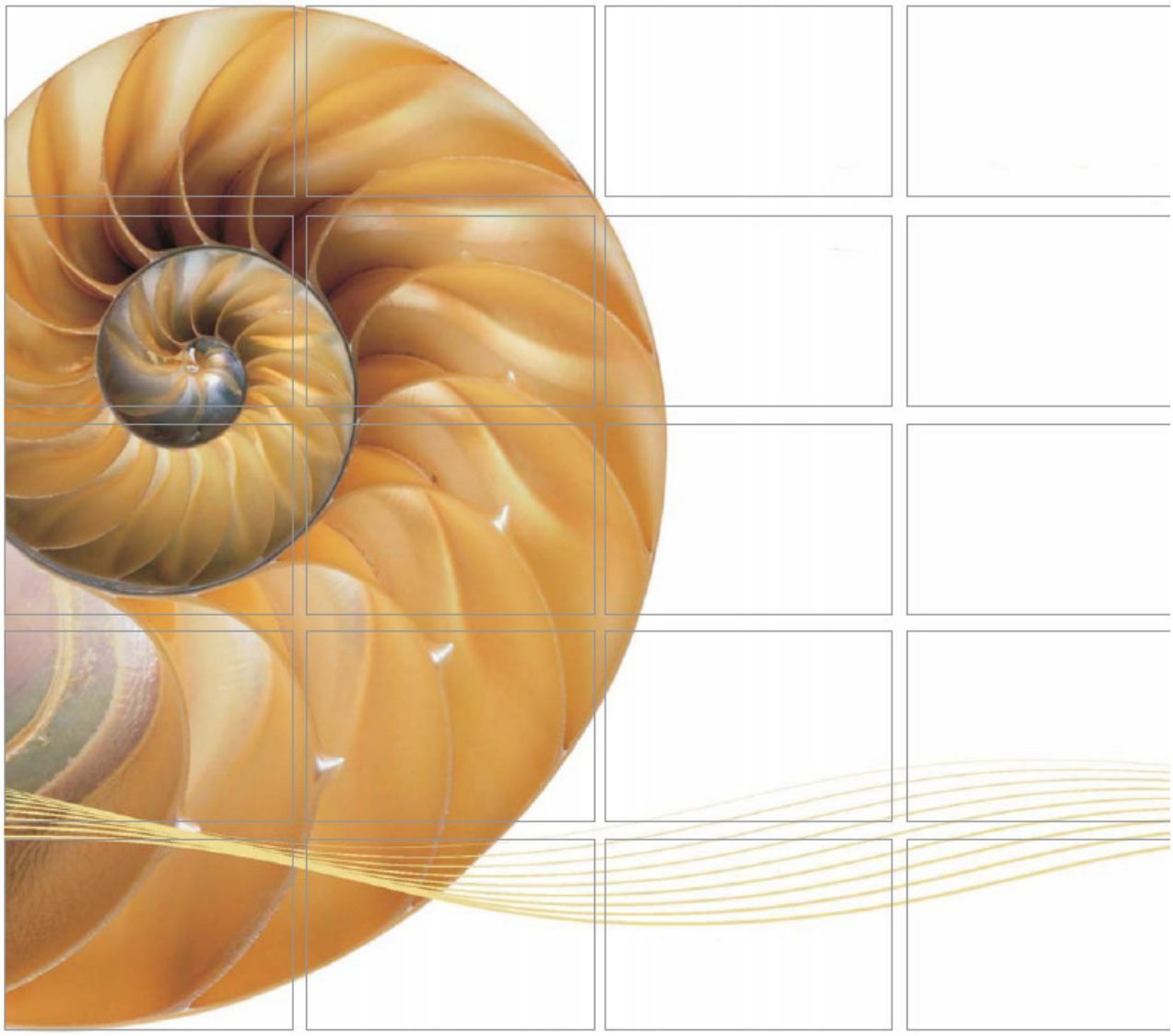
REPORT



Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development

Second Monthly Environmental Monitoring & Audit (EM&A) Report

14 August 2012

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Summary: This document presents the Second Monthly Environmental Monitoring and Audit (EM&A) Report for the Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development.	Date: 14 August 2012 Approved by: *Mr Craig Reid* *Partner*

Revision	Description	By	Checked	Approved	Date
1	2nd Monthly EM&A Report	VAR	JT	CAR	14/08/12

Distribution

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Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development

Environmental Certification Sheet

Environmental Permit No. EP-401/2010

Reference Document/~~Plan~~

Document/~~Plan~~ to be ~~Certified~~/ Verified:	Second Monthly Environmental Monitoring & Audit (EM&A) Report – July 2012
Date of Report: 14/08/2012	
Date prepared by ET: 13/08/2012	
Date received by IEC: 13/08/2012	

Reference EM&A Manual/ EP Requirement

EM&A Manual Requirement:	Section 12.4
Content:	*Monthly Environmental Monitoring & Audit (EM&A) Report*
12.4	"The EM&A report should be prepared by the ET, endorsed by IEC and submitted within 10 working days of the end of each reporting month ……".

EP Condition:	Condition No. 3.4
Content:	*Monthly Environmental Monitoring & Audit (EM&A) Report*
3.4	"Four hard copies and one electronic copy of monthly EM&A Report shall be submitted to the Director within two weeks after the end of the reporting month……."

ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced section/condition of the EM&A Manual and EP.

Ms Winnie Ko,
Environmental Team Leader:  Date: 13/08/2012

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced section/condition of the EM&A Manual and EP.

Dr Anne Kerr,
Independent Environmental Checker:  Date: 14/8/2012

CONTENTS

The construction works of the installation of submarine gas pipelines and associated facilities from To Kwa Wan to North Point for former Kai Tak Airport Development ("the Project") commenced on 13 June 2012. This is the 2nd Monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works carried out during the period from 1 to 31 July 2012 in accordance with the EM&A Manual of the Project (1).

Summary of Construction Works undertaken during the Reporting Month

Works undertaken in the reporting month include:

- Implementation of Temporary Traffic Arrangement (TTA) schemes for land works;
- Performing trial pit;
- Excavation works; and
- Dredging.

Environmental Monitoring and Audit Progress

A summary of the monitoring activities undertaken in this reporting period is listed below:

• Marine water quality monitoring	12 times
• Air borne noise monitoring	4 sets
• Weekly Environmental Site Inspection	4 times

Marine Water Quality

Marine water quality impact monitoring (2) was conducted in the reporting month during which dredging activities were scheduled to be undertaken. Exceedances of Action and Limit Levels for water quality were recorded during the reporting month. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of the EM&A Manual, these exceedances were considered to be due to natural background variation in water quality characteristics of the Victoria Harbour waters in Hong Kong and were unlikely to be due to the Project's dredging activities.

Air Borne Noise

Four sets of 30-minute construction noise measurements were carried out at the monitoring stations SCH02 and FSQ during normal weekdays of the

(1) Mott MacDonald 2010. Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development: Environmental Monitoring and Audit Manual.

(2) Marine Water Quality Monitoring on24 July 2012 was cancelled due to adverse weather condition.

reporting period. No exceedance of Action or Limit Level was recorded during the reporting period.

Waste Management

Waste generated from this Project includes inert Construction and Demolition (C&D) materials, non-inert C&D materials and marine deposit. A total of 398.16 tonnes of inert C&D materials were generated, in which 98.16 tonnes were disposed of at the Tseung Kwan O Area 137 Fill Bank, 150 tonnes were reused and stockpiled on site, respectively. A total of 2,550 m^3 and 6,450 m^3 of Type 1 marine deposits were disposed of at the open sea floor disposal area of South Cheung Chau and East Ninepin, respectively, and 19,920 m^3 of Type 2 marine deposits were disposed of at the East Sha Chau Contaminated Mud Pit.

Environmental Site Inspection

Four weekly site inspections were conducted by representatives of the Contractor and the ET. Details of the audit findings and implementation status of the mitigation measures are presented in *Section 5.1*.

Non-conformance/Compliant/Summons and Prosecution

No non-compliance event was recorded during the reporting period.

No environmental complaint and summon/prosecution was received in this reporting period.

Future Key Issues

Works to be undertaken in the next reporting month of August 2012 include:

- Implementation of TTA schemes for land works;
- Performing trial pit;
- Excavation works;
- Welding works; and
- Dredging (including the works section within 250 m of To Kwa Wan breakwaters).

Potential environmental impacts arising from the above construction activities are mainly associated with dust, construction noise, site runoff, marine water quality, marine ecology and waste management issues.

1 INTRODUCTION

ERM-Hong Kong, Limited (ERM) and Mott MacDonald Hong Kong Limited were appointed by the Hong Kong and China Gas Company Limited and McDow-Kaden JV as the Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertaken the Environmental Monitoring and Audit (EM&A) activities for the installation of submarine gas pipelines and associated facilities from To Kwa Wan to North Point for former Kai Tak Airport Development ("the Project").

1.1 PURPOSE OF THE REPORT

This is the 2nd Monthly EM&A Report which summarises the impact monitoring results and inspection/audit findings for the EM&A programme during the reporting period from **1 to 31 July 2012**.

1.2 STRUCTURE OF THE REPORT

The remainder of the report is structured as follows:

Section 2 : **Project Information**
summarises the background and scope of the Project, works locations and construction works undertaken.

Section 3 : **Environmental Monitoring Requirements**
summarises the environmental monitoring requirements including monitoring programmes, monitoring methodologies, monitoring parameters, monitoring frequency, monitoring locations, Action and Limit Levels, Event/Action Plans, environmental mitigation measures as recommended in the approved EIA report, EP and relevant environmental requirements stated in the Contract Specifications.

Section 4 : **Implementation Status on Environmental Mitigation Measures**
summarises the implementation of environmental mitigation measures as recommended in the approved EIA report, EM&A Manual, EP and relevant environmental requirements stated in the Contract Specifications.

Section 5 : **EM&A Results**
summarises the monitoring results obtained in the reporting period and the findings of the weekly site inspection undertaken within the reporting period.

Section 6 : **Environmental Non-conformance**
summarises any non-compliance of environmental performance standard, and environmental complaints and environmental summons received within the reporting period.

Section 7 : **Upcoming Works for the next Reporting Period**
summarises the impact forecast and monitoring schedule for the next reporting month.

Section 8 : **Conclusion**

2 PROJECT INFORMATION

2.1 PROJECT BACKGROUND

The Project proposed by the Hong Kong and China Gas Company Limited comprises the construction of a new gas pipeline network from To Kwa Wan to North Point so as to replace the existing one affected by the proposed Cruise Terminal dredging works adjacent to the former Kai Tak runway and the proposed Central Kowloon Route crossing the Kowloon Bay at To Kwa Wan.

The Environmental Impact Assessment (EIA) report (*Register No.: AEIAR-153/2010*) for the Project was approved by the Director of Environmental Protection (DEP) on 2 August 2010 under the Environmental Impact Assessment Ordinance (EIAO). Subsequent to the approval of the EIA, an Environmental Permit (Permit No. EP-401/2010) for the Project was granted by the DEP on 6 October 2010.

2.2 GENERAL SITE DESCRIPTION

The Project involves the construction of the twin submarine gas pipelines across the Victoria Harbour from To Kwa Wan to North Point and the construction of the land gas pipelines and pigging stations for pigging operation at both To Kwa Wan and North Point.

2.3 CONSTRUCTION ACTIVITIES UNDERTAKEN DURING THE REPORTING PERIOD

A summary of the major construction activities undertaken in the reporting period is shown in *Table 2.1*. The locations of the construction activities are shown in *Annex A*.

Table 2.1 Summary of Construction Activities Undertaken in Reporting Period

Construction Activities Undertaken
<u>To Kwa Wan Site A1-2</u> • Nil.
<u>To Kwa Wan landmain works areas:</u> • Implementation of TTA schemes for land works; • Performing trial pit; and • Excavation works.
<u>Marine works Section 2 and 3:</u> • Dredging.
<u>Landing point at North Point</u> • Nil.

2.4 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS

A summary of the valid permits, licences and notifications on environmental protection for this Project is presented in *Table 2.2*.

Table 2.2 Summary of Environmental Licensing, Notification and Permit Status

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Environmental Permit	EP-401/20	Throughout the Contract	Permit granted on 6 October 2010.
Notification of Commencement of Works	Ref No. 1123/01.01/12/ 0233/L	Throughout the Contract	-
Water Discharge License (North Point)	WT00012521-2012	Till 31 March 2017	Wastewater discharge licence was issued by EPD on 22 March 2012.
Water Discharge License (To Kwa Wan)	WT00012299-2012	Till 30 April 2017	Wastewater discharge licence was issued by EPD on 25 April 2012.
Construction Noise Permit (Marine works)	GW-RE0486-12	Till 17 December 2012	Issued on 20 June 2012.
Chemical Waste Producer Registration	5213-244-M2830-01	Throughout the Contract	Licence approved on 17 February 2012
Marine Dumping Permit (Sediment Type 1, Cheung Chau South)	EP/MD/12-125	Till 14 November 2012	Issued on 15 May 2012.
Marine Dumping Permit (Sediment Type 1, East Ninepin)	EP/MD/13-012	Till 30 September 2012	Issued on 29 May 2012.
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-023	Till 17 July 2012	Issued on 15 June 2012.
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-042	Till 17 August 2012	Issued on 17 July 2012

3.1 MARINE WATER QUALITY MONITORING

3.1.1 Water Quality Parameters

The parameters measured *in situ* were:

- Dissolved Oxygen (DO) (% saturation and mg L^{-1})
- Salinity (ppt)
- Temperature (ºC)
- Turbidity (NTU)

The only parameter to be measured in the laboratory was:

- Suspended solids (SS) (mg L^{-1})

In addition to the water quality parameters, other relevant data were measured and recorded in Water Quality Monitoring Logs, including monitoring location, time, tidal stages, weather conditions and any special phenomenon or work underway at the construction site that may influence the monitoring results.

3.1.2 Monitoring Equipment

Table 3.1 summaries the equipment used for the water quality monitoring.

Table 3.1 Equipment used during the Water Quality Monitoring Programme

Equipment	Model
Global Positioning Device	Garmin etrex 10
Water Depth Detector (Echo sounder)	Speedtech Instrument SM-5A
Water Sampler	1510 Kemmerer Water Sampler
Salinity, DO, Temperature Measuring Meter	YSI Pro 2030
Turbidity Meter	HACH Model 2100P Turbid Meter

3.1.3 Sampling / Testing Protocol

All *in situ* monitoring instruments were checked, calibrated and certified by the analytical laboratory before use (see calibration reports in *Annex G*) [(1)]. Responses of sensors and electrodes were checked with certified standard solutions before each use.

Wet bulb calibration for a DO probe was carried out at least once per monitoring day. A zero check in distilled water was performed with the

(1) Marine water quality monitoring was undertaken by the HOKLAS accredited laboratory ETS-Testconsult Ltd.

turbidity probe at least once per monitoring day. The probe was calibrated with a solution of known NTU. In addition, the turbidity probe was calibrated at least twice per month to establish the relationship between turbidity readings (in NTU) and levels of suspended solids (in mg L^{-1}).

On-site calibration of equipment was also carried out following the "*Guide to On-Site Test Methods for the Analysis of Waters*", BS 1427:1993 to check the responses of sensors and electrodes using certified standard solutions before each use. Sufficient stocks of spare parts were maintained for replacements when necessary. Backup monitoring equipment was made available so that monitoring can proceed uninterrupted even when equipment is under maintenance, calibration etc.

Water samples for SS measurements were collected in high density polythene, packed in ice (cooled to 4 °C without being frozen) and delivered to the analytical laboratory as soon as possible after collection.

3.1.4 Laboratory Measurement and Analysis

Analysis of SS was carried out in a HOKLAS accredited laboratory [1]. Water samples of about 1L were collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work started within 24 hours after the collection of the water samples. The SS analyses followed the standard method APHA 2540D with a detection limit of 1 mg L^{-1} as described in *APHA Standard Methods for the Examination of Water and Wastewater, 21st Edition*, unless specified.

Quality Assurance/ Quality Control (QA/ QC) details (such as blank, spike recovery, number of duplicate samples per batch etc) were provided in accordance with requirements of HOKLAS (details refer to *Annex H*).

3.1.5 Sampling Depths & Replication

Each station was sampled and measurements/ water samples were taken at three depths, namely, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth was less than 6 m, the mid-depth station may be omitted. For stations that were less than 3 m in depth, only the mid-depth sample was taken.

For *in situ* measurements, duplicate readings were made at each water depth at each station. Duplicate water samples were collected at each water depth at each station.

3.1.6 Monitoring Locations and Frequency

Impact water quality monitoring was conducted during the dredging works period at the monitoring stations listed in *Table 3.2* and shown in *Annex B1.*

[1] Marine water quality monitoring was undertaken by the HOKLAS accredited laboratory ETS-Testconsult Ltd.

Table 3.2 ***Water Quality Monitoring Stations***

Monitoring Station	Area	Easting	Northing
WM1	Tai Wan WSD Seawater Intake	837818.8258	818059.9297
WM2	City Garden	838278.6734	817209.9656
WM3	Provident Centre	838443.5777	817233.5234
WM4	North Point Government Offices	839536.1868	817215.6195
WM5	Quarry Bay WSD Seawater Intake	839781.4231	817107.8097
WM6	Taikoo Place	840026.6594	817000
C1	Control Station	836625.9264	817422.6424
C2	Control Station	836747.9445	816670.1762
C3	Control Station	840810.5828	817825.8986
C4	Control Station	840432.5877	816920.1674

In accordance with the EM&A Manual, marine water quality monitoring were conducted at six Water Sensitive Receivers (WM1, WM2, WM3, WM4, WM5 and WM6) as well as four Control stations (C1, C2, C3 and C4) (*Table 3.2*) at a frequency of three times a week during the marine works period for the Project. Monitoring was undertaken at mid-flood and mid-ebb tides during each monitoring day. The tidal range selected for the monitoring was at least 0.5 m for both flood and ebb tides as far as practicable. The interval between two sets of consecutive monitoring was not less than 36 hours.

For scheduling, reference were made to the predicted tides at Quarry Bay, which is the tidal station nearest to the Project Site, published on the website of the Hong Kong Observatory [1]. Schedule for impact monitoring has been submitted to the Contractor, Independent Environmental Checker (IEC), Engineer Representative (ER) and Environmental Protection Department (EPD) prior to the commencement of the monitoring works (*Annex B2*).

3.1.7 Water Quality Compliance

Water quality monitoring will be evaluated against Action and Limit Levels. The proposed Action and Limit Levels which are determined from the baseline water quality monitoring results are shown in *Table 3.3*.

In the event that the levels are exceeded, appropriate actions in the Event and Action Plan (*Annex E1*) should be undertaken and a review of works will be carried out by the Contractor(s).

[1] Hong Kong Observatory (2012) http://www.hko.gov.hk/tide/eQUBtide.htm [Accessed in March 2012]

Table 3.3 Action and Limit Levels for Water Quality [(e)]

Parameters	Action Level	Limit Level
DO in mg L^{-1} (Surface, Middle & Bottom)	*WSD Seawater Intakes* 2 mg L^{-1} *Other Impact Monitoring Stations* 5 percentile of baseline data, i.e. 7.79 mg L^{-1}	**Surface and Middle** *WSD Seawater Intake* 2 mg L^{-1} *Other Impact Monitoring Stations* 4 mg L^{-1} or 1 percentile of baseline data, i.e. 7.46 mg L^{-1} **Bottom** *Impact Monitoring Stations* 2 mg L^{-1} or 1 percentile of baseline data, i.e. 7.66 mg L^{-1}
SS in mg L^{-1} (depth-averaged)	*WSD Seawater Intakes* 10 mg L^{-1} *Other Impact Monitoring Stations* 95 percentile of baseline data, i.e. 5.13 mg L^{-1} or 120% of upstream control station at the same tide of the same day	*WSD Seawater Intake* 10 mg L^{-1} *Other Impact Monitoring* Stations 99 percentile of baseline data, i.e. 5.53 mg L^{-1} or 130% of upstream control station at the same tide of the same day
Turbidity (depth-averaged)	*WSD Seawater Intakes* 10 NTU *Other Impact Monitoring Stations* 95 percentile of baseline data, i.e. 3.71 NTU or 120% of upstream control station at the same tide of the same day	*WSD Seawater Intakes* 10 NTU *Other Impact Monitoring Stations* 99 percentile of baseline data, i.e. 4.03 NTU or 130% of upstream control station at the same tide of the same day

Notes:

(a) "Depth-averaged" is calculated by taking the arithmetic means of the readings of the three depths.

(b) For DO measurement, non-compliance occurs when monitoring result is lower than the limits.

(c) For SS and turbidity, non-compliance of water quality results when monitoring results is higher than the limits.

(d) All the figures given in the table are used for reference only the EPD may amend the figures whenever necessary.

(e) The levels of SS, Turbidity and DO were confirmed to be similar amongst monitoring stations by statistical analysis. Therefore, the calculation of Action and Limit Levels was based on baseline monitoring data collected from all monitoring stations and the same set of Action and Limit Levels will be adopted for the *Impact Monitoring Stations* (ie not including the *WSD Seawater Intakes* and *Control Stations*).

3.2 MARINE ECOLOGY MONITORING

3.2.1 Monitoring Locations

Impact Coral Monitoring should conducted at three Impact Sites near the pipeline (Areas 1, 2 and 3) and one Control Site (Area 4) at the far end of the seawall which is perpendicular to the pipeline run as shown in *Annex C1*. The Impact Coral Monitoring Survey will be undertaken weekly when dredging operations were being conducted within 250 m from the To Kwa Wan breakwaters. The start and end coordinates of each monitoring site will be recorded using a portable GPS unit. Shoreline features for the start and end points of each monitoring sites will also be noted to aid the re-location of the points for subsequent coral monitoring surveys (i.e. Impact Coral Monitoring Survey during dredging). The coordinates of the start and end points for each monitoring site are presented in *Table 3.4*.

Table 3.4 GPS Coordinates of Coral Monitoring Sites

		GPS				Depth
		Starting Point		Finishing Point		(-mCD)
Impact Sites	Area 1	22°18'50.87"	114°11'40.48"	22°18'49.86"	114°11'41.06"	2.5
	Area 2	22°18'40.90"	114°11'47.35"	22°18'41.73"	114°11'46.73"	1.8
	Area 3	22°18'35.18"	114°11'47.18"	22°18'35.71"	114°11'48.02"	3.0
Control Site	Area 4	22°18'43.57"	114°12'03.87"	22°18'43.05"	114°12'02.84"	3.5

3.2.2 Monitoring Methodology

The Impact Coral Monitoring should be carried out at Areas 1 to 4. A total of 10 colonies were tagged at each site during the Baseline Coral Monitoring Survey which was undertaken on 23 May 2012 before construction of the Project commenced, allowing 30 impact coral colonies and 10 control colonies. Beside the tagged coral colony, a white cable tie was tied around a rock. The tag which was laminated underwater paper of approximately 3 x 6 cm in size was attached to the cable tie. Tags and the target coral colonies were numbered 1-10 at each site (i.e. Area 1-4). Each of the tagged coral colonies was identified to species levels and photographed. These tagged colonies will be monitored during the Impact Coral Monitoring Survey.

The following data were recorded for each tagged coral colonies during the Baseline Coral Monitoring Survey. These data will also be recorded during the Impact Coral Monitoring Survey:

- Species
- Size (cm^2)
- Growth form
- Partial mortality (%)
- Sediment (thickness, type and colour)

- The general health of the coral colony using the Asian Coral Watch Chart (1)

During the Impact Coral Monitoring Survey, photographic records of each tagged coral colony should be collected from an angle that best represents the entire colony, maintaining the same aspect and orientation as the photographic records taken during the Baseline Coral Monitoring Survey. The adoption of the same monitoring method would allow for direct comparison of impact monitoring data with the baseline data in order to determine any changes in conditions of corals after commencement of the concerned dredging works. Should impacts caused by the dredging operations to corals are identified, appropriate remedial action can be implemented to reduce such impacts.

3.2.3 Event and Action Plan

In the event that the levels are exceeded, appropriate actions in Event and Action Plan (*Annex E2*) should be undertaken and a review of works will be carried out by the Marine Ecologist.

3.3 AIR-BORNE NOISE MONITORING

3.3.1 Monitoring Location

In accordance with the EM&A Manual, monitoring of construction noise impact should be conducted at the designated monitoring stations. The construction noise monitoring location for this Project is listed in *Table 3.4* and is shown in *Annex D1*.

Table 3.5 Noise Monitoring Location

Monitoring Station	Area	Description
SCH02	To Kwa Wan	CCC Kei To Secondary School
FSQ	North Point	North Point Fire Services Married Quarters

3.3.2 Monitoring Parameter and Frequency

Weekly construction noise monitoring was conducted in accordance with the requirements stipulated in the EM&A Manual. The monitoring programme for this reporting period is shown in *Annex D2*.

The construction noise levels were measured in terms of A-weighted equivalent continuous sound pressure level (L_{eq}) in decibels dB(A). $L_{eq\ (30min)}$ were used as the monitoring parameter for the period in between 0700 – 1900 hours on normal weekdays. In order to obtain supplementary information for data auditing, two statistical sound levels L_{10} and L_{90} (ie the levels

(1) Coral Watch is a rapid assessment on the health of coral colonies by using coral health color charts to monitor bleaching stages of corals. Coral color, or more specifically brightness and saturation, correlate with chlorophyll content and density of symbiotic algae (zooxanthellae) in coral tissue, providing a measure of coral health. Coral bleaching results from a loss of symbiosis or pigmentation from stressed, unhealthy coral.

exceeded for 10 and 90 percent of the time, respectively), were also recorded during the monitoring for reference. The measured noise levels were logged in every 5 minutes throughout the impact monitoring period.

3.3.3 Action and Limit Levels

The Action and Limit levels for noise monitoring during different monitoring periods are summarised in *Table 3.5*.

Table 3.6 Summary of Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level (dB(A))
0700-1900 hrs on normal weekdays	When one documented compliant is received	75*
1900-2300 hrs on normal weekdays	When one documented compliant is received	70
Restricted hours (2300-0700 hrs)	When one documented compliant is received	55

Note:
* 70 dB(A) for schools and 65 dB(A) during school examination periods.

3.3.4 Monitoring Equipment and Methodology

Construction noise measurements were conducted in accordance with the calibration and measurement procedures as stated in *Annex – General Calibration and Measurement Procedures* of *Technical Memorandum on Noise from Construction Work other than Percussive Piling* (*GW-TM*) issued under the *Noise Control Ordinance* (*NCO*) (Cap.400).

The sound level meters and calibrator used for the noise measurement, as listed in *Table 3.6*, complies with IEC 651: 1979 and 804:1985 (Type 1) specification. The calibration certificates of the sound level meters and calibrator are included in *Annex G*.

Table 3.7 Noise Monitoring Equipments

Monitoring Station	Monitoring Equipment (Sound Level Meter and Calibrator)
SCH02	Rion NL-31 (S/N 00320533), NC-73 (S/N 10786708)
FSQ	Rion NL-31 (S/N 00320533), NC-73 (S/N 10786708)

Immediately prior to and following the noise measurements, the accuracy of the measurement equipment was checked using an acoustic calibrator generating a known sound pressure level at a known frequency.

3.3.5 Event and Action Plan

The Event and Action Plan (EAP) for noise monitoring is presented in *Annex E3*.

4 IMPLEMENTATION STATUS ON ENVIRONMENTAL MITIGATION MEASURES

The Contractor has implemented environmental mitigation measures and requirements as stated in the EIA Report, Environmental Permit and EM&A Manual. The implementation status during the reporting period is summarised in *Annex F*.

5 MONITORING RESULTS

5.1 SITE INSPECTIONS & AUDITS

Weekly site inspections were conducted by representatives of the Contractor and the ET on 5, 12, 19 and 27 July 2012.

Major observations during the reporting period were summarised as follows:

5 July 2012

- To Kwa Wan Site A1-2:
  The drain plug for the drip tray of the power generator was found missing. The Contractor was reminded to close the drain hole by a drain plug.

- Marine works area:
  Nil.

- Landing point at North Point:
  Nil.

12 July 2012

- Nil.

19 July 2012

- Nil.

27 July 2012

To Kwa Wan Site A1-2:
The stockpiles were uncovered for drying after rain. The Contractor was reminded to cover them up by tarpaulin after drying.
The drip tray of a machine in To Kwa Wan land-based A1-2 is not plugged. The Contractor was reminded to close the drain hole by a drain plug.

- Marine works area: Visit cancelled due to thunderstorm signal.

- Landing point at North Point: Nil.

5.2 MARINE WATER QUALITY MONITORING

Marine dredging activities for pipeline trench construction commenced on 13 June 2012. In accordance with the requirements described in the EM&A Manual, marine water quality monitoring was conducted during periods when dredging activities were scheduled to be undertaken. Impact monitoring was undertaken three times per week from 25 June to 31 July 2012

for marine dredging works (see monitoring schedule for the present monitoring period in *Annex B2*). During the period of impact monitoring, weather condition was generally fine, except for the following date when the weather condition was affected by tropical cyclone:

- On 24 July 2012, Tropical Cyclone Warning Signal No. 10 was hoisted during mid-night which was then changed to Signal No. 8 and eventually became Signal No. 3 in the morning at around 10:00. The marine water quality monitoring event originally scheduled on that day was cancelled due to adverse weather conditions.

The completed set of marine water quality monitoring data and the laboratory analysis of SS samples for the period of 25 June to 31 July 2012 was available during the preparation of this monthly EM&A report. As such, data for the period of 25 June to 31 July 2012 is presented in this monthly report. Monitoring results are presented graphically in *Annex B3 – B7* and key observations are described below.

DO levels from surface, mid-depth and bottom waters were generally similar amongst Control, Impact and WSD Seawater Intake stations, and DO levels were variable throughout the monitoring period which represented natural background fluctuation in water quality.

Similar to DO levels, turbidity and SS levels were generally similar at all stations and variable throughout the monitoring period. High levels of turbidity and SS were occasionally recorded during both mid-ebb and mid-flood tides. Such fluctuations were also observed during baseline monitoring and are considered to be sporadic events and characteristic of water quality in this area of Hong Kong.

Exceedances were recorded on 26, 28, 30 June 2012; and 3, 5, 7, 10, 12, 14, 17, 19, 21, 26, 28 and 31 July 2012. Exceedances in the Action and Limit Levels of surface, mid-depth and bottom DO were observed. It is considered that the exceedances in DO levels are more likely to be representing natural background fluctuation in water quality rather than indicating any adverse water quality impacts from the Project since the levels of DO at the Impact Stations where exceedances were recorded were similar to those at the Control Stations, which are far away from the dredging locations which should not be affected by the dredging works. In addition, some exceedances were recorded when no dredging works were being undertaken for the Project (eg on 30 June, 3, 19 and 26 July 2012).

Exceedances in the Action and Limit Levels of depth-averaged turbidity and SS levels were recorded. As explained above, high level of turbidity and SS in this area are considered to be sporadic and characteristic of water quality in this area of Hong Kong. The observed turbidity and SS exceedances were thus not considered to be of environmental concern.

Closed grab dredgers were used and silt curtains were deployed during dredging works, and the dredging rates were within the limits described in the approved EIA Report. Following the review of monitoring data and

marine works details in accordance with the procedures stipulated in the Event and Action Plan of the EM&A Manual, these exceedances were considered to be due to natural background variation in water quality characteristic and were unlikely to be due to the Project's dredging activities.

5.3 MARINE ECOLOGY MONITORING

Since there was no marine works undertaken within 250 m distance from the To Kwa Wan breakwaters during this reporting period, no Impact Coral Monitoring was conducted during the reporting period.

5.4 AIR-BORNE NOISE MONITORING

A total of four sets of 30-minute construction noise measurements were carried out on 4 (for SCH02 only), 6 (for FSQ only), 11, 18 and 28 July 2012 at the monitoring stations SCH02 and FSQ during normal working hours of the reporting period. No exceedances of Action and Limit Levels for noise monitoring during normal working hours were recorded.

The monitoring results together with graphical presentations are presented in *Annex D3*. The local impacts observed near the monitoring stations of SCH02 and FSQ were due to traffic noise from Sung On Street and Island Eastern Corridor.

5.5 WASTE MANAGEMENT EM&A

Waste generated from this Project includes inert Construction and Demolition (C&D) materials, non-inert C&D materials, and marine deposit. Marine deposits requiring Type 1 and Type 2 disposal methods were generated during the reporting month. Reference has been made to the Monthly Summary Waste Flow Table prepared by the Contractor (*Annex I*). The waste statistics provided in this section represent the cumulative quantity of wastes generated from all sites in this Project. With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are summarised in *Table 5.1*. The inert C&D materials and general refuse generated from the Project were disposed of at Tseung Kwan O Area 137 Fill Bank and SENT Landfill, respectively. The marine deposits requiring Type 1 disposal were disposed of at the open sea floor disposal areas of South Cheung Chau and East Ninepin, while those requiring Type 2 disposal were disposed of at East Sha Chau Contaminated Mud Pit.

Table 5.1 Quantities of Waste Generated from the Project for all Sites

Month / Year	Quantity					
	C&D Materials (inert) [a]	C&D Materials (non-inert) [b]	Chemical Waste	Marine Deposit		
				Type 1[c]	Type 2[c]	Type 3
July 2012[d]	398.16 tonnes[e]	1.60 tonnes	0 L	9,000 m^3	19,920 m^3	0 tonnes

	Quantity
Notes: (a) Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil. Inert C&D materials. (b) 1.60 tonnes of non-inert C&D materials was generated in July 2012 which were all general refuse for recycling, whereas 0 tonnes was disposed at SENT landfill. (c) The marine deposits requiring Type 1 disposal were disposed of at South Cheung Chau, East Ninepin and East Sha Chau, whereas those requiring Type 2 disposal were disposed of at East Sha Chau Contaminated Mud Pits. (d) The reporting period for July 2012 is from 1 July 2012 to 31 July 2012. (e) 398.16 tonnes of inert C&D Materials was generated in July. 150 tonnes have been reused on site. 150 tonnes were stockpiled at site and 98.16 tonnes were disposed of at the Tseung Kwan O Area 137 Fill Bank.	

6 ENVIRONMENTAL NON-COMFORMANCE

6.1 SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

No non-compliance of EIA/ EM&A/ EP/ legislative requirements was recorded during the reporting period.

6.2 SUMMARY OF ENVIRONMENTAL COMPLAINT

No complaint was received during the reporting period. The cumulative compliant/summons/prosecution log is shown in *Annex J*.

6.3 SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION

No summons/ prosecution was received during the reporting period. The cumulative compliant/summons/prosecution log is shown in *Annex J*.

7 FUTURE KEY ISSUES

7.1 CONSTRUCTION ACTIVATES FOR THE COMING MONTH

Works to be undertaken for the coming monitoring periods are summarised in *Table 7.1.*

Table 7.1 Construction Works to be undertaken in the Coming Month

Work to be taken
To Kwa Wan Site A1-2 • Nil.
To Kwa Wan landmain works areas: • Implementation of TTA schemes for land works; • Performing trial pit; • Excavation works; and • Welding works.
Marine works Section 2 and 3: • Dredging (including works area within 250 m of TKW breakwaters).
Landing point at North Point • Nil.

Potential environmental impacts arising from the above construction activities are mainly associated with dust, construction noise, site runoff, water quality, marine ecology and waste management.

7.2 MONITORING SCHEDULE FOR THE COMING MONTH

The tentative schedule of marine water quality, marine ecology and noise monitoring for the next reporting period is presented in *Annex B2*, *Annex C2* and *Annex D2*.

Environmental monitoring will be conducted at the same monitoring locations in this reporting period. The monitoring programme has been reviewed and was considered adequate to cater for the nature of works in progress.

7.3 SOLID AND LIQUID WASTE MANAGEMENT STATUS

As the major construction works in the coming month are excavation and dredging, waste generated from this Project for the coming month will included inert C&D materials, non-inert C&D materials and marine deposit. Part of the inert C&D materials will be stockpile on site for reuse and the remaining inert C&D materials will be disposed of at Tseung Kwan O Area 137 Fill Bank. Chemical waste will be stored at designed area and collected by a licensed collector. General refuse generated from the Project will be disposed of SENT Landfill. The marine deposits requiring Type 1 disposal will be disposed of at the open sea floor disposal areas of South Cheung Chau

and East Ninepin, while those requiring Type 2 disposal will be disposed of at East Sha Chau Contaminated Mud Pit.

8 CONCLUSION

This 2nd Monthly EM&A Report presents the EM&A programme undertaken during the reporting period from 1 July to 31 July 2012 in accordance with EM&A Manual and requirements of the EP (EP-401/2010).

Dredging activities were undertaken during this reporting period and construction phase water quality monitoring was conducted in accordance with the requirements described in the EM&A Manual. The completed set of marine water quality monitoring data and the laboratory analysis of SS samples for the period of 25 June to 31 July 2012 was available during the preparation of this monthly EM&A report. Marine Water Quality Monitoring on 24 July 2012 was cancelled due to adverse weather condition. Exceedances of Action and Limit Levels for water quality were recorded in 15 monitoring events from 25 June to 31 July 2012. Since no dredging works were undertaken with 250 m distance from the To Kwa Wan breakwaters, no Impact Coral Monitoring was conducted. The review of monitoring data suggested that marine dredging activities have proceeded in an environmentally acceptable manner.

Four sets of 30-minute construction noise measurements were carried out on 4 (for SCH02 only), 6 (for FSQ only), 11, 18 and 28 July 2012 at the monitoring stations SCH02 and FSQ during normal working hours in the reporting period. No exceedance of Action or Limit Level was recorded during the reporting period.

Weekly site inspections were conducted in the reporting period. Most of the mitigation measures recommended in the EIA/ EM&A manual/ EP were implemented by the Contractor. Follow-up actions for the observed environmental deficiency during the site inspections were taken as reported by the Contractor and observed in the next weekly site inspection conducted.

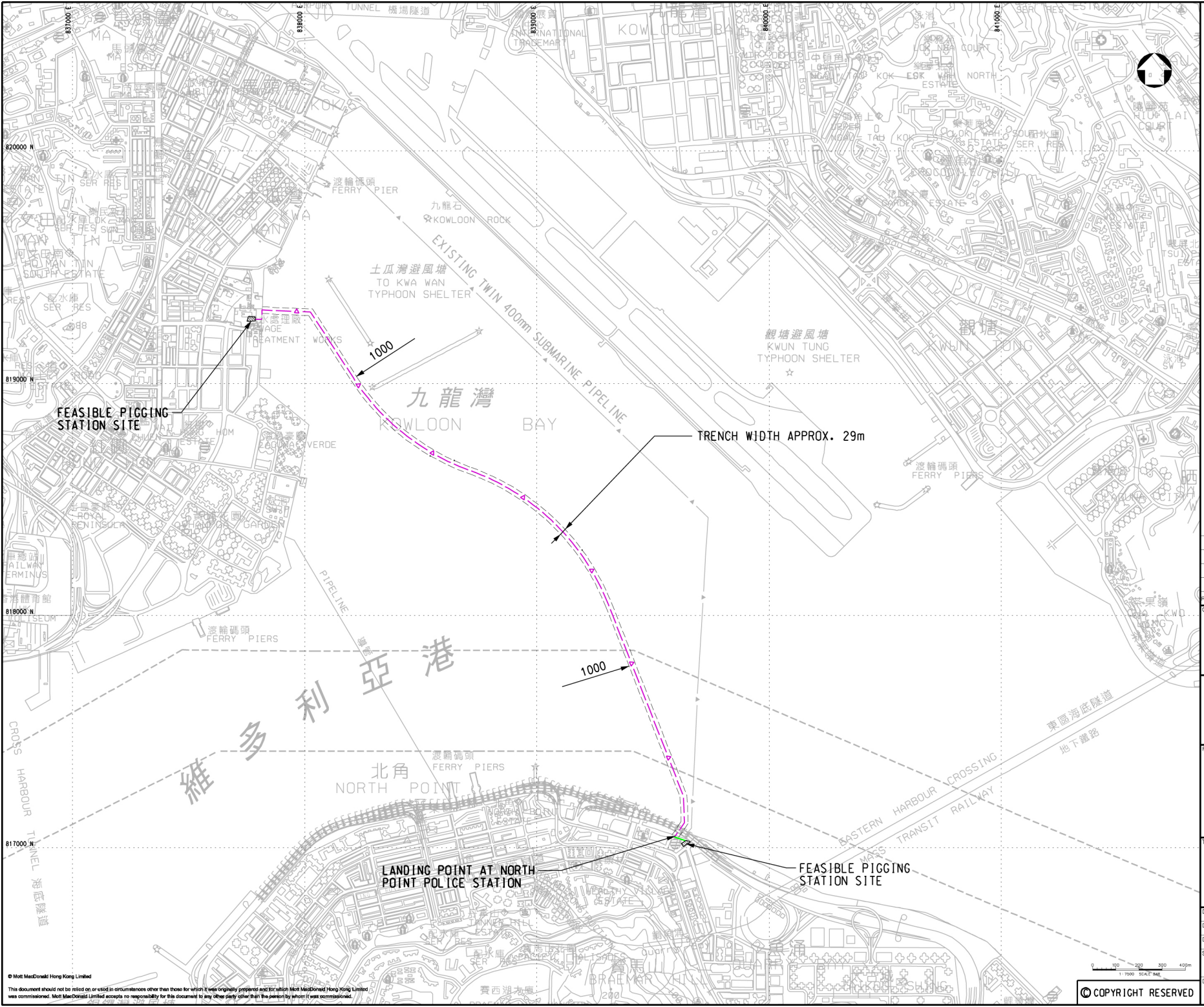
No non-compliance event was recorded during the reporting period.

No complaint and summons/prosecution was received during the reporting period.

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

Annex A

Locations of Works Areas



LEGEND:

- PROPOSED TWIN 450 SUBMARINE GAS MAIN
- CONNECTION TO NEW PIGGING STATION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P4	FEB 10	MING	GENERAL REVISION	FY	TI
P3	DEC 09	MING	GENERAL REVISION	BL	TI
P2	JUN 09	MING	MINOR AMENDMENT	BL	TI
P1	DEC 08	MING	FIRST ISSUE	BL	TI

Client

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Project

INSTALLATION OF SUBMARINE GAS PIPELINES AND ASSOCIATED FACILITIES FROM TO KWA WAN TO NORTH POINT FOR FORMER KAI TAK AIRPORT DEVELOPMENT

Title

GENERAL LAYOUT

Designed	DL		Eng.Chk.	TT	
Drawn	YKL		Coordination	DL	
Dwg.Chk.	DL		Approved	TI	

Scale 1:7500@A1

Project 237926

Status PRE

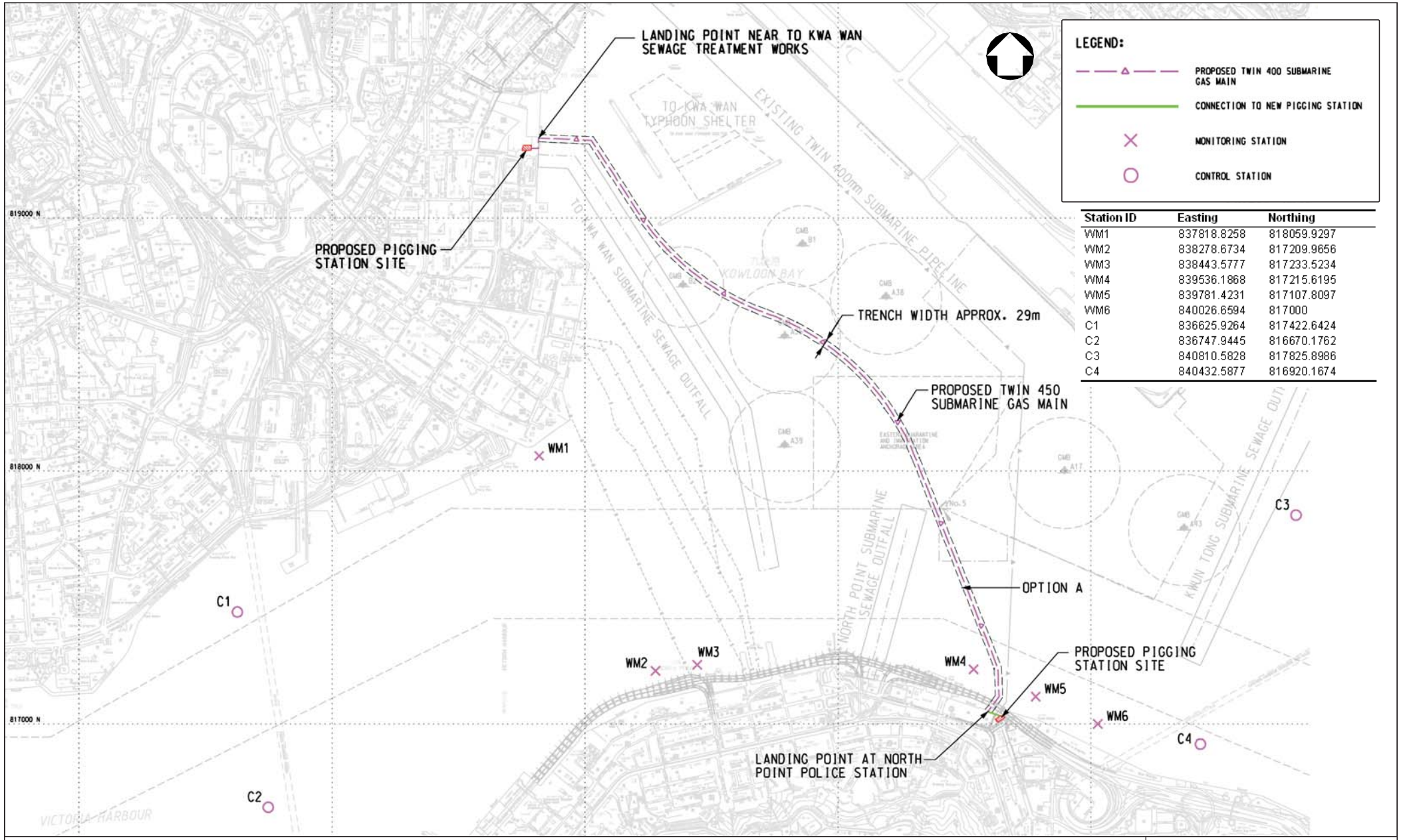
CAD File J:\237926\REPORT\ENV\EWBA MANUAL\0002051\FIGURE H.dgn

Drawing No. Annex A1

Rev P4

Annex B

Marine Water Quality Monitoring



Station ID	Easting	Northing
WM1	837818.8258	818059.9297
WM2	838278.6734	817209.9656
WM3	838443.5777	817233.5234
WM4	839536.1868	817215.6195
WM5	839781.4231	817107.8097
WM6	840026.6594	817000
C1	836625.9264	817422.6424
C2	836747.9445	816670.1762
C3	840810.5828	817825.8986
C4	840432.5877	816920.1674

Annex B1

Location of Water Quality Monitoring Stations

FILE: 0158059c
DATE: 03/04/2012

Environmental Resources Management

ERM

Annex B2
Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development
Impact Marine Water Quality Monitoring (WQM) Schedule (25 June to 31 July 2012)

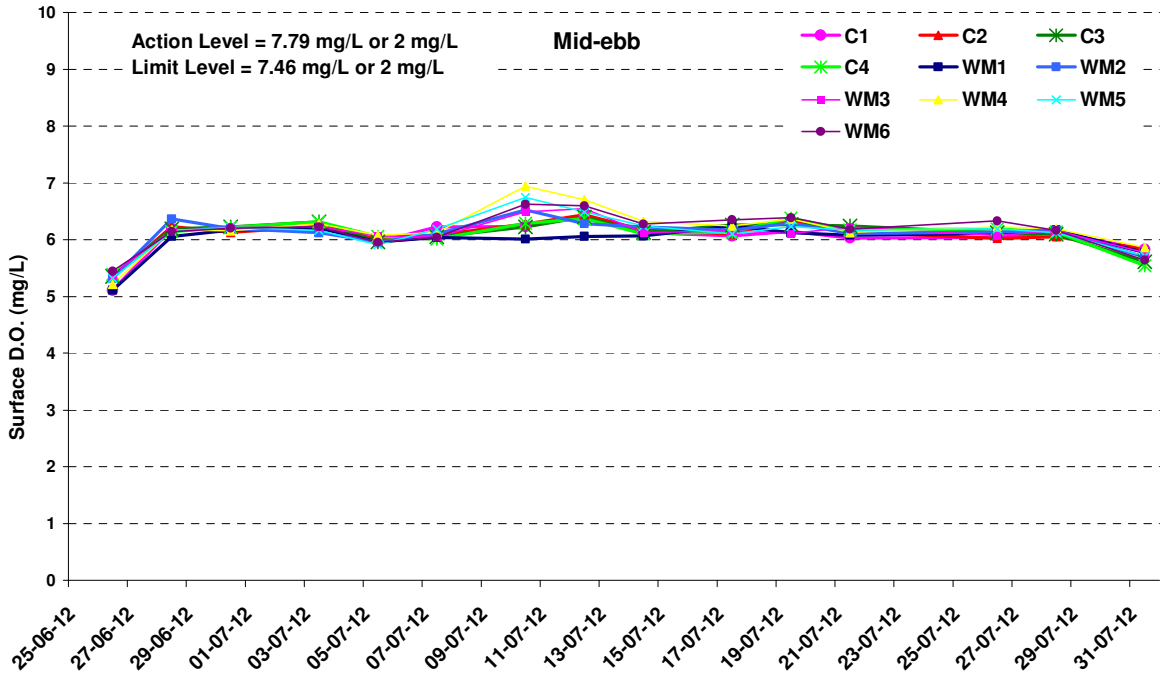
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun	01-Jul
	Mid-Flood 9:23 Mid-Ebb 15:47		**Mid-Flood 11:42 Mid-Ebb 17:42**		**Mid-Ebb 9:18 Mid-Flood 16:12**	
02-Jul	03-Jul	04-Jul	05-Jul	06-Jul	07-Jul	08-Jul
	Mid-Ebb 11:53 Mid-Flood 19:08		**Mid-Ebb 13:28 Mid-Flood 20:35**		**Mid-Ebb 8:07 Mid-Flood 14:51**	
09-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul
	Mid-Flood 10:29 Mid-Ebb 16:41		**Mid-Flood 13:15 Mid-Ebb 18:21**		**Mid-Ebb 9:39 Mid-Flood 16:34**	
16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul
	Mid-Ebb 11:22 Mid-Flood 18:38		**Mid-Ebb 12:34 Mid-Flood 19:33**		**Mid-Ebb 13:49 Mid-Flood 20:31**	
23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
	Cancel due to typhoon		**Mid-Flood 11:42 Mid-Ebb 17:42**		**Mid-Ebb 7:59 Mid-Flood 15:00**	
30-Jul	31-Jul					
	Mid-Ebb 10:56 Mid-Flood 18:14					

Annex B2

Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development

Tentative Impact Marine Water Quality Monitoring (WQM) Schedule (1 August to 31 August 2012)

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30-Jul	31-Jul	01-Aug	02-Aug	03-Aug	04-Aug	05-Aug
			Mid-Ebb **12:27** **Mid-Flood** **19:29**		**Mid-Ebb** **13:46** **Mid-Flood** **20:34**	
06-Aug	07-Aug	08-Aug	09-Aug	10-Aug	11-Aug	12-Aug
	Mid-Flood **9:19** **Mid-Ebb** **15:28**		**Mid-Flood** **11:04** **Mid-Ebb** **16:38**		**Mid-Ebb** **7:57** **Mid-Flood** **19:21**	
13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug
	Mid-Ebb **10:17** **Mid-Flood** **17:48**		**Mid-Ebb** **11:33** **Mid-Flood** **18:31**		**Mid-Ebb** **12:49** **Mid-Flood** **19:19**	
20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug
	Mid-Flood **8:32** **Mid-Ebb** **14:48**		**Mid-Flood** **10:26** **Mid-Ebb** **16:23**		**Mid-Flood** **13:27** **Mid-Ebb** **18:37**	
27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	01-Sep	02-Sep
	Mid-Ebb **9:56** **Mid-Flood** **17:16**		**Mid-Ebb** **11:27** **Mid-Flood** **18:21**			



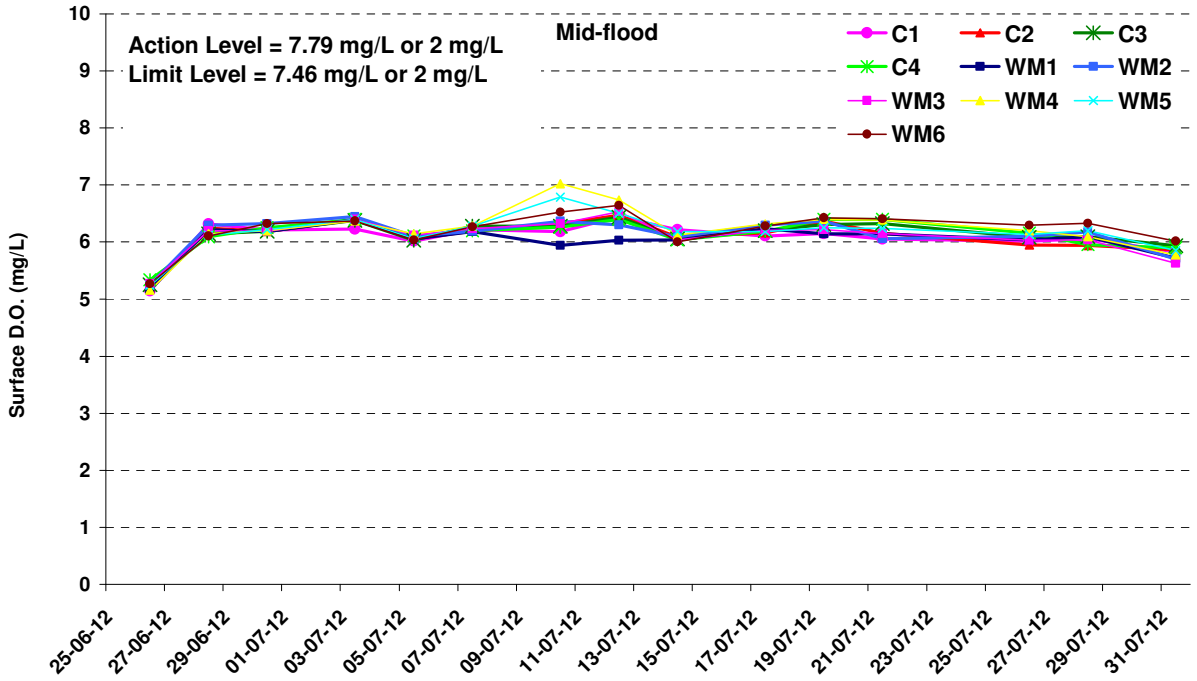
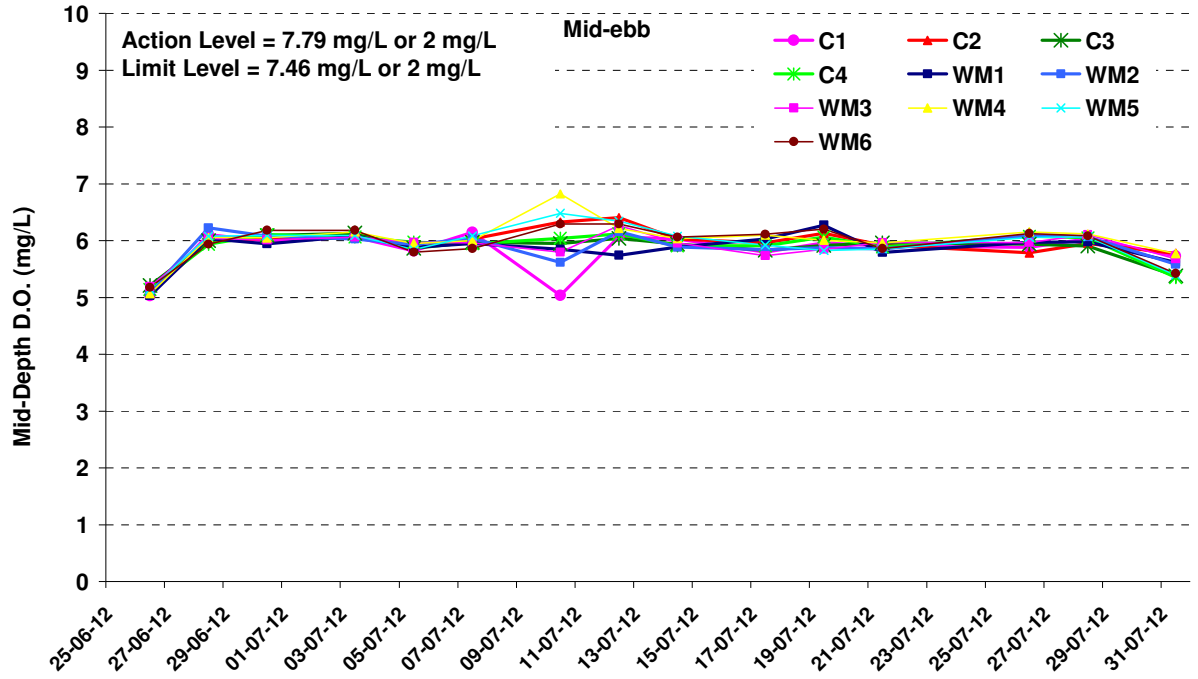


Figure B3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 25 June and 31 July 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex B_WQM graphs_July2012.doc



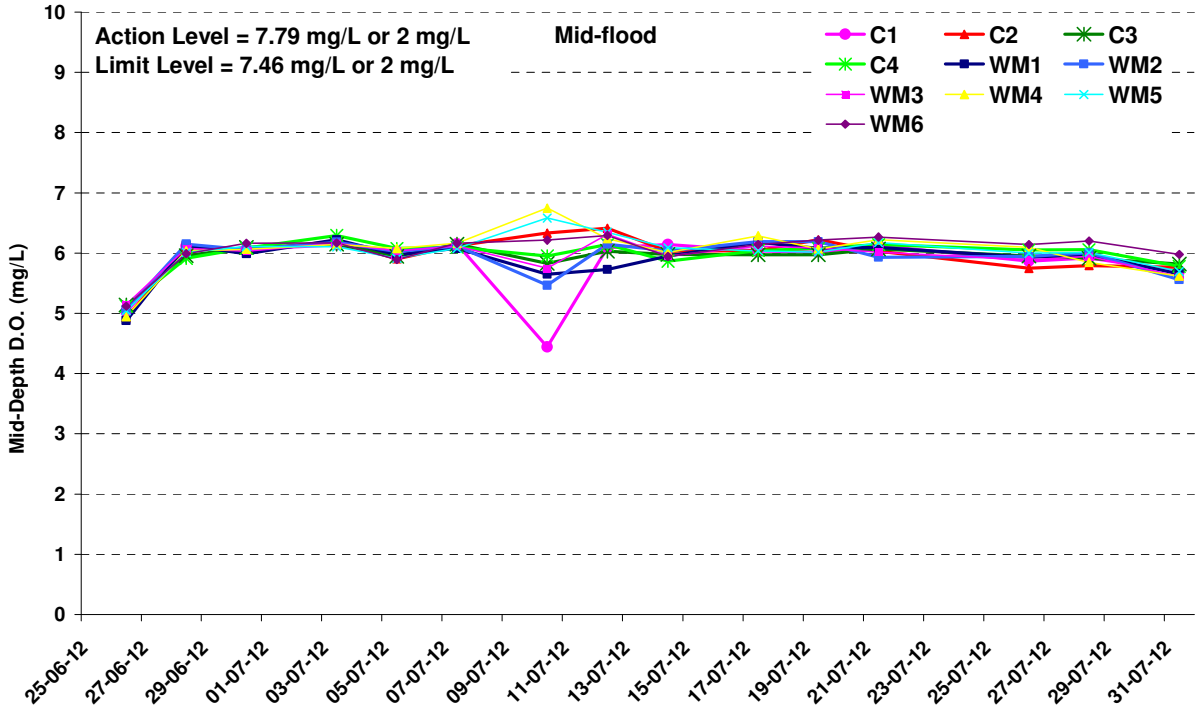
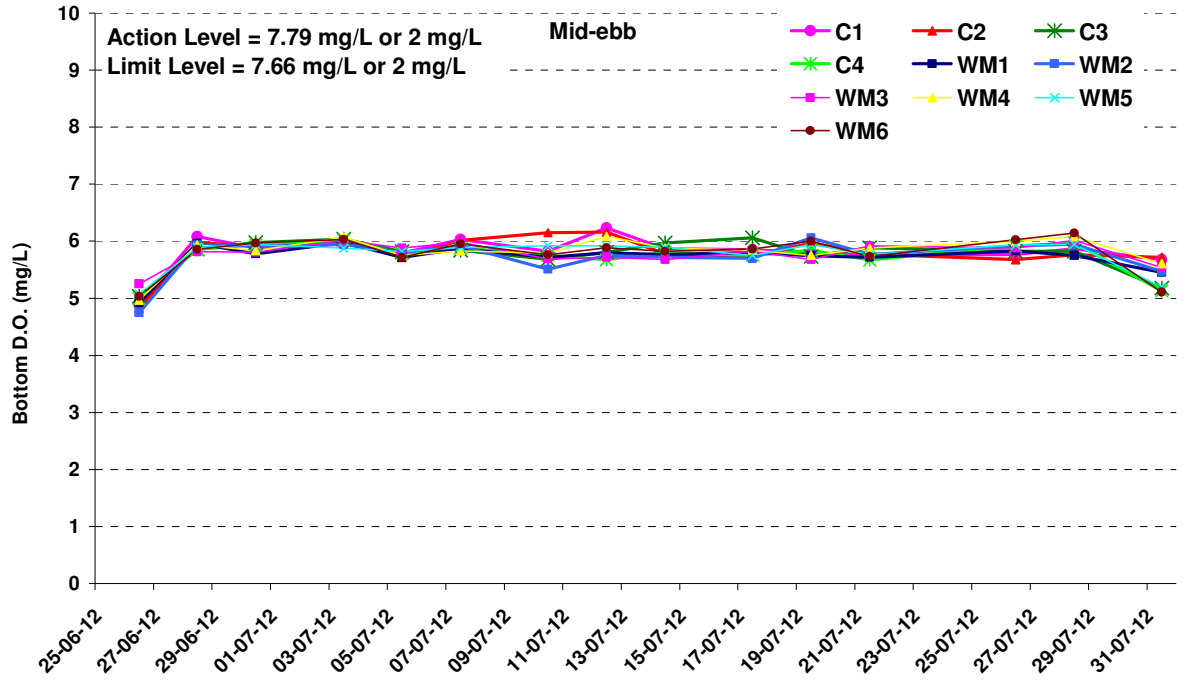


Figure B4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 25 June and 31 July 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex B_WQM graphs_July2012.doc



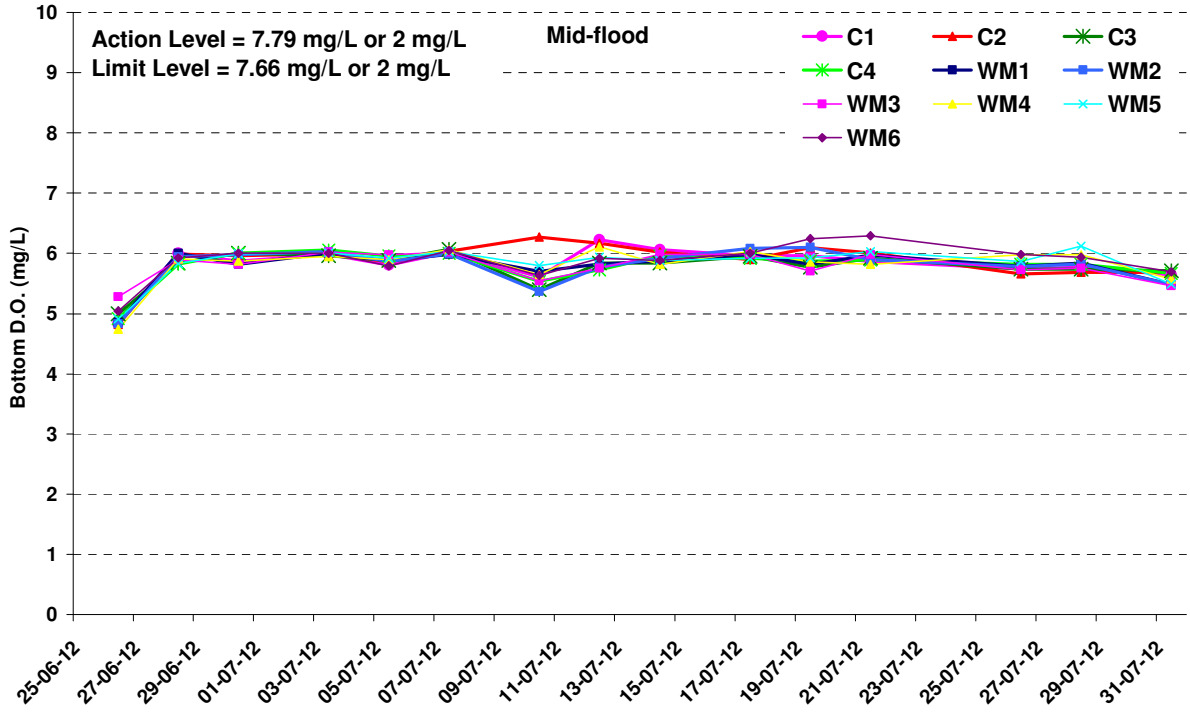
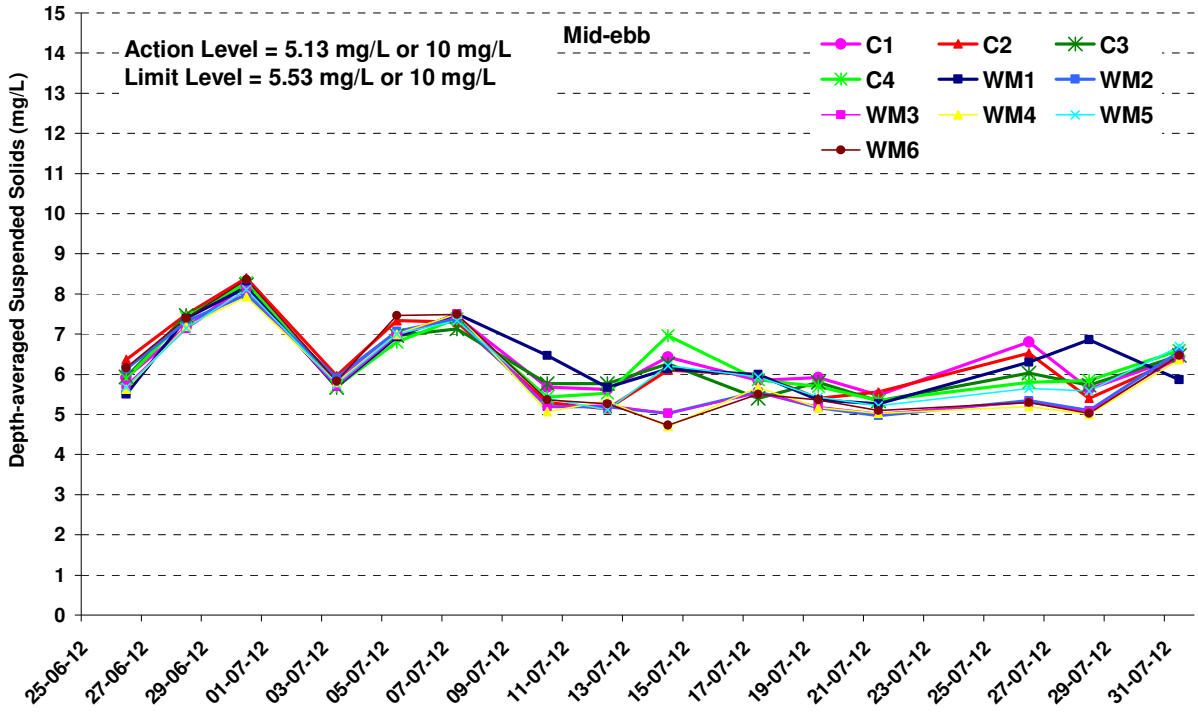


Figure B5 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 25 June and 31 July 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex B_WQM graphs_July2012.doc



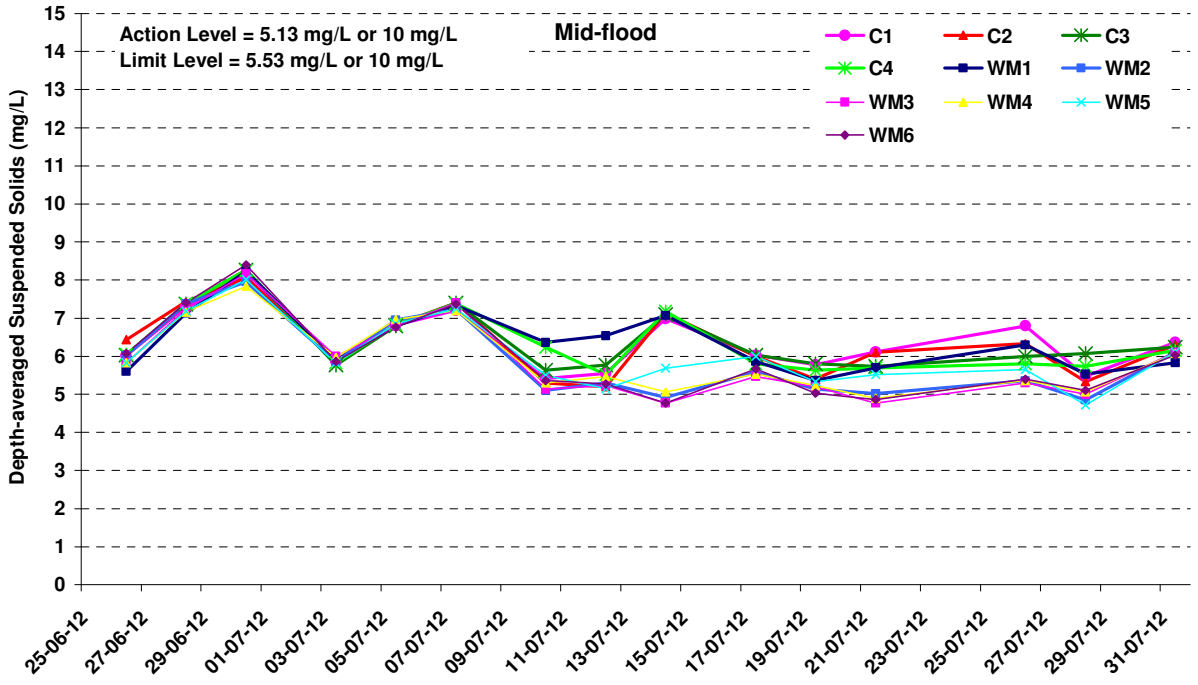
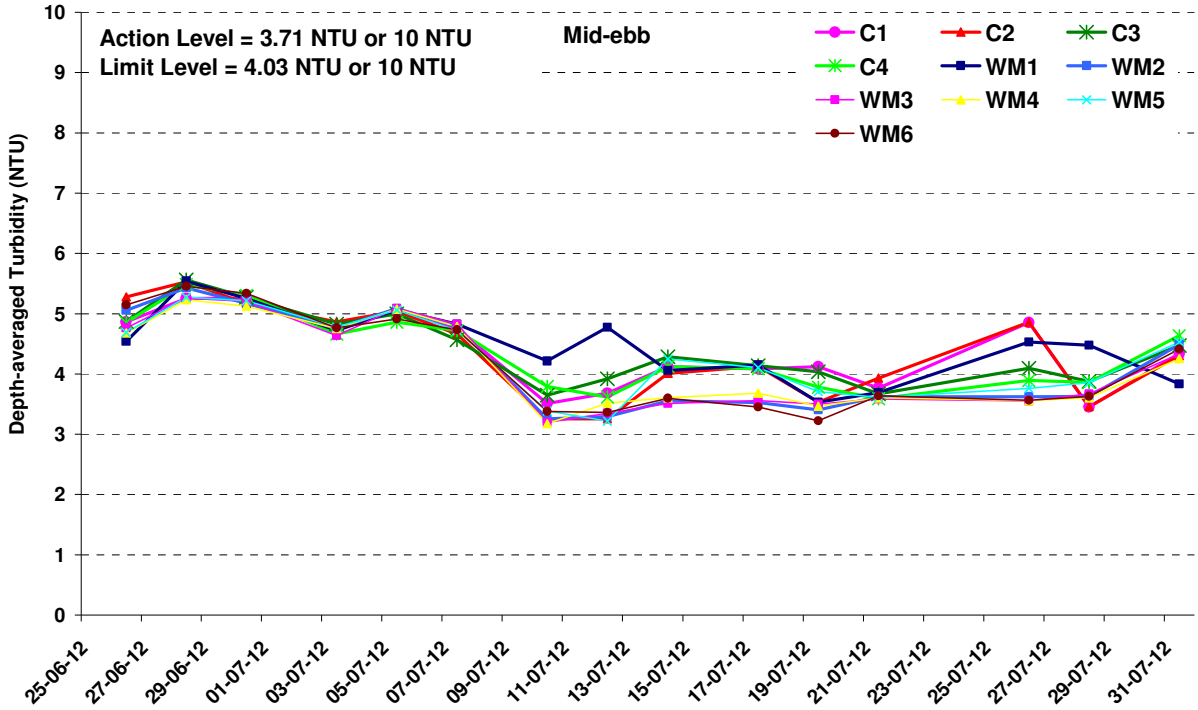


Figure B6 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids between 25 June and 31 July 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex B_WQM graphs_July2012.doc



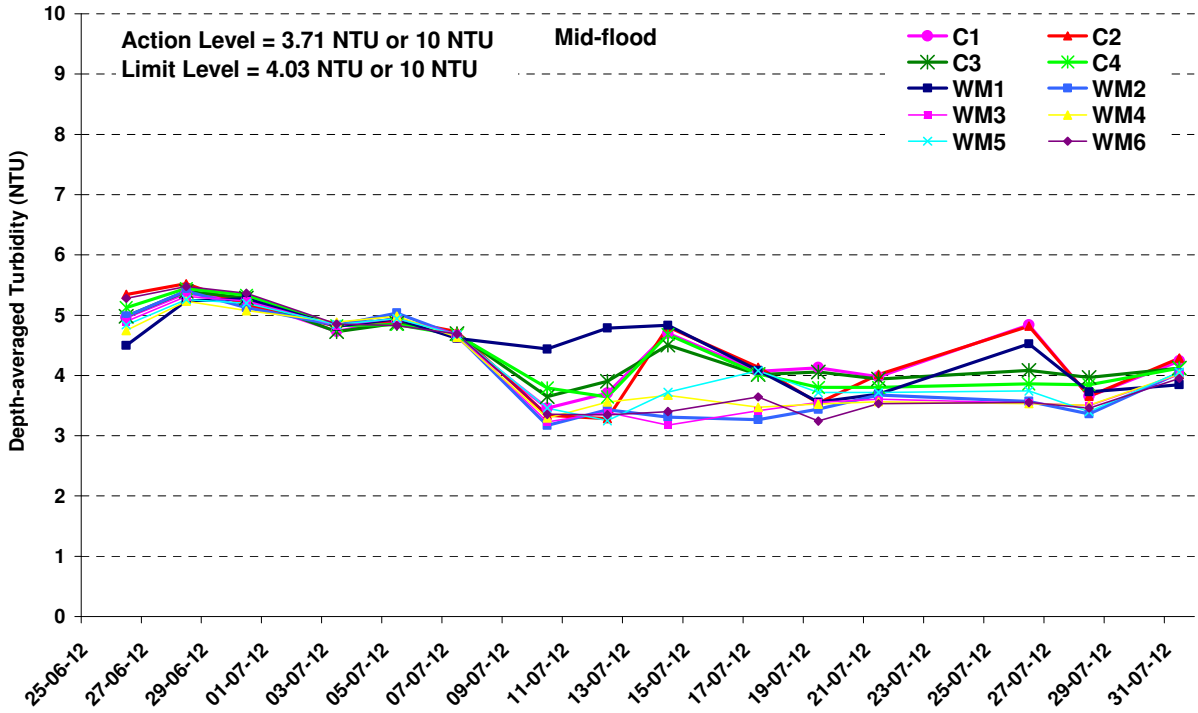


Figure B7 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 25 June and 31 July 2012 at Monitoring Stations for Dredging Works.

Ref: 0158059 Annex B_WQM graphs_July2012.doc

Annex C

Marine Ecology

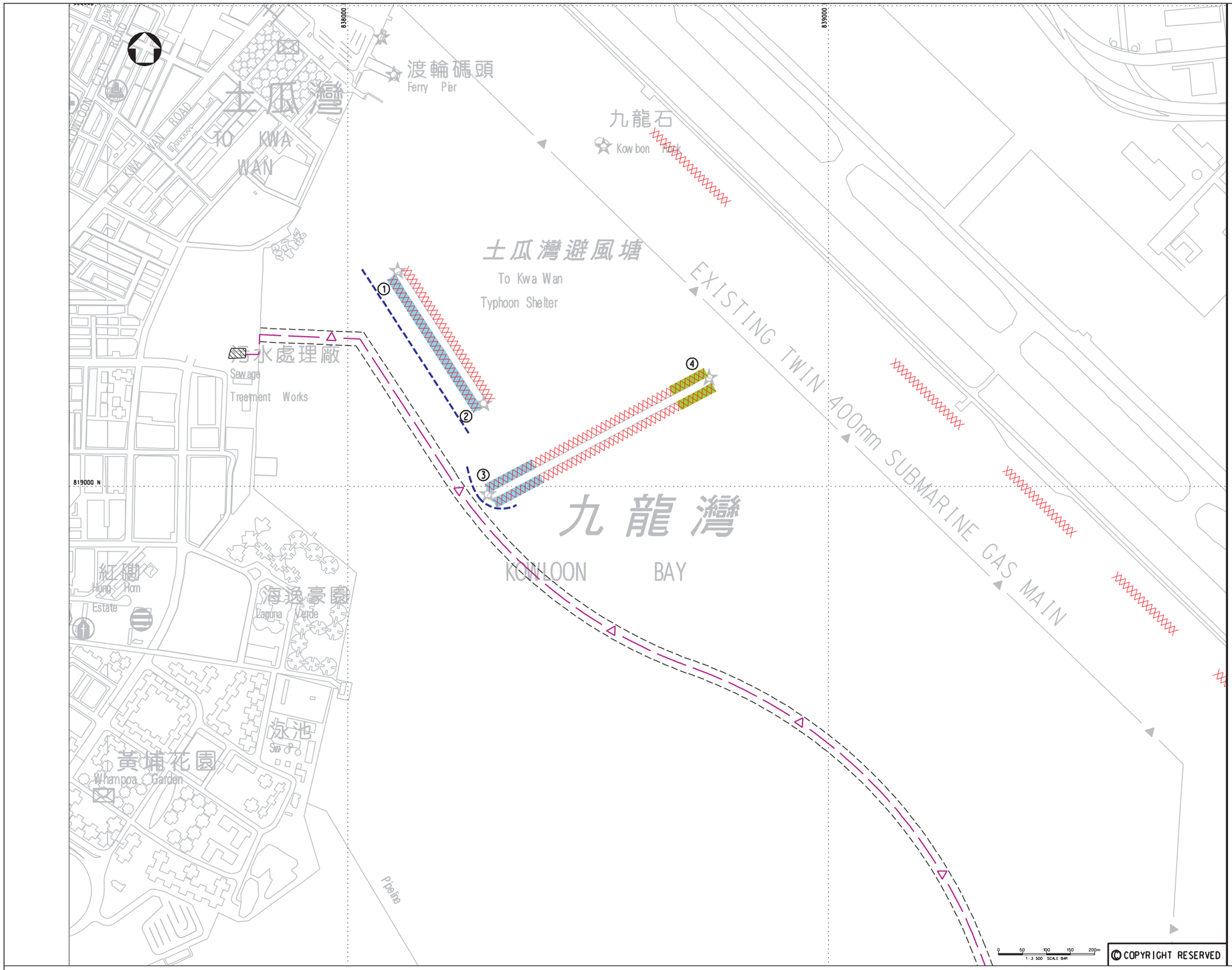


Figure 2.1

Locations of Coral Monitoring Sites at To Kwa Wan Breakwaters

FILE: 0158059e
DATE: 30/05/2012

Environmental Resources Management

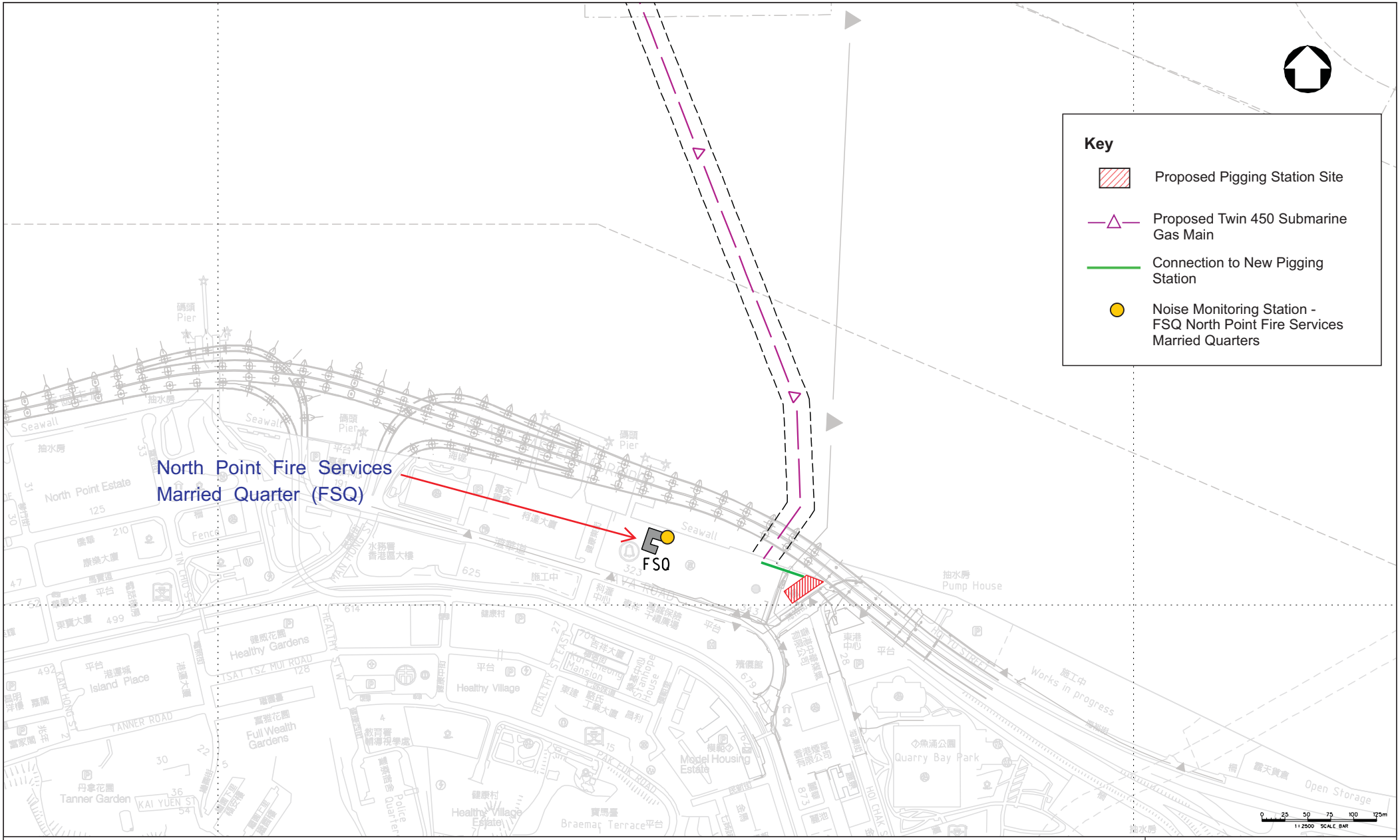
ERM

Annex C2 Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development Coral Monitoring Schedule (1 August to 31 August 2012)

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30-Jul	31-Jul	01-Aug	02-Aug	03-Aug	04-Aug	05-Aug
06-Aug	07-Aug	08-Aug	09-Aug	10-Aug	11-Aug	12-Aug
Coral Monitoring 10:00 - 12:00						
13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug
Coral Monitoring 10:00 - 12:00						
20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug
Coral Monitoring 10:00 - 12:00						
27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	01-Sep	02-Sep
Coral Monitoring 10:00 - 12:00						

Annex D

Air Borne Noise Monitoring



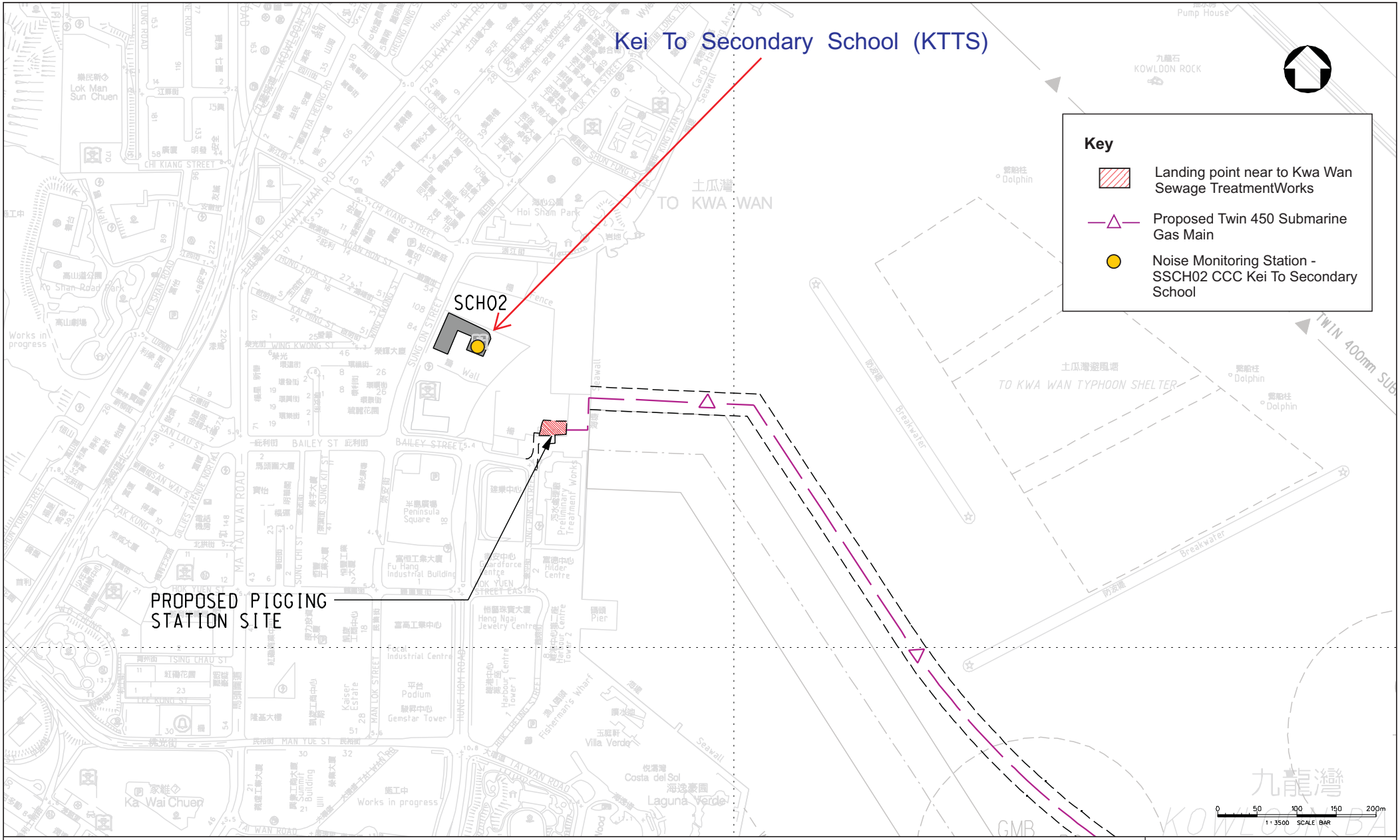
Annex D1

Location of Noise Monitoring Stations (North Point)

FILE: 0158059b
DATE: 03/04/2012

Environmental Resources Management

ERM



Annex D1

Location of Noise Monitoring Stations (To Kwa Wan)

FILE: 0158059a
DATE: 03/04/2012

Environmental Resources Management

ERM

Annex D2 Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development
July 2012 Noise Monitoring Schedule

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						01-Jul
02-Jul	03-Jul	04-Jul	05-Jul	06-Jul	07-Jul	08-Jul
The day following Hong Kong Special Administrative Region Establishment Day		Noise Monitoring at SCH02		Noise Monitoring at FSQ		
09-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul
		Noise Monitoring at SCH02 and FSQ				
16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul
		Noise Monitoring at SCH02 and FSQ				
23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
					Noise Monitoring at SCH02 and FSQ	

SCH02 - CCC Kei To Secondary School

FSQ - North Point Fire Service Married Quarters

Annex D2
Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development
Tentative August 2012 Noise Monitoring Schedule

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30-Jul	31-Jul	1-Aug	2-Aug	3-Aug	4-Aug	5-Aug
		Noise Monitoring at SCH02 and FSQ				
6-Aug	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug	12-Aug
		Noise Monitoring at SCH02 and FSQ				
13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug
		Noise Monitoring at SCH02 and FSQ				
20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug
		Noise Monitoring at SCH02 and FSQ				
27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	01-Sep	02-Sep
		Noise Monitoring at SCH02 and FSQ				

SCH02 - CCC Kei To Secondary School
FSQ - North Point Fire Service Married Quarters

Annex D3 Noise Monitoring Results

Daytime Noise Monitoring Results

FSQ Monitoring Station

Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (℃)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
06-Jul-12	13:45	14:15	Sunny	69.9	71.5	67.7	Excavation at the site next to the Project	Traffic noise	-	31	0.7	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
11-Jul-12	14:55	15:25	Sunny	68.6	70.3	66.2	-	Traffic noise	-	32	0.5	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
18-Jul-12	10:45	11:15	Sunny	70.2	71.4	68.4	-	Traffic noise	-	32	0.4	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
28-Jul-12	15:00	15:30	Sunny	71.8	73.3	70.1	-	Traffic noise	-	32	0.6	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
			Min.	**68.6**									
			Max.	**71.8**									

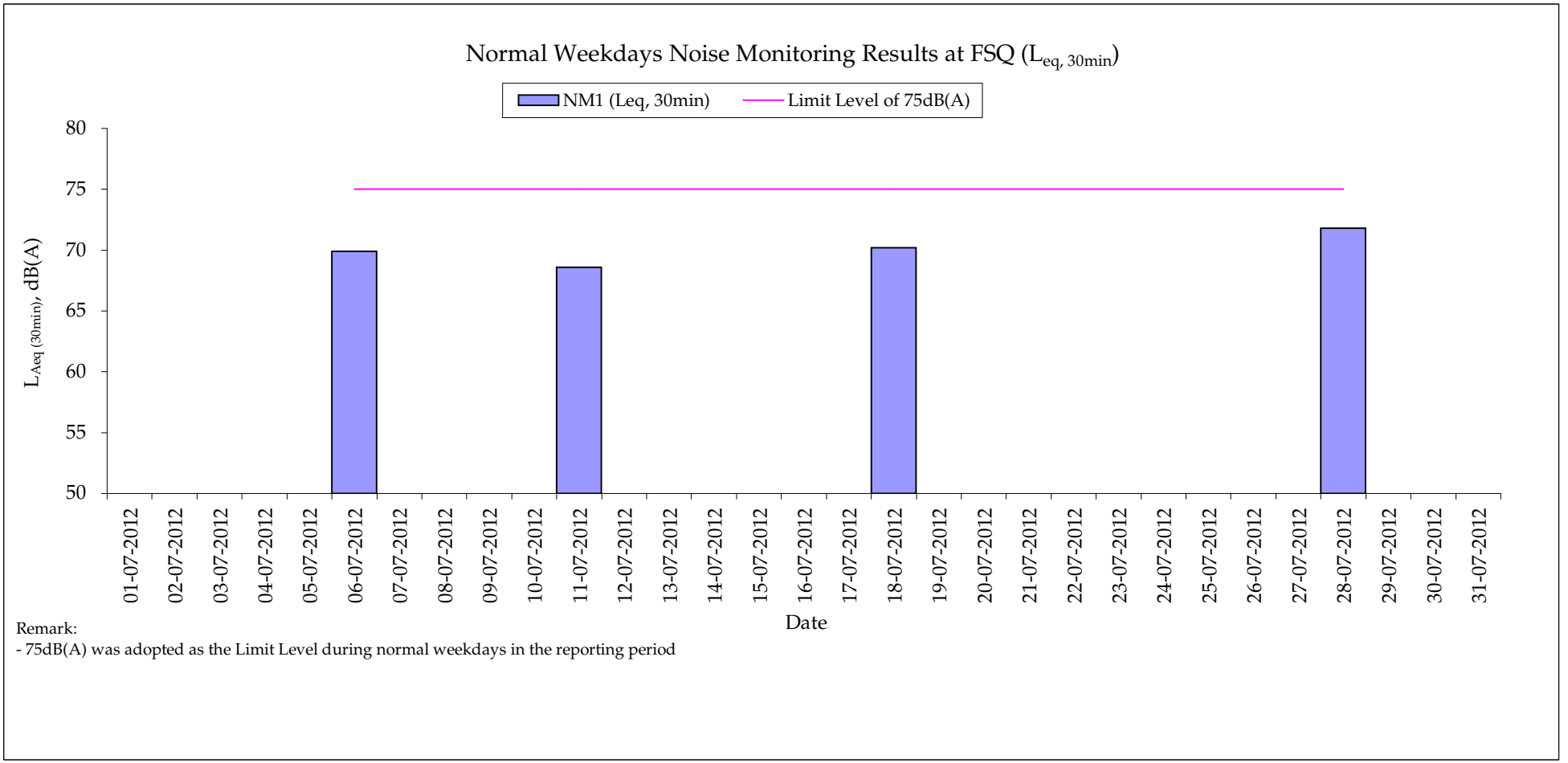
Annex D3 Noise Monitoring Results

Daytime Noise Monitoring Results

SCH02 Monitoring Station

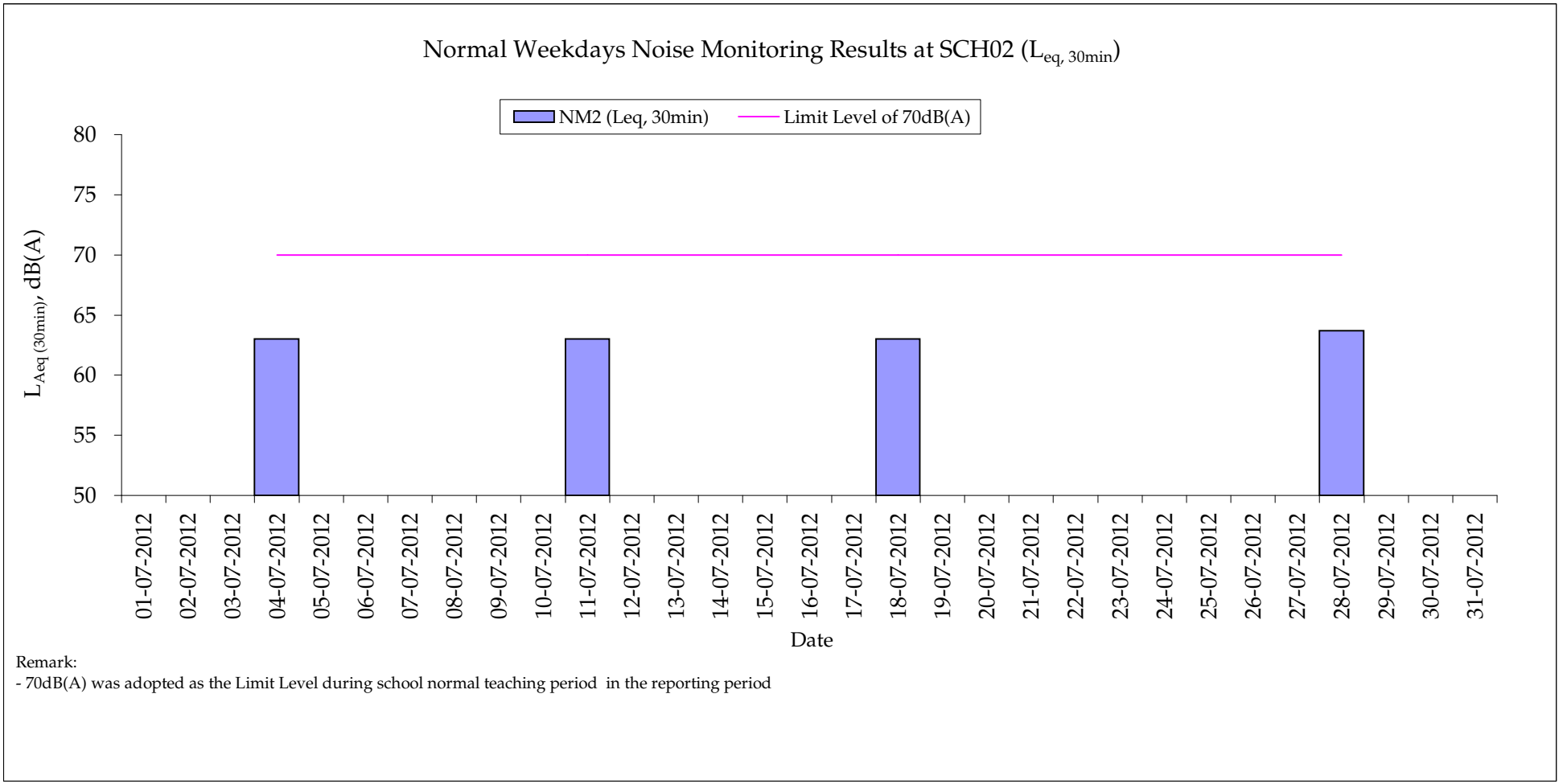
Date	Start Time	End Time	Weather	Noise level (dB(A)), 30 min			Major Construction Noise Source(s) Observed	Other Noise Source(s) Observed	Remarks	Temp. (℃)	Wind Speed (m/s)	Noise Meter Model / ID	Calibrator Model / ID
				Leq	L10	L90							
04-Jul-12	13:10	13:40	Sunny	63.0	65.1	61.1	-	Traffic noise	-	31	0.3	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
11-Jul-12	11:08	11:38	Sunny	63.0	64.3	60.6	-	Traffic noise	-	32	0.6	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
18-Jul-12	14:33	15:03	Sunny	63.0	64.4	60.9	-	Traffic noise	-	32	0.3	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
28-Jul-12	10:10	10:40	Sunny	63.7	66.0	60.4	-	Traffic noise	-	32	0.5	RION- NL31 (S/N 00320533)	RION- NC37 (S/N 10786708)
			Min.	**63.0**									
			Max.	**63.7**									

Annex D3 - Noise Monitoring Result



Remark:
- 75dB(A) was adopted as the Limit Level during normal weekdays in the reporting period

Annex D3 - Noise Monitoring Result



Remark:
- 70dB(A) was adopted as the Limit Level during school normal teaching period in the reporting period

Annex E

Event /Action Plans for Marine Water Quality, Marine Ecology and Air Borne Noise Monitoring

Annex E1 *Event and Action Plan for Water Quality Monitoring during Construction Phase*

Event	Action			
	ET (1)	**IEC** (1)	**ER** (1)	**Contractor(s)**
Action Level				
Exceedance by one sampling day	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC and Contractor 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measure with IEC and Contractor; and 6. Repeat measurement on next day of exceedance	1. Discuss with ET and Contractor on the mitigations measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; and 6. Implement the agreed mitigation measures.
Exceedance for two or more consecutive sampling days	1. Repeat in-situ measurement to confirm finding; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measure with IEC and Contractor;	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on mitigation measures to be implemented; and 3. Assess the effectiveness of the implemented mitigation measures	1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; and

Event	Action			
	ET (1)	**IEC** (1)	**ER** (1)	**Contractor(s)**
	6. Ensure mitigation measures are implemented			6. Implement the agreed mitigation measures.
	7. Prepare to increase the monitoring frequency to daily; and			
	8. Repeat measurement on next day of exceedance.			
Limit Level				
Exceedance by one sampling day	1. Repeat *in situ* measurement to confirm findings;	1. Discuss with ET and Contractor on the mitigations measures;	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;	1. Inform the Engineer and confirm notification of the non-compliance in writing;
	2. Identify source(s) of impact;	2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and	2. Request Contractor to critically review the working methods	2. Rectify unacceptable practice;
	3. Inform IEC and Contractor and EPD	3. Assess the effectiveness of the implemented mitigation measures	3. Make agreement on mitigation measures to be implemented; and	3. Check all plant and equipment
	4. Check monitoring data, all plant, equipment and Contractor's working methods;		4. Assess the effectiveness of the implemented mitigation measures	4. Consider changes of working methods;
	5. Discuss mitigation measure with IEC and Contractor;			5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days; and
	6. Repeat measurement on next day of exceedance			6. Implement the agreed mitigation measures.
	7. Increase the monitoring frequency to daily until no exceedance of Limit Level			
Exceedance two or more consecutive sampling days	1. Repeat *in situ* measurement to confirm findings;	1. Discuss with ET and Contractor on the mitigations measures;	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;	1. Inform the ER and confirm notification of the non-compliance in writing;
	2. Identify source(s) of impact;	2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and	2. Request Contractor to critically review the working methods	2. Rectify unacceptable practice;

Event	Action			
	ET [1]	**IEC** [1]	**ER** [1]	**Contractor(s)**
	3. Inform IEC and Contractor and EPD	3. Assess the effectiveness of the implemented mitigation measures	3. Make agreement on mitigation measures to be implemented;	3. Check all plant and equipment
	4. Check monitoring data, all plant, equipment and Contractor's working methods;		4. Assess the effectiveness of the implemented mitigation measures; and	4. Consider changes of working methods;
	5. Discuss mitigation measure with IEC, ER and Contractor;		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	5. Discuss with ET and IEC and ER and propose mitigation measures to IEC and ER within 3 working days;
	6. Ensure mitigation measures are implemented; and			6. Implement the agreed mitigation measures; and
	7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days			7. As directed by the Engineer, to slow down or to stop all to part of the marine work or construction activities.

Note: [1] ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

Annex E2 *Event and Action Plan for Marine Ecology Monitoring during Construction Phase*

	Action
Event	**The Marine Biologist**
Action Level Exceedance	Step 1 - Inform the Contractor, the Project Designer and AFCD and discuss the most appropriate method of reducing sediment in the discharge Step 2 - Implement mitigation measures on site Step 3 - If non-compliance continues, check and confirm the effectiveness of mitigation measures and repeat monitoring survey measurements
Limit Level Exceedance	Undertake Steps 1- 3. If further exceedance of Limit Level, suspend construction works until an effective solution is identified. Once the solutions have been identified and agreed with all parties, construction works may commence

Annex E3 *Event and Action Plan for Air-borne Noise Monitoring during Construction Phase*

Event	Action			
	ET (1)	**IEC** (1)	**ER** (1)	**Contractor(s)**
Action Level	1. Notify IEC and the Contractor	1. Review with analysed results submitted by ET	1. Confirm receipt of notification of exceedance in writing	1. Submit noise mitigation proposals to IEC
	2. Carry Out investigation	2. Review the proposed remedial measures by the Contractor and advise ER accordingly	2. Notify the Contractor.	2. Implement noise mitigation proposals.
	3. Report the results of investigation to IEC and the Contractor	3. supervise the implement of remedial measures.	3. Require the Contractor to proposed remedial measures for the analysed noise problem	
	4. Discuss with the Contractor and formulate remedial measures		4. Ensure remedial measures are properly implemented	
	5. Increase monitoring frequency to check mitigation measures			
Limit Level	1. Identify the source	1. Discuss amongst ER, ET Leader and the Contractor on the potential remedial actions	1. Confirm receipt of notification of exceedance in writing	1. Take immediate action to avoid further exceedance
	2. Notify IEC, ER, EPD and the Contractor	2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly	2. Notify the Contractor	2. Submit proposals for remedial actions to IEC within 3 working days of notification.
	3. Repeat measurement to confirm findings	3. Supervise the implement of remedial measures.	3. Require the Contractor to proposed remedial measures for the analysed noise problem	3. Implemet the agreed proposals.
	4. Increase monitoring frequency		4. Ensure remedial measures are properly implemented	4. Resubmit proposals if problem still not under control.
	5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented		5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated	5. Stop the relevant activity of works as determined by the ER until exceedance is abated.
	6. Inform IEC, ER and EPD the causes and actions taken for the exceedances			

Event	Action			
	ET [1]	**IEC** [1]	**ER**[1]	**Contractor(s)**
	7. Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and ER informed of the results			
	8. If exceedance stops, cease additional monitoring			

Note: [1] ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

Annex F

Implementation Schedule

ANNEX F SUMMARY OF MITIGATION MEASURE IMPLEMENTATION SCHEDULE

Environmental Protection Measures	Location	Timing	Status
Water Quality			
Mitigation Measures for Dredging Although adverse water quality impact is not predicted during the construction phase, implementation of the following mitigation measures is recommended to minimise the potential SS impact from dredging activities: • Dredging shall be carried out by closed grab dredger to minimize release of sediment and other contaminants during dredging; • The maximum production rate for dredging from the seabed for installation of the submarine gas pipelines shall not be more than 4,000m3 per day (and no more than 1 closed grab dredger); and • Deployment of frame type silt curtain to fully enclose the grab while dredging works are in progress. An illustration of a typical configuration of frame type silt curtain is shown in EM&A manual Figure 3.10. The frame type silt curtain shall be designed to enclose local pollution caused by the grab dredger and suspended by a steel frame mounted on the grab dredger and floating on water. This frame type silt curtain shall be fabricated from permeable, durable, abrasion resistant membrane like geotextiles and be mounted on a floating boom structure. The frame type silt curtain shall also extend to the seabed to cover the entire water column. Steel chain or ballast shall be attached to the bottom of the silt curtain. Mid-ballast may be added as necessary. The structure of the silt curtain shall be maintained by metal grids. The frame type silt curtain shall be capable or reducing sediment loss to outside by a factor of 4 (or about 75%). Other Good Site Practices for Dredging Other good site practices that shall be undertaken during dredging includes: • all vessels shall be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; • all barges / dredgers used shall be fitted with tight fitting seals to their bottom openings to prevent leakage of material; • construction activities shall not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds; • barges or hopper shall not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation; and • before commencement of dredging works, the holder of the Environmental Permit shall submit detailed proposal of the design and arrangement of the frame type silt curtain to EPD for approval.	Construction Work Sites (Along the alignment of dredging)	During Marine Dredging works	√
Effluent from Hydrostatic/ Commissioning Tests of the Gas Pipeline System For hydrostatic testing of gas pipelines, the gas pipelines would be filled with potable water (a nearly incompressible liquid) and examined for leaks or permanent changes in shape with a specified test pressure. The test would be carried out at room temperature and dosing of chemicals into the water for testing is not required. Water used for testing shall be reused as far as possible (e.g. water	Construction Work Sites (General)	During Hydrostatic Tests	N.A.

Environmental Protection Measures	Location	Timing	Status
spray for dust suppression on site). To ensure compliance with the standards for effluent discharged into the inshore waters or marine waters of Victoria Harbour WCZ as shown in Tables 9a and 9b of the TM-DSS, sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m3 capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and suited to applications where the influent is pumped.			
Surface Runoff, Sewage and Wastewater from Construction Activities Appropriate measures shall be implemented to control runoff and prevent high loads of SS from entering the marine environment. Proper site management is essential to minimize surface runoff and sewage effluents. • Construction site runoff shall be prevented or minimised in accordance with the guidelines stipulated in the EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). All discharges from the construction site shall be controlled to comply with the standards for effluents discharged into the Victoria Harbour WCZ under the TM-DSS. Good housekeeping and stormwater best management practices, as detailed below, shall be implemented to ensure all construction runoff complies with WPCO standards and no unacceptable impact on the WSRs as a result of construction of the proposed submarine gas pipelines; • Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m3 capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped; • Manholes (including newly constructed ones) shall always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the storm runoff being directed into foul sewers; • All vehicles and plant shall be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and located wheel washing bay shall be provided at every site exit, and wash-water shall have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road shall be paved with sufficient backfill toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains; • Precautions shall be taken at any time of year when rainstorms are likely. Actions shall be taken when a rainstorm is imminent or forecast. Actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention shall be paid to the control of silty surface runoff during storm events, particularly for areas located near steep slopes; • Fuel tanks and storage areas shall be provided with locks and be located on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank, to prevent spilled fuel oils from reaching the coastal waters of the Victoria Harbour and Western and Eastern Buffer WCZs; • Portable chemical toilets shall be used to handle construction workforce sewage prior to discharge to the existing trunk sewer. Sufficient numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers. The Contractor should also be responsible for waste disposal and maintenance practices.	Construction Work Sites (General)	Construction period	√
Waste Management			
Good Site Practices Adverse impacts related to waste management are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:	Construction Work Sites (General)	Construction period	√

Environmental Protection Measures	Location	Timing	Status
• Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site • Training of site personnel in proper waste management and chemical handling procedures, separation of chemical wastes with appropriate treatment which is mentioned in Section 4.6.5 • Provision of sufficient waste disposal points and regular collection of waste • Barges filled with dredged sediment shall be towed away immediately for disposal. In doing so, odour is not anticipated to be an issue to distant sensitive receivers • Well planned delivery programme for offsite disposal such that adverse impact from transporting sediment material is not anticipated • Well maintained PME should be operated on site • Regular cleaning and maintenance of the drainage systems for construction of the landing points • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers			
<u>Waste Reduction Measures</u> Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: • Sort C&D material from demolition and decommissioning of the existing facilities to recover recyclable portions such as metals; • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force; • Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and • Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.	Construction Work Sites (General)	Construction period	√
<u>C&D Material</u> In order to minimise impacts resulting from collection and transportation of C&D material for off-site disposal, the excavated materials shall be reused on-site as backfilling material and for landscaping works as far as practicable. Surplus C&D material generated from excavation works shall be disposed of at public fill reception facilities for other beneficial uses. Other mitigation requirements are listed below: • A Waste Management Plan shall be prepared;	Construction Work Sites (General)	Construction period	√

Environmental Protection Measures	Location	Timing	Status
• A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) shall be proposed; and • In order to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) shall be included.			
General Refuse General refuse shall be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area shall be provided to reduce the occurrence of 'wind blown' light material.	Construction Work Sites (General)	Construction period	√
Chemical Waste Good quality containers compatible with the chemical wastes shall be used, and incompatible chemicals shall be stored separately. Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to either the approved Chemical Waste Treatment Centre, or another licensed facility.	Construction Work Sites (General)	Construction period	Δ
Marine Dredged Sediment During transportation and disposal of the dredged marine sediments, the following measures shall be taken to minimise potential impacts on water quality: • Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and dredgers before the vessel is moved; • Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the EPD; and Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation. • The use of 300m3 geosynthetic container, with outer woven fabric tensile strength of 200 kN/m and seam strength of 140 kN/m for effective method for contained disposal which meets ETWB TCW No. 34/2002 requirements for assuring negligible loss of contaminants to marine environment during disposal. • Allocation of marine disposal sites and all necessary permits shall be applied from relevant authorities for disposal of dredged sediment. Project Proponent will obtain confirmation from CEDD/Marine Fill Committee (MFC) on the disposal options before commencement of the Project.	Construction Work Sites (Along the alignment of dredging)	During Marine Dredging works	√
Marine Ecology			
Placement of a second silt curtain between the dredger and the To Kwa Wan breakwater. The silt curtain shall be 75m long. This curtain shall be moved along with the dredger as the work progresses. The curtain shall be arranged so that at least 15m of the curtain shall extend past the dredger in each direction. This curtain shall remain in a suitable position between the dredger and the corals until the dredger is 250m from the corals.	Proposed dredging near To Kwa Wan breakwaters	Construction period	√
Hazard to Life			
Proper general traffic management measures. • Minimisation of works activity footprint – dredging and backfilling. • Safety provision during dredging and backfilling. • Liaison with relevant Government Departments before and during construction stage. • Requirements during the submarine pipe pulling.	Construction Work Sites	Construction period	√

Environmental Protection Measures	Location	Timing	Status
Risk mitigation measures to prevent the damage of submarine pipeline during operation will be adopted. They are listed as follows: • The submarine gas pipeline will be covered by armour rock, damage from anchor drop could be prevented.	Construction Work Sites	Construction period	√
Landscape			
Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colours, to screen Works.	Construction Work Sites	Construction period	N.A.
Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).	Construction Work Sites	Construction period	N.A.
Ensure no run-off into the harbour adjacent to the site.	Construction Work Sites	Construction period	N.A.
Cultural Heritage			
A Monitoring Brief shall be conducted as set out in Appendix H2 of the EIA. This can be done in parallel with the monitoring of barge loading as set out in section 4.6.	Construction Work Sites	Construction period	√
Noise			
Construction Noise Impact from Test before Backfilling and Hydrostatic/ Commissioning Test The total maximum allowable SWL of the test before backfilling and hydrostatic/ commissioning test is ranged from 112-126 dB(A) at different location and period, the Contractor shall strictly follow the specification listed above to meet the noise criteria and closely liaise with the schools nearby before carrying out the activities. Noise mitigation measures including the use of movable noise barriers and/ or noise enclosure to block the direct line of sight to the receivers, installation of mufflers and/ or silencers on the machine(s) should be implemented if necessary.	Construction Work Sites (Landmain work)	Construction period	√
Using Quiet PME The use of quiet PME recognized by the Noise Control Authority for the purpose of CNP application can effectively reduce the noise generated from the construction plants. Quiet PME are construction plants and equipments that are notably quieter, more environmental friendly and efficiently. The noise level reduction ranges from 5 – 10 dB(A) depending on the type of equipment used. The Contractor should note the required procedures involved in application of the QPME. A list of QPME recommended is list in **Table 10.11** of the EIA report.	Construction Work Sites (Along the alignment of dredging and landmain works)	Construction period	√
Using Movable Noise Barriers Movable noise barriers to be erected near to the construction plants would reduce the noise levels for commonly 5 – 10 dB(A) depending on the types of items of PME and materials of the barriers. It is recommended that the Contractor should screen noisy works and noise from stationary items of PME whenever practicable.	Construction Work Sites (Landmain work)	Construction period	√
Good Site Practices Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures shall be followed during construction: • The Contractor shall adopt the Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD; • The Contractor shall observe and comply with the statutory and non-statutory requirements and guidelines; • Before commencing any work, the Contractor shall submit to the Engineer Representative for approval the method of working, equipment and noise mitigation measures intended to be used at the site; • The Contractor shall devise and execute working methods to minimise the noise impact on the surrounding sensitive uses, and provide experienced personnel with suitable training to ensure that those methods are implemented; • Unused equipment shall be turned off. Number of operating PME shall be kept to a minimum and the parallel use of noisy	Construction Work Sites (Along the alignment of dredging and landmain works)	Construction period	√

Environmental Protection Measures	Location	Timing	Status
equipment / machinery shall be avoided; • Regular maintenance of all plant and equipment; and • Material stockpiles and other structures shall be effectively utilised as noise barriers, where practicable.			
Construction Dust			
Mitigation Measures for Fugitive Dust To mitigate fugitive dust impact, all dust control measures recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, shall be implemented. Relevant dust control measures include: • The works area for site clearance shall be sprayed with water before, during and after the operation so as to maintain the entire surface wet; • Restricting heights from which materials are to be dropped, as far as practicable to minimise the fugitive dust arising from unloading/ loading; • Immediately before leaving a construction site, all vehicles shall be washed to remove any dusty materials from the bodies and wheels. However, all spraying of materials and surfaces should avoid excessive water usage; • Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle; • Any stockpile of dusty materials shall be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 4 sides; and • All dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.	Construction Work Sites (General)	Construction period	√

Remark:

√ Compliance of Mitigation Measures
<> Compliance of Mitigation but need improvement
x Non-compliance of Mitigation Measures
Δ Deficiency of Mitigation Measures but rectified by the Contractor
NA Not Applicable

Annex G

Calibration Reports for Monitoring Equipments

Annex G Water Quality Monitoring Equipment

Equipment	Model	Last Calibration Date	Next Calibration Date
Salinity, DO, Temperature Measuring Meter	YSI Pro 2030	25 May 2012	24 August 2012
Turbidity Meter	HACH Model 2100P Turbidimeter	13 July 2012	12 October 2012

Annex G Noise Monitoring Equipments

Monitoring Station ID	Monitoring Equipment	Model & Serial No.	Last Calibration Date	Next Calibration Date
FSQ and SCH02	Calibrator	Rion NC-73 (S/N 10997142)	9 July 2012	9 July 2013
	Sound Level Meter	Rion NL-31 (S/00410224)	15 June 2012	15 June 2013

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Form E/CE/R/12 Issue 7 (1/2) [09/09]

Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No.	:	ET/EW/008/005	Manufacturer	:	YSI
Model No.	:	Pro 2030	Serial No.	:	12A 100353
Date of Calibration	:	25/05/12	Calibration Due Date	:	24/08/12

Temperature Verification

Ref. No. of Reference Thermometer : ET/0521/001

Ref. No. of Water Bath : ---

	Temperature (°C)			
Reference Thermometer reading	Measured	20.1	Corrected	19.7
DO Meter reading	Measured	19.6	Difference	0.1

Standardization of sodium thiosulphate ($Na_2S_2O_3$) solution

Reagent No. of $Na_2S_2O_3$ titrant	CPE/012/4.5/001/5	Reagent No. of 0.025N $K_2Cr_2O_7$	CPE/012/4.4/001/10

	Trial 1	Trial 2
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	0.00
Final Vol. of $Na_2S_2O_3$ (ml)	39.80	40.00
Vol. of $Na_2S_2O_3$ used (ml)	39.80	40.00
Normality of $Na_2S_2O_3$ solution (N)	0.02513	0.02500
Average Normality (N) of $Na_2S_2O_3$ solution (N)	0.02507	
Acceptance criteria, Deviation	Less than ± 0.001N	

Calculation: Normality of $Na_2S_2O_3$, N = 1 / ml $Na_2S_2O_3$ used

Lineality Checking

Determination of dissolved oxygen content by Winkler Titration *

Purging Time (min)	2		5		10	
Trial	1	2	1	2	1	2
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	10.60	21.10	0.00	8.10	13.00
Final Vol. of $Na_2S_2O_3$ (ml)	10.60	21.10	29.50	8.10	13.00	17.50
Vol. (V) of $Na_2S_2O_3$ used (ml)	10.60	10.50	8.40	8.10	4.90	4.50
Dissolved Oxygen (DO), mg/L	7.13	7.07	5.65	5.45	3.30	3.03
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	7.20	7.16	7.18	7.13	7.07	7.10	1.12
5	5.58	5.50	5.54	5.65	5.45	5.55	0.18
10	3.17	3.07	3.12	3.30	3.03	3.17	1.59
Linear regression coefficient				0.99990			

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/012/4.7/001/23	Reagent No. of NaCl (30ppt)	CPE/012/4.8/001/23

Determination of dissolved oxygen content by Winkler Titration **

Salinity (ppt)	10		30	
Trial	1	2	1	2
Initial Vol. of $Na_2S_2O_3$ (ml)	0.00	11.70	23.10	33.80
Final Vol. of $Na_2S_2O_3$ (ml)	11.70	23.10	33.80	44.40
Vol. (**V**) of $Na_2S_2O_3$ used (ml)	11.70	11.40	10.70	10.60
Dissolved Oxygen (**DO**), mg/L	7.87	7.67	7.20	7.13
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = **V** x **N** x 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	7.9	7.84	7.87	7.87	7.67	7.77	1.28
30	7.09	7.07	7.08	7.20	7.13	7.17	1.26

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 : L de Lam

Approved by :

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

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 :	25/05/2012	Due Date :	24/08/2012

Ref. No. of Salinity Standard used (30ppt)	S/001/3

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30.0	30.0	0.0

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 : Ada Lam

Approved by :

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Performance Check of Turbidimeter

Equipment Ref. No. : ET/0505/007 Manufacturer : HACH

Model No. : 2100P Serial No. : 08060 C 030281

Date of Calibration : 13/04/2012 Due Date : 12/07/2012

Gelex Vial Std	Theoretical Value (NTU)	Measured Value (NTU)	Difference %
0-10 NTU	5.34	5.24	1.87
10-100 NTU	52.5	53.0	0.95
100-1000 NTU	543	536	1.29

Acceptance Criteria

Difference : <5 %

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 : Ade Lam Approved by :

東業德勤測試顧問有限公司
ETS-TESTCONSULT LIMITED

Performance Check of Turbidimeter

Equipment Ref. No. : ET/0505/007 Manufacturer : HACH

Model No. : 2100P Serial No. : 08060 C 030281

Date of Calibration : 13/07/2012 Due Date : 12/10/2012

Gelex Vial Std	Theoretical Value (NTU)	Measured Value (NTU)	Difference %
0-10 NTU	5.36	5.25	2.07
10-100 NTU	52.8	53.1	0.57
100-1000 NTU	546	537	1.66

Acceptance Criteria

Difference : <5 %

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 : _____

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

Certificate No. : C113972

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Calibrator

Manufacturer : Rion

Model No. : NC-73

Serial No. : 10786708

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C113972.

The equipment is supplied by

Co. Name : Envirotech Services Co.

Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

Date of Issue : 18 July 2011

Certified by : H C Chan

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

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

Report No. : C113972

Calibration Report

ITEM TESTED

DESCRIPTION : Sound Level Calibrator
MANUFACTURER : Rion
MODEL NO. : NC-73
SERIAL NO. : 10786708

TEST CONDITIONS

AMBIENT TEMPERATURE : (23 ± 2)°C RELATIVE HUMIDITY : (55 ± 20)%
LINE VOLTAGE : ---

TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 16 July 2011 ***JOB NO.*** : IC11-1746

TEST RESULTS

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested by : *K C Lee* *Date : 18 July 2011*

Calibration and Testing Laboratory of Sun Creation Engineering Limited
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Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Report No. : C113972

Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
TST150A	Measuring Amplifier	C101008
CL130	Universal Counter	C113350
CL281	Multifunction Acoustic Calibrator	C1006860

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.9	± 0.5	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.991	1 kHz ± 2 %	± 1

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

Note :
The values given in this Calibration Report 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C124011
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-1674)

Description / 儀器名稱	:	Sound Level Calibrator
Manufacturer / 製造商	:	Rion
Model No. / 型號	:	NC-73
Serial No. / 編號	:	10997142
Supplied By / 委託者	:	Envirotech Services Co. Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 9 July 2012

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By 測試 : K. Yeung
L K Yeung

Certified By 核證 : K C Lee

Date of Issue 簽發日期 : 10 July 2012

Certificate of Calibration
校正證書

Certificate No. : C124011
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

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

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.5	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.990	1 kHz ± 2 %	± 1

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

Note :
The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
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輝創工程有限公司 – 校正及檢測實驗所
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輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C123580
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-1472)

Description / 儀器名稱	:	Sound Level Meter
Manufacturer / 製造商	:	Rion
Model No. / 型號	:	NL-31
Serial No. / 編號	:	00410224
Supplied By / 委託者	:	Envirotech Services Co. Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 15 June 2012

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Precision Measurement Ltd., UK
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By 測試 : L K Yeung

Certified By 核證 : K C Lee

Date of Issue 簽發日期 : 15 June 2012

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 E-mail 電郵: callab@suncreation.com Website 網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C123580
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C120016
CL281	Multifunction Acoustic Calibrator	DC110233

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	93.7	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 120	L_A	A	Fast	94.00	1	93.7 (Ref.)
				104.00		103.7
				114.00		113.7

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

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	93.7	Ref.
			Slow			93.6	± 0.3

Certificate of Calibration
校正證書

Certificate No. : C123580
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_A	A	Fast	94.00	63 Hz	67.3	-26.2 ± 1.5
					125 Hz	77.4	-16.1 ± 1.5
					250 Hz	85.0	-8.6 ± 1.4
					500 Hz	90.4	-3.2 ± 1.4
					1 kHz	93.7	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.7	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_C	C	Fast	94.00	63 Hz	92.8	-0.8 ± 1.5
					125 Hz	93.5	-0.2 ± 1.5
					250 Hz	93.7	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.7	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.1	-0.8 ± 1.6
					8 kHz	90.8	-3.0 (+2.1 ; -3.1)
					12.5 kHz	88.0	-6.2 (+3.0 ; -6.0)

Remarks : - Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.35 dB
  250 Hz - 500 Hz : ± 0.30 dB
  1 kHz : ± 0.20 dB
  2 kHz - 4 kHz : ± 0.35 dB
  8 kHz : ± 0.45 dB
  12.5 kHz : ± 0.70 dB
  104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
  114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)

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

Note :
The values given in this 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Annex H

QA/QC Results for Suspended Solids Testing

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 @
26-06-2012	94.3	FC1S-1	0.00	FWM2S-2	100
	99.6	FWM2M-1	0.00	FWM5M-2	98.0
	95.6	FWM5B-1	8.00	FC4B-2	103.8
	94.6	EC1S-1	0.00	EWM2S-2	106.4
	100.8	EWM2M-1	0.00	EWM5M-2	96.1
	103.9	EWM5B-1	8.00	EC4B-2	96.2

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 MD

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 @
28-06-2012	92.3	FC1S-1	6.90	FWM2S-2	95.8
	95.7	FWM2M-1	0.00	FWM5M-2	104.3
	106.9	FWM5B-1	0.00	FC4B-2	98.1
	95.1	EC1S-1	0.00	EWM2S-2	108.0
	103.1	EWM2M-1	6.90	EWM5M-2	108.3
	93.9	EWM5B-1	0.00	EC4B-2	104.1

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 MD

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 @
30-06-2012	94.9	FC1S-1	6.90	FWM2S-2	101.9
	103.6	FWM2M-1	0.00	FWM5M-2	100.0
	106.5	FWM5B-1	0.00	FC4B-2	108.0
	99	EC1S-1	0.00	EWM2S-2	108.0
	99.2	EWM2M-1	6.06	EWM5M-2	104.1
	97.5	EWM5B-1	0.00	EC4B-2	97.9

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 MD

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 @
03-07-2012	95.9	FC1S-1	0.00	FWM2S-2	107.5
	99.4	FWM2M-1	0.00	FWM5M-2	108.3
	95.9	FWM5B-1	8.00	FC4B-2	106.1
	103.4	EC1S-1	0.00	EWM2S-2	102.1
	97.8	EWM2M-1	0.00	EWM5M-2	94.3
	98.2	EWM5B-1	8.00	EC4B-2	103.9

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 MD

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 @
05-07-2012	94.8	FC1S-1	8.00	FWM2S-2	91.8
	102.2	FWM2M-1	0.00	FWM5M-2	98.0
	107.4	FWM5B-1	6.90	FC4B-2	101.9
	100.4	EC1S-1	0.00	EWM2S-2	98.0
	98.4	EWM2M-1	0.00	EWM5M-2	98.0
	97.6	EWM5B-1	0.00	EC4B-2	98.0

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%.

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 @
07-07-2012	102.7	FC1S-1	6.90	FWM2S-2	98.1
	92.5	FWM2M-1	0.00	FWM5M-2	96.2
	103.5	FWM5B-1	0.00	FC4B-2	107.8
	99.0	EC1S-1	6.90	EWM2S-2	104.2
	104.2	EWM2M-1	6.45	EWM5M-2	105.8
	105.0	EWM5B-1	0.00	EC4B-2	98.0

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%.

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 @
10-07-2012	106.3	FC1S-1	0.00	FWM2S-2	104.3
	93	FWM2M-1	0.00	FWM5M-2	93.8
	96.3	FWM5B-1	8.70	FC4B-2	95.8
	97.9	EC1S-1	0.00	EWM2S-2	96.1
	103.5	EWM2M-1	0.00	EWM5M-2	100.0
	104.0	EWM5B-1	8.70	EC4B-2	98.0

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%.

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 @
12-07-2012	107.7	FC1S-1	0.00	FWM2S-2	95.7
	102.0	FWM2M-1	0.00	FWM5M-2	105.8
	99.6	FWM5B-1	8.70	FC4B-2	95.8
	105.4	EC1S-1	0.00	EWM2S-2	100.0
	94.0	EWM2M-1	0.00	EWM5M-2	106.0
	103.8	EWM5B-1	8.70	EC4B-2	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%.

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 @
14-07-2012	97.4	FC1S-1	0.00	FWM2S-2	93.9
	96.6	FWM2M-1	0.00	FWM5M-2	105.7
	96.8	FWM5B-1	8.00	FC4B-2	95.9
	101	EC1S-1	0.00	EWM2S-2	101.9
	107.4	EWM2M-1	0.00	EWM5M-2	96.2
	99.8	EWM5B-1	0.00	EC4B-2	102.0

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 MD

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 @
17-07-2012	103.3	FC1S-1	0.0	FWM2S-2	93.9
	98.2	FWM2M-1	8.70	FWM5M-2	98.0
	94.8	FWM5B-1	0.0	FC4B-2	100.0
	99.2	EC1S-1	8.70	EWM2S-2	99.2
	99.8	EWM2M-1	0.0	EWM5M-2	99.8
	95.9	EWM5B-1	0.0	EC4B-2	95.9

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 MD

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 @
19-07-2012	92.8	FC1S-1	0.0	FWM2S-2	105.8
	95.7	FWM2M-1	0.00	FWM5M-2	105.7
	107.5	FWM5B-1	0.0	FC4B-2	100.0
	96.0	EC1S-1	8.70	EWM2S-2	106.2
	99.0	EWM2M-1	0.0	EWM5M-2	92.3
	93.9	EWM5B-1	8.7	EC4B-2	102.0

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 MD

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 @
21-07-2012	107.2	FC1S-1	0.00	FWM2S-2	103.8
	96.3	FWM2M-1	0.00	FWM5M-2	93.9
	107.5	FWM5B-1	8.70	FC4B-2	106.1
	98.6	EC1S-1	0.00	EWM2S-2	102.0
	93.7	EWM2M-1	0.00	EWM5M-2	100.0
	107.5	EWM5B-1	8.70	EC4B-2	96.2

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 MD

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 @
26-07-2012	102.5	FC1S-1	7.41	FWM2S-2	98.0
	97.8	FWM2M-1	0.00	FWM5M-2	98.0
	95.2	FWM5B-1	0.00	FC4B-2	100.0
	100.2	EC1S-1	7.41	EWM2S-2	104.1
	102.3	EWM2M-1	0.00	EWM5M-2	102.0
	104.2	EWM5B-1	0.00	EC4B-2	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 MD

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 @
28-07-2012	92.8	FC1S-1	0.00	FWM2S-2	98.0
	103.1	FWM2M-1	0.00	FWM5M-2	102.0
	104.1	FWM5B-1	0.00	FC4B-2	102.0
	96.4	EC1S-1	8.70	EWM2S-2	94.1
	94.4	EWM2M-1	0.00	EWM5M-2	101.9
	107.0	EWM5B-1	8.70	EC4B-2	105.7

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 MD

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 @
31-07-2012	106.2	FC1S-1	8.00	FWM2S-2	97.9
	105.3	FWM2M-1	0.00	FWM5M-2	96.2
	103.3	FWM5B-1	8.00	FC4B-2	107.7
	98.4	EC1S-1	0.00	EWM2S-2	102.1
	100.6	EWM2M-1	0.00	EWM5M-2	107.7
	100.8	EWM5B-1	6.90	EC4B-2	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 MD

Annex I

Waste Flow Table

The installation of submarine gas pipelines and associated facilities from To Kwa Wan to North Point for former Kai Tak Airport

Monthly Summary Waste Flow Table for 2012 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly (see Note 1)						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete (see Note 2)	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Stockpiling	General refuse	Vegetation / Rubbish	Disposal at Landfill	Chemical Waste Recycling (see Note 3)	Recycling of vegetation
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in'000kg / '000L)	(in '000kg)
Jan	-	-	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-
Apr	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	858.93	858.93	150	0	8.93	700	0	0	0	0	0
July	398.16	398.16	150	0	98.16	150	0	0	0	0	0
Sub-total	**1257.09**	**1257.09**	**300**	**0**	**107.09**	**850**	**0**	**0**	**0**	**0**	**0**
Aug											
Sept											
Oct											
Nov											
Dec											
Total	**1257.09**	**1257.09**	**300**	**0**	**107.09**	**850**	**0**	**0**	**0**	**0**	**0**

Notes: (1) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m^3 by volume.
(2) Broken concrete for recycling into aggregates.
(3) For chemical waste, the actual quantities of empty paint cans will be in kilogram (kg) and spent lubrication oil will be in litre (L).

Annex J

Cumulative Complaint and Summons/Prosecutions Log

Annex J *Cumulative Complaint and Summons/Prosecutions Log*

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
June 2012	0	0
July 2012	0	0
Overall Total	0	0