring Results

Monitoring Station : TKO-A1  
Location : Site Egress

Date	Start Time	Finish		Elapse Time		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min.)		Average (m <sup>3</sup> /min.)	Filter Weight (g)		Conc. (µg/m <sup>3</sup> )
		Date	Time	Initial	Final		Initial	Final		Initial	Final	
22/01/14	13:00	23/01/14	13:00	20778.33	20802.33	24.00	1.0944	1.0944	1.0944	2.7535	2.9855	147
28/01/14	09:00	29/01/14	09:00	20804.33	20828.33	24.00	1.0944	1.0944	1.0944	2.7487	2.9368	119

Monitoring Station : TKO-A2a  
Location : CREO

Date	Start Time	Finish		Elapse Time		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min.)		Average (m <sup>3</sup> /min.)	Filter Weight (g)		Conc. (µg/m <sup>3</sup> )
		Date	Time	Initial	Final		Initial	Final		Initial	Final	
22/01/14	13:00	23/01/14	13:00	20005.44	20029.44	24.00	1.0844	1.0844	1.0844	2.7531	2.9897	152
28/01/14	09:00	29/01/14	09:00	20031.44	20055.44	24.00	1.0844	1.0844	1.0844	2.7524	2.9489	126

## Summary of 1-hr TSP Monitoring Results

Monitoring Station : TKO-A1  
Location : Site Egress

Date	Time		Elapse Time		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min.)		Average (m <sup>3</sup> /min.)	Filter Weight (g)		Conc. (µg/m <sup>3</sup> )
	Start	Finish	Initial	Final		Initial	Final		Initial	Final	
22/01/14	10:45	11:45	20777.33	20778.33	1.00	1.0944	1.0944	1.0944	2.7511	2.7675	250
24/01/14	10:30	11:30	20802.33	20803.33	1.00	1.0944	1.0944	1.0944	2.7547	2.7694	224
27/01/14	10:30	11:30	20803.33	20804.33	1.00	1.0944	1.0944	1.0944	2.7536	2.7678	216
29/01/14	09:05	10:05	20828.33	20829.33	1.00	1.0944	1.0944	1.0944	2.7511	2.7658	224
29/01/14	10:10	11:10	20829.33	20830.33	1.00	1.0944	1.0944	1.0944	2.7522	2.7657	206
29/01/14	13:00	14:00	20830.33	20831.33	1.00	1.0944	1.0944	1.0944	2.7533	2.7699	253

Monitoring Station : TKO-A2a  
Location : CREO

Date	Time		Elapse Time		Sampling Time (hrs)	Flow Rate (m <sup>3</sup> /min.)		Average (m <sup>3</sup> /min.)	Filter Weight (g)		Conc. (µg/m <sup>3</sup> )
	Start	Finish	Initial	Final		Initial	Final		Initial	Final	
22/01/14	10:30	11:30	20004.44	20005.44	1.00	1.0844	1.0844	1.0844	2.7554	2.7742	289
24/01/14	10:45	11:45	20029.44	20030.44	1.00	1.0844	1.0844	1.0844	2.7438	2.7592	237
27/01/14	10:45	11:45	20030.44	20031.44	1.00	1.0844	1.0844	1.0844	2.7542	2.7687	223
29/01/14	09:10	10:10	20055.44	20056.44	1.00	1.0844	1.0844	1.0844	2.7495	2.7651	240
29/01/14	10:15	11:15	20056.44	20057.44	1.00	1.0844	1.0844	1.0844	2.7532	2.7681	229
29/01/14	13:00	14:00	20057.44	20058.44	1.00	1.0844	1.0844	1.0844	2.7546	2.7737	294



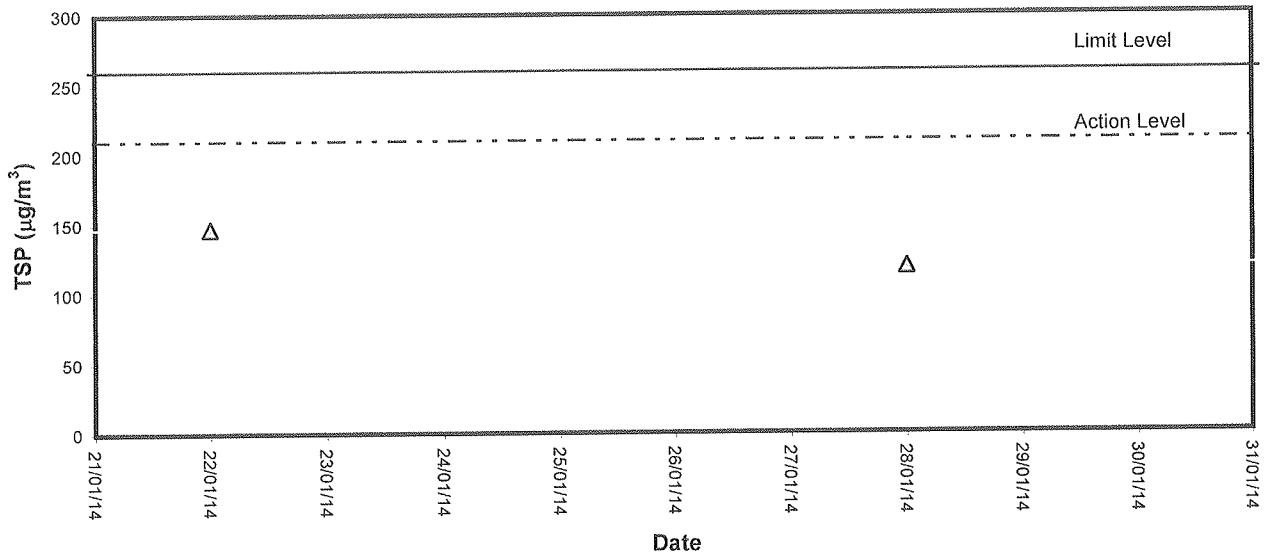
## Appendix I

### B3

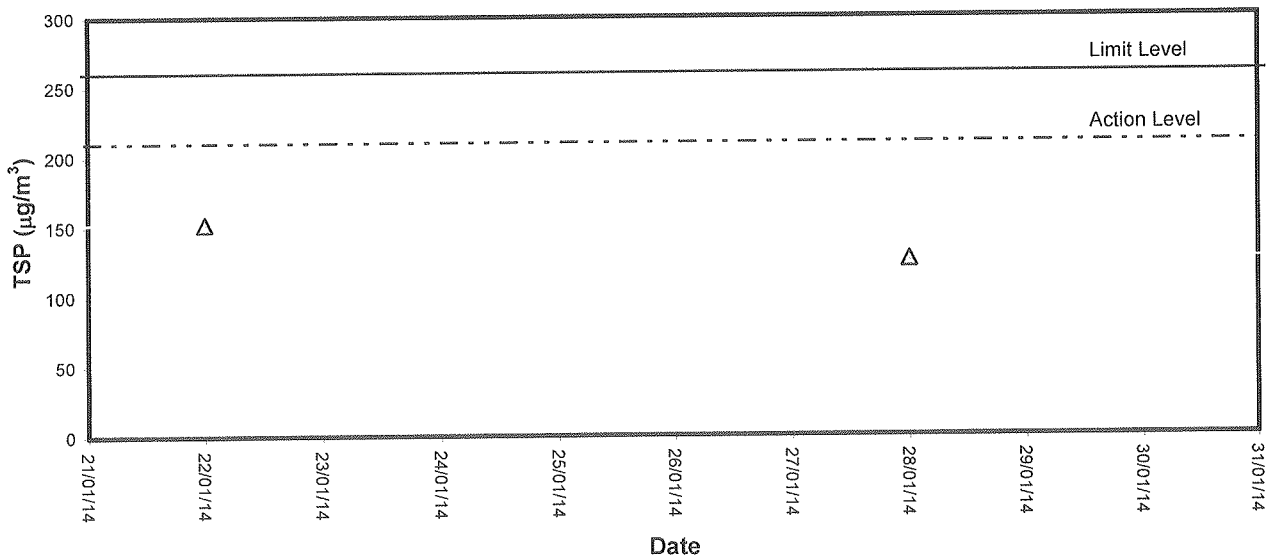
## Graphical Plots of Impact Air Quality Monitoring Data

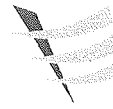


**24-hour TSP level at TKO-A1**

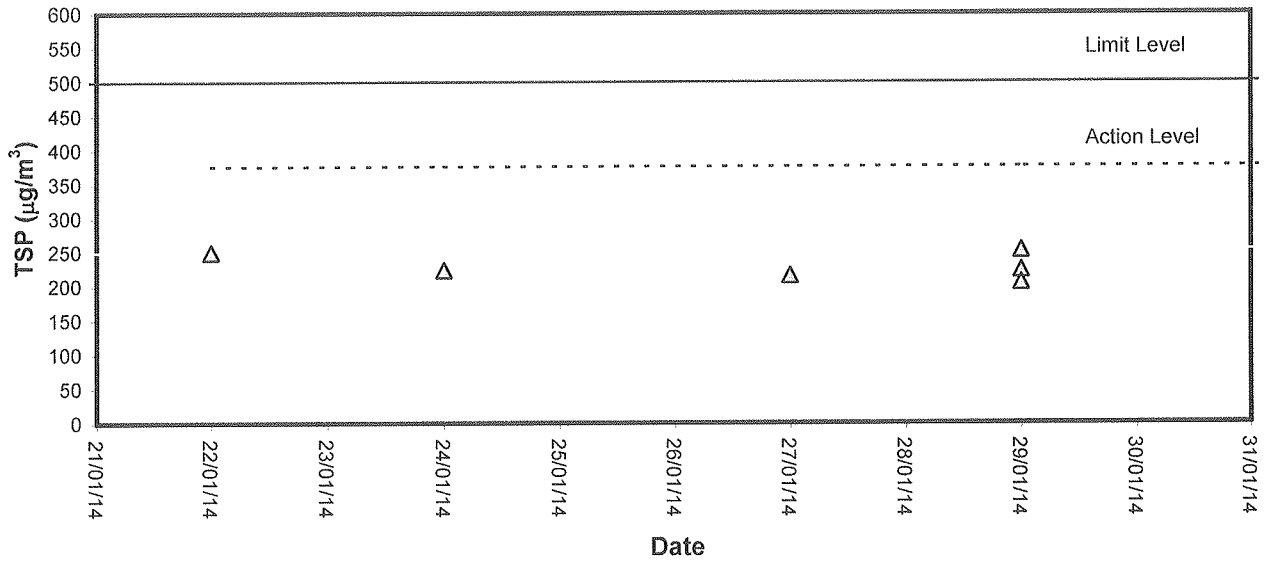


**24-hour TSP level at TKO-A2a**

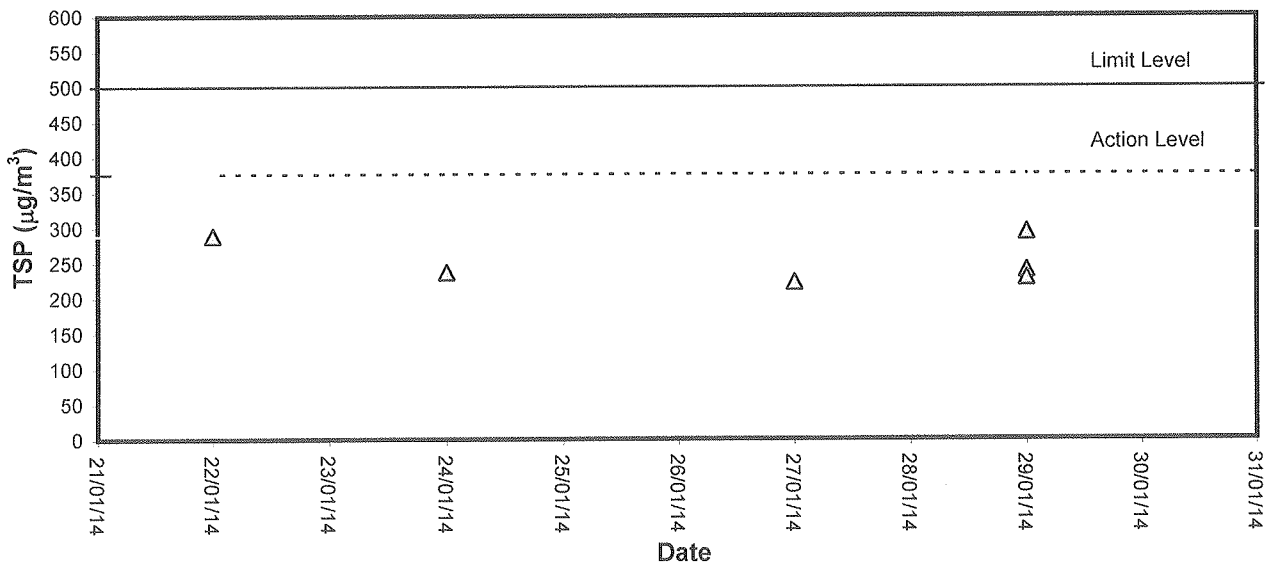




1-hour TSP level at TKO-A1



1-hour TSP level at TKO-A2a







## Appendix I

### C1

## Calibration Certificates for Impact Noise Monitoring Equipment



# Calibration Certificate

Certificate No. **38223**

**Customer :** ETS-Testconsult Limited

**Address :** 8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan St., Fotan, Hong Kong.

**Order No. :** Q33271

**Date of receipt :** 13-Nov-13

## Item Tested

**Description :** Precision Integrating Sound Level Meter (ET/EN/003/13)

**Manufacturer :** Rion

**Model :** NL-31

**Serial No. :** 00593620

## Test Conditions

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

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

**Supply Voltage :** --

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

## Test Specifications

Calibration check.

Ref. Document/Procedure : Z01.

## Test Results

All results were within the IEC 651 Type 1 & IEC 804 Type1 specification.

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>
S017	Multi-Function Generator	C127181	SCL-HKSAR
S205	Ref. Sound Level Calibrator	PHCO40002	SCL-HKSAR

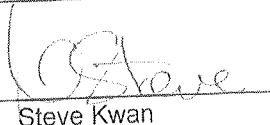
The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, 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: 15-Nov-13

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

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# Calibration Certificate

Certificate No. 38223

Page 2 of 3 Pages

Results :

## 1. SPL Accuracy

UUT Setting			Applied Value (dB)	UUT Reading (dB)
Level Range (dB)	Weight	Response		
20 - 100	L <sub>A</sub>	Fast	94.0	94.0
		Slow		94.0
	L <sub>C</sub>	Fast		94.0
		L <sub>p</sub>		Fast
30 - 120	L <sub>A</sub>	Fast	94.0	94.0
		Slow		94.0
	L <sub>C</sub>	Fast		94.0
		L <sub>p</sub>		Fast
30 - 120	L <sub>A</sub>	Fast	114.0	114.0
		Slow		114.0
	L <sub>C</sub>	Fast		114.0
		L <sub>p</sub>		Fast

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB  
Uncertainty :  $\pm 0.1$  dB

2. **Level Stability** : 0.0 dB  
IEC 651 Type 1 Spec. :  $\pm 0.3$  dB  
Uncertainty :  $\pm 0.01$  dB

## 3. Linearity

### 3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
130	114.0	114.0	0.0	$\pm 0.7$ dB
130	104.0	104.0	0.0	
120	94.0	94.0 (Ref.)	--	
110	84.0	84.0	0.0	
100	74.0	74.0	0.0	
90	64.0	64.1	0.1	
80	54.0	54.1	0.1	

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 38223

### 3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	84.0	0.0	± 0.4 dB
	94.0	94.0 (Ref.)	--	
	95.0	95.0	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

### 4. Frequency Weighting - A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	39.6	- 39.4 dB, ± 1.5 dB
63 Hz	-36.3	- 26.2 dB, ± 1.5 dB
125 Hz	-16.3	- 16.1 dB, ± 1 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref.)	0 dB, ± 1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1 dB
4 kHz	+1.1	+ 1.0 dB, ± 1 dB
8 kHz	-1.0	- 1.1 dB, + 1.5 dB ~ - 3 dB
16 kHz	-6.4	- 6.6 dB, + 3 dB ~ ∞

Uncertainty : ± 0.1 dB

### 5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 <sup>2</sup>	40.0	39.7	
1/10 <sup>3</sup>	40.0	39.8	± 1.0 dB
1/10 <sup>4</sup>	40.0	39.8	

Uncertainty : ± 0.1 dB

- Remarks:
1. UUT : Unit-Under-Test
  2. The uncertainty claimed is for a confidence probability of not less than 95%.
  3. Atmospheric Pressure : 1006 hPa
  4. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.

----- END -----



# Calibration Certificate

Certificate No. **38224**

Page 1 of 2 Pages

**Customer :** ETS-Testconsult Limited

**Address :** 8/F., Block B, Veristrong Industrial Centre, 34-36 Au Pui Wan St., Fotan, Hong Kong.

**Order No. :** Q33271

**Date of receipt :** 13-Nov-13

## Item Tested

**Description :** Sound Level Calibrator (ET/EN/002/01)

**Manufacturer :** Rion

**Model :** NC-73

**Serial No. :** 10196943

## Test Conditions

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

**Ambient Temperature :** (23 ± 3)°C

**Supply Voltage :** --

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

## Test Results

All results were within the manufacturer's specification.  
The results are shown in the attached page(s).

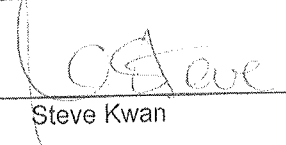
Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	35730	NIM-PRC & SCL-HKSAR
S205	Ref. Sound Level Calibrator	PHCO40002	SCL-HKSAR
S041	Universal Counter	34621	SCL-HKSAR
S206	Sound Level Meter	36203	SCL-HKSAR
S031	6½ dgt. Multimeter	30128	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:** 15-Nov-13



# Calibration Certificate

Certificate No. 38224

Page 2 of 2 Pages

Results :

## 1. Level Accuracy (at 1 kHz)

UUT Nominal Value	Measured Value	Mfr's Spec.
94 dB	94.1 dB	$\pm 1$ dB

Uncertainty :  $\pm 0.2$  dB

## 2. Frequency Accuracy

UUT Nominal Value	Measured Value	Mfr's Spec.
1 kHz	0.986 kHz	$\pm 2$ %

Uncertainty :  $\pm 0.1$  %

## 3. Level Stability : 0.0 dB

Uncertainty :  $\pm 0.01$  dB

## 4. Total Harmonic Distortion : $< 0.1$ %

Mfr's Spec. :  $< 3$  %

Uncertainty :  $\pm 2.3$  % of reading

- Remarks:
1. UUT : Unit-Under-Test
  2. The uncertainty claimed is for a confidence probability of not less than 95%.
  3. Atmospheric Pressure : 1006 hPa

----- END -----



## Appendix I

### C2

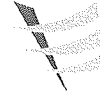
## Impact Noise Monitoring Results

## Day-time Noise Monitoring

Monitoring Location: TKO-N1 (Site Egress)

Date	Start Sampling Time (hh:mm)	Noise Level dB (A)			Wind Speed (m/s)	Weather Condition
		L <sub>eq</sub> (30min)	L <sub>10</sub>	L <sub>90</sub>		
24/01/14	13:00	64.4	66.9	58.7	0.3	Fine





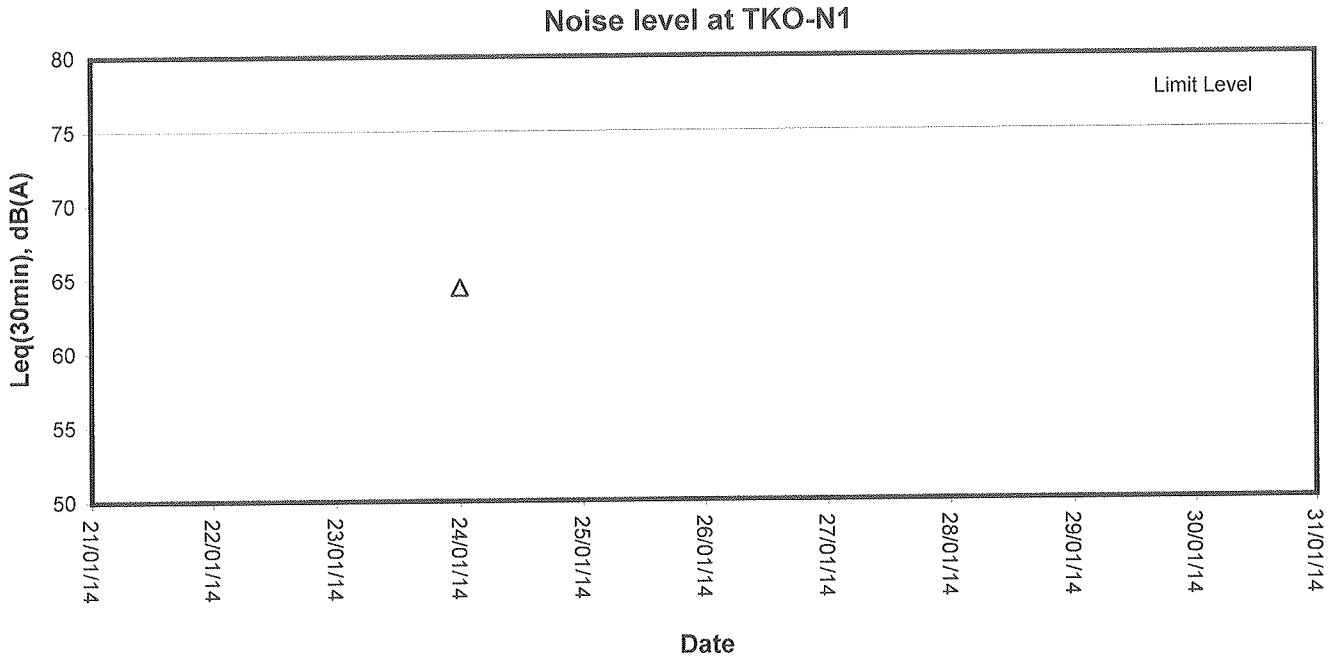
## Appendix I

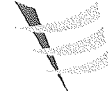
### C3

## Graphical Plots of Impact Noise Monitoring Data



## Noise Monitoring (Day-time)





## Appendix I

### D1

## Calibration Certificates for Impact Marine Water Quality Monitoring Equipments



### Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>ET/EW/008/004</u>	Manufacturer : <u>YSI</u>
Model No. : <u>Pro 2030</u>	Serial No. : <u>10F 101978</u>
Date of Calibration : <u>29/10/2013</u>	Calibration Due Date : <u>28/01/2014</u>

**Temperature Verification**

Ref. No. of Reference Thermometer : ET/0521/008  
 Ref. No. of Water Bath : ---

		Temperature (°C)		
Reference Thermometer reading	Measured	20.3	Corrected	19.9
DO Meter reading	Measured	19.8	Difference	0.1

**Standardization of sodium thiosulphate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) solution**

Reagent No. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> titrant	CPE/012/4.5/001/7	Reagent No. of 0.025N K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	CPE/012/4.4/001/22
		Trial 1	Trial 2
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)		1.00	12.00
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)		11.55	22.50
Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)		10.55	10.50
Normality of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> solution (N)		0.02370	0.02381
Average Normality (N) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> solution (N)		0.02376	
Acceptance criteria, Deviation		Less than ± 0.001N	

Calculation: Normality of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>, N = 0.25 / ml Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> used

**Linearity Checking**

**Determination of dissolved oxygen content by Winkler Titration \***

Purging Time (min)	2		5		10	
	1	2	1	2	1	2
Trial						
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	11.40	22.60	0.00	8.20	13.30
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	11.40	22.60	31.00	8.20	13.30	18.30
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	11.40	11.20	8.40	8.20	5.10	5.00
Dissolved Oxygen (DO), mg/L	7.27	7.14	5.36	5.23	3.25	3.19
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = V x N x 8000/298

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.22	7.10	7.16	7.27	7.14	7.21	0.70
5	5.34	5.16	5.25	5.36	5.23	5.30	0.95
10	3.32	3.11	3.22	3.25	3.19	3.22	0.00
Linear regression coefficient				0.9981			



## Internal Calibration Report of Dissolved Oxygen Meter

### Zero Point Checking

DO meter reading, mg/L	0.00
------------------------	------

### Salinity Checking

Reagent No. of NaCl (10ppt)	CPE/012/4.7/002/11	Reagent No. of NaCl (30ppt)	CPE/012/4.8/002/11
-----------------------------	--------------------	-----------------------------	--------------------

### Determination of dissolved oxygen content by Winkler Titration \*\*

Salinity (ppt)	10		30	
	1	2	1	2
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	12.30	24.50	35.80
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	12.30	24.50	35.80	46.90
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	12.30	12.20	11.30	11.10
Dissolved Oxygen (DO), mg/L	7.85	7.78	7.21	7.08
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation:  $DO (mg/L) = V \times N \times 8000/298$

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.86	7.91	7.89	7.85	7.78	7.82	0.89
30	7.29	7.24	7.27	7.21	7.08	7.15	1.66

### Acceptance Criteria

- (1) Difference between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : >0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies <sup>#</sup> / does not comply <sup>#</sup> with the specified requirements and is deemed acceptable <sup>#</sup> / unacceptable <sup>#</sup> for use.

<sup>#</sup> Delete as appropriate

Calibrated by :

Approved by :



## Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/004                      Manufacturer : YSI  
Model No. : Pro 2030                                      Serial No. : 10F 101978  
Date of Calibration : 29/10/2013                      Due Date : 28/01/2014

Ref. No. of Salinity Standard used (30ppt)

S/001/5

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30.0	32.1	6.76

Acceptance Criteria

Difference : <10 %

The salinity meter complies \* / ~~does not comply~~ \* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~ \* for use. Measurements are traceable to national standards.

Checked by : 

Approved by : 



### Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>ET/EW/008/004</u>	Manufacturer : <u>YSI</u>
Model No. : <u>Pro 2030</u>	Serial No. : <u>10F 101978</u>
Date of Calibration : <u>29/01/2014</u>	Calibration Due Date : <u>28/04/2014</u>

#### Temperature Verification

Ref. No. of Reference Thermometer : ET/0521/008

Ref. No. of Water Bath : ---

		Temperature (°C)		
Reference Thermometer reading	Measured	20.2	Corrected	19.8
DO Meter reading	Measured	19.6	Difference	0.2

#### Standardization of sodium thiosulphate ( $Na_2S_2O_3$ ) solution

Reagent No. of $Na_2S_2O_3$ titrant	CPE/012/4.5/001/8	Reagent No. of 0.025N $K_2Cr_2O_7$	CPE/012/4.4/001/24
		Trial 1	Trial 2
Initial Vol. of $Na_2S_2O_3$ (ml)		0.00	10.50
Final Vol. of $Na_2S_2O_3$ (ml)		10.50	20.95
Vol. of $Na_2S_2O_3$ used (ml)		10.50	10.45
Normality of $Na_2S_2O_3$ solution (N)		0.02381	0.02392
Average Normality (N) of $Na_2S_2O_3$ solution (N)		0.02387	
Acceptance criteria, Deviation		Less than $\pm 0.001N$	

Calculation: Normality of  $Na_2S_2O_3$ ,  $N = 0.25 / ml Na_2S_2O_3$  used

#### Linearity Checking

##### Determination of dissolved oxygen content by Winkler Titration \*

Purging Time (min)	2		5		10	
	1	2	1	2	1	2
Trial						
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	11.30	22.40	0.00	8.20	13.20
Final Vol. of $Na_2S_2O_3$ (ml)	11.30	22.40	30.80	8.20	13.20	18.10
Vol. (V) of $Na_2S_2O_3$ used (ml)	11.30	11.10	8.40	8.20	5.00	4.90
Dissolved Oxygen (DO), mg/L	7.24	7.11	5.38	5.25	3.20	3.14
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation:  $DO (mg/L) = V \times N \times 8000/298$

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.23	7.11	7.17	7.24	7.11	7.18	0.14
5	5.33	5.17	5.25	5.38	5.25	5.32	1.32
10	3.30	3.12	3.21	3.20	3.14	3.17	1.25
Linear regression coefficient				0.9990			



### Internal Calibration Report of Dissolved Oxygen Meter

**Zero Point Checking**

DO meter reading, mg/L	0.00
------------------------	------

**Salinity Checking**

Reagent No. of NaCl (10ppt)	CPE/012/4.7/002/15	Reagent No. of NaCl (30ppt)	CPE/012/4.8/002/15
-----------------------------	--------------------	-----------------------------	--------------------

**Determination of dissolved oxygen content by Winkler Titration \*\***

Salinity (ppt)	10		30	
	1	2	1	2
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	12.00	24.30	35.30
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	12.00	24.30	35.30	46.50
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	12.00	12.30	11.00	11.20
Dissolved Oxygen (DO), mg/L	7.69	7.88	7.05	7.18
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation:  $DO (mg/L) = V \times N \times 8000/298$

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.81	7.92	7.87	7.69	7.88	7.79	1.02
30	7.33	7.42	7.38	7.05	7.18	7.12	3.59

**Acceptance Criteria**

- (1) Difference between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : >0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies # / does not comply # with the specified requirements and is deemed acceptable # / unacceptable # for use.

# Delete as appropriate

Calibrated by :

Approved by :





## Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/004      Manufacturer : YSI  
Model No. : Pro 2030      Serial No. : 10F 101978  
Date of Calibration : 29/01/2014      Due Date : 28/04/2014

Ref. No. of Salinity Standard used (30ppt)

S/001/5

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30.0	32.3	7.38

Acceptance Criteria

Difference : <10 %

The salinity meter complies \* / ~~does not comply~~ \* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~ \* for use. Measurements are traceable to national standards.

Checked by : 

Approved by : 



## Performance Check of Turbidity Meter

Equipment Ref. No. : ET/0505/010

Manufacturer : HACH

Model No. : 2100Q

Serial No. : 11110 C 014260

Date of Calibration : 07/01/2014

Due Date : 06/04/2014

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	19.2	-4.08
100	104	3.92
800	793	-0.88

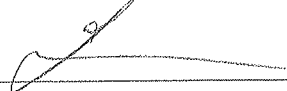
(\* ) Difference = (Measured Value – Theoretical Value) / Theoretical Value

Acceptance Criteria

Difference : -5 % to 5 %

The turbidity meter complies \* / ~~does not comply~~ \* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~ \* for use. Measurements are traceable to national standards.

Prepared by : 

Checked by : 



## Appendix I

### D2

## Impact Marine Water Quality Monitoring Results

# Mid-Flood Tide

## Monitoring Station : TKO-C1

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)		Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)			Turbidity (NTU)			Suspended Solids (mg/L)		
			Surface	Bottom		Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
22/01/14	1000-1017	13/Sunny	Surface	1.0	15.6	27.4	27.4	6.23	6.22	74.4	74.3	3.22	3.23	4.4	4.4	3.30	4.3		
						27.4	6.21	74.2	3.24	4.4									
						27.5	6.14	73.3	3.30	4.2									
24/01/14	1030-1048	18/Fine	Middle	9.3	15.7	27.5	27.5	6.16	6.15	73.6	73.5	3.33	3.32	4.4	4.3	3.30	4.3		
						27.5	6.03	72.0	3.32	4.4									
						27.5	6.05	72.2	3.36	4.2									
			Surface	1.0	16.6	27.2	27.3	6.54	6.54	78.8	78.8	3.75	3.77	4.8	4.8	3.77	4.8		
						27.3	6.53	78.7	3.79	4.8									
						27.3	6.31	76.1	3.81	4.8									
Bottom	17.6	15.7	27.4	27.4	6.32	6.32	76.3	76.2	3.83	3.82	4.6	4.7	3.77	4.7					
			27.5	6.30	76.2	3.70	4.6												
			27.5	6.28	75.9	3.72	4.8												
27/01/14	1330-1348	19/Sunny	Surface	1.0	17.1	27.2	27.3	6.44	6.42	78.5	78.3	3.31	3.30	4.4	4.3	3.33	4.4		
						27.3	6.40	78.0	3.28	4.2									
						27.3	6.38	77.8	3.29	4.2									
			Middle	9.4	17.1	27.3	27.3	6.36	6.37	77.5	77.7	3.34	3.32	4.4	4.3	3.33	4.4		
						27.3	6.36	77.5	3.34	4.4									
						27.4	6.40	78.0	3.34	4.4									
Bottom	17.8	17.2	27.3	27.4	6.36	6.38	77.5	77.8	3.40	3.37	4.6	4.5	3.40	4.5					
			27.3	6.38	77.8	3.40	4.4												
			27.3	6.35	77.4	3.28	4.0												
29/01/14	1530-1548	20/Sunny	Surface	1.0	17.2	27.3	27.3	6.35	6.37	77.4	77.6	3.28	3.29	4.0	4.2	3.30	4.3		
						27.3	6.35	77.4	3.33	4.4									
						27.3	6.35	77.4	3.33	4.4									
			Middle	9.5	17.1	27.4	27.4	6.33	6.34	77.2	77.3	3.34	3.34	4.6	4.5	3.34	4.5		
						27.4	6.33	77.2	3.34	4.6									
						27.4	6.28	76.5	3.28	4.2									
Bottom	17.9	17.2	27.4	27.4	6.30	6.29	76.8	76.7	3.25	3.27	4.4	4.3	3.25	4.3					
			27.4	6.30	76.8	3.25	4.4												

# Mid-Flood Tide

## Monitoring Station : TKO-M4

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)		Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)		Turbidity (NTU)		Suspended Solids (mg/L)		
			Surface	Middle		Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
22/01/14	1134-1158	13/Sunny	Surface	1.0	15.7	27.3	6.28	27.4	75.0	3.26	74.8	3.28	4.2	3.34	4.2	4.3	4.4
					15.8	27.4	6.24	27.5	74.5	3.30	4.4						
			Middle	4.4	15.8	27.4	6.18	27.5	73.8	3.34	3.35	4.4					
					15.7	27.5	6.16	27.5	73.6	3.36	4.6						
			Bottom	7.7	15.7	27.5	6.06	27.4	72.4	3.36	3.38	4.2					
					16.5	27.4	6.08	27.4	72.6	3.39	4.4						
24/01/14	1209-1230	18/Fine	Surface	1.0	16.5	27.1	6.48	27.2	78.1	3.66	78.1	3.68	4.4	3.57	4.4	4.5	4.5
					16.5	27.2	6.47	27.3	78.0	3.69	4.6						
			Middle	4.3	16.5	27.3	6.83	27.4	82.4	3.75	3.76	4.4					
					16.4	27.4	6.82	27.4	82.2	3.76	4.8						
			Bottom	7.6	16.4	27.6	6.71	27.6	81.3	3.25	3.27	4.2					
					17.1	27.5	6.73	27.3	81.5	3.29	4.4						
27/01/14	1510-1530	19/Sunny	Surface	1.0	17.1	27.3	6.38	27.3	77.8	3.36	78.1	3.38	4.2	3.41	4.2	4.4	4.6
					17.2	27.3	6.42	27.4	78.3	3.40	4.6						
			Middle	4.4	17.2	27.3	6.40	27.4	78.0	3.31	3.34	4.6					
					17.2	27.4	6.36	27.4	77.5	3.36	4.6						
			Bottom	7.7	17.2	27.3	6.33	27.4	77.2	3.44	3.50	4.6					
					17.0	27.4	6.35	27.4	77.4	3.56	4.8						
29/01/14	1710-1730	20/Sunny	Surface	1.0	17.0	27.3	6.33	27.3	77.2	3.32	76.9	3.33	4.4	3.32	4.4	4.5	4.3
					17.1	27.2	6.28	27.3	76.5	3.34	4.2						
			Middle	4.4	17.1	27.3	6.30	27.4	76.8	3.34	3.35	4.6					
					17.2	27.4	6.34	27.4	77.2	3.36	4.4						
			Bottom	7.8	17.2	27.3	6.26	27.4	76.3	3.30	3.28	4.4					
					17.2	27.4	6.26	27.4	76.3	3.26	4.0						

# Mid-Ebb Tide

## Monitoring Station : TKO-C1

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)	Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)			Turbidity (NTU)			Suspended Solids (mg/L)		
					Value	Average	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
22/01/14	1500-1518	16/Sunny	Surface	15.7	27.5	27.5	6.03	6.02	6.00	72.0	71.9	3.34	3.35	4.2	4.3	4.4		
			Middle	15.8	27.4	6.00	5.99	6.00	71.7	71.6	3.36	3.42	4.4	4.7				
			Bottom	15.8	27.4	5.98	5.95	71.4	71.1	3.44	3.43	4.8	4.3					
24/01/14	1715-1732	18/Fine	Surface	16.2	27.1	27.2	6.40	6.41	6.47	77.2	77.3	3.84	3.85	4.6	4.7	4.7		
			Middle	16.3	27.3	27.4	6.53	6.53	78.8	78.8	3.74	3.75	4.6	4.6				
			Bottom	16.4	27.4	6.52	6.74	6.74	78.7	81.5	3.76	3.90	4.6	4.9				
27/01/14	0802-0820	15/Sunny	Surface	16.8	27.2	27.2	6.33	6.35	6.39	77.1	77.3	3.56	3.57	4.6	4.7	4.7		
			Middle	16.9	27.3	27.3	6.44	6.43	78.5	78.3	3.58	3.60	4.8	4.5				
			Bottom	16.9	27.3	6.41	6.44	6.44	78.1	78.5	3.59	3.75	4.4	4.9				
29/01/14	1000-1020	19/Sunny	Surface	17.1	27.2	27.2	6.34	6.35	6.34	77.3	77.4	3.73	3.45	4.4	4.5	4.6		
			Middle	17.1	27.3	27.3	6.33	6.33	77.4	77.1	3.43	3.50	4.6	4.5				
			Bottom	17.2	27.3	6.32	6.35	6.35	77.0	77.4	3.48	3.57	4.6	4.7				

# Mid-Ebb Tide

## Monitoring Station : TKO-M4

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Monitoring Depth (m)		Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen Saturation (%)			Turbidity (NTU)			Suspended Solids (mg/L)		
			Surface	Bottom		Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
22/01/14	1644-1700	16/Sunny	Surface	1.0	15.5	27.5	27.5	6.05	6.07	72.3	72.5	3.36	3.37	4.0	4.2	4.3			
						27.4	27.5	6.08	6.03	72.6	72.0	3.37	3.35	4.4	4.3				
						27.5	27.5	6.04	6.03	71.8	72.1	3.34	3.36	4.4	4.2				
24/01/14	1854-1915	18/Fine	Bottom	7.3	15.7	27.5	27.6	5.98	5.98	71.4	71.4	3.40	3.42	4.5	4.5	4.6			
						27.6	27.6	5.97	6.33	71.3	76.3	3.44	3.73	4.4	4.6				
						27.0	27.1	6.32	6.33	76.2	76.3	3.72	3.73	4.4	4.8				
27/01/14	0941-1000	15/Sunny	Middle	4.2	16.3	27.2	27.3	6.52	6.51	78.8	78.7	3.85	3.85	4.8	4.9	4.6			
						27.3	27.3	6.50	6.66	80.4	80.6	3.84	3.41	4.4	4.4				
						27.3	27.4	6.64	6.66	80.8	80.8	3.41	3.42	4.4	4.4				
27/01/14	0941-1000	15/Sunny	Bottom	7.4	16.4	27.4	27.4	6.67	6.30	76.8	76.8	3.54	3.56	4.6	4.5	4.7			
						27.4	27.3	6.29	6.30	76.7	76.8	3.57	3.57	4.4	4.5				
						27.2	27.3	6.29	6.31	77.2	76.9	3.58	3.61	4.8	4.8				
29/01/14	1141-1200	19/Sunny	Surface	1.0	17.2	27.3	27.3	6.30	6.32	76.8	77.1	3.48	3.46	4.6	4.5	4.5			
						27.2	27.4	6.34	6.26	77.3	76.3	3.44	3.38	4.4	4.4				
						27.3	27.4	6.30	6.27	76.8	76.3	3.36	3.40	4.4	4.4				
29/01/14	1141-1200	19/Sunny	Middle	4.1	17.2	27.4	27.4	6.22	6.27	75.8	76.3	3.40	3.50	4.6	4.7	4.5			
						27.4	27.4	6.26	6.27	76.3	76.4	3.48	3.52	4.6	4.8				
						27.4	27.4	6.27	6.27	76.4	76.4	3.52	3.50	4.8	4.7				

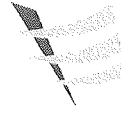


## Appendix I

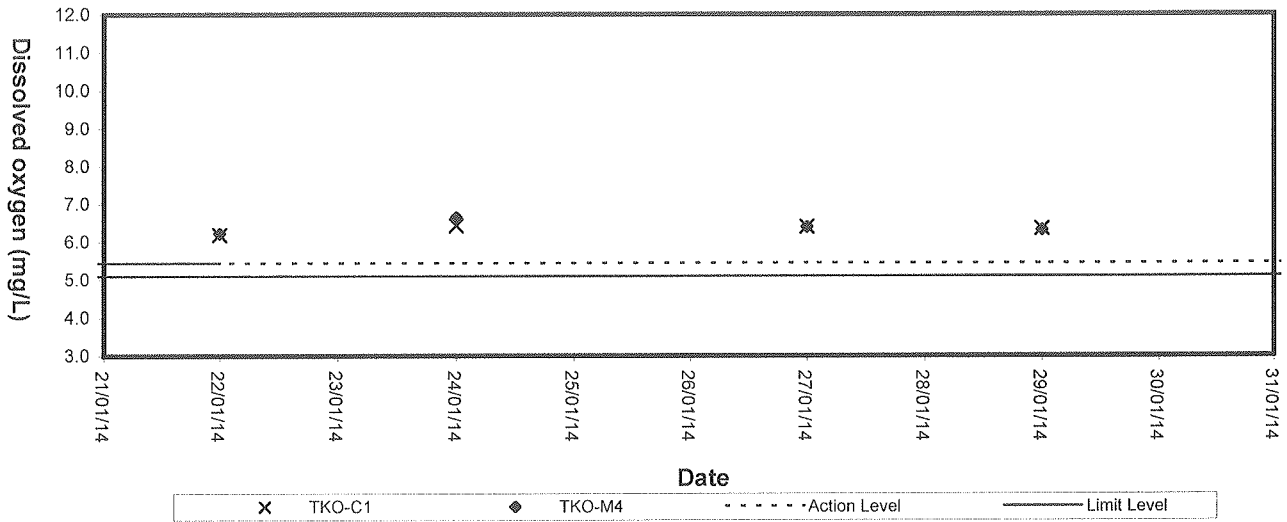
### D3

## Graphical Plots of Impact Marine Water Quality Monitoring Data

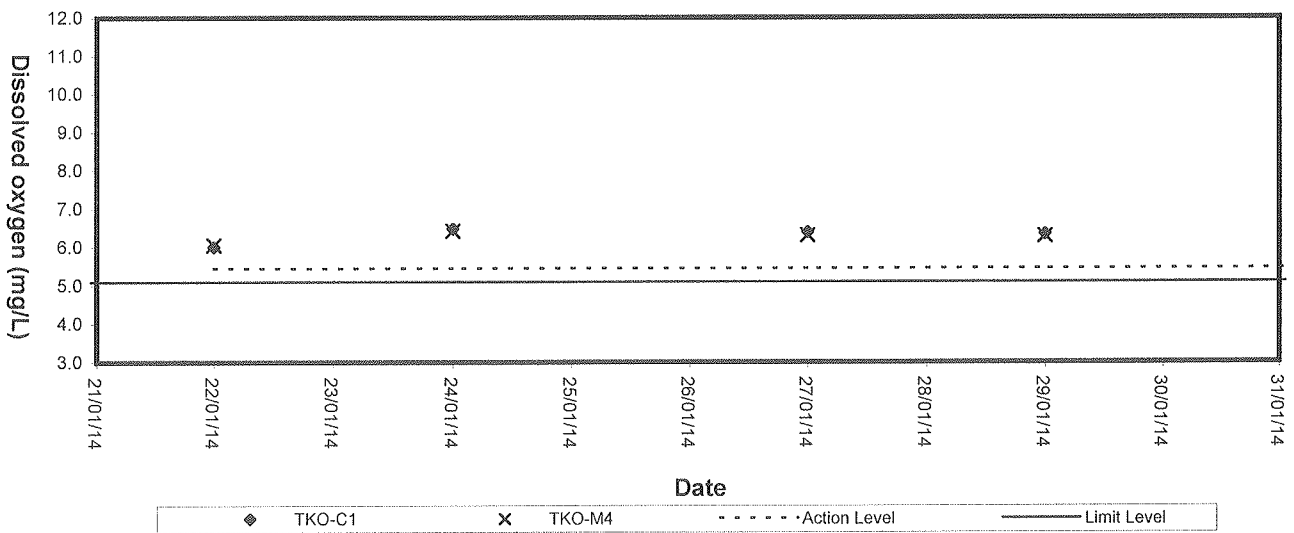


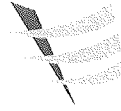


### Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide

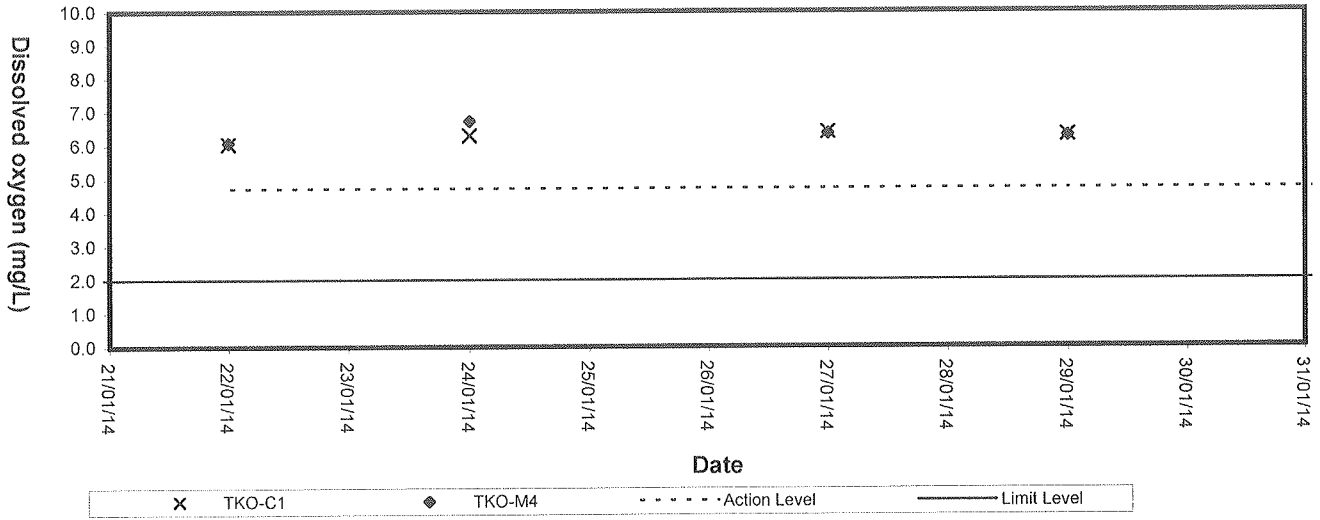


### Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide

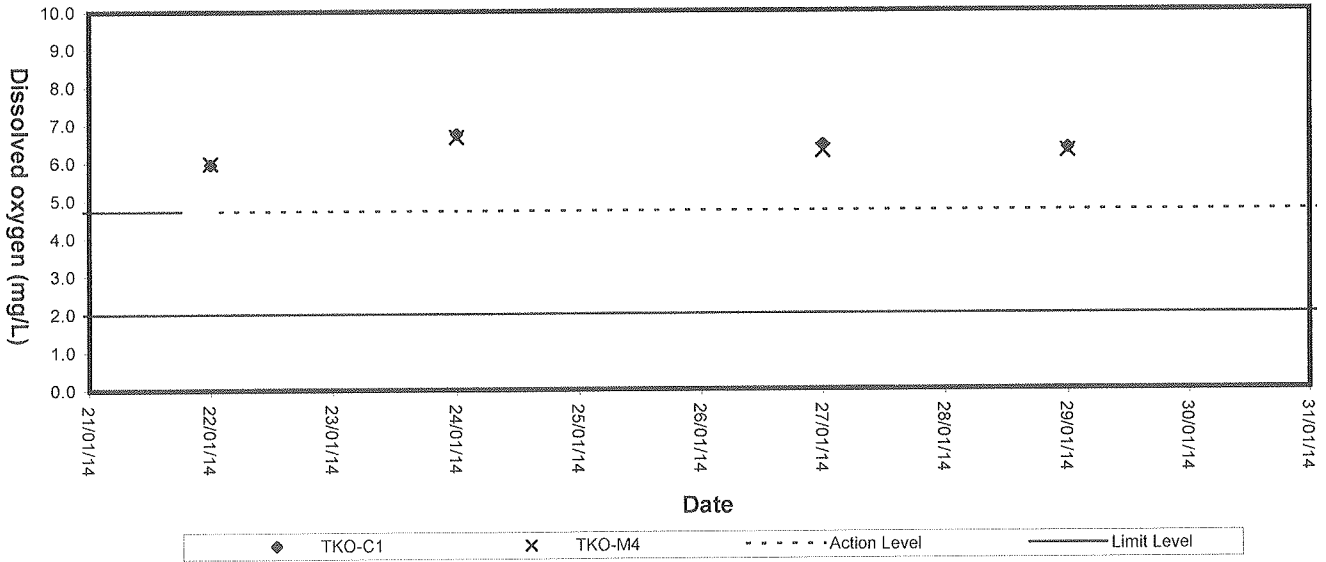


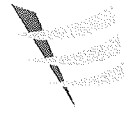


### Dissolved Oxygen (Bottom) at Mid-Flood Tide

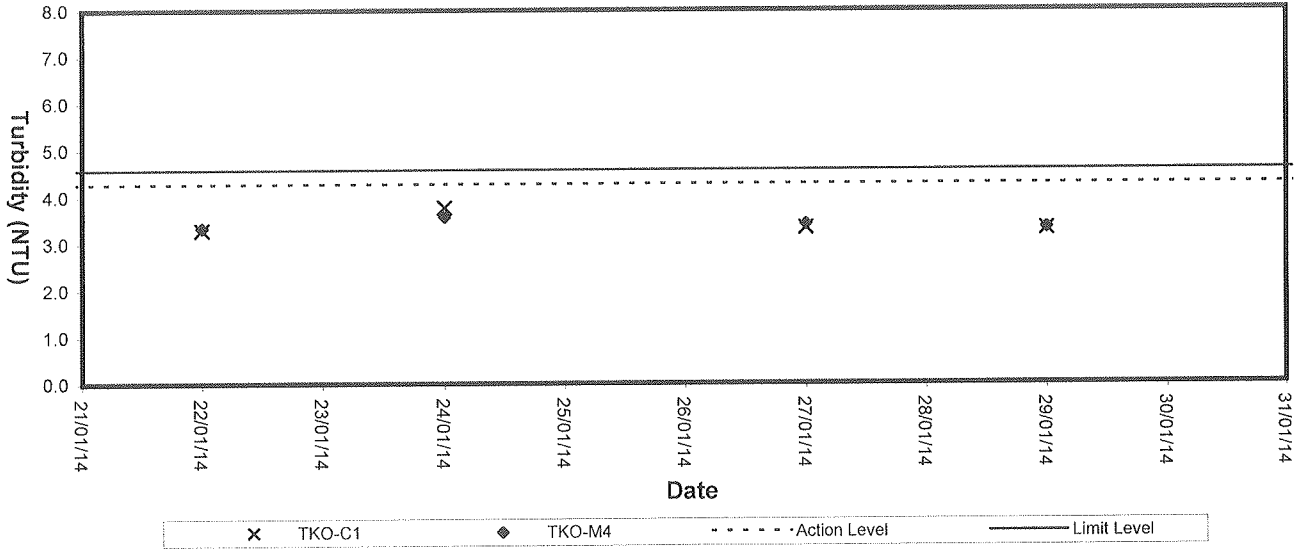


### Dissolved Oxygen (Bottom) at Mid-Ebb Tide

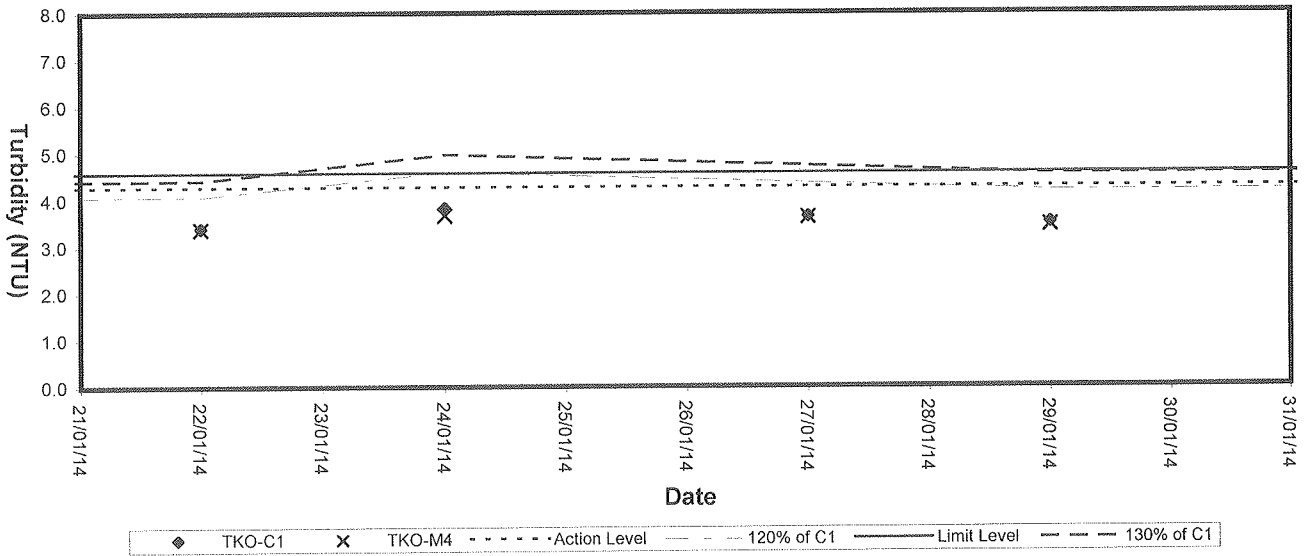




### Turbidity (Depth-average) at Mid-Flood Tide

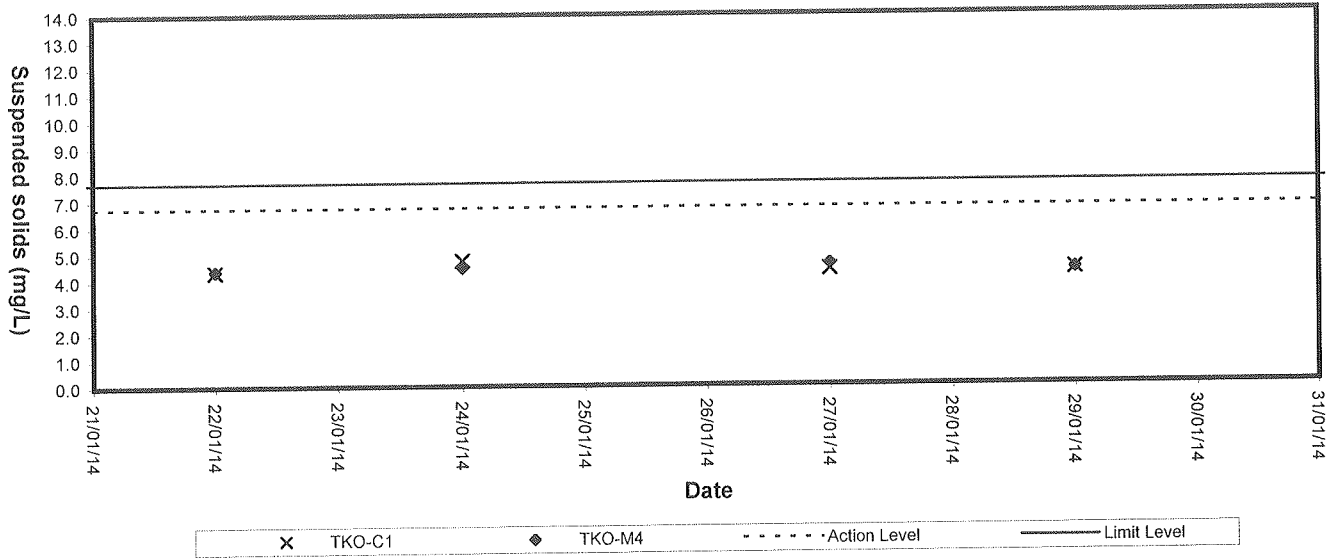


### Turbidity (Depth-average) at Mid-Ebb Tide

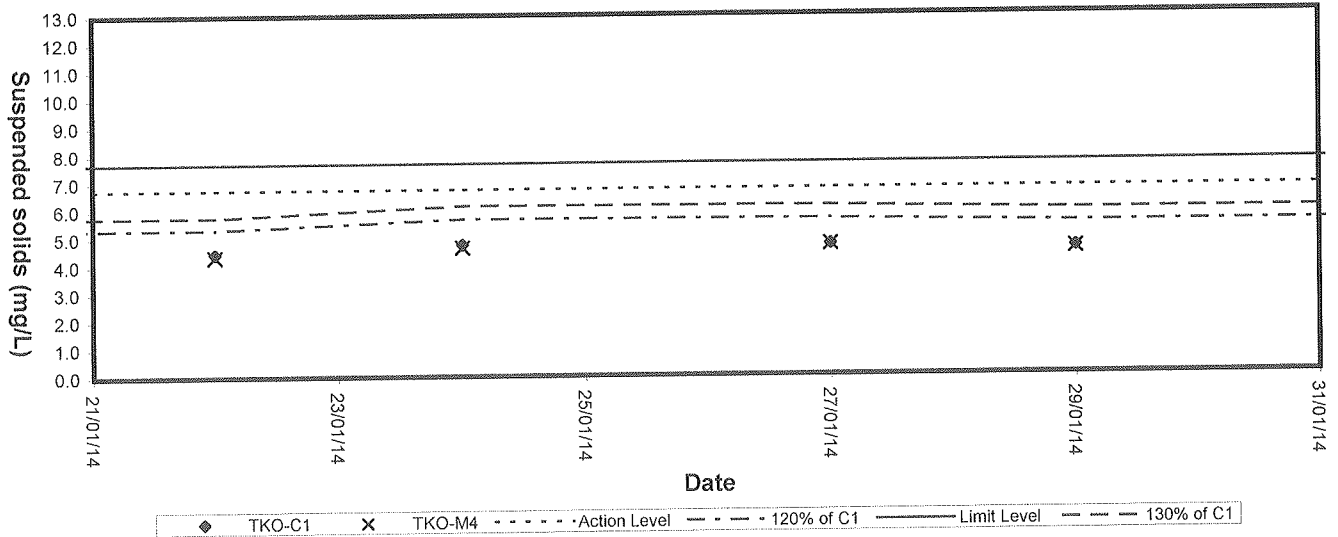




### Suspended solids (Depth-average) at Mid-Flood Tide



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





## Appendix I

### E

#### Weather Condition

Extract of Meteorological Observations for Tseung Kwan O Automatic Weather Station, January 2014

Date	Mean Pressure at M.S.L. (hPa)	Air Temperature			Mean Dew Point Temperature (deg C)	Relative Humidity		
		Max. (deg C)	Mean (deg C)	Min. (deg C)		Max. (%)	Mean (%)	Min. (%)
Jan 1	*****	21.3	13.1	8.4	3.9	87	59	23
Jan 2	*****	20.4	15.3	10.2	10.6	99	75	49
Jan 3	*****	24.9	18.6	14.4	13.0	91	72	47
Jan 4	*****	22.8	17.6	13.7	5.5	81	47	26
Jan 5	*****	18.7	14.5	10.0	7.0	87	62	35
Jan 6	*****	18.5	15.6	13.5	10.3	89	71	54
Jan 7	*****	17.6	16.8	15.7	13.4	93	81	67
Jan 8	*****	22.9	18.2	13.5	15.4	99	84	65
Jan 9	*****	16.4	14.5	12.8	7.7	79	64	55
Jan 10	*****	15.7	14.6	13.5	10.1	83	75	66
Jan 11	*****	19.2	15.6	12.7	11.4	91	77	53
Jan 12	*****	22.7	16.6	12.4	11.0	98	72	48
Jan 13	*****	17.2	12.9	9.9	6.4	79	65	49
Jan 14	*****	17.5	12.4	8.6	5.3	86	63	45
Jan 15	*****	16.5	12.3	7.8	3.9	83	59	32
Jan 16	*****	16.8	13.2	9.9	6.6	88	65	42
Jan 17	*****	21.5	14.5	10.6	9.8	97	77	39
Jan 18	*****	21.1	15.2	11.7	3.1	89	47	23
Jan 19	*****	17.1	13.1	10.2	7.3	87	70	42
Jan 20	*****	22.9	15.0	9.4	3.0	87	49	20
Jan 21	*****	18.4	14.0	11.0	-5.4	40	26	15
Jan 22	*****	17.5	11.4	7.6	-1.6	81	44	20
Jan 23	*****	15.9	11.4	8.0	6.2	90	73	41
Jan 24	*****	18.5	14.7	10.0	10.2	91	75	53
Jan 25	*****	21.8	17.8	15.0	13.4	90	76	57
Jan 26	*****	25.1	18.2	15.3	13.4	90	76	42
Jan 27	*****	19.2	15.3	12.5	10.3	94	74	49
Jan 28	*****	20.8	15.7	13.0	11.1	94	77	43
Jan 29	*****	21.5	15.6	11.6	11.6	95	79	48
Jan 30	*****	23.7	16.8	12.4	13.4	99	82	54
Jan 31	*****	24.9	18.0	12.6	14.0	99	81	43
<b>Mean</b>	*****	20.0	15.1	11.5	8.4	88	68	43
<b>Maximum</b>	*****	25.1	18.6	15.7	15.4	99	84	67
<b>Minimum</b>	*****	15.7	11.4	7.6	-5.4	40	26	15

Extract of Meteorological Observations for Tseung Kwan O Automatic Weather Station, January 2014

Date	Total Rainfall (mm)	Prevailing Wind Direction (degrees)	Mean Wind Speed (km/h)
Jan 1	0.0	070	3.5
Jan 2	0.0	010	3.8
Jan 3	0.0	360	2.7
Jan 4	0.0	070	8.0
Jan 5	0.0	020	4.6
Jan 6	0.0	020	8.4
Jan 7	0.0	020	7.5
Jan 8	0.0	060	4.8
Jan 9	0.0	070	7.4
Jan 10	0.0	070	7.8
Jan 11	0.0	030	7.2
Jan 12	0.0	060	7.1
Jan 13	0.0	070	7.5
Jan 14	0.0	340	6.3
Jan 15	0.0	080	5.5
Jan 16	0.0	020	8.2
Jan 17	0.0	320	5.3
Jan 18	0.0	360	7.9
Jan 19	0.0	080	6.4
Jan 20	0.0	350	6.2
Jan 21	0.0	030	9.1
Jan 22	0.0	340	5.5
Jan 23	0.0	070	6.0
Jan 24	0.0	020	7.3
Jan 25	0.0	070	6.1
Jan 26	0.0	020	6.6
Jan 27	0.0	030	6.8
Jan 28	0.0	020	5.4
Jan 29	0.0	010	4.0
Jan 30	0.0	360	3.2
Jan 31	0.0	350	4.1
<b>Mean</b>	-----	070	6.1
<b>Total</b>	0.0	---	-----
<b>Maximum</b>	0.0	---	9.1
<b>Minimum</b>	0.0	---	2.7

\*\*\* unavailable

# missing (less than 24 hourly observations a day)

Rainfall measured in increment of 0.5 mm. Amount of < 0.5 mm cannot be detected



## Appendix I

### F

## Event-Action Plans



# EVENT/ACTION PLAN FOR AIR QUALITY EXCEEDANCE

EVENT		ACTION			Contractor
ET Leader		IC(E)	ER		
<b>ACTION LEVEL</b>					
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 ER, IC(E) and Contractor</li> <li>3. Repeat measurement to confirm finding</li> <li>4. Increase monitoring frequency to daily</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET</li> <li>2. Check contractor's working method</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practise</li> <li>2. Amend working methods if appropriate</li> </ol>	
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures</li> <li>2. Inform IC(E) and Contractor</li> <li>3. Repeat measurements to confirm finding</li> <li>4. Increase monitoring frequency to daily</li> <li>5. Discuss with IC(E) and Contractor on remedial actions</li> <li>6. If exceedance continues, arrange meeting with IC(E) and ER.</li> <li>7. If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET</li> <li>2. Check the Contractor's working method</li> <li>3. Discuss with ET and Contractor on possible remedial measures</li> <li>4. Advise the ER on the effectiveness of the proposed remedial measures</li> <li>5. Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify the Contractor</li> <li>3. Ensure remedial measures properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial actions to IC(E) within 3 working days of notification</li> <li>2. Implement the agreed proposals</li> <li>3. Amend proposal if appropriate</li> </ol>	
<b>LIMIT LEVEL</b>					
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 ER, Contractor and EPD</li> <li>3. Repeat measurement to confirm finding</li> <li>4. Increase monitoring frequency to daily</li> <li>5. Assess the effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by the ET</li> <li>2. Check Contractor's working method</li> <li>3. Discuss with ET and Contractor on possible remedial measures</li> <li>4. Advise the ER on the effectiveness of the proposed remedial measures</li> <li>5. Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify the Contractor</li> <li>3. 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 IC(E) within 3 working days of notification</li> <li>3. Implement the agreed proposals</li> <li>4. Amend proposal if appropriate.</li> </ol>	

## EVENT/ACTION PLAN FOR AIR QUALITY EXCEEDANCE

EVENT	ACTION			Contractor
	ET Leader	IC(E)	ER	
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures</li> <li>2. Notify IC(E), ER, EPD and Contractor</li> <li>3. Repeat measurement to confirm finding</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 IC(E) and ER to discuss the remedial actions to be taken</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results</li> <li>8. If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, 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 ER 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. In consultation with the IC(E), agree with the Contractor on the remedial measures to be implemented</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. If exceedances continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedances</li> <li>2. Submit proposals for remedial actions to IC(E) 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 activity of works as determined by the ER until the exceedance is abated</li> </ol>

## EVENT/ACTION PLAN FOR NOISE EXCEEDANCE

EVENT	ACTION			
	ET Leader	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify the IC(E) and the Contractor.</li> <li>2. Carry out investigation.</li> <li>3. Report the results of investigation to the IC(E) and the 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 ER 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 the Contractor.</li> <li>3. Require the 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 IC(E).</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify the IC(E), the ER, the EPD and the Contractor.</li> <li>2. Identify source.</li> <li>3. Repeat measurement 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 the IC(E), the ER and the EPD the causes &amp; actions taken for the exceedances.</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep the IC(E), the EPD and the ER informed of the results</li> <li>8. If exceedance due to the construction works stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst the ER, the ET Leader and the Contractor on the potential remedial actions.</li> <li>2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER 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 the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problem.</li> <li>4. Ensure remedial measures are properly implemented.</li> <li>5. If exceedances continue, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedances is abated.</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 IC(E) 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 activity of works as determined by the ER until the exceedances is abated.</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION			IEC
	ET Leader	Contractor	ER	
<p>Action level being exceeded by one sampling day</p>	<ol style="list-style-type: none"> <li>1. Identify source(s) of impact;</li> <li>2. Repeat in-situ measurement to confirm findings;</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with Contractor if exceedance is due to the construction works within 4 working days</li> <li>8. Repeat measurement on next day of exceedance if exceedance is due to the construction works</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the ER and IEC in writing within 24 hours of identification of exceedance</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Submit investigation report to IEC and ER within 3 working days of the identification of an exceedance</li> <li>5. Consider changes of working method if exceedance is due to the construction works</li> <li>6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER if exceedance is due to the construction works within 4 working days of identification of an exceedance</li> <li>7. Implement the agreed mitigation measures within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance</li> <li>2. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>3. Require contractor to propose remedial measures for the analysed problem if related to the construction works</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. Assess the effectiveness of the mitigation measure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET</li> <li>2. Confirm ET assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ET, ER and Contractor on the mitigation measures</li> <li>4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly</li> <li>5. Supervise the implementation of mitigation measures</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY

Event	ACTION			IEC
	ET Leader	Contractor	ER	
<p>Action level being exceeded by more than one consecutive sampling days</p>	<ol style="list-style-type: none"> <li>1. Identify source(s) of impact;</li> <li>2. Repeat in-situ measurement to confirm findings</li> <li>3. Notify Contractor in writing within 24 hours of identification</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with IEC and Contractor within 4 working of identification of an exceedance</li> <li>8. Ensure mitigation measures are implemented;</li> <li>9. Prepare to increase the monitoring frequency to daily;</li> <li>10. Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing within 24 hours of identification of exceedance</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance</li> <li>6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of identification of an exceedance</li> <li>7. Implement the agreed mitigation measures within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of the identification of the exceedance</li> <li>2. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>3. Require contractor to propose remedial measures for the analysed problem if related to the construction works</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. Assess the effectiveness of the mitigation measure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET</li> <li>2. Confirm ET assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ET, ER and Contractor on the mitigation measures.</li> <li>4. Review contractor's mitigation measures whenever necessary to ensure their effectiveness and advise the ER accordingly</li> <li>5. Assess the effectiveness of the implemented mitigation measures.</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION			IEC
	ET Leader	Contractor	ER	
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with IEC, ER and Contractor within 4 working of identification of an exceedance</li> <li>8. Ensure mitigation measures are implemented;</li> <li>9. Increase the monitoring frequency to daily until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER in writing; within 24 hours of the identification of the exceedance</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance</li> <li>6. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days of the identification of an exceedance</li> <li>7. Implement the agreed mitigation measures within reasonable time scale</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance</li> <li>2. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>3. Request Contractor to critically review the working methods;</li> <li>4. Ensure remedial measures are properly implemented</li> <li>5. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET</li> <li>2. Confirm ET assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ET, ER and Contractor on the mitigation measures.</li> <li>4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly.</li> <li>5. Assess the effectiveness of the implemented mitigation measures</li> </ol>

## EVENT AND ACTION PLAN FOR WATER QUALITY EXCEEDANCE

Event	ACTION			IEC
	ET Leader	Contractor	ER	
Limit Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify source(s) of impact;</li> <li>3. Notify Contractor in writing within 24 hours of identification of the exceedance</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Carry out investigation</li> <li>6. Report the results of investigation to the Contractor within 3 working days of identification of exceedance and advise contractor if exceedance is due to contractor's construction works</li> <li>7. Discuss mitigation measures with IEC, ER and Contractor;</li> <li>8. Ensure mitigation measures are implemented;</li> <li>9. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify ER and IEC in writing within 24 hours of the identification of the exceedance and Rectify unacceptable practice;</li> <li>2. Check all plant and equipment;</li> <li>3. Consider changes of working methods;</li> <li>8. Submit the results of the investigation to IEC and ER within 3 working days of the identification of an exceedance</li> <li>5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 4 working days;</li> <li>6. Implement the agreed mitigation measures within reasonable time scale</li> <li>7. As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify EPD and other relevant governmental agencies in writing within 24 hours of identification of exceedance</li> <li>2. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>3. Request Contractor to critically review the working methods;</li> <li>6. Ensure remedial measures are properly implemented</li> <li>4. Assess the effectiveness of the implemented mitigation measures;</li> <li>5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET</li> <li>2. Confirm ET assessment if exceedance is due / not due to the works</li> <li>3. Discuss with ER, ET and Contractor on the mitigation measures.</li> <li>4. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly.</li> <li>5. Assess the effectiveness of the implemented mitigation measures.</li> </ol>



## Appendix I

### G

## Works Programme



Master Programme of Contract No. CV/2013/06 - Handling of Surplus Public Fill

Site Location : Tseung Kwan O Area 137 Fill Bank

ID	Activity	Original Duration	Start	Finish
A1150	Take Over	0	23-Jan-14	
A1170	Operation	1100	23-Jan-14	26-Jan-17
A1370	Hand Over to CEDD	0		26-Jan-17
Stage A1 Construction of New Office		120	28-Nov-13	27-May-14
A1080	Submission	30	28-Nov-13	27-Dec-13
A1090	Approval by Engineer	7	28-Dec-13	03-Jan-14
A1100	Installation	64	23-Jan-14	27-May-14
A1110	Hand Over to Engineer	0		27-May-14
Stage A1 Surveillance System		120	28-Nov-13	27-May-14
A1190	Submission	30	28-Nov-13	27-Dec-13
A1200	Approval by Engineer	7	28-Dec-13	03-Jan-14
A1210	Installation	64	23-Jan-14	27-May-14
A1230	Hand Over to Engineer	0		27-May-14



## Appendix I

### H


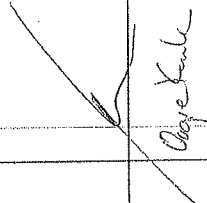

## Weekly ET's Site Inspection Record



CEDD Contract No.: CV/2013/06

Handling of Surplus Public Fill - **Tseung Kwan O Fill Bank**

Inspection Date : 22-1-14  
 Time : 10:00  
 Weather : Sunny / Fine Cloudy / Overcast / Drizzle / Rain / Storm / Hazy  
 Wind : Calm / Light / Breeze / Strong  
 Temperature : 17  
 Humidity : High / Moderate / Low

Inspected by	CEDD	Contractor / Sub-Contractor	ET
Signature:			
Name:	C.K. Woo P.O. PA 607A	<del>Cheong Kwan</del> Kwok Luk WAI <del>Hiale</del>	Tsz Chung Hing
Title	Asst. Insp	Site Agent (K.O. F.B.)	E.T



Implementation Stages*		Remark
<b>Fugitive Dust Emission</b>		
✓		Dust control / mitigation measures shall be provided to prevent dust nuisance.
✓		A buffer zone of at least 100m shall be maintained between the edge of the stockpiling area and the nearest ASRs at the TKO Industrial Estate. Within the buffer zone, no dusty material shall be stockpiled and no loading / unloading and similar activities should be allowed.
✓		Water sprays shall be provided and used to dampen materials.
✓		Regular cleaning and watering the site shall be provided to minimize the fugitive dust emissions.
✓		All vehicles shall be restrict to a maximum speed of 10 km per hour.
✓		Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.
✓		The designated site main haul road shall be paved or regular watering.
✓		Frequent watering of work site shall be at least three times per day.
✓		Wheel washing facilities including high-pressure water jet shall be provided at the entrance of work site.
✓		Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank.
✓		All plant and equipment should be well maintained e.g. without black smoke emission.
✓		Open burning should be prohibited.
✓		The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.
✓		Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shot concrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.
✓		When fill material is transfer by belt conveyor systems, the conveyors shall be enclosed on top and 2 sides.
✓		The belt scraper shall be equipped with bottom plates or other similar means to prevent falling of material from the return belt.
✓		The level of stockpiling belt conveyor shall be adjustable such that the vertical distance between the belt conveyor and the material landing point is maintained at no more than 1m.
<b>Noise Impact</b>		
✓		The approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted.
✓		Only well maintained plant should be operated on-site and plant should be serviced regularly during the construction works.
✓		Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials.
✓		Air compressors and hand held breakers should have noise labels.
✓		Machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.
✓		Noisy equipment and mobile plant shall always be site away from NSRs.

Handling of Surplus Public Fill - Tseung Kwan O Fill Bank

Environmental Checklist		Implementation Stages*			Remark
		Yes	No	N/A	
<b>Water Quality</b>					
<input checked="" type="checkbox"/>	Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	The permanent drainage channels should have sediment basin, traps and baffles and maintain properly.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Temporary intercepting drains should be used at the stockpiling area to divert polluted stormwater to the intercepting channels. Earth bunds and sand bay barriers shall be used to assist the diversion of polluted stormwater to the intercepting channels.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Manholes should be covered and sealed.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	A buffer distance of at least 100m shall be maintained between the boundary of the public fill stockpiling area and the sea front.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafront.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	The stormwater intercepting system shall be effective to collect runoff and remove suspended solids before discharge.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shotcrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Existing and newly constructed Catchpits, sand and silt removal facilities and intercepting channels shall be maintained, and the deposited silt and grit shall be removed weekly and on a need basis especially at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	The section of construction road between wheel washing bay and the public road shall be paved with concrete, bituminous materials or hardcores to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Sewage from toilets shall be discharged in to a foul sewer, or chemical toilets shall be provided. The chemical toilets (if use) shall be provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Oil intercept in addition of sand / silt removal facilities shall be provided at the car parking areas.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Oil interceptor shall be provided at work shop.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Tipping halls enclosed with top and 3-side to prevent spillage of material into marine water.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	The barges shall be in right size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure the undue turbidity is not generated by turbulence from vessel movement or propeller wash.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	All vessels used for transportation of fill material shall have tight fitting seals to their bottom openings to prevent leakage of material during transport.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Barges shall not be filled to a level which may cause the overflow of material during loading or transportation. Barge effluents shall be properly collected and treated before disposal.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities.	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>	Existing silt curtain at the outward side of the basin near the Barging Handling Area throughout the period shall be repair, maintain and service when there is public fill intake by barges to the Fill Bank in accordance with PS Clause 1.68. The total length of the silt curtains shall not be less than 160m, and a gap of about 80m shall be left open for access of barges. The silt curtain shall be properly maintained such that it can also serve the function of refuse containment boom to confine floating refuse.	<input checked="" type="checkbox"/>			Item 1
<input checked="" type="checkbox"/>	A waste collection vessel shall be deployed to remove floating debris.	<input checked="" type="checkbox"/>			

Environmental Checklist	Implementation Stages*		Remark
	Yes	No / N/A	
<b>Landscape and Visual</b>			
<ul style="list-style-type: none"> <li>▪ The design of the fill bank and platform heights adopted should allow the fill bank to fit into the general topography of the surrounding land. Straight edged slopes should be avoided.</li> <li>▪ The maximum stockpiling height at the fill bank shall be limited to a maximum of +35.2mPD.</li> <li>▪ Surface of outer slopes of the fill bank shall preferably be hydroseeded or covered with geo-textile matting of appropriate colour (e.g. dark green / brown) once completed.</li> <li>▪ The barging point and the C&amp;DMSF at the fill bank shall not be in operation from 07:00 pm to 08:00 am daily to avoid potential visual impact from glare.</li> </ul>	√		
<b>Other Environmental Factors</b>			
<ul style="list-style-type: none"> <li>▪ C&amp;D waste sorted from mixed C&amp;D material shall be removed from the temporary buffer storage area on a daily basis and transfer to SENT landfill for disposal.</li> <li>▪ Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.</li> <li>▪ Any unused materials or those with remaining functional capacity should be recycled and stored properly.</li> <li>▪ All generators, fuel and oil storage are within bundle areas.</li> <li>▪ Oil leakage from machinery, vehicle and plant is prevented.</li> <li>▪ The Environmental Permit should be displaced conspicuously on site.</li> <li>▪ Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment.</li> <li>▪ To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce.</li> </ul>	√		



**Summary of the Weekly Site Inspection:**

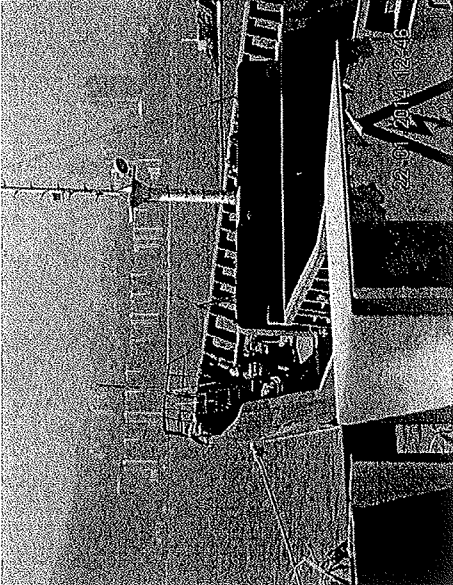
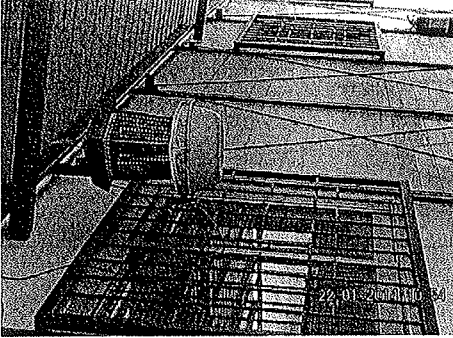
Item	Details of defective works or observations	Proposed Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Target Completion Date
1	The floating booms of silt curtain near the tipping hall No. 1 was found damaged.	To repair the damaged part of silt curtain as soon as possible.	140122_001	Yes	29/01/14
2	Mosquito killer at CEDD site office was found out of order.	To repair the defect mosquito killer as soon as possible.	140122_002	Yes	29/01/14

Remark

--

Name	Title	Signature	Date
Linda Law	Senior Environmental Officer		22 January 2014

**Photos**

 <p>         Photo 140122_001 (Silt curtain near tipping hall No.1)       </p>	 <p>         Photo 140122_002 (CEDD site office)       </p>		





CEDD Contract No.: CV/2013/06

Handling of Surplus Public Fill - **Tseung Kwan O Fill Bank**

Inspection Date : 27/1/14


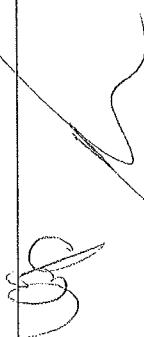
Time : 14:30

Weather : Sunny / Fine / Cloudy / Overcast / Drizzle / Rain / Storm / Hazy

Wind : Calm / Light / Breeze / Strong

Temperature : 17°C

Humidity : High / Moderate / Low

Inspected by	CEDD	Contractor / Sub-Contractor	ET
Signature:			Mark
Name:	C.K. Wong	Veronica Coyne Kende	Mark Hei Wai
Title	Acow/PD	ASO Sub Agent (K1(b))	E.T



Environmental Checklist		Implementation Stages*		Remark
		Yes	No / N/A	
<b>Fugitive Dust Emission</b>				
▪	Dust control / mitigation measures shall be provided to prevent dust nuisance.	√		
▪	A buffer zone of at least 100m shall be maintained between the edge of the stockpiling area and the nearest ASRs at the TKO Industrial Estate. Within the buffer zone, no dusty material shall be stockpiled and no loading / unloading and similar activities should be allowed.	√		
▪	Water sprays shall be provided and used to dampen materials.	√		
▪	Regular cleaning and watering the site shall be provided to minimize the fugitive dust emissions.	√	Item 4	
▪	All vehicles shall be restrict to a maximum speed of 10 km per hour.	√		
▪	Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.	√		
▪	The designated site main haul road shall be paved or regular watering.	√	Item 4	
▪	Frequent watering of work site shall be at least three times per day.	√		
▪	Wheel washing facilities including high-pressure water jet shall be provided at the entrance of work site.	√		
▪	Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank.	√		
▪	All plant and equipment should be well maintained e.g. without black smoke emission.	√		
▪	Open burning should be prohibited.	√		
▪	The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	√		
▪	Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shot concrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	√		
▪	When fill material is transfer by belt conveyor systems, the conveyors shall be enclosed on top and 2 sides.	√		
▪	The belt scraper shall be equipped with bottom plates or other similar means to prevent falling of material from the return belt.	√		
▪	The level of stockpiling belt conveyor shall be adjustable such that the vertical distance between the belt conveyor and the material landing point is maintained at no more than 1m.	√		
<b>Noise Impact</b>				
▪	The approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted.	√		
▪	Only well maintained plant should be operated on-site and plant should be serviced regularly during the construction works.	√		
▪	Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials.	√		
▪	Air compressors and hand held breakers should have noise labels.	√		
▪	Machines and plants that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.	√		
▪	Noisy equipment and mobile plant shall always be site away from NSRs.	√		

Handling of Surplus Public Fill - **Tseung Kwan O Fill Bank**

Environmental Checklist	Implementation Stages*			Remark
	Yes	No	N/A	
	<b>Water Quality</b>			
Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms.	√			
The permanent drainage channels should have sediment basin, traps and baffles and maintain properly.	√			
Temporary intercepting drains should be used at the stockpiling area to divert polluted stormwater to the intercepting channels. Earth bunds and sand bay barriers shall be used to assist the diversion of polluted stormwater to the intercepting channels.	√			
Manholes should be covered and sealed.	√			
Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding.	√			
A buffer distance of at least 100m shall be maintained between the boundary of the public fill stockpiling area and the sea front.	√			
A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafont.	√			
The stormwater intercepting system shall be effective to collect of runoff and remove suspended solids before discharge.	√			
The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	√			
Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shotcrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	√			
Existing and newly constructed Catchpits, sand and silt removal facilities and intercepting channels shall be maintained, and the deposited silt and grit shall be removed weekly and on a need basis especially at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.	√			
A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains.	√			
The section of construction road between wheel washing bay and the public road shall be paved with concrete, bituminous materials or hardcore to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	√			
Sewage from toilets shall be discharged in to a foul sewer, or chemical toilets shall be provided. The chemical toilets (if use) shall be provided by a licensed contractor, who will be responsible for disposal and maintenance of these facilities.	√			
Oil intercept in addition of sand / silt removal facilities shall be provided at the car parking areas.	√			
Oil interceptor shall be provided at work shop.	√			
Tipping halls enclosed with top and 3-side to prevent spillage of material into marine water.	√			
The barges shall be in right size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure the undue turbidity is not generated by turbulence from vessel movement or propeller wash.	√			
All vessels used for transportation of fill material shall have tight fitting seals to their bottom openings to prevent leakage of material during transport.	√			
Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer.	√			
Barges shall not be filled to a level which may cause the overflow of material during loading or transportation. Barge effluents shall be properly collected and treated before disposal.	√			
The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities.	√			
Existing silt curtain at the outward side of the basin near the Barging Handling Area throughout the period shall be repair, maintain and service when there is public fill intake by barges to the Fill Bank in accordance with PS Clause 1.68. The total length of the silt curtains shall not be less than 160m, and a gap of about 80m shall be left open for access of barges. The silt curtain shall be properly maintained such that it can also serve the function of refuse containment boom to confine floating refuse.	√			
A waste collection vessel shall be deployed to remove floating debris.	√			

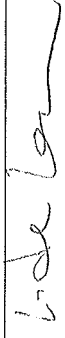
Environmental Checklist		Implementation Stages*		Remark
		Yes	No / N/A	
<b>Landscape and Visual</b>				
▪	The design of the fill bank and platform heights adopted should allow the fill bank to fit into the general topography of the surrounding land. Straight edged slopes should be avoided.	√		
▪	The maximum stockpiling height at the fill bank shall be limited to a maximum of +35.2mPD.	√		
▪	Surface of outer slopes of the fill bank shall preferably be hydroseeded or covered with geo-textile matting of appropriate colour (e.g. dark green / brown) once completed.	√		
▪	The barging point and the C&DMSF at the fill bank shall not be in operation from 07:00 pm to 08:00 am daily to avoid potential visual impact from glare.	√		
<b>Other Environmental Factors</b>				
▪	C&D waste sorted from mixed C&D material shall be removed from the temporary buffer storage area on a daily basis and transfer to SENT landfill for disposal.	√		
▪	Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	√		
▪	Any unused materials or those with remaining functional capacity should be recycled and stored properly.	√		
▪	All generators, fuel and oil storage are within bundle areas.	√		
▪	Oil leakage from machinery, vehicle and plant is prevented.	√		
▪	The Environmental Permit should be displaced conspicuously on site.	√		
▪	Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment.	√		Item 3
▪	To encourage collection of aluminium cans by individual collectors, separate labelled bins should be provided to segregate this waste from other general refuse generated by the workforce.	√		

**Summary of the Weekly Site Inspection:**

Item	Details of defective works or observations	Proposed Follow Up Action	Photo Ref.	Further Action Required (Yes/No)	Target Completion Date
1	Follow up action to item 1 on 22/01/14, the silt curtain near the tipping hall No. 1 was repaired properly.	---	140127_001	No	---
2	Follow up action to item 2 on 22/01/14, new mosquito killer at CEDD site office was Used.	---	140127_002	No	---
3	C&D waste, such as paper, plastic bag and wood, were discarded near site entrance.	To collect and dispose of the waste properly.	140127_003	Yes	05/02/14
4	Haul road to wet soil disposition area was found dry.	To water the haul road frequently especially during dry season.	140127_004	Yes	05/02/14

Remark

--

	Name	Title	Signature	Date
Checked by	Linda Law	Senior Environmental Officer		27 January 2014

Photos

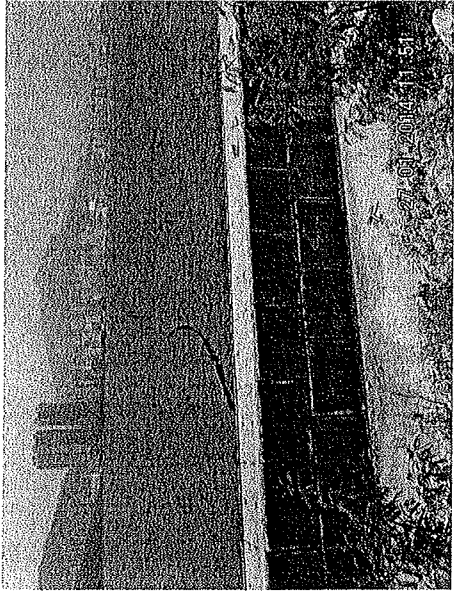


Photo 140127\_001 (Silt curtain near tipping hall No. 1)

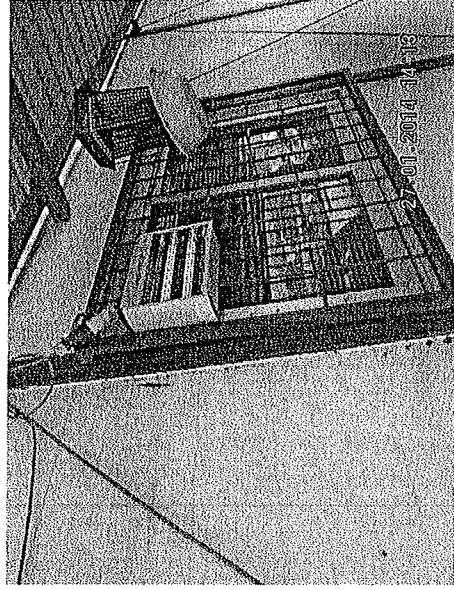


Photo 140127\_002 (CEDD site office)



Photo 140127\_003 (Site entrance)

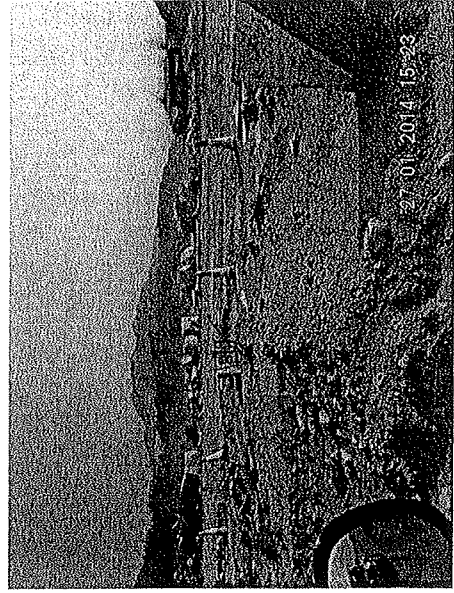


Photo 140127\_004 (Haul road to wet soil deposition area)



## Appendix I

### I

## Implementation Schedule of Mitigation Measures

## Environmental Mitigation Implementation Schedule

	Location	Implementation Status		
		Implemented	Partially implemented	Not implemented
<b>Environmental Protection Measures</b>				
<b>Air Quality</b>				
▪ Dust control / mitigation measures shall be provided to prevent dust nuisance.	All areas	✓	✓	
▪ A buffer zone of at least 100m shall be maintained between the edge of the stockpiling area and the nearest ASRs at the TKO Industrial Estate. Within the buffer zone, no dusty material shall be stockpiled and no loading / unloading and similar activities should be allowed.	Northern Site Boundary	✓		
▪ Water sprays shall be provided and used to dampen materials.	All areas	✓		
▪ Regular cleaning and watering the site shall be provided to minimize the fugitive dust emissions.	All areas	✓		
▪ All vehicles shall be restrict to a maximum speed of 10 km per hour.	All areas	✓		
▪ Any vehicle with open load carrying area used for moving materials which has the potential to create dust shall have properly fitting side and tail boards. Material having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin.	Site Egress	✓		
▪ The designated site main haul rout shall be paved or regular watering.	All haul roads		✓	
▪ Frequent watering of work site shall be at least three times per day.	All areas	✓		
▪ Wheel washing facilities including high pressure water jet shall be provided at the entrance of work site.	Site Egress	✓		
▪ Every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving the fill bank.	Site Egress	✓		
▪ The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	All areas	✓		
▪ Final slope surfaces, especially those facing to the north of the site shall be treated by compaction, followed by hydroseeding, vegetation planting or sealing with shotconcrete, latex, vinyl, bitumen, or other suitable surface stabilizer approved by CEDD.	All areas	✓		
▪ When fill material is transfer by belt conveyor systems, the conveyors shall be enclosed on top and 2 sides.	C&DMSF			✓
▪ The belt scraper shall be equipped with bottom plates or other similar means to prevent falling of material from the return belt.	C&DMFS			✓
▪ The level of stockpiling belt conveyor shall be adjustable such that the vertical distance between the belt conveyor and the material landing point is maintained at no more than 1m.	C&DMFS			✓
▪ All plant and equipment should be well maintained e.g. without black smoke emission.	All areas	✓		
<b>Noise Impact</b>				
▪ Approved method of working, equipment and sound-reducing measures (e.g. use of silenced type of equipment, etc.) shall be adapted.	All areas	✓		
▪ Only well maintained plant should be operated on-site and plant should be serviced regularly during the site works.	All areas	✓		
▪ Powered mechanical equipment (PME) should be covered or shielded by appropriate acoustic materials.	All areas	✓		
▪ Air compressors and hand held breakers should have noise labels.	All areas	✓		
▪ Machines and plants that may be in intermittent use should be shut down between work months or should be throttled down to a minimum.	All areas	✓		
▪ Noisy equipment and mobile plant shall always be site away from NSRs.	All areas	✓		





	Location	Implementation Status		
		Implemented	Partially implemented	Not implemented
<b>Environmental Protection Measures</b>				
<b>Water Quality</b>				
▪ Drainage system should be adequate and well maintained to prevent flooding and overflow, especially after rain storms.	All areas	√		
▪ Unnecessary water retained in receptacles and standing water should be avoided to prevent mosquito breeding.	All areas	√		
▪ The existing / realigned intercepting channels and the sand / silt removal facilities shall be used and maintained regularly.	All areas	√		
▪ Existing silt curtain at the outward side of the basin near the Barging Handling Area throughout the month shall be repair, maintain and service when there is public fill intake by barges to the Fill Bank.	Along the seafront		√	
▪ A buffer distance of at least 20m shall be maintained between the boundary of the C&DMSF and the seafront.	C&DMFS	√		
▪ The stormwater intercepting system shall be effective to collect of runoff and remove suspended solids before discharge.	All areas	√		
▪ The material shall be properly covered to prevent washed away especially before rainstorm.	All areas	√		
▪ The temporary slope surfaces, especially those facing to the north of the site shall be covered with impermeable sheet or sprayed with water or protected by other method approved by CEDD.	Temporary Slopes	√		
▪ A wheel washing bay shall be provided at the site exit and wash-water shall have sand and silt settled out or removed before being discharged into storm drains.	Wheel Washing facility	√		
▪ Obtain Discharge License	Site Office	√		
▪ Adequate environmental control measures shall be provided to prevent / avoid dropping of fill material into the sea during the transfer.	Barge Handling Area (BHA)	√		
▪ The work activities shall not cause any visible foam, oil, grease, scum, litter or other objectionable matters to be present on the water in the vicinity of the barging facilities.	Barge Handling Area (BHA)	√		
▪ A waste collection vessel shall be deployed to remove floating debris.	Barge Handling Area (BHA)	√		
<b>Landscape and Visual</b>				
• Construction of lighting to avoid spillage and glare	All areas	√		
• Hydro-seeding	Completed slopes	√		
• Hoarding erection	Site boundary	√		
• Damage to surrounding area avoided	All areas	√		
<b>Other Environmental Factors</b>				
• C&D waste sorted from mixed C&D material shall be transfer to SENT landfill for disposal.	All areas	√		
• Plan and stock construction materials carefully to minimise generation of waste.	All areas	√		
• Any unused materials or those with remaining functional capacity should be recycled.	All areas	√		
• All generators, fuel and oil storage are within bunded areas.	All areas	√		
• Oil leakage from machinery, vehicle and plant is prevented.	All areas	√		
• Bund chemical storage area to 110% capacity.	All areas	√		
• Prevent disposal of hazardous materials to air, soil and water body.	All areas	√		
• Provide rubbish skips at all work areas	All areas	√		
• Good site practices should be adopted to clean the rubbish and litter on a regular basis so as to prevent the rubbish and litter from dropping into the nearby environment.	All areas	√	√	



## Appendix I

### J

## Site General Layout plan





## Appendix I

K

### Monitoring Schedule for the Coming Month



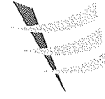
**Contract No. CV/2013/06 Handling of Surplus Public Fill**

**Tseung Kwan O Area137**

**Time Schedule for Impact Water Quality Monitoring (WQM), Impact Air Monitoring (1-hr TSP & 24-hr TSP), Weekly Site Inspection (Weekly SI) and Impact Noise Monitoring (NM)**

**February 2014**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4 <u>24 hr TSP</u>	5 <u>1-hr TSP x 2</u> <u>Weekly SI</u> <u>WQM</u> Mid-flood (09:30-11:30) Mid-ebb (15:30-17:30)	6	7 <u>1-hr TSP</u> <u>WQM</u> Mid-flood (11:00-13:00) Mid-ebb (17:30-19:30)	8
9	10 <u>1-hr &amp; 24 hr TSP</u> <u>WQM</u> Mid-flood (09:00-11:00) Mid-ebb (19:00-21:00)	11	12 <u>1-hr TSP</u> <u>Weekly SI</u> <u>NM</u> <u>WQM</u> Mid-ebb (10:00 -12:00) Mid-flood (15:30 -17:30)	13	14 <u>1-hr TSP</u> <u>WQM</u> Mid-ebb (11:00 -13:00) Mid-flood (16:30 -18:30)	15
16 <u>24 hr TSP</u>	17 <u>1-hr TSP</u> <u>WQM</u> Mid-ebb (12:30 -14:30) Mid-flood (18:00 -20:00)	18	19 <u>1-hr TSP</u> <u>Weekly SI</u> <u>WQM</u> Mid-flood (08:30-10:30) Mid-ebb (13:30-15:30)	20	21 <u>1-hr TSP</u> <u>WQM</u> Mid-flood (09:00-11:00) Mid-ebb (15:30-17:30)	22 <u>24 hr TSP</u>
23	24 <u>1-hr TSP x 2</u> <u>WQM</u> Mid-flood (11:30-13:30) Mid-ebb (18:30-20:30)	25	26 <u>1-hr TSP</u> <u>Weekly SI</u> <u>WQM</u> Mid-ebb (09:00 -11:00) Mid-flood (14:00 -16:00)	27	28 <u>1-hr &amp; 24 hr TSP</u> <u>NM</u> <u>WQM</u> Mid-ebb (10:30 -12:30) Mid-flood (16:00 -18:00)	



## Appendix I

L

## Complaint Log

## Complaint Logs

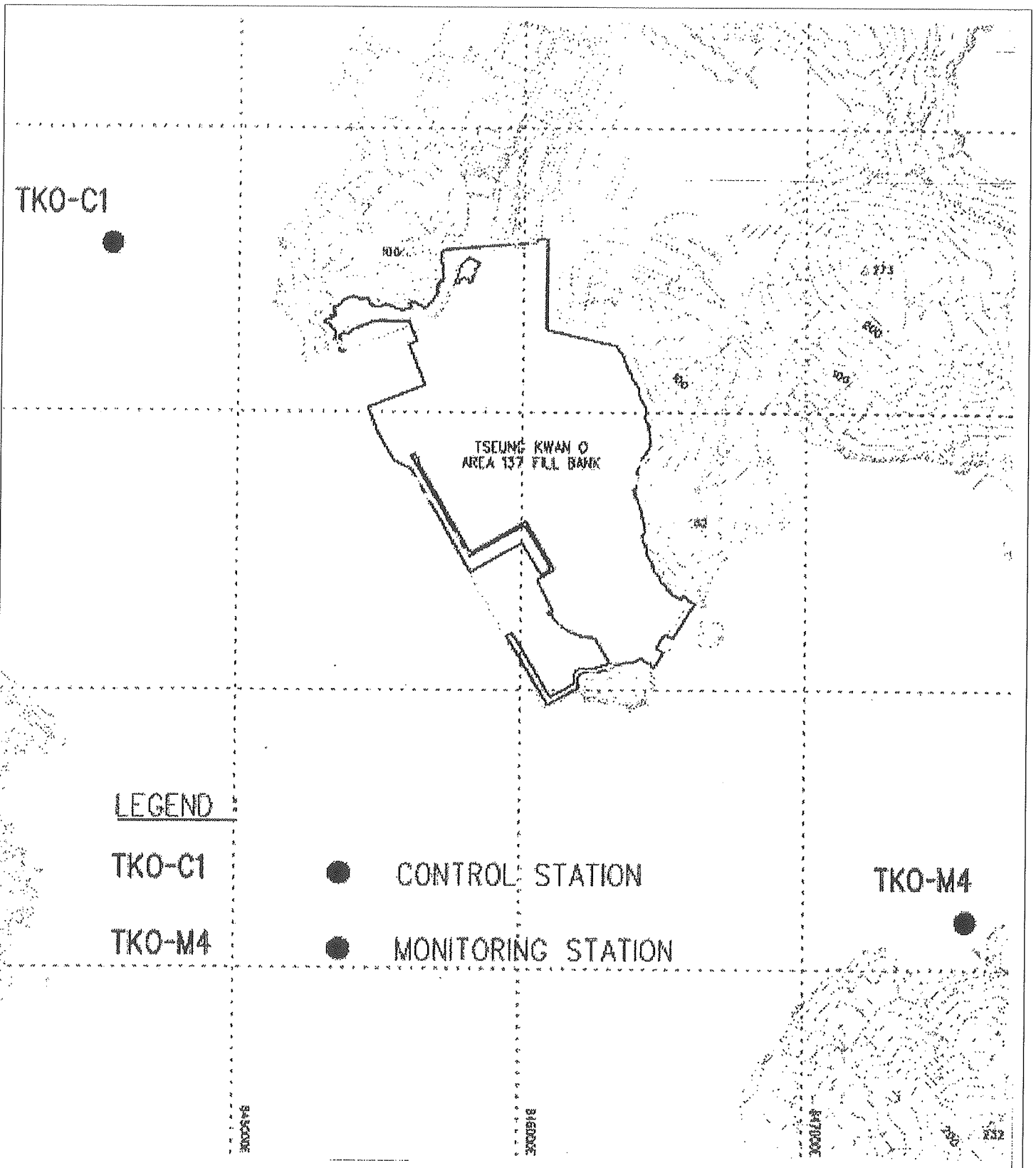
Log Ref.	Location	Received Date	Details of Complaint	Investigation / Mitigation Action	Status
---	---	---	---	---	---



## Appendix I

### Figures

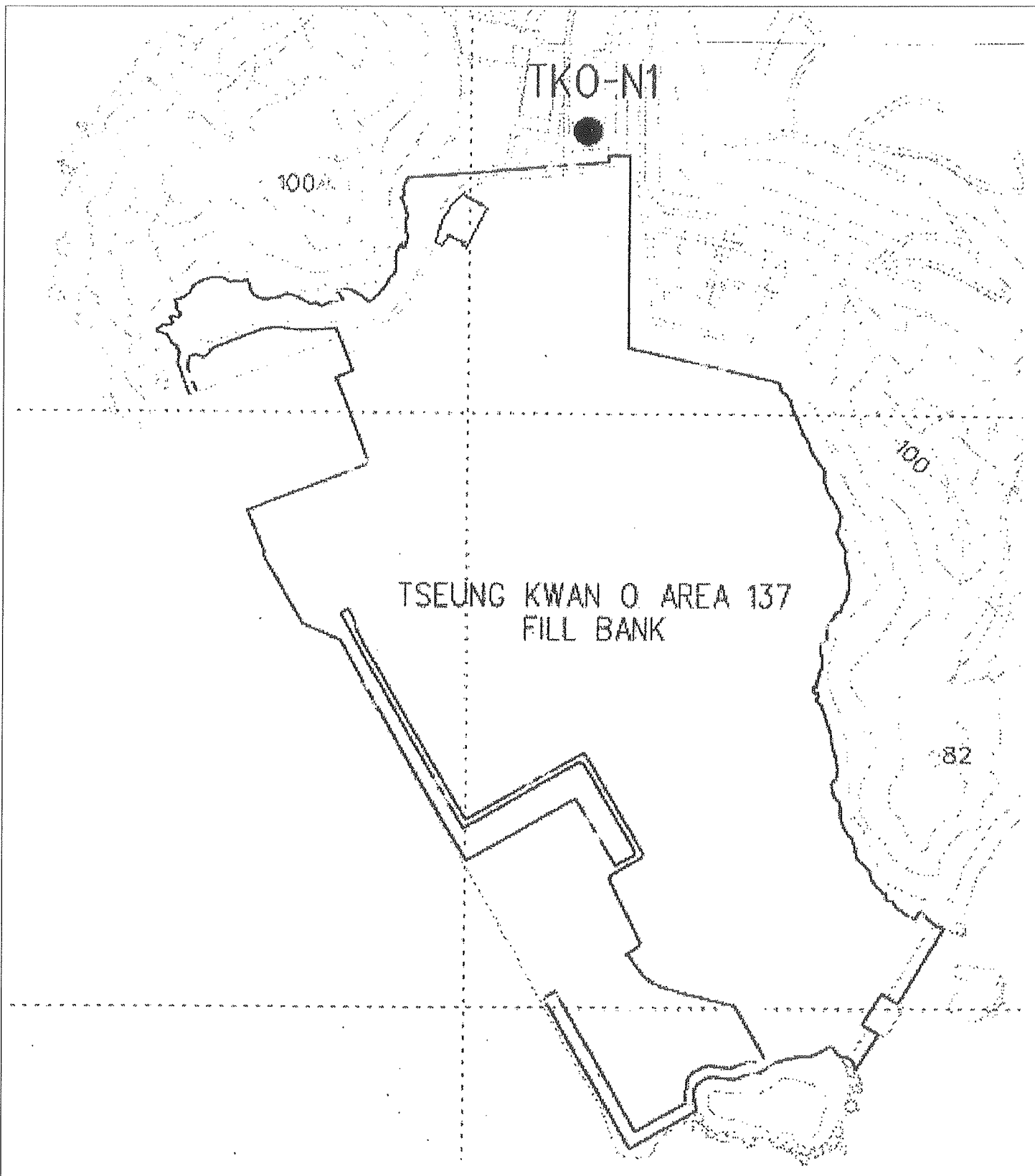




Contract No. CV/2013/06  
 Handling of Surplus Public Fill (2014-2016)

Figure 1  
 Locations of Water Quality Monitoring Stations –  
 Tseung Kwan O Area 137 Fill Bank





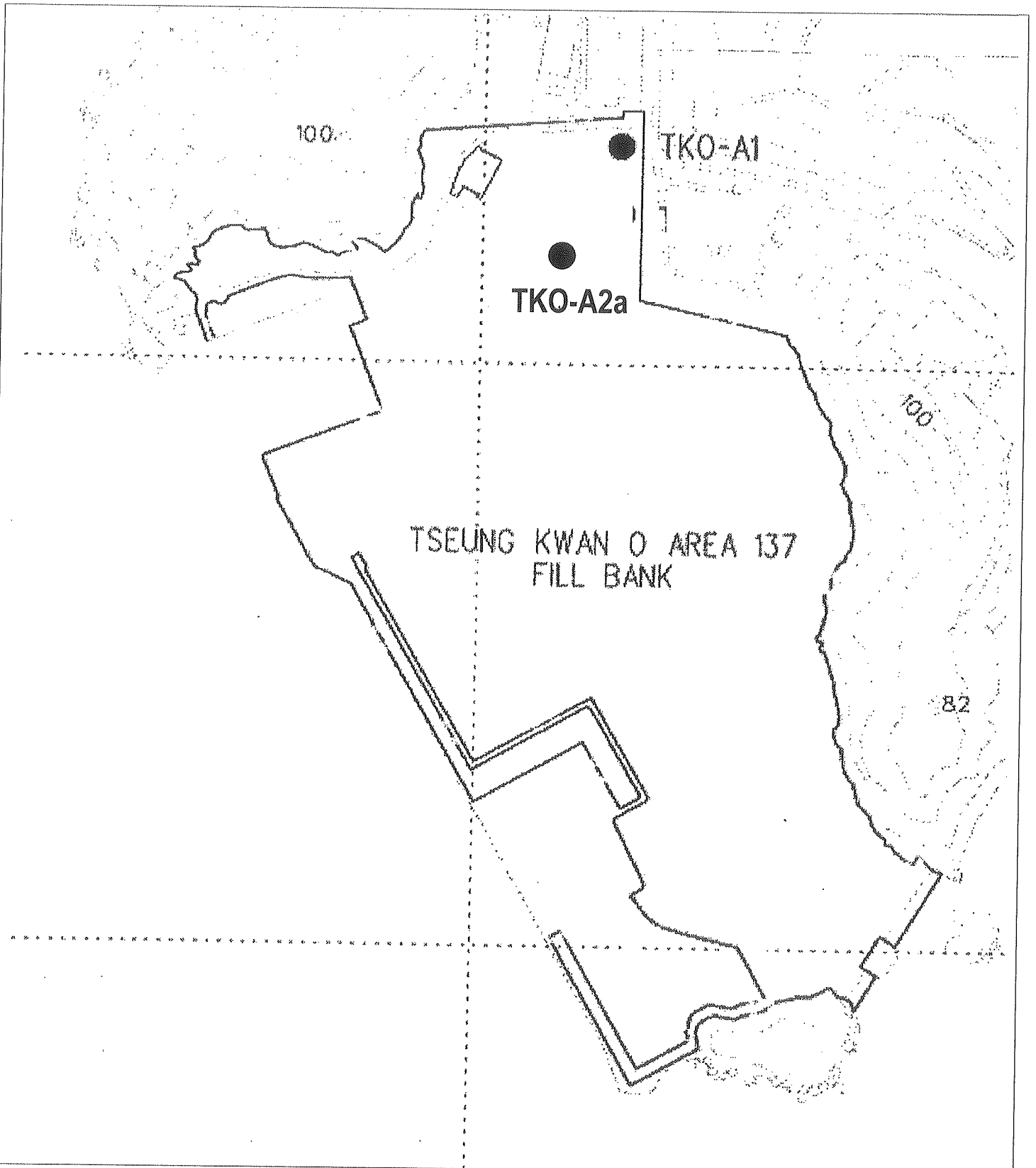
Contract No. CV/2013/06  
 Handling of Surplus Public Fill (2014-2016)

Figure 2

Location of Noise Monitoring Station –  
 Tseung Kwan O Area 137 Fill Bank



東業德勤測試顧問有限公司  
 ETS-TESTCONSULT LIMITED



Contract No. CV/2013/06  
 Handling of Surplus Public Fill (2014-2016)

Figure 3  
 Locations of Air Quality Monitoring Stations –  
 Tseung Kwan O Area 137 Fill Bank



東業德勤測試顧問有限公司  
 ETS-TESTCONSULT LIMITED

## **Appendix II**

**Marine Water Quality Monitoring Report for Contract No. HY/2010/02  
Hong Kong – Zhuhai – Macao Bridge, Hong Kong Boundary Crossing  
Facilities – Reclamation Works**

RECEIVED  
12 FEB 2014

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BY: *TW/ell*

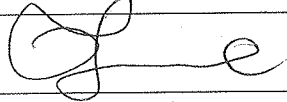

China Harbour Engineering Company Limited

Contract No. HY/2010/02

Hong Kong – Zhuhai – Macao Bridge  
Hong Kong Boundary Crossing  
Facilities –  
Reclamation Works

Impact Water Quality Monitoring Report  
for TKO 137 Fill Bank  
January 2014

[02/2014]

	Name	Signature
Prepared & Checked:	Isabella Yeung	
Reviewed & Approved:	Y T Tang	

Version:	Rev. 0	Date: 14 February 2014
<b>Disclaimer</b> This report is prepared for China Harbour Engineering Company Limited and is given for its sole benefit in relation to and pursuant to Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities-Reclamation Works and may not be disclosed to, quoted to or relied upon by any person other than China Harbour Engineering Company Limited without our prior written consent. No person (other than China Harbour Engineering Company Limited) into whose possession a copy of this report comes may rely on this report without our express written consent and China Harbour Engineering Company Limited may not rely on it for any purpose other than as described above.		

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15/F, Grand Central Plaza, Tower 1, 138 Shatin Rural Committee Road, Shatin, NT, Hong Kong  
Tel: (852) 3922 9000 Fax: (852) 2317 7609 www.aecom.com

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Appendix C	Impact Water Quality Monitoring Results and their Graphical Presentation
Appendix D	QA/QC Report

## EXECUTIVE SUMMARY

On-site sorting facilities for imported material (public fill) for reclamation works of the "Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as "the Project") were proposed to establish in Tseung Kwan O (TKO) 137 Fill Bank area (here below known as "the Works Area). Impact monitoring of water quality was conducted at the designated monitoring location. This report presents the impact monitoring results regarding water quality aspects performed in January 2014.

### *Water Quality*

Impact water quality monitoring was conducted at three monitoring stations, C1a, M4a & M5. Monitoring Station C1a serves as the control station; Monitoring Station M4a and M5 are the impact stations. The impact monitoring was carried out three times per week (from 1 to 31 January 2014) during the operation of the mentioned facilities for both mid-ebb and mid-flood tides. Data of temperature, salinity, dissolved oxygen (DO), turbidity (Tby) and suspended solids (SS) were collected and analysed. Details of the monitoring methodology, locations and results are presented in this report.

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

No exceedance of Action and Limit Level of water quality monitoring results was recorded in the reporting month.



## 1 INTRODUCTION

### 1.1 Background

- 1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as “the Project”) mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL).
- 1.1.2 On-site sorting facilities for imported material (public fill) for reclamation works of the Project were proposed to establish in Tseung Kwan O (TKO) 137 Fill Bank area (here below, known as “the Works Area”). The proposed sorting facilities together with barging points, tipping halls and associated facilities will be installed at the Works Area.
- 1.1.3 The latest Environmental Permit (EP) for Fill Bank at TKO Area 137 was issued on 4 February 2013 (EP-134/2002/K) by the Environmental Protection Department (EPD) to Civil Engineering and Development Department (CEDD), the Permit Holder, regarding the Project. Condition 3.2 of the EP requires the water quality monitoring frequency and parameters at stations C1a, M4a and M5 shall be same as the requirements set out in the EM&A Manual for TKO 137 Fill Bank (here below, known as “EM&A Manual”) and the monitoring results shall be incorporated in the monthly EM&A reports.

### 1.2 Purpose of the Report

- 1.2.1 The purpose of this impact monitoring report is to assess environmental impact and compliance during transportation and operation of the mentioned facilities for the Project. This report presents the impact monitoring requirements, methodologies and results of water quality measurements in accordance with the EM&A Manual.
- 1.2.2 This impact report presents the monitoring works of water quality monitoring, at two monitoring stations (M4a and M5) and one control station (C1a), conducted in January 2014. A layout plan of the Works Area is provided in Figure 1.1.

### 1.3 Structure of the Report

- 1.3.1 The structure of the report is as follows:

Section 1: Introduction, background, purpose and the structure of the report.

Section 2: Water quality, which describes the impact water quality monitoring requirements, methodology and action/limit level.

Section 3: Impact water quality monitoring results.

Section 4: Conclusions.

## 2 WATER QUALITY

### 2.1 Monitoring Requirements

2.1.1 Impact marine water quality monitoring at 3 water quality monitoring stations should be established. In accordance with the EM&A Manual, impact water quality monitoring should be conducted 3 days per week during the operation of the facilities in the Works Area. Moreover, as stipulated in the latest EP, water quality monitoring should be conducted since 2 weeks before commencement of operation of the additional barging points. Measurements shall be taken at the 3 designated stations, 2 impact and 1 control stations at mid-flood and mid-ebb tides at three water depths, i.e., 1 m below surface, mid-depth and 1 m from seabed.

### 2.2 Monitoring Equipment

2.2.1 Equipment used in the impact water quality monitoring programme is summarized in Table 2.1. A copy of the calibration certificates for the water quality monitoring equipment are attached in Appendix A.

**Table 2.1 Water Quality Monitoring Equipment**

Parameter	Model and Make
Coordinate of Monitoring stations	Garmin etrex 10
Dissolved Oxygen (Saturation), Temperature, Salinity	YSI Dissolved Oxygen, Salinity & Temperature Meter, YSI Pro2030
Turbidity	HACH Model 2100Q Turbid Meter
Water Depth	Speedtech Instrument SM-5A

### 2.3 Monitoring Parameters, Frequency and Duration

2.3.1 Table 2.2 summarises the monitoring parameters, frequency and duration of impact water quality monitoring. Impact water quality monitoring was carried out at three stations in January 2014. Detailed impact water quality monitoring schedule was provided in Appendix B.

**Table 2.2 Water Quality Monitoring Parameters, Frequency and Duration**

Monitoring Stations	Parameter, unit	Frequency	No. of Depths
Control Stations: C1a  Impact Stations: M4a – M5	<ul style="list-style-type: none"> <li>• Depth, m</li> <li>• Temperature, °C</li> <li>• Salinity, ppt</li> <li>• DO, mg/L</li> <li>• DO Saturation, %</li> <li>• Turbidity, NTU</li> <li>• Suspended Solids (SS), mg/L</li> </ul>	Three times per week during mid-ebb and mid-flood tides (within ± 1.75 hour of the predicted time)	3 (1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted. Should the water depth be less than 3 m, only the mid-depth station will be monitored).

### 2.4 Monitoring Locations

2.4.1 The measurements were taken at all designated impact and control stations summarized in Table 2.3. The two impact stations were chosen on the basis of their proximity to the Works Area, which would be under the greatest potential for water quality impacts. In addition, a control station was also set up for ebb-tide references respectively of the surrounding ambient.

**Table 2.3 Location of Water Quality Impact Stations**

Station I.D.	HK 1980 Grid		Status
	Easting	Northing	
C1a	845647	814146	Control Station (Ebb-tide)
M4a	845922	813973	Impact Station (Close to Additional Barging Point, Tipping Halls and Associated Facilities at TKO 137 Fill Bank)
M5	847005	813678	Impact Station (Close to Tai Miu Wan)

## 2.5 Monitoring Methodology

### 2.5.1 Instrumentation

- (a) The in-situ water quality parameters, viz. dissolved oxygen, temperature, salinity and turbidity were measured by multi-parameter meters and turbidity was measured by Turbid Meter.

### 2.5.2 Operating/Analytical Procedures

- (a) A hand-held digital Global Positioning Systems (GPS) were used to ensure that the correct location was selected prior to sample collection.
- (b) Portable, battery-operated echo sounders were used for the determination of water depth at each designated monitoring station.
- (c) All in-situ measurements were taken at 3 water depths, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth was less than 6 m, in which case the mid-depth station was omitted. Should the water depth be less than 3 m, only the mid-depth station was monitored.
- (d) At each measurement/sampling depth, two consecutive in-situ monitoring (DO concentration and saturation, temperature, turbidity, salinity) and water sample for SS were collected. For turbidity measurement, the sample was collected by using sampler and then transferred to the cell. The reading of turbidity of the sample was directly recorded from the Turbidimeter (HACH 2100Q) after inserting the cell to the Turbidimeter. For DO concentration and saturation, temperature and salinity, duplicate measurements were performed by dropping the calibrated probes of the corresponding monitoring equipments to the designated depths of the water column and taking readings after stabilized. Where the difference in the value between the first and second readings of DO or turbidity parameters was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.
- (e) Duplicate samples from each independent sampling event were collected for SS measurement. Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then be packed in cool-boxes (cooled at 4°C without being frozen), and delivered to Environmental Laboratory, ETS-Testconsult Ltd. (HOKLAS Registration No. 022) for the analysis of suspended solids concentrations. The laboratory determination work would be started within 24 hours after collection of the water samples. Environmental Laboratory, ETS-Testconsult Ltd., is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes. For QA/QC procedures, one duplicate samples of every batch of 20 samples was analyzed and attached in Appendix D.

### 2.5.3 Maintenance and Calibration

- (a) Before each round of monitoring, the dissolved oxygen probe of YSI Pro2030 was calibrated by the wet bulb method.
- (b) The monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS before use and subsequently re-calibrated at 3-monthly intervals throughout all stages of the water quality monitoring.

**2.6 Action and Limit Levels**

2.6.1 The Action and Limit Levels (AL levels) have been set in accordance with the derivation criteria specified in the EM&A Manual. This is shown in Table 2.4.

**Table 2.4 Action and Limit Levels for Water Quality**

Parameters	Action	Limit
DO in mg/L (Surface & Middle, Bottom)	Surface & Middle 5.5 mg/L  Bottom 5.2 mg/L	Surface & Middle 4.0 mg/L  Bottom 2.0 mg/L
SS in mg/L (depth-averaged)	4.9 mg/L or 120% of upstream control station's SS at the same tide of the same day	5.2 mg/L or 130% of upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements (e.g. required suspended solids level at FCZ)
Turbidity in NTU (depth-averaged)	3.9 NTU or 120% of upstream control station's turbidity at the same tide of the same day	4.2 NTU or 130% of upstream control station's turbidity at the same tide of the same day

- Notes:
1. "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
  2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
  3. For turbidity, SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
  4. All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

### 3 MONITORING RESULTS

3.1.1 The impact water quality monitoring results for C1a, M4a and M5 are summarized in Tables 2.5 and 2.6. Detail water quality monitoring results are presented in Appendix C.

**Table 2.5 Summary of Marine Water Monitoring Results for Mid-ebb Tide**

Monitoring Station	Temperature (°C)	Salinity (ppt)	DO (SM) (mg/L)	DO (Bottom) (mg/L)	DO Saturation (%)	Turbidity (NTU)	SS (mg/L)
C1a	16.9 (15.6 -18.2)	27.8 (27 - 30.2)	6.5 (6.1 - 7.8)	6.6 (6.1 - 7.9)	80.5 (72.4 - 97)	3.1 (2.4 - 3.6)	4.1 (2.6 - 4.8)
M4a	17.0 (15.6 -18.3)	27.8 (27 - 30.2)	6.4 (6 - 7.5)	6.5 (6 - 7.7)	79.2 (71.5 - 94.2)	3.0 (2 - 3.6)	4.0 (3 - 4.6)
M5	17.0 (15.6 -18.3)	27.8 (27 - 30.3)	6.5 (6 - 7.9)	6.6 (6 - 7.9)	80.3 (71.8 - 97.2)	2.9 (1.6 - 3.7)	4.0 (2.4 - 4.8)

**Table 2.6 Summary of Marine Water Monitoring Results for Mid-flood Tide**

Monitoring Station	Temperature (°C)	Salinity (ppt)	DO (SM) (mg/L)	DO (Bottom) (mg/L)	DO Saturation (%)	Turbidity (NTU)	SS (mg/L)
C1a	17.0 (15.6 -18.2)	27.8 (27 - 30.2)	6.6 (6.3 - 7.9)	6.7 (6.3 - 8)	81.7 (76 - 98.2)	3.0 (2.3 - 3.3)	3.9 (3.2 - 4.6)
M4a	17.0 (15.5 -18.3)	27.8 (27 - 30.2)	6.6 (6.2 - 7.6)	6.6 (6.1 - 7.8)	80.7 (73.2 - 95.4)	2.8 (1.9 - 3.3)	3.8 (3 - 4.6)
M5	16.9 (15.5 -18.3)	27.8 (27 - 30.2)	6.6 (6.2 - 7.9)	6.7 (6.2 - 8)	81.6 (74.2 - 98.4)	2.8 (1.5 - 3.6)	3.8 (2.4 - 4.6)

3.1.2 The weather conditions during the monitoring period were generally sunny and fine with a few cloudy days. Sea conditions for the majority of monitoring days were generally small wave however with a few great wave days. No major water pollution source, which might affect the result observed during the impact monitoring period.

3.1.3 Since the water depths at all the monitoring stations were generally higher than 6m, sampling was conducted at three water depths at each station.

3.1.4 The summary of impact water quality exceedance is shown in Table 2.7.

**Table 2.7 Summary of Marine Water Monitoring Exceedance**

Monitoring Station	Exceedance Level	DO (SM)		DO(Bottom)		Turbidity		SS		Total	
		Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb
M4a	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
M5	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0

Note: S: Surface; and  
 M: Mid-depth.

3.1.5 No exceedance of Action and Limit Level of water quality monitoring results was recorded in the reporting month.

## 4 CONCLUSIONS

- 4.1.1 This impact monitoring report presents impact monitoring results for water quality at designated locations C1a, M4a and M5 in accordance with the EM&A Manual. Monitoring Station C1a serves as the control station; Monitoring Station M4a and M5 are the impact stations.
- 4.1.2 All laboratory results satisfied the QA/QC requirements and all monitoring equipment is properly calibrated and with valid calibration certificates.
- 4.1.3 No exceedance of Action and Limit Level of water quality monitoring results was recorded in the reporting month.

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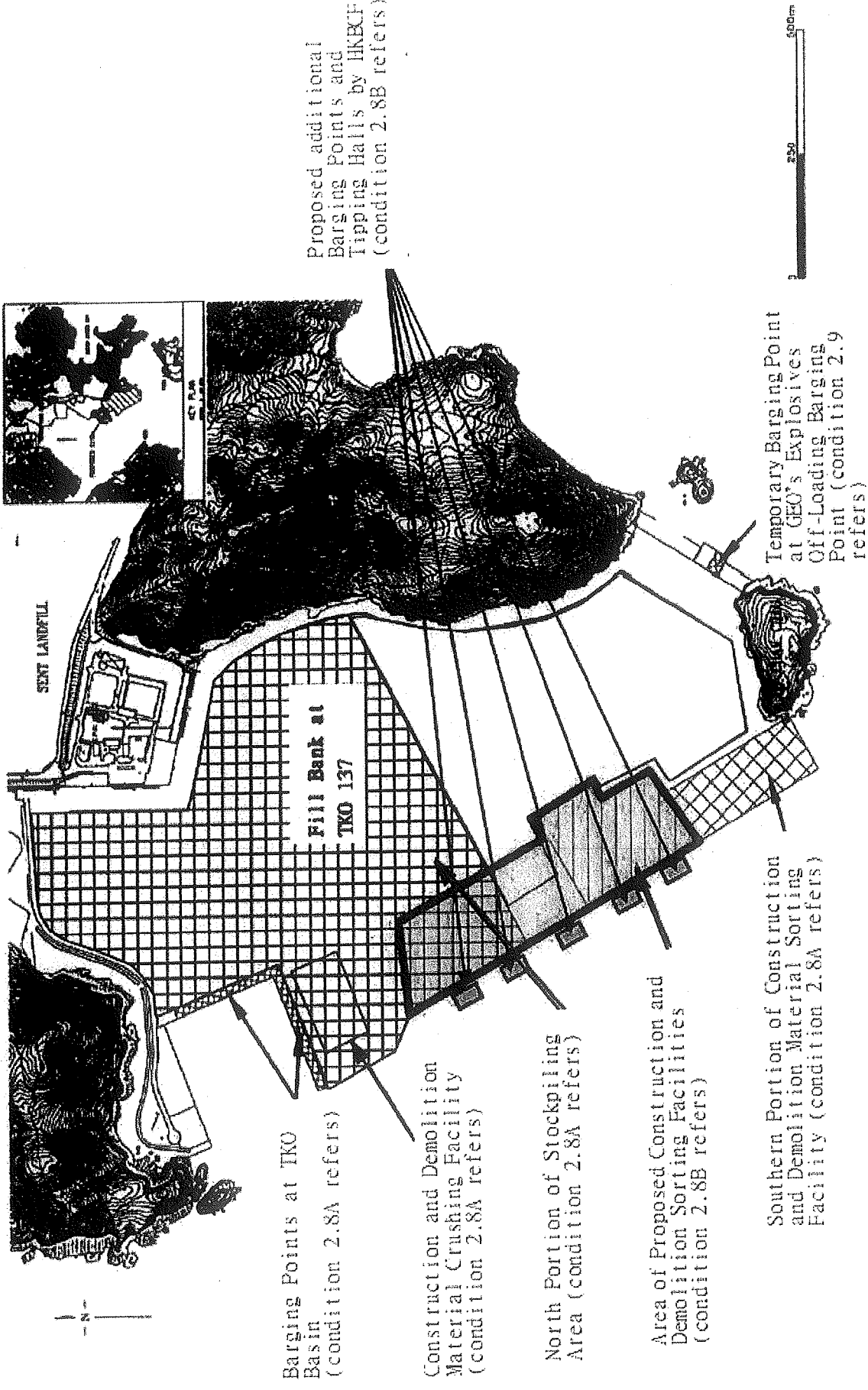
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**FIGURES**

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(Plan Originated from Figure 2 of Environmental Permit No.: EP-134/2002(K))

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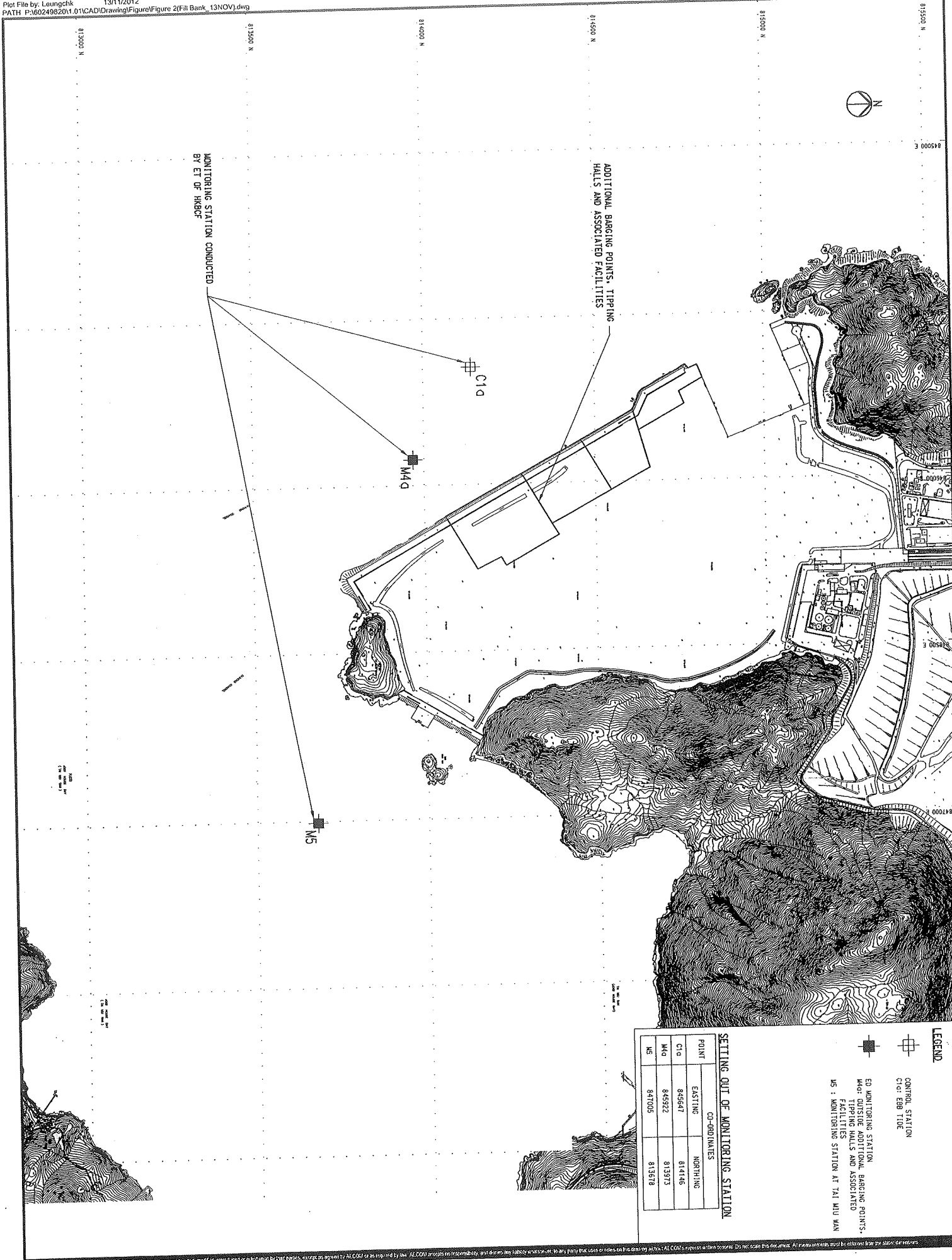
**HONG KONG - ZHUHAI - MACAO BRIDGE  
HONG KONG BOUNDARY CROSSING FACILITIES  
RECLAMATION WORKS**

Site Layout Plan for TKO 137 Fill Bank

Project No.: 60249820 Date: MAY 2012



Figure 1.1



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**APPENDIX A  
CALIBRATION RECORDS**

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### Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>ET/EW/008/005</u>	Manufacturer : <u>YSI</u>
Model No. : <u>Pro 2030</u>	Serial No. : <u>12A 100353</u>
Date of Calibration : <u>29/10/2013</u>	Calibration Due Date : <u>28/01/2014</u>

**Temperature Verification**

Ref. No. of Reference Thermometer : ET/0521/008

Ref. No. of Water Bath : ---

		Temperature (°C)		
Reference Thermometer reading	Measured	20.3	Corrected	19.9
DO Meter reading	Measured	19.8	Difference	0.1

**Standardization of sodium thiosulphate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) solution**

Reagent No. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> titrant	CPE/012/4.5/001/7	Reagent No. of 0.025N K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	CPE/012/4.4/001/22
		Trial 1	Trial 2
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)		1.00	12.00
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)		11.55	22.50
Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)		10.55	10.50
Normality of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> solution (N)		0.02370	0.02381
Average Normality (N) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> solution (N)		0.02376	
Acceptance criteria, Deviation		Less than ± 0.001N	
Calculation: Normality of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , N = 0.25 / ml Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used			

**Lineality Checking**

**Determination of dissolved oxygen content by Winkler Titration \***

Purging Time (min)	2		5		10	
	1	2	1	2	1	2
Trial						
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	11.80	23.40	0.00	8.00	13.00
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	11.80	23.40	31.50	8.00	13.00	18.10
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	11.80	11.60	8.10	8.00	5.00	5.10
Dissolved Oxygen (DO), mg/L	7.53	7.40	5.17	5.10	3.19	3.25
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	
Calculation: DO (mg/L) = V x N x 8000/298						

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.66	7.41	7.54	7.53	7.40	7.47	0.93
5	5.31	5.23	5.27	5.17	5.10	5.14	2.50
10	3.20	3.10	3.15	3.19	3.25	3.22	2.20
Linear regression coefficient				0.9987			



## Internal Calibration Report of Dissolved Oxygen Meter

### Zero Point Checking

DO meter reading, mg/L	0.00
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### Salinity Checking

Reagent No. of NaCl (10ppt)	CPE/012/4.7/002/11	Reagent No. of NaCl (30ppt)	CPE/012/4.8/002/11
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### Determination of dissolved oxygen content by Winkler Titration \*\*

Salinity (ppt)	10		30	
	1	2	1	2
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	12.40	24.50	35.80
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	12.40	24.50	35.80	47.00
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	12.40	12.10	11.30	11.20
Dissolved Oxygen (DO), mg/L	7.91	7.72	7.21	7.14
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation:  $DO (mg/L) = V \times N \times 8000/298$

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.82	7.63	7.73	7.91	7.72	7.82	1.16
30	7.22	7.16	7.19	7.21	7.14	7.18	0.14

### Acceptance Criteria

- (1) Differenc between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : >0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies # / ~~does not comply~~ # with the specified requirements and is deemed acceptable # / unacceptable # for use.

# Delete as appropriate

Calibrated by

:

Approved by :



### Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>ET/EW/008/005</u>	Manufacturer : <u>YSI</u>
Model No. : <u>Pro 2030</u>	Serial No. : <u>12A 100353</u>
Date of Calibration : <u>29/01/2014</u>	Calibration Due Date : <u>28/04/2014</u>

#### Temperature Verification

Ref. No. of Reference Thermometer : ET/0521/008

Ref. No. of Water Bath : ---

		Temperature (°C)		
Reference Thermometer reading	Measured	20.2	Corrected	19.8
DO Meter reading	Measured	19.7	Difference	0.1

#### Standardization of sodium thiosulphate ( $Na_2S_2O_3$ ) solution

Reagent No. of $Na_2S_2O_3$ titrant	CPE/012/4.5/001/8	Reagent No. of 0.025N $K_2Cr_2O_7$	CPE/012/4.4/001/24
		Trial 1	Trial 2
Initial Vol. of $Na_2S_2O_3$ (ml)		0.00	10.50
Final Vol. of $Na_2S_2O_3$ (ml)		10.50	20.95
Vol. of $Na_2S_2O_3$ used (ml)		10.50	10.45
Normality of $Na_2S_2O_3$ solution (N)		0.02381	0.02392
Average Normality (N) of $Na_2S_2O_3$ solution (N)		0.02387	
Acceptance criteria, Deviation		Less than $\pm 0.001N$	

Calculation: Normality of  $Na_2S_2O_3$ ,  $N = 0.25 / ml Na_2S_2O_3$  used

#### Linearity Checking

##### Determination of dissolved oxygen content by Winkler Titration \*

Purging Time (min)	2		5		10	
	1	2	1	2	1	2
Trial						
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	11.90	23.50	0.00	8.20	13.20
Final Vol. of $Na_2S_2O_3$ (ml)	11.90	23.50	31.90	8.20	13.20	17.90
Vol. (V) of $Na_2S_2O_3$ used (ml)	11.90	11.60	8.40	8.20	5.00	4.70
Dissolved Oxygen (DO), mg/L	7.63	7.43	5.38	5.25	3.20	3.01
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation:  $DO (mg/L) = V \times N \times 8000/298$

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.65	7.41	7.53	7.63	7.43	7.53	0.00
5	5.38	5.21	5.30	5.38	5.25	5.32	0.38
10	3.22	3.09	3.16	3.20	3.01	3.11	1.59
Linear regression coefficient						0.9998	



### Internal Calibration Report of Dissolved Oxygen Meter

**Zero Point Checking**

DO meter reading, mg/L	0.00
------------------------	------

**Salinity Checking**

Reagent No. of NaCl (10ppt)	CPE/012/4.7/002/15	Reagent No. of NaCl (30ppt)	CPE/012/4.8/002/15
-----------------------------	--------------------	-----------------------------	--------------------

**Determination of dissolved oxygen content by Winkler Titration \*\***

Salinity (ppt)	10		30	
	1	2	1	2
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	12.30	24.40	35.80
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	12.30	24.40	35.80	47.00
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	12.30	12.10	11.40	11.20
Dissolved Oxygen (DO), mg/L	7.88	7.75	7.31	7.18
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation:  $DO (mg/L) = V \times N \times 8000/298$

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.88	7.65	7.77	7.88	7.75	7.82	0.64
30	7.23	7.14	7.19	7.31	7.18	7.25	0.83

**Acceptance Criteria**

- (1) Differenc between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : >0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies # / does not comply # with the specified requirements and is deemed acceptable # / unacceptable # for use.

# Delete as appropriate

Calibrated by :

Approved by :



## Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/005                      Manufacturer : YSI  
Model No. : Pro 2030                                      Serial No. : 12A 100353  
Date of Calibration : <sup>29/10/2013</sup> ~~29/08/2013~~ <sub>29/10/2013</sub>                      Due Date : 28/01/2014

Ref. No. of Salinity Standard used (30ppt)

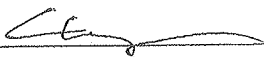
S/001/4

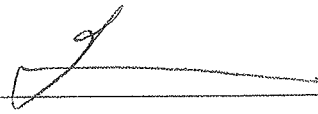
Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30.0	30.8	2.63

Acceptance Criteria

Difference : <10 %

The salinity meter complies \* / ~~does not comply~~ \* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~ \* for use. Measurements are traceable to national standards.

Checked by : 

Approved by : 





## Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/005      Manufacturer : YSI  
Model No. : Pro 2030      Serial No. : 12A 100353  
Date of Calibration : 29/01/2014      Due Date : 28/04/2014

Ref. No. of Salinity Standard used (30ppt)

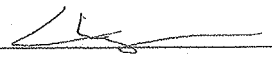
S/001/5

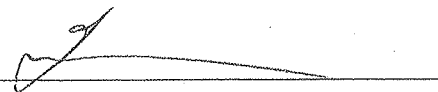
Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30.0	30.9	3.00

Acceptance Criteria

Difference : <10 %

The salinity meter complies \* / ~~does not comply~~ \* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~ \* for use. Measurements are traceable to national standards.

Checked by : 

Approved by : 



## Performance Check of Turbidity Meter


Equipment Ref. No. : ET/0505/009                      Manufacturer : HACH  
Model No. : 2100Q                                      Serial No. : 11060 C 010010  
Date of Calibration : 08/10/2013                      Due Date : 07/01/2014


Gelex Vial Std	Theoretical Value (NTU)	Measured Value (NTU)	Difference %
0-10 NTU	5	5.2	3.92
10-100 NTU	50	5.19	3.73
100-1000 NTU	550	561	1.98

Acceptance Criteria

Difference : -5 % to 5%

The turbidity meter complies \* / ~~does not comply~~\* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~\* for use. Measurements are traceable to national standards.

Checked by : 

Approved by : 



## Performance Check of Turbidity Meter

Equipment Ref. No. : ET/0505/010                      Manufacturer : HACH  
Model No. : 2100Q                                      Serial No. : 11110 C 014260  
Date of Calibration : 07/01/2014                      Due Date : 06/04/2014

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	19.2	-4.08
100	104	3.92
800	793	-0.88

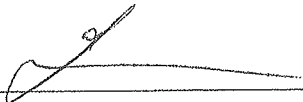
(\* ) Difference = (Measured Value – Theoretical Value) / Theoretical Value

Acceptance Criteria

Difference : -5 % to 5 %

The turbidity meter complies \* / ~~does not comply~~ \* with the specified requirements and is deemed acceptable \* / ~~unacceptable~~ \* for use. Measurements are traceable to national standards.

Prepared by : 

Checked by : 

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**APPENDIX B  
IMPACT MONITORING SCHEDULES**

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**Contract No. HY/2010/02 - Hong Kong-Zhuhai-Macao Bridge  
Hong Kong Boundary Crossing Facilities – Reclamation Works  
Impact Water Quality Monitoring Schedule for January 2014 (TKO 137 Filling Bank)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					Impact Water Quality Monitoring Mid-ebb: 13:45 Mid-flood: 19:08	04-Jan
05-Jan	06-Jan	07-Jan	08-Jan	09-Jan	10-Jan	11-Jan
	Impact Water Quality Monitoring Mid-flood: 10:27 Mid-ebb: 16:16		Impact Water Quality Monitoring Mid-flood: 12:00 Mid-ebb: 18:32		Impact Water Quality Monitoring Mid-flood: 13:35 Mid-ebb: 21:12*	
12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	18-Jan
	Impact Water Quality Monitoring Mid-ebb: 10:40 Mid-flood: 15:56		Impact Water Quality Monitoring Mid-ebb: 11:55 Mid-flood: 17:14		Impact Water Quality Monitoring Mid-ebb: 13:00 Mid-flood: 18:26	
19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	25-Jan
	Impact Water Quality Monitoring Mid-flood: 09:07 Mid-ebb: 14:43		Impact Water Quality Monitoring Mid-flood: 10:18 Mid-ebb: 16:14		Impact Water Quality Monitoring Mid-flood: 11:42 Mid-ebb: 18:22	
26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan	
	Impact Water Quality Monitoring Mid-ebb: 09:08 Mid-flood: 14:23		Impact Water Quality Monitoring Mid-ebb: 11:09 Mid-flood: 16:23			

(\* ) Proposed WQM on 10 January 2014 will be carried out between 1900 to 2100 due to the completion of construction works after 2100. The proposed WQM period was within the ebb tide (1750 on 10 January 2014 to 0033 on 11 January 2014).

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**APPENDIX C  
IMPACT WATER QUALITY MONITORING  
RESULTS AND THEIR GRAPHICAL  
PRESENTATION**

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**Mid-Ebb Tide**

**Monitoring Station : C1a**

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
							Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
03/01/14	1254-1313	23/Sunny	Small Wave	19.6	Surface	17.8	27.2	6.5	82.1	2.4	3.2	2.7	2.5	3.4			
						17.9	27.3	6.5	81.5	2.5	3.6						
						17.9	27.4	6.6	82.5	2.6	3.6						
						18.0	27.4	6.6	82.2	2.6	3.8						
						18.1	27.5	6.7	84.0	2.9	4.0						
						18.1	27.5	6.7	84.5	2.9	3.8						
06/01/14	1539-1557	16/Cloudy	Small Wave	19.8	Surface	17.9	27.3	6.6	82.4	2.4	3.4	2.6	2.4	3.5			
						18.0	27.2	6.5	81.8	2.5	3.6						
						18.1	27.3	6.6	82.7	2.6	3.6						
						18.1	27.4	6.6	82.4	2.6	3.8						
						18.2	27.5	6.7	84.3	2.8	3.8						
						18.1	27.4	6.8	84.8	2.9	4.0						
08/01/14	1741-1800	15/Cloudy	Great Wave	20.3	Surface	17.7	27.0	6.7	82.2	2.7	2.6	2.9	2.7	4.3			
						17.6	27.1	6.7	82.4	2.7	2.8						
						17.8	27.2	6.3	77.9	2.8	3.6						
						17.8	27.1	6.3	77.8	2.9	3.8						
						17.9	27.4	6.7	82.5	3.0	4.2						
						17.9	27.4	6.7	87.8	3.0	4.4						
10/01/14	1927-1947	13/Cloudy	Great Wave	20.0	Surface	17.3	27.0	6.6	81.5	3.4	4.6	3.4	3.4	4.7			
						17.4	27.1	6.6	81.3	3.4	4.8						
						17.3	27.2	6.7	82.5	3.5	4.4						
						17.3	27.3	6.7	82.7	3.5	4.4						
						17.4	27.5	6.8	83.3	3.4	4.6						
						17.4	27.6	6.8	83.5	3.4	4.6						
13/01/14	0954-1013	15/Fine	Small Wave	18.4	Surface	16.5	30.1	7.6	93.4	2.5	3.6	2.6	2.5	3.6			
						16.4	30.0	7.6	92.9	2.5	3.6						
						16.5	30.1	7.8	95.3	2.7	3.6						
						16.6	30.1	7.8	95.7	2.8	3.8						
						16.6	30.1	7.9	96.6	2.6	3.8						
						16.6	30.2	7.9	97.0	2.6	3.8						
15/01/14	1111-1131	15/Sunny	Great Wave	19.8	Surface	16.4	27.2	6.3	77.5	3.3	4.2	3.3	3.3	4.3			
						16.5	27.2	6.3	77.8	3.3	4.4						
						16.5	27.4	6.2	76.7	3.4	4.4						
						16.6	27.3	6.2	76.2	3.5	4.8						
						16.6	27.5	6.1	75.1	3.6	4.8						
						16.6	27.5	6.1	75.4	3.6	4.6						
17/01/14	1225-1243	20/Sunny	Small Wave	19.9	Surface	16.6	27.3	6.2	76.8	3.3	4.6	3.3	3.3	4.7			
						16.6	27.4	6.2	76.1	3.3	4.8						
						16.5	27.4	6.2	76.5	3.3	4.8						
						16.6	27.4	6.2	75.8	3.4	4.8						
						16.6	27.4	6.1	75.0	3.4	4.8						
						16.6	27.4	6.1	74.8	3.4	4.8						
20/01/14	1355-1410	17/Fine	Small Wave	18.2	Surface	16.5	30.1	6.7	82.6	2.9	3.4	2.9	2.8	3.5			
						16.5	30.1	6.7	82.1	2.8	3.6						
						16.4	30.1	6.6	81.2	2.9	4.0						
						16.4	30.2	6.6	80.7	3.0	4.0						
						16.4	30.2	6.6	80.2	2.9	3.8						
						16.4	30.2	6.6	80.5	2.9	4.0						

**Mid-Ebb Tide**

Monitoring Station : C1a

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
							Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
22/01/14	1525-1543	16/Sunny	Small Wave	19.9	Surface	15.6	27.5	6.2	74.2	3.3	3.3	4.4	3.3	4.4	4.4	3.3	4.4
						15.7	27.4	6.2	73.8	3.3	3.3	4.4					
						15.7	27.5	6.1	73.3	3.4	3.4	4.4					
					Middle	15.7	27.6	6.2	73.6	3.5	3.5	4.6	3.4	4.5	4.4		
						15.7	27.6	6.1	72.4	3.4	3.4	4.2					
						15.7	27.5	6.1	72.5	3.4	3.4	4.2					
24/01/14	1737-1755	18/Fine	Small Wave	19.8	Surface	16.2	27.1	6.4	76.7	3.1	3.1	4.2	3.1	4.3	4.3	3.1	4.3
						16.3	27.2	6.4	76.9	3.1	3.1	4.4					
						16.3	27.3	6.5	79.1	3.1	3.1	4.0					
					Middle	16.3	27.3	6.6	79.2	3.1	3.1	4.0	3.0	4.0	4.1		
						16.4	27.4	6.7	81.1	2.9	2.9	3.8					
						16.4	27.4	6.7	81.4	2.9	2.9	4.0					
27/01/14	0825-0843	15/Sunny	Small Wave	19.7	Surface	16.8	27.3	6.3	77.3	3.2	3.2	4.6	3.2	4.5	4.5	3.2	4.5
						16.8	27.2	6.3	76.8	3.2	3.2	4.4					
						16.9	27.3	6.4	78.0	3.3	3.3	4.4					
					Middle	16.9	27.3	6.4	77.5	3.3	3.3	4.2	3.2	4.3	4.2		
						17.0	27.3	6.4	78.1	3.0	3.0	3.8					
						16.9	27.4	6.4	78.5	3.1	3.1	4.0					
29/01/14	1025-1043	19/Sunny	Small Wave	19.6	Surface	17.1	27.3	6.3	77.2	3.3	3.3	4.2	3.3	4.1	4.1	3.3	4.1
						17.1	27.3	6.3	76.8	3.4	3.4	4.0					
						17.2	27.3	6.3	77.1	3.3	3.3	4.4					
					Middle	17.2	27.4	6.3	76.5	3.3	3.3	4.2	3.3	4.3	4.3		
						17.2	27.3	6.3	77.2	3.4	3.4	4.2					
						17.3	27.3	6.3	77.2	3.4	3.4	4.4					
Bottom	17.3	27.3	6.4	77.4	3.4	3.4	4.6	3.4	4.5	4.5							
	17.3	27.3	6.4	77.4	3.4	3.4	4.6										



**Mid-Flood Tide**

**Monitoring Station : C1a**

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
							Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
03/01/14	1754-1813	22/Sunny	Small Wave	19.8	Surface	17.8	27.2	27.2	6.6	6.6	6.7	2.3	2.3	3.6	3.5		
						17.8	27.2	27.2	6.6	6.6	2.4	2.4	3.4				
						17.8	27.3	27.3	6.7	6.7	2.6	2.6	3.6				
					Middle	17.9	27.2	27.3	6.7	6.7	2.6	2.6	3.8	3.7			
						17.9	27.4	27.4	6.8	6.8	2.8	2.8	4.0				
						18.0	27.4	27.4	6.8	6.8	2.8	2.8	3.9				
06/01/14	0954-1012	16/Cloudy	Small Wave	20.4	Surface	17.9	27.2	27.2	6.6	6.6	2.4	2.4	3.2	3.3			
						17.8	27.1	27.1	6.6	6.6	2.4	2.4	3.4				
						17.9	27.2	27.3	6.7	6.7	2.5	2.5	3.6				
					Middle	18.0	27.3	27.3	6.6	6.6	2.6	2.6	3.4	3.5			
						18.2	27.4	27.4	6.8	6.8	2.8	2.8	3.6				
						18.2	27.4	27.4	6.8	6.8	2.8	2.8	3.7				
08/01/14	1124-1142	15/Cloudy	Great Wave	20.5	Surface	17.8	27.0	27.1	6.6	6.6	2.5	2.5	3.6	3.6			
						17.9	27.1	27.1	6.6	6.6	2.5	2.5	3.6				
						17.9	27.1	27.2	6.5	6.5	2.6	2.6	3.8				
					Middle	18.0	27.2	27.3	6.5	6.5	2.6	2.6	4.0	3.7			
						18.0	27.3	27.4	6.7	6.7	2.8	2.8	4.0				
						18.1	27.4	27.4	6.7	6.7	2.8	2.8	3.9				
10/01/14	1255-1314	13/Cloudy	Great Wave	20.2	Surface	17.5	27.1	27.1	6.7	6.7	3.1	3.1	4.2	4.1			
						17.6	27.1	27.1	6.7	6.7	3.1	3.1	4.0				
						17.6	27.3	27.3	6.9	6.9	2.9	2.9	4.0				
					Middle	17.7	27.2	27.3	6.9	6.9	2.9	2.9	4.0	4.1			
						17.8	27.4	27.4	6.9	6.9	3.2	3.2	4.4				
						17.7	27.4	27.4	6.9	6.9	3.2	3.2	4.2				
13/01/14	1520-1535	15/Fine	Small Wave	18.8	Surface	16.6	30.2	30.2	7.7	7.7	2.4	2.4	3.6	3.6			
						16.6	30.2	30.2	7.6	7.6	2.5	2.5	3.6				
						16.6	30.2	30.2	7.8	7.8	2.7	2.7	3.8				
					Middle	16.6	30.2	30.2	7.9	7.9	2.7	2.7	3.8	3.8			
						16.6	30.2	30.2	8.0	8.0	2.5	2.5	3.6				
						16.6	30.2	30.2	8.0	8.0	2.6	2.6	3.6				
15/01/14	1625-1644	14/Sunny	Great Wave	20.3	Surface	16.3	27.2	27.2	6.6	6.7	3.2	3.2	4.4	4.3			
						16.2	27.2	27.2	6.7	6.7	3.3	3.3	4.2				
						16.4	27.3	27.3	6.6	6.5	3.3	3.3	4.2				
					Middle	16.4	27.3	27.3	6.5	6.5	3.3	3.3	4.2	4.2			
						16.5	27.3	27.4	6.5	6.5	3.3	3.3	4.4				
						16.4	27.4	27.4	6.4	6.4	3.3	3.3	4.4				
17/01/14	1740-1758	18/Sunny	Small Wave	20.3	Surface	16.4	27.2	27.2	6.5	6.5	3.2	3.2	3.6	3.5			
						16.3	27.2	27.2	6.5	6.5	3.2	3.2	3.4				
						16.3	27.3	27.3	6.6	6.5	3.2	3.2	3.4				
					Middle	16.4	27.3	27.3	6.5	6.5	3.2	3.2	3.4	3.4			
						16.4	27.3	27.3	6.5	6.5	3.2	3.2	3.4				
						16.4	27.3	27.3	6.5	6.5	3.2	3.2	3.4				
20/01/14	0825-0840	16/Fine	Small Wave	18.8	Surface	16.4	27.3	27.3	6.5	6.5	3.2	3.2	3.6	3.7			
						16.4	27.3	27.3	6.5	6.5	3.3	3.3	3.4				
						16.3	30.1	30.1	6.5	6.5	2.5	2.5	3.6				
					Middle	16.3	30.1	30.1	6.5	6.5	2.6	2.6	3.8	3.7			
						16.3	30.1	30.1	6.5	6.5	2.9	2.9	3.8				
						16.3	30.1	30.1	6.5	6.5	2.9	2.9	4.0				
Bottom	16.3	30.1	30.1	6.4	6.4	2.9	2.9	3.6	3.7								
	16.3	30.1	30.1	6.5	6.5	2.9	2.9	3.8									
	16.3	30.1	30.1	6.5	6.5	2.9	2.9	3.8									

**Mid-Flood Tide**

Monitoring Station : C1a

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)			
							Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average	
22/01/14	1024-1042	13/Sunny	Small Wave	20.3	Surface	15.6	27.3	27.3	6.5	77.4	3.2	4.4	3.2	4.4	3.3	3.3	4.5	4.4
						15.6	27.3	6.4	76.9	3.3	4.4							
					Middle	15.7	27.4	27.4	6.5	77.2	3.3	4.4	3.3	4.4				
						15.7	27.4	27.4	6.4	76.8	3.3	4.6						
					Bottom	15.7	27.3	27.4	6.4	76.4	3.3	4.4	3.3	4.3				
						15.8	27.4	27.4	6.4	76.0	3.3	4.2						
24/01/14	1054-1111	18/Fine	Small Wave	20.0	Surface	16.6	27.0	27.1	6.5	78.4	3.1	4.0	3.1	4.1	3.0	3.2	4.3	4.0
						16.5	27.1	27.2	6.6	78.6	3.1	4.2						
					Middle	16.5	27.2	27.2	6.6	80.1	3.2	4.4	3.2	4.3				
						16.5	27.2	27.2	6.6	79.9	3.2	4.2						
					Bottom	16.4	27.4	27.5	6.8	82.6	2.7	3.6	2.7	3.7				
						16.3	27.5	27.5	6.8	82.5	2.7	3.8						
27/01/14	1355-1413	19/Sunny	Small Wave	20.1	Surface	17.1	27.3	27.3	6.4	78.0	3.2	4.4	3.2	4.2	3.2	3.2	4.3	4.3
						17.2	27.3	27.3	6.4	77.5	3.1	4.0						
					Middle	17.1	27.3	27.3	6.4	77.8	3.2	4.2	3.2	4.3				
						17.1	27.2	27.2	6.3	77.2	3.2	4.4						
					Bottom	17.2	27.3	27.3	6.3	76.8	3.2	4.4	3.3	4.3				
						17.3	27.3	27.3	6.3	77.3	3.3	4.2						
29/01/14	1555-1613	20/Sunny	Small Wave	20.2	Surface	17.1	27.3	27.3	6.3	76.8	3.3	4.4	3.3	4.3	3.3	3.3	4.5	4.4
						17.2	27.3	27.3	6.3	76.3	3.3	4.2						
					Middle	17.2	27.3	27.3	6.3	77.2	3.3	4.4	3.3	4.5				
						17.2	27.2	27.2	6.4	77.5	3.3	4.6						
					Bottom	17.3	27.3	27.4	6.3	76.8	3.2	4.2	3.2	4.3				
						17.2	27.4	27.4	6.3	77.3	3.3	4.4						

**Mid-Ebb Tide**

Monitoring Station : M4a

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
							Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
03/01/14	1318-1337	23/Sunny	Small Wave	15.8	Surface	18.0	27.2	27.3	6.6	82.4	82.6	2.6	2.6	3.6			
					Middle	17.9	27.3	6.6	82.8	2.6	2.6	3.8					
					Bottom	18.1	27.4	6.7	83.3	2.7	2.7	3.4					
06/01/14	1603-1621	16/Cloudy	Small Wave	16.4	Surface	18.0	27.5	27.5	6.6	83.5	83.4	2.8	2.8	3.5			
					Middle	18.1	27.5	6.7	83.7	2.8	2.8	3.6					
					Bottom	18.2	27.2	6.6	84.0	2.5	2.5	3.8					
08/01/14	1807-1825	15/Cloudy	Great Wave	16.7	Surface	17.9	27.3	27.3	6.6	82.8	82.7	2.6	2.6	3.3			
					Middle	18.2	27.4	27.4	6.7	83.6	83.7	2.6	2.6	3.7			
					Bottom	18.3	27.3	6.7	83.8	2.6	2.6	3.8					
10/01/14	1952-2010	13/Cloudy	Great Wave	16.6	Surface	18.3	27.4	27.5	6.7	84.1	84.4	2.8	2.8	3.9			
					Middle	17.8	27.5	6.8	84.6	2.7	2.7	4.0					
					Bottom	17.7	27.1	6.4	78.2	2.3	2.4	3.2					
13/01/14	1018-1037	15/Fine	Small Wave	18.8	Surface	18.0	27.2	27.2	6.4	79.0	79.1	2.7	2.7	3.6			
					Middle	17.9	27.1	6.4	79.1	2.7	2.7	3.6					
					Bottom	18.1	27.2	6.3	77.8	3.1	3.1	4.2					
15/01/14	1136-1154	15/Sunny	Great Wave	16.4	Surface	17.4	27.5	27.5	6.3	77.7	77.8	3.2	3.2	4.2			
					Middle	17.4	27.0	6.0	74.1	3.2	3.2	4.2					
					Bottom	17.3	27.1	6.0	73.8	3.2	3.2	4.0					
17/01/14	1248-1308	20/Sunny	Small Wave	16.4	Surface	17.4	27.1	27.2	6.3	76.8	76.9	3.1	3.1	4.0			
					Middle	17.4	27.2	6.3	76.9	3.1	3.1	4.0					
					Bottom	17.5	27.3	6.4	78.5	3.5	3.6	4.4					
20/01/14	1415-1430	17/Fine	Small Wave	17.4	Surface	16.4	30.0	30.1	7.3	89.8	90.1	2.2	2.2	3.1			
					Middle	16.5	30.1	7.3	90.3	2.2	2.2	3.0					
					Bottom	16.5	30.2	7.5	91.8	2.0	2.5	3.2					
15/01/14	1136-1154	15/Sunny	Great Wave	16.4	Surface	16.4	30.2	30.2	7.6	92.3	92.1	3.0	3.0	3.2			
					Middle	16.5	30.2	7.7	94.2	2.3	2.3	3.4					
					Bottom	16.6	30.1	7.6	93.6	2.2	2.3	3.4					
17/01/14	1248-1308	20/Sunny	Small Wave	16.4	Surface	16.4	27.2	27.3	6.0	73.7	73.5	3.3	3.3	4.3			
					Middle	16.5	27.3	6.0	73.2	3.3	3.3	4.4					
					Bottom	16.5	27.4	6.1	75.0	3.4	3.4	4.6					
20/01/14	1415-1430	17/Fine	Small Wave	17.4	Surface	16.5	27.4	27.4	6.1	74.5	74.8	3.5	3.5	4.6			
					Middle	16.6	27.4	6.1	74.8	3.5	3.5	4.6					
					Bottom	16.6	27.5	6.0	73.9	3.4	3.5	4.6					

# Mid-Ebb Tide

Monitoring Station : M4a

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)		Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)							
					Surface	Bottom		Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average					
22/01/14	1548-1608	16/Sunny	Small Wave	16.5	Surface	1.0	15.6	27.5	6.2	27.5	73.8	3.3	4.2	3.3	4.2	4.3	3.3	3.3	4.3				
							15.6	27.5	6.2	27.5	73.6	3.3	4.4										
					Middle	8.3	15.7	27.6	6.1	27.6	73.3	3.3	4.0	3.4	4.0	4.1				3.3	4.1	4.2	
							15.6	27.6	6.0	27.6	72.1	3.4	4.2										
					Bottom	15.5	15.7	27.6	6.0	27.6	72.0	3.3	4.4	3.4	4.4	4.3				3.3	4.3	4.2	
							15.7	27.6	6.0	27.6	71.5	3.4	4.2										
24/01/14	1801-1820	18/Fine	Small Wave	16.4	Surface	1.0	16.2	27.2	6.5	27.3	78.7	2.7	3.6	2.7	3.6	3.7	2.7	2.7	3.7				
							16.3	27.3	6.5	27.3	78.5	2.7	3.8										
					Middle	8.2	16.3	27.4	6.6	27.4	79.6	2.7	3.4	2.7	3.4	3.5				2.8	3.5	2.7	2.7
							16.3	27.4	6.6	27.4	80.0	2.8	3.6										
					Bottom	15.4	16.4	27.5	6.7	27.6	81.0	2.8	3.8	2.9	2.8	3.7				2.9	3.7	3.6	
							16.3	27.6	6.7	27.6	81.2	2.9	3.6										
27/01/14	0850-0908	15/Sunny	Small Wave	16.3	Surface	1.0	16.8	27.3	6.4	27.3	78.1	3.1	4.2	3.2	4.2	4.1	3.2	3.2	4.1				
							16.9	27.3	6.4	27.3	77.6	3.2	4.0										
					Middle	8.2	17.0	27.4	6.3	27.4	77.2	3.2	4.4	3.3	4.4	4.3				3.2	4.3	3.2	3.2
							17.1	27.3	6.4	27.3	77.5	3.3	4.2										
					Bottom	15.3	17.0	27.4	6.4	27.4	78.0	3.3	4.4	3.3	4.4	4.5				3.3	4.5	3.3	3.3
							17.0	27.3	6.4	27.3	78.4	3.3	4.6										
29/01/14	1050-1108	19/Sunny	Small Wave	16.2	Surface	1.0	17.1	27.3	6.3	27.3	77.1	3.3	4.0	3.3	4.0	4.1	3.3	3.3	4.1				
							17.2	27.3	6.3	27.3	76.8	3.2	4.2										
					Middle	8.1	17.1	27.3	6.3	27.4	76.5	3.3	4.4	3.4	4.4	4.3				3.4	4.3	3.4	3.4
							17.1	27.4	6.3	27.4	76.9	3.4	4.2										
					Bottom	15.2	17.2	27.4	6.3	27.4	77.3	3.4	4.4	3.5	4.4	4.5				3.4	4.5	3.5	3.5
							17.2	27.4	6.4	27.4	77.5	3.5	4.6										

# Mid-Flood Tide

Monitoring Station : M4a

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)		Water Temp (°C)		Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
					Surface	Bottom	Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average		
03/01/14	1818-1837	22/Sunny	Small Wave	16.2	Surface	1.0	17.8	27.2	6.7	6.7	6.7	83.9	2.4	2.4	3.4				
							17.7	27.3	6.7	84.1	2.5	2.5	3.6						
					Middle	8.1	17.8	27.3	6.7	84.4	2.6	2.6	3.8						
							17.8	27.4	6.8	84.5	2.6	2.6	3.8						
					Bottom	15.2	17.8	27.5	7.8	84.9	2.6	2.6	3.8						
							17.9	27.5	7.8	84.5	2.6	2.6	4.0						
06/01/14	1018-1036	16/Cloudy	Small Wave	16.6	Surface	1.0	17.9	27.1	6.7	6.7	83.3	2.5	2.5	3.4					
							17.9	27.2	6.7	83.8	2.5	2.5	3.2						
					Middle	8.3	18.1	27.4	6.7	84.3	2.6	2.6	3.6						
							18.2	27.3	6.8	84.5	2.6	2.6	3.8						
					Bottom	15.6	18.3	27.5	6.8	84.8	2.7	2.7	3.8						
							18.2	27.4	6.6	85.3	2.7	2.7	3.6						
08/01/14	1148-1206	15/Cloudy	Great Wave	16.8	Surface	1.0	17.8	27.0	6.5	6.5	79.9	2.1	2.1	3.2					
							17.9	27.1	6.5	79.6	2.1	2.1	3.4						
					Middle	8.4	18.0	27.2	6.6	81.0	2.3	2.3	3.6						
							18.1	27.3	6.6	81.2	2.4	2.4	3.4						
					Bottom	15.8	18.2	27.4	6.6	81.7	2.6	2.6	3.6						
							18.3	27.6	6.6	81.6	2.6	2.6	3.6						
10/01/14	1320-1339	13/Cloudy	Great Wave	16.7	Surface	1.0	17.6	27.1	6.4	6.4	78.5	3.0	3.0	3.8					
							17.5	27.2	6.4	78.8	3.0	3.0	3.8						
					Middle	8.4	17.6	27.2	6.6	81.2	2.7	2.7	3.4						
							17.6	27.3	6.6	81.0	2.8	2.8	3.4						
					Bottom	15.7	17.7	27.5	6.7	82.5	3.0	3.0	4.2						
							17.6	27.5	6.7	82.8	2.9	2.9	4.2						
13/01/14	1540-1555	15/Fine	Small Wave	19.2	Surface	1.0	16.6	30.2	7.4	7.4	91.0	2.1	2.1	3.2					
							16.6	30.2	7.4	91.5	2.2	2.2	3.2						
					Middle	9.6	16.6	30.2	7.6	93.0	2.0	2.0	3.0						
							16.6	30.2	7.6	93.5	1.9	1.9	3.0						
					Bottom	18.2	16.6	30.2	7.8	95.4	2.3	2.3	3.4						
							16.5	30.2	7.7	94.9	2.2	2.2	3.4						
15/01/14	1650-1708	14/Sunny	Great Wave	16.8	Surface	1.0	16.3	27.3	6.3	6.4	77.9	3.0	3.0	3.2					
							16.3	27.3	6.4	78.8	3.0	3.0	3.2						
					Middle	8.4	16.3	27.4	6.3	77.2	3.0	3.0	3.2						
							16.4	27.3	6.2	76.5	3.0	3.0	3.2						
					Bottom	15.8	16.4	27.3	6.3	77.9	3.2	3.2	3.4						
							16.5	27.3	6.4	78.5	3.2	3.2	3.4						
17/01/14	1804-1822	18/Sunny	Small Wave	16.8	Surface	1.0	16.3	27.3	6.4	6.3	78.2	3.0	3.0	4.2					
							16.3	27.3	6.3	77.5	3.0	3.0	4.2						
					Middle	8.4	16.4	27.3	6.2	76.5	3.0	3.0	4.0						
							16.3	27.4	6.2	76.0	3.0	3.0	4.0						
					Bottom	15.8	16.3	27.3	6.2	76.3	3.0	3.0	4.0						
							16.3	27.4	6.2	75.8	3.1	3.1	4.0						
20/01/14	0845-0900	16/Fine	Small Wave	17.6	Surface	1.0	16.3	30.1	6.6	6.6	81.2	2.7	2.7	3.6					
							16.3	30.0	6.6	80.8	2.7	2.7	3.8						
					Middle	8.8	16.3	30.1	6.4	78.7	2.6	2.6	3.4						
							16.2	30.1	6.5	79.2	2.5	2.5	3.6						
					Bottom	16.6	16.3	30.2	6.5	79.2	2.6	2.6	3.8						
							16.3	30.2	6.5	79.5	2.6	2.6	3.6						

**Mid-Flood Tide**

**Monitoring Station : M4a**

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
							Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
22/01/14	1047-1105	13/Sunny	Small Wave	16.8	Surface	15.5	27.5	27.5	6.3	75.6	3.2	4.2	3.2	3.2	4.3		
					Middle	15.6	27.4	6.4	76.0	3.2	4.4						
					Bottom	15.7	27.5	6.3	75.0	3.2	4.4						
						15.8	27.4	6.3	74.8	3.2	4.0						
					Bottom	15.7	27.5	6.1	73.2	3.2	4.2						
						15.7	27.5	6.2	73.5	3.2	4.4						
24/01/14	1116-1134	18/Fine	Small Wave	16.5	Surface	16.6	27.1	27.2	6.7	80.1	2.5	3.6	2.6	3.5			
					Middle	16.5	27.3	6.6	80.0	2.6	3.4						
					Bottom	16.4	27.4	6.7	81.0	2.7	3.8						
						15.5	27.5	6.9	81.3	2.5	3.6						
					Bottom	16.3	27.5	6.9	82.9	2.5	3.4						
						17.2	27.3	6.4	82.7	2.5	3.6						
27/01/14	1418-1436	19/Sunny	Small Wave	16.6	Surface	17.2	27.3	27.3	6.4	77.8	3.2	4.2	3.2	4.1			
					Middle	17.2	27.2	6.4	77.9	3.2	4.0						
					Bottom	17.1	27.3	6.3	77.3	3.2	4.2						
						8.3	27.4	6.4	77.6	3.2	4.4						
					Bottom	17.2	27.3	6.3	77.3	3.3	4.6						
						15.6	27.4	6.3	76.8	3.3	4.4						
29/01/14	1618-1635	20/Sunny	Small Wave	16.7	Surface	17.2	27.3	27.3	6.3	77.2	3.3	4.4	3.3	4.3			
					Middle	17.2	27.3	6.4	77.4	3.3	4.2						
					Bottom	17.1	27.3	6.3	76.3	3.3	4.4						
						8.4	27.3	6.3	76.2	3.3	4.2						
					Bottom	17.1	27.3	6.3	76.3	3.3	4.2						
						15.7	27.2	6.3	76.3	3.3	4.6						
17.2	27.3	6.3	76.7	3.3	4.4												

**Mid-Ebb Tide**

Monitoring Station : M5

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)		Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen			Turbidity (NTU)			Suspended Solids (mg/L)		
					Surface	Bottom		Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
03/01/14	1342-1401	23/Sunny	Small Wave	13.2	Surface	1.0	18.1	27.3	6.6	27.3	83.2	83.4	2.5	2.5	3.4						
							18.1	27.2	6.7	27.2	83.6	83.4	2.5	2.5	3.4						
							18.0	27.4	6.8	27.4	84.8	84.6	2.7	2.7	3.6						
							18.1	27.4	6.7	27.4	84.4	84.4	2.7	2.7	3.8						
							18.2	27.5	6.7	27.5	84.0	84.1	2.8	2.8	3.8						
							18.2	27.5	6.7	27.5	84.1	84.1	2.8	2.8	4.0						
06/01/14	1627-1645	16/Cloudy	Small Wave	13.6	Surface	1.0	17.9	27.3	6.7	27.3	83.6	84.0	2.5	2.5	3.4						
							18.0	27.3	6.7	27.3	84.4	84.0	2.5	2.5	3.6						
							18.2	27.3	6.8	27.4	85.3	85.1	2.6	2.6	3.6						
							18.1	27.4	6.8	27.4	84.9	84.9	2.7	2.7	3.8						
							18.3	27.4	6.7	27.4	84.5	84.6	2.8	2.8	3.8						
							18.2	27.3	6.7	27.3	84.6	84.6	2.8	2.8	4.0						
08/01/14	1832-1850	15/Cloudy	Great Wave	13.9	Surface	1.0	17.7	27.1	6.4	27.2	78.2	78.1	2.5	2.5	3.4						
							17.8	27.2	6.3	27.2	78.0	78.0	2.5	2.5	3.4						
							17.9	27.3	6.4	27.3	78.9	79.1	2.7	2.7	3.8						
							18.0	27.3	6.4	27.3	79.2	79.1	2.7	2.7	3.8						
							18.2	27.4	6.6	27.5	81.1	81.2	2.9	2.9	4.0						
							18.1	27.5	6.6	27.5	81.3	81.2	2.9	2.9	4.0						
10/01/14	2018-2037	13/Cloudy	Great Wave	13.9	Surface	1.0	17.3	27.1	6.2	27.1	75.9	76.0	3.7	3.6	4.6						
							17.4	27.0	6.2	27.0	76.1	76.1	3.6	3.6	4.6						
							17.5	27.1	6.5	27.1	79.6	79.7	3.5	3.4	4.4						
							17.4	27.1	6.5	27.1	79.7	79.7	3.4	3.4	4.4						
							17.5	27.3	6.7	27.4	81.8	81.7	3.6	3.6	4.6						
							17.5	27.4	6.6	27.4	81.5	81.7	3.6	3.6	4.8						
13/01/14	1042-1101	15/Fine	Small Wave	16.2	Surface	1.0	16.4	30.1	7.8	30.1	96.1	95.9	1.7	1.6	2.4						
							16.3	30.1	7.8	30.1	95.7	95.7	1.6	1.6	2.6						
							16.4	30.2	7.8	30.2	96.5	96.6	1.9	1.9	3.0						
							16.5	30.1	7.9	30.1	96.7	96.7	2.0	2.0	3.0						
							16.6	30.2	7.9	30.3	97.2	97.1	1.7	1.7	2.8						
							16.5	30.3	7.9	30.3	97.0	97.0	1.7	1.7	2.8						
15/01/14	1202-1220	15/Sunny	Great Wave	13.8	Surface	1.0	16.5	27.2	6.1	27.3	74.6	74.5	3.3	3.4	4.4						
							16.5	27.3	6.1	27.3	74.3	74.5	3.4	3.4	4.4						
							16.6	27.4	6.0	27.5	73.9	73.8	3.5	3.5	4.6						
							16.6	27.5	6.0	27.5	73.7	73.8	3.5	3.5	4.6						
							16.5	27.6	6.1	27.6	75.1	74.8	3.6	3.6	4.6						
							16.6	27.5	6.1	27.5	74.4	74.4	3.6	3.6	4.8						
17/01/14	1316-1336	20/Sunny	Small Wave	13.8	Surface	1.0	16.5	27.3	6.0	27.3	74.0	73.8	3.3	3.3	4.2						
							16.6	27.3	6.0	27.3	73.5	73.5	3.3	3.3	4.2						
							16.6	27.4	6.0	27.4	74.3	74.4	3.4	3.4	4.4						
							16.6	27.3	6.1	27.3	74.5	74.4	3.4	3.4	4.4						
							16.7	27.5	6.1	27.5	75.5	75.8	3.5	3.4	4.4						
							16.6	27.4	6.2	27.4	76.0	76.0	3.4	3.4	4.4						
20/01/14	1440-1455	17/Fine	Small Wave	14.6	Surface	1.0	16.5	30.0	6.8	30.1	83.9	83.7	2.4	2.5	3.6						
							16.5	30.1	6.8	30.1	83.4	83.4	2.5	2.5	3.8						
							16.4	30.1	6.7	30.2	82.0	81.9	2.6	2.6	3.4						
							16.4	30.2	6.7	30.2	81.7	81.9	2.6	2.6	3.6						
							16.4	30.1	6.6	30.1	80.8	80.7	2.5	2.5	3.6						
							16.4	30.2	6.6	30.2	80.5	80.5	2.5	2.5	3.6						

# Mid-Ebb Tide

Monitoring Station : M5

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)		Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
					Surface	Middle		Value	Ave.	Value	Average	Depth-average	Value	Average	Depth-average	Value	Average	Depth-average
22/01/14	1616-1636	16/Sunny	Small Wave	13.9	Surface	1.0	15.6	27.6	6.1	27.6	73.3	3.2	4.0	3.2	4.0	3.3	3.3	4.3
							15.6	27.5	6.1	27.5	73.0	3.2	4.2					
					Middle	7.0	15.6	27.5	6.0	27.5	72.1	3.3	4.4	3.3	4.4			
							15.7	27.5	6.1	27.5	72.6	3.2	4.2					
					Bottom	12.9	15.7	27.5	6.1	27.6	72.3	3.4	4.4	3.4	4.4			
							15.7	27.6	6.0	27.6	71.8	3.4	4.4					
24/01/14	1827-1847	18/Fine	Small Wave	13.6	Surface	1.0	16.2	27.1	6.6	27.2	80.1	2.9	3.8	2.9	3.7	2.7	2.7	3.7
							16.3	27.2	6.6	27.2	79.8	2.9	3.6					
					Middle	6.8	16.3	27.3	6.7	27.4	81.1	2.8	3.4	2.8	3.4			
							16.3	27.4	6.7	27.4	81.2	2.8	3.6					
					Bottom	12.6	16.4	27.4	6.8	27.5	82.8	2.6	3.6	2.6	3.8			
							16.4	27.5	6.9	27.5	82.9	2.6	4.0					
27/01/14	0916-0934	15/Sunny	Small Wave	13.5	Surface	1.0	16.8	27.3	6.4	27.3	78.0	3.2	4.0	3.2	4.1	3.3	3.3	4.3
							16.9	27.3	6.4	27.3	77.5	3.2	4.2					
					Middle	6.8	16.9	27.4	6.5	27.4	78.6	3.3	4.4	3.3	4.4			
							17.0	27.3	6.5	27.3	79.0	3.3	4.2					
					Bottom	12.5	17.1	27.4	6.4	27.4	77.9	3.4	4.4	3.4	4.4			
							17.0	27.4	6.4	27.4	78.3	3.4	4.4					
29/01/14	1116-1135	19/Sunny	Small Wave	13.4	Surface	1.0	17.2	27.3	6.3	27.3	76.8	3.3	4.2	3.3	4.3	3.3	3.3	4.4
							17.2	27.2	6.3	27.3	76.3	3.3	4.4					
					Middle	6.7	17.1	27.2	6.3	27.3	76.3	3.3	4.2	3.3	4.2			
							17.1	27.3	6.2	27.3	76.1	3.4	4.4					
					Bottom	12.4	17.2	27.3	6.3	27.3	76.3	3.4	4.6	3.4	4.5			
							17.2	27.3	6.2	27.3	75.9	3.4	4.4					



# Mid-Flood Tide

Monitoring Station : M5

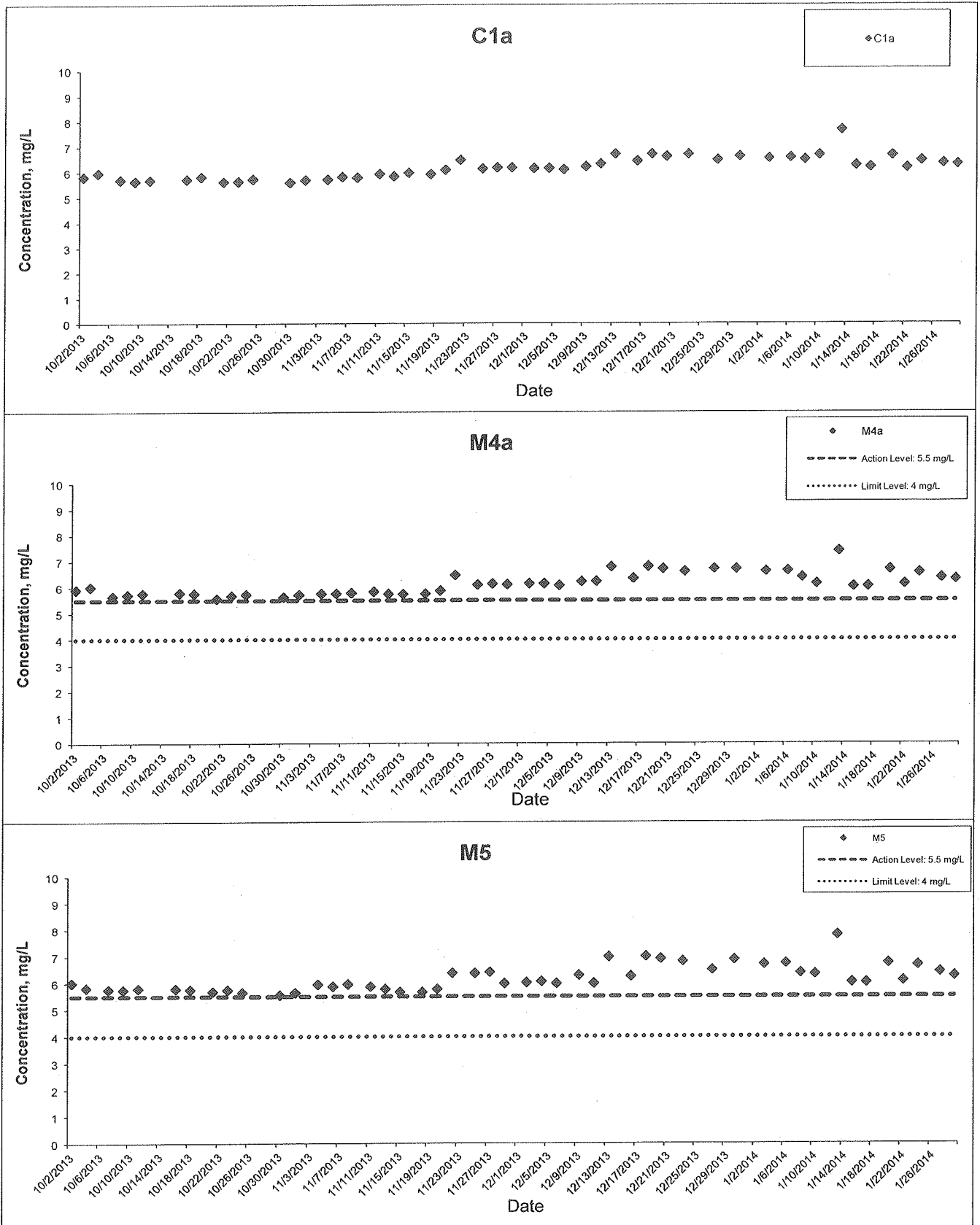
Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)		Salinity (ppt)		Dissolved Oxygen (mg/L)			Dissolved Oxygen		Turbidity (NTU)		Suspended Solids (mg/L)		Depth-average
						Value	Ave.	Value	Ave.	Value	Average	Depth-average	Value	Average	Value	Average	Value	Average	
03/01/14	1842-1901	22/Sunny	Small Wave	13.6	Surface	17.7	27.3	6.8	27.3	85.0	85.2	2.4	2.4	3.4	3.3	2.6	2.6	3.6	3.6
					Middle	17.7	27.2	6.8	27.4	85.4	85.5	2.4	2.6	3.2	3.7				
					Bottom	17.8	27.4	6.7	27.6	85.2	85.6	2.6	2.7	3.6	3.7				
06/01/14	1042-1100	16/Cloudy	Small Wave	14.2	Surface	17.9	27.6	6.8	27.6	85.8	85.6	2.6	2.6	3.6	3.7	2.5	2.4	3.5	3.5
					Middle	17.9	27.2	6.8	27.2	84.3	84.7	2.4	2.4	3.2	3.3				
					Bottom	18.0	27.2	6.8	27.4	85.0	85.9	2.4	2.5	3.4	3.5				
08/01/14	1214-1234	15/Cloudy	Great Wave	14.1	Surface	18.1	27.5	6.8	27.5	85.1	85.2	2.7	2.7	3.6	3.7	2.3	2.3	3.4	3.4
					Middle	17.8	27.0	6.5	27.1	80.4	80.3	2.2	2.2	3.2	3.2				
					Bottom	17.8	27.3	6.7	27.3	82.2	82.1	2.4	2.3	3.6	3.4				
10/01/14	1345-1401	13/Cloudy	Great Wave	14.1	Surface	18.2	27.3	6.7	27.4	83.2	83.2	2.5	2.5	3.4	3.5	3.4	3.5	4.4	4.4
					Middle	17.7	27.3	6.9	27.6	84.6	84.7	3.6	3.6	4.6	4.6				
					Bottom	17.6	27.6	6.9	27.6	84.7	84.7	3.6	3.6	4.6	4.6				
13/01/14	1605-1620	15/Fine	Small Wave	16.8	Surface	16.5	30.2	7.9	30.2	97.3	97.1	1.6	1.6	2.4	2.4	1.7	1.9	3.0	3.0
					Middle	16.5	30.2	7.9	30.2	96.8	97.9	1.5	1.8	2.4	3.0				
					Bottom	16.5	30.2	7.9	30.2	97.7	97.9	1.8	1.9	3.0	3.0				
15/01/14	1714-1730	14/Sunny	Great Wave	14.2	Surface	16.5	30.2	8.0	30.2	98.4	98.2	1.6	1.7	3.0	3.1	3.3	3.5	4.6	4.6
					Middle	16.5	30.2	6.2	27.2	77.9	78.2	3.0	3.0	4.0	4.1				
					Bottom	16.3	27.1	6.4	27.3	78.4	76.7	3.0	3.3	4.2	4.3				
17/01/14	1830-1848	18/Sunny	Small Wave	14.2	Surface	16.3	27.3	6.2	27.3	76.0	76.8	3.1	3.1	3.8	3.8	3.2	3.1	4.1	4.1
					Middle	16.3	27.4	6.2	27.4	76.5	76.5	3.1	3.1	4.0	4.1				
					Bottom	16.3	27.4	6.2	27.4	76.5	76.8	3.1	3.1	4.2	4.2				
20/01/14	0910-0925	16/Fine	Small Wave	15.4	Surface	16.4	27.5	6.2	27.5	77.4	77.0	3.3	3.3	4.4	4.4	2.5	2.6	3.7	3.7
					Middle	16.3	30.1	6.7	30.1	82.0	82.3	2.2	2.2	3.2	3.3				
					Bottom	16.2	30.1	6.5	30.1	79.7	79.5	2.5	2.6	3.6	3.7				
20/01/14	0910-0925	16/Fine	Small Wave	15.4	Surface	16.2	30.2	6.5	30.2	79.3	79.1	2.6	2.6	3.8	3.9	2.6	2.6	3.8	3.9
					Middle	16.2	30.2	6.4	30.2	78.8	78.8	2.6	2.6	3.8	3.9				
					Bottom	16.2	30.2	6.4	30.2	78.8	78.8	2.6	2.6	3.8	3.9				

**Mid-Flood Tide**

Monitoring Station : M5

Date	Sampling Duration	Ambient Temp (°C) / Weather Condition	Sea Condition	Total Water Depth (m)	Monitoring Depth (m)	Water Temp (°C)	Salinity (ppt)		Dissolved Oxygen (mg/L)			Turbidity (NTU)		Suspended Solids (mg/L)		
							Value	Ave.	Value	Average	Depth-average	Value	Average	Value	Average	Depth-average
22/01/14	1100-1128	13/Sunny	Small Wave	14.1	Surface	15.5	27.4	6.3	74.9	3.1	4.0	3.1	3.1	4.1		
						15.6	27.4	6.3	74.8	3.1	4.2					
						15.6	27.5	6.2	74.2	3.2	4.2					
						15.6	27.5	6.2	74.5	3.1	4.0					
						15.6	27.4	6.3	75.0	3.2	4.4					
						15.7	27.5	6.3	74.7	3.2	4.2					
24/01/14	1140-1157	18/Fine	Small Wave	13.8	Surface	16.6	27.1	6.7	81.1	2.6	3.8	2.7	2.7	3.7		
						16.5	27.2	6.7	81.2	2.7	3.6					
						16.4	27.3	6.9	83.8	2.7	3.4					
						16.5	27.3	7.0	83.9	2.7	3.6					
						16.5	27.4	7.0	85.3	2.5	3.8					
						16.4	27.5	7.1	85.5	2.6	3.6					
27/01/14	1442-1500	19/Sunny	Small Wave	13.8	Surface	17.2	27.3	6.4	78.1	3.1	4.2	3.2	3.2	4.1		
						17.2	27.4	6.4	78.3	3.2	4.0					
						17.1	27.3	6.4	77.5	3.2	4.0					
						17.2	27.4	6.3	77.0	3.2	4.2					
						17.2	27.4	6.2	75.8	3.3	4.4					
						17.2	27.4	6.3	76.6	3.3	4.2					
29/01/14	1641-1700	20/Sunny	Small Wave	13.9	Surface	17.2	27.3	6.4	77.6	3.3	4.6	3.3	3.3	4.5		
						17.3	27.3	6.4	77.4	3.3	4.4					
						17.2	27.3	6.3	77.1	3.3	4.2					
						17.2	27.4	6.3	76.9	3.3	4.6					
						17.2	27.4	6.3	77.3	3.3	4.6					
						17.2	27.3	6.3	76.8	3.3	4.4					

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



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**- RECLAMATION WORKS**

**Graphical Presentation of Impact Water Quality**  
**Monitoring Results**

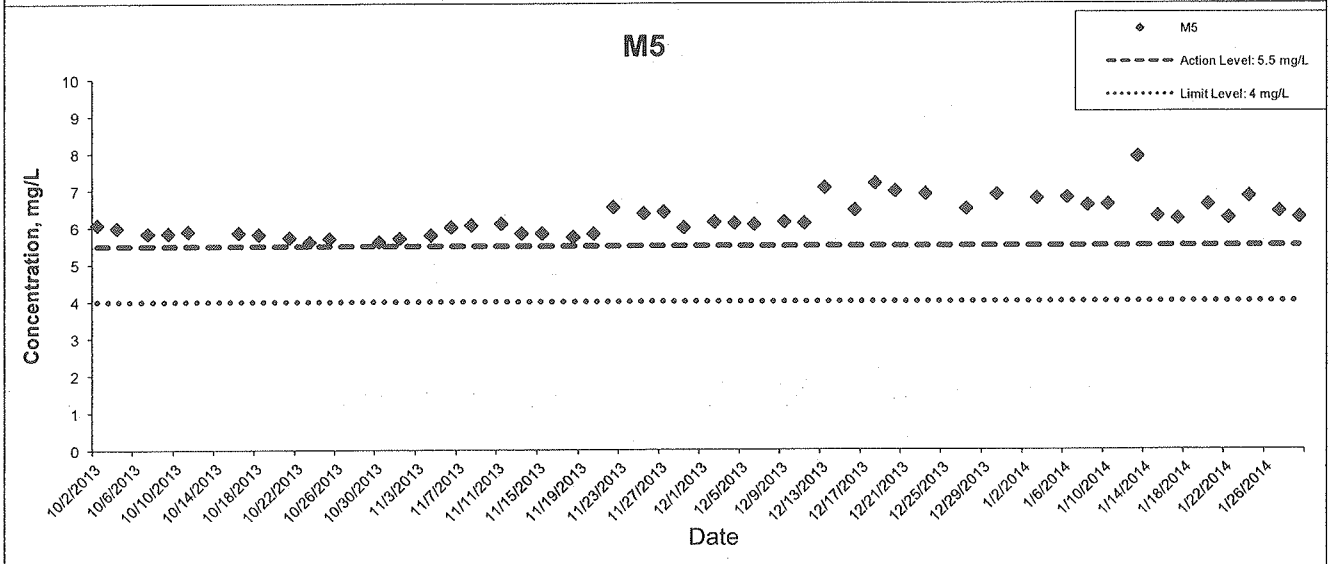
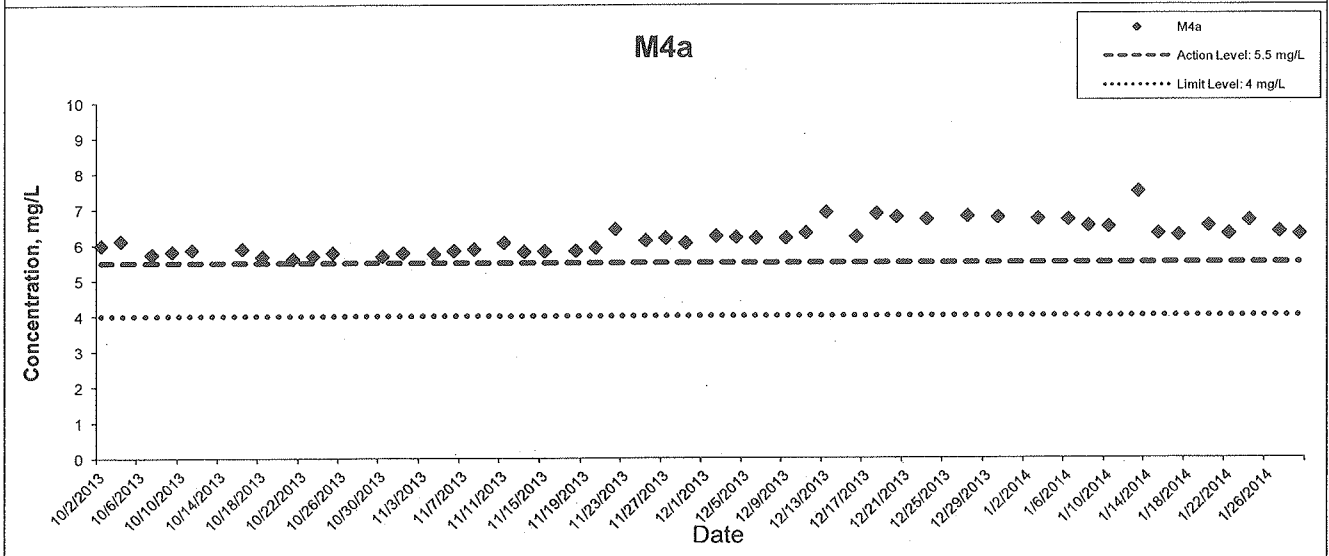
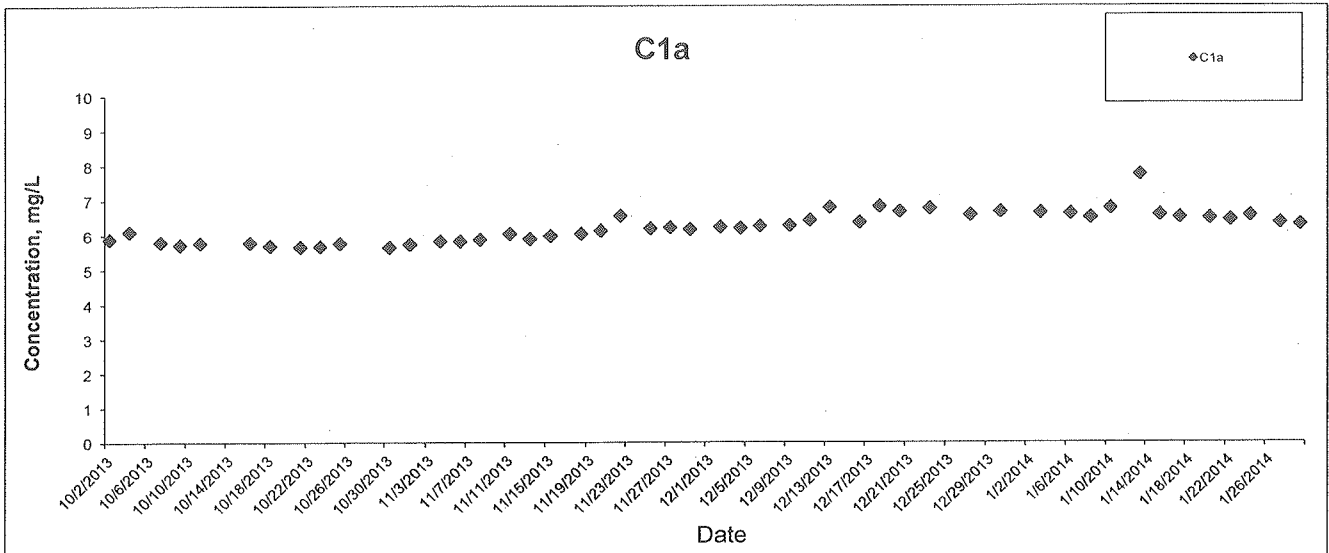


Project No.: 60249820

Date: February 2014

Appendix C

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



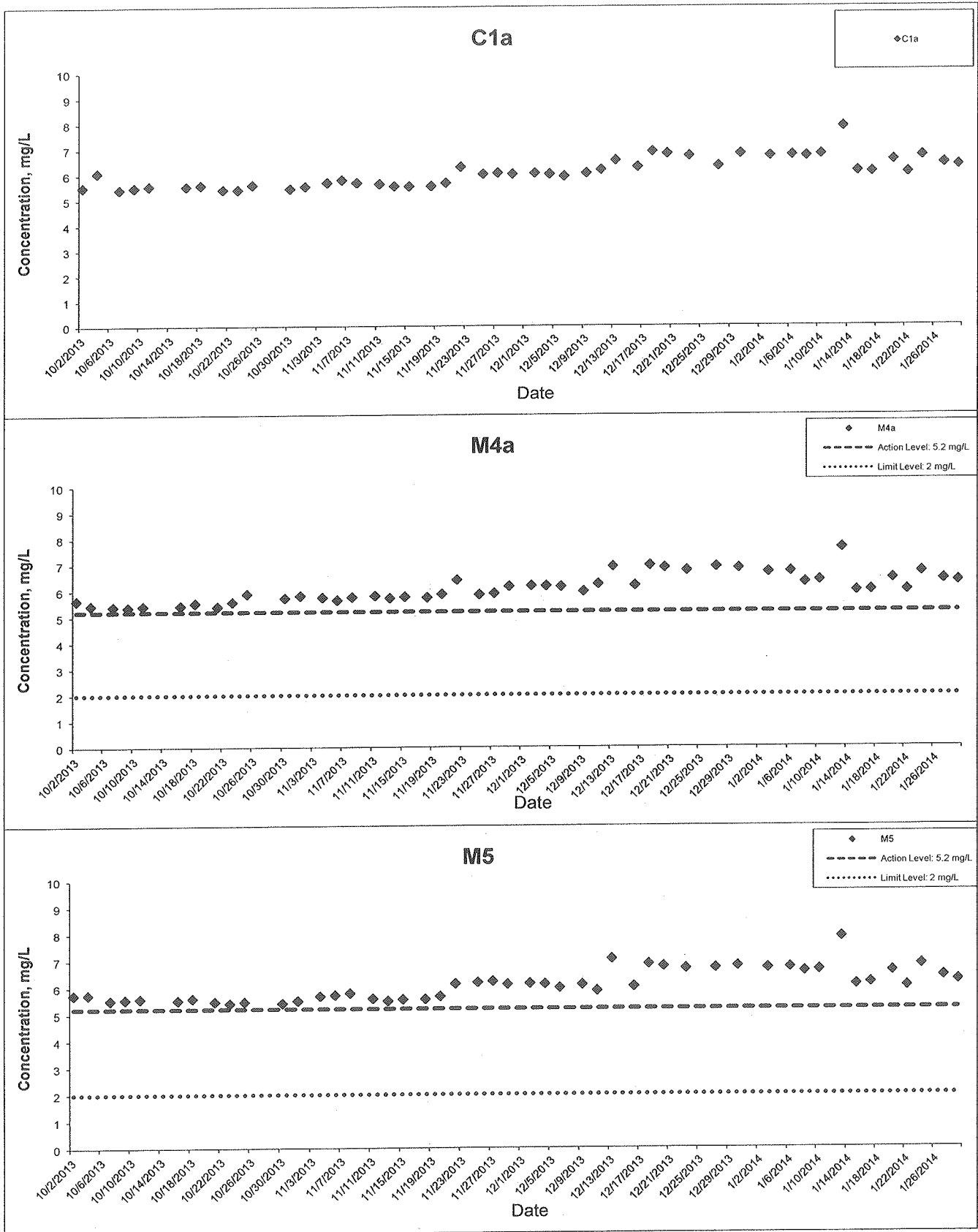
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### Dissolved Oxygen (Bottom) at Mid-Ebb Tide



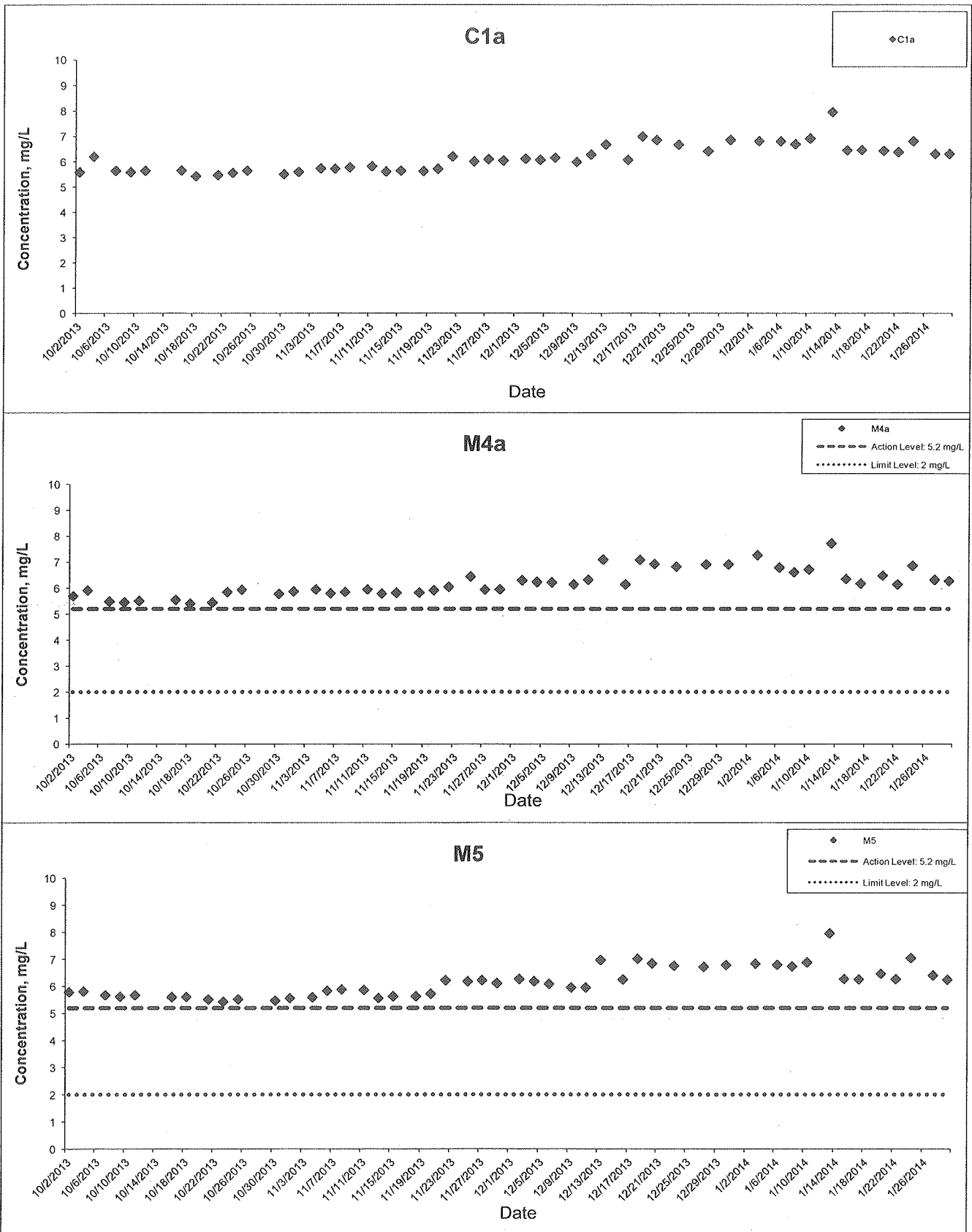
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## Dissolved Oxygen (Bottom) at Mid-Flood Tide



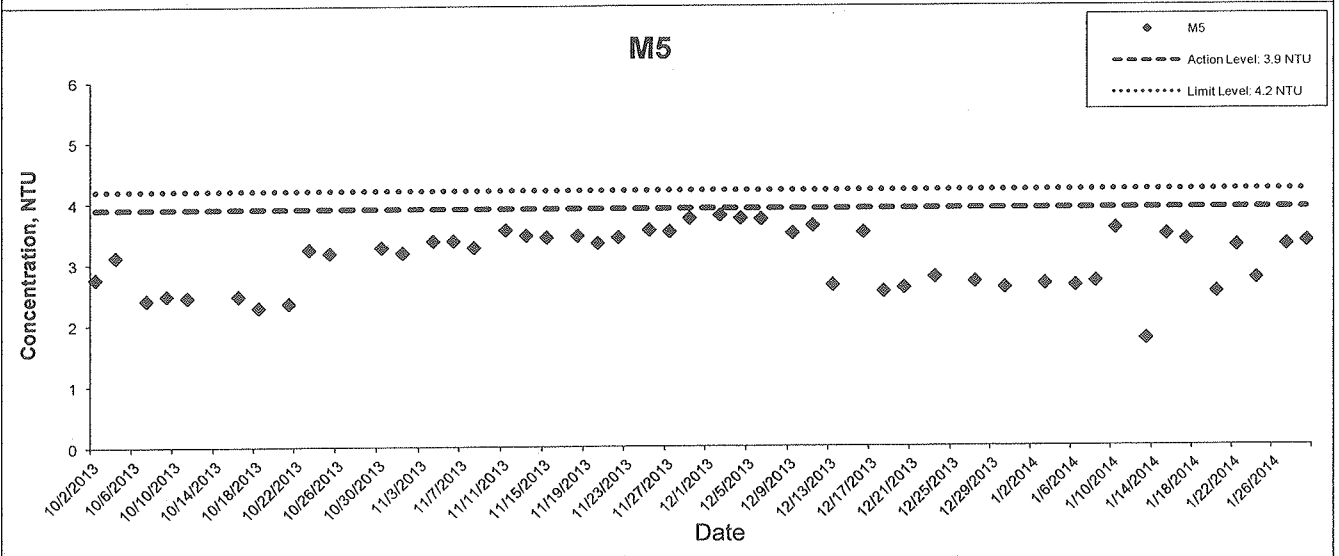
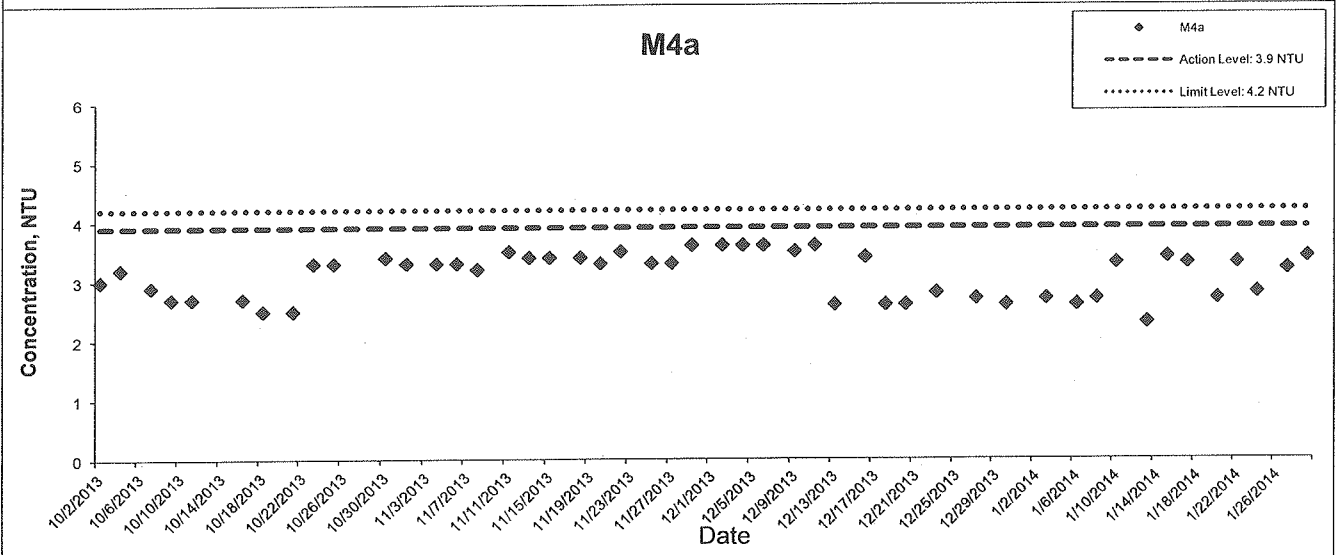
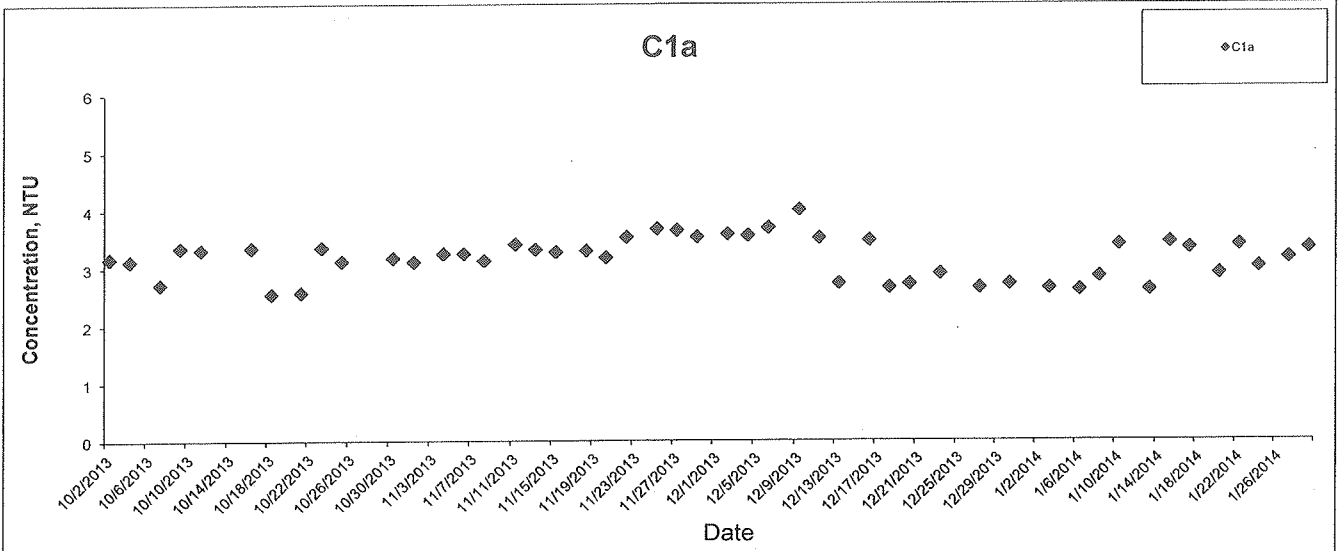
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## Turbidity at Mid-Ebb Tide



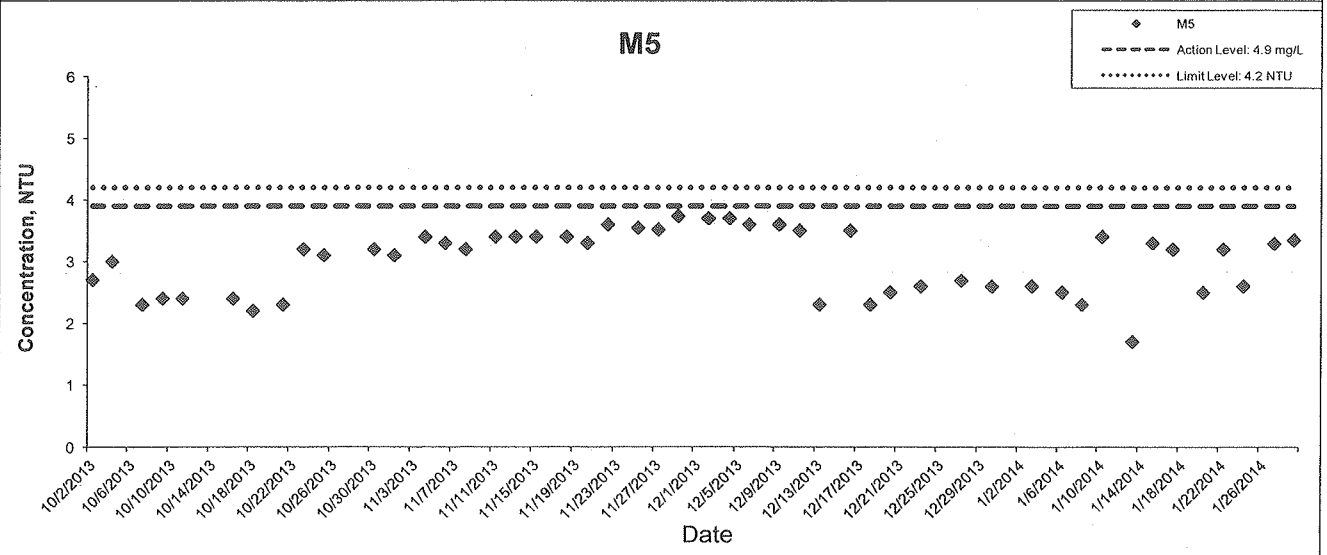
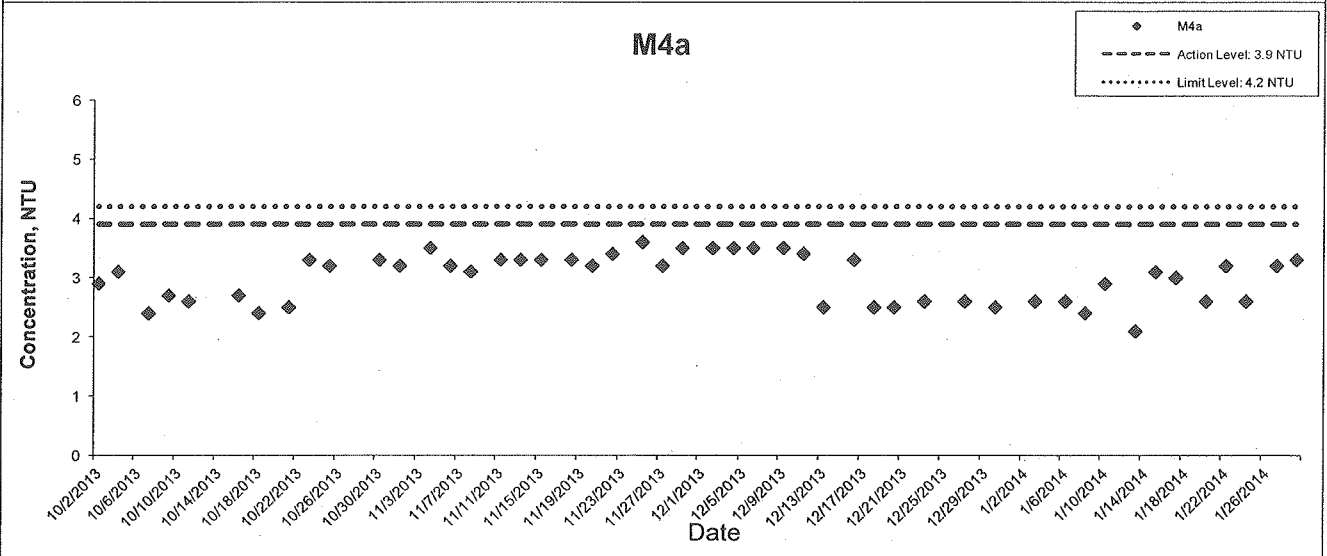
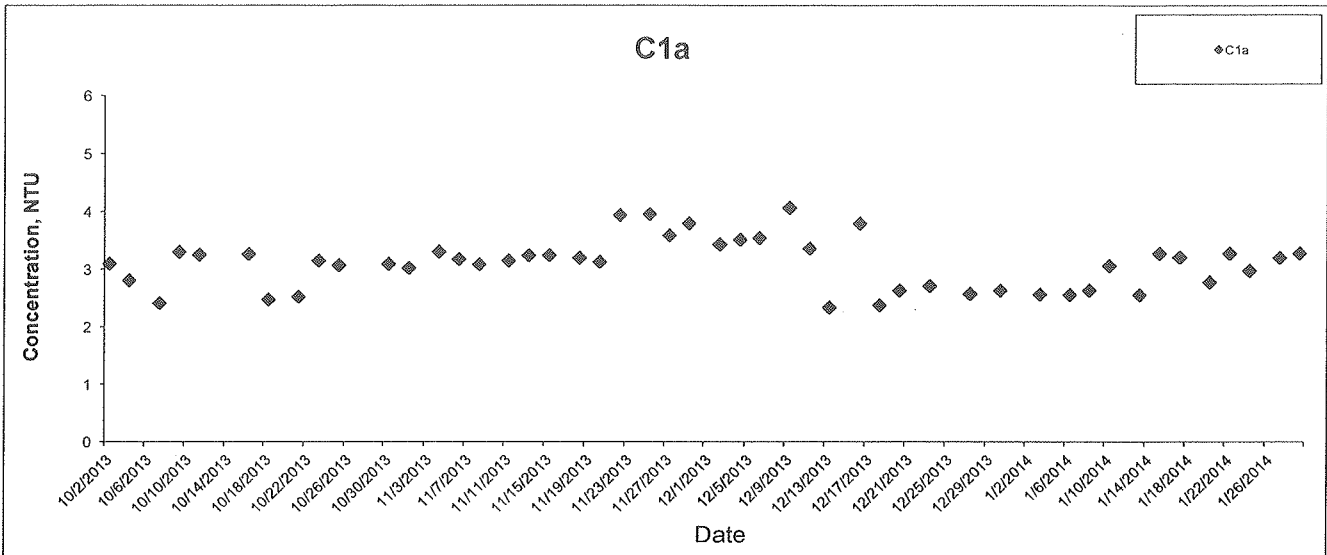
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### Turbidity at Mid-Flood Tide



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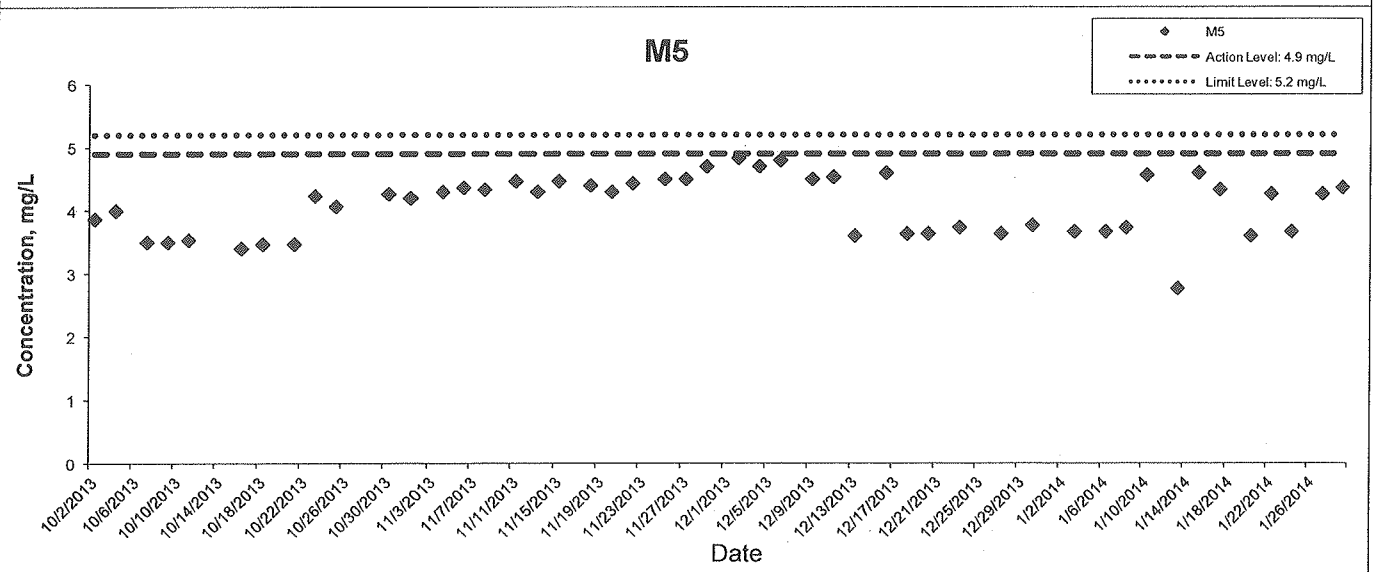
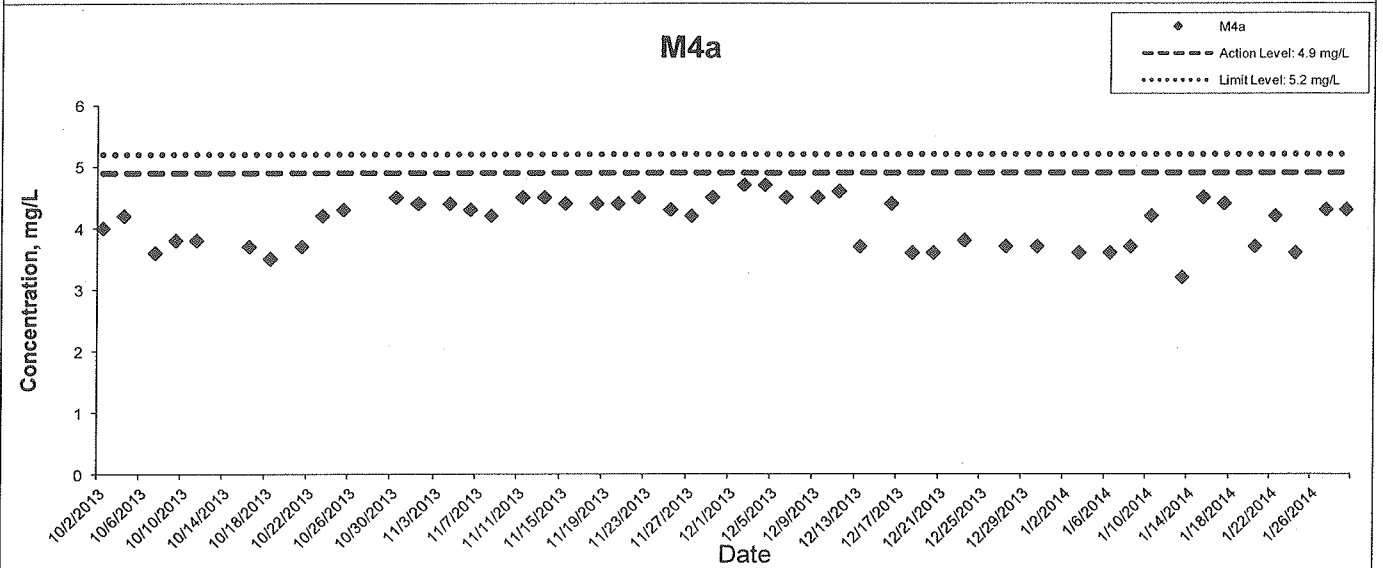
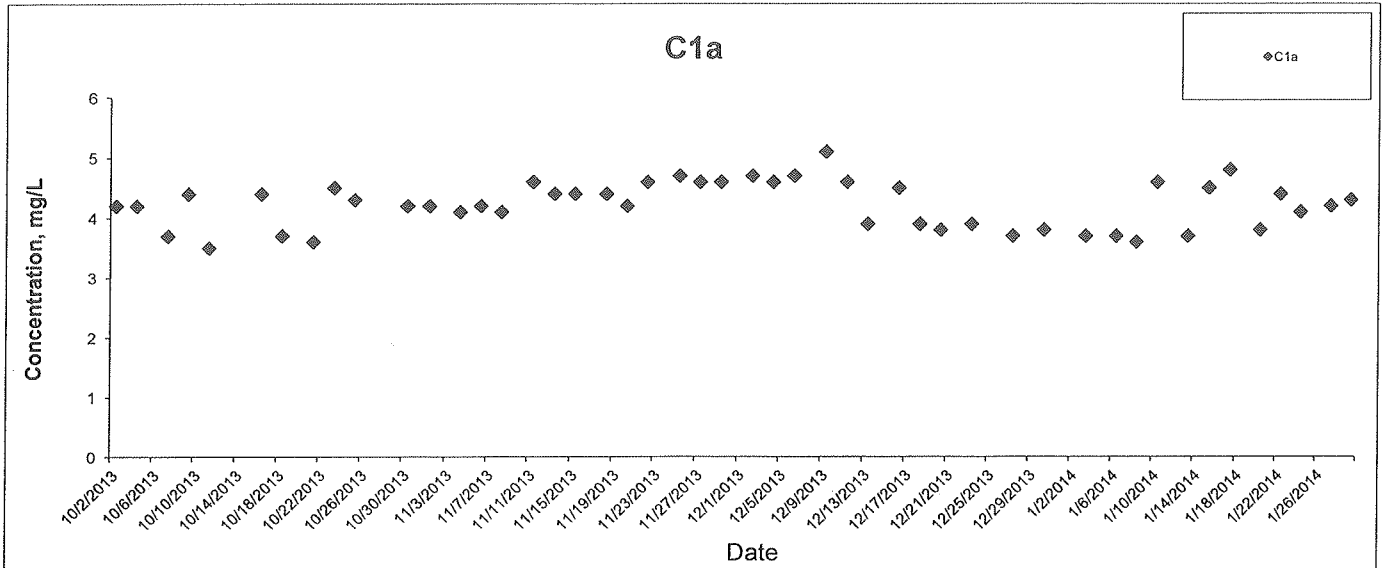
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## Suspended Solids at Mid-Ebb Tide



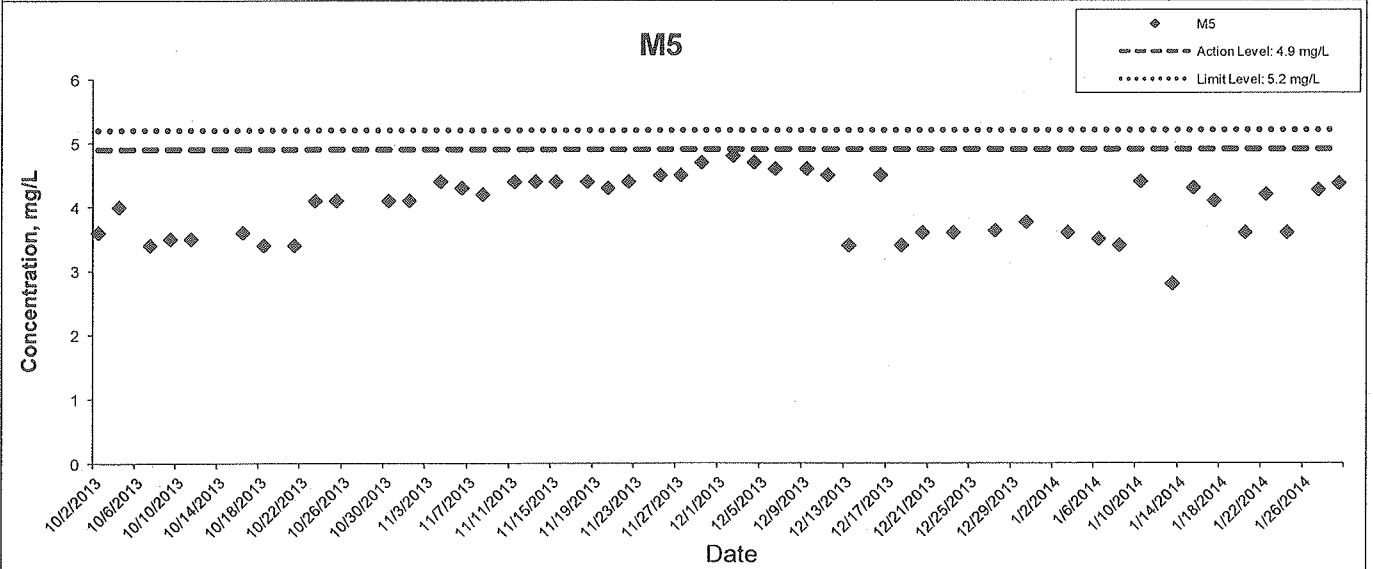
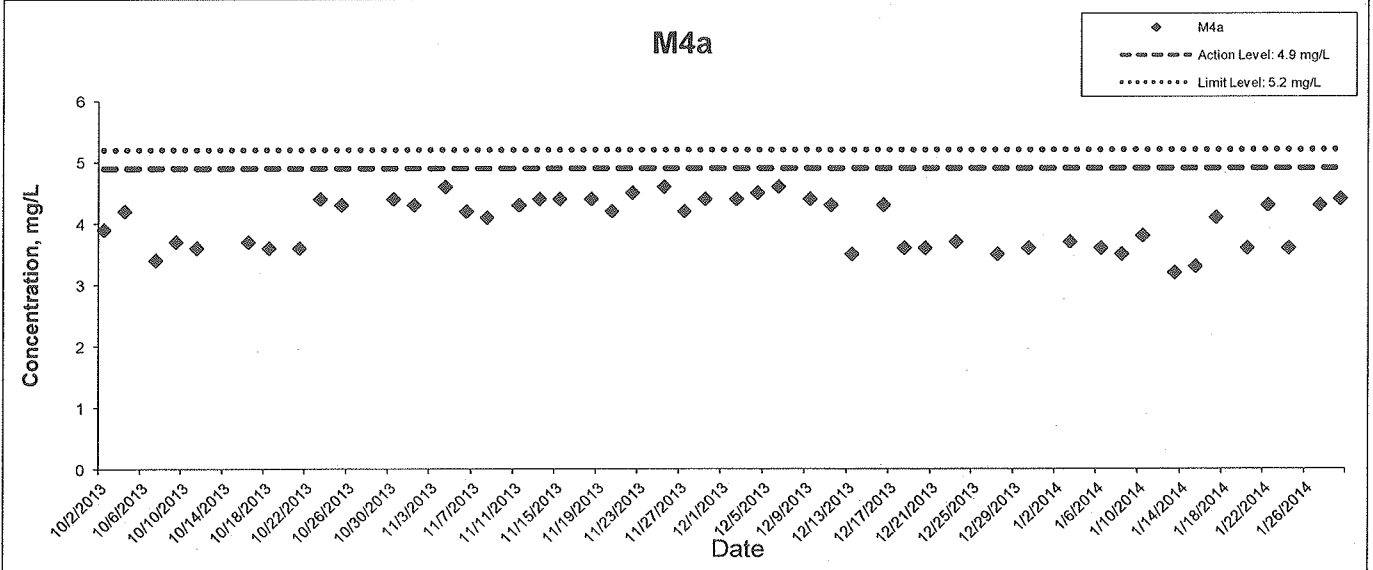
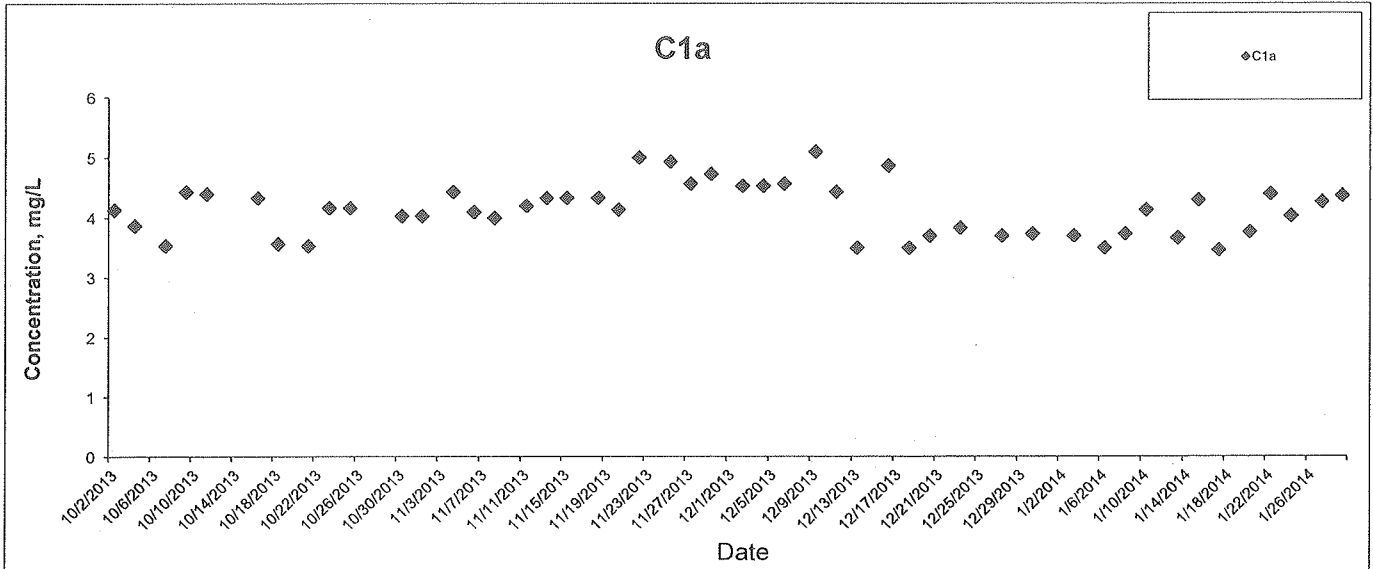
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## Suspended Solids at Mid-Flood Tide



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**APPENDIX D  
QA/QC REPORT**

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## QA/QC Results of Laboratory Analysis of Total Suspended Solids

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
03/01/2014	103.4	FC1a-S1	10.53	EC1a-S2	105.9
	96.2	EC1a-M1	0.00	EWM5-B2	100.0

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
06/01/2014	106.4	FC1a-S1	11.76 **	EC1a-S2	102.0
	96.1	EC1a-M1	0.00	EWM5-B2	94.2

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
08/01/2014	101.9	FC1a-S1	0.00	EC1a-S2	100.0
	99.6	EC1a-M1	0.00	EWM5-B2	107.7

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
10/01/2014	92.8	FC1a-S1	0.00	EC1a-S2	92.0
	93.3	EC1a-M1	0.00	EWM5-B2	104.0

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
13/01/2014	107.1	FC1a-S1	0.00	EC1a-S2	103.9
	93.4	EC1a-M1	0.00	EWM5-B2	106.0

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
15/01/2014	106.4	FC1a-S1	0.00	EC1a-S2	104.0
	107.4	EC1a-M1	8.70	EWM5-B2	107.8

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
17/01/2014	94.1	FC1a-S1	10.53 **	EC1a-S2	98.0
	95.3	EC1a-M1	0.00	EWM5-B2	106.4

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
20/01/2014	102.1	FC1a-S1	10.53 **	EC1a-S2	100.0
	104.4	EC1a-M1	0.00	EWM5-B2	100.0

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
22/01/2014	95.2	FC1a-S1	8.70	EC1a-S2	92.5
	93.8	EC1a-M1	0.00	EWM5-B2	98.1

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
24/01/2014	92.2	FC1a-S1	0.00	EC1a-S2	103.8
	96.7	EC1a-M1	9.52	EWM5-B2	100.0

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
27/01/2014	97.6	FC1a-S1	0.00	EC1a-S2	100.0
	103.9	EC1a-M1	8.70	EWM5-B2	100.0

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.

Sampling Date	QC Sample	Sample Duplicate		Sample Spike	
	% Recovery *	Sample ID	% Error #	Sample ID	% Recovery @
29/01/2014	98.8	FC1a-S1	0.00	EC1a-S2	105.9
	101.4	EC1a-M1	8.70	EWM5-B2	94.1

Note: (\*) % Recovery of QC sample should be between 80% to 120%.  
 (#) % Error of Sample Duplicate should be between 0% to 10%.  
 (@) % Recovery of Sample Spike should be between 80% to 120%.  
 (\*\*) % Error of Sample Duplicate >10% but invalid due to sample results less than PQL.