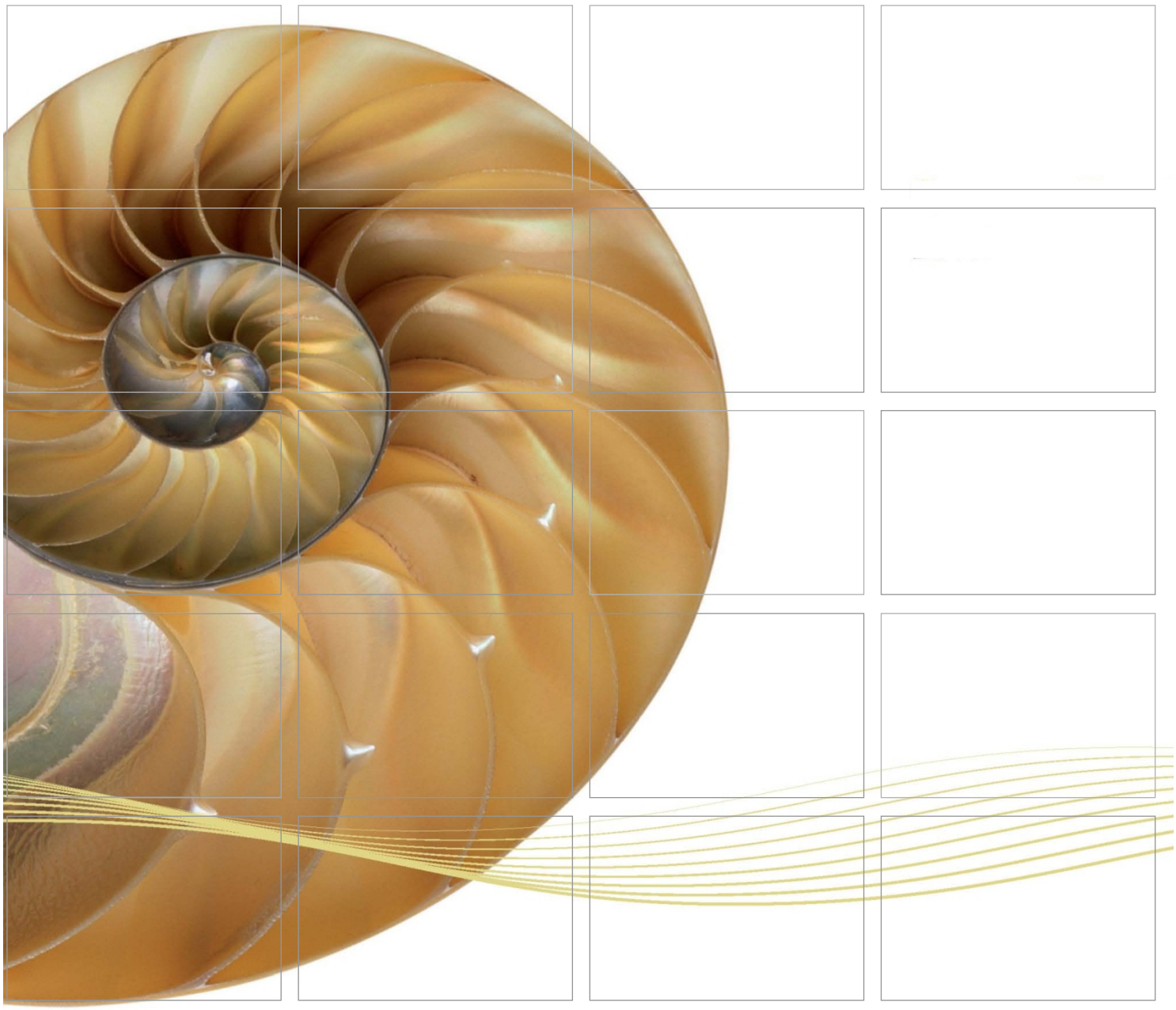
REPORT



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

Final Environmental Monitoring & Audit (EM&A) Review Report

16 October 2014

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Final Environmental Monitoring & Audit (EM&A) Review Report

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Summary:	Date: 16 October 2014
This document presents the Final Environmental Monitoring and Audit (EM&A) Review Report for the Installation of Submarine Gas Pipelines and Associated Facilities from To Kwa Wan to North Point for Former Kai Tak Airport Development.	Approved by:  *Mr Craig Reid* *Partner*

Revision	Description	By	Checked	Approved	Date
v1	Final EM&A Review Report	RC	JT	CAR	16/10/14
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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:	Final Environmental Monitoring & Audit (EM&A) Review Report
Date of Report: 15/10/2014	
Date prepared by ET: 15/10/2014	
Date received by IEC: 15/10/2014	

Reference EM&A Manual Requirement

EM&A Manual Requirement:	Section 12.4 iv
Content:	*Final EM&A Review Report*
12.4	"The Final EM&A Report should contain at least the following information: ……".

ET Certification

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

Ms Winnie Ko,
Environmental Team Leader: 

Date: 15/10/2014

IEC Verification

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

Dr Anne Kerr,
Independent Environmental Checker: 

Date: 17/10/2014

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 Final Environmental Monitoring and Audit (EM&A) Review Report presenting the EM&A works carried out during the construction period from 13 June 2012 to 31 August 2014 in accordance with the *EM&A Manual* of the Project (1).

Weekly site inspections were conducted by representatives of the Contractor and the Environmental Team (ET) from June 2012 to August 2014 in a weekly basis. Joint site inspections were conducted by the Contractor, the ET, the Resident Engineer (RE) and the Independent Environmental Checker (IEC) monthly from June 2012 to August 2014.

Environmental monitoring activities on marine water quality, marine ecology and air-borne noise have been undertaken in accordance with the requirements of the EM&A programme.

Baseline water quality monitoring was conducted between 3 and 29 March 2012 prior to the commencement of marine works while impact and post-construction marine water quality monitoring were conducted throughout the monitoring period in accordance with the requirements described in the EM&A Manual. Exceedances of Action and Limit Levels for water quality were recorded in three hundred and seventeen (317) impact monitoring events. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of *EM&A Manual*, these exceedances were considered to be due to natural variation in water quality characteristic of Hong Kong waters and were unlikely to be due to the Project's marine works activities. Environmental performance of the Project complied with the environmental requirements and all necessary mitigation measures were properly implemented.

Baseline Coral Monitoring Surveys were undertaken on 23 May 2012 and 6 August 2012 prior to the commencement of marine works. A total of eleven (11) impact coral monitoring surveys were then conducted at four designated monitoring sites (including 3 Impact Sites and 1 Control Site) in accordance with the *EM&A Manual*. No exceedances of Action and Limit Levels were recorded for partial mortality of coral colonies. There thus did not appear to be any deterioration in the general health and condition of the tagged coral colonies as a result of the dredging activities within 250 m from the To Kwa Wan breakwaters during the entire dredging period from August to early November 2012.

(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.

Baseline noise monitoring was conducted between 13 and 28 March 2012 at a logging interval of 5 minutes for daytime and evening, holidays and night-time. 30-minute construction noise measurements were then carried out at the monitoring stations SCH02 and FSQ during normal weekdays of the project period. No exceedance of Action or Limit Level was recorded during the project period.

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of the Project were recorded throughout the project period. No environmental complaint or environmental summons was received throughout the project period.

Mitigation measures for the construction works were implemented properly in accordance with requirements stipulated in the *EIA Report, EP* and *EM&A Manual*.

The EM&A programme is considered effective in reflecting the environmental conditions at the site. The site inspection results also indicated that the Project has no unacceptable environmental impacts as predicted in the approved EIA Report and the mitigation measures were effectively implemented.

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 undertake 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 Final EM&A Review Report which summarises and reviews the monitoring results and inspection/audit findings for the EM&A programme during the construction period from **13 June 2012 to 31 August 2014**.

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, construction programme, construction works undertaken, project organisation and management structure, and the status of Environmental Permit (EP)/licences over the construction phase of the Project.

Section 3 : **EM&A Requirements**
summarises the environmental monitoring and audit 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 Environmental Impact Assessment (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 : **Monitoring Results**
summarises the monitoring results obtained during the course of the project and the findings of the weekly site inspection including solid and liquid waste management undertaken during the construction period.

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

Section 7 : **Review of EM&A Programme**
reviews the validity of EIA Report predictions, effectiveness of the mitigation measures and the success of the EM&A programme.

Section 8 : **Conclusions**

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 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 (EP) (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. The locations of the project areas and stations are presented in *Annex A*.

2.3 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.3.1 Project Organization

The EM&A programme will require the involvement of the Hong Kong and China Gas Company Limited, an Environmental Team (ET), an Independent Environmental Checker (IEC) and the Contractor. The roles and responsibilities of the various parties involved in the EM&A process have been described in the *EM&A Manual* for this Project and the organization of these parties is presented in *Annex B*.

2.3.2 Key Contact Information

Key contact information of the Project Organization is provided in *Annex B.*

2.4 CONSTRUCTION ACTIVITIES UNDERTAKEN

A summary of the major construction activities undertaken during the course of the Project is shown in *Table 2.1*. The locations of the construction activities are shown in *Annex A*. The construction programme of the Project is presented in *Annex C*. All major construction works were substantially completed in August 2014.

Table 2.1 Summary of Construction Activities Undertaken

Construction Activities Undertaken
• Site Preparation, Mobilization and Permit Application; • Trench Dredging; • Pipeline Construction; • Pipeline Testing; • Backfilling and Reinstatement; and • Final Pipeline Testing.

2.5 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-401/2010	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; Expired; new permit granted	Issued on 20 June 2012
Construction Noise Permit (Marine works)	GW-RE0976-12	Till 9 March 2013; Expired; new permit granted	Issued on 13 November 2012
Construction Noise Permit (Marine works)	GW-RE0193-13	Till 9 April 2013; Expired; new permit granted	Issued on 1 March 2013
Construction Noise Permit (Marine works)	GW-RE0313-13	Till 9 August 2013; Expired; new permit granted	Issued on 27 March 2013
Construction Noise Permit (Marine works)	GW-RE0570-13	Till 25 July 2013; Expired; new permit granted	Issued on 15 June 2013
Construction Noise Permit (Marine works)	GW-RS0761-13	Till 11 September 2013	Issued on 10 July 2013
Construction Noise Permit (Marine works)	GW-RE1014-13	Till 16 December 2013	Issued on 18 September 2013
Construction Noise Permit (Marine works)	GW-RS1115-13	Till 31 December 2013	Issued on 10 October 2013
Construction Noise Permit (Marine works)	GW-RE0069-14	Till 30 April 2014; Expired; new permit granted	Issued on 20 January 2014

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Construction Noise Permit (Marine works)	GW-RE0391-14	Till 31 October 2014	Issued on 8 April 2014
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; Expired; new permit granted	Issued on 15 May 2012
Marine Dumping Permit (Sediment Type 1, Cheung Chau South)	EP/MD/13-102	Till 17 June 2013; Expired; new permit granted	Issued on 17 December 2012
Marine Dumping Permit (Sediment Type 1, Cheung Chau South)	EP/MD/14-028	Till 25 December 2013	Issued on 26 June 2013
Marine Dumping Permit (Sediment Type 1, East Ninepin)	EP/MD/13-012	Till 30 September 2012; Expired	Issued on 29 May 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-023	Till 17 July 2012; Expired; new permit granted	Issued on 15 June 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-042	Till 17 August 2012; Expired; new permit granted	Issued on 17 July 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-054	Till 20 September 2012; Expired; new permit granted	Issued on 20 August 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-078	Till 8 November 2012; Expired; new permit granted	Issued on 8 October 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-090	Till 8 December 2012; Expired; new permit granted	Issued on 8 November 2012
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/13-136	Till 21 April 2013; Expired; new permit granted	Issued on 21 March 2013
Marine Dumping Permit (Sediment Type 2, East Sha Chau)	EP/MD/14-004	Till 31 May 2013; Expired	Issued on 30 April 2013
Marine Dumping Permit (Sediment Type 3, East Sha Chau)	EP/MD/12-127	Till 8 September 2012; Expired; new permit granted	Issued on 8 August 2012
Marine Dumping Permit (Sediment Type 3, East Sha Chau)	EP/MD/13-067	Till 24 October 2012; Expired;	Issued on 25 September 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 (^{o}C)
- 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 Impact Hypothesis

The impact null hypothesis for this work component has been defined based on the predictions from the EIA regarding impacts from the marine works activities and the objectives for the EM&A.

H_0 There is no unacceptable impact in water quality resulting from the marine works activities of the Project.

3.1.3 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/Q Turbid Meter

3.1.4 Sampling / Testing Protocol

All *in situ* monitoring instruments were checked, calibrated and certified by the analytical laboratory before use [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 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 ^{o}C without being frozen) and delivered to the analytical laboratory as soon as possible after collection.

3.1.5 Laboratory Measurement and Analysis

Analysis of SS was carried out in a HOKLAS accredited laboratory [2]. Water samples of about 1 L 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 *Monthly EM&A Reports* in accordance with requirements of HOKLAS.

3.1.6 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.

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

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

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.

3.1.7 Monitoring Locations and Frequency

Baseline water quality monitoring was conducted between 3 and 29 March 2012 prior to the commencement of marine works while impact water quality monitoring was conducted since 13 June 2012 during the marine works period at the monitoring stations listed in *Table 3.2* and shown in *Annex D1.*

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*, impact 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 interval between two sets of consecutive monitoring was not less than 36 hours.

Post-construction water quality monitoring was conducted for four weeks at the same monitoring locations and frequency as impact water quality monitoring after the substantial completion of marine construction activities on 3 July 2014.

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 water quality 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.

3.1.8 Water Quality Compliance

Water quality monitoring was 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 G1*) 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 CORAL MONITORING

3.2.1 Impact Hypothesis

The impact null hypothesis for this work component has been defined based on the predictions from the EIA regarding impacts from the marine works activities and the objectives for the EM&A.

H_0 There is no unacceptable impact in general health and condition of the tagged coral colonies resulting from the dredging activities within 250 m from the To Kwa Wan breakwaters.

3.2.2 Monitoring Locations

Coral Monitoring was 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 E*.

Baseline Coral Monitoring Survey of the Coral Monitoring Programme was conducted on 23 May 2012 which provided baseline data prior to the commencement of the concerned dredging operations within 250 m from the To Kwa Wan breakwaters. Since then, Tropical Cyclones Doksuri and Vincente hit Hong Kong resulting in the hoisting of No. 8 Gale Signal on 30 June and Tropical Cyclone Warning Signal No. 10 on 24 July 2012, respectively. As such, an Updated Baseline Coral Monitoring Survey was undertaken on 6 August 2012 to ensure that the tagged corals were still intact before commencement of the concerned dredging operations and to provide updated baseline data for the Coral Monitoring Programme. The Impact Coral Monitoring Survey was undertaken weekly from 13 August 2012 to 16 November 2012 when dredging operations were being conducted within 250 m from the To Kwa Wan breakwaters. The start and end coordinates of each monitoring site was recorded using a portable GPS unit. Shoreline features for the start and end points of each monitoring sites was also noted to aid the re-location of the points for subsequent coral monitoring surveys (ie 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

3.2.3 Monitoring Methodology

The Impact Coral Monitoring was 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 and Updated Baseline Coral

Monitoring Survey was undertaken on 6 August 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 were 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 were also 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 were 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 be identified, appropriate remedial action can be implemented to reduce such impacts.

3.2.4 Action and Limit Levels

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

(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.

Table 3.5 Determination of Action and Limit Level for Partial Mortality of the Tagged Coral Colonies

Parameter	Action Level
Partial Mortality	If during Impact Monitoring, a 15% increase in the percentage of partial mortality of corals occurs at more than 20% of the tagged coral colonies at either of the Impact Monitoring Stations (ie Areas 1, 2 and 3) that is not recorded at the Control Station (ie Area 4).
	Limit Level
	If during Impact Monitoring, a 25% increase in the percentage of partial mortality at more than 20% of any tagged coral colonies occurs that is not recorded at the Control Station (ie Area 4).

3.2.5 Event and Action Plan

In the event that the levels are exceeded, appropriate actions in Event and Action Plan (*Annex G2*) 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 Impact Hypothesis

The impact null hypothesis for this work component has been defined based on the predictions from the EIA regarding impacts from the construction activities and the objectives for the EM&A.

H_0 There is no unacceptable impact in noise levels resulting from the project works.

3.3.2 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 3.6* and is shown in *Annexes F1 and F2*.

Table 3.6 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

3.3.3 Monitoring Parameter and Frequency

Baseline noise monitoring was conducted between 13 and 28 March 2012 at a logging interval of 5 minutes for daytime and evening, holidays and night-time. Fourteen (14) days of sampling was carried out at both SCH02 and FSQ monitoring station.

Weekly construction noise monitoring was conducted in accordance with the requirements stipulated in the *EM&A Manual*. A total of one hundred and

sixteen (116) sets of noise monitoring were carried out throughout the impact monitoring period.

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

3.3.4 Action and Limit Levels

The Action and Limit levels for noise monitoring during different monitoring periods are summarised in *Table 3.7*.

Table 3.7 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.

3.3.5 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 3.8*, complies with IEC 651: 1979 and 804:1985 (Type 1) specification. The calibration certificates of the sound level meters and calibrator were shown in *Monthly EM&A Reports.*

Table 3.8 Noise Monitoring Equipment

Monitoring Station	Monitoring Equipment (Sound Level Meter and Calibrator)
SCH02	Rion NL-18, NL-31, NL-52, NC-73
FSQ	Rion NL-31, NL-52, NC-73

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.

3.3.6 Event and Action Plan

The Event and Action Plan (EAP) for noise monitoring is presented in *Annex G3*.

4 IMPLEMENTATION STATUS ON ENVIRONMENTAL MITIGATION MEASURES

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

5 MONITORING RESULTS

5.1 SITE INSPECTIONS & AUDITS

Weekly site inspections were conducted by representatives of the Contractor and the ET from June 2012 to August 2014 in a weekly basis. In addition, monthly joint site inspections were conducted by the Contractor, the ET, the Resident Engineer (RE) and the IEC from June 2012 to August 2014.

Major observations of the site inspections have been reported in the twenty-seven (27) Monthly EM&A Reports. 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.

5.2 MARINE WATER QUALITY MONITORING

In accordance with the requirements described in the EM&A Manual, baseline water quality monitoring has been conducted between 3 and 29 March 2012 at 10 designated monitoring stations (including 6 Sensitive Receiver Stations and 4 Control Stations) before the commencement of marine works to determine the Action and Limit Levels (*Table 3.3*). Impact marine water quality monitoring was then conducted since 13 June 2012 during periods when marine works were scheduled to be undertaken (ie impact monitoring) and for four weeks after substantial completion of marine construction works on 3 July 2014 (ie post-construction monitoring). Impact monitoring was undertaken until 3 July 2014 for marine works while post-construction monitoring was undertaken three times a week for four weeks from 5 to 31 July 2014. During the baseline monitoring period, no major activities influencing water quality were observed in the vicinity of the Project's marine works area. During the period of impact and post-project monitoring, weather condition was generally fine except for the following occasions summarised in *Table 5.1* below:

Table 5.1 Adverse Weather Conditions throughout the Monitoring Period

Date	Weather Conditions	Remarks
24/7/2012	Typhoon Signal No. 10 was hoisted during mid-night which was then changed to Typhoon Signal No. 8 and eventually became Signal No. 3 in the morning at around 10:00.	Monitoring event was cancelled for both mid-flood and mid-ebb tides.
16/8/2012	Tropical Signal No. 3 was hoisted in the afternoon (13:40) which was then changed to Typhoon Signal No. 8 at night (22:15).	Monitoring event was cancelled for mid-flood tide.
1/8/2013	Typhoon Signal No. 3 was hoisted.	Monitoring event was cancelled for mid-flood tide.

Date	Weather Conditions	Remarks
13/8/2013	Typhoon Signal No. 3 was hoisted.	Monitoring event was cancelled for both mid-flood and mid-ebb tides.
23/9/2013	Typhoon Signal No. 8 was hoisted.	Monitoring event was cancelled for mid-flood tide.

Monitoring results are presented graphically in *Annex D2 – D6* 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.

Mean DO levels from surface, mid-depth and bottom waters of Impact Stations were significantly lower than those recorded in Baseline Water Quality Monitoring in March 2012 ($p < 0.005$). Mean DO levels from surface, mid-depth and bottom waters of Control Stations were also significantly lower than those recorded in Baseline Water Quality Monitoring in March 2012 ($p < 0.005$). When comparing mean DO levels from surface, mid-depth and bottom waters between Impact Stations and Control Stations, no significant difference was found ($p > 0.05$). Therefore, it is considered that the significantly lower DO levels recorded throughout the monitoring period (ie compared to the baseline levels) are more likely to be representing natural background fluctuation in water quality rather than indicating any unacceptable water quality impacts from the Project since the lower DO levels were recorded at the Impact Stations as well as the Control Stations, which are far away from the marine works locations that should not be affected by the marine works.

Similar to DO levels, turbidity and SS levels were generally similar amongst 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.

Mean turbidity and SS levels of Impact Stations were significantly higher than those recorded in Baseline Water Quality Monitoring in March 2012 ($p < 0.001$). Mean turbidity and SS levels of Control Stations were also significantly higher than those recorded in Baseline Water Quality Monitoring in March 2012 ($p < 0.001$).

Comparison of mean depth-averaged turbidity and SS levels indicated that Control Stations had higher levels of turbidity and SS than Impact Stations ($p < 0.01$). Therefore, it is considered that the Project did not pose any unacceptable water quality impacts in the vicinity of the area.

A total of three hundred and seventeen (317) exceedances were recorded throughout the impact monitoring period. 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 unacceptable water quality impacts from the Project since exceedances were recorded when marine works were not being undertaken for the Project. In addition, 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 Project area.

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.

Mitigation measures for marine works were implemented properly in accordance with requirements stipulated in the *EIA Report, EP* and *EM&A Manual*. 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 marine works activities.

5.3 CORAL MONITORING

An updated baseline coral monitoring survey was conducted on 6 August 2012 and followed by eleven (11) Impact Coral Monitoring Surveys from 13 August 2012 to 16 November 2012, during which dredging operations were undertaken within 250 m from the To Kwa Wan breakwaters. The monitoring was undertaken at four designated monitoring sites (including 3 Impact Sites and 1 Control Site) in accordance with the *EM&A Manual*. During the monitoring, 10 tagged coral colonies were re-visited and monitored at each site. The conditions of the tagged coral colonies during the Impact Coral Monitoring Surveys were compared with the baseline conditions which were recorded prior to the commencement of the concerned dredging operations within 250 m from the breakwaters.

Photographic records of the tagged coral colonies during the Baseline (ie including the Baseline and Update Baseline Surveys) and the Final (11th) Impact Coral Monitoring Surveys are shown in *Annex E2*. No exceedances of the Action and Limit Levels were identified throughout the monitoring period. There thus did not appear to be any deterioration in the general health and condition of the tagged coral colonies as a result of the dredging activities within 250 m from the To Kwa Wan breakwaters during the entire dredging period from August to early November 2012.

5.4 AIR-BORNE NOISE MONITORING

Baseline noise monitoring was conducted between 13 and 28 March 2012 at a logging interval of 5 minutes for daytime and evening, holidays and night-time. The baseline noise monitoring results during normal weekdays working hours are presented in *Annex F3 – F4*.

30-minute construction noise measurements were carried out weekly from June 2012 to August 2014 at monitoring stations FSQ and SCH02 during normal working hours in weekdays. The impact monitoring results are presented in *Annex F5 – F6*. No exceedances of Action and Limit Levels for noise monitoring during normal working hours were recorded. 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, respectively.

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, Type 2 and Type 3 disposal methods were generated during the course of the Project. Reference has been made to the Monthly Summary Waste Flow Table prepared by the Contractor (*Annex I*).

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, Type 2 and Type 3 disposal were disposed of at the open sea floor disposal area of South Cheung Chau or East Ninepin (for Type 1) and at East Sha Chau Contaminated Mud Pits (for Types 2 and 3).

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 project period.

6.2 SUMMARY OF ENVIRONMENTAL COMPLAINT

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

Mitigation measures for marine works were implemented properly in accordance with requirements stipulated in the *EIA Report, EP* and *EM&A Manual*.

The EM&A programme is considered effective in reflecting the environmental conditions at the site. The site inspection results also indicated that the Project has no unacceptable environmental impacts and the mitigation measures were effectively implemented.

8 CONCLUSIONS

This Final EM&A Review Report presents the EM&A programme undertaken during the project period from 13 June 2012 to 31 August 2014 in accordance with *EM&A Manual* and requirements of the EP (EP-401/2010).

Baseline water quality monitoring was conducted between 3 and 29 March 2012 prior to the commencement of marine works while impact and post-construction marine water quality monitoring were conducted throughout the monitoring period in accordance with the requirements described in the *EM&A Manual*. Exceedances of Action and Limit Levels for water quality were recorded in three hundred and seventeen (317) impact monitoring events. It is considered that the exceedances were sporadic events and represented natural background fluctuation in water quality.

Baseline Coral Monitoring Surveys were undertaken on 23 May 2012 and 6 August 2012 prior to the commencement of marine works. A total of eleven (11) impact coral monitoring surveys were then conducted at four designated monitoring sites (including 3 Impact Sites and 1 Control Site) in accordance with the *EM&A Manual*. No exceedances of Action and Limit Levels were recorded for partial mortality of coral colonies. There thus did not appear to be any deterioration in the general health and condition of the tagged coral colonies as a result of the dredging activities within 250 m from the To Kwa Wan breakwaters during the entire dredging period from August to early November 2012.

Baseline noise monitoring was conducted between 13 and 28 March 2012 at a logging interval of 5 minutes for daytime and evening, holidays and night-time. 30-minute construction noise measurements were then carried out at the monitoring stations SCH02 and FSQ during normal weekdays of the project period. No exceedance of Action or Limit Level was recorded during the project period.

Weekly site inspections were conducted by representatives of the Contractor and the ET from June 2012 to August 2014 in a weekly basis. In addition, joint site inspections were conducted by the Contractor, the ET, the Resident Engineer (RE) and the IEC monthly from June 2012 to August 2014. 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.

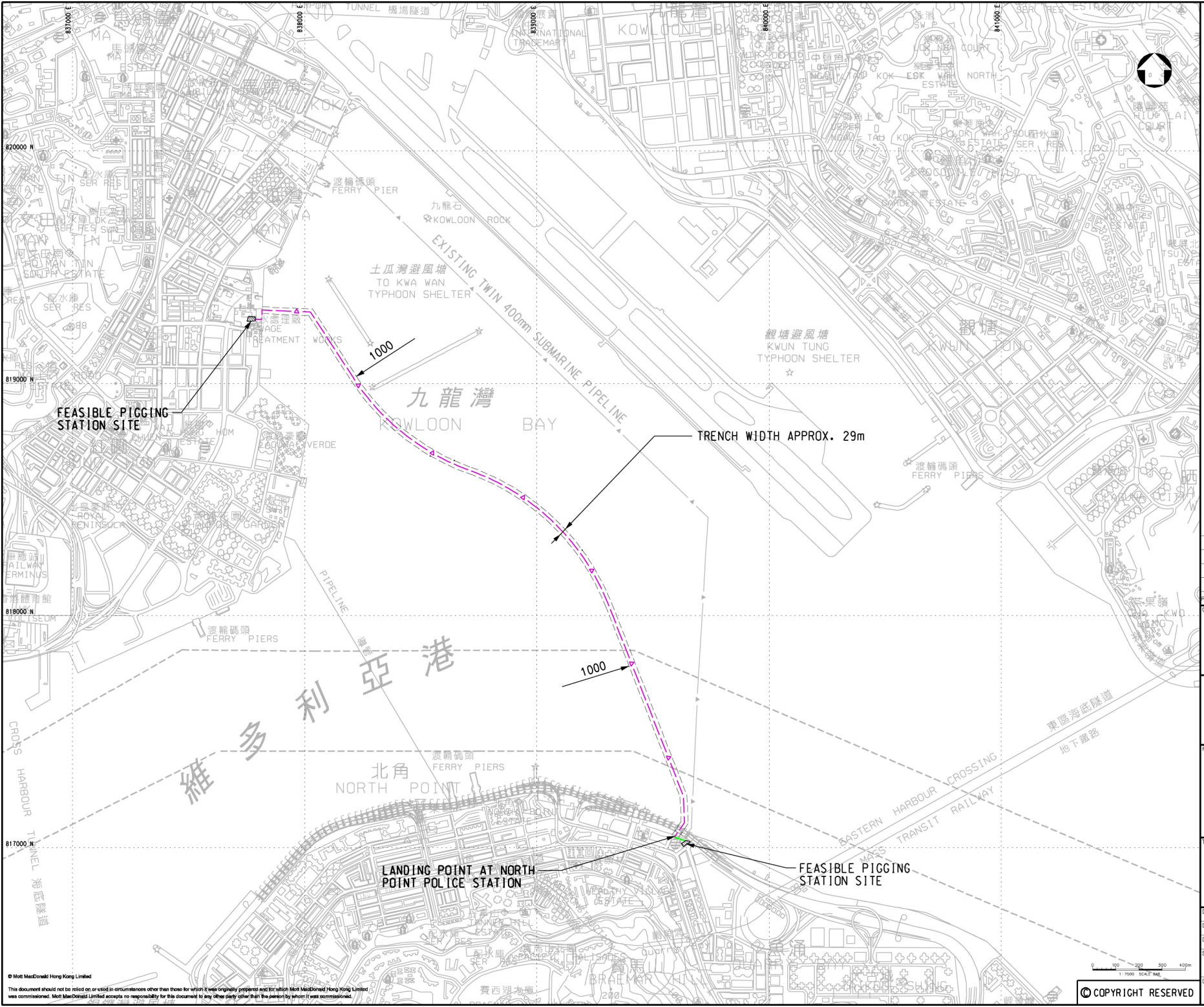
No non-compliance event was recorded throughout the project period. No complaint and summons/prosecution was received throughout the project period.

Mitigation measures for marine works were implemented properly in accordance with requirements stipulated in the *EIA Report, EP* and *EM&A Manual*.

The EM&A programme is considered effective in reflecting the environmental conditions at the site. The site inspection results also indicated that the Project has no unacceptable environmental impacts as predicted in the approved EIA report and the mitigation measures were effectively implemented.

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

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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

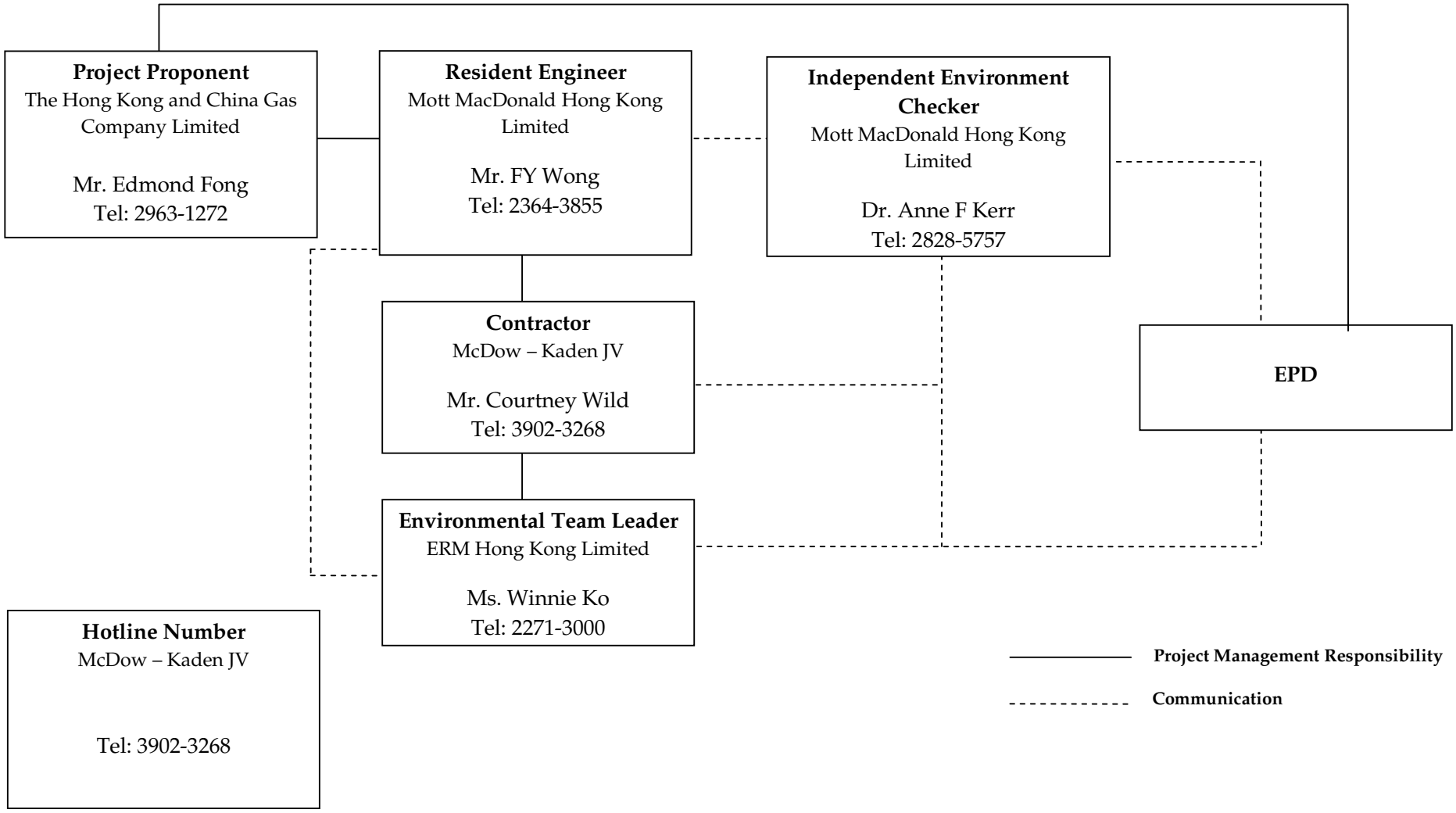
Drawing No. Annex A1

Rev P4

Annex B

Project Organization Chart and Contact Details

Annex B - Project Organization During Construction Phase (with contact details)



Annex C

Construction Programme

Project Ref. No.: GSPD/SP/TKW-NP/089/2011

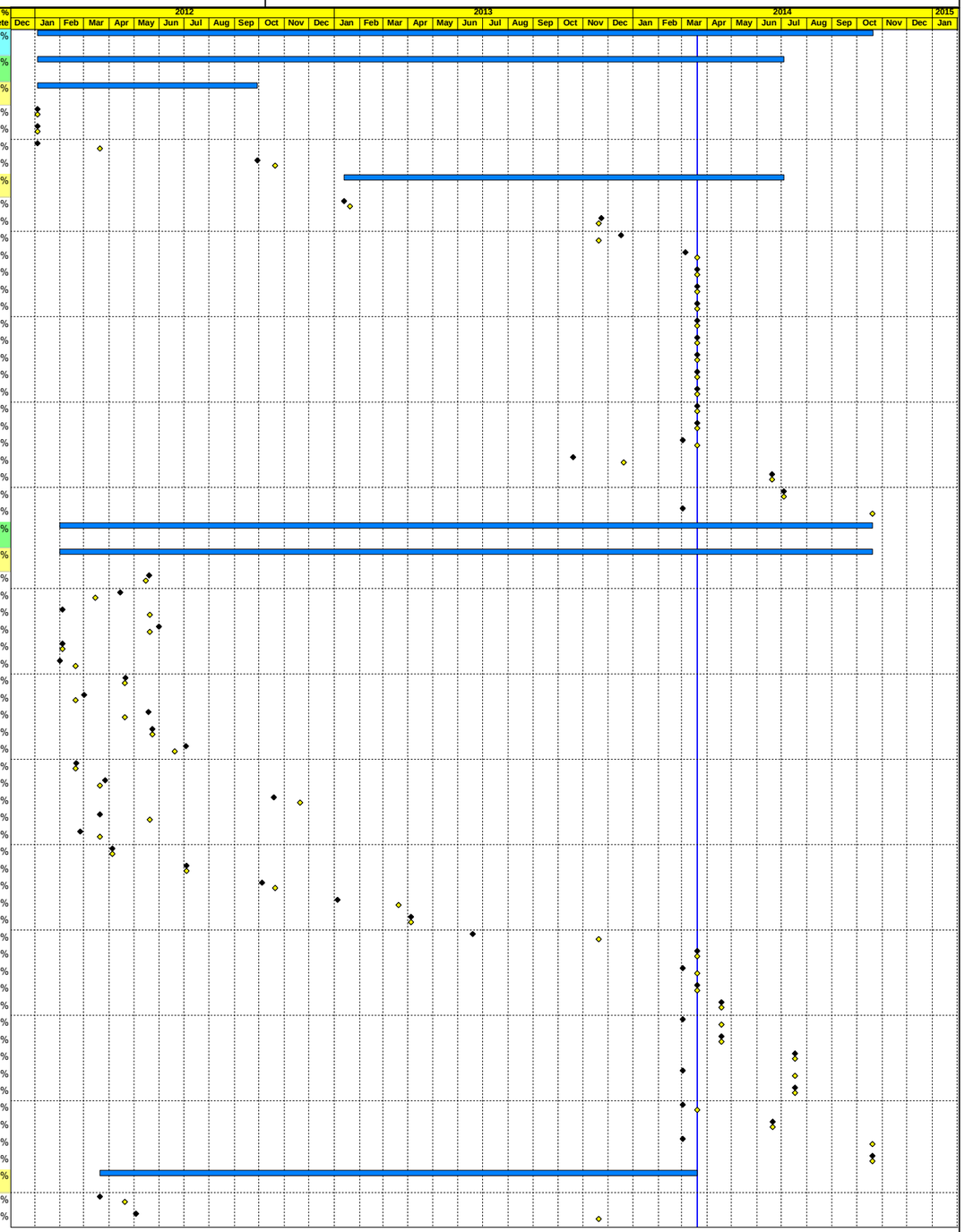
Installation of Submarine Gas Pipelines and Associated Facilities From To Kwa Wan to North Point for Former Kai Tak Airport Development

UPDATED MASTER PROGRAMME REV. 27

Progress Report as of 20 March 2014

Macdow - Kaden Joint Venture

Activity ID	Activity Name	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Duration % Complete
Towngas - Submarine and Land Gas Pipelines Project		1046	04-Jan-12 A	20-Oct-14	02-Jan-13	20-Oct-14	0	79.44%
Project Key Dates		1021	04-Jan-12 A	03-Jul-14	03-Jun-13	03-Jul-14	0	89.63%
Project Key Dates for Commencement of Works		290	04-Jan-12 A	29-Sep-12 A				100%
TG-KD-C-S-0001	Project Commencement	0	04-Jan-12 A					100%
TG-KD-C-S-0002	Possession of Portion A1, A2, C, E and F	0	04-Jan-12 A					100%
TG-KD-C-S-0003	Possession of Portion D	0	04-Jan-12 A					100%
TG-KD-C-S-0004	Arrival of Pipeline Sections by HKCG	0	29-Sep-12 A					100%
Project Key Dates for Completion of Works		639	12-Jan-13 A	03-Jul-14	03-Jun-13	03-Jul-14	0	83.42%
TG-KD-C-F-1010	Completion of Trench Dredging	0		12-Jan-13 A				100%
TG-KD-C-F-1020	Completion of Pipe Laying for Submarine Gas	0		23-Nov-13 A				100%
TG-KD-C-F-1030	Completion of Pipe Testing for Submarine Pipeline before Backfilling	0		17-Dec-13 A				100%
TG-KD-C-F-1035	Completion of All Works in Portion C and Handover of Portion C to pigging station contractor	0		06-Mar-14 A				100%
TG-KD-C-F-1040	Completion of Backfilling for Submarine Gas Pipelines	0		20-Mar-14*		03-Jun-13	-289	0%
TG-KD-C-F-1045	Completion of Reinstatement of Seawall and other Existing Features	0		20-Mar-14*		03-Jun-13	-289	0%
TG-KD-C-F-1050	Early Completion of All Works in To Kwa Wan Works Area Portion A1 if all Permits are Approved by 90 Days	0		20-Mar-14*		19-Jun-13	-273	0%
TG-KD-C-F-1070	Early Completion of All Works in North Point Works Area Portion D, E and F if all Permits are Approved by 90 Days	0		20-Mar-14*		19-Jun-13	-273	0%
TG-KD-C-F-1080	Early Completion of Submarine Gas Pipelines including Final Testing if all Permits are Approved by 90 Days	0		20-Mar-14*		19-Jun-13	-273	0%
TG-KD-C-F-1090	Early Completion of Portion C1 Land Gas Pipelines if all Permits are Approved by 90 Days	0		20-Mar-14*		19-Jun-13	-273	0%
TG-KD-C-F-1260	Late Completion of All Works in To Kwa Wan Works Area Portion A1 if all Permits are not Approved by 90 Days	0		20-Mar-14*		03-Jul-13	-259	0%
TG-KD-C-F-1280	Late Completion of All Works in North Point Works Area Portion D, E and F if all Permits are not Approved by 90 Days	0		20-Mar-14*		03-Jul-13	-259	0%
TG-KD-C-F-1300	Late Completion of Submarine Gas Pipelines including Final Testing if all Permits are not Approved by 90 Days	0		20-Mar-14*		03-Jul-13	-259	0%
TG-KD-C-F-1340	Late Completion of Portion C1 Land Gas Pipelines if all Permits are not Approved by 90 Days	0		20-Mar-14*		03-Jul-13	-259	0%
TG-KD-C-F-1400	Completion of Portion C2 Land Gas Pipelines	0		03-Mar-14 A				100%
TG-KD-C-F-1410	Completion of Project Video	0		20-Oct-13 A				100%
TG-KD-C-F-1420	Early Completion of Maintenance Period for Portions A1, A2, B, C1, D, E and F	0		19-Jun-14*		19-Jun-14	0	0%
TG-KD-C-F-1430	Late Completion of Maintenance Period for Portions A1, A2, B, C1, D, E and F	0		03-Jul-14*		03-Jul-14	0	0%
TG-KD-C-F-1460	Completion of Maintenance Period for Portion C2	0		03-Mar-14 A				100%
Milestone Dates		990	31-Jan-12 A	20-Oct-14	02-Jan-13	20-Oct-14	0	78.3%
Cost Centre A		990	31-Jan-12 A	20-Oct-14	18-Jan-14	20-Oct-14	0	78.3%
TG-CC-A-M-0002	On completion of the provision of the Enigneer's principal office for occupation and use	0		19-May-12 A				100%
TG-CC-A-M-0003	On completion of the provision of the Enigneer's secondary office for occupation and use	0		14-Apr-12 A				100%
TG-CC-A-M-0004	Provide all necessary documentation that the third party insurance has been effected	0		03-Feb-12 A				100%
TG-CC-A-M-0005	Provide all necessary documentation that the professional indemnity insurance has been effected	0		31-May-12 A				100%
TG-CC-A-M-0006	Provide all necessary documentation that the care of the Works insurance has been effected	0		03-Feb-12 A				100%
TG-CC-A-M-0007	Provide all necessary documentation that the employees' compensation insurance has been effected	0		31-Jan-12 A				100%
TG-CC-A-M-0008	Provide all necessary documentation that the surety bond has been effected	0		20-Apr-12 A				100%
TG-CC-A-M-0009	On acceptance of all land transport delivered for the use of the Engineer	0		01-Mar-12 A				100%
TG-CC-A-M-0010	On acceptance of all marine transport delivered for the use of the Engineer	0		18-May-12 A				100%
TG-CC-A-M-0011	On completion of installation of the Contract Computer Facilities for the use of the Engineer	0		23-May-12 A				100%
TG-CC-A-M-0012	On completion of all hoardings, temporary fences, gates and signboards	0		03-Jul-12 A				100%
TG-CC-A-M-0013	On acceptance of Safety Plan	0		20-Feb-12 A				100%
TG-CC-A-M-0014	On acceptance of Environmental Management Plan	0		26-Mar-12 A				100%
TG-CC-A-M-0015	On completion of all Welding Procedure Qualification Tests	0		18-Oct-12 A				100%
TG-CC-A-M-0016	On completion of condition surveys for existing TKW Sewage Outfall, existing bridge at IEC and Existing Seawalls	0		20-Mar-12 A				100%
TG-CC-A-M-0017	On completion of general site clearance of the Site	0		25-Feb-12 A				100%
TG-CC-A-M-0018	Satisfactory fulfilment of all obligations & completion of all activities expressly covered for the period of 3 mths	0		04-Apr-12 A				100%
TG-CC-A-M-0019	Satisfactory fulfilment of all obligations & completion of all activities expressly covered for the period of 6 mths	0		04-Jul-12 A				100%
TG-CC-A-M-0020	Satisfactory fulfilment of all obligations & completion of all activities expressly covered for the period of 9 mths	0		04-Oct-12 A				100%
TG-CC-A-M-0021	Satisfactory fulfilment of all obligations & completion of all activities expressly covered for the period of 12 mths	0		04-Jan-13 A				100%
TG-CC-A-M-0022	Satisfactory fulfilment of all obligations & completion of all activities expressly covered for the period of 15 mths	0		04-Apr-13 A				100%
TG-CC-A-M-0023	Issuance of the certificates of completion of the Works under Cost Centres B, C1 and D plus all works under Portion A	0		19-Jun-13 A				100%
TG-CC-A-M-0024	Completion of all activities 3 mths commencement of the Maintenance Period of the Works for Cost Centres A, B, C1 and D	0		20-Mar-14*		18-Jan-14	-60	0%
TG-CC-A-M-0025	Completion of all activities 3 mths commencement of the Maintenance Period of the Works for Cost Centre C2	0		03-Mar-14 A				100%
TG-CC-A-M-0026	Completion of all activities 3 mths commencement of the Maintenance Period of the Works for Cost Centre of All Section	0		20-Mar-14*		18-Jan-14	-60	0%
TG-CC-A-M-0027	Completion of all activities 6 mths commencement of the Maintenance Period of the Works for Cost Centres A, B, C1 and D	0		18-Apr-14*		18-Apr-14	0	0%
TG-CC-A-M-0028	Completion of all activities 6 mths commencement of the Maintenance Period of the Works for Cost Centre C2	0		03-Mar-14 A				100%
TG-CC-A-M-0029	Completion of all activities 6 mths commencement of the Maintenance Period of the Works for Cost Centre of All Section	0		18-Apr-14*		18-Apr-14	0	0%
TG-CC-A-M-0030	Completion of all activities 9 mths commencement of the Maintenance Period of the Works for Cost Centres A, B, C1 and D	0		17-Jul-14*		17-Jul-14	0	0%
TG-CC-A-M-0031	Completion of all activities 9 mths commencement of the Maintenance Period of the Works for Cost Centre C2	0		03-Mar-14 A				100%
TG-CC-A-M-0032	Completion of all activities 9 mths commencement of the Maintenance Period of the Works for Cost Centre of All Section	0		17-Jul-14*		17-Jul-14	0	0%
TG-CC-A-M-0033	Issuance of the certificates of completion of the Works under Cost Centre C2	0		03-Mar-14 A				100%
TG-CC-A-M-0034	Issuance of the maintenance certificate for the Works under Cost Centres B, C1 and D plus all works under Portion A	0		20-Jun-14*		20-Jun-14	0	0%
TG-CC-A-M-0035	Issuance of the maintenance certificate for the all Works for under Cost Centre C2 plus other remaining works	0		03-Mar-14 A				100%
TG-CC-A-M-0036	Issuance of the maintenance certificate of all Section(s) of the Works by the Engineer	0		20-Oct-14*		20-Oct-14	0	0%
Cost Centre B		699	20-Mar-12 A	20-Mar-14	04-Mar-13	28-May-13	150	100%
TG-CC-B-M-0036	On submission of method statement for hydrographic / geophysical surveys	0		20-Mar-12 A				100%
TG-CC-B-M-0037	On acceptance of method statement for hydrographic / geophysical surveys	0		04-May-12 A				100%



Remaining Level of Effort | Actual Work | Critical Remaining Work | Milestone
Primary Baseline | Remaining Work | Baseline Milestone | Summary

20-Mar-14

Project Ref. No.: GSPD/SP/TKW-NP/089/2011

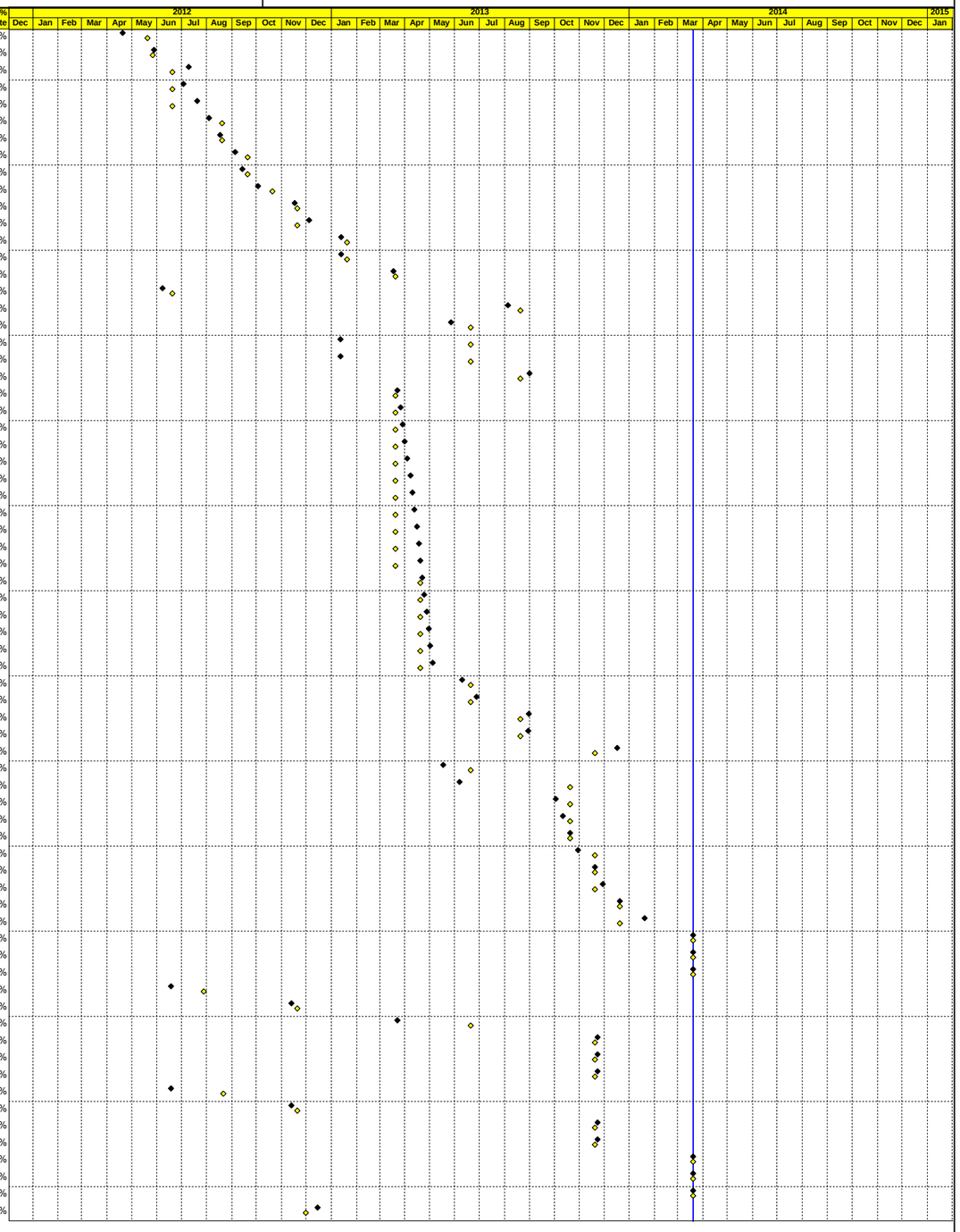
Installation of Submarine Gas Pipelines and Associated Facilities From To Kwa Wan to North Point for Former Kai Tak Airport Development

UPDATED MASTER PROGRAMME REV. 27

Progress Report as of 20 March 2014

Macdow - Kaden Joint Venture

Activity ID	Activity Name	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Duration % Complete
TG-CC-B-M-0038	On completion of pre-commencement survey	0		19-Apr-12 A				100%
TG-CC-B-M-0039	On submission of method statement for dredging	0		28-May-12 A				100%
TG-CC-B-M-0040	On acceptance of method statement for dredging	0		09-Jul-12 A				100%
TG-CC-B-M-0041	On completion of 10% for the total volume of dredging	0		03-Jul-12 A				100%
TG-CC-B-M-0042	On completion of 20% for the total volume of dredging	0		20-Jul-12 A				100%
TG-CC-B-M-0043	On completion of 30% for the total volume of dredging	0		03-Aug-12 A				100%
TG-CC-B-M-0044	On completion of 40% for the total volume of dredging	0		17-Aug-12 A				100%
TG-CC-B-M-0045	On completion of 50% for the total volume of dredging	0		04-Sep-12 A				100%
TG-CC-B-M-0046	On completion of 60% for the total volume of dredging	0		13-Sep-12 A				100%
TG-CC-B-M-0047	On completion of 70% for the total volume of dredging	0		02-Oct-12 A				100%
TG-CC-B-M-0048	On completion of 80% for the total volume of dredging	0		16-Nov-12 A				100%
TG-CC-B-M-0049	On completion of 90% for the total volume of dredging	0		04-Dec-12 A				100%
TG-CC-B-M-0050	On completion of 100% for the total volume of dredging	0		12-Jan-13 A				100%
TG-CC-B-M-0051	Completion of trench dredging on or before the target completion date as specified in the Contract	0		12-Jan-13 A				100%
TG-CC-B-M-0052	On acceptance of post-dredging survey	0		17-Mar-13 A				100%
TG-CC-B-M-0053	On submission of method statement for submarine pipe laying	0		07-Jun-12 A				100%
TG-CC-B-M-0054	On acceptance of method statement for submarine pipe laying	0		05-Aug-13 A				100%
TG-CC-B-M-0055	On completion of establishment of submarine pipe laying equipment for Section 1 of the submarine pipeline	0		27-May-13 A				100%
TG-CC-B-M-0056	On completion of establishment of submarine pipe laying equipment for Section 2 of the submarine pipeline	0		11-Jan-13 A				100%
TG-CC-B-M-0057	On completion of establishment of submarine pipe laying equipment for Section 3 of the submarine pipeline	0		11-Jan-13 A				100%
TG-CC-B-M-0058	On completion of establishment of submarine pipe laying equipment for Section 4 of the submarine pipeline	0		31-Aug-13 A				100%
TG-CC-B-M-0059	On completion of laying of 5% for the total length of 2 x 450mm submarine pipeline	0		23-Mar-13 A				100%
TG-CC-B-M-0060	On completion of laying of 10% for the total length of 2 x 450mm submarine pipeline	0		27-Mar-13 A				100%
TG-CC-B-M-0061	On completion of laying of 15% for the total length of 2 x 450mm submarine pipeline	0		29-Mar-13 A				100%
TG-CC-B-M-0062	On completion of laying of 20% for the total length of 2 x 450mm submarine pipeline	0		01-Apr-13 A				100%
TG-CC-B-M-0063	On completion of laying of 25% for the total length of 2 x 450mm submarine pipeline	0		04-Apr-13 A				100%
TG-CC-B-M-0064	On completion of laying of 30% for the total length of 2 x 450mm submarine pipeline	0		08-Apr-13 A				100%
TG-CC-B-M-0065	On completion of laying of 35% for the total length of 2 x 450mm submarine pipeline	0		10-Apr-13 A				100%
TG-CC-B-M-0066	On completion of laying of 40% for the total length of 2 x 450mm submarine pipeline	0		13-Apr-13 A				100%
TG-CC-B-M-0067	On completion of laying of 45% for the total length of 2 x 450mm submarine pipeline	0		16-Apr-13 A				100%
TG-CC-B-M-0068	On completion of laying of 50% for the total length of 2 x 450mm submarine pipeline	0		18-Apr-13 A				100%
TG-CC-B-M-0069	On completion of laying of 55% for the total length of 2 x 450mm submarine pipeline	0		20-Apr-13 A				100%
TG-CC-B-M-0070	On completion of laying of 60% for the total length of 2 x 450mm submarine pipeline	0		22-Apr-13 A				100%
TG-CC-B-M-0071	On completion of laying of 65% for the total length of 2 x 450mm submarine pipeline	0		25-Apr-13 A				100%
TG-CC-B-M-0072	On completion of laying of 70% for the total length of 2 x 450mm submarine pipeline	0		28-Apr-13 A				100%
TG-CC-B-M-0073	On completion of laying of 75% for the total length of 2 x 450mm submarine pipeline	0		30-Apr-13 A				100%
TG-CC-B-M-0074	On completion of laying of 80% for the total length of 2 x 450mm submarine pipeline	0		02-May-13 A				100%
TG-CC-B-M-0075	On completion of laying of 85% for the total length of 2 x 450mm submarine pipeline	0		05-May-13 A				100%
TG-CC-B-M-0076	On completion of laying of 90% for the total length of 2 x 450mm submarine pipeline	0		10-Jun-13 A				100%
TG-CC-B-M-0077	On completion of laying of 95% for the total length of 2 x 450mm submarine pipeline	0		28-Jun-13 A				100%
TG-CC-B-M-0078	On completion of laying of 100% for the total length of 2 x 450mm submarine pipeline	0		31-Aug-13 A				100%
TG-CC-B-M-0079	Completion of pipe laying of submarine gas pipelines on or before the target completion date	0		30-Aug-13 A				100%
TG-CC-B-M-0080	Completion of pipe testing of submarine gas pipelines before backfilling on or before the target completion date	0		17-Dec-13 A				100%
TG-CC-B-M-0081	On submission of method statement for backfilling	0		18-May-13 A				100%
TG-CC-B-M-0082	On acceptance of method statement for backfilling	0		07-Jun-13 A				100%
TG-CC-B-M-0083	On completion of 10% for the total volume of backfilling	0		03-Oct-13 A				100%
TG-CC-B-M-0084	On completion of 20% for the total volume of backfilling	0		12-Oct-13 A				100%
TG-CC-B-M-0085	On completion of 30% for the total volume of backfilling	0		20-Oct-13 A				100%
TG-CC-B-M-0086	On completion of 40% for the total volume of backfilling	0		30-Oct-13 A				100%
TG-CC-B-M-0087	On completion of 50% for the total volume of backfilling	0		20-Nov-13 A				100%
TG-CC-B-M-0088	On completion of 60% for the total volume of backfilling	0		30-Nov-13 A				100%
TG-CC-B-M-0089	On completion of 70% for the total volume of backfilling	0		20-Dec-13 A				100%
TG-CC-B-M-0090	On completion of 80% for the total volume of backfilling	0		20-Jan-14 A				100%
TG-CC-B-M-0091	On completion of 90% for the total volume of backfilling	0		20-Mar-14*	17-Apr-13		-336	0%
TG-CC-B-M-0092	On completion of 100% for the total volume of backfilling	0		20-Mar-14*	02-May-13		-321	0%
TG-CC-B-M-0093	On acceptance of post-backfilling survey	0		20-Mar-14*	28-May-13		-295	0%
TG-CC-B-M-0094	On submission of method statement for cofferdam at To Kwa Wan	0		18-Jun-12 A				100%
TG-CC-B-M-0095	On acceptance of method statement for cofferdam at To Kwa Wan	0		12-Nov-12 A				100%
TG-CC-B-M-0096	On completion of excavation at To Kwa Wan	0		23-Mar-13 A				100%
TG-CC-B-M-0097	On completion of main laying at To Kwa Wan	0		23-Nov-13 A				100%
TG-CC-B-M-0098	On completion of permanent reinstatement at To Kwa Wan	0		23-Nov-13 A				100%
TG-CC-B-M-0099	Completion of all works in To Kwa Wan Works Area (Portion A1)	0		23-Nov-13 A				100%
TG-CC-B-M-0100	On submission of method statement for cofferdam at North Point	0		18-Jun-12 A				100%
TG-CC-B-M-0101	On acceptance of method statement for cofferdam at North Point	0		12-Nov-12 A				100%
TG-CC-B-M-0102	On completion of excavation at North Point	0		23-Nov-13 A				100%
TG-CC-B-M-0103	On completion of main laying at North Point	0		23-Nov-13 A				100%
TG-CC-B-M-0104	On completion of permanent reinstatement at North Point	0		20-Mar-14*	04-Mar-13		-380	0%
TG-CC-B-M-0105	Completion of all works in North Point Works Area (Portion C)	0		20-Mar-14*	03-Apr-13		-350	0%
TG-CC-B-M-0106	Completion of backfilling of pipelines, reinstatement of seawalls &existing features on or before target completion date	0		20-Mar-14*	02-May-13		-321	0%
TG-CC-B-M-0107	On submission of method statement for cathodic protection	0		14-Dec-12 A				100%



Remaining Level of Effort | Actual Work | Critical Remaining Work | Milestone
Primary Baseline | Remaining Work | Baseline Milestone | Summary

20-Mar-14

Project Ref. No.: GSPD/SP/TKW-NP/089/2011

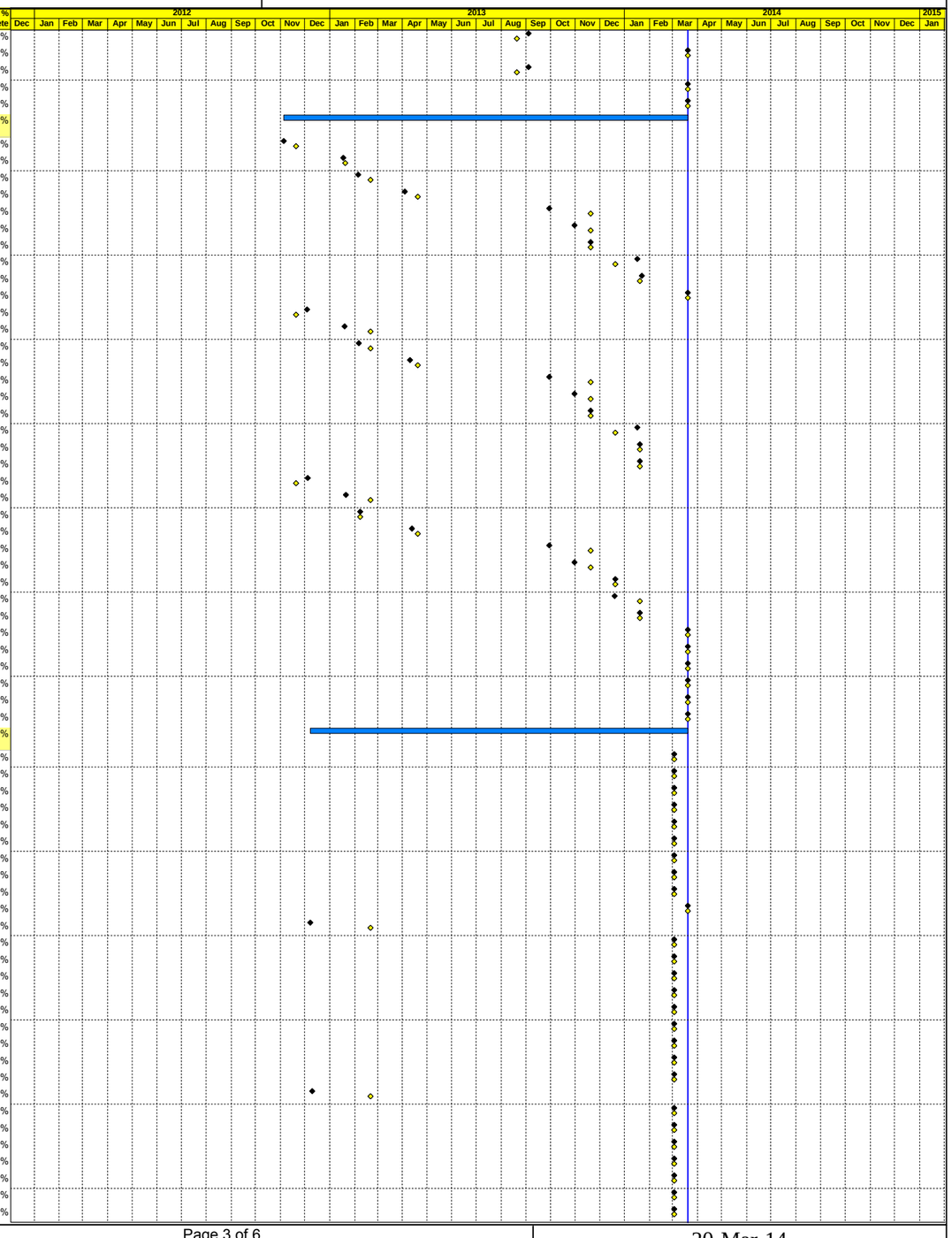
Installation of Submarine Gas Pipelines and Associated Facilities From To Kwa Wan to North Point for Former Kai Tak Airport Development

UPDATED MASTER PROGRAMME REV. 27

Progress Report as of 20 March 2014

Macdow - Kaden Joint Venture

Activity ID	Activity Name	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Duration % Complete
TG-CC-B-M-0108	On acceptance of method statement for cathodic protection	0		04-Sep-13 A				100%
TG-CC-B-M-0109	On completion of installation for cathodic protection	0		20-Mar-14*		10-Apr-13	-343	0%
TG-CC-B-M-0110	On completion of testings for cathodic protection	0		04-Sep-13 A				100%
TG-CC-B-M-0111	Completion of final pipe testing (excluding intelligent pigging inspection) for submarine gas pipelines & reinstatement	0		20-Mar-14*		28-May-13	-295	0%
TG-CC-B-M-0112	On completion of the whole of the works under this Cost Centre to the satisfaction of the Engineer	0		20-Mar-14*		28-May-13	-295	0%
Cost Centre C1		485	05-Nov-12 A	20-Mar-14	02-Feb-13	15-May-13	205	100%
TG-CC-C1-M-0113	On completion of 10% for the total length of trench excavation	0		05-Nov-12 A				100%
TG-CC-C1-M-0114	On completion of 20% for the total length of trench excavation	0		18-Jan-13 A				100%
TG-CC-C1-M-0115	On completion of 30% for the total length of trench excavation	0		05-Feb-13 A				100%
TG-CC-C1-M-0116	On completion of 40% for the total length of trench excavation	0		04-Apr-13 A				100%
TG-CC-C1-M-0117	On completion of 50% for the total length of trench excavation	0		30-Sep-13 A				100%
TG-CC-C1-M-0118	On completion of 60% for the total length of trench excavation	0		31-Oct-13 A				100%
TG-CC-C1-M-0119	On completion of 70% for the total length of trench excavation	0		20-Nov-13 A				100%
TG-CC-C1-M-0120	On completion of 80% for the total length of trench excavation	0		17-Jan-14 A				100%
TG-CC-C1-M-0121	On completion of 90% for the total length of trench excavation	0		22-Jan-14 A				100%
TG-CC-C1-M-0122	On completion of 100% for the total length of trench excavation	0		20-Mar-14*		02-Feb-13	-410	0%
TG-CC-C1-M-0123	On completion of 10% for the total length of pipelaying and mechanical works	0		04-Dec-12 A				100%
TG-CC-C1-M-0124	On completion of 20% for the total length of pipelaying and mechanical works	0		19-Jan-13 A				100%
TG-CC-C1-M-0125	On completion of 30% for the total length of pipelaying and mechanical works	0		06-Feb-13 A				100%
TG-CC-C1-M-0126	On completion of 40% for the total length of pipelaying and mechanical works	0		10-Apr-13 A				100%
TG-CC-C1-M-0127	On completion of 50% for the total length of pipelaying and mechanical works	0		30-Sep-13 A				100%
TG-CC-C1-M-0128	On completion of 60% for the total length of pipelaying and mechanical works	0		31-Oct-13 A				100%
TG-CC-C1-M-0129	On completion of 70% for the total length of pipelaying and mechanical works	0		20-Nov-13 A				100%
TG-CC-C1-M-0130	On completion of 80% for the total length of pipelaying and mechanical works	0		17-Jan-14 A				100%
TG-CC-C1-M-0131	On completion of 90% for the total length of pipelaying and mechanical works	0		20-Jan-14 A				100%
TG-CC-C1-M-0132	On completion of 100% for the total length of pipelaying and mechanical works	0		20-Jan-14 A				100%
TG-CC-C1-M-0133	On completion of 10% for the total length of permanent reinstatement	0		04-Dec-12 A				100%
TG-CC-C1-M-0134	On completion of 20% for the total length of permanent reinstatement	0		21-Jan-13 A				100%
TG-CC-C1-M-0135	On completion of 30% for the total length of permanent reinstatement	0		07-Feb-13 A				100%
TG-CC-C1-M-0136	On completion of 40% for the total length of permanent reinstatement	0		13-Apr-13 A				100%
TG-CC-C1-M-0137	On completion of 50% for the total length of permanent reinstatement	0		30-Sep-13 A				100%
TG-CC-C1-M-0138	On completion of 60% for the total length of permanent reinstatement	0		31-Oct-13 A				100%
TG-CC-C1-M-0139	On completion of 70% for the total length of permanent reinstatement	0		20-Dec-13 A				100%
TG-CC-C1-M-0140	On completion of 80% for the total length of permanent reinstatement	0		20-Dec-13 A				100%
TG-CC-C1-M-0141	On completion of 90% for the total length of permanent reinstatement	0		20-Jan-14 A				100%
TG-CC-C1-M-0142	On completion of 100% for the total length of permanent reinstatement	0		20-Mar-14*		11-Mar-13	-373	0%
TG-CC-C1-M-0143	On completion of all cathodic protection works	0		20-Mar-14*		27-Mar-13	-357	0%
TG-CC-C1-M-0144	On completion of final air testing to the satisfaction of the Engineer	0		20-Mar-14*		19-Mar-13	-365	0%
TG-CC-C1-M-0145	On completion of hydrostatic testing to the satisfaction of the Engineer	0		20-Mar-14*		27-Mar-13	-357	0%
TG-CC-C1-M-0146	On completion of vacuum drying to the satisfaction of the Engineer	0		20-Mar-14*		05-Apr-13	-348	0%
TG-CC-C1-M-0147	On completion of the whole of the works under this Cost Centre to the satisfaction of the Engineer	0		20-Mar-14*		15-May-13	-308	0%
Cost Centre C2		393	08-Dec-12 A	20-Mar-14	16-Jul-13	16-Jul-13	176	100%
TG-CC-C2-M-0148	On completion of 10% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0149	On completion of 20% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0150	On completion of 30% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0151	On completion of 40% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0152	On completion of 50% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0153	On completion of 60% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0154	On completion of 70% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0155	On completion of 80% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0156	On completion of 90% for the total length of trench excavation	0		03-Mar-14 A				100%
TG-CC-C2-M-0157	On completion of 100% for the total length of trench excavation	0		20-Mar-14*		16-Jul-13	-246	0%
TG-CC-C2-M-0158	On completion of 10% for the total length of pipelaying and mechanical works	0		08-Dec-12 A				100%
TG-CC-C2-M-0159	On completion of 20% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0160	On completion of 30% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0161	On completion of 40% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0162	On completion of 50% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0163	On completion of 60% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0164	On completion of 70% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0165	On completion of 80% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0166	On completion of 90% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0167	On completion of 100% for the total length of pipelaying and mechanical works	0		03-Mar-14 A				100%
TG-CC-C2-M-0168	On completion of 10% for the total length of permanent reinstatement	0		10-Dec-12 A				100%
TG-CC-C2-M-0169	On completion of 20% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0170	On completion of 30% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0171	On completion of 40% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0172	On completion of 50% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0173	On completion of 60% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0174	On completion of 70% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0175	On completion of 80% for the total length of permanent reinstatement	0		03-Mar-14 A				100%



Remaining Level of Effort | Actual Work | Critical Remaining Work | Milestone
Primary Baseline | Remaining Work | Baseline Milestone | Summary

20-Mar-14

Project Ref. No.: GSPD/SP/TKW-NP/089/2011

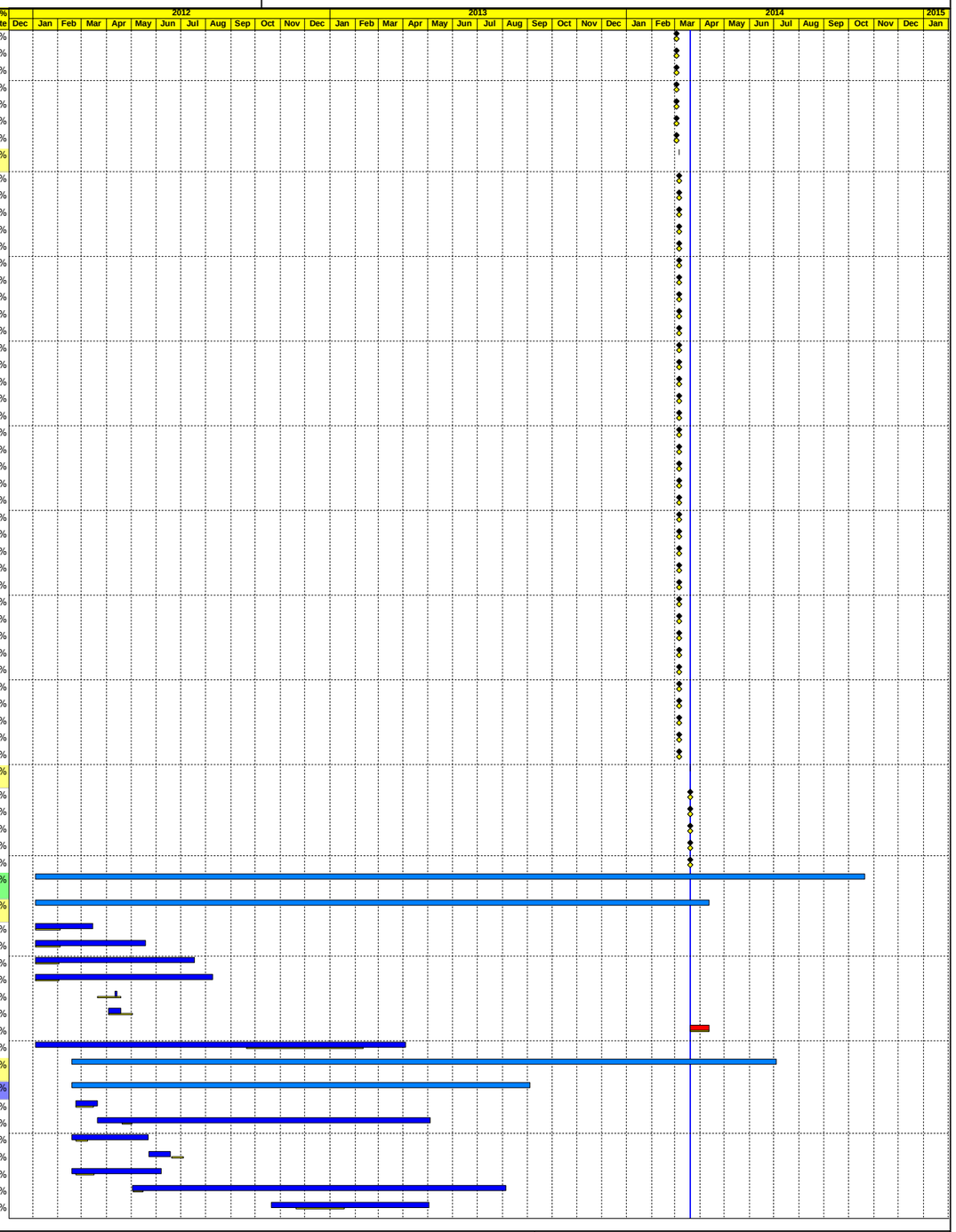
Installation of Submarine Gas Pipelines and Associated Facilities From To Kwa Wan to North Point for Former Kai Tak Airport Development

UPDATED MASTER PROGRAMME REV. 27

Progress Report as of 20 March 2014

Macdow - Kaden Joint Venture

Activity ID	Activity Name	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Duration % Complete
TG-CC-C2-M-0176	On completion of 90% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0177	On completion of 100% for the total length of permanent reinstatement	0		03-Mar-14 A				100%
TG-CC-C2-M-0178	On completion of all cathodic protection works	0		03-Mar-14 A				100%
TG-CC-C2-M-0179	On completion of final air testing to the satisfaction of the Engineer	0		03-Mar-14 A				100%
TG-CC-C2-M-0180	On completion of hydrostatic testing to the satisfaction of the Engineer	0		03-Mar-14 A				100%
TG-CC-C2-M-0181	On completion of vacuum drying to the satisfaction of the Engineer	0		03-Mar-14 A				100%
TG-CC-C2-M-0182	On completion of the whole of the works under this Cost Centre to the satisfaction of the Engineer	0		03-Mar-14 A				100%
Cost Centre D		0	06-Mar-14 A	06-Mar-14 A				0%
TG-CC-D-M-0183	On completion of 10% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0184	On completion of 20% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0185	On completion of 30% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0186	On completion of 40% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0187	On completion of 50% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0188	On completion of 60% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0189	On completion of 70% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0190	On completion of 80% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0191	On completion of 90% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0192	On completion of 100% for the total length of trench excavation	0		06-Mar-14 A				100%
TG-CC-D-M-0193	On completion of 10% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0194	On completion of 20% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0195	On completion of 30% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0196	On completion of 40% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0197	On completion of 50% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0198	On completion of 60% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0199	On completion of 70% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0200	On completion of 80% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0201	On completion of 90% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0202	On completion of 100% for the total length of pipelaying and mechanical works	0		06-Mar-14 A				100%
TG-CC-D-M-0203	On completion of 10% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0204	On completion of 20% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0205	On completion of 30% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0206	On completion of 40% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0207	On completion of 50% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0208	On completion of 60% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0209	On completion of 70% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0210	On completion of 80% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0211	On completion of 90% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0212	On completion of 100% for the total length of permanent reinstatement	0		06-Mar-14 A				100%
TG-CC-D-M-0213	On completion of all cathodic protection works	0		06-Mar-14 A				100%
TG-CC-D-M-0214	On completion of final air testing to the satisfaction of the Engineer	0		06-Mar-14 A				100%
TG-CC-D-M-0215	On completion of hydrostatic testing to the satisfaction of the Engineer	0		06-Mar-14 A				100%
TG-CC-D-M-0216	On completion of vacuum drying to the satisfaction of the Engineer	0		06-Mar-14 A				100%
TG-CC-D-M-0218	On completion of the whole of the works under this Cost Centre to the satisfaction of the Engineer	0		06-Mar-14 A				100%
Cost Centre F		0	20-Mar-14	20-Mar-14	02-Jan-13	19-Jun-13	-273	0%
TG-CC-F-M-0219	Down payment on conclusion of contract	0		20-Mar-14*		02-Jan-13	-441	0%
TG-CC-F-M-0220	Commencement on site	0		20-Mar-14*		29-May-13	-294	0%
TG-CC-F-M-0221	Completion of successful field works (dig verifications not inclusive)	0		20-Mar-14*		05-Jun-13	-287	0%
TG-CC-F-M-0222	Submission of draft Report	0		20-Mar-14*		12-Jun-13	-280	0%
TG-CC-F-M-0223	Presentation of Final Report	0		20-Mar-14*		19-Jun-13	-273	0%
Construction Works		1046	04-Jan-12 A	20-Oct-14	30-Jan-13	20-Oct-14	0	79.44%
Cost Centre A - Preliminaries		830	04-Jan-12 A	12-Apr-14	20-Mar-14	12-Apr-14	191	97.12%
TG-CC-A-A-0800	Construct Contractor's Site Office	25	04-Jan-12 A	15-Mar-12 A				100%
TG-CC-A-A-0900	Accomodation for RE	25	04-Jan-12 A	19-May-12 A				100%
TG-CC-A-A-1000	Application for Marine Department Notice	24	04-Jan-12 A	18-Jul-12 A				100%
TG-CC-A-A-1010	Application for Dumping Permit	24	04-Jan-12 A	09-Aug-12 A				100%
TG-CC-A-A-1037	Application of Construction Noise Permit	24	11-Apr-12 A	13-Apr-12 A				100%
TG-CC-A-A-1040	Notification to Ferry Company	24	03-Apr-12 A	18-Apr-12 A				100%
TG-CC-A-A-1041	Aechaeological Survey	24	20-Mar-14	12-Apr-14	20-Mar-14	12-Apr-14	0	0%
TG-CC-A-A-1045	Application and Approval of Excavation Permit and TTA for Portion C1, C2 and D for Land Gas Pipelines	144	04-Jan-12 A	04-Apr-13 A				100%
Cost Centre B - Submarine Gas Pipelines and Landfall Works (from CH(TKW)0 to 3176.239)		834	18-Feb-12 A	03-Jul-14	30-Jan-13	03-Jul-14	109	87.3%
Submission, Permit Application and Approval		437	18-Feb-12 A	04-Sep-13 A				100%
TG-CC-B-A-0800	Submission of Hydrographic / Geophysical Surveys Method Statement	18	23-Feb-12 A	20-Mar-12 A				100%
TG-CC-B-A-0802	Approval of Hydrographic / Geophysical Surveys Method Statement	12	20-Mar-12 A	04-May-13 A				100%
TG-CC-B-A-0805	Submission of Dredging Method Statement by DSD, Hyd, MD, HKCG and the Engineer	12	18-Feb-12 A	22-May-12 A				100%
TG-CC-B-A-0807	Approval of Dredging Method Statement by DSD, Hyd, MD, HKCG and the Engineer	12	23-May-12 A	18-Jun-12 A				100%
TG-CC-B-A-0810	Submission of Submarine Pipe Laying Method Statement and associated Temporary Works Design	18	18-Feb-12 A	07-Jun-12 A				100%
TG-CC-B-A-0815	Approval of Submarine Pipe Laying Method Statement and associated Temporary Works Design	12	03-May-12 A	05-Aug-13 A				100%
TG-CC-B-A-0830	Submission of Backfilling Method Statement	59	20-Oct-12 A	03-May-13 A				100%



Remaining Level of Effort | Actual Work | Critical Remaining Work | Milestone

Primary Baseline | Remaining Work | Baseline Milestone | Summary

20-Mar-14

Project Ref. No.: GSPD/SP/TKW-NP/089/2011

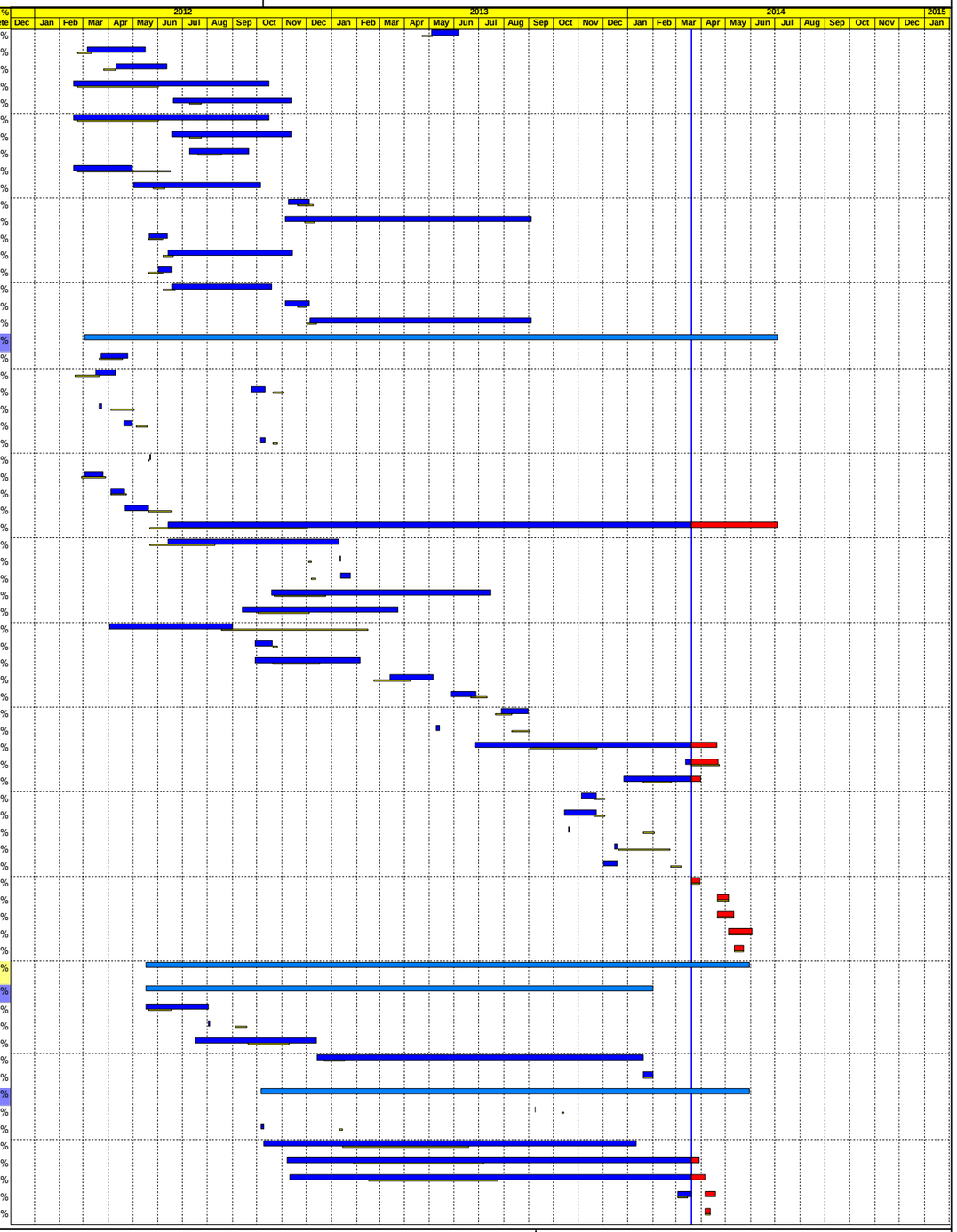
Installation of Submarine Gas Pipelines and Associated Facilities From To Kwa Wan to North Point for Former Kai Tak Airport Development

UPDATED MASTER PROGRAMME REV. 27

Progress Report as of 20 March 2014

Macdow - Kaden Joint Venture

Activity ID	Activity Name	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Duration % Complete
TG-CC-B-A-0835	Approval of Backfilling Method Statement	13	04-May-13 A	07-Jun-13 A				100%
TG-CC-B-A-0840	Submission the Design of Silt Curtain	14	06-Mar-12 A	16-May-12 A				100%
TG-CC-B-A-0842	Approval of Silt Curtain Design	11	10-Apr-12 A	11-Jun-12 A				100%
TG-CC-B-A-0845	Submission of Temporary Work for Seawall at To Kwa Wan to CEDD and the Engineer	80	18-Feb-12 A	15-Oct-12 A				100%
TG-CC-B-A-0855	Approval of Temporary Work for Seawall at To Kwa Wan to CEDD and the Engineer	12	20-Jun-12 A	12-Nov-12 A				100%
TG-CC-B-A-0865	Submission of Temporary Work for Seawall at North Point to CEDD and the Engineer	80	18-Feb-12 A	15-Oct-12 A				100%
TG-CC-B-A-0875	Approval of Temporary Work for Seawall at North Point to CEDD and the Engineer	12	19-Jun-12 A	12-Nov-12 A				100%
TG-CC-B-A-0900	Submission of Sounding Plan Fronting Seawall to Port Works/CEDD	24	10-Jul-12 A	20-Sep-12 A				100%
TG-CC-B-A-0910	Submission of Protection Measure to Existing Facilities	92	18-Feb-12 A	30-Apr-12 A				100%
TG-CC-B-A-0915	Approval of Protection Measure To Existing Facilities	11	02-May-12 A	05-Oct-12 A				100%
TG-CC-B-A-0920	Submission of Method Statement for Cathodic Protection	19	09-Nov-12 A	04-Dec-12 A				100%
TG-CC-B-A-0940	Approval of Method Statement for Cathodic Protection	12	05-Nov-12 A	04-Sep-13 A				100%
TG-CC-B-A-1050	Submission of Internal and External Coating Method Statement	15	21-May-12 A	12-Jun-12 A				100%
TG-CC-B-A-1085	Approval of Internal and External Coating Method Statement	12	13-Jun-12 A	14-Nov-12 A				100%
TG-CC-B-A-1090	Material Submission for Welding Qualification	15	01-Jun-12 A	18-Jun-12 A				100%
TG-CC-B-A-1095	Approval of Material for Welding Qualification	12	19-Jun-12 A	18-Oct-12 A				100%
TG-CC-B-A-1110	Material Submission of Cathodic Protection (Wire, Electrode, Cable, etc.)	12	05-Nov-12 A	04-Dec-12 A				100%
TG-CC-B-A-1115	Approval of Cathodic Protection (Wire, Electrode, Cable, etc.)	12	05-Dec-12 A	04-Sep-13 A				100%
Construction Activities		834	03-Mar-12 A	03-Jul-14	30-Jan-13	03-Jul-14	109	87.3%
TG-CC-B-A-1000	Locate Existing Submarine Gas Mains by Geophysical Survey	24	23-Mar-12 A	24-Apr-12 A				100%
TG-CC-B-A-1010	Pre-condition Survey to IEC Bridge, Seawall, Pigging Station, NPPS and DSD Outfalls	24	16-Mar-12 A	09-Apr-12 A				100%
TG-CC-B-A-1015	Install Monitoring Stations, Points and Devices to Existing Structures	12	24-Sep-12 A	10-Oct-12 A				100%
TG-CC-B-A-1020	Carry Out IHS to Seabed	23	20-Mar-12 A	23-Mar-12 A				100%
TG-CC-B-A-1040	Submission and Approval of IHS Plan by the Engineer	11	20-Apr-12 A	30-Apr-12 A				100%
TG-CC-B-A-1060	Protective Measure of Existing Structures	6	05-Oct-12 A	10-Oct-12 A				100%
TG-CC-B-A-1080	Mobilization of Plant and Equipment for Dredging Works	2	22-May-12 A	22-May-12 A				100%
TG-CC-B-A-1082	Environmental Baseline Monitoring	24	03-Mar-12 A	25-Mar-12 A				100%
TG-CC-B-A-1083	Submission of Baseline Monitoring Report	16	04-Apr-12 A	20-Apr-12 A				100%
TG-CC-B-A-1084	Approval of Baseline Monitoring Report by EPD	24	21-Apr-12 A	20-May-12 A				100%
TG-CC-B-A-1092	Routine Environmental Monitoring	194	13-Jun-12 A	03-Jul-14	19-Mar-14	03-Jul-14	0	45.5%
TG-CC-B-A-1100	Dredging Works Between CH0000 and CH3070	80	13-Jun-12 A	10-Jan-13 A				100%
TG-CC-B-A-1130	IHS Survey to the Dredged Trench of Submarine Gas Pipelines	3	11-Jan-13 A	12-Jan-13 A				100%
TG-CC-B-A-1135	Submission of IHS Survey to Excavated Trench and Obtain Approval from the Engineer	6	12-Jan-13 A	24-Jan-13 A				100%
TG-CC-B-A-1145	Construct Cofferdam and Carry Out Excavation at North Point	64	19-Oct-12 A	16-Jul-13 A				100%
TG-CC-B-A-1150	Construct Cofferdam and Carry Out Excavation at To Kwa Wan	64	13-Sep-12 A	23-Mar-13 A				100%
TG-CC-B-A-1160	Purchase Material, Setup of Marine Plant and Equipment	144	02-Apr-12 A	31-Aug-12 A				100%
TG-CC-B-A-1161	Pipe Delivery from HKCG	6	29-Sep-12 A	19-Oct-12 A				100%
TG-CC-B-A-1162	Pipe String Fabrication and Delivery to Site	58	29-Sep-12 A	05-Feb-13 A				100%
TG-CC-B-A-1165	Submarine Gas Pipelines - Pipe Laying by Bottom Pull Method (Section 2 & 3)	45	14-Mar-13 A	06-May-13 A				100%
TG-CC-B-A-1170	Submarine Gas Pipelines - Pipe Laying by Float and Sink Method at To Kwa Wan (Section 1, include Riser Section))	20	28-May-13 A	28-Jun-13 A				100%
TG-CC-B-A-1175	Submarine Gas Pipelines - Pipe Laying by Float and Sink Method at North Point (Section 4, include Riser Section)	20	29-Jul-13 A	31-Aug-13 A				100%
TG-CC-B-A-1190	Carry Out IHS to Pipe Alignment and Pipe Testing before Backfilling	23	10-May-13 A	14-May-13 A				100%
TG-CC-B-A-1400	Backfilling the Dredged Trench of Submarine Gas Pipelines	82	26-Jun-13 A	20-Apr-14	30-Mar-13	01-May-13	-354	60.98%
TG-CC-B-A-1410	Backfill and Reinstatement of Seawall at North Point	35	13-Mar-14 A	21-Apr-14	30-Jan-13	04-Mar-13	-413	5.71%
TG-CC-B-A-1420	Backfill and Reinstatement of Seawall at To Kwa Wan	35	27-Dec-13 A	31-Mar-14	20-Apr-13	02-May-13	-333	65.71%
TG-CC-B-A-1450	Land Pipe Laying to Pigging Station at North Point	14	05-Nov-13 A	23-Nov-13 A				100%
TG-CC-B-A-1470	Land Pipe Laying to Pigging Station at To Kwa Wan	14	15-Oct-13 A	23-Nov-13 A				100%
TG-CC-B-A-1475	Reinstatement and Handover Portion C after Land Pipe Laying	14	20-Oct-13 A	21-Oct-13 A				100%
TG-CC-B-A-1478	Purchase Material and Equipment for Cathodic Protection	64	16-Dec-13 A	19-Dec-13 A				100%
TG-CC-B-A-1480	Installation of Cathodic Protection	14	02-Dec-13 A	19-Dec-13 A				100%
TG-CC-B-A-1490	Testing of Cathodic Protection	11	20-Mar-14	30-Mar-14	10-May-13	21-May-13	-313	0%
TG-CC-B-A-1500	Carry Out Final IHS to the Backfilled Trench	14	21-Apr-14	04-May-14	07-May-13	21-May-13	-348	0%
TG-CC-B-A-1510	Final Pipelines Testing to the Installed Submarine Gas Pipelines	21	21-Apr-14	11-May-14	01-May-13	22-May-13	-354	0%
TG-CC-B-A-1580	Remaining Works and Site Cleaning for Portion D, E and F Handover at North Point	29	05-May-14	02-Jun-14	21-May-13	19-Jun-13	-348	0%
TG-CC-B-A-1600	Remaining Works and Site Cleaning for Portion A1 Handover at To Kwa Wan	12	12-May-14	23-May-14	07-Jun-13	19-Jun-13	-338	0%
Cost Centre C1 - Landmains and Associated Works at TKW (from CH(TKW)0 to 0324.147)		741	17-May-12 A	30-May-14	22-Feb-13	15-May-13	-380	90.28%
Submission, Permit Application and Approval		622	17-May-12 A	31-Jan-14 A				100%
TG-CC-C1-A-0820	Submission of Land Pipe Laying Method Statement and Temporary Works Design	24	17-May-12 A	02-Aug-12 A				100%
TG-CC-C1-A-0840	Approval of Land Pipe Laying Method Statement and Temporary Works Design	12	02-Aug-12 A	03-Aug-12 A				100%
TG-CC-C1-A-0860	Submission of TTA to TD, HKP, Hyd and other Authorities for Pipe Laying (V.O. 1)	50	17-Jul-12 A	13-Dec-12 A				100%
TG-CC-C1-A-0880	Approval of TTA by TD, HKP, Hyd and other Authorities for Pipe Laying(V.O. 1)	25	14-Dec-12 A	20-Jan-14 A				100%
TG-CC-C1-A-0900	Application to RMO for TTA at Section C1 Land Gas Pipelines(V.O. 1)	12	20-Jan-14 A	31-Jan-14 A				100%
Construction Activities		506	06-Oct-12 A	30-May-14	22-Feb-13	15-May-13	-380	85.77%
TG-CC-C1-A-0950	Implementation of TTA	3	09-Sep-13 A	09-Sep-13 A				100%
TG-CC-C1-A-1000	Mobilization of Plant and Equipment	3	06-Oct-12 A	09-Oct-12 A				100%
TG-CC-C1-A-1005	Excavate Land Mains at Car Park (CH(TKWLL).0 - 324.147)	156	09-Oct-12 A	11-Jan-14 A				100%
TG-CC-C1-A-1015	Lay Land Mains at Car Park (CH(TKWLL)0 - 324.147)	161	07-Nov-12 A	29-Mar-14	22-Feb-13	04-Mar-13	-390	93.78%
TG-CC-C1-A-1025	Backfill Land Mains at Car Park (CH(TKWLL)0 - 324.147)	160	10-Nov-12 A	05-Apr-14	22-Feb-13	11-Mar-13	-390	89.38%
TG-CC-C1-A-1115	Install Cathodic Protection	13	03-Mar-14 A	18-Apr-14	14-Mar-13	27-Mar-13	-387	0%
TG-CC-C1-A-1125	Final Air Testing	7	06-Apr-14	12-Apr-14	12-Mar-13	19-Mar-13	-389	0%



Remaining Level of Effort | Actual Work | Critical Remaining Work | Milestone

Primary Baseline | Remaining Work | Baseline Milestone | Summary

20-Mar-14

Project Ref. No.: GSPD/SP/TKW-NP/089/2011

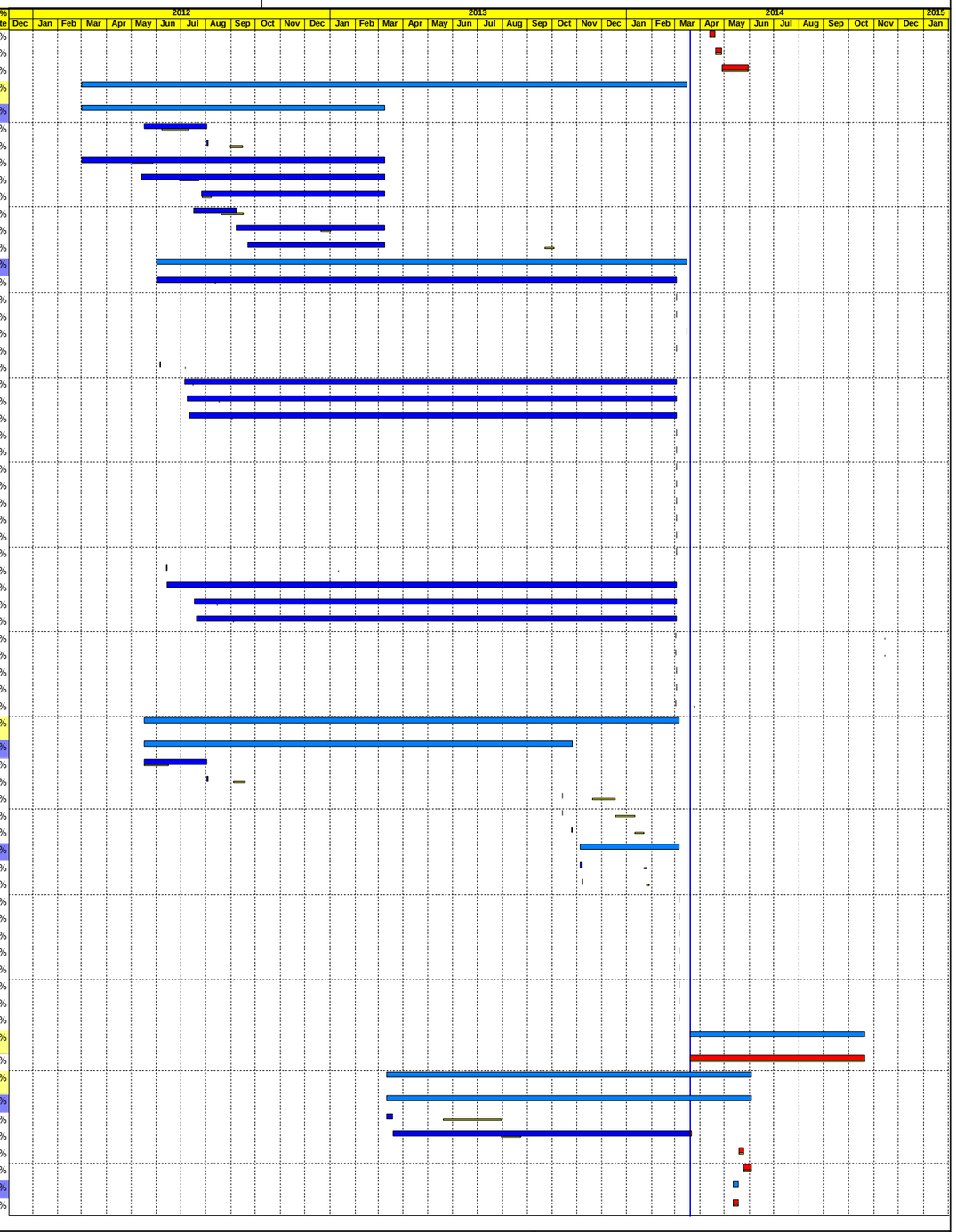
Installation of Submarine Gas Pipelines and Associated Facilities From To Kwa Wan to North Point for Former Kai Tak Airport Development

UPDATED MASTER PROGRAMME REV. 27

Progress Report as of 20 March 2014

Macdow - Kaden Joint Venture

Activity ID	Activity Name	Original Duration	Early Start	Early Finish	Late Start	Late Finish	Total Float	Duration % Complete
TG-CC-C1-A-1135	Hydrostatic Testing	7	13-Apr-14	19-Apr-14	20-Mar-13	27-Mar-13	-388	0%
TG-CC-C1-A-1260	Vacuum Drying	8	20-Apr-14	27-Apr-14	28-Mar-13	05-Apr-13	-387	0%
TG-CC-C1-A-1300	Reinstatement	33	28-Apr-14	30-May-14	12-Apr-13	15-May-13	-380	0%
Cost Centre C2 - Landmains and Associated Works at TKW (from CH(TKWLL)324.147 to 1152)		926	01-Mar-12 A	16-Mar-14 A				100%
Submission, Permit Application and Approval		519	01-Mar-12 A	09-Mar-13 A				100%
TG-CC-C2-A-0500	Submission of Land Pipe Laying Method Statement and Temporary Works Design	26	17-May-12 A	02-Aug-12 A				100%
TG-CC-C2-A-0550	Approval of Land Pipe Laying Method Statement and Temporary Works Design	12	02-Aug-12 A	03-Aug-12 A				100%
TG-CC-C2-A-0580	Submission of TTA to TD, HKP, Hyd and other Authorities for Pipe Laying	25	01-Mar-12 A	09-Mar-13 A				100%
TG-CC-C2-A-0620	Approval of TTA by TD, HKP, Hyd and other Authorities for Pipe Laying	24	14-May-12 A	09-Mar-13 A				100%
TG-CC-C2-A-0640	Application to RMO for TTA at Section C2 Land Gas Pipelines	11	27-Jul-12 A	09-Mar-13 A				100%
TG-CC-C2-A-3010	Submission of TTA to TD, HKP, Hyd and other Authorities for Pipe Laying (V.O. 2)(CH490-500)(CH880-900)	27	17-Jul-12 A	07-Sep-12 A				100%
TG-CC-C2-A-3020	Approval of TTA by TD, HKP, Hyd and other Authorities for Pipe Laying (V.O. 2)(CH490-500)(CH880-900)	12	07-Sep-12 A	09-Mar-13 A				100%
TG-CC-C2-A-3030	Application to RMO for TTA at Section C2 Land Gas Pipelines (V.O. 2)(CH490-500)(CH880-900)	12	22-Sep-12 A	09-Mar-13 A				100%
Construction Activities		861	01-Jun-12 A	16-Mar-14 A				100%
TG-CC-C2-A-0650	Implementation of 1st TTA at Chi Kiang Street, Yuk Yat Street and Kwei Chau Street	0	01-Jun-12 A	03-Mar-14 A				100%
TG-CC-C2-A-0700	Mobilization of Plant and Equipment at Chi Kiang Street	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-0720	Excavate land mains at Chi Kiang Street (CH(TKWLL)324.147 - 400)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-0730	Lay land mains at Chi Kiang Street (CH(TKWLL)324.147 - 400)	0	16-Mar-14 A	16-Mar-14 A				100%
TG-CC-C2-A-0740	Backfill land mains at Chi Kiang Street (CH(TKWLL)324.147 - 400)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-0800	Mobilization of Plant and Equipment at Yuk Yat Street	0	05-Jun-12 A	06-Jun-12 A				100%
TG-CC-C2-A-0810	Excavate land mains at Yuk Yat Street (CH(TKWLL)400 - 700)	0	06-Jul-12 A	03-Mar-14 A				100%
TG-CC-C2-A-0820	Lay land mains at Yuk Yat Street (CH(TKWLL)400 - 700)	0	09-Jul-12 A	03-Mar-14 A				100%
TG-CC-C2-A-0830	Backfill land mains at Yuk Yat Street (CH(TKWLL)400 - 700)	0	11-Jul-12 A	03-Mar-14 A				100%
TG-CC-C2-A-1025	Mobilization of Plant and Equipment at Kwei Chau Street	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1030	Excavate land mains at Kwei Chau Street (CH(TKWLL)700 - 850)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1040	Lay land mains at Kwei Chau Street (CH(TKWLL)700 - 850)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1050	Backfill land mains at Kwei Chau Street (CH(TKWLL)700 - 850)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1480	Mobilization of Plant and Equipment at Wai King Street	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1500	Excavate land mains at Wai King Street (CH(TKWLL) 850 - 990)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1510	Lay land mains at Wai King Street (CH(TKWLL) 850 - 990)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1520	Backfill land mains at Wai King Street (CH(TKWLL) 850 - 990)	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-1980	Mobilization of Plant and Equipment at San Ma Tau Street	0	13-Jun-12 A	14-Jun-12 A				100%
TG-CC-C2-A-2000	Excavate land mains at San Ma Tau Street (CH(TKWLL) 990 - 1152)	0	14-Jun-12 A	03-Mar-14 A				100%
TG-CC-C2-A-2010	Lay land mains at San Ma Tau Street (CH(TKWLL) 990 - 1152)	0	18-Jul-12 A	03-Mar-14 A				100%
TG-CC-C2-A-2020	Backfill land mains at San Ma Tau Street (CH(TKWLL) 990 - 1152)	0	20-Jul-12 A	03-Mar-14 A				100%
TG-CC-C2-A-2950	Install Cathodic Protection	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-2960	Final Air Testing	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-2970	Hydrostatic Testing	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-2980	Vacuum Drying	0	03-Mar-14 A	03-Mar-14 A				100%
TG-CC-C2-A-3000	Connection to Existing IPB network	0	03-Mar-14 A	03-Mar-14 A				100%
Cost Centre D - Landmains and Associated Works at NP (from CH(NPLL)0 to 15.567)		658	17-May-12 A	06-Mar-14 A				100%
Submission, Permit Application and Approval		616	17-May-12 A	26-Oct-13 A				100%
TG-CC-D-A-1000	Submission of Land Pipe Laying Method Statement and Temporary Works Design	24	17-May-12 A	02-Aug-12 A				100%
TG-CC-D-A-1020	Approval of Land Pipe Laying Method Statement and Temporary Works Design	12	02-Aug-12 A	03-Aug-12 A				100%
TG-CC-D-A-1030	Submission of TTA to TD, HKP, Hyd and other Authorities for Pipe Laying	28	14-Oct-13 A	14-Oct-13 A				100%
TG-CC-D-A-1040	Approval of TTA by TD, HKP, Hyd and other Authorities for Pipe Laying	24	14-Oct-13 A	14-Oct-13 A				100%
TG-CC-D-A-1800	Application to RMO for TTA at the Footpath of Hoi Yu Street	12	25-Oct-13 A	26-Oct-13 A				100%
Construction Activities		42	05-Nov-13 A	06-Mar-14 A				100%
TG-CC-D-A-3010	Implementation of TTA	3	05-Nov-13 A	07-Nov-13 A				100%
TG-CC-D-A-3020	Mobilization of Plant and Equipment to Hoi Yu Street	3	07-Nov-13 A	08-Nov-13 A				100%
TG-CC-D-A-3030	Trench Excavation for Land Mains along the Footpath of Hoi Yu Street	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3040	Lay Land Mains along the Footpath of Hoi Yu Street	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3050	Backfill Land Mains along the Footpath of Hoi Yu Street	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3070	Install Cathodic Protection	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3080	Final Air Testing	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3090	Hydrostatic Testing	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3100	Vacuum Drying	0	06-Mar-14 A	06-Mar-14 A				100%
TG-CC-D-A-3300	Connect to Existing IBP at Hoi Yu Street	0	06-Mar-14 A	06-Mar-14 A				100%
Cost Centre E - Daywork		215	20-Mar-14	20-Oct-14	20-Mar-14	20-Oct-14	0	0%
TG-CC-E-A-1000	Daywork	215	20-Mar-14	20-Oct-14	20-Mar-14	20-Oct-14	0	0%
Cost Centre F - Intelligent Pigging Inspection		380	12-Mar-13 A	03-Jun-14	20-May-13	19-Jun-13	-349	80%
Submission, Permit Application and Approval		380	12-Mar-13 A	03-Jun-14	20-May-13	19-Jun-13	-349	80%
TG-CC-F-A-0500	Submission of Intelligent Pigging Inspection Method Statement	72	12-Mar-13 A	19-Mar-13 A				100%
TG-CC-F-A-0510	Approval of Intelligent Pigging Inspection Method Statement	24	20-Mar-13 A	21-Mar-14	20-May-13	22-May-13	-303	91.67%
TG-CC-F-A-1020	Submission of Draft Report of Intelligent Pigging Inspection	6	19-May-14	24-May-14	03-Jun-13	09-Jun-13	-349	0%
TG-CC-F-A-1040	Submission of Final Report of Intelligent Pigging Inspection	10	25-May-14	03-Jun-14	09-Jun-13	19-Jun-13	-349	0%
Construction Activities		7	12-May-14	18-May-14	22-May-13	29-May-13	-354	0%
TG-CC-F-A-1100	Carry Out Intelligent Pigging Inspection	7	12-May-14	18-May-14	22-May-13	29-May-13	-354	0%



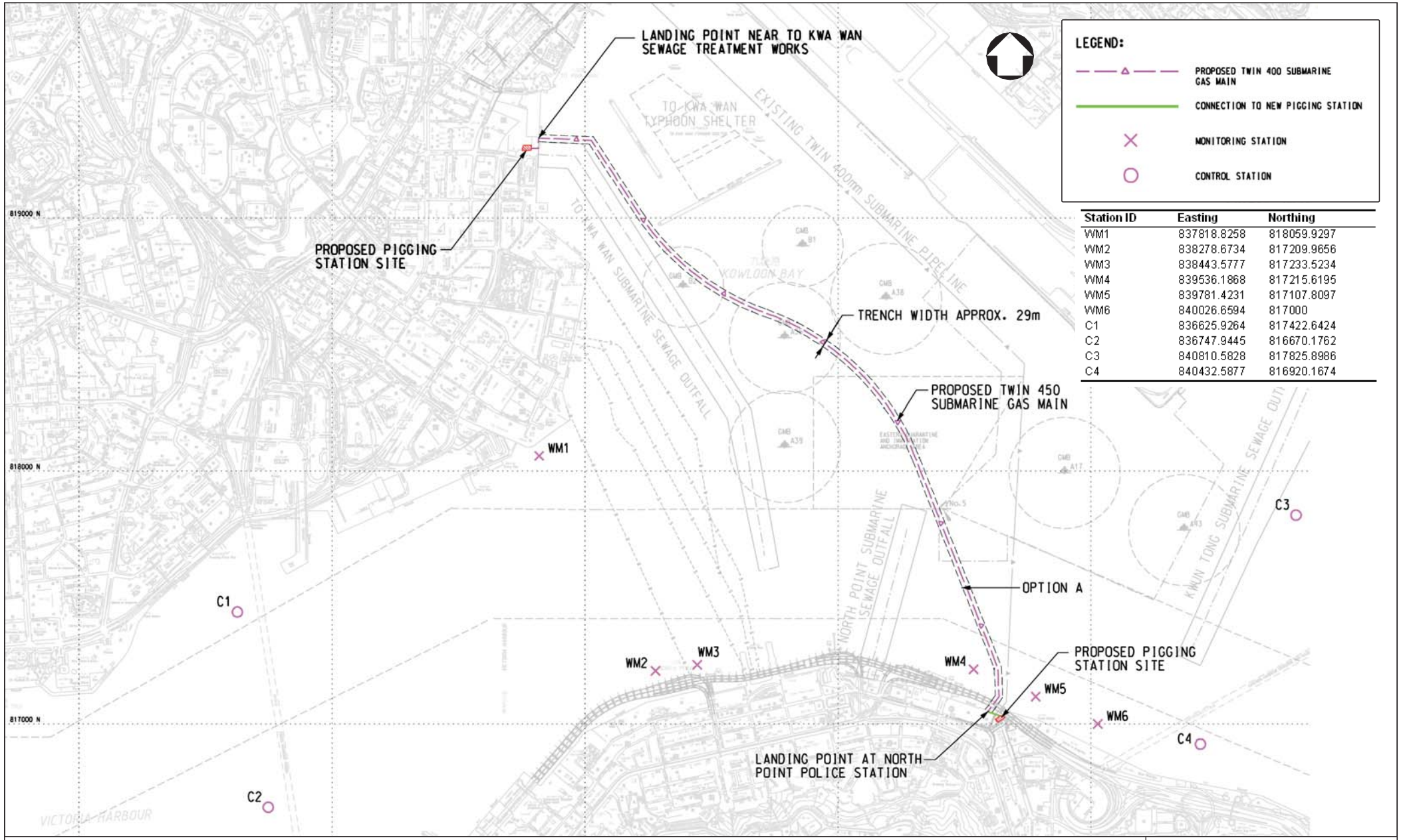
Remaining Level of Effort | Actual Work | Critical Remaining Work | Milestone

Primary Baseline | Remaining Work | Baseline Milestone | Summary

20-Mar-14

Annex D

Marine Water Quality Monitoring



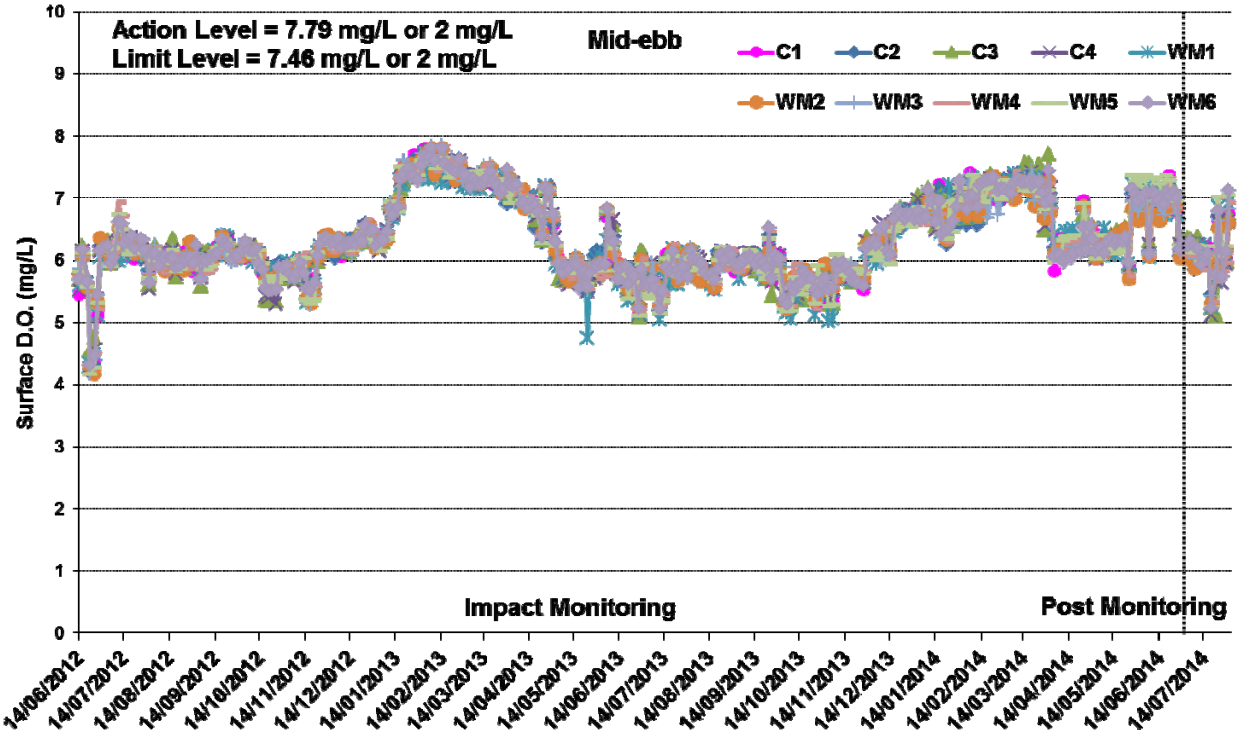
Annex D1

Location of Water Quality Monitoring Stations

FILE: 0158059c
DATE: 03/04/2012

Environmental Resources Management

ERM



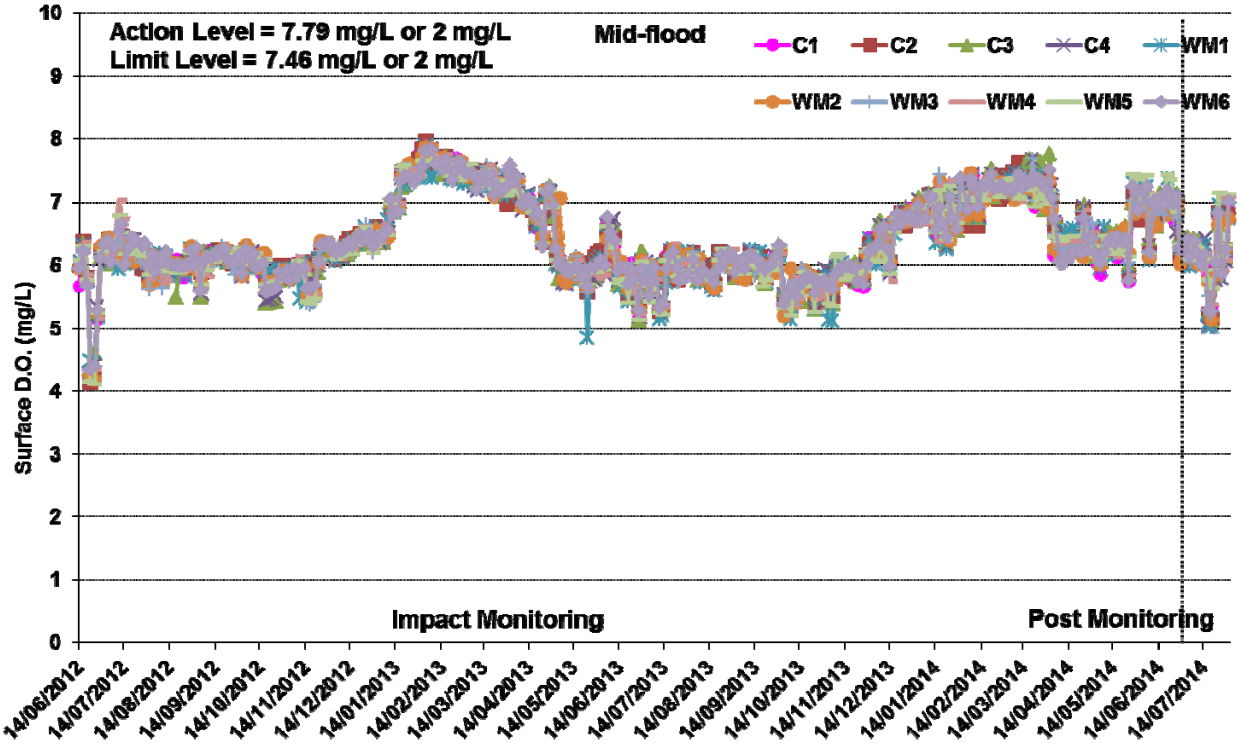
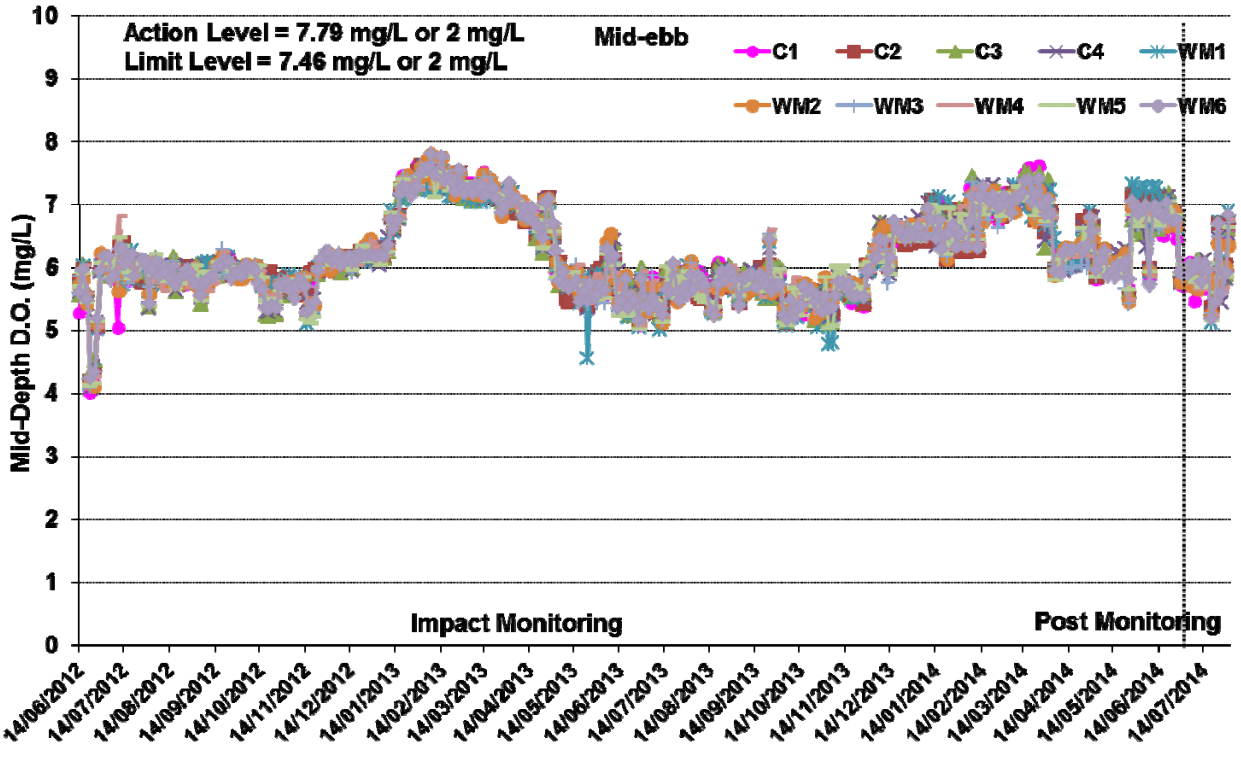


Figure D2 Impact and Post Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 14 June 2012 and 31 July 2014 at Monitoring Stations for Marine Works.

Ref: 0158059 Annex D2_Impact-WQ_Graph June to July 2014.xls



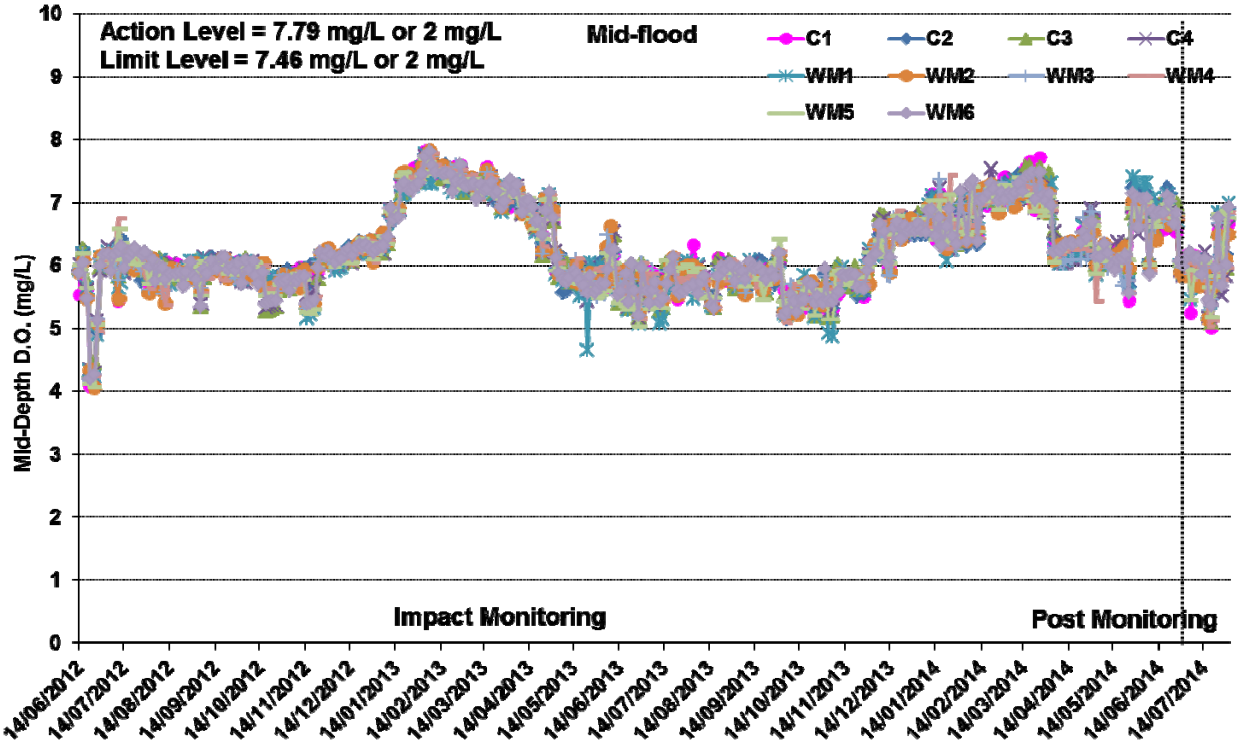


Figure D3 Impact and Post Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 14 June 2012 and 31 July 2014 at Monitoring Stations for Marine Works.

Ref: 0158059 Annex B3_Impact-WQ_Graph June to July 2014.xls

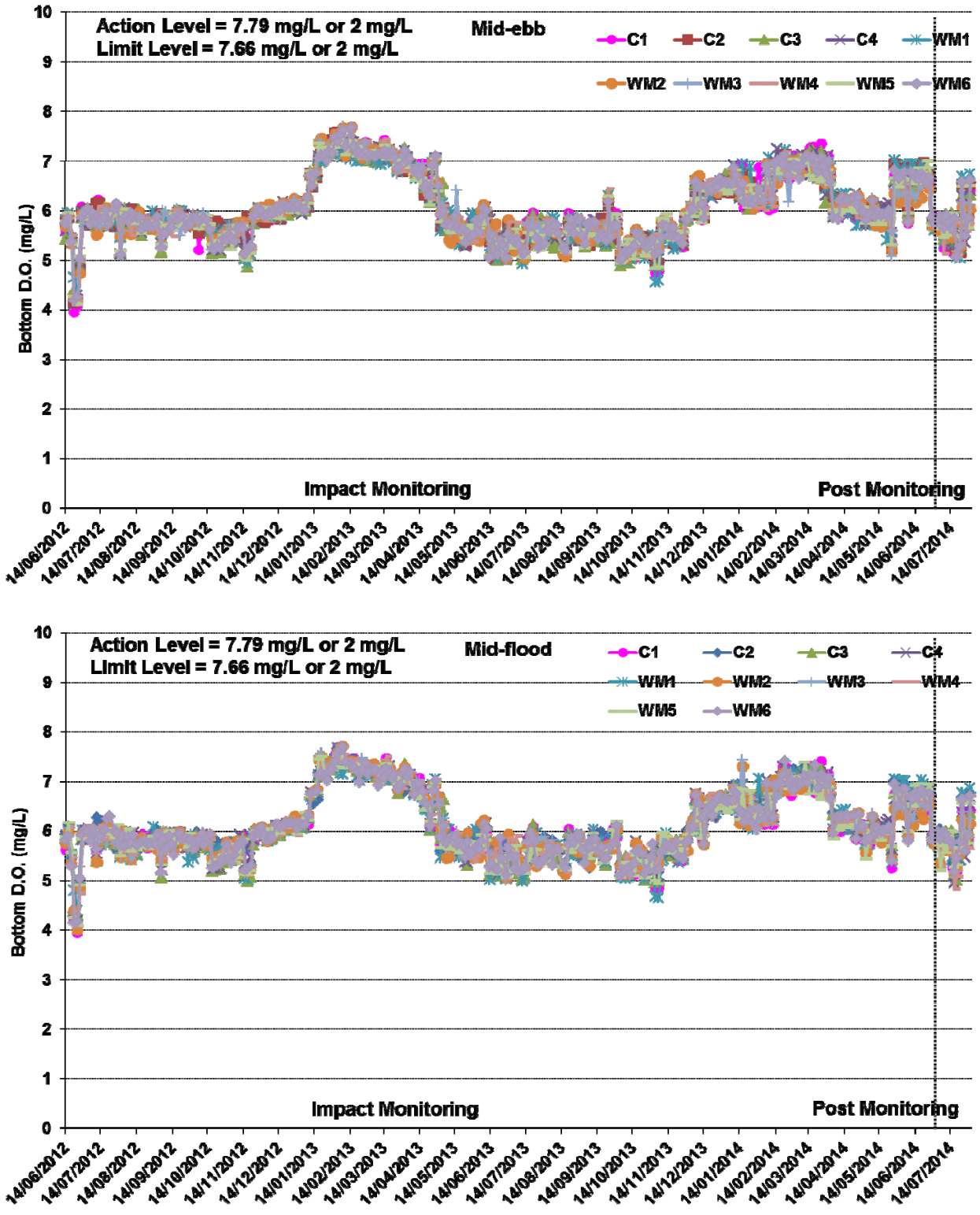


Figure D4 Impact and Post Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters between 14 June 2012 and 31 July 2014 at Monitoring Stations for Marine Works.

Ref: 0158059 Annex D2_Impact-WQ_Graph June to July 2014.xls

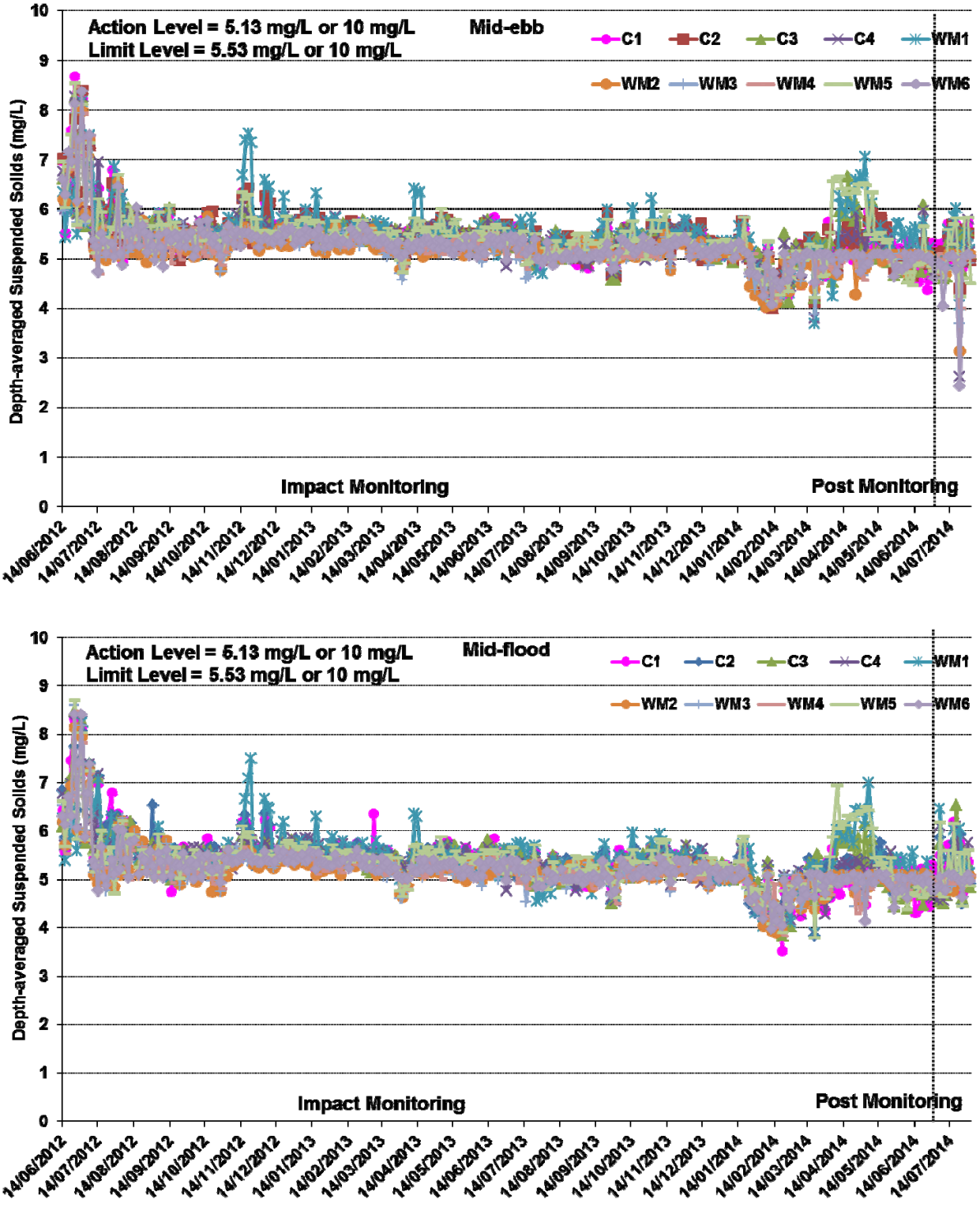


Figure D5 Impact and Post Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 14 June 2012 and 31 July 2014 at Monitoring Stations for Marine Works.

Ref: 0158059 Annex D2_Impact-WQ_Graph June to July 2014.xls

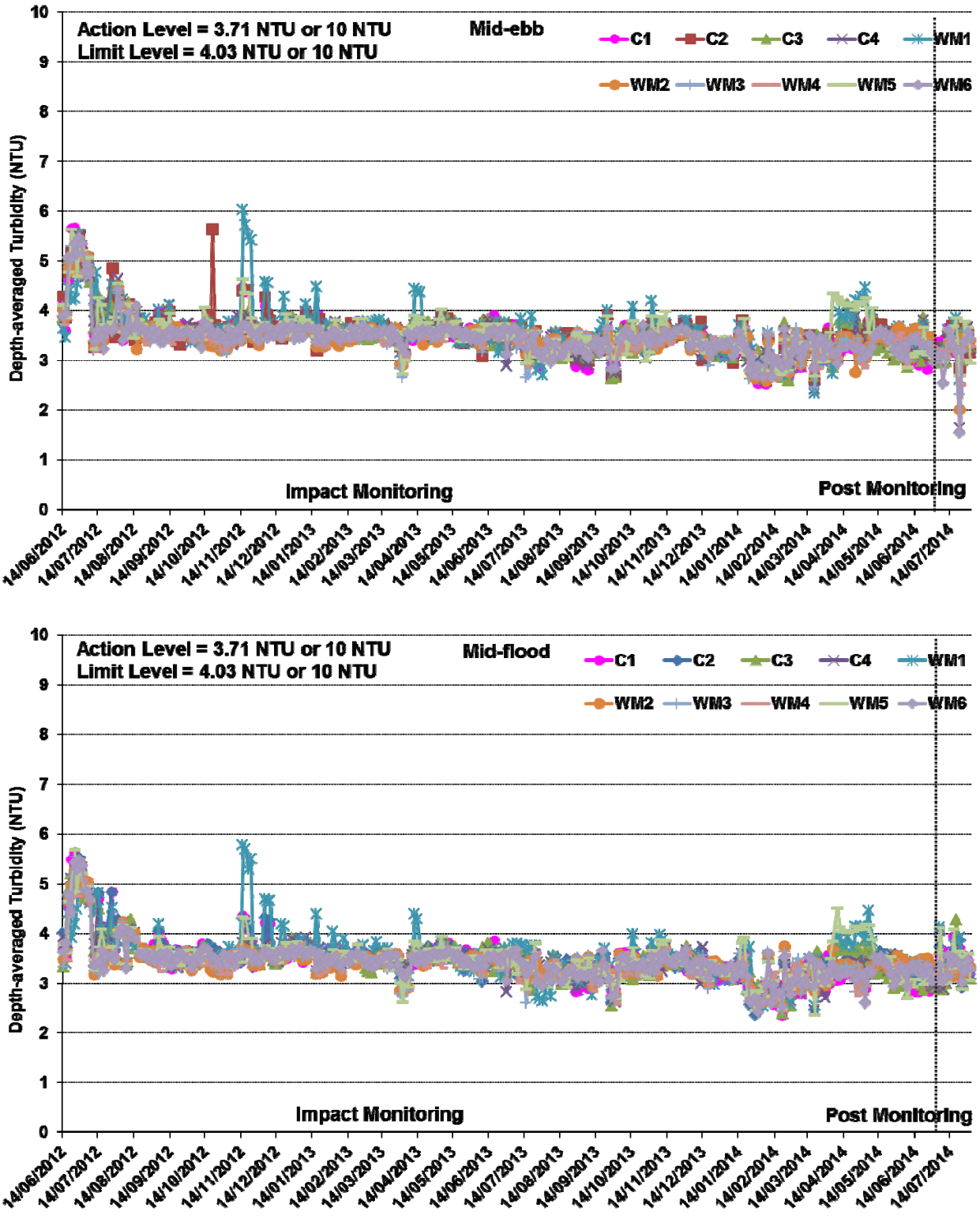
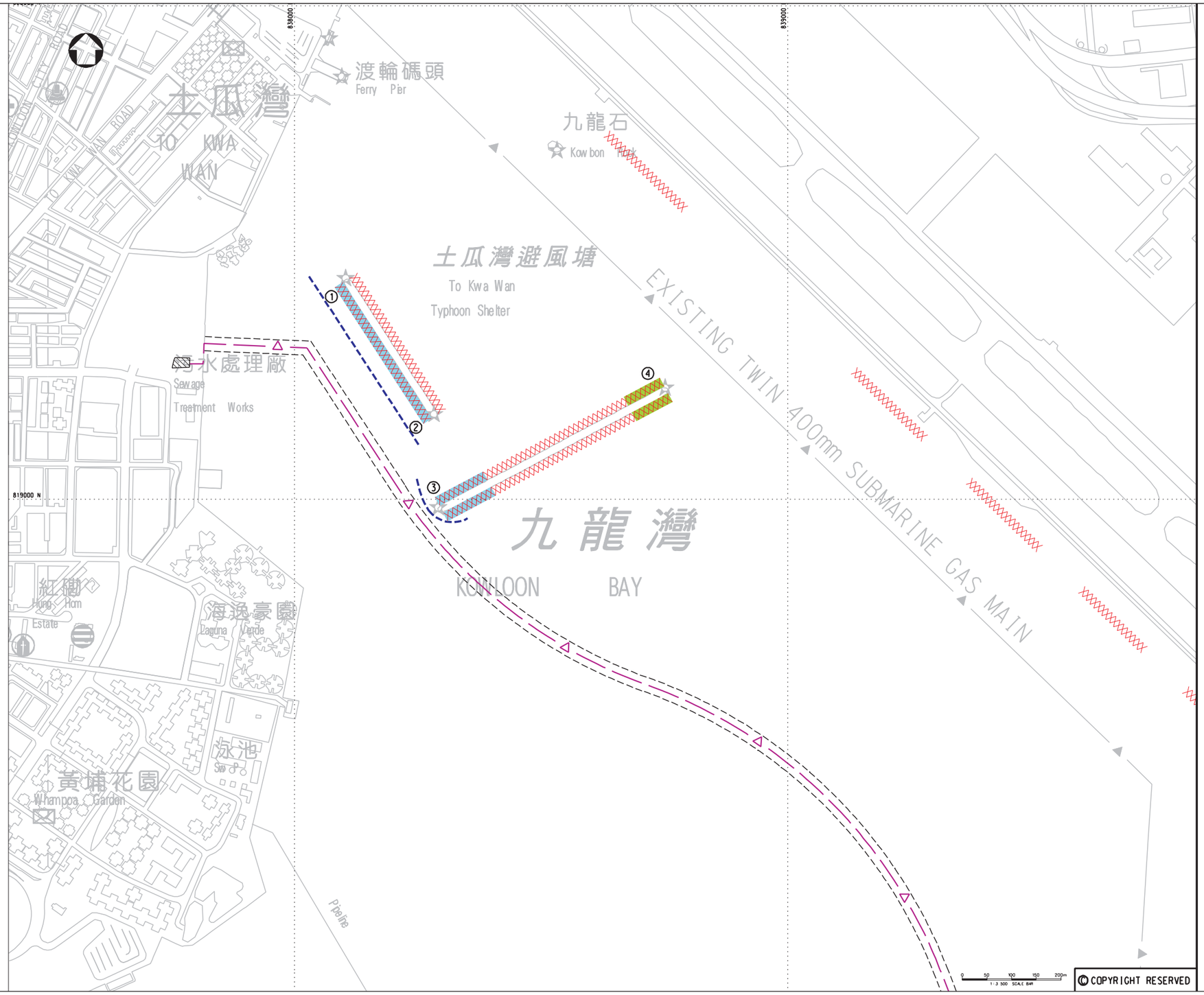


Figure D6 Impact and Post Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 14 June 2012 and 31 July 2014 at Monitoring Stations for Marine Works.

Ref: 0158059 Annex D2_Impact-WQ_Graph June to July 2014.xls

Annex E

Marine Ecology



LEGEND:

- EXISTING TWIN 400 SUBMARINE GAS MAIN
- PROPOSED SUBMARINE GAS MAIN
- ALIGNMENT OF THE MOVING SECOND SILT CURTAIN
- CORAL COMMUNITIES
- CORAL IMPACT MONITORING SITES
- CORAL CONTROL SITE
- ① — ③ IMPACT MONITORING SITES
- ④ CONTROL SITE

Annex E1

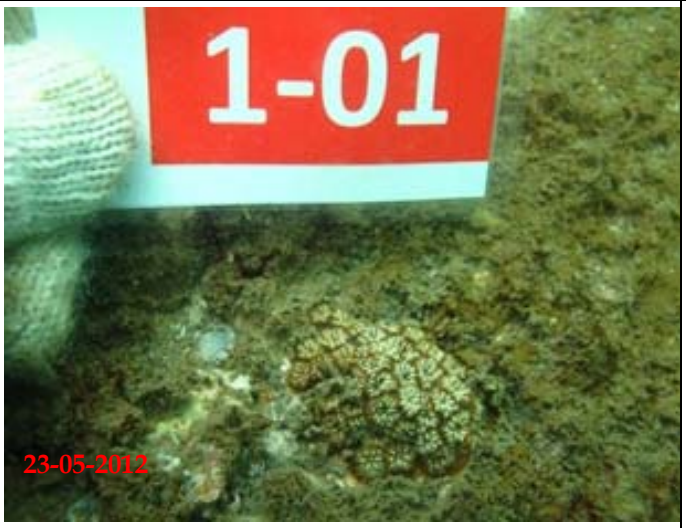
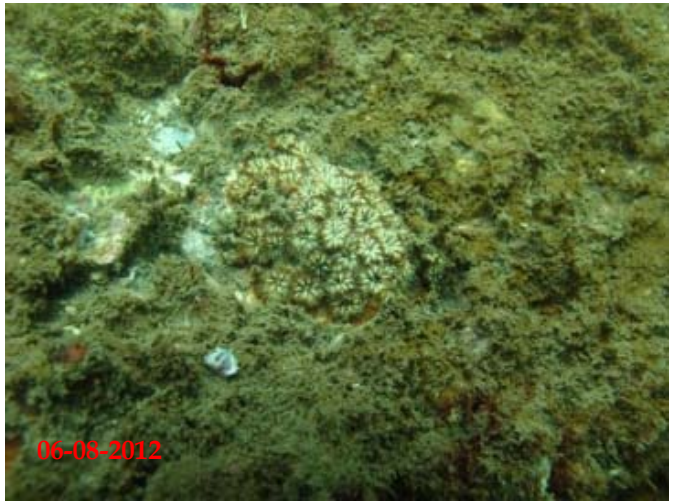
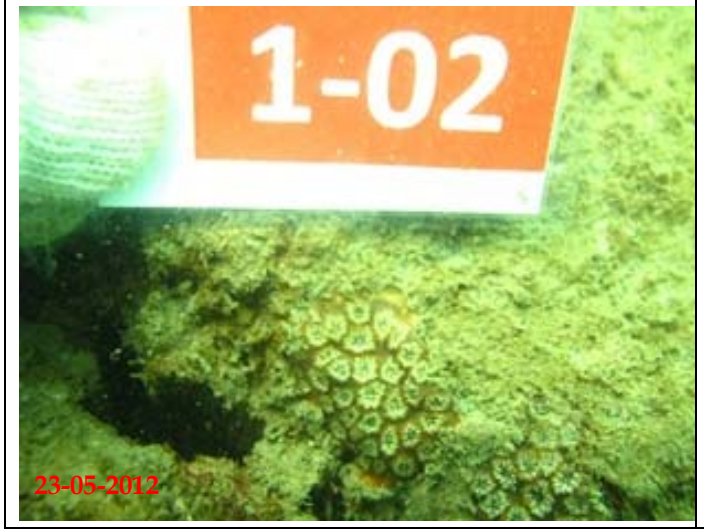
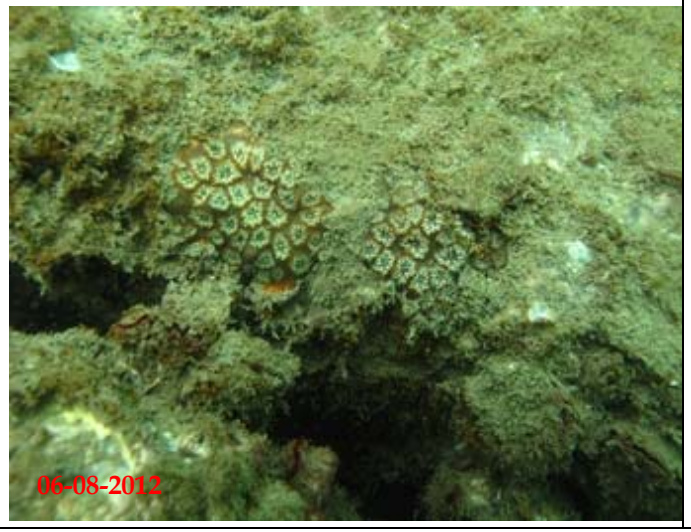
Locations of Coral Monitoring Sites at To Kwa Wan Breakwaters

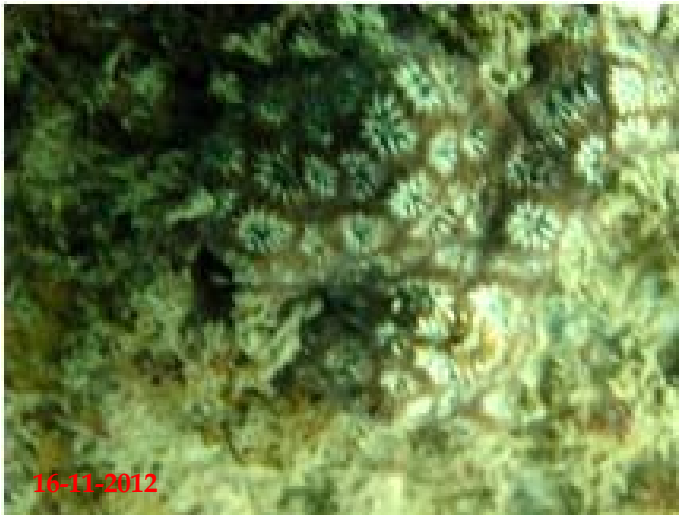
FILE: 0158059e
DATE: 30/05/2012

Environmental Resources Management

ERM

Annex E2 Photographic Records of Tagged Coral Colonies at Impact Monitoring Site (Area 1) during the Baseline and Impact Monitoring Surveys

Baseline 23 May 2012	Updated Baseline 6 August 2012	Final (Impact) 16 November 2012
		
		

 1-03 23-05-2012	 06-08-2012	 16-11-2012
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23-05-2012


06-08-2012


16-11-2012


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06-08-2012


16-11-2012

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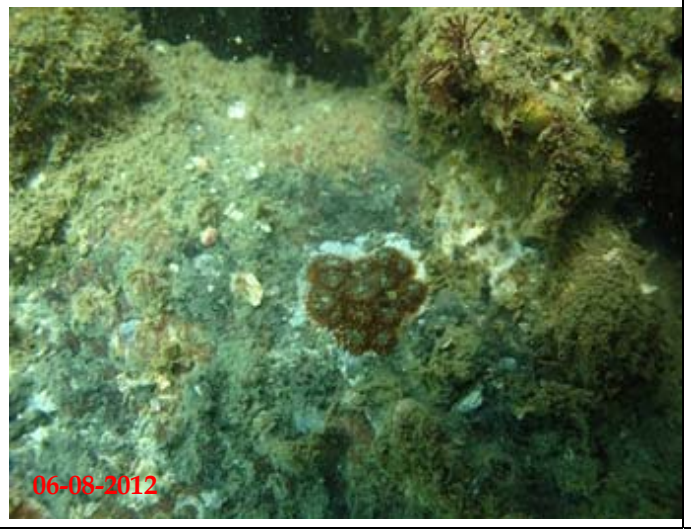
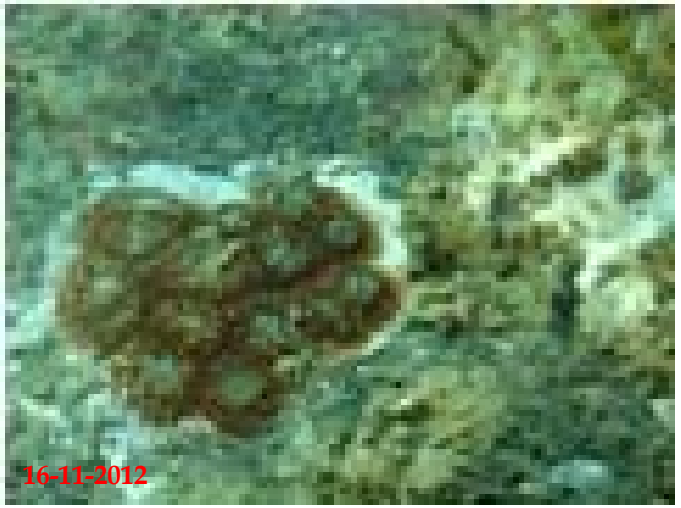
 1-08 23-05-2012	 06-08-2012	 16-11-2012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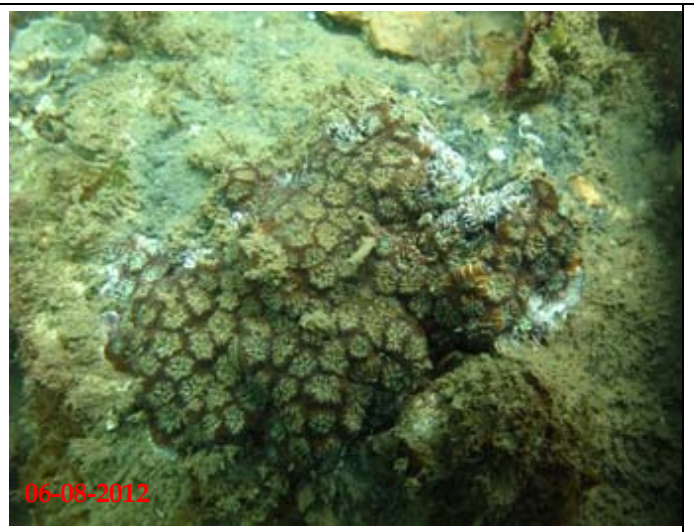
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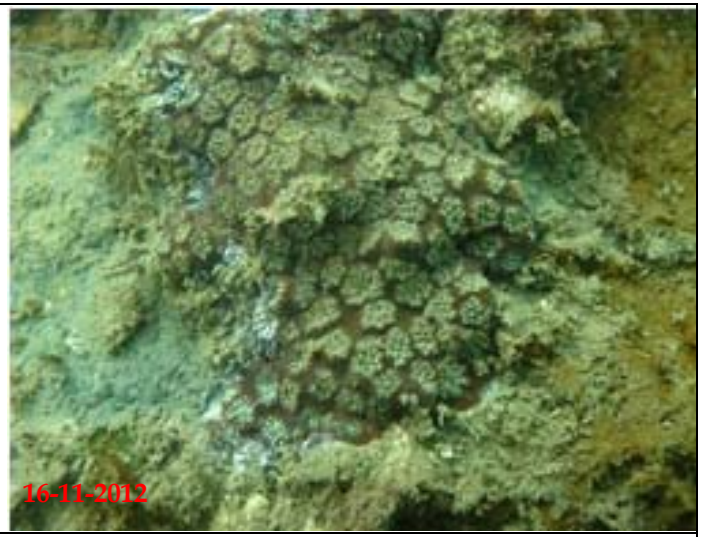
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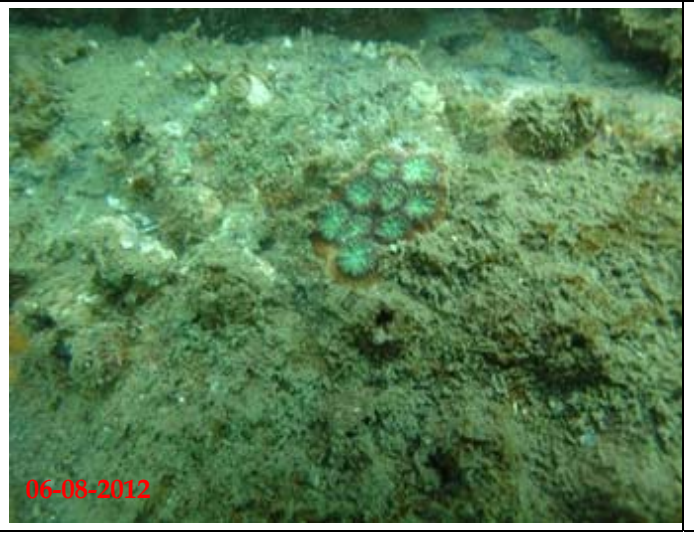
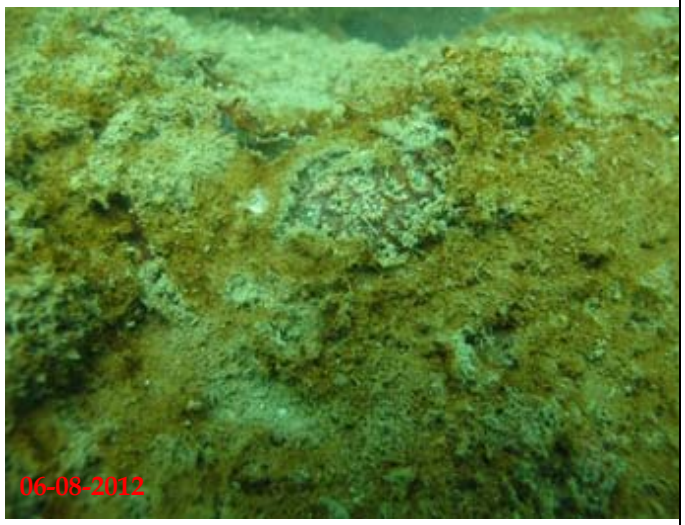
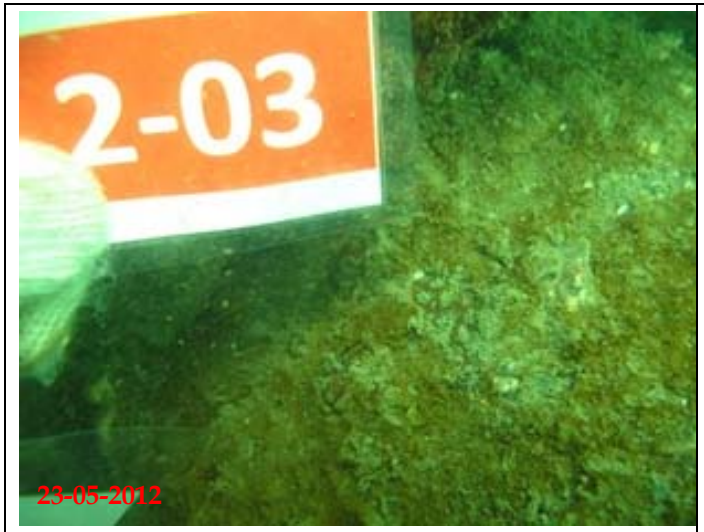
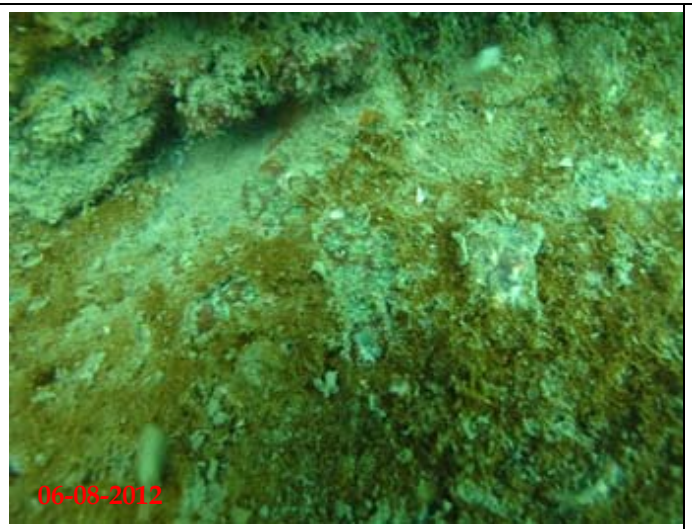
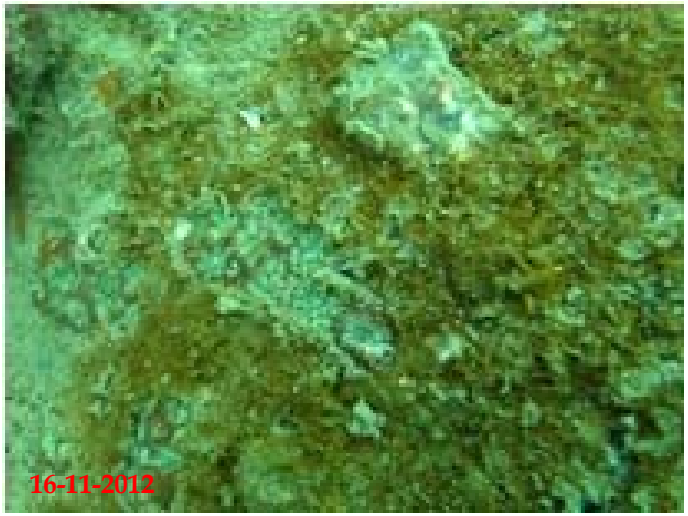
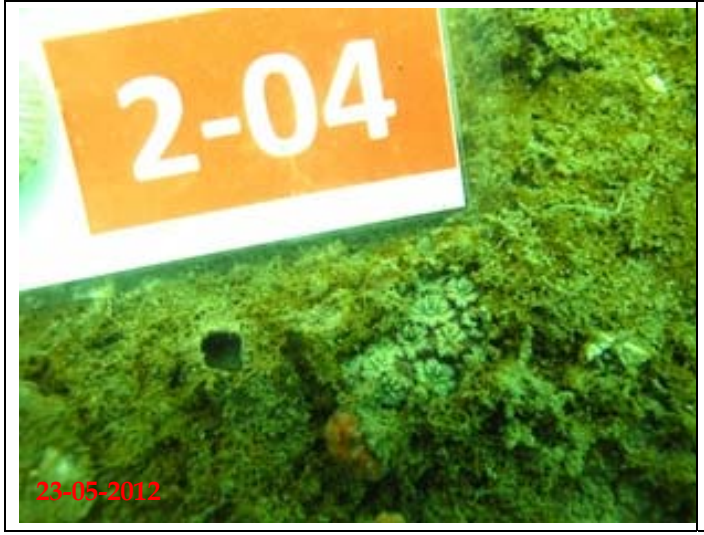
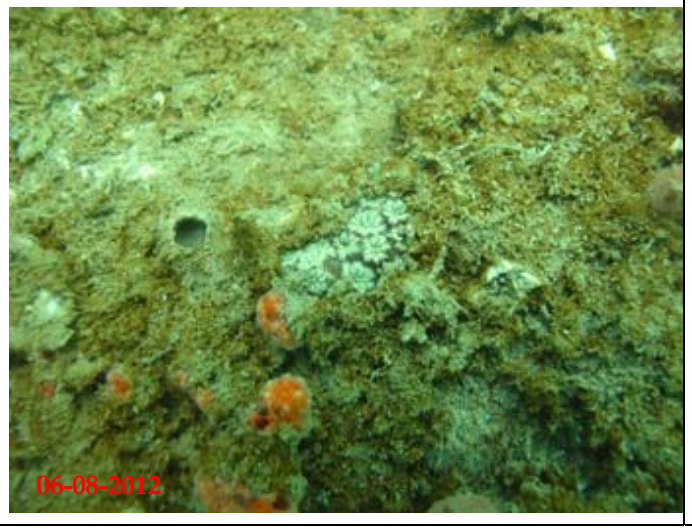

06-08-2012


16-11-2012

Annex E3 Photographic Records of Tagged Coral Colonies at Impact Monitoring Site (Area 2) during Baseline and Impact Monitoring Surveys

Baseline 23 May 2012	Updated Baseline 6 August 2012	Final (Impact) 16 November 2012
		
		

 2-03 23-05-2012	 06-08-2012	 16-11-2012
 2-04 23-05-2012	 06-08-2012	 16-11-2012

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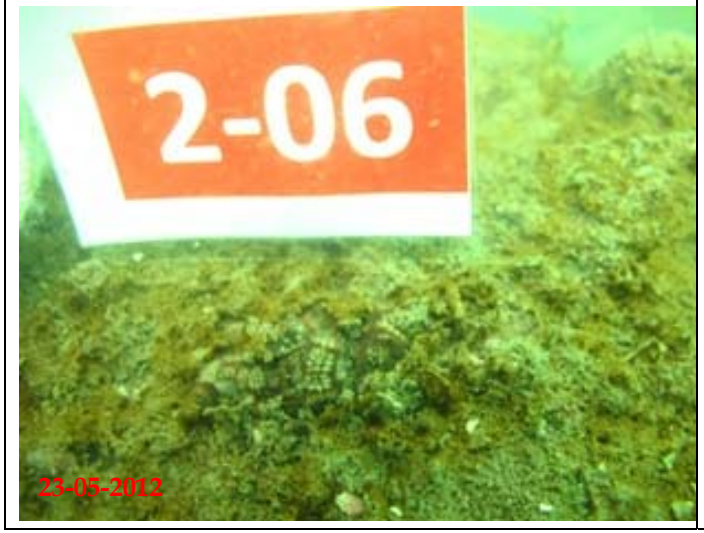
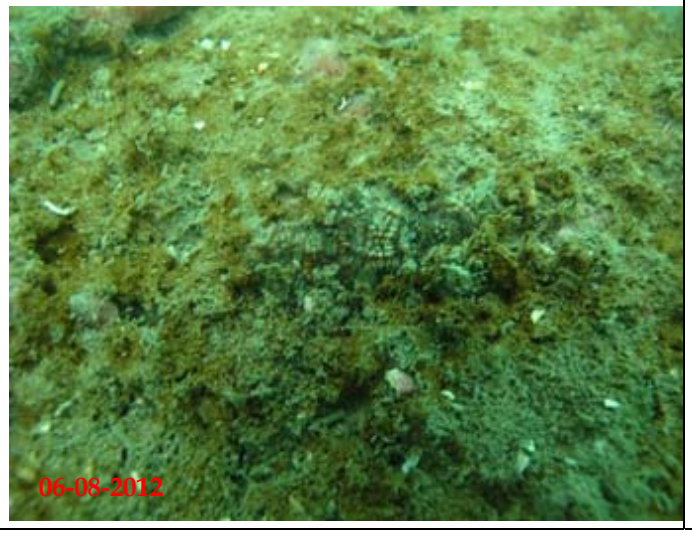
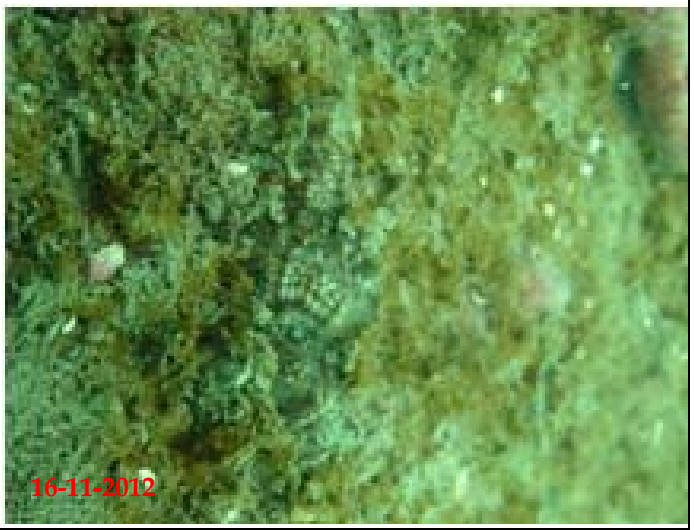
 2-06 23-05-2012	 06-08-2012	 16-11-2012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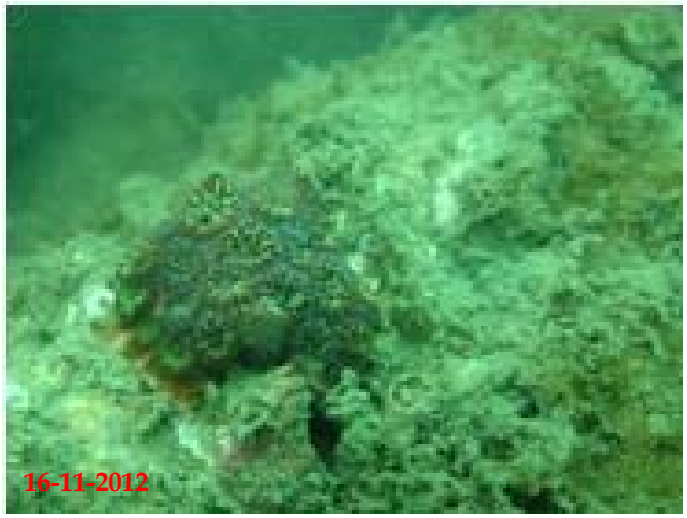
23-05-2012


06-08-2012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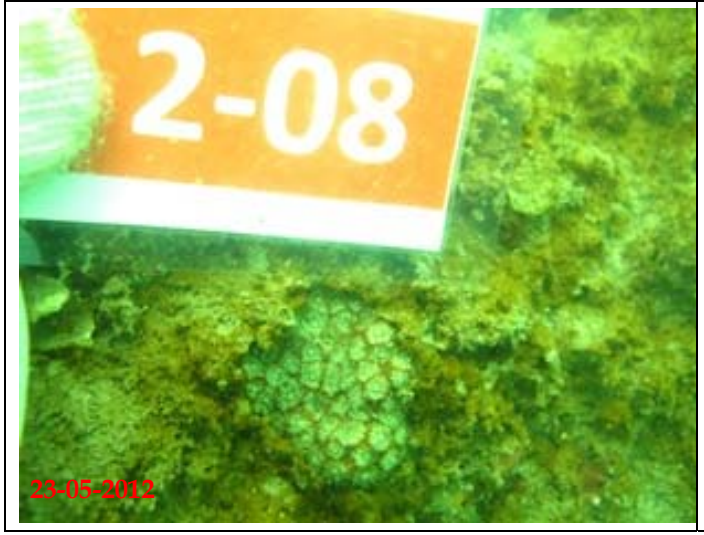
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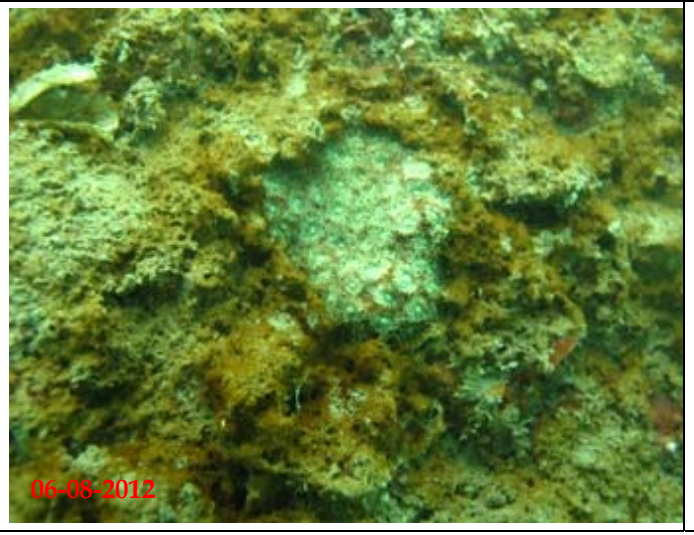
23-05-2012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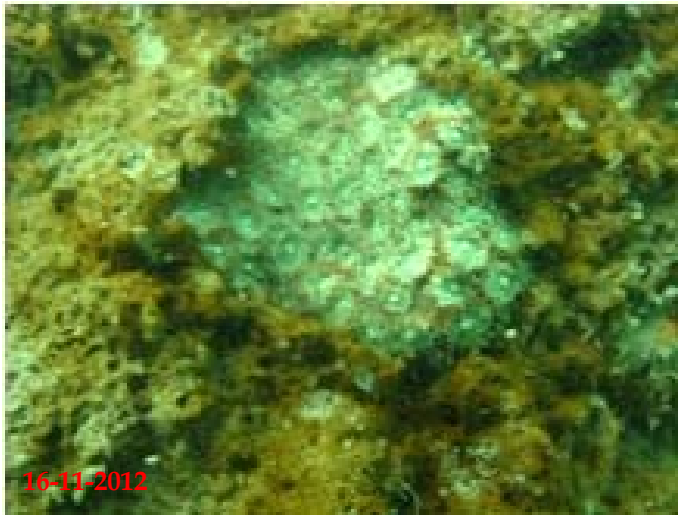
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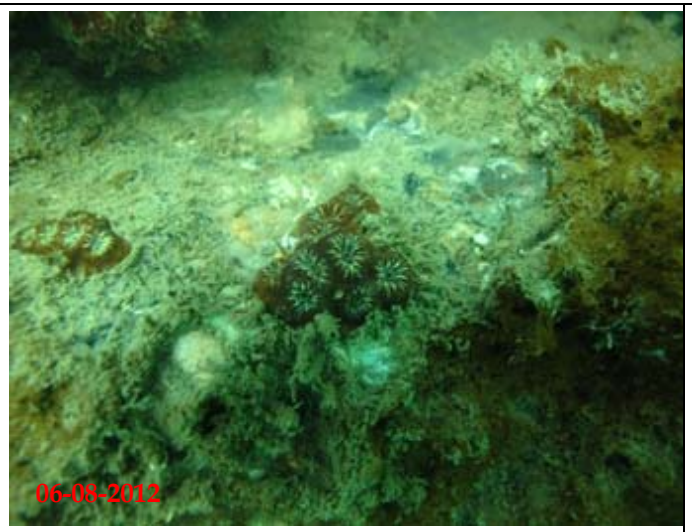
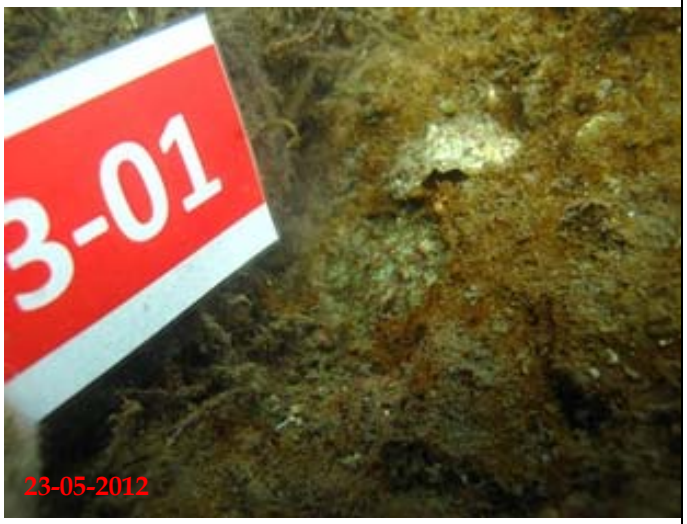
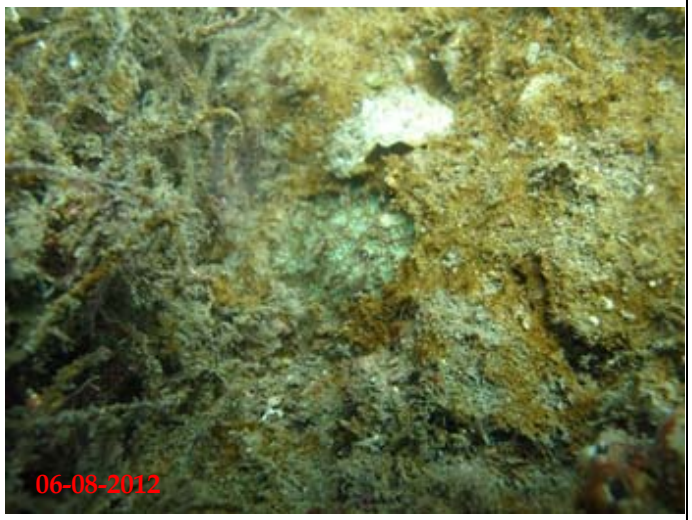
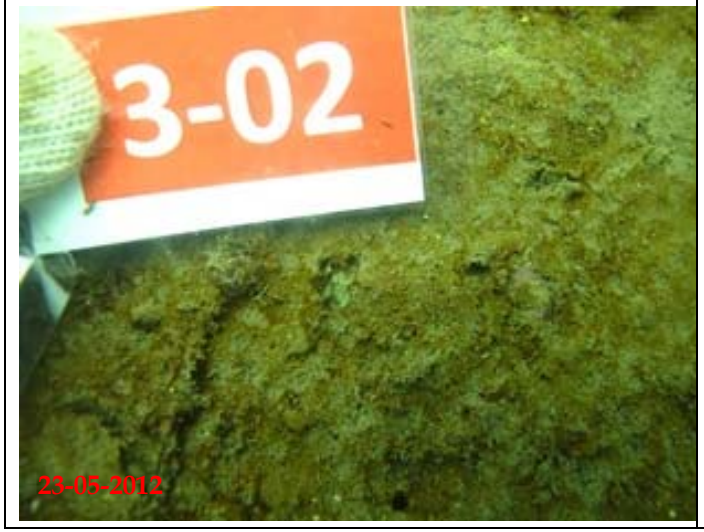
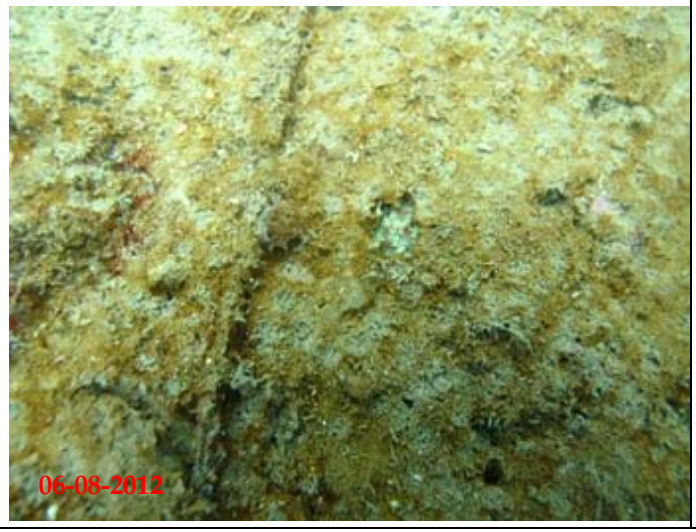
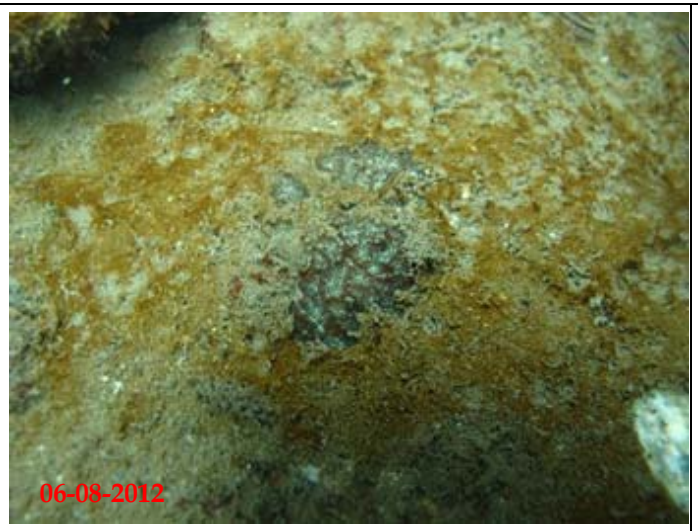
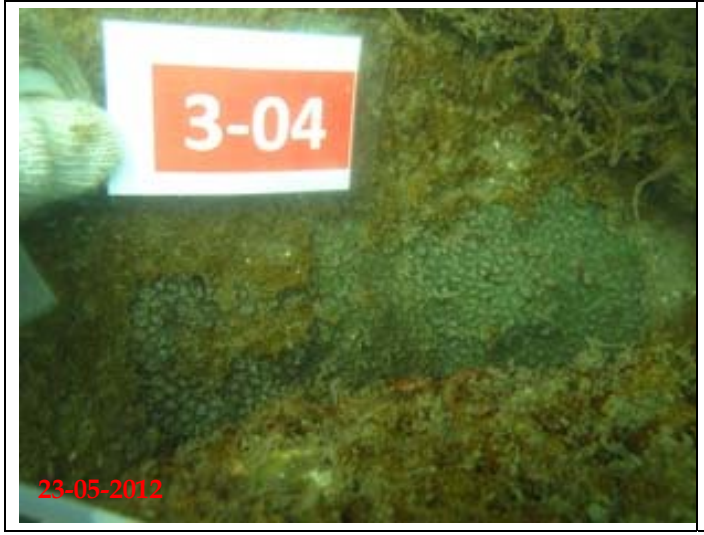
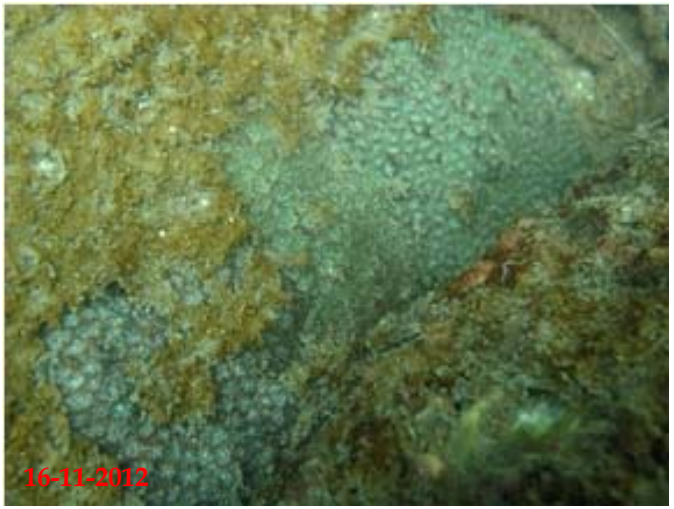
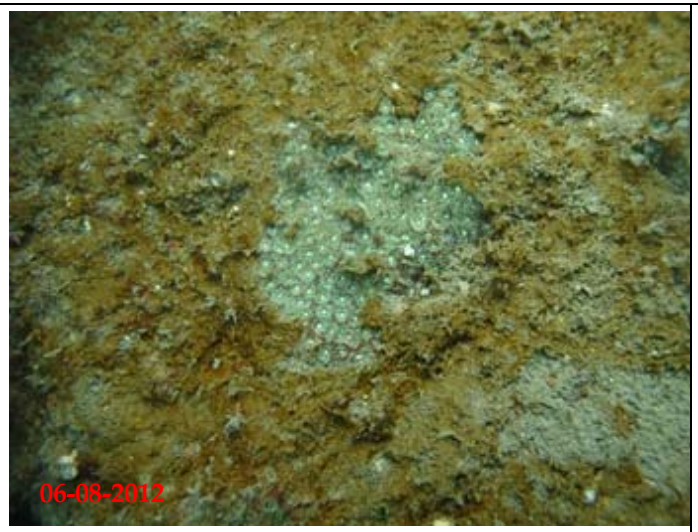
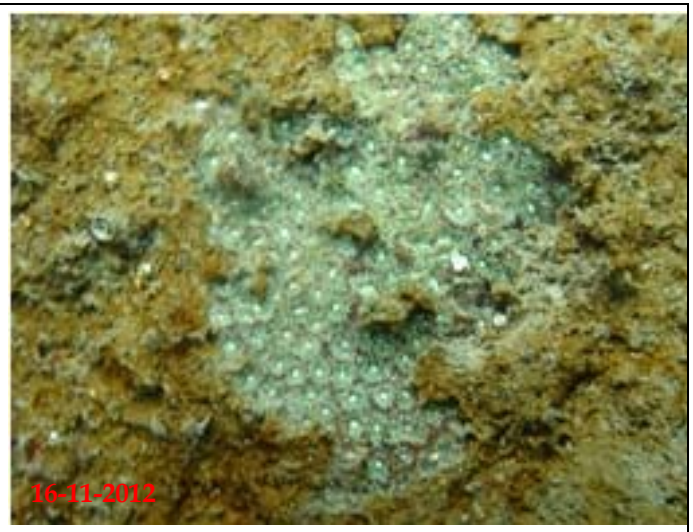
 2-09 23-05-2012	 06-08-2012	 16-11-2012
 2-10 23-05-2012	 06-08-2012	 16-11-2012

Annex E4 Photographic Records of Tagged Coral Colonies at Impact Monitoring Site (Area 3) during Baseline and Impact Monitoring Surveys

Baseline 23 May 2012	Updated Baseline 6 August 2012	Final (Impact) 16 November 2012
		
		

 3-03 23-05-2012	 06-08-2012	 16-11-2012
 3-04 23-05-2012	 06-08-2012	 16-11-2012

 3-05 23-05-2012	 06-08-2012	 16-11-2012
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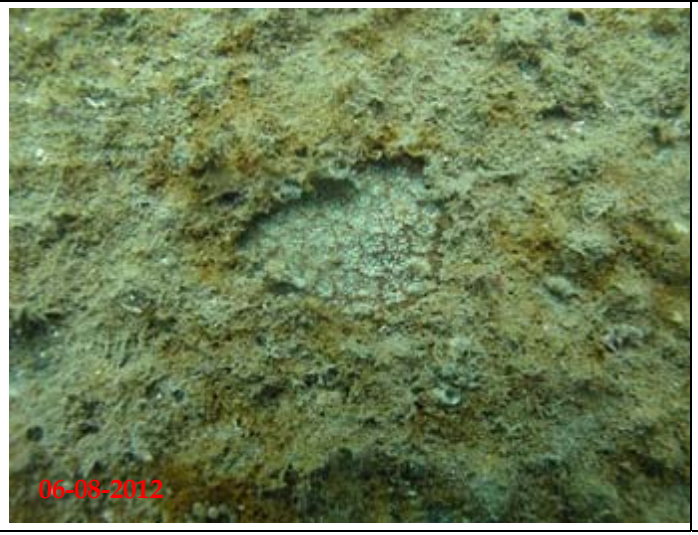
 3-08 23-05-2012	 06-08-2012	 16-11-2012


3-09
23-05-2012


06-08-2012

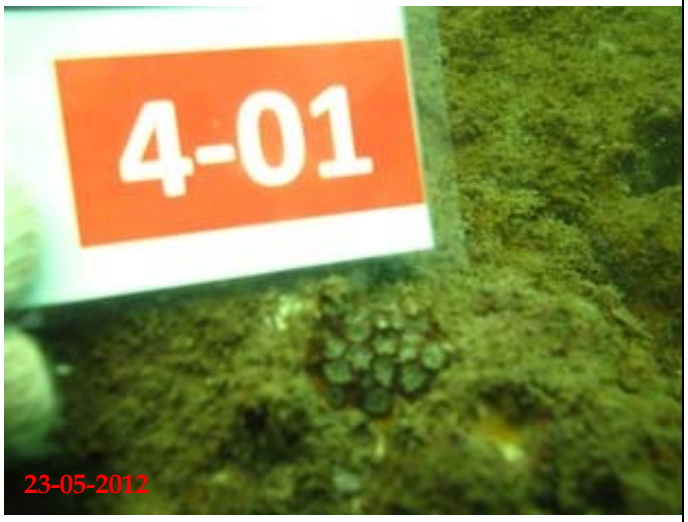
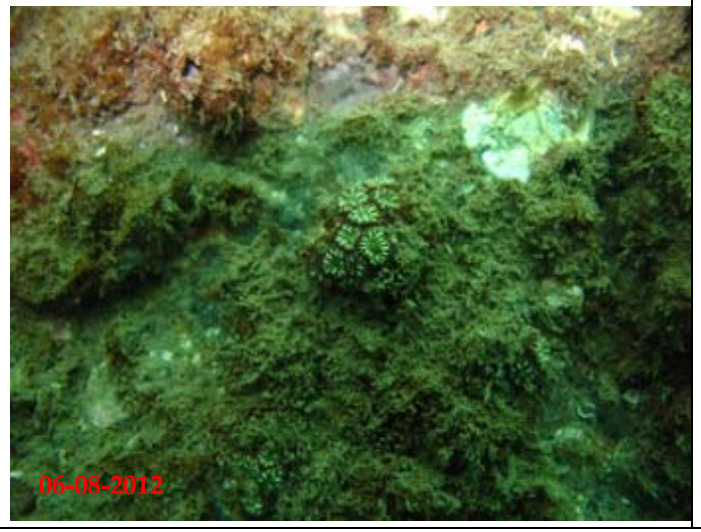

16-11-2012

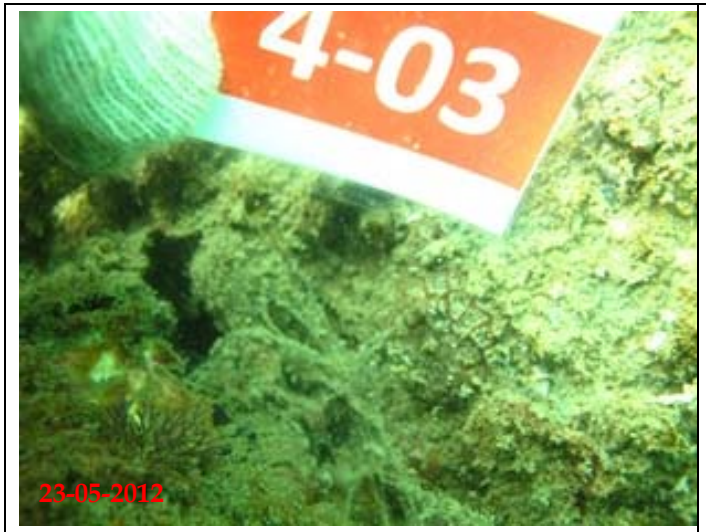
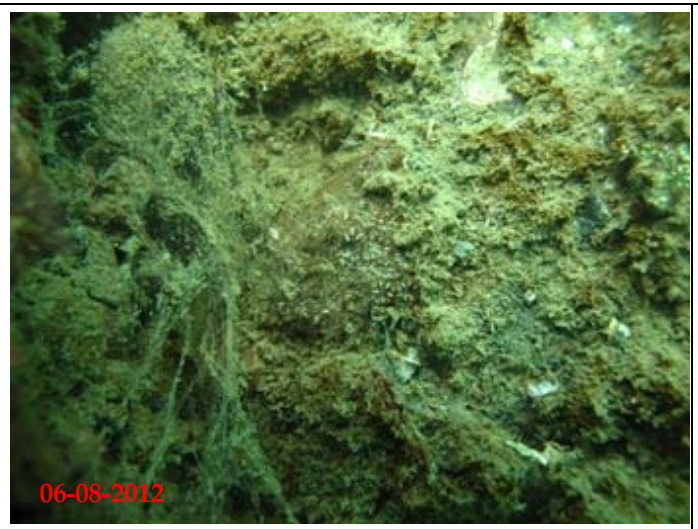
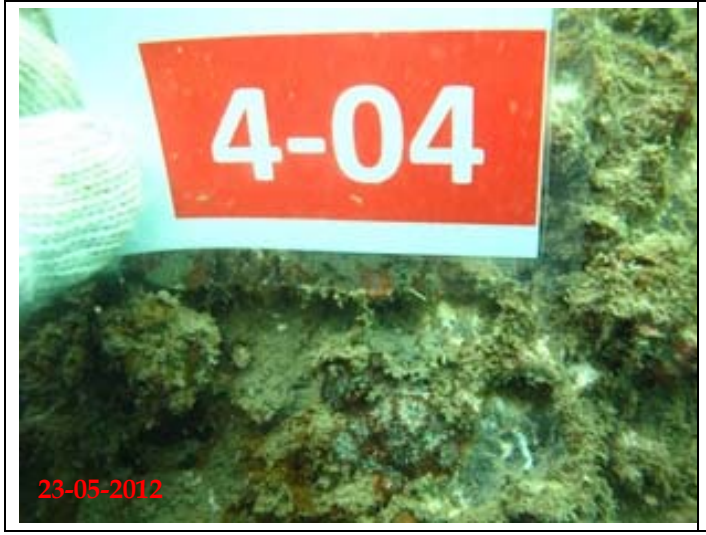
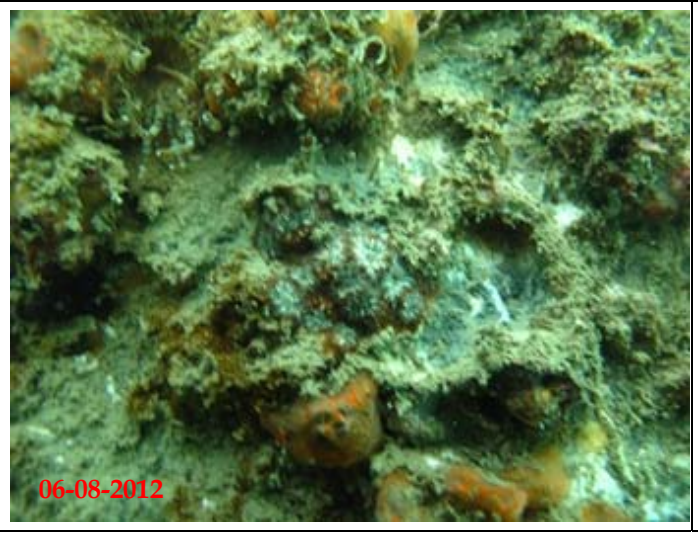

3-10
23-05-2012

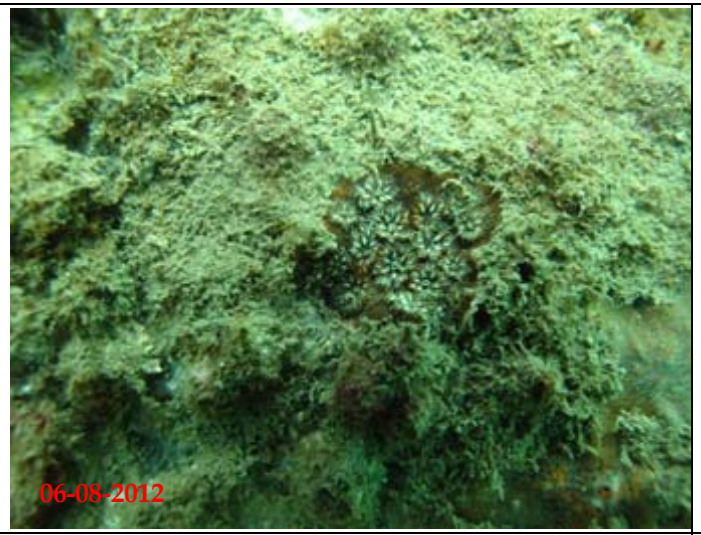
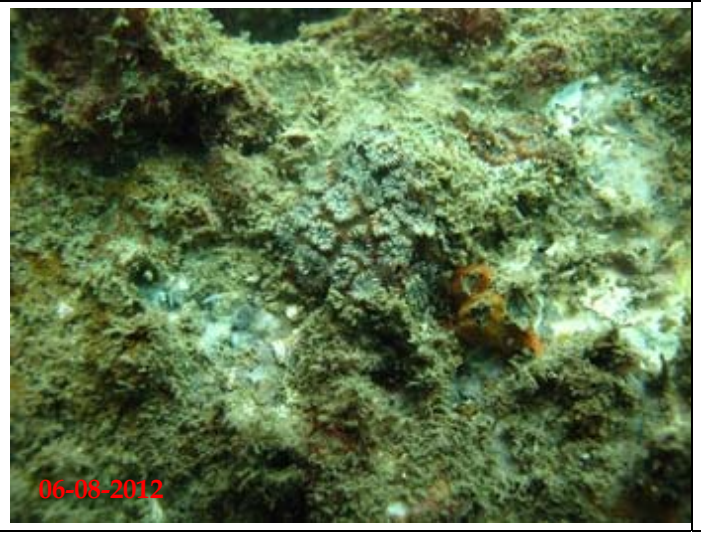

06-08-2012

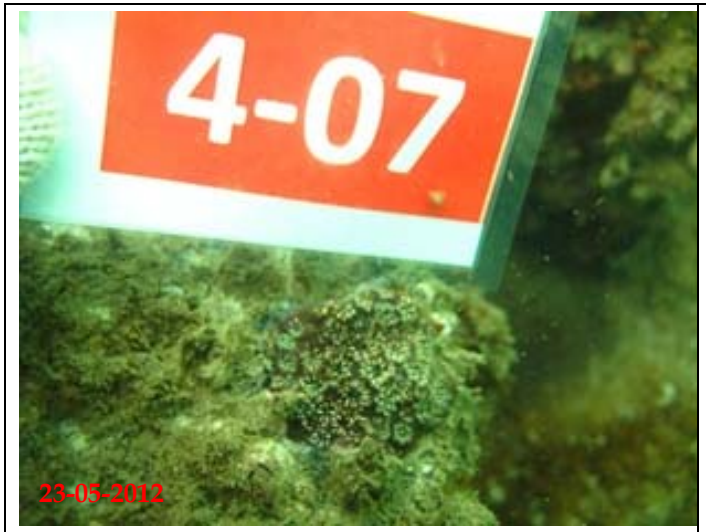

16-11-2012

Annex E5 Photographic Records of Tagged Coral Colonies at Control Site (Area 4) during Baseline and Impact Monitoring Surveys

Baseline 23 May 2012	Updated Baseline 6 August 2012	Final (Impact) 16 November 2012
		
		

 4-03 23-05-2012	 06-08-2012	 16-11-2012
 4-04 23-05-2012	 06-08-2012	 16-11-2012

 4-05 23-05-2012	 06-08-2012	 16-11-2012
 4-06 23-05-2012	 06-08-2012	 16-11-2012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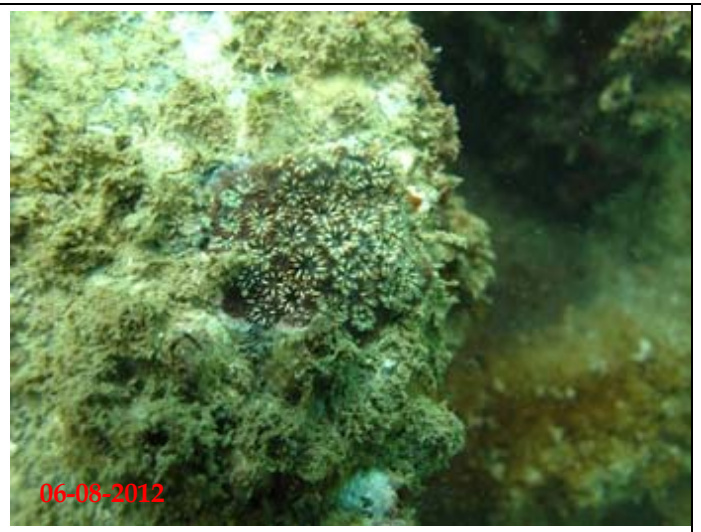
23-05-2012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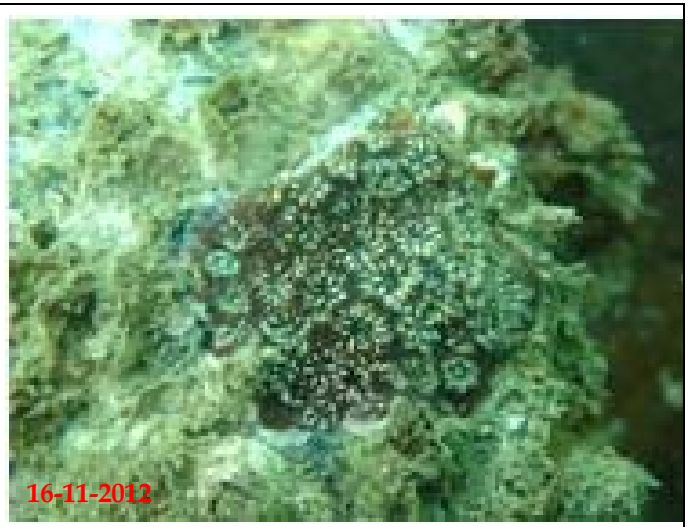
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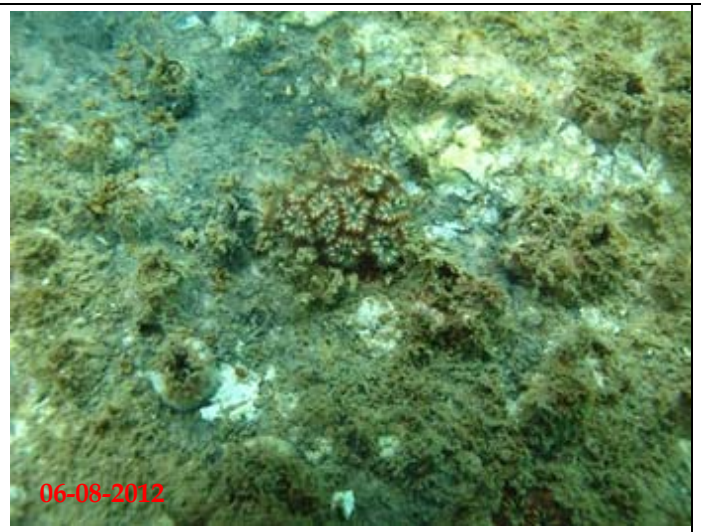
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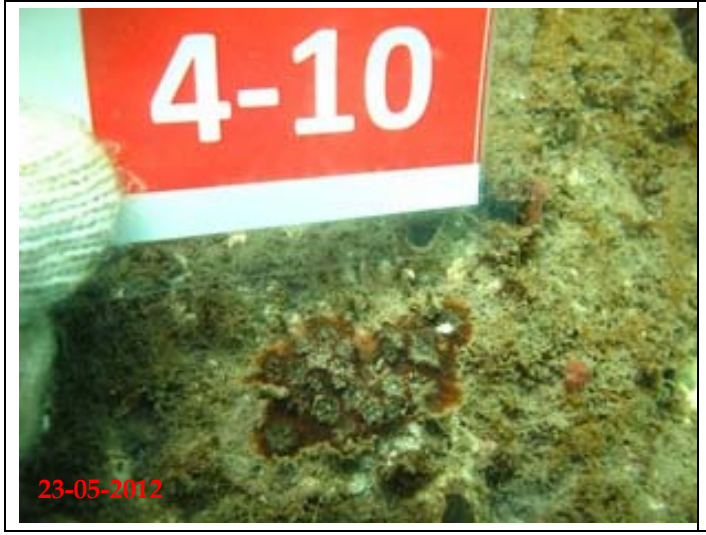
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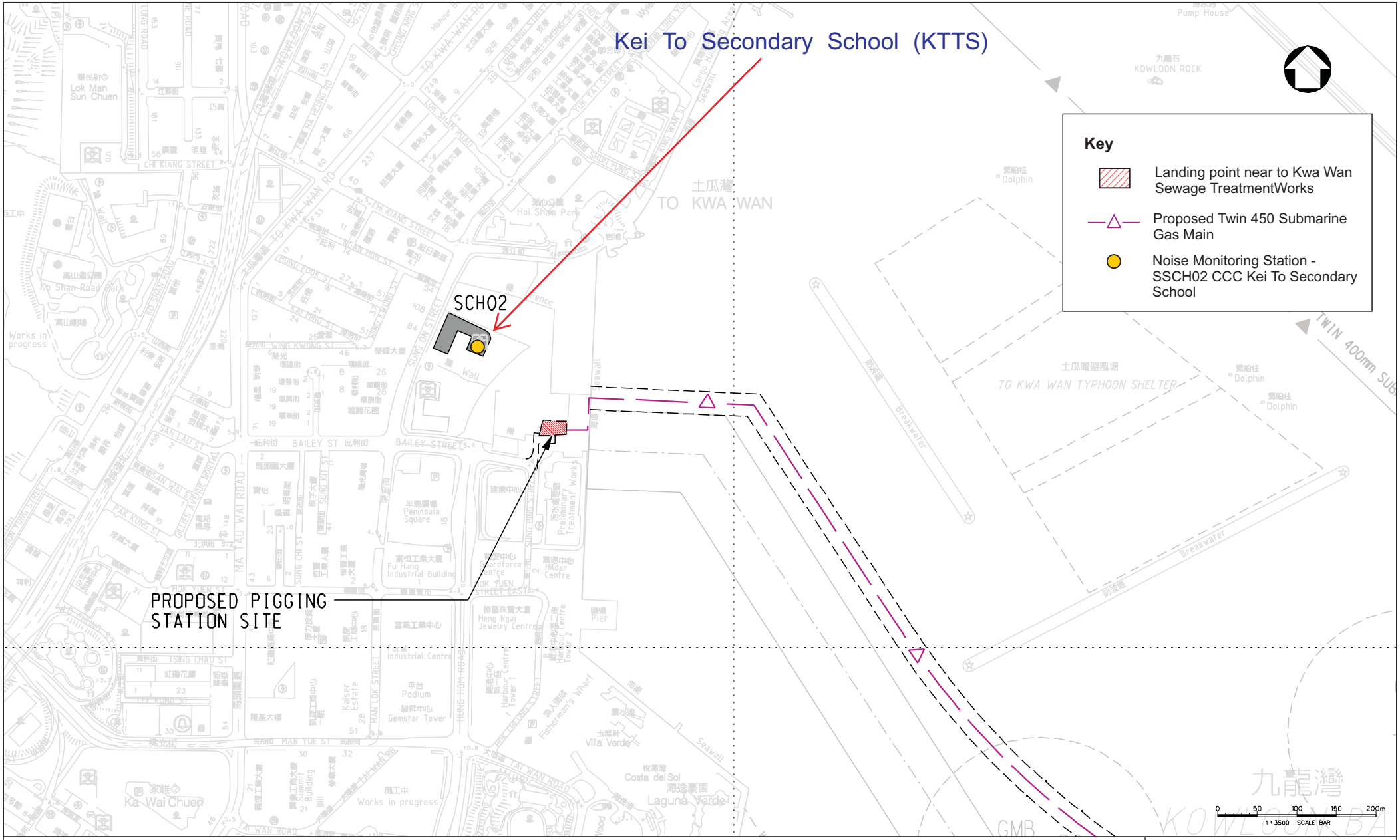
Annex F

Air Borne Noise Monitoring



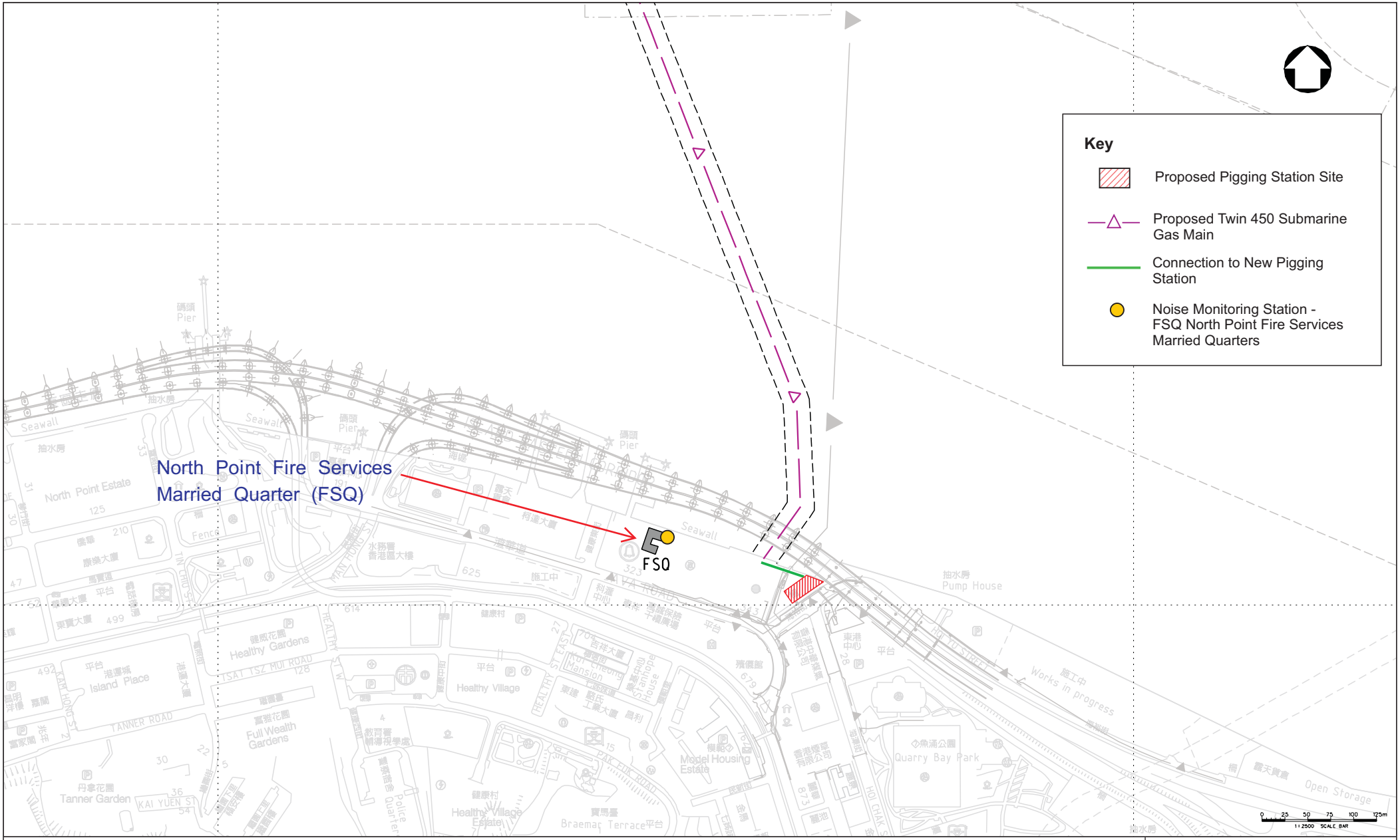
Annex F1

Location of Noise Monitoring Stations (To Kwa Wan)

FILE: 0158059a
DATE: 03/04/2012

Environmental Resources Management

ERM



Annex F2

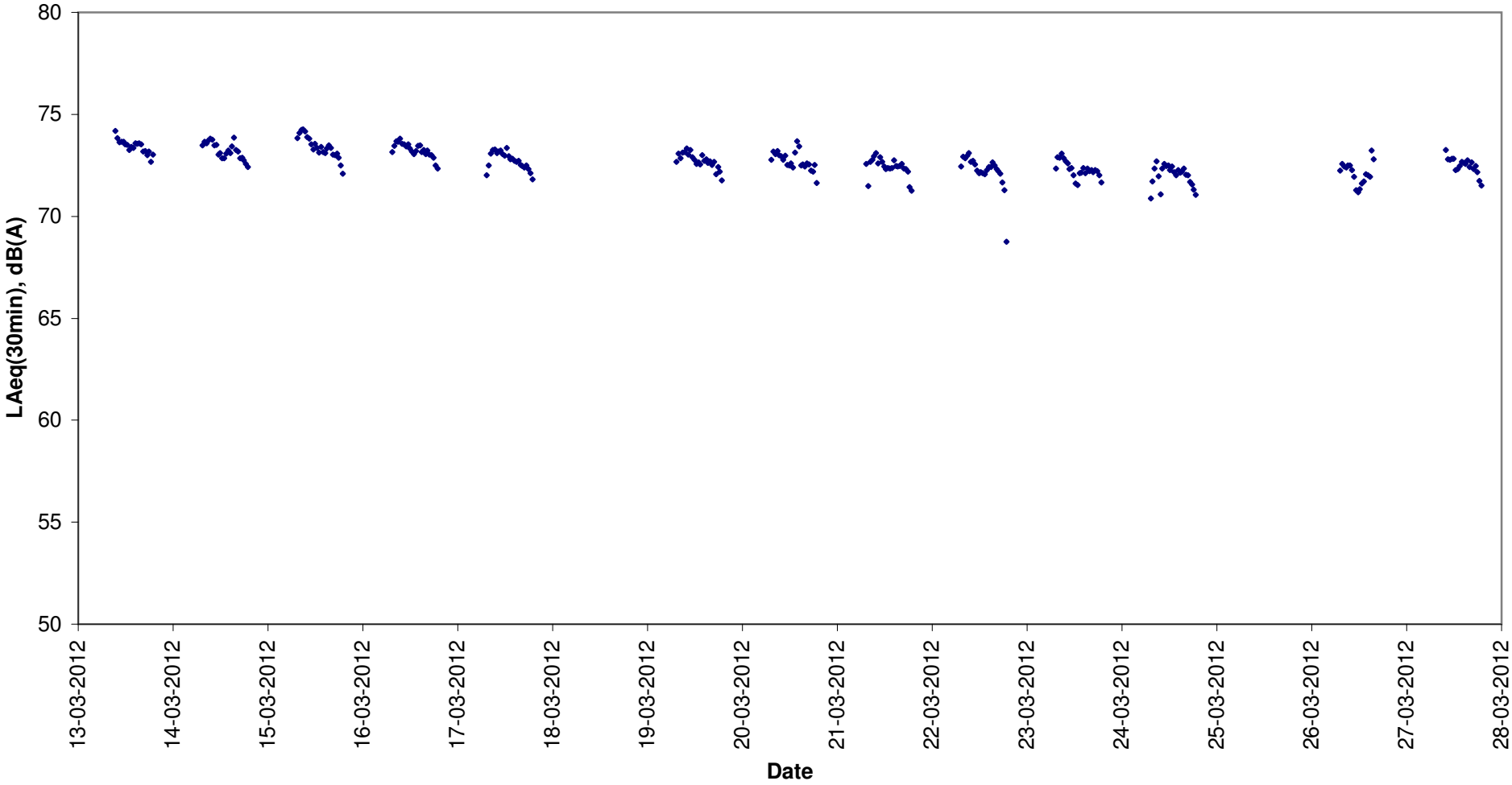
Location of Noise Monitoring Stations (North Point)

FILE: 0158059b
DATE: 03/04/2012

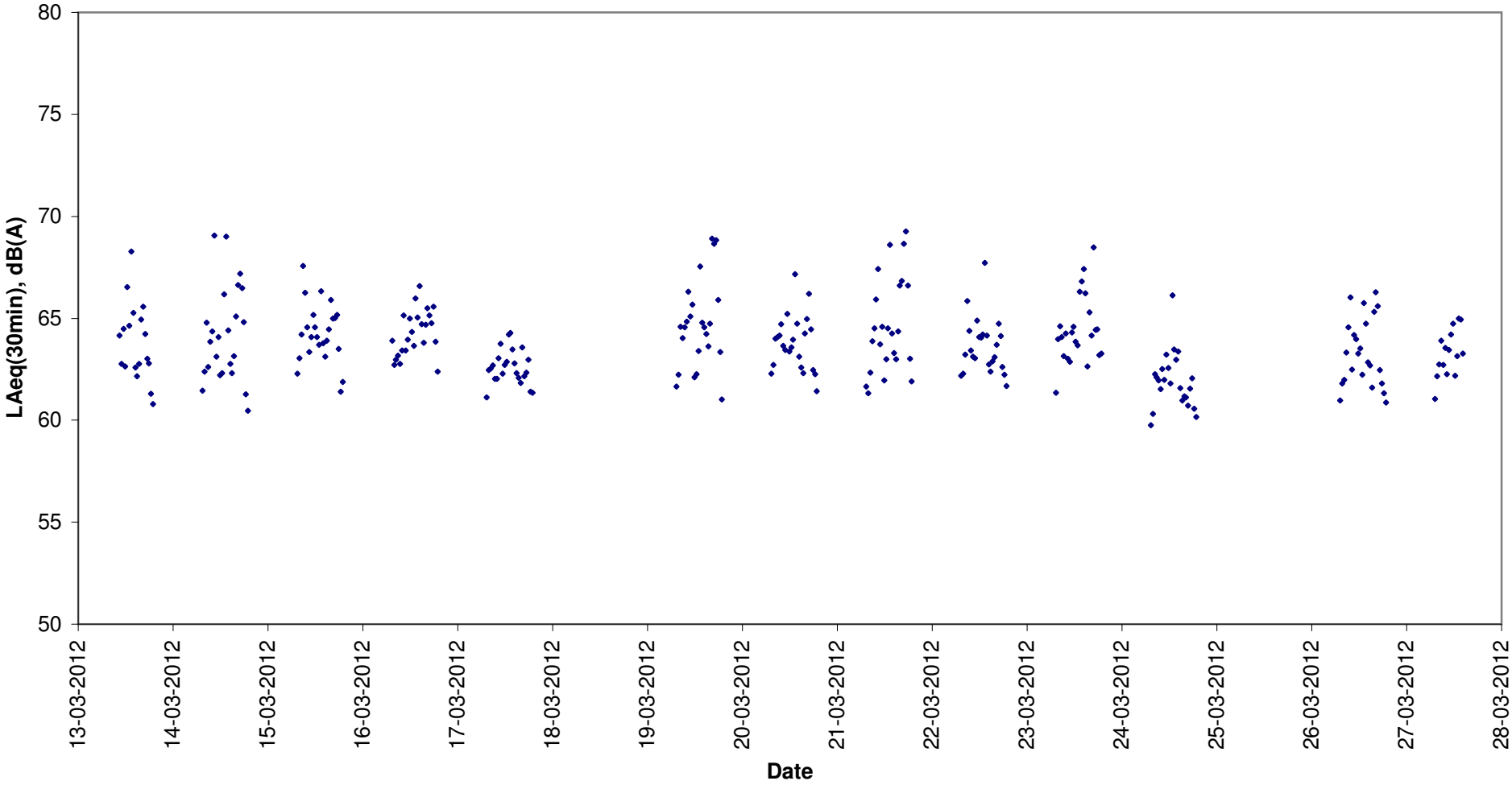
Environmental Resources Management

ERM

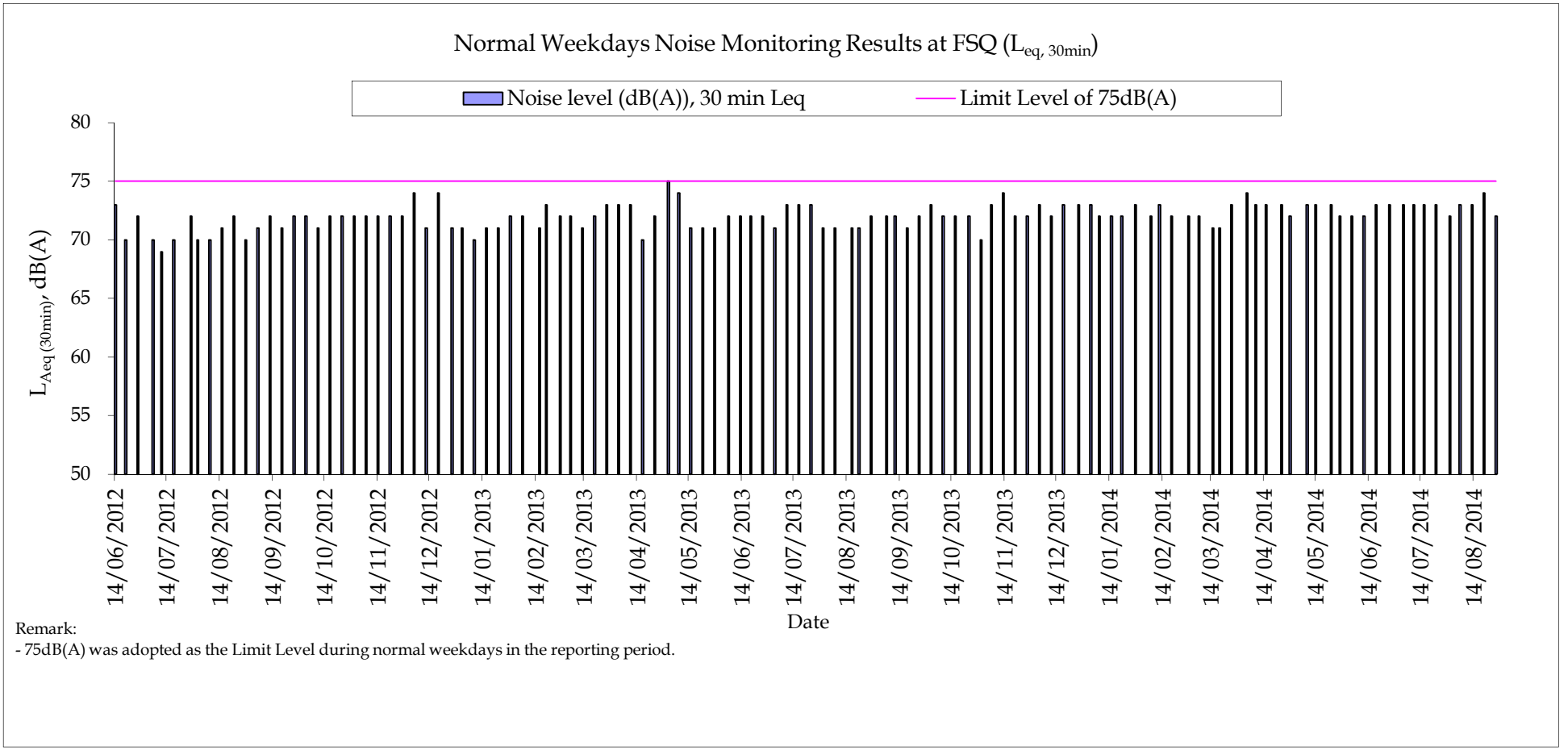
Annex F3 **LAeq(30min) during Normal Weekdays Working Hours (0700 - 1900) at FSQ - North Point Fire Services Married Quarters**



Annex F4 **LAeq(30min) during Normal Weekdays Working Hours (0700 - 1900) at SCH02 CCC Kei To Secondary School**

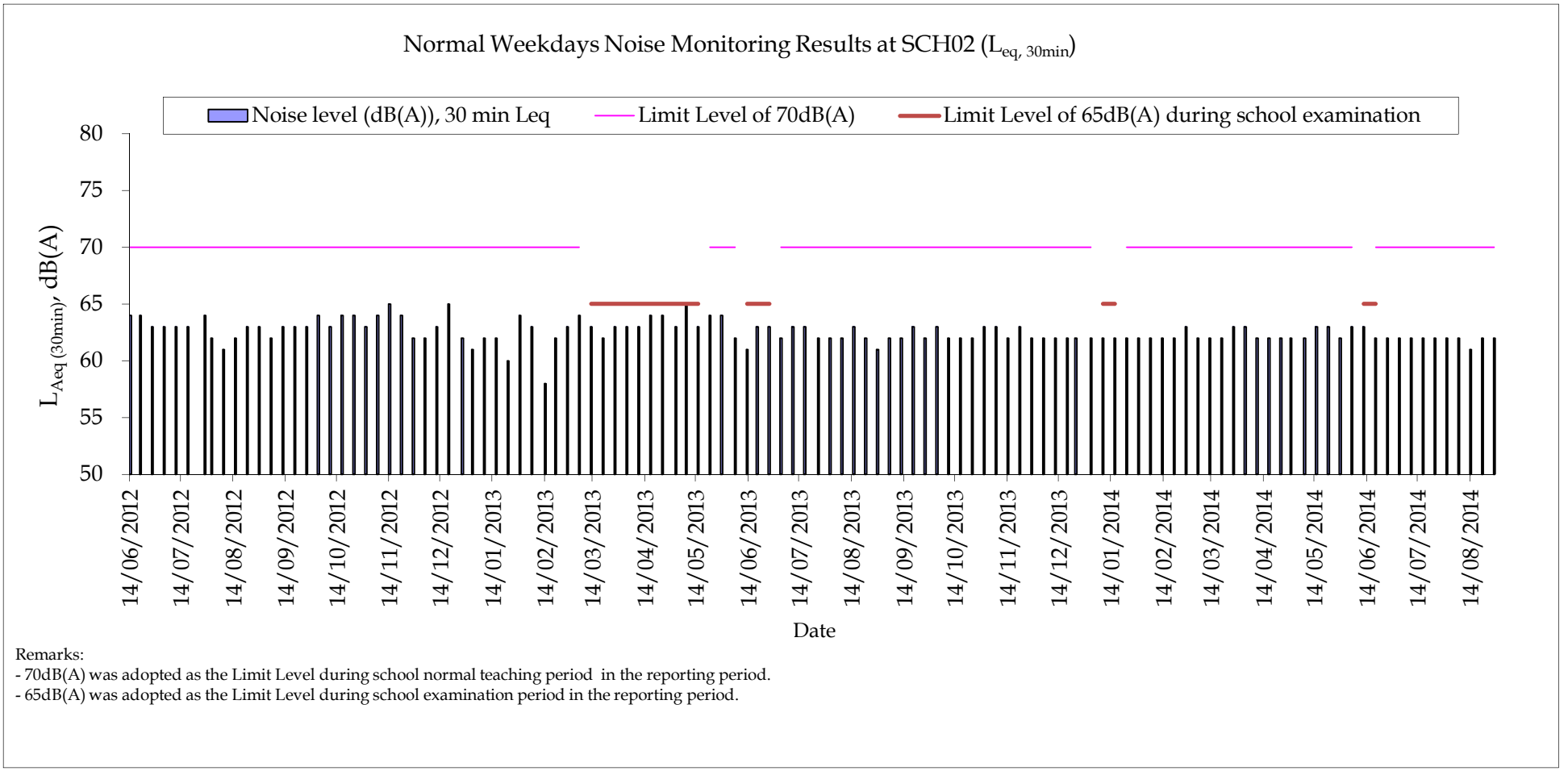


Annex F5 - Noise Monitoring Result



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

Annex F6 - Noise Monitoring Result



Remarks:
- 70dB(A) was adopted as the Limit Level during school normal teaching period in the reporting period.
- 65dB(A) was adopted as the Limit Level during school examination period in the reporting period.

Annex G

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

Annex G1 Event and Action Plan for Water Quality Monitoring during Construction Phase

	Action			
Event	**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 G2 *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 G3 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 H

Implementation Schedule

ANNEX H 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 4,000m^3 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	√

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 m^3 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	Δ
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	Δ

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	Δ
<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.			
<u>General Refuse</u> 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	Δ
<u>Chemical Waste</u> 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
<u>Marine Dredged Sediment</u> 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 300 m^3 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	√
<u>Marine Ecology</u>			
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	√
<u>Hazard to Life</u>			
• 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	√
Risk mitigation measures to prevent the damage of submarine pipeline during operation will be adopted. They are listed as follows:	Construction Work	Construction	√

Environmental Protection Measures	Location	Timing	Status
• The submarine gas pipeline will be covered by armour rock, damage from anchor drop could be prevented.	Sites	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 equipment / machinery shall be avoided;	Construction Work Sites (Along the alignment of dredging and landmain works)	Construction period	√

Environmental Protection Measures	Location	Timing	Status
• 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

N.A. Not Applicable

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 Year 2012-2014

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 at Public Fill	Stockpiling	General refuse	Vegetation / Rubbish	Disposal at Landfill	Chemical Waste Recycling (see Note 3)	Recycling of Rubbish
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in'000kg / '000L)	(in '000kg)
Jun 12	858.93	858.93	150	0	8.93	700	0	0	0	0	0
Jul 12	398.16	398.16	150	0	98.16	150	0	0	0	0	0
Aug 12	316.12	316.12	290	0	25.87	0	0.25	0.5	0	0	0.5
Sep 12	136.5	136.5	80.5	0	56.1	0	0.5	0.5	0	0	0.5
Oct 12	82.39	82.39	30	0	52.39	0	0.2	0.3	0	0	0.2
Nov 12	71.23	71.23	44.84	0	26.39	0	0.1	0.1	0	0	0.1
Dec 12	168.22	168.22	95.35	0	72.87	0	0.15	0.15	0	0	0.15
Jan 13	1872.19	469.54	106.92	0	1765.27	0	0.5	0.06	0.51	0	0.05
Feb 13	1838.82	477.36	238.68	0	1480.8	119.34	0.04	0	0	0.2	0
Mar 13	473.94	473.94	57.6	0	377.94	38.4	1.24	0	1.24	0	0
Apr 13	210.07	166.07	66.96	0	99.11	0	0.5	0	0	0	0
May 13	253.8	253.8	192.6	0	0	61.2	2.06	0	2.56	0	0
Jun 13	172.8	172.8	45.07	0	57.71	70.02	7.27	0	7.27	0	0
Jul 13	151.57	151.57	41.18	0	92.39	18	0.96	0	0.96	0	0
Aug 13	575.18	575.18	41.18	0	516	18	2.63	0	2.63	0	0
Sep 13	615.37	0	0	0	597.37	18	5.74	0	0	0	0
Oct 13	706.56	0	0	0	688.56	18	2.98	0	0	0	0
Nov 13	525.56	0	60.31	0	435.25	30	0	0	0	0	0
Dec 13	231.54	0	21.09	0	210.45	0	2.91	0	2.91	0	0

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 at Public Fill	Stockpiling	General refuse	Vegetation / Rubbish	Disposal at Landfill	Chemical Waste Recycling (see Note 3)	Recycling of Rubbish
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in'000kg / '000L)	(in '000kg)
Jan 14	231.54	0	126.6	0	104.94	0	3.46	0	3.46	0	0
Feb 14	115.00	0	75.92	0	9.08	30	4.25	0	0	0	0
Mar 14	37.80	0	30.00	0	0	7.8	4.25	0	0	0	0
Apr 14	0	0	0	0	0	0	1.07	0	0	0	0
May 14	27	0	27	0	0	0	1.12	0	0	0	0
Jun 14	36	0	36	0	0	0	2.34	0	0	0	0
Jul 14	28.8	0	28.8	0	0	0	0.2	0	0	0	0
Sub-total	**10135.09**	**4771.81**	**2036.60**	**0**	**6775.58**	**1278.76**	**44.72**	**1.61**	**21.54**	**0.20**	**1.50**
Aug 14	0	0	0	0	0	0	3.72	0	3.72	0	0
Total	**10135.09**	**4771.81**	**2036.60**	**0**	**6775.58**	**1278.76**	**48.44**	**1.61**	**25.26**	**0.20**	**1.50**

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
August 2012	0	0
September 2012	0	0
October 2012	0	0
November 2012	0	0
December 2012	0	0
January 2013	0	0
February 2013	0	0
March 2013	0	0
April 2013	0	0
May 2013	0	0
June 2013	0	0
July 2013	0	0
August 2013	0	0
September 2013	0	0
October 2013	0	0
November 2013	0	0
December 2013	0	0
January 2014	0	0
February 2014	0	0
March 2014	0	0
April 2014	0	0
May 2014	0	0
June 2014	0	0
July 2014	0	0
August 2014	0	0
Overall Total	0	0