

Maeda - CRGL - SELI Joint Venture

Contract No. DC/2007/12 - Design and
Construction of Tsuen Wan Drainage Tunnel

Monthly EM&A Report (March 2013)

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Report No EB000364R0931

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Report No EB000364R0931

Date 15 April 2013

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EXECUTIVE SUMMARY

- Drainage Services Department (DSD) has awarded the contract for the Design and Construction of Tsuen Wan Drainage Tunnel (hereafter referred to as the “Project”) to Maeda-CRGL-SELI Joint Venture (MCSJV). MCSJV has appointed Hyder Consulting Limited (HCL) as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works in accordance with the EM&A Manual and Environmental Permit (EP). Commencement of the construction work had been notified to the Environmental Protection Department (EPD) in January 2008. This Monthly EM&A Report summarises the EM&A works undertaken in March 2013.
- According to the EM&A Manual, there are four designated air quality monitoring locations, five designated noise monitoring locations and five water quality monitoring locations during the construction phase: (i) Sik Sik Yuen Ho Fung College (ASR 1, NSR 1 and Intake I-1); (ii) Hong Hoi Chee Hong Temple (ASR 3, NSR 3 and Intake I-2); (iii) Squatters (NSR 6 and Intake I-3); (iv) Beach Tower (Long Beach Gardens) (ASR 8, NSR 8 and Outfall O-1); and (v) Greenview Terrace (Block 1) (ASR 9, NSR 9 and Outfall O-1).
- During the non-restricted hours, major construction activities undertaken by the Contractor at Tsuen Wan Drainage Tunnel included site cleaning and tidying at Outfall, I-1, I-2 and I-3; construction of reinforced concrete (RC) structure of cascade and trellis beams at Outfall; construction of surface drainage at Outfall; water proofing works on spiral ramp roof at Outfall; backfilling on top of box culvert and temporary tie back wall at Outfall; filling top soil for planters at Outfall; slope reinstatement at Outfall; installation of penstock system at Outfall; construction of RC structure of air vent shaft and approach channel at I-3; construction of permanent access road, surface drainage and access ramp at I-3; repair and remedial works of vortex shaft and de-aeration chamber at I-3; installation of handrail for approach channel and vortex shaft cover at I-3; finishing works for kiosk at I-3; casting of granular bedding at I-3; construction of RC structure of upper man access shaft (UMAS), approach channel, vortex shaft, skin wall and L-shape retaining wall at I-2; remedial works at main adit, de-aeration chamber and air vent shaft at I-2; casting of granular bedding at I-2; installation of stone facing for approach channel, handrail at upper man access shaft and trash grill at I-2; finishing works for man access shaft and equipment room at I-2; installation of stop log and handrail at I-1; repair and remedial works of cascade at I-1; excavation and construction of temporary concrete base slab at I-1; hydroseeding for slopes at I-1; tiling works for spiral ramp at I-1; segment repair works at Tunnel; PU grout for waterproofing at Tunnel; installation of kerbs, chainage marker and stainless steel cover at Tunnel; and installation of radio communication system at Tunnel.
- No exceedance was recorded for air quality monitoring during the reporting month.
- No exceedance was recorded for noise monitoring during the reporting month.
- Exceedances for river water quality monitoring are summarised in the following table:

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	One record at I-1 on 20 March 2013	One record at I-2 on 15 March 2013

- Marine water quality monitoring for dredging and marine works has been terminated since 1 May 2012. As such, there was no marine water quality monitoring in this reporting month.
- The status of waste generation in the reporting month is:
 - A total of 1195.2 m³ C&D material was disposed to public fill at Tuen Mun. No inert C&D material was reused in this Contract and no inert C&D material was reused in other Contracts. Detail information could be referred to Section 5.1.1 of this report;
 - About 102.4 m³ general waste was disposed of to NENT Landfill;
 - No paper/cardboard was recycled in the reporting month;
 - No metal was generated in the reporting month;
 - No plastic waste was disposed of in the reporting month; and
 - No chemical waste was disposed of in the reporting month.
- In this reporting month, two site inspections and one monthly site audit were carried out by the ET and Independent Environmental Checker (IEC) respectively, to ensure proper implementation of environmental mitigation measures specified in the EM&A Manual and compliance with environmental legislation. All observations, which were recorded on the site inspection checklists, were passed to the Contractor together with the ET's recommendations.
- As advised by the Contractor and verified by ET:
 - No non-compliance regarding the site inspection was received in the reporting month;
 - No environmental complaint was received in the reporting month; and
 - No summons and prosecution was received in the reporting month.
- The major construction works for the upcoming three months will be:
 - Site cleaning and tidying at Outfall, I-1, I-2 and I-3;
 - Construction of trellis beams and pump room RC structures at Outfall;
 - Construction of maintenance access at Outfall;
 - Slope reinstatement works at Outfall;
 - Finishing works for spiral ramp at Outfall;
 - Construction of surface drainage at Outfall;
 - Installation of GRP panels at Outfall;
 - Water proofing for tapered channel planter at Outfall;
 - Landscape works at Outfall;
 - Installation of additional irrigation system at Outfall;
 - Excavation and construction of permanent access road at I-3;
 - Construction of road drainage and surface drainage at I-3;
 - Water proofing works for approach channel at I-3;
 - Installation of stone facing for vortex shaft and air vent shaft at I-3;
 - Tiling works for man access shaft and kiosk at I-3;
 - Construction of man access shaft and approach channel RC structure at I-2;

- Installation of stone facing for approach channel, vortex shaft and air vent shaft at I-2;
- Tiling works for man access shaft and equipment room at I-2;
- Construction of concrete base slab at I-1;
- Slope reinstatement works at I-1;
- Surface drainage works at I-1;
- Construction of inclined ramp at I-1;
- Finishing works for spiral ramp at I-1; and
- Installation of GRP panels at I-1.

1 INTRODUCTION

- 1.1.1 The Drainage Services Department (DSD) proposed to construct a tunnel with an internal diameter of 6.5 m and a length of 5.13 km, with the purpose to alleviate the flooding risk in Tsuen Wan and Kwai Chung.
- 1.1.2 This project is a Designated Project under Schedule 2 Part I Category Q, of the Environmental Impact Assessment Ordinance (EIAO) as part of the proposed Tsuen Wan Drainage Tunnel (TWDT) passes underneath the existing Tai Mo Shan Country Park. An Environmental Impact Assessment (EIA) Study has therefore been undertaken to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed designated project and related activities taking place concurrently. From the EIA, the recommendations for monitoring contained herein are made.
- 1.1.3 The Maeda-CRGL-SELI Joint Venture (MCSJV) was awarded by DSD with the Contract – Design and Construction of Tsuen Wan Drainage Tunnel.
- 1.1.4 Hyder was commissioned by the MCSJV as the Environmental Team (ET) to implement an EM&A programme in accordance with the EM&A Manual. The proposed tunnel section flows from the junction of Shing Mun Road and Wo Yi Hop Road and discharges to south of Yau Kom Tau underneath Castle Peak Road as shown in Appendix A.
- 1.1.5 The construction works of the Project was commenced in January 2008. This is the sixtieth monthly EM&A report summarising the impact monitoring results and audit findings of the EM&A programme in March 2013.

2 PROJECT INFORMATION

2.1 Project Organization and Management Structure

2.1.1 The organization chart and lines of communication with respect to the on-site environmental management are shown in Appendix B.

2.2 Construction Progress

2.2.1 The overall project programme from the detail design to completion of all civil works shall take approximately 64 months. The construction programme is presented in Appendix C.

2.2.2 The major construction activities undertaken in the reporting month were:

- Site cleaning and tidying at Outfall, I-1, I-2 and I-3;
- Construction of reinforced concrete (RC) structure of cascade and trellis beams at Outfall;
- Construction of surface drainage at Outfall;
- Water proofing works on spiral ramp roof at Outfall;
- Backfilling on top of box culvert and temporary tie back wall at Outfall;
- Filling top soil for planters at Outfall;
- Slope reinstatement at Outfall;
- Installation of penstock system at Outfall;
- Construction of RC structure of air vent shaft and approach channel at I-3;
- Construction of permanent access road, surface drainage and access ramp at I-3;
- Repair and remedial works of vortex shaft and de-aeration chamber at I-3;
- Installation of handrail for approach channel and vortex shaft cover at I-3;
- Finishing works for kiosk at I-3;
- Casting of granular bedding at I-3;
- Construction of RC structure of upper man access shaft (UMAS), approach channel, vortex shaft, skin wall and L-shape retaining wall at I-2;
- Remedial works at main adit, de-aeration chamber and air vent shaft at I-2;
- Casting of granular bedding at I-2;
- Installation of stone facing for approach channel, handrail at upper man access shaft and trash grill at I-2;
- Finishing works for man access shaft and equipment room at I-2;
- Installation of stop log and handrail at I-1;
- Repair and remedial works of cascade at I-1;
- Excavation and construction of temporary concrete base slab at I-1;
- Hydroseeding for slopes at I-1;
- Tiling works for spiral ramp at I-1;

- Segment repair works at Tunnel;
- PU grout for waterproofing at Tunnel;
- Installation of kerbs, chainage marker and stainless steel cover at Tunnel; and
- Installation of radio communication system at Tunnel.

2.2.3 No marine mud dredging works for basin scheme at portion E was conducted in the reporting month, as all marine works were completed on 30 March 2012.

2.2.4 Tiling works at spiral ramp at I-1 was undertaken during the restricted hours in the reporting period.

2.3 Mitigation Measures

2.3.1 The implemented environmental mitigation measures and their statuses are given in Appendix D.

2.4 Statuses of Licences and Permits

2.4.1 A summary of relevant permits and licences for the Project is given in Appendix E.

3 SUMMARY OF EM&A REQUIREMENT

3.1 Air Quality

Air Quality Parameters

- 3.1.1 One-hour total suspended particulates (TSP) levels were measured at the designated air quality monitoring locations in accordance with the EM&A Manual. Information such as date of monitoring, duration, weather condition, equipment used and monitoring results were recorded on the field data sheet developed for the Project. The monitoring results are presented in Section 4.

Monitoring Methodology

- 3.1.2 One-hour TSP monitoring was carried out under typical weather conditions (with no adverse weather such as typhoon signal or rain storm warning) three times every six days using High Volume Air Samplers (HVASs). Monitoring was conducted in accordance with the standard sampling method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.
- 3.1.3 After each sampling, the filter paper loaded with dust was kept in a clean and tightly sealed plastic bag. The filter paper was then re-conditioned in desiccators for 24 hours before obtaining the weight under laboratory conditions.
- 3.1.4 The average concentrations of the TSP were calculated based on the following information obtained from monitoring:
- Flow rate;
 - Weight of the filter paper before and after sampling; and
 - Sampling period indicated by the elapsed-time meter.
- 3.1.5 All samples were kept in good condition (i.e. stored in sealed plastic bags, with brief description of the monitoring dates and locations) for a period of 6 months before disposal. Sample analysis was carried out by ALS Technichem (HK) Pty Limited (HOKLAS Registration Number 066).

Monitoring Equipment and Calibration

- 3.1.6 High Volume Air Samplers (HVASs) were used for 1-hour TSP monitoring to comply with the USEPA specifications in Appendix B Part 5 - Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method) of the Code of Federal Regulation dated June 1, 1991.
- 3.1.7 All HVASs were calibrated before commencement of monitoring using standard orifice 5-points calibration method with orifice calibrator to determine the actual flow rate of each HVAS. This was used for the calculation of the TSP level. Calibration Kit Model - TE5025A was used for calibration of the HVAS. Recalibration of the HVAS was carried out after motor maintenance, at least once every six months, which was about the expected life of carbon brush. The air quality monitoring equipment used during the

reporting month is shown in Table 3-1 below. The calibration certificates are included in Appendix F.

Equipment Type	Model	Serial Number	Calibration Orifice Number	Location
HVAS	BM2000HX	4994	1785	ASR 1
HVAS	BM2000HX	5875	1785	ASR 3
HVAS	TE5005X	1059	1785	ASR 8
HVAS	TE5005X	1713	1785	ASR 9

Table 3-1 Air Quality Monitoring Equipment

Monitoring Location

3.1.8 Four designated air quality monitoring locations were identified in the contract specific EM&A Manual. They are listed in Table 3-2 below and shown in Appendix G.

Monitoring Station ID	Name of Premises	Floor Level
ASR1	Sik Sik Yuen Ho Fung College	G/F
ASR3	Hong Hoi Chee Hong Temple	Podium
ASR8	Beach Tower (Long Beach Garden)	G/F
ASR9	Greenview Terrace (Block 1)	G/F

Table 3-2 Air Quality Monitoring Locations

Action and Limit Levels

3.1.9 The Action and Limit Levels for the 1-hour TSP monitoring are shown in Table 3-3. In case exceedances of Action and/or Limit levels for air quality occur, Event Contingency Plans (ECPs) would be implemented. The ECPs for Action and Limit levels exceedances are shown in Table 3-4.

Station	1-hour TSP Level in $\mu\text{g}/\text{m}^3$	
	Action Level	Limit Level
ASR 1	307	500
ASR 3	327	500
ASR 8	337	500
ASR 9	329	500

Table 3-3 Action & Limit Levels for Air Quality

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

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
	<ul style="list-style-type: none"> • Inform IEC, SOR, Contractor and EPD; • Repeat measurement to confirm finding; • Increase monitoring frequency to daily; • Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SOR informed of the results. 	<ul style="list-style-type: none"> • Contractor on possible remedial measures; • Advise SOR on the effectiveness of the proposed remedial measures; • Supervise implementation of remedial measures. 	<ul style="list-style-type: none"> • measures properly implemented. 	<ul style="list-style-type: none"> • days of notification; • Implement the agreed proposals; • Amend proposal if appropriate.
Exceedance for two or more consecutive samples	<ul style="list-style-type: none"> • Notify IEC, SOR, Contractor and EPD; • Identify source; • Repeat measurement to confirm findings; • Increase monitoring frequency to daily; • Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; • Arrange meeting with IEC and SOR to discuss the remedial actions to be taken; • Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SOR informed of the results; • If exceedance stops, cease additional monitoring. 	<ul style="list-style-type: none"> • Discuss amongst SOR, ET, and Contractor on the potential remedial actions; • Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise SOR accordingly; • Supervise the implementation of remedial measures. 	<ul style="list-style-type: none"> • Confirm receipt of notification of exceedance in writing; • Notify Contractor; • In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; • Ensure remedial measures properly implemented; • If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ul style="list-style-type: none"> • Take immediate action to avoid further exceedance; • Submit proposals for remedial actions to IEC within 3 working days of notification; • Implement the agreed proposals; • Resubmit proposals if problem still not under control; • Stop the relevant portion of works as determined by SOR until the exceedance is abated.

Table 3-4 Event/Action Plan for Air Quality

3.2 Noise

Noise Parameters

- 3.2.1 The construction noise level was measured in terms of equivalent A-weighted sound pressure level (L_{eq}) measured in decibels (dB(A)). Monitoring of $L_{eq(30 \text{ min})}$ was carried out at the noise monitoring locations on a weekly basis during normal construction working hours (0700-1900 hours from Monday to Saturday except public holidays). For all other time periods (i.e. restricted hours), $L_{eq(5 \text{ min})}$ would be employed for comparison with the Noise Control Ordinance (NCO) criteria if necessary.
- 3.2.2 The two statistical sound levels L_{10} and L_{90} , the level exceeded for 10 and 90 percent of the time respectively, were also recorded during monitoring. Major noise sources observed, both on-site and off-site, were recorded on the field data sheet. All measurements were recorded and presented to the nearest 0.1 dB(A) in this report. Results are presented in Section 4.

Monitoring Methodology

- 3.2.3 Sound level meters, which comply with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to the Technical Memorandum (TM) issued under the Noise Control Ordinance, were used. Noise levels for the A-weighted levels $L_{eq(30 \text{ min})}$, L_{10} and L_{90} were measured throughout the impact monitoring. An average, by sound power, of six consecutive 5-minute readings was used to provide $L_{eq(30 \text{ min})}$ for non-restricted hours (0700-1900 hours from Monday to Saturday except public holidays). A facade correction of 3 dB(A) was applied to the measurements that were carried out under free field conditions.
- 3.2.4 During the impact monitoring, parameters such as dates, weather condition, equipment used, measurement results and major noise sources were recorded on the field data record sheet. Monitoring would not be carried out in the presence of fog, rain or strong wind with a steady speed exceeding 5 m/s. In relation to the monitored noise levels, other noise sources such as road traffic might make a significant contribution to the overall noise environment. Therefore, noise monitoring activities would take into account such influencing factors, which were not present during the baseline monitoring period.

Monitoring Equipment and Calibration

- 3.2.5 Rion Precision Sound Level Meters of Type NL-31 and B&K Integrating Sound Level Meter of Type 2238 in compliance with the International Electrotechnical Commission Publication specifications (Paragraph 3.2.3) were used for noise monitoring in this reporting month.
- 3.2.6 Prior to and following each noise measurement, the accuracy of the sound level meters was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements were considered as valid only if the calibration levels from before and after the noise measurement agreed to within 1.0 dB(A). Sound level meters and calibrators were calibrated annually to ensure they performed to the same level of accuracy as stated in the manufacturer's specifications. The noise monitoring

equipment used during the reporting month are shown in Table 3-5 below. The calibration certificates are included in Appendix F.

Equipment Type	Manufacturer	Type Number	Serial Number	Location
Sound Level Meter	Rion	NL-31	00410224	NSR1, NSR3,
Sound Level Meter	B&K	2238	2448529	NSR6, NSR8 and NSR9
Sound Level Calibrator	Rion	NC-73	10486660	
Sound Level Calibrator	B&K	4231	2699361	

Table 3-5 Noise Monitoring Equipment

Monitoring Location

3.2.7 Five designated noise monitoring locations were identified in the contract specific EM&A Manual. They are listed in Table 3-6 below and shown in Appendix G. All the locations below are in facade measurement.

Monitoring Station ID	Name of Premises	Floor Level
NSR1	Sik Sik Yuen Ho Fung College	G/F
NSR3	Hong Hoi Chee Hong Temple	Podium
NSR6	Squatters	G/F
NSR8	Beach Tower (Long Beach Garden)	G/F
NSR9	Greenview Terrace (Block 1)	Podium (up to 6 July 2009) Roof* (since 16 July 2009)

* The noise monitoring location of NSR9 had been adjusted to rooftop since 16 July 2009.

Table 3-6 Noise Monitoring Locations

Action and Limit Levels

3.2.8 The Action and Limit levels for construction noise are defined in Table 3-7. If non-compliance of the criteria occurs, actions in accordance with the Action Plan in Table 3-8 would be carried out.

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

* For educational establishments the limit level shall be 70 dB(A) and reduced to 65 dB(A) during examination periods between 0700 and 1900 hours on normal weekdays.

Table 3-7 Action & Limit Levels for Air Borne Noise

Event	Action			
	ET Leader	IEC	SOR	Contractor
Action Level	<ul style="list-style-type: none"> • Notify IEC and the Contractor. • Carry out investigation. • Report the results of investigation to IEC and the Contractor. • Discuss with the Contractor and formulate remedial measures. • Increase monitoring frequency to check mitigation measures. 	<ul style="list-style-type: none"> • Review with analysed results submitted by ET. • Review the proposed remedial measures by the Contractor and advise SOR accordingly. • Supervise the implementation of remedial measures. 	<ul style="list-style-type: none"> • Confirm receipt of notification of exceedance in writing. • Notify the Contractor. • Require the Contractor to propose remedial measures for the analysed noise problem. • Ensure remedial measures are properly implemented. 	<ul style="list-style-type: none"> • Submit noise mitigation proposals to IEC. • Implement noise mitigation proposals.
Limit Level	<ul style="list-style-type: none"> • Identify the source. • Notify IEC, SOR, EPD and the Contractor. • Repeat measurement to confirm findings. • Increase monitoring frequency. • Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. • Inform IEC, SOR, and EPD the causes and actions taken for the exceedances. • Assess effectiveness of the Contractor's remedial actions and keep IEC, EPD and SOR informed of the results. • If exceedance stops, cease additional monitoring. 	<ul style="list-style-type: none"> • Discuss amongst SOR, ET Leader and the Contractor on the potential remedial actions. • Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise SOR accordingly. • Supervise the implementation of remedial measures. 	<ul style="list-style-type: none"> • Confirm receipt of notification of exceedance in writing. • Notify the Contractor. • Require the Contractor to propose remedial measures for the analysed noise problem. • Ensure remedial measures are properly implemented. • 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. 	<ul style="list-style-type: none"> • Take immediate action to avoid further exceedance. • Submit proposals for remedial actions to IEC within 3 working days of notification. • Implement the agreed proposals. • Resubmit proposals if problem still not under control. • Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

Table 3-8 Event/Action Plan for Airborne Noise

3.3 Water Quality

- 3.3.1 The water quality impact would be insignificant with the protection measures recommended in Section 5.6 of the EIA report. However, in view of the sensitive nature of the rivers/streams and bathing beaches near the Project site, it is suggested that a programme of monitoring should be established to confirm the effectiveness of these mitigation measures in protecting these water bodies.

Water Quality Parameters

- 3.3.2 Monitoring for dissolved oxygen (DO), temperature, turbidity, pH and suspended solids (SS) should be undertaken at designated monitoring locations. It should be noted that DO, temperature, turbidity and pH should be measured in-situ whereas SS is assayed in a laboratory.
- 3.3.3 In association with the water quality parameters, other relevant data should also be measured, such as monitoring location/position, time, weather conditions, and any special phenomena and description of work underway at the construction site etc.

Monitoring Methodology

- 3.3.4 In accordance with the EM&A Manual, the water quality monitoring for all specified parameters were measured at all designated monitoring locations including control points at an interval of 3 days per week. DO, temperature, turbidity, pH and SS measurements were undertaken at designated monitoring locations.
- 3.3.5 It should be noted that water samples for all monitoring parameters were collected, stored, preserved and analysed according to Standard Methods, APHA 17 ed. and/or methods agreed by the Director of Environmental Protection.
- 3.3.6 Each sample was analysed in accordance with the APHA Standard Methods for the Examination of Water and Wastewater, 18th edition, or an equivalent method approved by the EPD. In any circumstance, the sample testing should comply with a comprehensive quality assurance and quality control programme. The laboratory should be prepared to demonstrate the quality programmes to the EPD when requested.

Monitoring Equipment and Calibration

- 3.3.7 All the water samples collected were transferred to clearly labelled and pre-cleaned sample containers with necessary preservatives immediately after collection. The sample containers were provided by a HOKLAS accredited laboratory. About 1 L of samples was collected for all laboratory analysis. Following sampling, samples should be stored in a cool box at temperature between 0 and 4 °C, and transported to the laboratory within the sample retention time as advised by the laboratory under proper chain-of-custody system. The water quality monitoring equipment used during the reporting month is shown in Table 3-9 below.

Equipment Type	Manufacturer	Model	Quantity
DO / Temperature Meter	YSI	55/12	1
DO / Temperature Meter / pH	YSI	Professional Plus	1
pH Meter	Hanna	HI-8014	1
Turbidimeter	Hanna	HI 98703-02	1

Table 3-9 Water Quality Monitoring Equipment

3.3.8 All in-situ monitoring equipment were checked and calibrated prior to use. They were calibrated by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibrations for all DO meters were carried out before measurement at each monitoring location. For the on-site calibration of field equipment, BS 127:1993, "Guide to field and on-site test methods for the analysis of waters" was observed. The calibration certificates are included in Appendix F.

Monitoring Location

3.3.9 Five designated impact monitoring locations (three river stations and two marine stations) and five control locations (three river control stations and two marine control stations) were identified in the contract specific EM&A Manual for river and marine water quality monitoring. These monitoring stations are listed in Table 3-10 below and shown in Appendix G.

Monitoring Station ID	Name of Premises
<i>River</i>	
I-1	Intake I-1
I-1-C	Control of Intake I-1
I-2	Intake I-2
I-2-C	Control of Intake I-2
I-3	Intake I-3
I-3-C*	Control of Intake I-3
<i>Marine</i>	
O-1 (FT) and (ET)	Outfall O-1 during Flood Tide and Ebb Tide
O-1-C (FT)	Control of Outfall O-1 during Flood Tide
O-1-C (ET)	Control of Outfall O-1 during Ebb Tide

The upper stream location (I-3-C) had been relocated from end of February 2009 due to coarse stone blockage.

Table 3-10 Water Quality Monitoring Locations

- 3.3.10 Note that there were two control stations for Outfall O-1, one for sampling during flood tide and one for sampling during ebb tide. Only one of these control stations for Outfall O-1 was sampled during each sampling. Control station to be sampled was determined based on the tidal information provided by the Hong Kong Observatory.
- 3.3.11 Referring to Section 4.4 of the approved Contract Specific EM&A Manual (Report No. EB000364R0273, dated 6 January 2010), while the construction of the Outfall requires minor dredging, water quality monitoring at the Outfall shall be undertaken during the period of the dredging works. As advised by the Contractor, all relevant marine works at Portion E of the site were completed in April 2012. As such, the ET submitted a proposal to EPD on 30 April 2012 to terminate the marine water quality monitoring effective from 1 May 2012. EPD had no objection to the proposal in their reply on 7 May 2012.

Action and Limit Levels

- 3.3.12 The Action and Limit levels for water quality monitoring parameters are defined in Table 3-11. In case of any exceedance, appropriate actions would be undertaken in accordance with the Event and Action Plan as described in Table 3-12.

Parameters	Action	Limit
DO in mg/L (Surface, Middle and Bottom)	<p><u>Surface and Middle</u> 5%-ile of baseline data for surface and middle layer.</p> <p><u>Bottom</u> 5%-ile of baseline data for bottom layer.</p>	<p><u>Surface and Middle</u> 4 mg/L except 5 mg/L for Fish Culture Zone or 1%-ile of baseline data for surface and middle layer</p> <p><u>Bottom</u> 2 mg/L or 1%-ile of baseline data for bottom layer</p>
SS in mg/L (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's SS at the same tide of the same day	99%-ile of baseline or 130% of upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements (e.g. required suspended solids levels for concerned sea water intakes)
Turbidity (Tby) in NTU (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's Tby at the same tide of the same day	99%-ile of baseline or 130% of upstream control station's Tby at the same tide of the same day

Notes:

- For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limit.
- For SS and Tby, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary.

Table 3-11 Action/Limit Levels for Water Quality

Event	ET Leader	IEC	SOR	Contractor
Action Level being exceeded by one sampling day	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; and Repeat measurement on next day of exceedance. 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; and Make agreement on the mitigation measures to be implemented. 	<ul style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and SOR; and Implement the agreed mitigation measures.
Action Level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; and Repeat 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; and Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and SOR within 3 working days; and Implement the agreed mitigation measures.

Event	ET Leader	IEC	SOR	Contractor
	measurement on next day of exceedance.			
Limit Level being exceeded by one sampling day	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, SOR and Contractor; Ensure mitigation measures are implemented; and Increase the monitoring frequency to daily until no exceedance of Limit level. 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; and Assess the effectiveness of the implemented mitigation measures. 	<ul style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and SOR and propose mitigation measures to IEC and SOR within 3 working days; and Implement the agreed mitigation measures.
Limit Level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with 	<ul style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; and Assess the effectiveness of the implemented mitigation 	<ul style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of 	<ul style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and SOR and

Event	ET Leader	IEC	SOR	Contractor
	IEC, SOR and Contractor; <ul style="list-style-type: none"> • Ensure mitigation measures are implemented; and • Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. 	measures.	the implemented mitigation measures; and <ul style="list-style-type: none"> • 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. 	propose mitigation measures to IEC and SOR within 3 working days; <ul style="list-style-type: none"> • Implement the agreed mitigation measures; and • As directed by the SOR, to slow down or to stop all or part of the marine work or construction activities.

Table 3-12 Event/Action Plan for Water Quality

4 MONITORING RESULT

4.1 Air Quality

4.1.1 The air quality monitoring schedule of the reporting period is given in Appendix H.

1-hour TSP Monitoring

4.1.2 Results of 1-hour TSP level are shown in Table 4-1. All measurements were recorded and presented to the nearest 0.1 $\mu\text{g}/\text{m}^3$ in this report. Detailed results including weather conditions and graphical presentations are presented in Appendix I.

Station	Monitoring Date	Monitoring Result ($\mu\text{g}/\text{m}^3$)	Action/Limit Levels ($\mu\text{g}/\text{m}^3$)
ASR 1	4-Mar-13	62.4	307/500
		98.0	
		118.4	
	9-Mar-13	145.1	
		138.7	
		131.1	
	15-Mar-13	146.4	
		92.9	
		73.8	
	21-Mar-13	126.0	
		110.7	
		76.4	
	27-Mar-13	61.1	
		133.6	
		66.2	
ASR 3	4-Mar-13	89.2	327/500
		106.8	
		114.9	
	9-Mar-13	182.4	
		135.1	
		154.0	
	15-Mar-13	177.0	
		108.1	
		93.2	

Station	Monitoring Date	Monitoring Result ($\mu\text{g}/\text{m}^3$)	Action/Limit Levels ($\mu\text{g}/\text{m}^3$)		
ASR 8	21-Mar-13	89.2	337/500		
		106.8			
		171.6			
	27-Mar-13	74.3			
		145.9			
		66.2			
	ASR 9	4-Mar-13		84.7	329/500
				72.8	
				100.6	
		9-Mar-13		124.5	
109.9					
101.9					
15-Mar-13		111.2			
		94.0			
		67.5			
21-Mar-13		164.2			
	63.5				
	68.8				
27-Mar-13	64.9				
	95.3				
	54.3				
ASR 9	4-Mar-13	60.0	329/500		
		106.3			
		109.0			
	9-Mar-13	145.8			
		122.7			
		173.1			
	15-Mar-13	170.4			
		106.3			
		115.9			
	21-Mar-13	171.7			
55.9					
61.3					

Station	Monitoring Date	Monitoring Result ($\mu\text{g}/\text{m}^3$)	Action/Limit Levels ($\mu\text{g}/\text{m}^3$)
		57.2	
	27-Mar-13	117.2	
		53.2	

Note: *Italic* indicates the occurrence of exceedance of *Action level*
Bold indicates the occurrence of exceedance of **Limit Level**

Table 4-1 Air Quality Monitoring Results

4.1.3 No project related air quality exceedance was recorded in the reporting month.

4.2 Noise

Air Borne Noise Monitoring

4.2.2 The air borne noise monitoring schedule of the reporting period is given in Appendix H. Results of measured noise level, in terms of $L_{eq(30min)}$, during the construction are shown in Table 4-2. All measurements including L_{10} and L_{90} are recorded and presented to the nearest 0.1 dB(A) in this report. Detailed results including weather conditions and graphical presentation are presented in Appendix I.

Station	Monitoring Date	$L_{eq(30min)}$ dB(A)	Limit Levels dB(A)
NSR 1	4-Mar-13	67.6	70
	15-Mar-13	68.5	
	21-Mar-13	62.7	
	27-Mar-13	63.4	
NSR 3	4-Mar-13	63.8	75
	15-Mar-13	68.9	
	21-Mar-13	66.7	
	27-Mar-13	61.5	
NSR 6	4-Mar-13	70.6	75
	15-Mar-13	55.6	
	21-Mar-13	70.9	
	27-Mar-13	60.5	
NSR 8	4-Mar-13	62.8	75
	15-Mar-13	64.3	
	21-Mar-13	64.6	
	27-Mar-13	62.9	
NSR 9	4-Mar-13	62.8	75
	15-Mar-13	66.0	
	21-Mar-13	65.2	
	27-Mar-13	62.7	

Table 4-2 Air Borne Noise Monitoring Results

4.2.3 No project related noise exceedance was recorded in the reporting month.

4.3 Water Quality Monitoring

4.3.1 The water quality monitoring schedule of the reporting period is given in Appendix H. Summaries of exceedances for water quality monitoring are provided in Table 4-3 to Table 4-5.

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	One record at I-1 on 20 March 2013	Nil
Total	0	1

Table 4-3 Summary of Exceedances for I-1

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Nil	One record at I-2 on 15 March 2013
Total	1	0

Table 4-4 Summary of Exceedances for I-2

Parameter	Action Level Exceedance	Limit Level Exceedance
DO	Nil	Nil
Turbidity	Nil	Nil
SS	Nil	Nil
Total	0	0

Table 4-5 Summary of Exceedances for I-3

4.3.2 Results of measured water quality parameters during the reporting month are shown in Table 4-6. Detailed results including weather conditions and graphical presentations are enclosed in Appendix I.

River Water Quality Monitoring

- 4.3.3 Two exceedances were recorded for the river water quality monitoring within the reporting month.

Exceedances of Suspended Solids Level

Action Level at I-1 on 20 March 2013

- 4.3.4 One exceedance of SS limit level was recorded at I-1 on 20 March 2013. The measured SS level (2.40 mg/L) was lower than the baseline action / limit level, but higher than 120% of the SS level (<2.00 mg/L) of the upstream control station (I-1-C). Details of the construction activities conducted on the monitoring day are given in Appendix J. No direct disturbance was observed from the site. Therefore, the exceedance was considered to be contributed by natural variation. Since the exceedance was non-project related, no further action was required.

Limit Level at I-2 on 15 March 2013

- 4.3.5 One exceedance of SS limit level was recorded at I-2 on 15 March 2013. The measured SS level (2.85 mg/L) was lower than the baseline action / limit level, but higher than 130% of the SS level (<2.00 mg/L) of the upstream control station (I-2-C). Details of the construction activities conducted on the monitoring day are given in Appendix J. No direct disturbance was observed from the site. Therefore, the exceedance was considered to be contributed by natural variation. Since the exceedance was non-project related, no further action was required.

Station	Date	Temperature (°C)	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-1	1-Mar-13	25.50	9.23	3.42 / 3.34	7.69	4.13	9.75 / 12.47	3.70	8.85 / 10.17
	4-Mar-13	24.70	9.16		7.70	3.37		2.90	
	6-Mar-13	25.50	9.31		7.75	2.93		3.90	
	8-Mar-13	25.70	8.54		7.77	1.99		2.25	
	11-Mar-13	26.00	8.71		7.75	3.43		2.85	
	13-Mar-13	24.10	7.93		7.85	2.97		2.65	
	15-Mar-13	24.40	7.97		7.77	2.88		2.70	
	18-Mar-13	25.00	8.31		7.71	4.41		2.70	
	20-Mar-13	26.00	7.68		7.85	4.61		2.40	
	22-Mar-13	25.50	7.97		7.78	2.67		<2.00	
	25-Mar-13	23.00	7.80		7.70	2.67		<2.00	
	27-Mar-13	21.70	7.97		7.75	3.69		2.40	

Note: *Italic* indicates the occurrence of exceedance of *Action level*.

Bold indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature (°C)	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-1-C	1-Mar-13	25.50	9.15	- / -	7.69	4.31	- / -	4.35	- / -
	4-Mar-13	24.70	9.08		7.70	3.55		2.45	
	6-Mar-13	25.50	9.24		7.75	3.08		4.15	
	8-Mar-13	25.70	8.67		7.77	2.11		<2.00	
	11-Mar-13	26.00	8.64		7.75	3.54		2.80	
	13-Mar-13	24.10	7.87		7.85	2.88		2.30	
	15-Mar-13	24.40	7.90		7.77	2.94		2.60	
	18-Mar-13	25.00	8.24		7.71	4.29		2.55	
	20-Mar-13	26.00	7.61		7.85	4.80		<2.00	
	22-Mar-13	25.50	7.91		7.78	2.70		<2.00	
	25-Mar-13	23.00	7.88		7.70	2.76		<2.00	
	27-Mar-13	21.70	7.88		7.75	3.84		3.60	

Note: *Italic* indicates the occurrence of exceedance of *Action level*.

Bold indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature (°C)	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-2	1-Mar-13	25.50	9.05	3.66 / 3.63	7.72	1.53	6.63 / 6.99	<2.00	7.68 / 8.34
	4-Mar-13	24.80	9.11		7.71	1.20		<2.00	
	6-Mar-13	25.60	9.22		7.77	1.17		<2.00	
	8-Mar-13	25.50	8.61		7.75	0.56		<2.00	
	11-Mar-13	26.10	8.61		7.72	1.78		<2.00	
	13-Mar-13	24.20	7.62		7.88	1.09		<2.00	
	15-Mar-13	24.20	7.88		7.75	1.19		2.85	
	18-Mar-13	25.00	8.32		7.73	1.28		<2.00	
	20-Mar-13	26.10	7.65		7.86	1.62		<2.00	
	22-Mar-13	25.60	7.71		7.75	1.19		<2.00	
	25-Mar-13	22.90	8.01		7.72	1.33		<2.00	
	27-Mar-13	21.80	7.77		7.77	2.65		2.50	

Note: *Italic* indicates the occurrence of exceedance of *Action level*.

Bold indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature (°C)	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-2-C	1-Mar-13	25.50	9.09	- / -	7.72	1.51	- / -	<2.00	- / -
	4-Mar-13	24.80	9.25		7.71	1.12		<2.00	
	6-Mar-13	25.60	9.34		7.77	1.19		<2.00	
	8-Mar-13	25.50	8.62		7.75	0.62		<2.00	
	11-Mar-13	26.10	8.77		7.72	1.67		2.30	
	13-Mar-13	24.20	7.71		7.88	1.18		<2.00	
	15-Mar-13	24.30	8.04		7.75	1.26		<2.00	
	18-Mar-13	25.00	8.38		7.73	1.32		<2.00	
	20-Mar-13	26.10	7.72		7.86	1.71		<2.00	
	22-Mar-13	25.60	7.78		7.75	1.12		<2.00	
	25-Mar-13	22.90	7.95		7.72	1.39		<2.00	
	27-Mar-13	21.80	7.74		7.77	2.60		3.00	

Note: *Italic* indicates the occurrence of exceedance of *Action level*.

Bold indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature (°C)	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-3	1-Mar-13	25.60	9.08	3.65 / 3.51	7.73	2.05	3.99 / 4.18	<2.00	6.13 / 7.23
	4-Mar-13	24.80	9.22		7.75	1.30		<2.00	
	6-Mar-13	25.60	9.12		7.77	1.65		<2.00	
	8-Mar-13	25.50	8.62		7.75	1.31		<2.00	
	11-Mar-13	26.10	8.59		7.71	2.10		2.55	
	13-Mar-13	24.20	7.63		7.75	1.65		<2.00	
	15-Mar-13	24.20	7.85		7.73	1.43		<2.00	
	18-Mar-13	25.10	8.09		7.72	1.44		<2.00	
	20-Mar-13	26.00	7.49		7.81	2.12		<2.00	
	22-Mar-13	25.60	7.87		7.75	1.28		<2.00	
	25-Mar-13	22.90	7.79		7.72	1.89		<2.00	
	27-Mar-13	21.80	7.90		7.75	2.43		2.75	

Note: *Italic* indicates the occurrence of exceedance of *Action level*.

Bold indicates the occurrence of exceedance of **Limit level**.

Station	Date	Temperature (°C)	DO (mg/L)	Action/Limit Level for DO (mg/L)	pH	Turbidity (NTU)	Action/Limit Level for Turbidity (NTU)	SS (mg/L)	Action/Limit Level for SS (mg/L)
I-3-C	1-Mar-13	25.60	9.00	- / -	7.73	2.02	- / -	<2.00	- / -
	4-Mar-13	24.80	9.17		7.75	1.32		<2.00	
	6-Mar-13	25.70	9.17		7.77	1.68		<2.00	
	8-Mar-13	25.50	8.63		7.74	1.29		<2.00	
	11-Mar-13	26.10	8.55		7.71	2.15		2.40	
	13-Mar-13	24.20	7.56		7.75	1.72		<2.00	
	15-Mar-13	24.20	7.79		7.73	1.42		<2.00	
	18-Mar-13	25.10	8.16		7.72	1.46		<2.00	
	20-Mar-13	26.00	7.58		7.81	2.13		<2.00	
	22-Mar-13	25.60	7.77		7.75	1.34		<2.00	
	25-Mar-13	22.90	7.93		7.72	1.82		<2.00	
	27-Mar-13	21.80	7.85		7.75	2.46		2.35	

Note: *Italic* indicates the occurrence of exceedance of *Action level*. **Bold** indicates the occurrence of exceedance of **Limit level**

Table 4-6 Water Quality Monitoring Results

Monthly EM&A Report (March 2013)

Hyder Consulting Limited-Company Number 126012

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4.4 Summary of Project-Related Exceedances

4.4.1 Table 4-7 summarises the project-related exceedance results recorded in March 2013. Note that exceedances that are considered not related to the construction activities are not included in this table.

Environmental Monitoring	Total No. of Measurement	Action Level Exceedance	% of Action Level Exceedance	Limit Level Exceedance	% of Limit Level Exceedance
Air Quality	60	0	0	0	0
Air Borne Noise	20	0	0	0	0
Water	72	0	0	0	0

Note: Exceedances that are considered not related to the construction activities are not included in this table.

Table 4-7 Summary of Project-Related Exceedances

5 WASTE MANAGEMENT

5.1.1 The status of waste management is summarised in Table 5-1.

Status of waste management	Quantity
Inert C&D Material Disposed to Public Fill at Tuen Mun (m ³)	1195.2
Inert C&D Material Reused in this Contract (m ³)	0
Inert C&D Material Reused in other Contract(s) (m ³)	0
Metals Generated (kg)	0
Paper / Cardboard Packaging (kg)	0
Plastics (kg)	0
Chemical Waste (kg)	0
General Waste Disposed of to NENT Landfill (m ³)	102.4

Table 5-1 Waste Generated in March 2013

6 NON-COMPLIANCE AND DEFICIENCY

6.1 Site Audit by ET

6.1.1 ET has carried out two site inspections in the reporting month. All observations together with the appropriate recommended mitigation measures where necessary were recorded in the audit checklists that were passed to the Contractor. Major environmental deficiencies observed during site inspections / audits and recommendation, which were made by the ET, are summarised in Table 6-1 below. No non-compliance was observed.

Inspection Date	Observation	Recommendation	Status
7 March 2013	Chemical containers were stored without drip tray at Intake I-3	Chemical drums or containers should be placed on drip tray(s)	Chemical drums or containers were placed on a drip tray on 7 March 2013
21 March 2013	Nil	Nil	Nil

Table 6-1 Site Inspections by ET

7 COMPLAINT

- 7.1.1 A complaint hotline at **9850 3241** of the Contractor has been established for the Project.
- 7.1.2 No environmental complaint was received during the reporting month.
- 7.1.3 Details of the past complaint investigation and observations can also be referred to Appendix K.
- 7.1.4 Cumulative statistics of environmental complaints are shown in Table 7-1.

Complaints Received in the Reporting Month	Cumulative Number of Complaints
0	26

Table 7-1 Cumulative Statistics of Environmental Complaints

8 SUMMARY OF NOTIFICATION OF SUMMONS, SUCCESSFUL PROSECUTIONS AND CORRECTIVE ACTIONS

8.1.1 No summons and successful prosecution was received during the reporting month.

8.1.2 Cumulative statistics of notification of summons, successful prosecutions and convictions are shown in Table 8-1.

Notification of Summons		Successful Prosecution and Conviction	
March 2013	Cumulative	March 2013	Cumulative
0	0	0	0

Table 8-1 Cumulative Statistics of Notification of Summons and Successful Prosecutions and Convictions

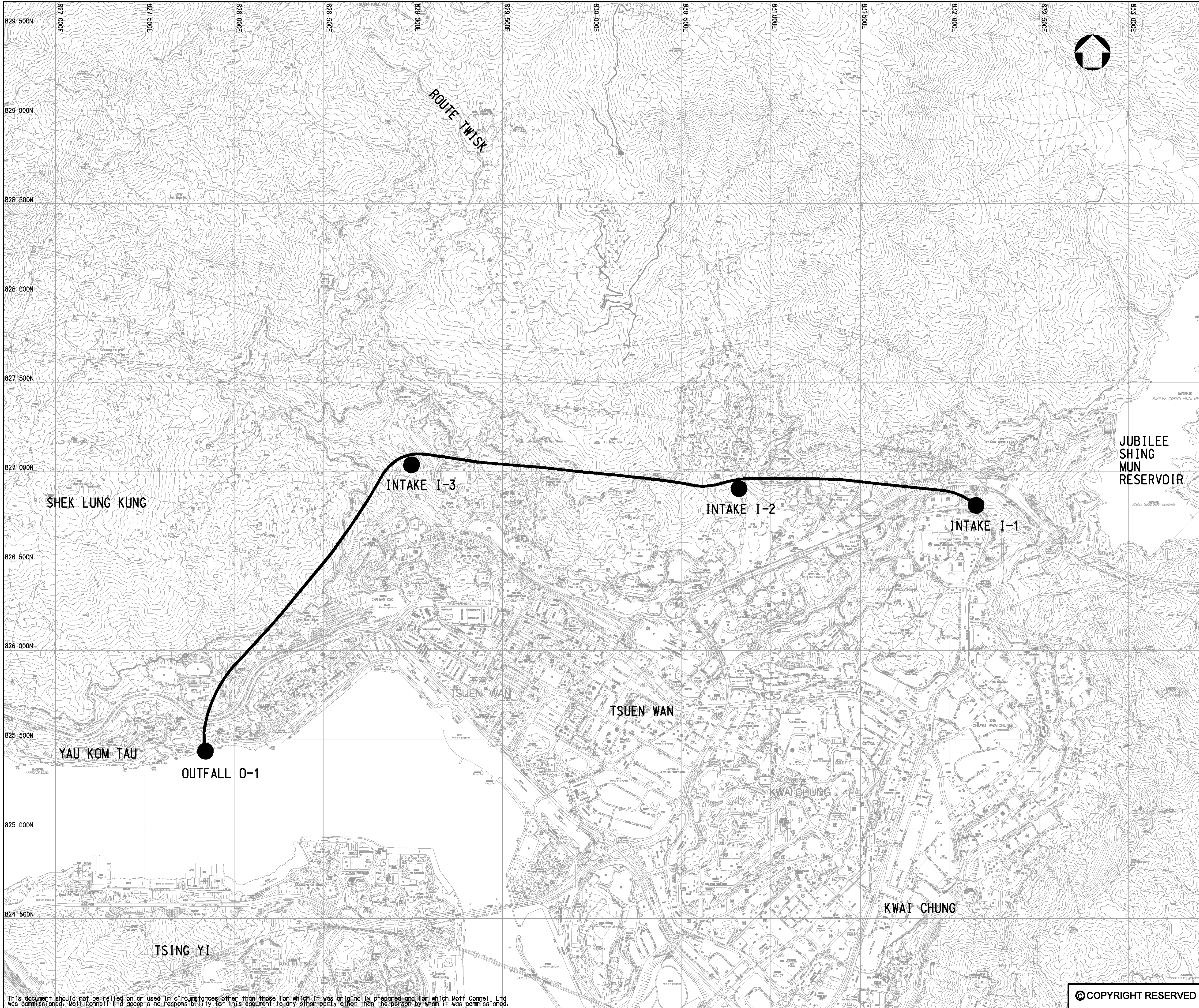
9 FUTURE KEY ISSUE

9.1.1 The forecast of construction works for the upcoming three months are:

- Site cleaning and tidying at Outfall, I-1, I-2 and I-3;
- Construction of trellis beams and pump room RC structures at Outfall;
- Construction of maintenance access at Outfall;
- Slope reinstatement works at Outfall;
- Finishing works for spiral ramp at Outfall;
- Construction of surface drainage at Outfall;
- Installation of GRP panels at Outfall;
- Water proofing for tapered channel planter at Outfall;
- Landscape works at Outfall;
- Installation of additional irrigation system at Outfall;
- Excavation and construction of permanent access road at I-3;
- Construction of road drainage and surface drainage at I-3;
- Water proofing works for approach channel at I-3;
- Installation of stone facing for vortex shaft and air vent shaft at I-3;
- Tiling works for man access shaft and kiosk at I-3;
- Construction of man access shaft and approach channel RC structure at I-2;
- Installation of stone facing for approach channel, vortex shaft and air vent shaft at I-2;
- Tiling works for man access shaft and equipment room at I-2;
- Construction of concrete base slab at I-1;
- Slope reinstatement works at I-1;
- Surface drainage works at I-1;
- Construction of inclined ramp at I-1;
- Finishing works for spiral ramp at I-1; and
- Installation of GRP panels at I-1.

Appendix A

Site Map and Works Area



Key Plan:

Notes:

1. CO-ORDINATES REFER TO HONG KONG METRIC GRID (1980).
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (P.D.).
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

Key to symbols

LEGENDS :

- TUNNEL ALIGNMENT
- INTAKE/OUTFALL STRUCTURES

B1	MAR 05	EL	FOR EMAA MANUAL	<i>M</i>	<i>De</i>
Rev	Date	Drawn	Description	Ch'kd	App'd

Client

The Government of the Hong Kong
Special Administrative Region
Drainage Services Department

Consulting Engineers
Mott Connell Ltd.
in Association with
MVA Hong Kong Ltd EDAW Earth Asia Ltd Environmental Resources
WL/Delft Hydraulics Ltd Chesterton Petty Ltd Management

Project
**Drainage Improvement in
Tsuen Wan and Kwai Chung -
Tsuen Wan Drainage Tunnel -
Investigation**

Title
**TUNNEL ALIGNMENT
AND SURROUNDING AREA**

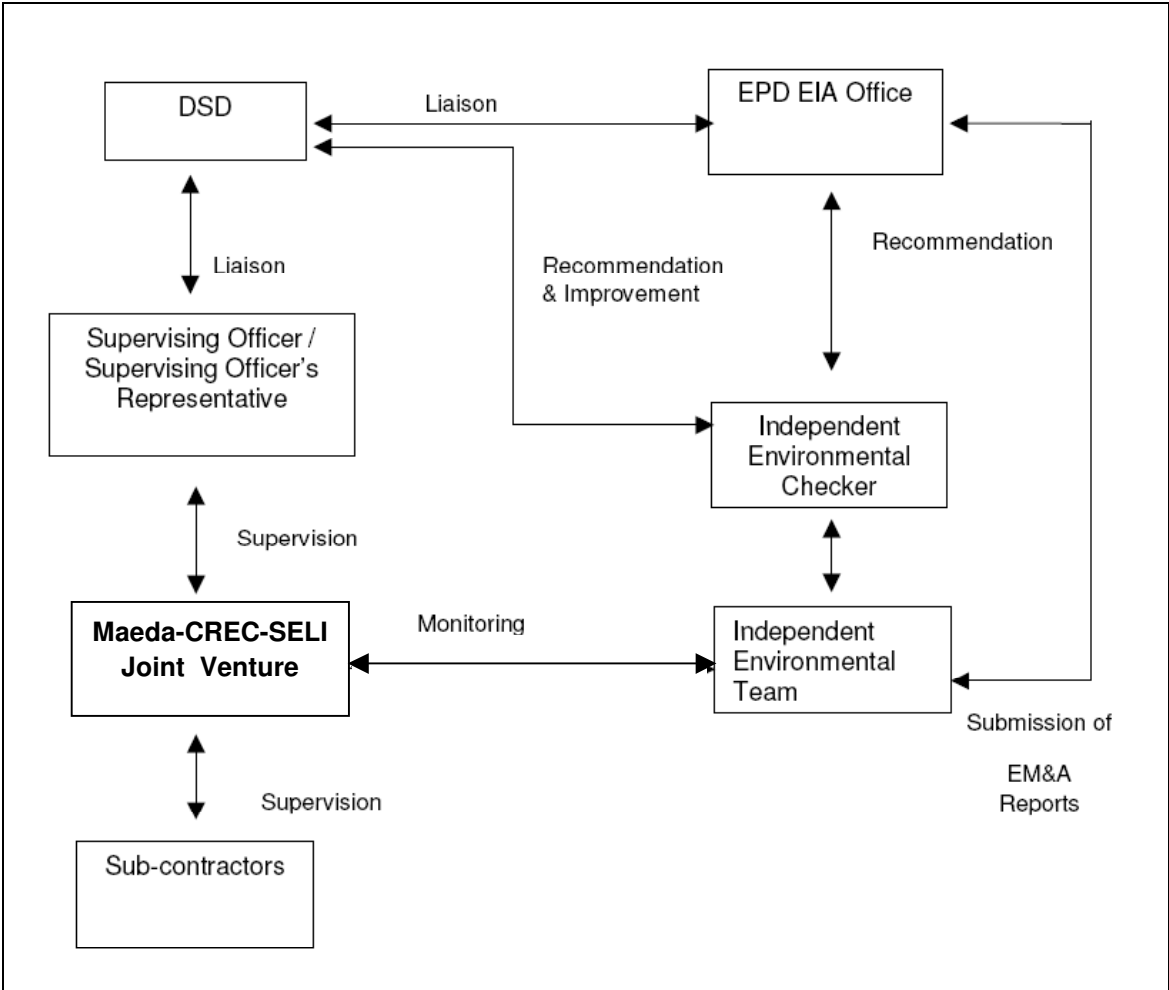
Designed	CF	<i>cf</i>	Eng.Chk.	MT	<i>M</i>
Drawn	HL	HL	Approved	TMC	<i>De</i>
Dwg.Chk.	KN	<i>KN</i>	Scale		
Project	204417				Status
CAD file	J:\204417\DRAWING\FIGURE EMAA MANUAL\FIGURE1.1.dgn				
Drawing No.	FIGURE 1.1				Rev 01

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Appendix B

Organization Chart



Appendix C

Construction Programme

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012												2013												2014												2015			
										A S O N D				J F M A M				J J A S O N D				J F M A M				J J A S O N D				J F M A																			
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95							
Preliminaries																																																	
Project Dates																																																	
01R0000002	Tender Issue Date	0	0	26JUN07A		100	26JUN07A																																										
01R0000004	Tender Closing Date	0	0	05OCT07A		100	05OCT07A																																										
01R0000006	Letter of Acceptance Issued Date	0	0	14DEC07A		100	14DEC07A																																										
01R0000008	Contract Commencement Date	0	0	28DEC07A		100	28DEC07A																																										
01R0000010	Completion of Section 1 of the Works	0	0		28MAR14	0		29APR13	-836	Contract completion date on 13/12/11																																							
01R0000012	Completion of Section 2 of the Works	0	0		06SEP11A	100		06SEP11A																																									
01R0000014	Completion of Section 3 of the Works	0	0		03AUG11A	100		03AUG11A																																									
01R0000016	Completion of Section 4 of the Works	0	0		11AUG11A	100		11AUG11A																																									
01R0000018	Completion of Section 5 of the Works	0	0		19SEP11A	100		19SEP11A																																									
01R0000020	Completion of Section 6 of the Works	0	0		16AUG12A	100		14SEP12		Contract completion date on 29/07/11																																							
01R0000022	Completion of Section 7 of the Works	0	0		06NOV14	0		29APR14	-713	Contract completion date on 23/11/12																																							
Possession of Area																																																	
01R00A0102	Possession Portion A - 90d of DOC	0	0	27FEB08A		100	27FEB08A																																										
01R00A0104	Handover of Portion A	0	0		07MAR14	0		12DEC12	-815																																								
01R00B0102	Possession of Portion B - 90d of DOC	0	0	07MAR08A		100	07MAR08A																																										
01R00B0104	Handover of Portion B	0	0		14MAR14	0		22MAR13	-822																																								
01R00C0102	Possession of Portion C - 90d of DOC	0	0	26MAR08A		100	26MAR08A																																										
01R00C0104	Handover of Portion C	0	0		14MAR14	0		16APR13	-822																																								
01R00D0102	Possession of Portion D on DOC	0	0	28DEC07A		100	28DEC07A																																										
01R00D0104	Handover of Portion D	0	0		06NOV13	0		29APR13	-694																																								
01R00E0102	Possession of Portion E - 650d of DOC	0	0	09JUL09A		100	09JUL09A																																										
01R00E0104	Handover of Portion E	0	0		06NOV13	0		29APR13	-694																																								
01R00F0102	Possession of Portion F on DOC	0	0	28DEC07A		100	28DEC07A																																										
01R00F0104	Handover of Portion F	0	0		28MAR14	0		09MAR13	-836	After Tunnel commission																																							
01R00G0102	Possession of Portion G - 700d of DOC	0	0	26NOV09A		100	26NOV09A																																										
01R00G0104	Handover of Portion G	0	0		07NOV12	0		14SEP12	857																																								
01R00I0102	Possession of Portion I on DOC	0	0	28DEC07A		100	28DEC07A																																										
01R00I0104	Handover of Portion I	0	0		06NOV14	0		29APR14	0																																								
01R00J0102	Possession of Portion J	0	0	15MAR15		0	29JUN14		0																																								
01R00J0104	Handover of Portion J	0	0		23NOV11A	100		23NOV11A																																									
01R0H10102	Possession of Portion H1 on DOC	0	0	28DEC07A		100	28DEC07A																																										
01R0H10104	Handover of Portion H1	0	0		05JAN15	0		28JUN14	0																																								
01R0H20102	Possession of Portion H2 - 300d of DOC	0	0	04NOV08A		100	04NOV08A																																										

Start Date 29JUN07
 Finish Date 14MAR15
 Data Date 28AUG12
 Run Date 19SEP12 11:47

Early Bar
 Target Bar
 Progress Bar
 Critical Activity

WP10 **Maeda-CREC-SELI JV**
CONTRACT NO. DC/2007/12
Design and Construction of
Tsuen Wan Drainage Tunnel
Works Programme

WP10			
Date	Revision	Checked	Approved
05SEP11	WP8A		
09MAR12	WP09		
13SEP12	WP10		

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012				2013				2014				2015																				
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
17R0000902	Fulfill all relevant environmental obligation	1,950	1,950	28DEC07A	14MAR14	84	28DEC07A	29APR13	0																																	
Excavation Permit/Utilities per SCC 54 & SCC 83																																										
01R0001002	Nominate IIUMS co-ordinator	7	7	14DEC07A	15JAN08A	100	14DEC07A	15JAN08A																																		
01R0001004	SO approve IIUMS co-ordinator	14	14	16JAN08A	29FEB08A	100	16JAN08A	29FEB08A																																		
01R0001006	Submit brand name of UGS detection equipment	7	7	28DEC07A	18FEB08A	100	28DEC07A	18FEB08A																																		
01R0001008	Utilities detection & report to the SO	21	21	29FEB08A	05APR08A	100	29FEB08A	05APR08A																																		
01R0001010	Liaison with UUs	21	21	04JAN08A	29FEB08A	100	04JAN08A	29FEB08A																																		
01R0001012	Apply XP for site entrance construction	7	7	21JAN08A	08MAR08A	100	21JAN08A	08MAR08A																																		
01R0001014	HyD process XP for site entrance construction	20	20	10MAR08A	28MAY08A	100	10MAR08A	28MAY08A																																		
01R0001016	HyD issue XP for site entrance construction	0	0		28MAY08A	100		28MAY08A																																		
01R0001018	Apply XP for GI works at I-1 & I-2	1	1	22APR08A	20MAY08A	100	22APR08A	20MAY08A																																		
01R0001020	HyD process XP for GI works at I-1 & I-2	30	30	23APR08A	26SEP08A	100	23APR08A	26SEP08A																																		
01R0001022	HyD issue XP for GI works at I-1 & I-2	0	0		26SEP08A	100		26SEP08A																																		
01R0001024	Apply XP for trial grout at Fault F1	1	1	22APR08A	20MAY08A	100	22APR08A	20MAY08A																																		
01R0001026	HyD process XP for trial grout at Fault F1	30	30	23APR08A	22JUL08A	100	23APR08A	22JUL08A																																		
01R0001028	HyD issue XP for trial grout at Fault F1	0	0		22JUL08A	100		22JUL08A																																		
Pre-construction Condition Survey																																										
Preliminaries																																										
01R0001102	Appoint a Qualified Structural Engineer	30	30	28DEC07A	19MAR08A	100	28DEC07A	19MAR08A																																		
01R0001104	Submit nos. & extent of the affected EBS	30	30	28DEC07A	19MAR08A	100	28DEC07A	19MAR08A																																		
PCS Stage 1 between I-1 & I-2																																										
01R0001118	Carry out stg 1 PCS between I-1 & I-2	6	6	22APR08A	23APR08A	100	22APR08A	23APR08A																																		
01R0001120	Prepare/submit reports for stg 1 PCS bet I-1&I-2	60	60	24APR08A	22SEP08A	100	24APR08A	22SEP08A																																		
01R0001122	Review/accept reports for stg 1 PCS bet I-1&I-2	60	60	31MAY08A	20JAN09A	100	31MAY08A	20JAN09A																																		
PCS Stage 1 between I-2 & I-3																																										
01R0001130	Carry out stg 1 PCS between I-2 & I-3	5	5	25MAR08A	30APR08A	100	25MAR08A	30APR08A																																		
01R0001132	Prepare/submit reports for stg 1 PCS bet I-2&I-3	60	60	24APR08A	22SEP08A	100	24APR08A	22SEP08A																																		
01R0001134	Review/accept reports for stg 1 PCS bet I-2&I-3	60	60	24MAY08A	04FEB09A	100	24MAY08A	04FEB09A																																		
PCS Stage 1 between I-3 & O-1																																										
01R0001142	Carry out stg 1 PCS between I-3 & O-1	5	5	25MAR08A	26MAR08A	100	25MAR08A	26MAR08A																																		
01R0001144	Prepare/submit reports for stg 1 PCS bet I-3&O-1	60	60	26MAR08A	11SEP08A	100	26MAR08A	11SEP08A																																		
01R0001146	Review/accept reports for stg 1 PCS bet I-3&O-1	60	60	31MAY08A	04FEB09A	100	31MAY08A	04FEB09A																																		
PCS Stage 1 at vicinity of O-1																																										
01R0001106	Carry out stg 1 PCS at vicinity of O-1	5	5	25MAR08A	29MAR08A	100	25MAR08A	29MAR08A																																		
01R0001108	Prepare/submit reports for stg 1 PCS at O-1	60	60	31MAR08A	10SEP08A	100	31MAR08A	10SEP08A																																		
01R0001110	Review/accept reports for stg 1 PCS at O-1	60	60	27MAY08A	09FEB09A	100	27MAY08A	09FEB09A																																		
PCS Stage 2 between I-1 & I-2																																										
01R0001124	Carry out stg 2 PCS between I-1 & I-2	5	5	22APR08A	02JUN08A	100	22APR08A	02JUN08A																																		
01R0001126	Prepare/submit reports for stg 2 PCS bet I-1&I-2	60	60	24APR08A	10JUN08A	100	24APR08A	10JUN08A																																		
01R0001128	Review/accept reports for stg 2 PCS bet I-1&I-2	60	60	11JUN08A	09FEB09A	100	11JUN08A	09FEB09A																																		

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																							
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A						
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95						
PCS Stage 2 between I-2 & I-3																																																
01R0001136	Carry out stg 2 PCS between I-2 & I-3	5	5	30APR08A	07JUN08A	100	30APR08A	07JUN08A																																								
01R0001138	Prepare/submit reports for stg 2 PCS bet I-2&I-3	60	60	02MAY08A	12JUN08A	100	02MAY08A	12JUN08A																																								
01R0001140	Review/accept reports for stg 2 PCS bet I-2&I-3	60	60	13JUN08A	09FEB09A	100	13JUN08A	09FEB09A																																								
PCS Stage 2 between I-3 & O-1																																																
01R0001148	Carry out stg 2 PCS between I-3 & O-1	5	5	09MAY08A	13JUN08A	100	09MAY08A	13JUN08A																																								
01R0001150	Prepare/submit reports for stg 2 PCS bet I-3&O-1	60	60	04JUN08A	18JUN08A	100	04JUN08A	18JUN08A																																								
01R0001152	Review/accept reports for stg 2 PCS bet I-3&O-1	60	60	19JUN08A	09FEB09A	100	19JUN08A	09FEB09A																																								
PCS Stage 2 at Vicinity of O-1																																																
01R0001112	Carry out stg 2 PCS at vicinity of O-1	12	12	01APR08A	06JUN08A	100	01APR08A	06JUN08A																																								
01R0001114	Prepare/submit reports for stg 2 PCS at O-1	60	60	02JUN08A	16JUN08A	100	02JUN08A	16JUN08A																																								
01R0001116	Review/accept reports for stg 2 PCS at O-1	60	60	17JUN08A	09FEB09A	100	17JUN08A	09FEB09A																																								
Pre-const. condition structural survey; I-1																																																
01R0001154	Prepare/submit reports for EBS at I-1	28	28	28AUG08A	10JAN09A	100	28AUG08A	10JAN09A																																								
01R0001156	Review/accept reports for EBS at I-1	28	28	12JAN09A	24MAR09A	100	12JAN09A	24MAR09A																																								
Pre-const. condition structural survey; I-2																																																
01R0001158	Prepare/submit reports for EBS at I-2	28	28	28AUG08A	10JAN09A	100	28AUG08A	10JAN09A																																								
01R0001160	Review/accept reports for EBS at I-2	28	28	12JAN09A	24MAR09A	100	12JAN09A	24MAR09A																																								
Pre-const. condition structural survey; I-3																																																
01R0001162	Prepare/submit reports for EBS at I-3	28	28	28AUG08A	10JAN09A	100	28AUG08A	10JAN09A																																								
01R0001164	Review/accept reports for EBS at I-3	28	28	12JAN09A	24MAR09A	100	12JAN09A	24MAR09A																																								
Pre-const. condition structural survey; O-1																																																
01R0001166	Prepare/submit reports for EBS at O-1	28	28	28AUG08A	10JAN09A	100	28AUG08A	10JAN09A																																								
01R0001168	Review/accept reports for EBS at O-1	28	28	12JAN09A	24MAR09A	100	12JAN09A	24MAR09A																																								
Pre-const. condition structural survey; Tunnel																																																
01R0001170	Prepare/submit reports for EBS along Tunnel align	346	346	28AUG08A	22SEP09A	100	28AUG08A	22SEP09A																																								
01R0001172	Review/accept reports for EBS along Tunnel align	207	207	16JAN09A	22APR10A	100	16JAN09A	22APR10A																																								
Traffic																																																
01R0001202	Appoint Traffic Consultant/Traffic Engineer	14	14	14DEC07A	03JAN08A	100	14DEC07A	03JAN08A																																								
01R0001204	Eng's Approval of Traffic Consultant	7	7	28DEC07A	28FEB08A	100	28DEC07A	28FEB08A																																								
01R0001206	Prepare/submit TTA Schemes (ingress & egress)	14	14	04JAN08A	31JAN08A	100	04JAN08A	31JAN08A																																								
01R0001216	Obtain endorsement of TTA schemes from TMLG	21	21	01FEB08A	01APR08A	100	01FEB08A	01APR08A																																								
01R0001234	Approval of TTA schemes by the Authorities	14	14	02APR08A	19APR08A	100	02APR08A	19APR08A																																								
01R0001236	Approval of TTA schemes by the Authorities	14	14	02APR08A	19APR08A	100	02APR08A	19APR08A																																								
Management of Sub-contractors as per SCC 44																																																
01R0001302	Submit a Sub-contractor Management Plan	30	30	14DEC07A	12JAN08A	100	14DEC07A	12JAN08A																																								
01R0001304	Submit Quarterly the Updated SMP	1,762	1,762	03JUL08A	14MAR14	83	03JUL08A	29APR13	0																																							
Trees																																																
Siu Ho Wan as a New Tree Transplanting Area																																																
VO028-02	Receive VO28 for new tree transplanting area	0	0		16AUG08A	100		16AUG08A																																								

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012				2013				2014				2015										
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
VO028-04	Preparation works for new T.T. area	20	20	18AUG08A	07SEP08A	100	18AUG08A	07SEP08A																								
Survey																																
01R0001502	Appoint Landscape Specialist Contractor	14	14	14DEC07A	14JAN08A	100	14DEC07A	14JAN08A																								
01R0001504	SO's Approval of Landscape Contractor	7	7	15JAN08A	28FEB08A	100	15JAN08A	28FEB08A																								
01R0001506	Nominate competent person to oversee tree works	45	45	14DEC07A	29JAN08A	100	14DEC07A	29JAN08A																								
01R0001510	Obtain Tree Removal Permit by Others	90	90	28DEC07A	06MAR08A	100	28DEC07A	06MAR08A																								
01R0001512	Remove / Transplant Trees start	0	0	08SEP08A		100	08SEP08A																									
Smart Card System as per ER B.30																																
01R0001602	Appoint Surveyors	14	14	28DEC07A	10JAN08A	100	28DEC07A	10JAN08A																								
01R0001604	SO's Approval of Surveyor	7	7	11JAN08A	16APR08A	100	11JAN08A	16APR08A																								
01R0001608	Initial Survey	28	28	18JAN08A	10MAR08A	100	18JAN08A	10MAR08A																								
01R0001610	Maintain & carry out survey works	1,893	1,893	23FEB08A	14MAR14	84	23FEB08A	29APR13	0																							
01R0001802	Submit Smart Card Sys for SO's Approval	7	7	28DEC07A	15JAN08A	100	28DEC07A	15JAN08A																								
01R0001804	Install & start Operating Smart-Card System	60	60	28DEC07A	23FEB08A	100	28DEC07A	23FEB08A																								
01R0001806	Operate & Maintain Smart-Card System	2,256	2,256	25FEB08A	06NOV14	70	25FEB08A	29APR14	0																							
Procurement of Sub-contractor																																
01R0001904	Spoil Disposal	60	60	28AUG08A	27MAR09A	100	28AUG08A	27MAR09A																								
01R0001906	Earthwork for Outfall O-1	60	60	14DEC07A	05JUN08A	100	14DEC07A	05JUN08A																								
01R0001910	Re-bar Supply	90	90	14DEC07A	30MAY08A	100	14DEC07A	30MAY08A																								
01R0001912	Soil Nailing	60	60	28DEC07A	02APR08A	100	28DEC07A	02APR08A																								
01R0001914	H-piling Works	90	90	14DEC07A	09MAY08A	100	14DEC07A	09MAY08A																								
01R0001916	Fabrication of Pre-cast Lining	80	80	02JUN08A	05JAN09A	100	02JUN08A	05JAN09A																								
01R0001920	Drainage/Road Works for Access Road at I-3	60	60	08AUG08A	03NOV08A	100	08AUG08A	03NOV08A																								
01R0001922	Temp. steel decking over Shing Mun Nullah at I-1	90	90	14DEC07A	25APR08A	100	14DEC07A	25APR08A																								
01R0001924	Design/Install Communication System	414	414	28JUN08A	31JUL09A	100	28JUN08A	31JUL09A																								
01R0001936	Procurement & delivery of Communication System	120	120	09JUL12A	05NOV12	42	06MAY12A	25AUG12	-377																							
01R0018A02	Supply TBM/Main Tunnel Construction	7	7	14DEC07A	21DEC07A	100	14DEC07A	21DEC07A																								
01R0018A04	Security	17	17	17DEC07A	02JAN08A	100	17DEC07A	02JAN08A																								
01R0018A06	Progress Photo/Vedio	25	25	29DEC07A	22JAN08A	100	29DEC07A	22JAN08A																								
01R0018A08	Webpage/Physical Model/3D Animation	48	48	14DEC07A	14FEB08A	100	14DEC07A	14FEB08A																								
01R0018A10	Hoarding/Fencing Erection	60	60	04JAN08A	03MAR08A	100	04JAN08A	03MAR08A																								
01R0018A12	Erection of Contractor's Office	67	67	28DEC07A	03MAR08A	100	28DEC07A	03MAR08A																								
01R0018A14	Remote Control CCTV	60	60	04JAN08A	03MAR08A	100	04JAN08A	03MAR08A																								
01R0018A16	Concrete Supply	45	45	14DEC07A	11MAR08A	100	14DEC07A	11MAR08A																								
01R0018A18	Geotechnical Instrumentation	60	60	15JAN08A	14MAR08A	100	15JAN08A	14MAR08A																								
01R0018A20	Drilling/Grouting for Geotchnical Instrumentat.	60	60	16JAN08A	15MAR08A	100	16JAN08A	15MAR08A																								
01R0018A22	Site Clearance	60	60	26JAN08A	25MAR08A	100	26JAN08A	25MAR08A																								
01R0018A24	Erection of SOR's Office	95	95	02JAN08A	05APR08A	100	02JAN08A	05APR08A																								

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012							2013							2014							2015																							
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A												
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95												
Design/Design Check for Permanent Works																																																						
Project -wide Packages																																																						
Project Design Plan (PDP)																																																						
02L10D0102	Employ Independent Designer	7	7	14DEC07A	20DEC07A	100	14DEC07A	20DEC07A																																														
02L10D0104	Prepare & submit Project Design Plan (PDP)	28	28	14DEC07A	26FEB08A	100	14DEC07A	26FEB08A																																														
02L10D0106	SO's review & comment on PDP	28	28	27FEB08A	18MAR08A	100	27FEB08A	18MAR08A																																														
02L10D0108	Provide further information of (PDP)	28	28	19MAR08A	21AUG08A	100	19MAR08A	21AUG08A																																														
02L10D0110	SO approves PDP	14	14	14MAY08A	04SEP08A	100	14MAY08A	04SEP08A																																														
02L10D0112	Employ Independent Design Checker	14	14	28DEC07A	01FEB08A	100	28DEC07A	01FEB08A																																														
02L10D0114	Approval of Design Checker by the SO	28	28	02FEB08A	28FEB08A	100	02FEB08A	28FEB08A																																														
Design for Communication System																																																						
02L1FE0002	Receive VO# 180 for Digital Comm. Sys	0	0	15NOV11A		100	15NOV11A																																															
02L1FE0012	AIP (Digital); Submit/approve from ICE & SOR	121	121	31OCT11A	11JUN12A	100	31OCT11A	27APR12																																														
02L1FE0102	Design preparation for the AIP submission	15	15	23NOV09A	10DEC09A	100	23NOV09A	10DEC09A																																														
02L1FE0103	Design (AIP) submission for the DC's approval	1	1	11DEC09A	11DEC09A	100	11DEC09A	11DEC09A																																														
02L1FE0104	Design (AIP) certification by the Design Checker	28	28	12DEC09A	26JAN10A	100	12DEC09A	26JAN10A																																														
02L1FE0106	Design (AIP) submission for the SO's approval	1	1	27JAN10A	27JAN10A	100	27JAN10A	27JAN10A																																														
02L1FE0108	Design (AIP) review by the SO	60	60	28JAN10A	24JUN10A	100	28JAN10A	24JUN10A																																														
02L1FE0110	AIP submission for rel. authorities' approval	1	1	05APR12A	17APR12A	100	30APR12	30APR12																																														
02L1FE0112	Design (AIP) review by the rel. authorities	28	28	06APR12A	11JUN12A	100	01MAY12	28MAY12																																														
02L1FE0114	Obtain rel. authorities's approval for AIP	0	1		11JUN12A	100	29MAY12	29MAY12																																														
02L1FE0116	Obtain SO's consent for design (AIP)	0	0		11JUN12A	100		24JUN10A																																														
02L1FE0118	Design preparation for the DDA submission	30	30	28AUG12	26SEP12	0	28APR12	27MAY12	-406																																													
02L1FE0119	Design (DDA) submission for the DC's approval	1	1	27SEP12	27SEP12	0	28MAY12	28MAY12	-331																																													
02L1FE0120	Design (DDA) certification by the Design Checker	28	28	28SEP12	25OCT12	0	29MAY12	25JUN12	-406																																													
02L1FE0122	Design (DDA) submission for the SO's approval	1	1	27SEP12	27SEP12	0	28MAY12	28MAY12	-325																																													
02L1FE0124	Design (DDA) review by the SO	60	60	05OCT12	03DEC12	0	05JUN12	03AUG12	-406																																													
02L1FE0126	DDA submission for rel. authorities' approval	1	1	27SEP12	27SEP12	0	28MAY12	28MAY12	-299																																													
02L1FE0128	Design (DDA) review by the rel. authorities	28	28	05OCT12	01NOV12	0	05JUN12	02JUL12	-374																																													
02L1FE0130	Obtain rel. authorities's approval for DDA	1	1	02NOV12	02NOV12	0	03JUL12	03JUL12	-305																																													
02L1FE0132	Obtain SO's consent for design (DDA)	0	0		04DEC12	0		04AUG12	-406																																													
Design Packages for Works in Portion A																																																						
Temp. Steel Decking Design Over Shing Mun Nullah																																																						
02L1AA0102	Design preparation by the Designer	14	14	22FEB08A	15MAY08A	100	22FEB08A	15MAY08A																																														
02L1AA0104	Design certification by the Design Checker	14	14	16MAY08A	26MAY08A	100	16MAY08A	26MAY08A																																														
02L1AA0106	Design submission for the SO's approval	1	1	26MAY08A	26MAY08A	100	26MAY08A	26MAY08A																																														
02L1AA0108	Design review by the SO	21	21	27MAY08A	30JUN08A	100	27MAY08A	30JUN08A																																														
02L1AA0110	Obtain design approval from the SO	0	0		30JUN08A	100		30JUN08A																																														
ELS Design for Spiral Ramp/Cascade/Box Culvert																																																						
02L1AA0202	Design preparation for the DDA submission	158	158	02MAY08A	16FEB09A	100	02MAY08A	16FEB09A																																														
02L1AA0203	Design submission for the DC's approval	2	2	10JUL08A	17FEB09A	100	10JUL08A	17FEB09A																																														
02L1AA0204	Design (DDA) certification by the Design Checker	30	30	11JUL08A	17FEB09A	100	11JUL08A	17FEB09A																																														

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																	
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Schedule of Milestones for Cost Centre No. 2L																																										
02L10D1002	2L 1; On submission of PDP to the SO	0	0		10JAN08A	100		10JAN08A																																		
02L10D1004	2L 2; On acceptance of PDP by the SO	0	0		04SEP08A	100		04SEP08A																																		
02L10D1006	2L 3; On submission of AIP to the SO; Portion A	0	0		12MAY09A	100		12MAY09A																																		
02L10D1008	2L 4; On acceptance of AIP by the SO; Portion A	0	0		25JUL09A	100		25JUL09A																																		
02L10D1010	2L 5; On subumission of DDA to the SO; Portion A	0	0		19NOV10A	100		28MAY12																																		
02L10D1012	2L 6; On acceptance of DDA by the SO; Portion A	0	0		24NOV10A	100		04AUG12																																		
02L10D1014	2L 7; On submission of AIP to the SO; Portion B	0	0		07JUL09A	100		07JUL09A																																		
02L10D1016	2L 8; On acceptance of AIP by the SO; Portion B	0	0		06OCT10A	100		06OCT10A																																		
02L10D1018	2L 9; On submission of DDA to the SO; Portion B	0	0		13APR12A	100		28MAY12																																		
02L10D1020	2L 10; On acceptance of DDA by the SO; Portion B	0	0		08JUN12A	100		11MAY12																																		
02L10D1022	2L 11; On submission of AIP to the SO; Portion C	0	0		25JUL09A	100		25JUL09A																																		
02L10D1024	2L 12; On acceptance of AIP by the SO; Portion C	0	0		06OCT10A	100		06OCT10A																																		
02L10D1026	2L 13; On submission of DDA to the SO; Portion C	0	0		13APR12A	100		28MAY12																																		
02L10D1028	2L 14; On acceptance of DDA by the SO; Portion C	0	0		08JUN12A	100		11MAY12																																		
02L10D1030	2L 15; On acceptance of AIP by the SO; Portion D	0	0		25JUL09A	100		25JUL09A																																		
02L10D1032	2L 16; On acceptance of DDA by the SO; Portion D	0	0		30JUL11A	100		30JUL11A																																		
02L10D1034	2L 17; On submission of AIP to the SO; Portion F	0	0		13JUL09A	100		13JUL09A																																		
02L10D1036	2L 18; On acceptance of AIP by the SO; Portion F	0	0		24JUN10A	100		24JUN10A																																		
02L10D1038	2L 19; On submission of DDA to the SO; Portion F	0	0		31JUL09A	100		28MAY12																																		
02L10D1040	2L 20; On acceptance of DDA by the SO; Portion F	0	0		28OCT09A	100		04AUG12																																		
02L10D1042	2L 21; On acceptance of AIP by the SO; Portion G	0	0		11JAN10A	100		11JAN10A																																		
02L10D1044	2L 22; On acceptance of DDA by the SO; Portion G	0	0		16SEP11A	100		27FEB12																																		
02L10D1046	2L 23; On completion of all works under this CC	0	0		08JUN12A	100		27FEB12																																		
Construction of Main Tunnel																																										
Trial Grout at Fault Zone F1																																										
3AL1FT0002	HyD issue XP	0	0		23JUL08A	100		23JUL08A																																		
3AL1FT0004	Adavance notice to HyD/Road advice	6	6	24JUL08A	30JUL08A	100	24JUL08A	30JUL08A																																		
3AL1FT0006	Trial pit excavation	4	4	31JUL08A	04AUG08A	100	31JUL08A	04AUG08A																																		
3AL1FT0010	Scaffolding, mobilize & set up	7	7	05AUG08A	13AUG08A	100	05AUG08A	13AUG08A																																		
3AL1FT0012	Drill & test for 2m Arrangement Test	45	45	14AUG08A	15NOV08A	100	14AUG08A	15NOV08A																																		
3AL1FT0014	Backfill drilled holes, demobilization & Tidy up	6	6	17NOV08A	22NOV08A	100	17NOV08A	22NOV08A																																		
3AL1FT0016	Drill & test for single hole arrangement test	17	17	11AUG08A	04SEP08A	100	11AUG08A	04SEP08A																																		
3AL1FT0018	Backfill drilled hole, demobilization & tidy up	1	1	05SEP08A	05SEP08A	100	05SEP08A	05SEP08A																																		
TBM Manufacture/Testing/Delivery																																										
Manufacture of TBM & Back-ups																																										
3AL1FT0302	TBM & Excavation Sys Procurement	30	30	14DEC07A	12JAN08A	100	14DEC07A	12JAN08A																																		
3AL1FT0304	TBM design & manufacturing	252	252	21DEC07A	28SEP08A	100	21DEC07A	28SEP08A																																		
3AL1FT0306	TBM workshop tests	7	7	04OCT08A	08OCT08A	100	04OCT08A	08OCT08A																																		
3AL1FT0308	TBM dismounting & packing	21	21	09OCT08A	24DEC08A	100	09OCT08A	24DEC08A																																		

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012				2013				2014				2015																				
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Delivery of TBM																																										
3AL1FT0105	TBM shipment to Hong Kong	30	30	06JUL09A	10AUG09A	100	06JUL09A	10AUG09A																																		
3AL1FT0110	TBM arriving Portion I	3	3	10AUG09A	12AUG09A	100	10AUG09A	12AUG09A																																		
3AL1FT0115	Destuffing Containers/Cleaning & lubrication	24	24	08SEP09A	10OCT09A	100	08SEP09A	10OCT09A																																		
TBM Pre-assembly/Test & Commis. at Portion I																																										
3AL1FT0215	Backup # 1	12	12	09SEP09A	22SEP09A	100	09SEP09A	22SEP09A																																		
3AL1FT0220	Backup # 2	8	8	15SEP09A	23SEP09A	100	15SEP09A	23SEP09A																																		
3AL1FT0225	Backup # 3	4	4	21SEP09A	24SEP09A	100	21SEP09A	24SEP09A																																		
3AL1FT0230	Backup # 4	3	3	24SEP09A	26SEP09A	100	24SEP09A	26SEP09A																																		
3AL1FT0240	Backup # 5	2	2	28SEP09A	29SEP09A	100	28SEP09A	29SEP09A																																		
3AL1FT0245	Backup # 6	3	3	29SEP09A	02OCT09A	100	29SEP09A	02OCT09A																																		
3AL1FT0250	Backup # 7	3	3	30SEP09A	05OCT09A	100	30SEP09A	05OCT09A																																		
3AL1FT0255	Backup # 8	4	4	05OCT09A	08OCT09A	100	05OCT09A	08OCT09A																																		
3AL1FT0260	Backup # 9	5	5	07OCT09A	15OCT09A	100	07OCT09A	15OCT09A																																		
3AL1FT0365	Backup # 10	6	6	09OCT09A	15OCT09A	100	09OCT09A	15OCT09A																																		
3AL1FT0370	Backup # 11	6	6	10OCT09A	15OCT09A	100	10OCT09A	15OCT09A																																		
3AL1FT0375	Backup # 12	6	6	13OCT09A	15OCT09A	100	13OCT09A	15OCT09A																																		
3AL1FT0377	Backup conveyor	5	5	17OCT09A	16JAN10A	100	17OCT09A	16JAN10A																																		
3AL1FT0379	Ventilation duct into cassette and scaffolding	3	3	04NOV09A	26JAN10A	100	04NOV09A	26JAN10A																																		
3AL1FT0381	Wheels	5	5	16OCT09A	11JAN10A	100	16OCT09A	11JAN10A																																		
3AL1FT0383	Testing for compressor	3	3	16OCT09A	19JAN10A	100	16OCT09A	19JAN10A																																		
3AL1FT0385	Testing for hoses reels	3	3	28OCT09A	19JAN10A	100	28OCT09A	19JAN10A																																		
3AL1FT0387	Testing for peagravel system	3	3	12NOV09A	19JAN10A	100	12NOV09A	19JAN10A																																		
3AL1FT0389	Erector	4	4	22OCT09A	20JAN10A	100	22OCT09A	20JAN10A																																		
3AL1FT0391	Segment hoisting crane	3	3	22OCT09A	27NOV09A	100	22OCT09A	27NOV09A																																		
3AL1FT0393	Shields	7	7	29OCT09A	07JAN10A	100	29OCT09A	07JAN10A																																		
3AL1FT0395	Pre-testing for hydraulic & electric system	4	4	22SEP09A	23JAN10A	100	22SEP09A	23JAN10A																																		
3AL1FT0397	Holding cylinder heads	8	8	16NOV09A	23NOV09A	100	16NOV09A	23NOV09A																																		
3AL1FT0399	Walkways	12	12	22SEP09A	23JAN10A	100	22SEP09A	23JAN10A																																		
3AL1FT0401	Ventilation pipes supports	16	16	05NOV09A	02JAN10A	100	05NOV09A	02JAN10A																																		
3AL1FT0403	Cutterhead, welding & testing	37	37	30OCT09A	22JAN10A	100	30OCT09A	22JAN10A																																		
TBM Transport from Portion I to Outfall																																										
3AL1FT0405	Bottom shield 1 piece	1	1	19FEB10A	19FEB10A	100	19FEB10A	19FEB10A																																		
3AL1FT0415	Outer telescopic shield bottom	0	0		22FEB10A	100		22FEB10A																																		
3AL1FT0425	Main bearing	0	0		19FEB10A	100		19FEB10A																																		
3AL1FT0435	Side shield balance 2 pieces	1	1	22FEB10A	23FEB10A	100	22FEB10A	23FEB10A																																		
3AL1FT0455	Bottom inner telescopic shield	1	1	22FEB10A	22FEB10A	100	22FEB10A	22FEB10A																																		
3AL1FT0465	Main thrust rams	1	1	23FEB10A	23FEB10A	100	23FEB10A	23FEB10A																																		
3AL1FT0475	Side gripper shield balance 2 pieces	1	1	22FEB10A	22FEB10A	100	22FEB10A	22FEB10A																																		
3AL1FT0495	Electric motors for maindrive	1	1	25FEB10A	25FEB10A	100	25FEB10A	25FEB10A																																		
3AL1FT0505	Cutterhead centre	1	1	02MAR10A	02MAR10A	100	02MAR10A	02MAR10A																																		
3AL1FT0515	Cutterhead balance 4 pieces	1	1	02MAR10A	02MAR10A	100	02MAR10A	02MAR10A																																		
3AL1FT0525	Gripper cylinders	1	1	22FEB10A	22FEB10A	100	22FEB10A	22FEB10A																																		

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																	
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
3AL1FT0829	TBM advances; CH955-250	36	36	20SEP11A	16NOV11A	100	20SEP11A	16NOV11A																																		
3AL1FT0831	TBM advances; Faault F1 CH250-150	10	10	16NOV11A	21NOV11A	100	16NOV11A	21NOV11A																																		
3AL1FT0832	TBM advances; Fault F1 CH150-0	82	82	21NOV11A	28FEB12A	100	21NOV11A	28FEB12																																		
3AL1FT0890	Remov framework/demobilization of TBM& BU	47*	48*	29FEB12A	27APR12A	100	29FEB12	30APR12																																		
3AL1FT0891	Removal of TBM services from tunnel	24	24	02MAR12A	30APR12A	100	02MAR12	29MAR12																																		
3AL1FT0892	Back grouting; CH5100-00	562	562	20APR10A	30APR12A	100	20APR10A	29MAY12																																		
3AL1FT0893	Secondary grouting	231	231	26AUG11A	26OCT12	91	26AUG11A	16AUG12	-324																																	
3AL1FT0894	Segment bolt pocket filling/repair segment crack	200	200	16APR12A	15DEC12	62	02APR12	01DEC12	-324																																	
3AL1FT0895	Install kerb for dry weathe channel	60	60	06OCT12	15DEC12	0	21SEP12	01DEC12	-324																																	
3AL1FT0896	Install anchorages for radio comm. system	42	60	04OCT12	22NOV12	0	21SEP12	01DEC12	-322																																	
3AL1FT0897	Lay cable for radio comm. system	18	0	05DEC12	27DEC12	0			-332																																	
3AL1FT0898	Testing & Commissioning	28	28	01MAR14	28MAR14	0	10FEB13	09MAR13	-836																																	
3AL1FT0904	Handover of Portion F	0	0		28MAR14	0		09MAR13	-677																																	

Schedule of Milestones for Cost Centre No. 6aR

6AR1FT0902	6aR 1; On completion of grouting at P7	0	0		20JUL10A	100		20JUL10A	
6AR1FT0904	6aR 2; On completion of grouting at F6c	0	0		30SEP10A	100		30SEP10A	
6AR1FT0906	6aR 3; On completion of grouting at F6b	0	0		09OCT10A	100		09OCT10A	
6AR1FT0908	6aR 4; On completion of grouting at F6a	0	0		24NOV10A	100		24NOV10A	
6AR1FT0910	6aR 5; On completion of grouting at WSD T. 3	0	0		14DEC10A	100		14DEC10A	
6AR1FT0912	6aR 6; On completion of 20% grout by lth at P6	0	0		20DEC10A	100		20DEC10A	
6AR1FT0914	6aR 7; On completion of 40% grout by lth at P6	0	0		20DEC10A	100		20DEC10A	
6AR1FT0916	6aR 8; On completion of 60% grout by lth at P6	0	0		21DEC10A	100		21DEC10A	
6AR1FT0918	6aR 9; On completion of 80% grout by lth at P6	0	0		21DEC10A	100		21DEC10A	
6AR1FT0920	6aR 10; On completion of grouting works at P6	0	0		22DEC10A	100		22DEC10A	
6AR1FT0922	6aR 11; On completion of grouting wks at P5	0	0		29JAN11A	100		29JAN11A	
6AR1FT0924	6aR 12; On completion of grouting wks at P4	0	0		21FEB11A	100		21FEB11A	
6AR1FT0926	6aR 13; On completion of grouting wks at P3	0	0		04APR11A	100		04APR11A	
6AR1FT0928	6aR 14; On completion of grouting wks at WSD's	0	0		29APR11A	100		29APR11A	
6AR1FT0930	6aR 15; On completion of grouting wks at F5	0	0		11MAY11A	100		11MAY11A	
6AR1FT0932	6aR 16; On completion of grouting wks at F4	0	0		20MAY11A	100		20MAY11A	
6AR1FT0934	6aR 17; On completion of grouting wks at F3	0	0		13JUN11A	100		13JUN11A	
6AR1FT0936	6aR 18; On completion of grouting wks at F2	0	0		29AUG11A	100		29AUG11A	
6AR1FT0938	6aR 19; On completion of grouting wks at P2	0	0		04OCT11A	100		04OCT11A	
6AR1FT0940	6aR 20; On completion of grouting wks at P1	0	0		24OCT11A	100		24OCT11A	
6AR1FT0942	6aR 21; On completion of 10% grout by lth at F1	0	0		21NOV11A	100		21NOV11A	
6AR1FT0944	6aR 22; On completion of 20% grout by lth at F1	0	0		22NOV11A	100		22NOV11A	
6AR1FT0946	6aR 23; On completion of 30% grout by lth at F1	0	0		22NOV11A	100		22NOV11A	
6AR1FT0948	6aR 24; On completion of 40% grout by lth at F1	0	0		23NOV11A	100		23NOV11A	
6AR1FT0950	6aR 25; On completion of 50% grout by lth at F1	0	0		24NOV11A	100		24NOV11A	
6AR1FT0952	6aR 26; On completion of 60% grout by lth at F1	0	0		10JAN12A	100		10JAN12A	
6AR1FT0954	6aR 27; On completion of 70% grout by lth at F1	0	0		30JAN12A	100		30JAN12A	
6AR1FT0956	6aR 28; On completion of 80% grout by lth at F1	0	0		14FEB12A	100		14FEB12A	

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																	
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6AR1FT0958	6aR 29; On completion of 90% grout by lth at F1	0	0		16FEB12A	100		16FEB12A																																		
6AR1FT0960	6aR 30; On completion of grouting works at F1	0	0		20FEB12A	100		20FEB12A																																		
6AR1FT0970	6aR 31; On completion of all works under this CC	0	0		28FEB12A	100		06MAR12																																		
Schedule of Milestones for Cost Centre No. 3aL																																										
3AL1FT1002	3aL 1; On providing evidence of procuring TBM	0	0		19JAN08A	100		19JAN08A																																		
3AL1FT1004	3aL 2; On providing evidence of TBM Factory Test	0	0		08OCT08A	100		08OCT08A																																		
3AL1FT1006	3aL 3; On delivery of all parts of TBM to the Si	0	0		12AUG09A	100		12AUG09A																																		
3AL1FT1008	3aL 4; On completion of site comm. & test. of TB	0	0		27SEP10A	100		27SEP10A																																		
3AL1FT1010	3aL 5; On completion of 5% perm. tunnel lining	0	0		02OCT10A	100		02OCT10A																																		
3AL1FT1012	3aL 6; On completion of 10% perm. tunnel lining	0	0		03NOV10A	100		03NOV10A																																		
3AL1FT1014	3aL 7; On completion of 15% perm. tunnel lining	0	0		26NOV10A	100		26NOV10A																																		
3AL1FT1016	3aL 8; On completion of 20% perm. tunnel lining	0	0		08JAN11A	100		08JAN11A																																		
3AL1FT1018	3aL 9; On completion of 25% perm. tunnel lining	0	0		27JAN11A	100		27JAN11A																																		
3AL1FT1020	3aL 10; On completion of 30% perm. tunnel lining	0	0		21FEB11A	100		21FEB11A																																		
3AL1FT1022	3aL 11; On completion of 35% perm. tunnel lining	0	0		12MAR11A	100		12MAR11A																																		
3AL1FT1024	3aL 12; On completion of 40% perm. tunnel lining	0	0		11APR11A	100		11APR11A																																		
3AL1FT1026	3aL 13; On completion of 45% perm. tunnel lining	0	0		05MAY11A	100		05MAY11A																																		
3AL1FT1028	3aL 14; On completion of 50% perm. tunnel lining	0	0		23MAY11A	100		23MAY11A																																		
3AL1FT1030	3aL 15; On completion of 55% perm. tunnel lining	0	0		08JUN11A	100		08JUN11A																																		
3AL1FT1032	3aL 16; On completion of 60% perm. tunnel lining	0	0		27JUN11A	100		27JUN11A																																		
3AL1FT1034	3aL 17; On completion of 65% perm. tunnel lining	0	0		11JUL11A	100		11JUL11A																																		
3AL1FT1036	3aL 18; On completion of 70% perm. tunnel lining	0	0		08AUG11A	100		08AUG11A																																		
3AL1FT1038	3aL 19; On completion of 75% perm. tunnel lining	0	0		25AUG11A	100		25AUG11A																																		
3AL1FT1040	3aL 20; On completion of 80% perm. tunnel lining	0	0		16SEP11A	100		16SEP11A																																		
3AL1FT1042	3aL 21; On completion of 85% perm. tunnel lining	0	0		05OCT11A	100		05OCT11A																																		
3AL1FT1044	3aL 22; On completion of 90% perm. tunnel lining	0	0		27OCT11A	100		27OCT11A																																		
3AL1FT1046	3aL 23; On completion of 95% perm. tunnel lining	0	0		16NOV11A	100		16NOV11A																																		
3AL1FT1048	3aL 24; On completion of perm. tunnel lining	0	0		08MAR12A	100		06MAR12																																		
3AL1FT1050	3aL 25; On completion of maint. access/flow chan	0	0		15DEC12	0		01DEC12	819																																	
3AL1FT1052	3aL 26; On completion of provision of communic.	0	0		22NOV12	0		01DEC12	842																																	
3AL1FT1054	3aL 27; On completion of all works under this CC	0	0		28MAR14	0		09MAR13	351																																	
Schedule of Milestones for Cost Centre No. 3dL																																										
3DL10T1202	3dL 1; On complet. of install geo instrument.	0	0		27MAY11A	100		27MAY11A																																		
3DL10T1204	3dL 2; Maint./monit. geo. inst. for 12 mth	0	0		27DEC08A	100		27DEC08A																																		
3DL10T1206	3dL 3; Maint./monitor geo. inst. for 24	0	0		26DEC09A	100		26DEC09A																																		
3DL10T1208	3dL 4; Maint./monitor geo. inst. for 36	0	0		27DEC10A	100		27DEC10A																																		
3DL10T1210	3dL 5; Maint./monitor geo. inst. for 48	0	0		26DEC11A	100		26DEC11A																																		
3DL10T1212	3dL 6; On completion of maint. & monit. of geo.	0	0		17OCT13	0		06AUG13	513																																	
3DL10T1224	3dL 12; On completion of all works under this CC	0	0		17OCT13	0		06AUG13	513																																	

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																		
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	
07R1AI1608	Pre-handover inspections and remedial works	30	30	29JAN14	07MAR14	0	08NOV12	12DEC12	-673																																		
16R7AI1602	Landscaping works at Portion A	30	30	11DEC12	17JAN13	0	06OCT12	10NOV12	-369																																		
16R7AI1604	Establishment Works at Portion A	365	365	18JAN13	17JAN14	0	11NOV12	10NOV13	-452																																		
Schedule of Milestones for Cost Center No. 4L																																											
04L1AI1802	4L 1; On completion of 50% excavation	0	0		29JUN09A	100		29JUN09A																																			
04L1AI1804	4L 2; On completion of excavation	0	0		30JAN10A	100		30JAN10A																																			
04L1AI1806	4L 3; On completion of 25% concreting	0	0		20APR11A	100		20APR11A																																			
04L1AI1808	4L 4; On completion of 50% concreting	0	0		27MAY11A	100		27MAY11A																																			
04L1AI1810	4L 5; On completion of 75% concreting	0	0		11JUN11A	100		11JUN11A																																			
04L1AI1812	4L 6; On completion of Cascade	0	0		26SEP12	0		05JUL12	899																																		
04L1AI1814	4L 7; On completion of connecting BC	0	0		26SEP12	0		05JUL12	899																																		
04L1AI1816	4L 8; On completion of all works under this CC	0	0		07MAR14	0		12DEC12	372																																		
Schedule of Milestones for Cost Centre No. 7R																																											
07R1AI1902	7R 1; On completion of trash grills	0	0		28FEB14	0		05DEC12	379																																		
07R1AI1904	7R 2; On completion of 25% excavation	0	0		29JUN09A	100		29JUN09A																																			
07R1AI1906	7R 3; On completion of 50% excavation	0	0		27JUL09A	100		27JUL09A																																			
07R1AI1908	7R 4; On completion of 75% excavation	0	0		24OCT09A	100		24OCT09A																																			
07R1AI1910	7R 5; On completion of all excavation	0	0		26DEC09A	100		26DEC09A																																			
07R1AI1912	7R 6; On completion of spiral ramp to +80mPD	0	0		19MAY10A	100		19MAY10A																																			
07R1AI1914	7R 7; On completion of spiral ramp to +90mPD	0	0		30JUN10A	100		30JUN10A																																			
07R1AI1916	7R 8; On completion of spiral ramp to +100mPD	0	0		29SEP10A	100		29SEP10A																																			
07R1AI1918	7R 9; On completion of spiral access ramp	0	0		07MAR11A	100		07MAR11A																																			
07R1AI1920	7R 10; On completion of all works under this CC	0	0		07MAR14	0		12DEC12	372																																		
Schedule of Milestones for Cost Centre No. 11R																																											
11R2AI1R02	11R 1; On completion of soil nailing works	0	0		06SEP08A	100		06SEP08A																																			
11R2AI1R04	11R 2; On completion of piling at platform	0	0		01JUN11A	100		01JUN11A																																			
11R2AI1R06	11R 3; On completion of piling at branch access	0	0		04NOV11A	100		04NOV11A																																			
11R2AI1R08	11R 4; On completion of all works under this CC	0	0		13SEP12	0		15OCT12	912																																		
Construction of Intake I-2																																											
Preliminary Works																																											
Additional GI Works to Finalize Design																																											
AGIB-02	Erect platform/mobilization & set up GI rig	3	3	12SEP08A	16SEP08A	100	12SEP08A	16SEP08A																																			
AGIB-04	Drill 3 nos. GI holes for Intake Structures	22	22	17SEP08A	03NOV08A	100	17SEP08A	03NOV08A																																			
AGIB-06	Drill 1 hole for Intersection with Main Tunnel	12	12	11NOV08A	24NOV08A	100	11NOV08A	24NOV08A																																			
Diversion of CLP Overhead Cable																																											
01R1BU0102	Temporary diversion of CLP overhead cable	30	30	02SEP08A	17OCT08A	100	02SEP08A	17OCT08A																																			
Diversion of 100mm Watermain																																											
01R1BU0202	Temporary Diversion of 100mm dia. Watermain	64*	64*	03OCT08A	05DEC08A	100	03OCT08A	05DEC08A																																			

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012												2013												2014												2015									
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A													
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95													
05L1BI2818	Construct wall & crown	20	20	03OCT12	26OCT12	0	11AUG12	03SEP12	-377																																														
Junction Between Main Tunnel & Adit Tunnel																																																							
3BL1BI2100	Remove TBM services/delivery of steel arches	0	0		24APR12A	100		03MAY12																																															
3BL1BI2106	Install steel arches from main tunnel	19	24	25APR12A	18MAY12A	100	04MAY12	31MAY12																																															
3BL1BI2107	Excavate (breathrough);2m	69	32	09JUL12A	26SEP12	45	14JUL12	20AUG12	-377																																														
3BL1BI2108	Construct invert	8	8	05OCT12	13OCT12	0	21AUG12	29AUG12	-363																																														
3BL1BI2118	Construct wall & crown	34	34	15OCT12	23NOV12	0	30AUG12	09OCT12	-343																																														
3BL1BI2128	Remove steel arches	6	6	24NOV12	30NOV12	0	10OCT12	16OCT12	-343																																														
Remaining Works Prior to Handover																																																							
Radio Communication System																																																							
VO180I205	Construct equipment room	18	18	20NOV12	10DEC12	0	03DEC12	22DEC12	-345																																														
VO180I210	Lay tiles on equipment room	12	12	11DEC12	24DEC12	0	24DEC12	09JAN13	-345																																														
VO180I215	Install radio communication system	18	18	27DEC12	17JAN13	0	10JAN13	30JAN13	-345																																														
08R1BI2102	Finishing & reinstatement works; Portion B	36	36	22JAN14	07MAR14	0	30JAN13	15MAR13	-679																																														
08R1BI2103	Pre-handover inspections and remedial works	30	30	08FEB14	14MAR14	0	16FEB13	22MAR13	-679																																														
16R7BI2102	Landscaping works at Portion B	30	30	15APR13	21MAY13	0	16FEB13	22MAR13	-466																																														
16R7BI2104	Establishment Works at Portion B	365	365	22MAY13	21MAY14	0	23MAR13	22MAR14	-576																																														
Schedule of Milestones for Cost Centre No. 3bL																																																							
3BL1BI2A02	3bL 1; On establishing tunnelling equipments	0	0		20FEB12A	100		20FEB12A																																															
3BL1BI2A04	3bL 2; On completion of 12.5% perm. tunnel lining	0	0		20OCT12	0		27JUL12	875	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A06	3bL 3; On completion of 25% perm. tunnel lining	0	0		29OCT12	0		03AUG12	866	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A08	3bL 4; On completion of 37.5% perm. tunnel lining	0	0		05NOV12	0		10AUG12	859	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A10	3bL 5; On completion of 50% perm. tunnel lining	0	0		12NOV12	0		17AUG12	852	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A12	3bL 6; On completion of 62.5% perm. tunnel lining	0	0		19NOV12	0		24AUG12	845	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A14	3bL 7; On completion of 75% perm. tunnel lining	0	0		26NOV12	0		31AUG12	838	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A16	3bL 8; On completion of 87.5% perm. tunnel lining	0	0		03DEC12	0		07SEP12	831	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A18	3bL 9; On completion of perm. tunnel lining	0	0		24DEC12	0		28SEP12	810	◆ for Adit Tunnel at Intake I-2																																													
3BL1BI2A20	3bL 10; On completion of all works under this CC	0	0		24DEC12	0		16OCT12	810	◆ under this Cost Centre																																													
Schedule of Milestones for Cost Centre No. 5L																																																							
05L1BI2M02	5L 1; On completion of 25% of excavation	0	0		27MAY11A	100		27MAY11A																																															
05L1BI2M04	5L 2; On completion of 50% of excavation	0	0		27DEC11A	100		27DEC11A																																															
05L1BI2M06	5L 3; On completion of 75% of excavation	0	0		14MAR12A	100		14MAR12																																															
05L1BI2M08	5L 4; On completion of all excavation	0	0		26SEP12	0		20AUG12	899	◆ below G.L. except for Adit Intake I-2																																													
05L1BI2M10	5L 5; On completion of drop shaft & vortex shaft	0	0		17NOV12	0		29NOV12	847	◆ vortex shaft at Intake I-2																																													
05L1BI2M12	5L 6; On completion of de-aeration chamber	0	0		05OCT12	0		27NOV12	890	◆ chamber at Intake I-2																																													
05L1BI2M14	5L 7; On completion of air vent shaft	0	0		11JAN13	0		29JAN13	792	◆ shaft at Intake I-2																																													
05L1BI2M16	5L 8; On completion of man access shaft	0	0		10DEC12	0		09FEB13	824	◆ shaft at Intake I-2																																													
05L1BI2M18	5L 9; On completion of man access adit	0	0		09FEB13	0		21MAY12	763	◆ adit at Intake I-2																																													

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012				2013				2014				2015																															
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A											
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95											
05L1BI2M20	5L 10; On completion of all works under this CC	0	0		14MAR14	0		22MAR13	365																																												
Schedule of Milestones for Cost Centre No. 8R																																																					
08R1BI2R02	8R 1; On completion of approach channel	0	0		13APR13	0		08MAR13	700																																												
08R1BI2R04	8R 2; On completion of trash grill	0	0		28FEB14	0		05FEB13	379																																												
08R1BI2R06	8R 3; On completion of all works under this CC	0	0		14MAR14	0		22MAR13	365																																												
Schedule of Milestones for Cost Centre No. 12R																																																					
12R3BI2S02	12R 1; On completion of 50% pile retain. wall	0	0		06NOV08A	100		06NOV08A																																													
12R3BI2S04	12R 2; On completion of pile retain. wall	0	0		26NOV08A	100		26NOV08A																																													
12R3BI2S06	12R 3; On completion of boulder traps	0	0		13MAR13	0		29JAN13	731																																												
12R3BI2S08	12R 4; On completion of all works under this CC	0	0		14MAR14	0		22MAR13	365																																												
Construction of Intake I-3																																																					
Preliminary Works																																																					
Additional GI Works To Finalize Design																																																					
AGIC-02	Erect platform/mobilization & set up GI rig	3	3	03NOV08A	05NOV08A	100	03NOV08A	05NOV08A																																													
AGIC-04	Drill 3 nos. GI holes for Intake Structures	12	12	06NOV08A	19NOV08A	100	06NOV08A	19NOV08A																																													
VO#32; Replace Hoarding by Chain Link Fence																																																					
VO032-I302	Received VO-32 for replacing hoarding by CLF	0	0		16SEP08A	100		16SEP08A																																													
VO032-I304	Procure/prepare/install transparent hoarding	80	80	17SEP08A	06MAR09A	100	17SEP08A	06MAR09A																																													
01R1CI3102	Possession of Portion C -90d of DOC	0	0	26MAR08A		100	26MAR08A																																														
01R1CI3104	Site clearance	40	40	22APR08A	20SEP08A	100	22APR08A	20SEP08A																																													
01R1CI3106	Hoarding at slope crest	48	48	03JUN08A	30JUL08A	100	03JUN08A	30JUL08A																																													
01R1CI3110	Set-up wheel washing facilities	6	6	30JUN08A	03JUL08A	100	30JUN08A	03JUL08A																																													
01R1CI3118	Install remote control CCTV as per ER 4.4.10	12	12	28OCT08A	10NOV08A	100	28OCT08A	10NOV08A																																													
Tree Transplanting Works																																																					
16R7CI3202	Tree inspection & report	7	7	01APR08A	26APR08A	100	01APR08A	26APR08A																																													
16R7CI3204	Tree transplant for upper parts; 8 nos.	86*	86*	04JUN08A	13SEP08A	100	04JUN08A	13SEP08A																																													
16R7CI3206	1st stg tree pruning	2	2	04JUN08A	21JUN08A	100	04JUN08A	21JUN08A																																													
16R7CI3208	2nd stg tree pruning	2	2	04JUL08A	04JUL08A	100	04JUL08A	04JUL08A																																													
16R7CI3210	Final stg. tree pruning & tree uplifting	6	6	08SEP08A	13SEP08A	100	08SEP08A	13SEP08A																																													
16R7CI3212	Tree transplanting at Ch250-Ch200); 20 nos.	214*	214*	21JUN08A	09MAR09A	100	21JUN08A	09MAR09A																																													
16R7CI3214	1st stg tree pruning	3	3	21JUN08A	15JUL08A	100	21JUN08A	15JUL08A																																													
16R7CI3216	2nd stg tree pruning	3	3	15JUL08A	12SEP08A	100	15JUL08A	12SEP08A																																													
16R7CI3218	Final stg tree pruning & tree uplifting	8	8	28FEB09A	09MAR09A	100	28FEB09A	09MAR09A																																													
16R7CI3220	Tree transplanting at Ch100-Ch0	437*	437*	21JUN08A	07DEC09A	100	21JUN08A	07DEC09A																																													
16R7CI3222	1st stg tree pruning	4	4	21JUN08A	01DEC08A	100	21JUN08A	01DEC08A																																													
16R7CI3224	2nd stg tree pruning	4	4	05JAN09A	28OCT09A	100	05JAN09A	28OCT09A																																													
16R7CI3226	Final stg tree pruning & tree uplifting	10	10	10FEB09A	07DEC09A	100	10FEB09A	07DEC09A																																													

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																						
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A					
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95					
H-Pile Retaining Wall for Wall A																																															
Piling Works																																															
13R4CI3400	Mobilize & set up piling rig	6	6	11AUG08A	16AUG08A	100	11AUG08A	16AUG08A																																							
13R4CI3401	Drill 28 nos. grout (partially) 11 nos. piles	1	1	18AUG08A	28AUG08A	100	18AUG08A	28AUG08A																																							
13R4CI3402	Piling stopped due to accessive grout loss	1	1	29AUG08A	22OCT08A	100	29AUG08A	22OCT08A																																							
13R4CI3403	Piling resumed date	1	1	26NOV08A	26NOV08A	100	26NOV08A	26NOV08A																																							
13R4CI3405	Complete all H-piles, Wall A; 347nos.	70	70	18AUG08A	21JAN09A	100	18AUG08A	21JAN09A																																							
Skin Wall																																															
13R4CI3406	Excavate for skin wall construction; 2130m3	60	60	14JAN09A	02MAR09A	100	14JAN09A	02MAR09A																																							
13R4CI3408	Hack off piles; piles 1 to 347	48	48	04FEB09A	02APR09A	100	04FEB09A	02APR09A																																							
13R4CI3410	Construct skin wall;	60	60	28FEB09A	19MAY09A	100	28FEB09A	19MAY09A																																							
13R4CI3414	Construct for capping beams;	24	24	14APR09A	04JUN09A	100	14APR09A	04JUN09A																																							
13R4CI3416	Construct U-channels	37	37	06MAY09A	18JUN09A	100	06MAY09A	18JUN09A																																							
Soil Nailing Works																																															
Soil Nailing Outside Excavation Area																																															
13R1CI3502	Scaffolding platform for soil nailing	18	18	08SEP08A	28OCT08A	100	08SEP08A	28OCT08A																																							
13R1CI3504	Mobilize & set up drilling & grouting plants	4	4	12SEP08A	17SEP08A	100	12SEP08A	17SEP08A																																							
13R1CI3506	Install & grout soil nails; 193 nos. + 8 Test N.	69	69	18SEP08A	09DEC08A	100	18SEP08A	09DEC08A																																							
Soil Nailing Within Excavation; Ch. 270-210																																															
13R1CI3508	Install & grout soil nails	89*	89*	03AUG09A	17NOV09A	100	03AUG09A	17NOV09A																																							
Soil Nailing Within Excavation; Ch. 210-130																																															
13R1CI3510	Install & grout soil nails	117*	117*	12DEC08A	11MAY09A	100	12DEC08A	11MAY09A																																							
Soil Nailing Within Excavation; Ch.130-0																																															
13R1CI3512	Install & grout soil nails	644*	644*	27OCT09A	24DEC11A	100	27OCT09A	24DEC11A																																							
Rem. Soil Nailing Outside Excavation																																															
13R1CI3522	Scaffolding platform for soil nailing	12	12	09JUL09A	03NOV09A	100	09JUL09A	03NOV09A																																							
13R1CI3532	Install & grout soil nails; 261 no.s + 3 Test N.	100	100	21JUL09A	12DEC09A	100	21JUL09A	12DEC09A																																							
Access Road Construction																																															
Concrete Pavement; Ch. 0-20																																															
09R1CI3706	Concrete pavement; Ch. 0 to 20 (6 bays)	18	0	18SEP12	09OCT12	0			-333																																						
Concrete Pavement; Ch. 20-160																																															
09R1CI3714	Road formation	14	11	03APR13	19APR13	0	21JAN13	01FEB13	-473																																						
09R1CI3724	Lay sub-base & kerb	7	11	20APR13	27APR13	0	02FEB13	18FEB13	-473																																						
09R1CI3734	Concrete paving	7	11	29APR13	07MAY13	0	19FEB13	02MAR13	-473																																						
Concrete Pavement; Ch. 160-300																																															
09R1CI3647	Road formation	11	12	08MAY13*	21MAY13	0	01NOV12*	14NOV12	-473																																						
09R1CI3648	Lay sub-base and kerb	6	12	22MAY13	28MAY13	0	15NOV12	28NOV12	-473																																						
09R1CI3654	Concrete paving	5	12	29MAY13	03JUN13	0	04MAR13	16MAR13	-473																																						
Concrete Pavement; Ch. 300-420																																															
09R1CI3674	Road formation	8	16	04JUN13	13JUN13	0	15NOV12	03DEC12	-473																																						
09R1CI3684	Lay sub-base and kerb	5	16	14JUN13	19JUN13	0	04JAN13	22JAN13	-473																																						
09R1CI3694	Concrete paving; 190m @ 12m/day	7	16	20JUN13	27JUN13	0	18MAR13	09APR13	-473																																						

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012																												2013												2014												2015				
										A S O N D				J F M A M				J J A S O N D				J F M A M				J J A S O N D				J F M A				J F M A																																
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95																								
Ch. 100 to Ch. 0; below Temp. Access to Wall PB																																																																		
09R1CI3638	55 deg. cut slope & soil nailing	41	41	12NOV11A	24DEC11A	100	12NOV11A	24DEC11A																																																										
09R1CI3640	80 deg cut slope +68.5 to +63mPD; 1900m3	100	100	28DEC11A	07JUL12A	100	28DEC11A	03MAY12																																																										
09R1CI3642	Rock excavation around edge of MAS; 100m3	10	10	17MAR12A	18JUL12A	100	04MAY12	15MAY12																																																										
Road Drainage; Ch. 460 to Ch. 270																																																																		
09R1CI3664	Construct 375UC; 250m	50	50	26MAR12A	03JUN13	90	03APR12	06JUN12	-473																																																									
Road Drainage; Ch. 270 to Ch. 100																																																																		
09R1CI3644	Construct 375UC; along slope toe (outer curve)	44	44	23NOV11A	24MAR12A	100	23NOV11A	02APR12																																																										
09R1CI3645	Construct 375UC; along inner curve	44	44	01JUN12A	17SEP12	59	07JUN12	30JUL12	-325																																																									
Road Drainage; Ch. 100 to Ch. 0																																																																		
09R1CI3704	Construct 900mm dia. & UC inner side	100	100	26MAR12A	17SEP12	82	16MAY12	11SEP12	-347																																																									
09R1CI3710	Construct 450mm dia. drainage & outer UC	18	60	19MAR13	12APR13	0	12SEP12	22NOV12	-473																																																									
H-Pile Retaining Wall for Wall B																																																																		
Additional land for Construction of Wall PB																																																																		
13R4CI3P02	Possession of additional land	0	0		01DEC09A	100		01DEC09A																																																										
13R4CI3P12	Internal transplant for 11# trees	55	55	02DEC09A	04MAR10A	100	02DEC09A	04MAR10A																																																										
13R4CI3P18	Form piling platform for Wall B	80	80	11MAR10A	19JUN10A	100	11MAR10A	19JUN10A																																																										
13R4CI3P20	Reconstruct piling platform	77	77	28JUN10A	27SEP10A	100	28JUN10A	27SEP10A																																																										
13R4CI3P22	Removal of piling platform	93	93	24MAR11A	27OCT11A	100	24MAR11A	27OCT11A																																																										
13R4CI3P32	Slope reinstatement	93	93	01APR11A	09NOV11A	100	01APR11A	09NOV11A																																																										
13R4CI3P42	Planting 13# trees	4	4	10NOV11A	12NOV11A	100	10NOV11A	12NOV11A																																																										
VO#188; Internal Transplant of Tree T765																																																																		
13R4CI3726	Issue VO #188	0	0		24MAY11A	100		24MAY11A																																																										
13R4CI3736	Construct planter wall	28	28	25MAY11A	27JUN11A	100	25MAY11A	27JUN11A																																																										
13R4CI3746	Tree pruning	1	1	28JUN11A	28JUN11A	100	28JUN11A	28JUN11A																																																										
13R4CI3756	Tree removal	1	1	03AUG11A	03AUG11A	100	03AUG11A	03AUG11A																																																										
Piling Works																																																																		
13R4CI3700	Demolish existing ret. wall/slope protection	28	28	15SEP10A	20OCT10A	100	15SEP10A	20OCT10A																																																										
13R4CI3702	Mobilize & set up piling rig	6	6	22OCT10A	29OCT10A	100	22OCT10A	29OCT10A																																																										
13R4CI3704	350mm dia. pre-bored H-piles, Wall B; 93 nos.	49	49	30OCT10A	11DEC10A	100	30OCT10A	11DEC10A																																																										
13R4CI3705	Demobilize piling rig	6	6	13DEC10A	18DEC10A	100	13DEC10A	18DEC10A																																																										
Skin Wall																																																																		
13R4CI3706	Extension of piles	18	18	20DEC10A	08JAN11A	100	20DEC10A	08JAN11A																																																										
13R4CI3708	Excavate & hack off piles	24	24	10JAN11A	22JAN11A	100	10JAN11A	22JAN11A																																																										
13R4CI3710	Construct skin wall & capping beams; 6 bays	24	24	24JAN11A	08MAR11A	100	24JAN11A	08MAR11A																																																										
13R4CI3714	Construct end walls	6	6	09MAR11A	15MAR11A	100	09MAR11A	15MAR11A																																																										
13R4CI3716	Backfill/reinstatement/U-channel	18	18	16MAR11A	31JUL12A	100	16MAR11A	07MAR12																																																										
Channel Modification Works (Dry Season)																																																																		
River Diversion for Underground Works																																																																		
09R1CI3802	Form a temporary plant access to stream	60	60	12DEC08A	04FEB09A	100	12DEC08A	04FEB09A																																																										
09R1CI3804	Break boulders	78	78	05FEB09A	24FEB09A	100	05FEB09A	24FEB09A																																																										
09R1CI3806	Concrete bedding for bund wall (gabion)	11	11	25FEB09A	09MAR09A	100	25FEB09A	09MAR09A																																																										

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																	
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Construction of Deaeration Chamber (DC)																																										
East Side, Around Drop Shaft																																										
06L1CI3E02	Clean & place blinding for all area	6	6	28DEC11A	03JAN12A	100	28DEC11A	03JAN12A																																		
06L1CI3E12	Construct base; 95m3	8	8	30MAR12A	11APR12A	100	17MAR12	26MAR12																																		
06L1CI3E22	Construct walls; 100m3	13	13	21APR12A	10MAY12A	100	27MAR12	14APR12																																		
06L1CI3E32	Construct crown; 150m3	25	25	11MAY12A	09JUN12A	100	16APR12	16MAY12																																		
West Side, Connecting to Main Adit																																										
06L1CI3W12	Construct base; 95m3	6	9	16JUN12A	22JUN12A	100	23AUG12	01SEP12																																		
06L1CI3W22	Construct walls	20	11	18SEP12	11OCT12	0	03SEP12	14SEP12	-469																																	
06L1CI3W32	Construct crown stage 1	14	22	12OCT12	29OCT12	0	15SEP12	11OCT12	-469																																	
06L1CI3W42	Construct crown stage 2	22	0	15NOV12	10DEC12	0			-473																																	
Construction of Vortex Shaft (VS)																																										
Vortex; East Side																																										
06L1CIE010	Construct Vortex; base	12	11	03NOV12	16NOV12	0	22OCT12	03NOV12	-469																																	
06L1CIE020	Construct Vortex; wall stg 1	23	11	17NOV12	13DEC12	0	05NOV12	16NOV12	-469																																	
06L1CIE030	Construct Vortex; wall stg 2 with roof	18	11	14DEC12	07JAN13	0	17NOV12	29NOV12	-469																																	
06L1CIE040	Construct Vortex; planter wall	11	0	08JAN13	19JAN13	0			-383																																	
Vortex, West Side																																										
06L1CIW010	Construct Vortex; base	12	11	06AUG12A	18AUG12A	100	12JUN12	25JUN12																																		
06L1CIW020	Construct Vortex; wall stg 1	23	11	20AUG12A	14SEP12	30	26JUN12	09JUL12	-419																																	
06L1CIW030	Construct Vortex; wall stg 2 with roof	18	11	15SEP12	06OCT12	0	10JUL12	21JUL12	-419																																	
06L1CIW040	Construct Vortex; planter wall	11	0	08OCT12	19OCT12	0			-319																																	
06L1CI3142	Construct drop shaft	12	12	16JUN12A	14JUL12A	100	17MAY12	30MAY12																																		
Construction of Air Vent Shaft Shaft (AVS)																																										
06L1CI3152	Install pre-cast #1 & construct collar ring	4	8	30OCT12	02NOV12	0	12OCT12	20OCT12	-469																																	
06L1CI3514	Temp. works & granular fill	8	8	03NOV12	12NOV12	0	22OCT12	31OCT12	-445																																	
06L1CI3515	Install pre-cast #2 & granular fill	8	8	13NOV12	21NOV12	0	01NOV12	09NOV12	-445																																	
06L1CI3516	Install pre-cast #3 to #6 & granular fill	12	2	27DEC12	10JAN13	0	10NOV12	12NOV12	-472																																	
06L1CI3526	Construct insitu (top of AVS)	8	0	11JAN13	19JAN13	0			-383																																	
Backfill Around Structure																																										
06L1CI3162	Granular fill at east of DC up to base of Vortex	10	10	17JUL12A	04AUG12A	100	31MAY12	11JUN12																																		
06L1CI3164	Granular fill at west of AVS below bay 6 of A.C.	12	6	11DEC12	24DEC12	0	23JUL12	28JUL12	-473																																	
06L1CI3174	Granular fill for bay 7 of A.C.	12	13	11JAN13	24JAN13	0	18JAN13	01FEB13	-472																																	
Construction of Approach Channel																																										
Excavation & Formation																																										
09R1CI3172	Excavation for Approach Channel	40	40	28SEP10A	21FEB11A	100	28SEP10A	21FEB11A																																		
Tower Crane																																										
09R1C17002	Construction of base for tower crane	10	10	21DEC10A	24DEC10A	100	21DEC10A	24DEC10A																																		

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012					2013					2014					2015																	
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Miscellaneous																																										
3AL1DO8502	Install transformer & harmonic filter	2	2	07JUN10A	10JUL10A	100	07JUN10A	10JUL10A																																		
3AL1DO8512	Remove invert segments	2	2	24JUL10A	06AUG10A	100	24JUL10A	06AUG10A																																		
3AL1DO8522	Make good slab	3	3	06AUG10A	07AUG10A	100	06AUG10A	07AUG10A																																		
3AL1DO8532	Install rail switch	1	1	23AUG10A	24AUG10A	100	23AUG10A	24AUG10A																																		
VO # 49 & 53; Additional Drainage & Stairway																																										
VO-04910	Received Variation orders	0	0		26FEB09A	100		26FEB09A																																		
VO-04920	Preparation works for varied works	14	14	27FEB09A	14MAR09A	100	27FEB09A	14MAR09A																																		
VO-04930	Construct u-channel & stairway; +71mPD to +55mPD	60	60	16MAR09A	29MAY09A	100	16MAR09A	29MAY09A																																		
VO-04940	Construct u-channel & stairway; +55mPD to +47mPD	27	27	05JUN09A	07JUL09A	100	05JUN09A	07JUL09A																																		
VO-04950	Construct u-channel & stairway; +47mPD to +41mPD	40	40	08JUL09A	08AUG09A	100	08JUL09A	08AUG09A																																		
VO-04960	Construct u-channel & stairway at middle portion	60	60	01NOV12*	12JAN13	0	30MAR12	14JUN12	-365																																	
VO #88/#094/#103; Revised Slope Design																																										
VO-088000	Received VO #088	0	0		27MAY09A	100		27MAY09A																																		
VO-088005	Excavate from 38.5mPD to 36.5mPD	6	6	29MAY09A	04JUN09A	100	29MAY09A	04JUN09A																																		
VO-088010	Procure and prepare materials	9	9	29MAY09A	08JUN09A	100	29MAY09A	08JUN09A																																		
VO-088015	SOR confirm soil nails location	2	2	05JUN09A	06JUN09A	100	05JUN09A	06JUN09A																																		
VO-088020	Drill/install/grout soil nails; rows AA-AB	7	7	09JUN09A	16JUN09A	100	09JUN09A	16JUN09A																																		
VO-088025	Install wire mesh & shorcrete 150mm	3	3	17JUN09A	19JUN09A	100	17JUN09A	19JUN09A																																		
VO-088030	Excavate from +36.5 mPD to 34.5mPD	6	6	20JUN09A	26JUN09A	100	20JUN09A	26JUN09A																																		
VO-088035	SOR confirm soil nails location	2	2	27JUN09A	29JUN09A	100	27JUN09A	29JUN09A																																		
VO-088040	Drill/install/grout soil nails; rows AC-AD	7	7	30JUN09A	08JUL09A	100	30JUN09A	08JUL09A																																		
VO-088045	Install wire mesh & shorcrete 150mm	3	3	09JUL09A	11JUL09A	100	09JUL09A	11JUL09A																																		
VO-088050	Excavate from +34.5 mPD to 32.5mPD	6	6	13JUL09A	18JUL09A	100	13JUL09A	18JUL09A																																		
VO-088055	SOR confirm soil nails location	2	2	20JUL09A	21JUL09A	100	20JUL09A	21JUL09A																																		
VO-088060	Drill/install/grout soil nails; rows AE-AF	7	7	22JUL09A	29JUL09A	100	22JUL09A	29JUL09A																																		
VO-088065	Install wire mesh & shorcrete 150mm	3	3	30JUL09A	01AUG09A	100	30JUL09A	01AUG09A																																		
VO-088070	Excavate from +34.5 mPD to 32.5mPD	6	6	03AUG09A	18AUG09A	100	03AUG09A	18AUG09A																																		
VO-088075	SOR confirm soil nails location	2	2	17AUG09A	18AUG09A	100	17AUG09A	18AUG09A																																		
VO-088080	Drill/install/grout soil nails; row AG	5	5	19AUG09A	24AUG09A	100	19AUG09A	24AUG09A																																		
VO-088085	Install wire mesh & shorcrete 150mm	3	3	25AUG09A	28AUG09A	100	25AUG09A	28AUG09A																																		
VO-10302	Drill & install rock dowels below +30 to 24mPD	6	6	06OCT09A	19NOV09A	100	06OCT09A	19NOV09A																																		
Instruction from SOR/VO#093 Add. Noise Barriers																																										
SORI-10	Suspension of rock drilling & breaking	1	1	20JUN09A	20JUN09A	100	20JUN09A	20JUN09A																																		
SORI-20	Erection/relocation of noise bearriers	30	30	22JUN09A	10NOV09A	100	22JUN09A	10NOV09A																																		
Construct Spiral Ramp																																										
ELS & Excavation for Spiral Ramp																																										
10R1DELS02	Install pipe piles/slope trim & protection works	104	104	01JUN10A	04OCT10A	100	01JUN10A	04OCT10A																																		
10R1DELS12	Pre-drilling for rock breaking & splitting	26	26	20AUG10A	18SEP10A	100	20AUG10A	18SEP10A																																		
10R1DELS22	Excavate to +13.5mPD & construct capping beam	24	24	20SEP10A	26OCT10A	100	20SEP10A	26OCT10A																																		
10R1DELS32	Excavate/rock dowels/ring beam/shotcrete; 11.5mPD	30	30	27OCT10A	06DEC10A	100	27OCT10A	06DEC10A																																		
10R1DELS42	Excavate/rock dowels/ring beam/shotcrete; 9.5mPD	33	33	07DEC10A	13JAN11A	100	07DEC10A	13JAN11A																																		
10R1DELS52	Excavate/rock dowels/ring beam/shotcrete; 7.5mPD	37	37	14JAN11A	01MAR11A	100	14JAN11A	01MAR11A																																		

ID	Activity Description	WP10 Dur	WP09 Dur	WP10 Start	WP10 Finish	% Comp	WP09 Start	WP09 Finish	Total Float	2012				2013				2014				2015																				
										A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
										63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
15R6GG0508	15R 4; On completion of 75% of pipejacking	0	0		19MAR11A	100		19MAR11A																																		
15R6GG0510	15R 5; On completion of all pipejacking	0	0		30JUL11A	100		30JUL11A																																		
15R6GG0512	15R 6; On completion of all wks under this CC	0	0		07NOV12	0		14SEP12	857																																	

♦ under this Cost Centre

Appendix D

Implementation Status of Environmental Mitigation Measures

IMPLEMENTATION SCHEDULE March 2013

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
Air Quality					
3.6.1	<p>Specific</p> <p>As mentioned in Section 3.5, exceedances of 1-hour and 24-hour average TSP guideline levels have been predicted at most of the ASRs. Hence, mitigation measures are considered necessary in order to suppress the potential dust impact.</p> <p>The dust suppression measures set out in the <i>Air Pollution Control (Construction Dust) Regulation</i>, in fact, are more extensive. Therefore, it is expected that with watering the construction site every four times daily together with strict implementation of dust suppression measures as stipulated in the <i>Air Pollution Control (Construction Dust) Regulation</i>, the dust level is expected to be reduced by over 75%.</p> <p>General</p> <p>To further ensure compliance with the guideline and AQO limit at the ASRs at all time, it is recommended to implement the <i>Air Pollution Control (Construction Dust) Regulation</i> and include good site practice in the contract clauses to minimize cumulative dust impact. In addition, a comprehensive dust monitoring and audit programme is recommended to ensure proper implementation of the identified mitigation measures. Details of the monitoring and audit requirements are provided in a separate EM&A Manual.</p> <ul style="list-style-type: none"> • effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level of the scaffolding where a scaffolding is erected around the perimeter of a building under construction; • dump truck for material transport should be totally enclosed by impervious sheeting; • any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading; • stockpile of dusty materials should not extend beyond the pedestrian barriers, fencing or traffic cones; • dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; 	DSD's Contractor	Construction Work Sites	Air Pollution Control (Construction Dust) Regulation	<p>✓</p> <p>✓</p> <p>N/A</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>

Appendix D

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
3.6.1	<ul style="list-style-type: none"> • the area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; 	DSD's Contractor	Construction Work Sites	Air Pollution Control (Construction Dust) Regulation	✓
	<ul style="list-style-type: none"> • where a site boundary adjoins a road, street or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length except for a site entrance or exit; 				✓
	<ul style="list-style-type: none"> • every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet; 				✓
	<ul style="list-style-type: none"> • the portion of road leading only to a construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials; 				✓
	<ul style="list-style-type: none"> • stockpile of dusty materials should be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet; 				✓
	<ul style="list-style-type: none"> • all dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet; 				✓
	<ul style="list-style-type: none"> • vehicle speed should be limited to 10 kph except on completed access roads; 				✓
	<ul style="list-style-type: none"> • every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites; 				✓
	<ul style="list-style-type: none"> • the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and 				✓
	<ul style="list-style-type: none"> • the working area of excavation should be sprayed with water immediately before, during and immediately after the operations so as to maintain the entire surface wet. 				✓
Noise					
4.6.1	During Construction	DSD's Contractor	Construction Work Sites	PN 2/93 Noise from Construction Activities & EIAO	✓
	Appropriate mitigation measures such as the use of quiet equipment and movable barriers will be developed to ensure that noise can be reduced to acceptable levels without causing programme delays				
	<i>Good Site Practice</i> Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during construction:				
	<ul style="list-style-type: none"> • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction works; 				✓
<ul style="list-style-type: none"> • machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; 	✓				

Appendix D

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
4.6.1	<ul style="list-style-type: none"> ● plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs; 	DSD's Contractor	Construction Work Sites	PN 2/93 Noise from Construction Activities & EIAO	✓
	<ul style="list-style-type: none"> ● mobile plant should be sited as far away from NSRs as possible; and 				✓
	<ul style="list-style-type: none"> ● material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 				✓
	<i>For Drill and Blast Works</i> <ul style="list-style-type: none"> ● Charge mass per delay should be decreased by minimising the number of blastholes firing on each delay. 				N/A
	<ul style="list-style-type: none"> ● Smaller blasthole patterns and longer delays should be used between dependent charges. 				N/A
	<ul style="list-style-type: none"> ● Times of blasting should be established to suit the situation and firing blasts when neighbours are busy with their daily tasks (and at a regular time such as lunch time). 				N/A
	<i>For TBM Tunnelling</i> <ul style="list-style-type: none"> ● For the tunnel excavation, it is anticipated that beyond the initial length (say within 30m), excavation will be carried out well within the tunnel and door should be provided to further minimize the noise nuisance to the nearby receivers. 				N/A
4.6.2	<p>During Operation</p> <p>Good site practice and noise management can significantly reduce the impact of maintenance activities on nearby NSRs. The following package of measures should be followed during construction</p> <ul style="list-style-type: none"> ● only well-maintained plant should be operated on-site; ● machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; and ● plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs. 	DSD's Contractor	Project Area	NCO & EIAO	N/A N/A N/A
Water Quality					
5.9.1	<p>During Construction</p> <p>Mitigation measures and a spill control and response plan have been prepared for works at the intakes and work sites.</p> <p><i>Precautions to be taken at any time of year when rainstorms are likely:</i></p> <ul style="list-style-type: none"> ● Temporarily exposed surfaces should be covered e.g. by tarpaulin. ● Temporary access roads should be protected by crushed stone or gravel. ● Trenches should be dug and backfilled in short sections. Measures should be taken to minimize the ingress of rainwater into trenches. <p><i>Actions to be taken when a rainstorm is imminent or forecast:</i></p> <ul style="list-style-type: none"> ● Silt removal facilities, should be checked to ensure that they can function properly. 	DSD's Contractor	Construction Work Sites	Practice Note for Professional Persons with regard to site drainage (ProPECC PN 1/94) and WQO	✓ ✓ ✓ ✓ ✓

Appendix D

EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
5.9.1	<ul style="list-style-type: none"> Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric. 	DSD's Contractor	Construction Work Sites	WQO	✓
	<ul style="list-style-type: none"> All temporary covers to slopes and stockpiles should be secured. 				✓
	<i>Actions to be taken during or after rainstorms:</i> <ul style="list-style-type: none"> Silt removal facilities should be checked and maintained to ensure satisfactory working conditions. 				✓
	<u>Spill Control and Response Plan</u>				
	1 Prevention and Precaution Measures				
	<i>General Precautions</i>				
	<ul style="list-style-type: none"> No discharge of silty water into watercourses. 				✓
	<ul style="list-style-type: none"> All materials to be used during construction and operation shall be identified and their hazard potential evaluated. 				✓
	<ul style="list-style-type: none"> Maintenance of vehicles and equipment involving activities with potential for leakage and spillage shall only be undertaken with the areas appropriately equipped to control these discharges. 				✓
	<ul style="list-style-type: none"> Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials. 				✓
	<ul style="list-style-type: none"> Any construction plant which causes pollution to catchwaters or water gathering ground due to leakage of oil or fuel shall be removed off-site immediately. 				✓
	<ul style="list-style-type: none"> Suitable containers shall be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport 				✓
	<ul style="list-style-type: none"> Chemical waste containers shall be suitably labelled to notify and warn the personnel who are handling the wastes to avoid accidents. 				✓
	<ul style="list-style-type: none"> Storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area. 				✓
	<ul style="list-style-type: none"> Prevent obstructions and tripping hazards. 				✓
	<i>Storage Precautions</i>				
	<ul style="list-style-type: none"> All chemical storage containers shall be correctly labelled. 				✓
<ul style="list-style-type: none"> Solid and impermeable enclosure walls or storage shelves shall be used. 	✓				
<ul style="list-style-type: none"> Only compatible chemical wastes shall be stored in the same storage area. 	✓				
<ul style="list-style-type: none"> The storage areas shall be inspected to detect any leakages or defective containers on a regular basis. 	✓				
<ul style="list-style-type: none"> Suitable notices warning of hazards, emergency response plans, telephone numbers etc shall be posted around the site, including storage areas. 	✓				
<ul style="list-style-type: none"> Large and heavy containers shall be stored at ground level. 	✓				

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EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
	<ul style="list-style-type: none"> • Chemical waste containers shall be stored below eye level. 				✓
5.9.1	<ul style="list-style-type: none"> • Adequate space for handling of the containers shall be provided 	DSD's Contractor	Construction Work Sites	WQO	✓
	<ul style="list-style-type: none"> • Spill response kits shall be located adjacent/near to the storage areas. 				✓
	<ul style="list-style-type: none"> • A log of chemical wastes shall be maintained. 				✓
	<ul style="list-style-type: none"> • Incompatible chemicals shall be stored separately. 				✓
	<p>2 Responses/Action Plan</p>				
	<p>All Workers shall be made aware of emergency telephone numbers and the location of all relevant pollution control equipment. Training be given in emergency response/action plans. The action include the following steps:</p>				✓
	<ul style="list-style-type: none"> • Only trained personnel who are equipped with protective clothing and equipment shall be allowed to enter the spillage area for clean up. 				✓
	<ul style="list-style-type: none"> • Spills shall be transferred appropriate back into containers using suitable equipment. 				✓
	<ul style="list-style-type: none"> • Absorbent materials shall be used to clean up the spills and shall be disposed of as chemical wastes. 				✓
	<ul style="list-style-type: none"> • Where appropriate suitable solvents may be used to clean the contaminated area after removal of all contaminated materials. 				✓
	<ul style="list-style-type: none"> • All necessary protective devices, safety equipment, containers and clean up materials for emergency use shall be maintained to a high standard. 				✓
	<p>3 Spill Clean Up and Disposal</p>				
	<p>Effect the response plan.</p>				✓
	<p>Control the leakage and absorb the spillage using suitably absorbent materials.</p>				✓
	<p>Provide safety equipment and personal protective equipment for handling of chemical wastes would be similar to that for handling of chemicals.</p>				✓
	<p><i>Safety equipment includes but is not limited to:</i></p> <ul style="list-style-type: none"> • Fire extinguishers. 				✓
	<ul style="list-style-type: none"> • Spades, brushes, dustpan, mop and bucket (or similar readily available on site). 				✓
	<ul style="list-style-type: none"> • Absorbent material such as dry sand, tissues and toweling (all materials readily available on-site). 				✓
	<ul style="list-style-type: none"> • Containers including plaster bags, drums, etc. 				✓
	<ul style="list-style-type: none"> • Absorbing materials. 				✓
<ul style="list-style-type: none"> • Pumps. 	✓				
<p><i>Personal protective equipment includes as appropriate:</i></p> <ul style="list-style-type: none"> • First-aid kits. 	✓				
<ul style="list-style-type: none"> • Safety helmet and goggles. 	✓				
<ul style="list-style-type: none"> • Gloves which can resist chemical reaction. 	✓				

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EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status			
5.9.1	<ul style="list-style-type: none"> • Protective boot and clothing. 	DSD's Contractor	Construction Work Sites	WQO	✓			
	<ul style="list-style-type: none"> • Respirators and gas masks. 				✓			
	<ul style="list-style-type: none"> • Face visor and masks. 				✓			
5.9.2	<p>Emergency Responses to Spillages</p> <p>Emergency plans and clean up procedures will need to be provided by the Contractor recognising his specific working methods and construction programme, activities and sequences. Agreement must be sought prior to commencement of the construction work but the following principles should be considered.</p> <p><i>The emergency plans should include the procedures for:</i></p> <ul style="list-style-type: none"> • spill prevention and precaution; • response actions; and • spill clean up and disposal. <p><i>Spill prevention and precaution embraces good site practice and covers:</i></p> <ul style="list-style-type: none"> • good housekeeping practices; • chemical storage requirements; and • chemical transfer and transport. 	DSD's Contractor	Project Area		✓			
5.9.3	<p>During Operation</p> <p>Regular inspection of the tunnels is essential to monitor the structural integrity and proper functioning of the drainage tunnel, which allows repairing of structural deterioration when it begins to develop. It is recommended that routine inspection shall be carried out at least two times per year for the drainage tunnel at the beginning and end of wet season from April to September.</p>				N/A			
Waste Management								
6.5.1	<p>During Construction</p> <p><i>Vegetation Removed from Site Clearance</i> Wastes generated from site clearance shall be sorted and excavated topsoil segregated from roots for re-use in landscaping works, thus eliminating the need for off-site disposal.</p>				DSD's Contractor	Construction Work Sites	Waste Disposal Ordinance (Cap.354); Waste Disposal (Chemical Wastes) (General) Regulation (Cap 354) and ETWBTC No. 15/2003, Waste anagement on Construction Site	✓
	<p><i>Construction and Demolition Materials</i> The Contractor should reuse any C&D material on-site. C&D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal. The use of wooden hoardings shall not be allowed. An alternative material, which can be reused or recycled, for example, metal (aluminium, alloy, etc) shall be used.</p>							✓

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EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
6.5.1	As referred to the section 6.4.1, the 317,936m ³ of inert surplus material generated by the project is suitable for public fill. The public fill reception facility at Tuen Mun Area 38 provides a suitable facility for the reuse of surplus inert C&D material generated from the project.	DSD's Contractor	Construction Work Sites	WDO (Cap.354), ETWBTC No. 15/2003, ETWBTC No. 12/2002 and ETWBTC No. 31/2004	
	Under the contract, the contractor will be required to minimise the generation of C&D material and reuse it on site through the following:				
	(a) to plan in the design and construction, methods to minimise the generation of C&D material;				✓
	(b) to submit a Waste Management Plan (WMP) in accordance with Environment Transport and Works Bureau Technical Circular (ETWBTC) No. 15/2003 or any superseding circular(s);				✓
	(c) to reuse recycled aggregates in accordance with ETWBTC No. 12/2002 or any superseding circular(s);				✓
	(d) to observe the requirements of the Trip-Ticket System, stipulated in ETWBTC No. 31/2004 or any superceding circular(s), for disposal of C&D material;				✓
	(e) to incorporate a Waste Management System into the WMP for effective management and control of C&D materials to avoid/reduce/minimise the generation of C&D material during construction.				✓
	The contractor will be required to properly sort into inert C&D materials, metals, timber and other non-inert C&D material in the workplace to prevent cross-contamination.		✓		
	In addition, DSD will conduct site inspection to monitor the contractors' performance in the implementation of the WMP and other relevant specified requirements.	DSD	Construction Work Sites	WDO (Cap.354) and ETWBTC No. 15/2003	✓
	<i>Excavated Materials</i> Excavated materials should be segregated from other wastes to avoid contamination thereby ensuring acceptability at public filling areas and avoiding the need for disposal at landfill.	DSD's Contractor	Construction Work Sites	WDO (Cap.354) and ETWBTC No. 15/2003	✓
	<i>Municipal Waste</i> Temporary refuse collection facilities should be set-up by the contractor and wastes should be stored in appropriate containers prior to collection and disposal.				✓
	Domestic effluent generated by the workforce will be directed to foul sewer or chemical toilets if public facilities are not available.				✓
6.5.1	<i>Waste Management Plan</i> A Waste Management Plan (WMP) for the construction of the Project should be prepared as part of the contractors submission. It will provide recommendations for appropriate recycling or disposal route and should include method statement for stockpiling and transportation of the excavated material and other construction wastes should also be included in the WMP and approved before the commencement of construction. All mitigation measures arising from the approved WMP shall be fully implemented.	DSD's Contractor	Construction Work Sites	WDO (Cap.354), ETWBTC No. 15/2003 and ETWBTC No. 33/2002	✓

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EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
	For the purpose of enhancing the management of C&D material including rock, and to minimize its generation at source, a C&D Material Management Plan (C&DMMP) has been prepared for this project and would be processed in accordance with the Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 - Management of Construction and Demolition Material Including Rock.				N/A
Ecology					
7.7.1	<p>Avoidance</p> <p>The surface structures are located mainly on existing disturbed areas (ie pollution and urbanisation) and have generally avoided the natural stream sections of higher species diversity and abundance of aquatic organisms.</p> <p>The major construction activities at streams are scheduled to avoid wet season of high water flow which may adversely affect the downstream natural habitats due to the construction runoff.</p>	DSD's Contractor	Construction Work Sites	EIAO	✓
7.7.2	<p>Minimisation</p> <p>The previous discussion in Section 7.6.4 has indicated that the impacts on ecological resources due to the construction and operation of the proposed Project are generally expected to be low. The following mitigation measures to minimise impacts and disturbance to the surrounding habitats, are recommended.</p> <p><i>Measures for Construction Runoff</i> Install sheet piles/cofferdam/weir along the boundary of the works area within the stream habitats in particular Sam Dip Tam Stream and Tso Kung Tam Stream before the commencement of works to prevent construction runoff during construction. Provision of adequate designed sand/ silt removal facilities such as sand traps, silt traps and sediment basin in the areas which could potentially be affected may be required.</p> <p><i>Good Construction Practice</i></p> <p>Erect fences along the boundary of the works area before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel onto adjacent areas, particularly the stream habitats.</p> <p>Avoid any damage and disturbance, particularly those caused by filling and illegal dumping, to the remaining and surrounding natural stream habitats.</p> <p>Regularly check the work site boundaries to ensure that they are not breached and that no damage occurs to surrounding areas.</p> <p>Prohibit and prevent open fires within the site boundary during construction and provide temporary fire fighting equipment in the work areas.</p> <p>Treat any damage that may have occurred to individual major trees in the adjacent area with surgery.</p>	DSD's Contractor	Construction Work Sites	EIAO	✓
					✓
					✓
					✓
					✓

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EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
	Reinstate temporary work sites/disturbed areas, particularly stream of natural bottom and bank, plantation, intertidal habitat, and the areas located within the proposed Ecological Park, immediately after completion of the construction works, ie through on-site tree/shrub planting and reprovision of natural or semi-natural bottom (also refer to Section 7.7.3), in order to facilitate the recolonisation of the wildlife recorded during the baseline surveys. Tree/shrub species used should make reference from those in the surrounding area	DSD's Contractor	Construction Work Sites	EIAO	✓
7.7.3	Compensation				
	Provide natural stream bed (approximately 0.03 ha) for the new Dry Weather Flow Channel (created from village-orchard) by laying natural stones at Intake I-2 (Figure 7.7). The reinstated stream bed shall mimic the existing natural conditions with certain portion of big boulders creating the lentic and lotic zones for the aquatic fauna, and while it will be developed during detailed design may draw on concepts shown in Figure 2.18.				N/A
	Provide natural stream bed (approximately 0.5 ha,) for the Approach Channel and Dry Weather Flow Channel by laying natural stones at Intake I-3 (Figure 7.8). The reinstated stream bed shall mimic the existing natural conditions (rocky bottom with very limited aquatic plants) with certain portion of big boulders creating the lentic and lotic zones for the aquatic fauna, and while it will be developed during detailed design may draw on concepts shown in Figure 2.18.				N/A
	Provide natural bottom (ie retain the existing stream bed or reinstate the stream bed by providing boulders/ rocks, riprap or gabion) for the affected stream sections (Figure 7.8) in order to allow natural colonisation of aquatic fauna.				N/A
	Provide at least 2.2 ha of compensatory planting on the permanent and temporary affected plantation areas, particularly the slopes along access road and adjacent to Intake I-3 and cascade at Outfall O-1, after construction to stabilise the slope to present soil erosion and consequent stream sedimentation. Among the 2.2 ha compensatory planting, at least 0.5 ha of compensatory tree planting on the new formed slope along the access road of the Intake I-3 and 0.5 ha of compensatory tree planting over the cascade (by constructing intermediate platform) at Outfall O-1 will be provided (location refer to Figures 7.4 – 7.6). Species used for planting should take reference from the species identified in Appendix F and be native to Hong Kong or South China region.				N/A
	Provide armour rocks for the affected intertidal habitat in order to allow natural colonisation of intertidal organisms.				N/A

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EIA Ref.	Recommended Mitigation Measures	Who to implement the measure ?	Location of the measure	What requirements or standards for the measure to achieve ?	Status
<u>Cultural Heritage</u>					
8.6	As no impacts on recorded archaeological sites or area with archaeological potential were identified within the Study Area, no mitigation measure for archaeological resources is considered necessary.				N/A
	The construction methods to be employed should seek to avoid potential vibration impacts to Kuen Yuen Tung Monastery at Lo Wai, the Western Monastery, Yuen Yuen Home for the Aged, Hong Hoi Chee Hong Temple, Chiu Yum Tsing Yuen, Tse's Grave, Wan Lin Bridge and Sam Dip Tam Rock Carving in Sam Dip Tam and the Tin Hau Temple, Yam Kom Tau Village Rural Committee and the Yeung's Ancestral Hall in Yau Kom Tau as these sites fall within 50 m of the Preferred Option of the drainage tunnel alignment or associated Intakes/Outfall construction activities. Construction works that generates excessive vibration in close proximity to these sites should be restricted to protect the building from adverse vibration impacts and to ensure that the building structures will not be damaged as a result of these impacts.	DSD's Contractor	Construction Work Sites	EIAO	✓
	In order to ensure that no structural or superficial damage will be caused by the construction activities, a precautionary approach involving a pre-construction condition survey and establishment of appropriate vibration limits for the potentially impacted structures should be adopted. Protection measures for the potentially impacted structures, if considered necessary from the pre-construction condition survey, should be implemented prior to the commencement of construction works. Vibration monitoring during the construction phase should be undertaken as part of the EM&A programme.	Qualified archaeologist/ built heritage specialist	Construction Work Sites	EIAO	✓
<u>Fisheries</u>					
10.6	In accordance with the guidelines in the <i>EIAO-TM</i> on fisheries impact assessment the general policy for mitigating impacts to fisheries, in order of priority are avoidance, minimization and compensation.	DSD's Contractor	Construction Work Sites	EIAO	N/A
	Impacts to fisheries resources and fishing operations have largely been avoided during the construction and operation of the drainage tunnel through the avoidance of dredging, reclamation and filling activities. Good construction practice and associated measures were recommended in Water Quality Assessment in Section 5 to control water quality impacts to within acceptable levels and are also expected to control impacts to fisheries resources. Hence, no fisheries-species mitigation measures are required during construction and operation of the drainage tunnel.				N/A

Remarks: ✓ Compliance of mitigation measure
 × Non-compliance of mitigation measure
 N/A Not applicable

Appendix E

Status of License and Permit

Updated Status of Environmental Permit & Licence

Application Date	Environmental Permit / Licence	Issued Date	Ref No.	Account No.	Permit / Licence No.	Permit / Licence Validity Date	Remarks
2 Jan 2008	Waste Disposal (Charges for Disposal of Construction Waste) Regulation - Billing Account	17 Jan 2008	WFG06289	7006574	----	----	Valid
10 Jan 2008	Notification Pursuant to Section 3(1) of the Air Pollution Control (Construction Dust) Regulation	10 Jan 2008	001026901	----	----	----	Valid
18 Apr 2008	Water Discharge Licence – Intake I-1	19 Jun 2008	001029978	----	EP760/327/013315I	19 Jun 2008 - 30 Jun 2013	Valid
18 Apr 2008	Water Discharge Licence – Intake I-2	2 Jul 2008	001029959	----	EP760/321/013020I	02 Jul 2008 - 31 Jul 2013	Valid
18 Apr 2008	Water Discharge Licence – Intake I-3	5 Aug 2008	001029960	----	EP760/323/013324I	05 Aug 2008 - 31 Aug 2013	Valid
18 Apr 2008	Water Discharge Licence – Portion I	26 Jun 2008	001029974	----	EP760/350/013334I	26 Jun 2008 - 30 Jun 2013	Valid
23 Jul 2008	Water Discharge Licence – Intake I-1 (Intersection of Wo Yi Hop Lane and Ho Fung College)	27 Aug 2008	001031974	----	EP760/325/013536I	27 Aug 2008 - 31 Aug 2013	Valid
2 Sep 2008	Variation of Environmental Permit	25 Sep 2008	VEP-271/2008	----	EP-275/2007/B	----	Valid
29 Apr 2009	Water Discharge Licence – Intake I-3 (Additional Discharge Point)	25 Mar 2010	305058	----	WT00005917-2010	25 Mar 2010 - 31 Mar 2015	Valid
4 Sep 2010	Water Discharge Licence – Portion G	28 Oct 2010	321337	----	WT00007685-2010	28 Oct 2010 - 31 Oct 2015	Valid
16 Nov 2010	Water Discharge Licence - Outfall	17 Nov 2011	(14) in EP/RW/0000080206	----	WT-00008094-2010	17 Nov 2011 - 30 Nov 2016	Valid
6 Aug 2012	Further Environmental Permit	29 Aug 2012	FEP-140/2012	----	FEP-02/275/2007/B	----	Valid
26 Jul 2012	Waste Disposal (Chemical Waste) (General) - Chemical Waste Producer	9 Oct 2012	(7) in EP/RW/0000062354	----	5111-324-M2703-01	----	Valid
23 Jan 2013	Construction Noise Permit - Outfall	06 Feb 2013	(4) in EP/RW/0000301563	----	GW-RW0063-13	12 Feb 2013 - 11 Aug 2013	Cancelled and Superseded by GW-RW0172-13
23 Jan 2013	Construction Noise Permit - Intake I-3	04 Feb 2013	(5) in EP/RW/0000080194	----	GW-RW0071-13	13 Feb 2013 - 12 Aug 2013	Valid
23 Jan 2013	Construction Noise Permit - Portion I	06 Feb 2013	(4) in EP/RW/0000080230	----	GW-RW0096-13	11 Feb 2013 - 10 Aug 2013	Valid
25 Jan 2013	Construction Noise Permit - Intake I-1	01 Feb 2013	(4) in EP731/N31/RW0085-13	----	GW-RW0085-13	18 Feb 2013 - 17 Apr 2013	Valid
6 Mar 2013	Construction Noise Permit - Outfall	18 Mar 2013	(4) in EP/RW/0000301563	----	GW-RW0172-13	19 Mar 2013 - 17 Sept 2013	Valid

Appendix F

Calibration Certificates

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
 Monitoring Location: Ho Fung College (ASR 1)
 Calibration Date: 29-Jan-13
 Calibration Due Date: 29-Mar-13
 Time: 8:15

Sampler Model:	BM2000HX
Serial No.:	4994
Calibrator Orifice no.:	1785
Slope (m):	2.00506
Intercept (b):	-0.02062
Correction coeff. (r)	0.99998

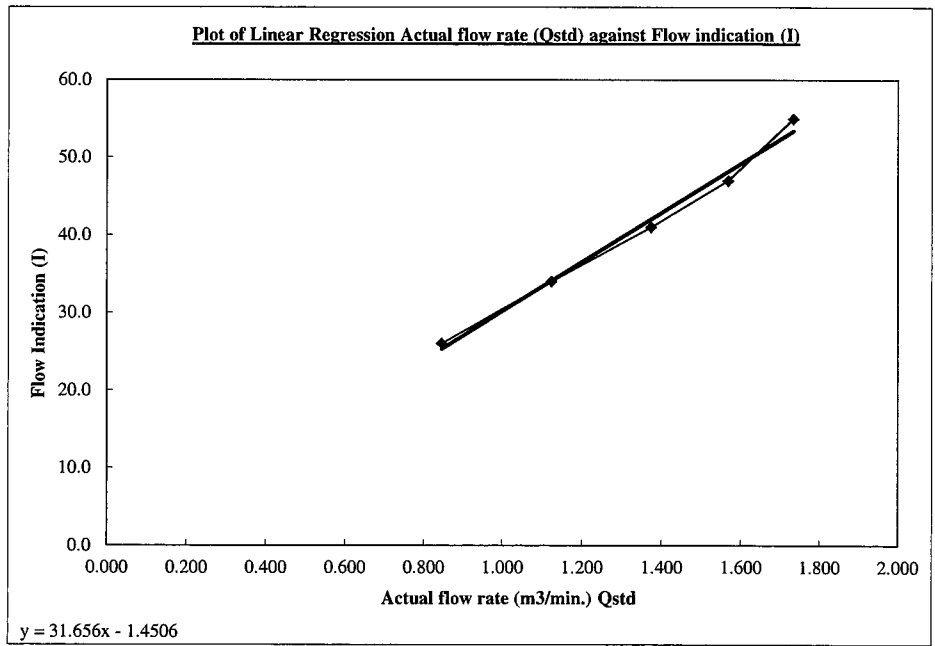
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	767.0
Calibration temp. (K) Ta:	288.5

$$Q_{std} = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	11.5	3.454	1.733	55.0
2	9.4	3.123	1.568	47.0
3	7.2	2.733	1.373	41.0
4	4.8	2.231	1.123	34.0
5	2.7	1.674	0.845	26.0

Correlation Coefficient : 0.9946



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Edwin CHAN
 (*[Signature]*)

Date: 29 January 2013

Checked by: F.C. Tsang
 (*[Signature]*)

Date: 29 January 2013

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
 Monitoring Location: Hong Hoi Chi Hong Ship Temple (ASR 3)
 Calibration Date: 29-Jan-13
 Calibration Due Date: 29-Mar-13
 Time: 9:00

Sampler Model:	BM2000HX
Serial No.:	5875
Calibrator Orifice no.:	1785
Slope (m):	2.00506
Intercept (b):	-0.02062
Correction coeff. (r)	0.99998

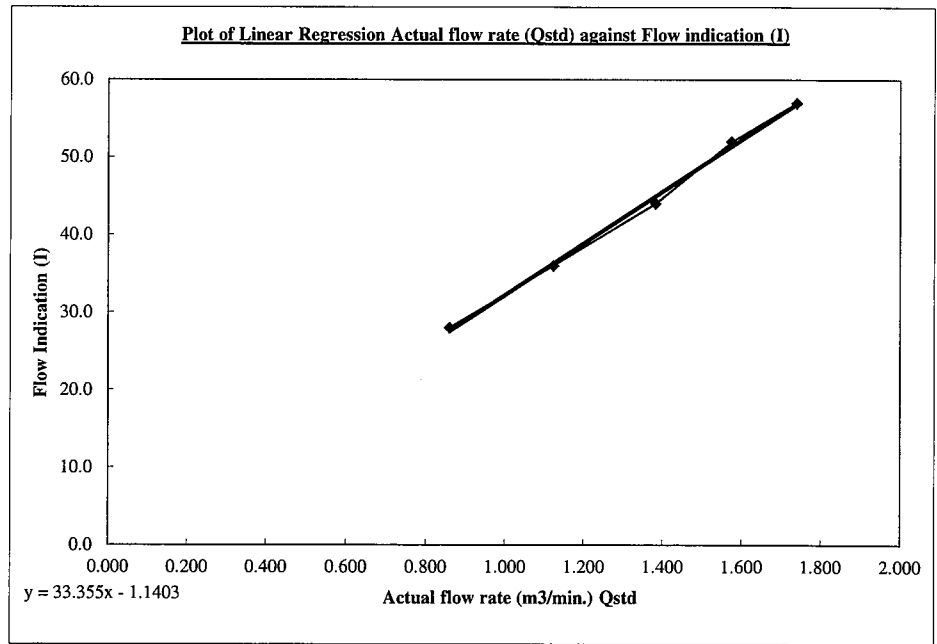
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	767.3
Calibration temp. (K) Ta:	289.1

$$Qstd = \frac{1}{m} \times (\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	11.6	3.466	1.739	57.0
2	9.5	3.137	1.575	52.0
3	7.3	2.749	1.382	44.0
4	4.8	2.229	1.122	36.0
5	2.8	1.703	0.860	28.0

Correlation Coefficient : 0.9986



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Edwin Chan
 (*[Signature]*)

Date: 29 January 2013

Checked by: F.C. Tsang
 (*[Signature]*)

Date: 29 January 2013

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
 Monitoring Location: Long Beach Garden (ASR 8)
 Calibration Date: 29-Jan-13
 Calibration Due Date: 29-Mar-13
 Time: 8:30

Sampler Model:	TE5005X
Serial No.:	1059
Calibrator Orifice no.:	1785
Slope (m):	2.00506
Intercept (b):	-0.02062
Correction coeff. (r)	0.99998

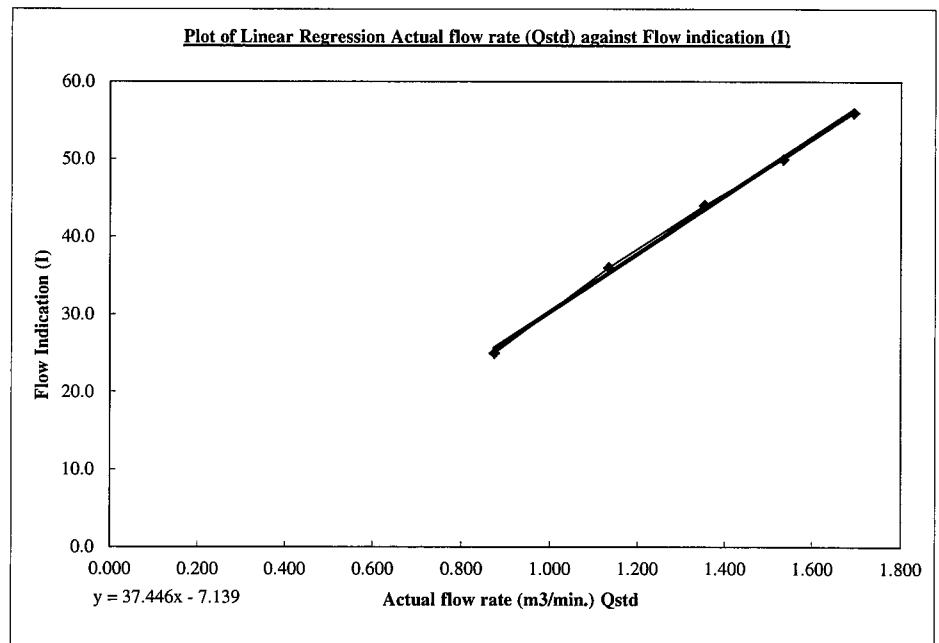
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	767.1
Calibration temp. (K) Ta:	289.0

$$Qstd = \frac{1}{m} \times (\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	11.0	3.375	1.694	56.0
2	9.0	3.053	1.533	50.0
3	7.0	2.692	1.353	44.0
4	4.9	2.253	1.134	36.0
5	2.9	1.733	0.875	25.0

Correlation Coefficient : 0.9990



Remark
 1HPa = 0.750062 mmHg

Calibrated by: **Edwin Chan**
 (*[Signature]*)

Date: 29 January 2013

Checked by: **F.C. Tsang**
 (*[Signature]*)

Date: 29 January 2013

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
 Monitoring Location: Greenview Terrace (ASR 9)
 Calibration Date: 29-Jan-13
 Calibration Due Date: 29-Mar-13
 Time: 8:00

Sampler Model:	TE5005X
Serial No.:	1713
Calibrator Orifice no.:	1785
Slope (m):	2.00506
Intercept (b):	-0.02062
Correction coeff. (r)	0.99998

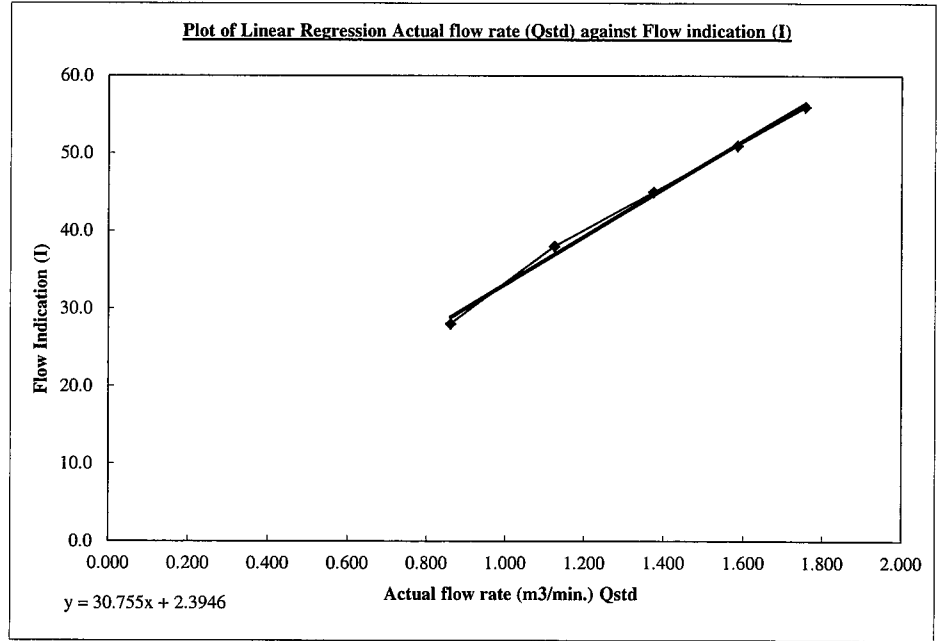
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	766.9
Calibration temp. (K) Ta:	288.2

$$Q_{std} = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	11.8	3.500	1.756	56.0
2	9.6	3.157	1.585	51.0
3	7.2	2.734	1.374	45.0
4	4.8	2.232	1.124	38.0
5	2.8	1.705	0.861	28.0

Correlation Coefficient : 0.9978



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Edwin Chan
 (*[Signature]*)

Date: 29 January 2013

Checked by: F.C. Tsang
 (*[Signature]*)

Date: 29 January 2013



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

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 04, 2012 Rootsmeter S/N 0438320 Ta (K) - 297
 Operator Tisch Orifice I.D. - 1785 Pa (mm) - 751.84

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3940	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8780	7.9	5.00
4	NA	NA	1.00	0.8360	8.8	5.50
5	NA	NA	1.00	0.6920	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9884	0.7090	1.4090	0.9957	0.7143	0.8889
0.9842	1.0012	1.9926	0.9915	1.0087	1.2570
0.9821	1.1185	2.2278	0.9894	1.1269	1.4054
0.9810	1.1734	2.3365	0.9883	1.1822	1.4740
0.9758	1.4101	2.8179	0.9831	1.4206	1.7777
Qstd slope (m) = 2.00815			Qa slope (m) = 1.25747		
intercept (b) = -0.01705			intercept (b) = -0.01076		
coefficient (r) = 0.99998			coefficient (r) = 0.99998		
y axis = SQRT[H2O(Pa/760)(298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

$$Qstd = Vstd/Time$$

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

$$Qa = Va/Time$$

For subsequent flow rate calculations:

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

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

Certificate of Calibration

校正證書

Certificate No. : C123580

證書編號

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

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

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 15 June 2012

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : L K Yeung

Certified By : 
核證 : K C Lee

Date of Issue : 15 June 2012
簽發日期

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

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Certificate of Calibration

校正證書

Certificate No. : C123580
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

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

- Test procedure : MA101N.

- Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

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

- 6.1.2 Linearity

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

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

- 6.2 Time Weighting

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

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

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Certificate of Calibration

校正證書

Certificate No. : C123580
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

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

6.3.2 C-Weighting

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

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

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

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

Note :

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

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

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

校正證書

Certificate No. : C126333
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-2717)

Description / 儀器名稱 : Integrating Sound Level Meter
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2448529
Supplied By / 委託者 : Hyder Consulting Limited
47/F., Hopewell Centre, 183 Queen's Road East,
Wanchai, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 3 November 2012

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : K C Lee

Certified By : 
核證 : C C Cheung

Date of Issue : 5 November 2012
簽發日期

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

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

校正證書

Certificate No. : C126665

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-2878)

Description / 儀器名稱 : Sound Level Calibrator
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-73
Serial No. / 編號 : 10486660
Supplied By / 委託者 : Envirotech Services Co.
Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road,
Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 November 2012

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : K C Lee

Certified By : 
核證 : C C Cheung

Date of Issue : 21 November 2012
簽發日期

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

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。



Calibration Certificate

Certificate No. **28658**

Page 1 of 2 Pages

Customer : Hyder Consulting Limited

Address : 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

Order No. : Q23280

Date of receipt : 17-Dec-12

Item Tested

Description : Sound Level Calibrator

Manufacturer : B&K

Model : Type 4231

Serial No. : 2699361

Test Conditions

Date of Test : 28-Dec-12

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the IEC 942 Class 1 specification.

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

Main Test equipment used:


<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	13535	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	28588	NIM-PRC & SCL-HKSAR
S041	Universal Counter	28347	SCL-HKSAR
S206	Sound Level Meter	16338	SCL-HKSAR

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

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

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

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 28-Dec-12

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.
Tel: 2425 8801 Fax: 2425 8646



Calibration Certificate

Certificate No. 28658

Page 2 of 2 Pages

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.10	± 0.3 dB
114	114.14	

Uncertainty : ± 0.1 dB

2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.000 kHz	± 2 %

Uncertainty : ± 3.6 x 10⁻⁶

3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.5 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurement.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 1005 hPa.

----- END -----

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1233313
 Date of Issue: 21/12/2012
 Client: HYDER CONSULTING LTD



Description: YSI Multimeter
 Brand Name: YSI
 Model No.: YSI Professional Plus
 Serial No.: 11J100824 (11F100420 Probe)
 Equipment No.: N/A
 Date of Calibration: 18 December, 2012 Date of next Calibration: 18 March, 2013

Parameters:

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.08	0.08
7.0	7.07	0.07
10.0	10.00	0.00
	Tolerance Limit (\pm unit)	0.20

Conductivity

Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	143.6	-2.2
6667	6240	-6.4
12890	12347	-4.2
58670	58327	-0.6
	Tolerance Limit (\pm %)	10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.09	4.00	-0.09
6.20	6.12	-0.08
8.46	8.40	-0.06
	Tolerance Limit (\pm mg/L)	0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
10.5	10.2	-0.3
21.0	20.8	-0.2
35.5	35.7	0.2
	Tolerance Limit ($^{\circ}$ C)	2.0

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1306753
Date of Issue: 15/03/2013
Client: HYDER CONSULTING LIMITED

Description: Multimeter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 11J100824
Equipment No.: --
Date of Calibration: 15 March, 2013 **Date of next Calibration:** 15 June, 2013

Parameters:

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.73	2.82	0.09
5.36	5.51	0.15
8.65	8.74	0.09
Tolerance Limit (\pm mg/L)		0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
9.0	9.1	0.1
23.0	22.5	-0.5
45.0	46.3	1.3
Tolerance Limit (\pm $^{\circ}$ C)		2.0

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.00	0.00
7.0	6.97	-0.03
10.0	9.96	-0.04
Tolerance Limit (\pm pH unit)		0.20

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (μ S/cm)	Displayed Reading (μ S/cm)	Tolerance (%)
146.9	138.4	-5.8
6667	6154	-7.7
12890	11994	-7.0
58670	55390	-5.6
Tolerance Limit (\pm %)		10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr. Fung Lim Chee, Richard
 General Manager -
 Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1232550
Date of Issue: 13/12/2012
Client: HYDER CONSULTING LTD



Description: Portable Turbidimeter
Brand Name: Hanna
Model No.: HI 98703-02
Serial No.: 08498735
Equipment No.: --
Date of Calibration: 11 December, 2012 **Date of next Calibration:** 11 March, 2013

Parameters:

Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	--
4	4.02	0.5
40	40.90	2.3
80	85.30	6.6
400	413.00	3.3
800	813.00	1.6
	Tolerance Limit (±%)	10.0


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1306041
Date of Issue: 08/03/2013
Client: HYDER CONSULTING LIMITED



Description: Turbidimeter
Brand Name: HANNA
Model No.: HI 98703-02
Serial No.: 08498735
Equipment No.: --
Date of Calibration: 08 March, 2013

Date of next Calibration: 08 June, 2013

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.05	--
4	4.17	4.3
40	42.2	5.5
80	85.7	7.1
400	410	2.5
800	829	3.6
	Tolerance Limit ($\pm\%$)	10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1231703
Date of Issue: 07/12/2012
Client: HYDER CONSULTING LTD



Description: YSI 55 DO METER
Brand Name: YSI
Model No.: 55/12
Serial No.: 95J38390
Equipment No.: N/A
Date of Calibration: 04 December, 2012 Date of next Calibration: 04 March, 2013

Parameters:

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.31	4.23	-0.08
6.65	6.54	-0.11
8.46	8.47	0.01
	Tolerance Limit (\pm mg/L)	0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
11.0	11.6	0.6
21.5	21.5	0.0
38.0	37.6	-0.4
	Tolerance Limit ($^{\circ}$ C)	2.0


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1305864
Date of Issue: 08/03/2013
Client: HYDER CONSULTING LIMITED

Description: DO METER
Brand Name: YSI
Model No.: 55/12
Serial No.: 95J38390
Equipment No.: --

Date of Calibration: 08 March, 2013 **Date of next Calibration:** 08 June, 2013

Parameters:

Dissolved Oxygen **Method Ref: APHA (21st edition), 4500O: G**

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.45	5.53	0.08
6.62	6.71	0.09
8.77	8.90	0.13
	Tolerance Limit (±mg/L)	0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
11.0	11.2	0.2
21.5	21.0	-0.5
38.5	38.7	0.2
	Tolerance Limit (±°C)	2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.



 Mr. Fung Lim Chee, Richard
 General Manager -
 Greater China & Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1233680
Date of Issue: 21/12/2012
Client: HYDER CONSULTING LTD



Description: pH Meter
Brand Name: Hanna
Model No.: Hanna HI-8014
Serial No.: SN 08345212
Equipment No.: N/A
Date of Calibration: 20 December, 2012

Date of next Calibration: 20 March, 2013

Parameters:

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.00	0.00
7.0	7.06	0.06
10.0	10.00	0.00
	Tolerance Limit (\pm unit)	0.20


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1307213
Date of Issue: 20/03/2013
Client: HYDER CONSULTING LIMITED



Description: pH meter
Brand Name: Hanna
Model No.: HI-8014
Serial No.: SN 08345212
Equipment No.: --
Date of Calibration: 20 March, 2013

Date of next Calibration: 20 June, 2013

Parameters:

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.06	0.06
7.0	7.09	0.09
10.0	10.02	0.02
	Tolerance Limit (\pm pH unit)	0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

A handwritten signature in blue ink, appearing to read 'Richard Fung'.

Mr. Fung Lim Chee, Richard
General Manager
Greater China & Hong Kong

Appendix G

Monitoring Locations

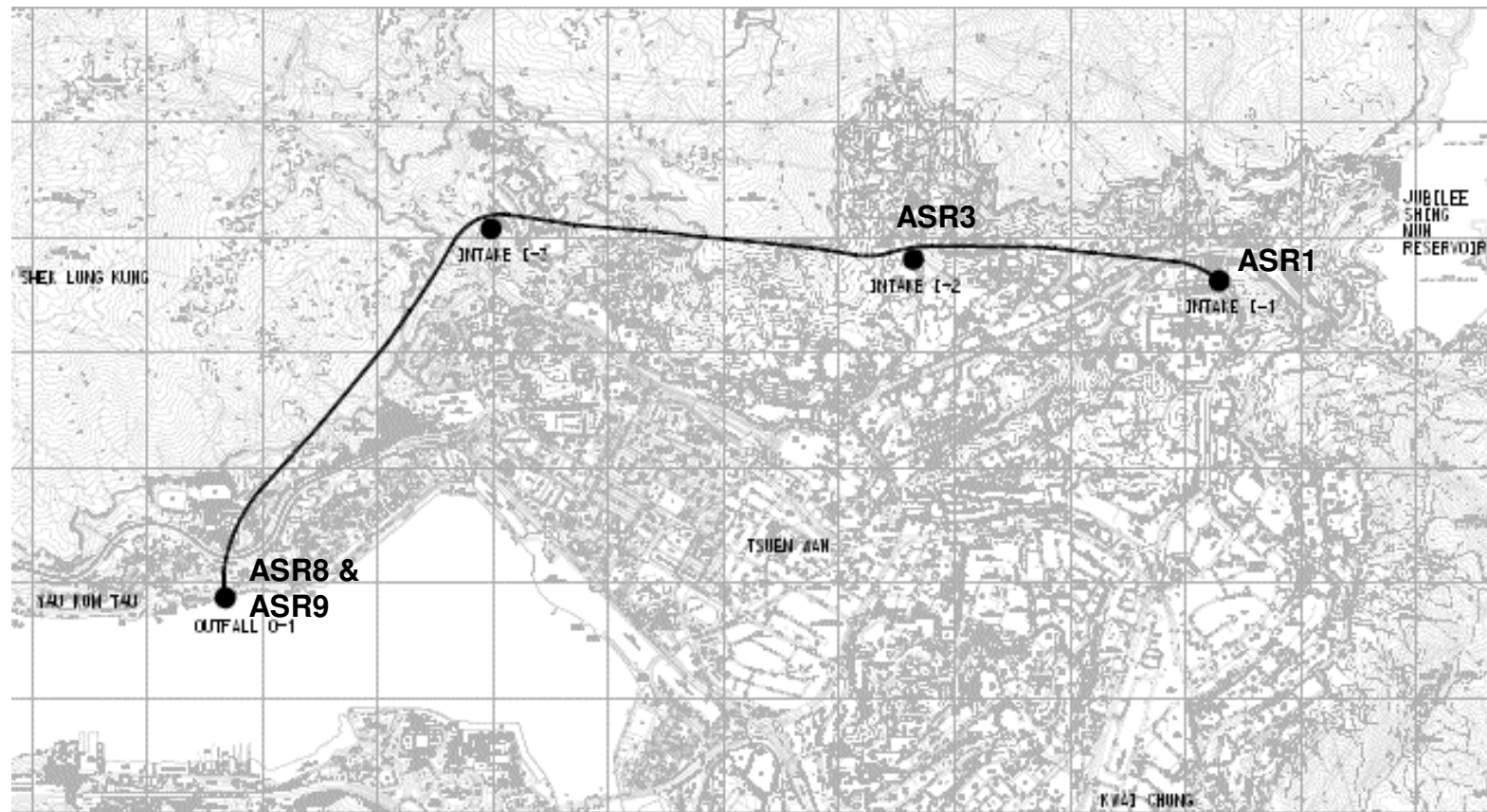


Figure 1 Air Quality Monitoring Stations

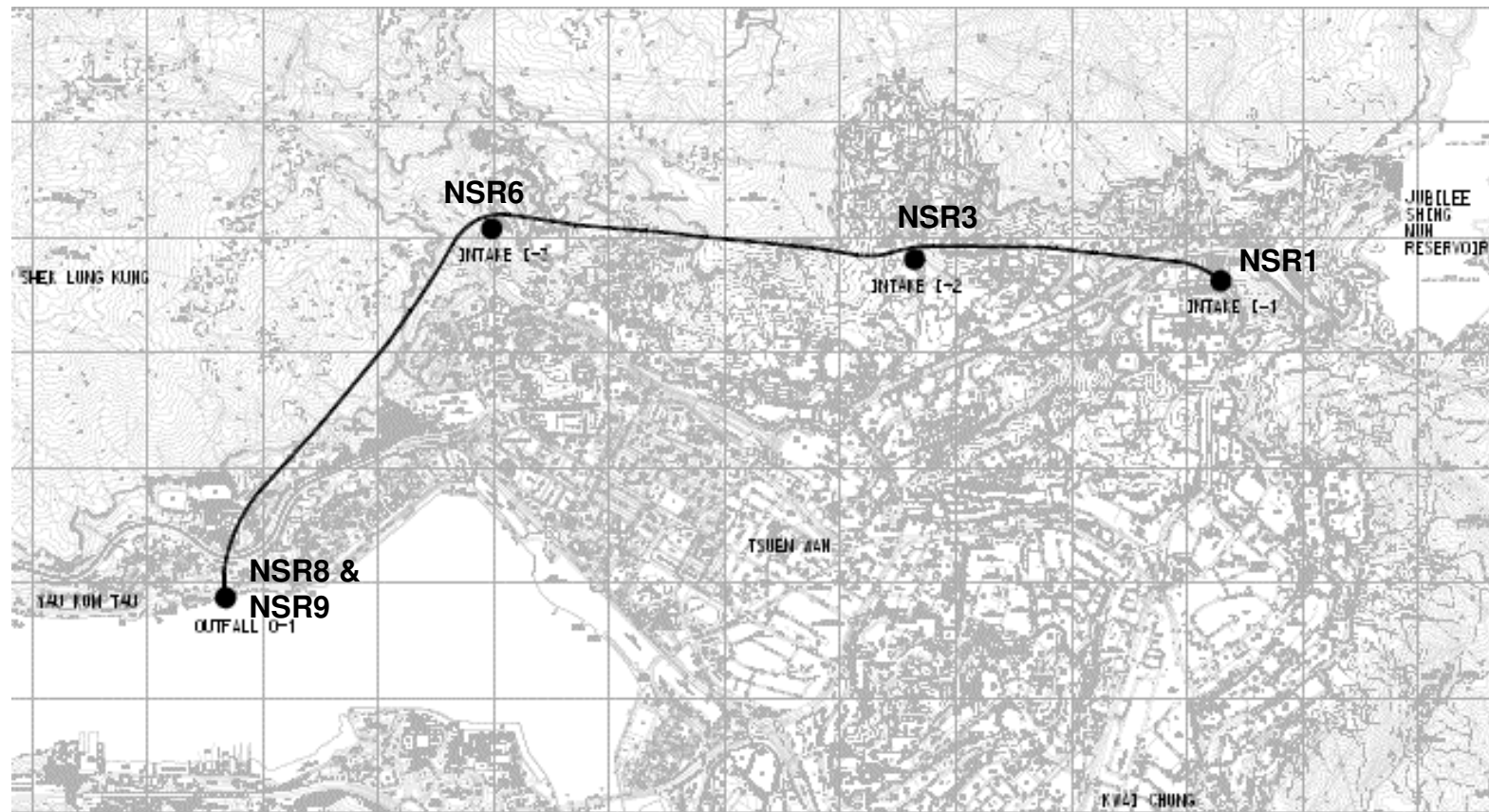


Figure 2 Noise Monitoring Stations

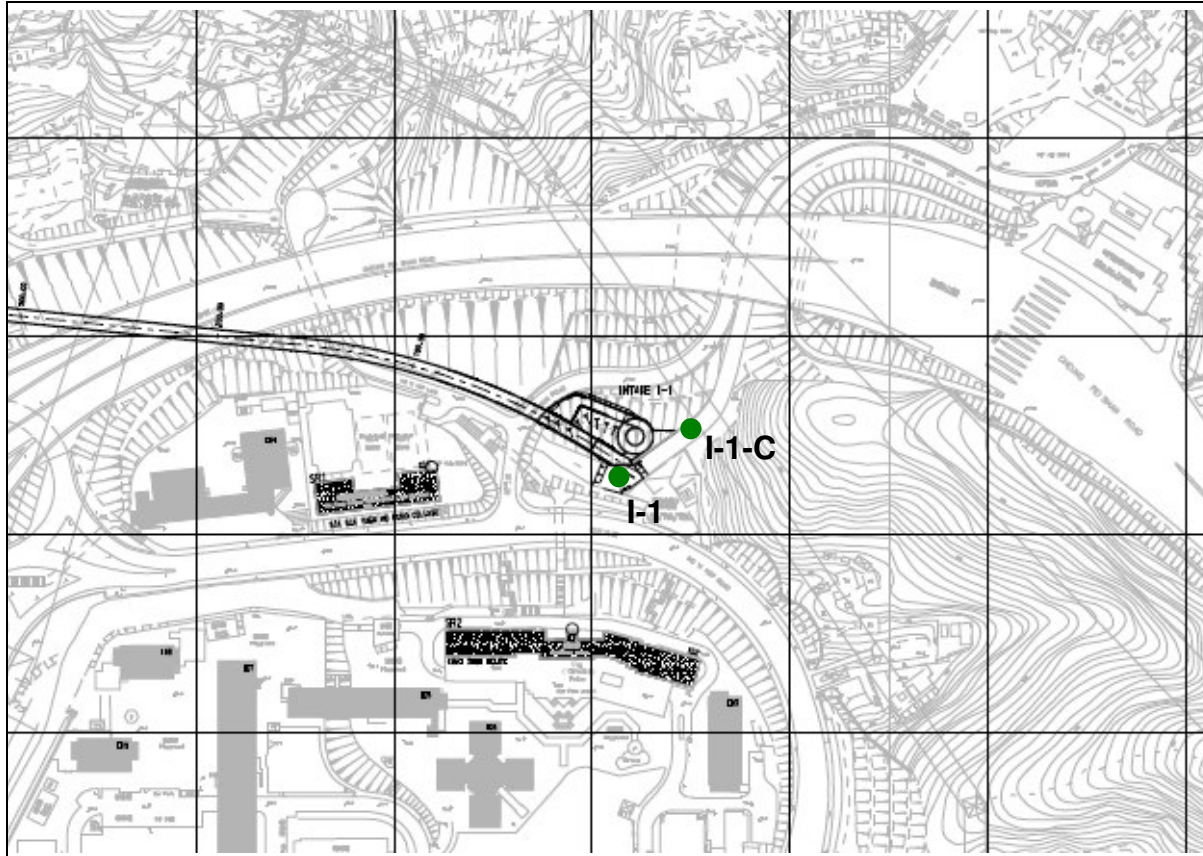


Figure 3 Water Quality Monitoring Stations: I-1 & I-1-C at Intake I-1

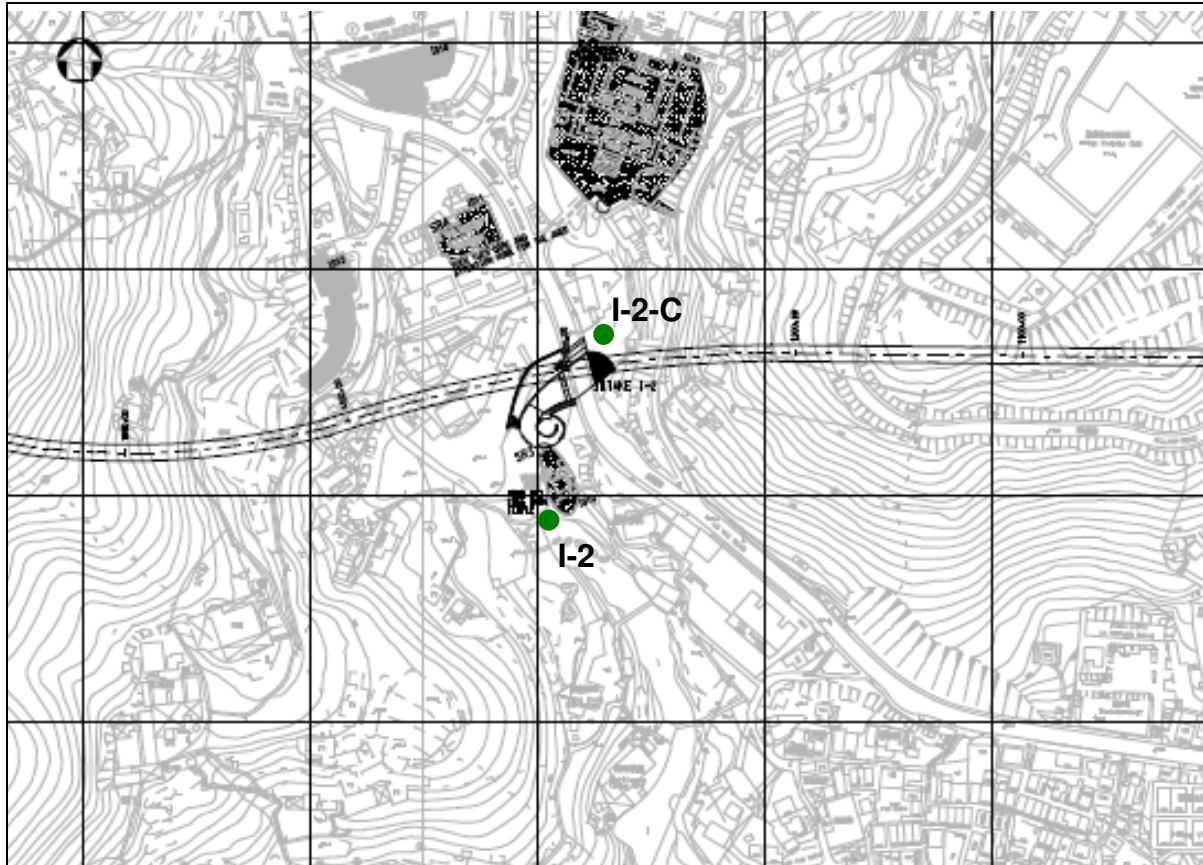


Figure 4 Water Quality Monitoring Stations: I-2 & I-2-C at Intake I-2

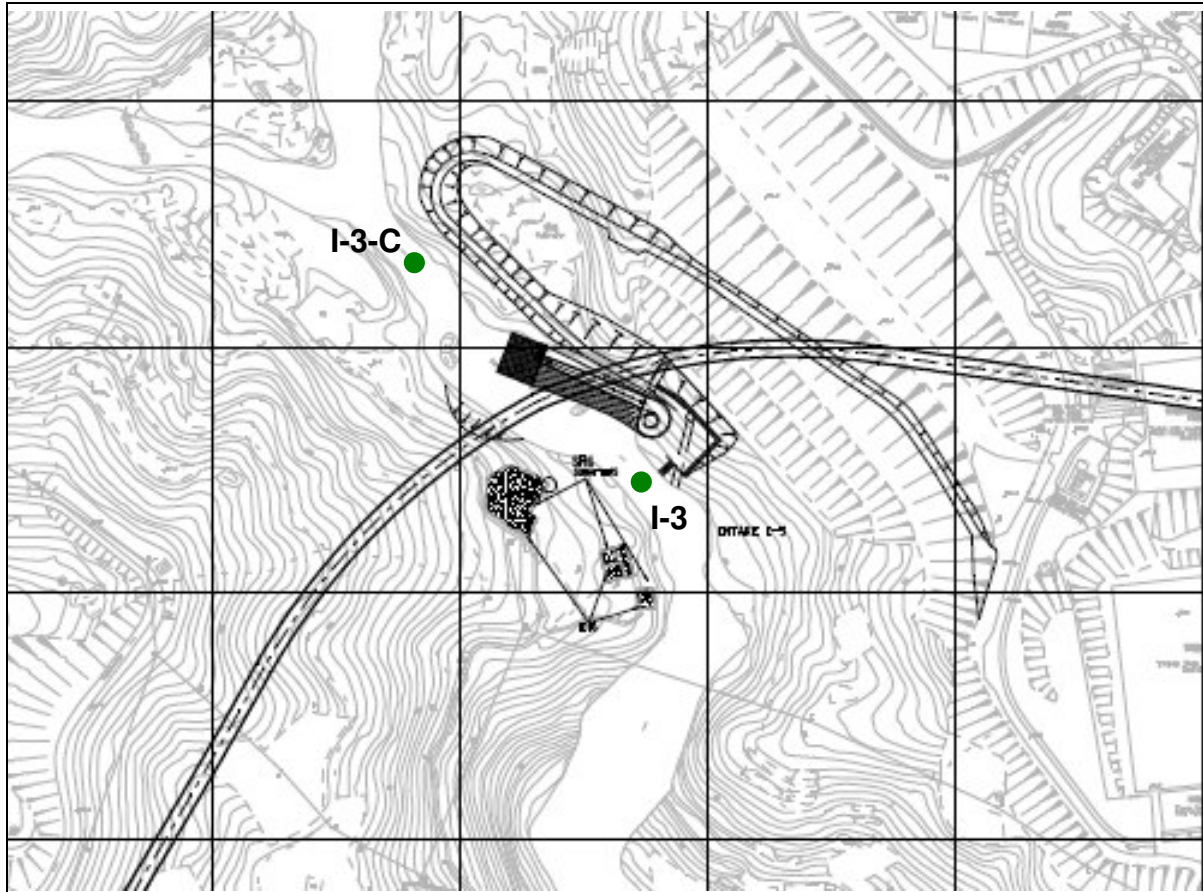


Figure 5 Water Quality Monitoring Stations: I-3 & I-3-C at Intake I-3

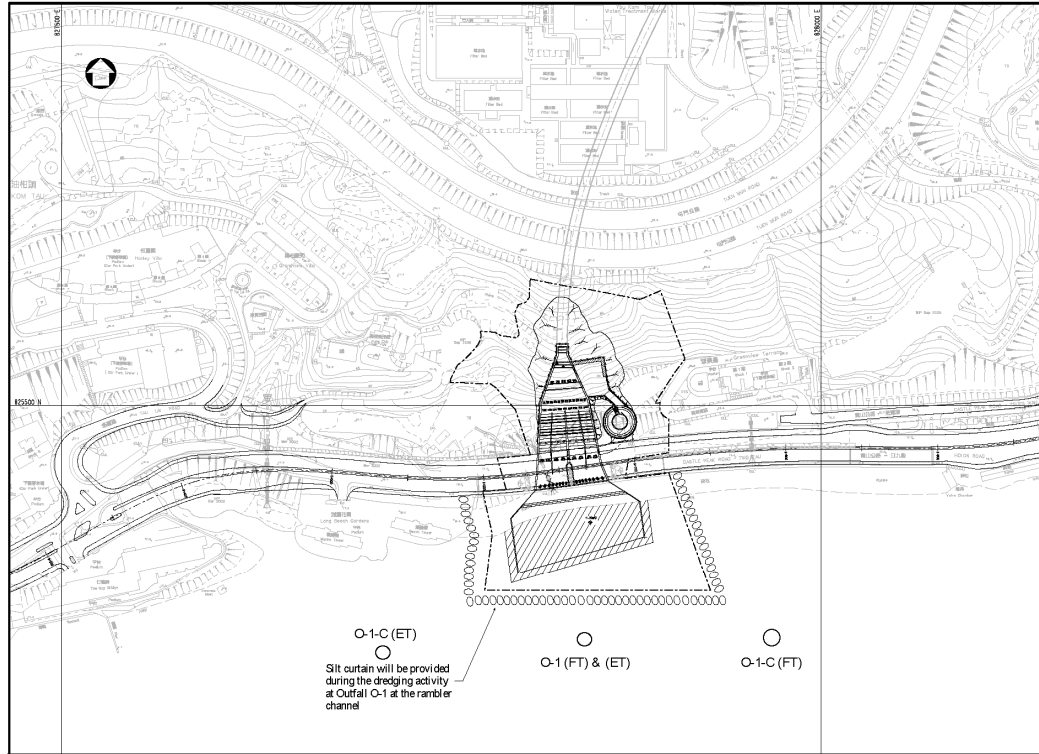


Figure 6 Water Quality Monitoring Stations: O-1 (FT) & (ET), O-1-C(FT) & O-1-C(ET) at Outfall O-1

Appendix H

EM&A Schedule

**Contract No. DC/2007/12 – Design and Construction of
Tsuen Wan Drainage Tunnel
Impact Monitoring Programme – March 13 (Tentative)**

Date		Air	Noise	Water
1-Mar-13	Fri			✓
2-Mar-13	Sat			
3-Mar-13	Sun			
4-Mar-13	Mon	✓	✓	✓
5-Mar-13	Tue			
6-Mar-13	Wed			✓
7-Mar-13	Thu			
8-Mar-13	Fri			✓
9-Mar-13	Sat	✓		
10-Mar-13	Sun			
11-Mar-13	Mon			✓
12-Mar-13	Tue			
13-Mar-13	Wed			✓
14-Mar-13	Thu			
15-Mar-13	Fri	✓	✓	✓
16-Mar-13	Sat			
17-Mar-13	Sun			
18-Mar-13	Mon			✓
19-Mar-13	Tue			
20-Mar-13	Wed			✓
21-Mar-13	Thu	✓	✓	
22-Mar-13	Fri			✓
23-Mar-13	Sat			
24-Mar-13	Sun			
25-Mar-13	Mon			✓
26-Mar-13	Tue			
27-Mar-13	Wed	✓	✓	✓
28-Mar-13	Thu			
29-Mar-13	Fri			
30-Mar-13	Sat			
31-Mar-13	Sun			

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week

**Contract No. DC/2007/12 – Design and Construction of
Tsuen Wan Drainage Tunnel
Impact Monitoring Programme – April 13 (Tentative)**

Date		Air	Noise	Water
1-Apr-13	Mon			
2-Apr-13	Tue	✓	✓	
3-Apr-13	Wed			✓
4-Apr-13	Thu			
5-Apr-13	Fri			✓
6-Apr-13	Sat			
7-Apr-13	Sun			
8-Apr-13	Mon	✓	✓	✓
9-Apr-13	Tue			
10-Apr-13	Wed			✓
11-Apr-13	Thu	✓		
12-Apr-13	Fri			✓
13-Apr-13	Sat			
14-Apr-13	Sun			
15-Apr-13	Mon			✓
16-Apr-13	Tue			
17-Apr-13	Wed	✓	✓	✓
18-Apr-13	Thu			
19-Apr-13	Fri			✓
20-Apr-13	Sat			
21-Apr-13	Sun			
22-Apr-13	Mon			✓
23-Apr-13	Tue	✓	✓	
24-Apr-13	Wed			✓
25-Apr-13	Thu			
26-Apr-13	Fri			✓
27-Apr-13	Sat			
28-Apr-13	Sun			
29-Apr-13	Mon	✓	✓	✓
30-Apr-13	Tue			

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week

**Contract No. DC/2007/12 – Design and Construction of
Tsuen Wan Drainage Tunnel
Impact Monitoring Programme – May 13 (Tentative)**

Date		Air	Noise	Water
1-May-13	Wed			
2-May-13	Thu			✓
3-May-13	Fri	✓		
4-May-13	Sat			✓
5-May-13	Sun			
6-May-13	Mon			✓
7-May-13	Tue			
8-May-13	Wed	✓	✓	✓
9-May-13	Thu			
10-May-13	Fri			✓
11-May-13	Sat			
12-May-13	Sun			
13-May-13	Mon			✓
14-May-13	Tue	✓	✓	
15-May-13	Wed			✓
16-May-13	Thu			
17-May-13	Fri			
18-May-13	Sat			✓
19-May-13	Sun			
20-May-13	Mon	✓	✓	✓
21-May-13	Tue			
22-May-13	Wed			✓
23-May-13	Thu			
24-May-13	Fri	✓		✓
25-May-13	Sat			
26-May-13	Sun			
27-May-13	Mon			✓
28-May-13	Tue			
29-May-13	Wed			✓
30-May-13	Thu	✓	✓	
31-May-13	Fri			✓

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week

**Contract No. DC/2007/12 – Design and Construction of
Tsuen Wan Drainage Tunnel
Impact Monitoring Programme – June 13 (Tentative)**

Date		Air	Noise	Water
1-Jun-13	Sat			
2-Jun-13	Sun			
3-Jun-13	Mon			✓
4-Jun-13	Tue			
5-Jun-13	Wed	✓	✓	✓
6-Jun-13	Thu			
7-Jun-13	Fri			✓
8-Jun-13	Sat			
9-Jun-13	Sun			
10-Jun-13	Mon			✓
11-Jun-13	Tue	✓	✓	
12-Jun-13	Wed			
13-Jun-13	Thu			✓
14-Jun-13	Fri			
15-Jun-13	Sat			✓
16-Jun-13	Sun			
17-Jun-13	Mon	✓	✓	✓
18-Jun-13	Tue			
19-Jun-13	Wed			✓
20-Jun-13	Thu			
21-Jun-13	Fri	✓		✓
22-Jun-13	Sat			
23-Jun-13	Sun			
24-Jun-13	Mon			✓
25-Jun-13	Tue			
26-Jun-13	Wed			✓
27-Jun-13	Thu	✓	✓	
28-Jun-13	Fri			✓
29-Jun-13	Sat			
30-Jun-13	Sun			

Note:

Shaded area indicates public holiday.

Air – Monitoring 1-hour TSP is undertaken three times per every six days

Noise – Noise measurements is undertaken once every week at (0700-1900 Monday to Saturday)

Water –Water quality monitoring is undertaken three times per week

Appendix I

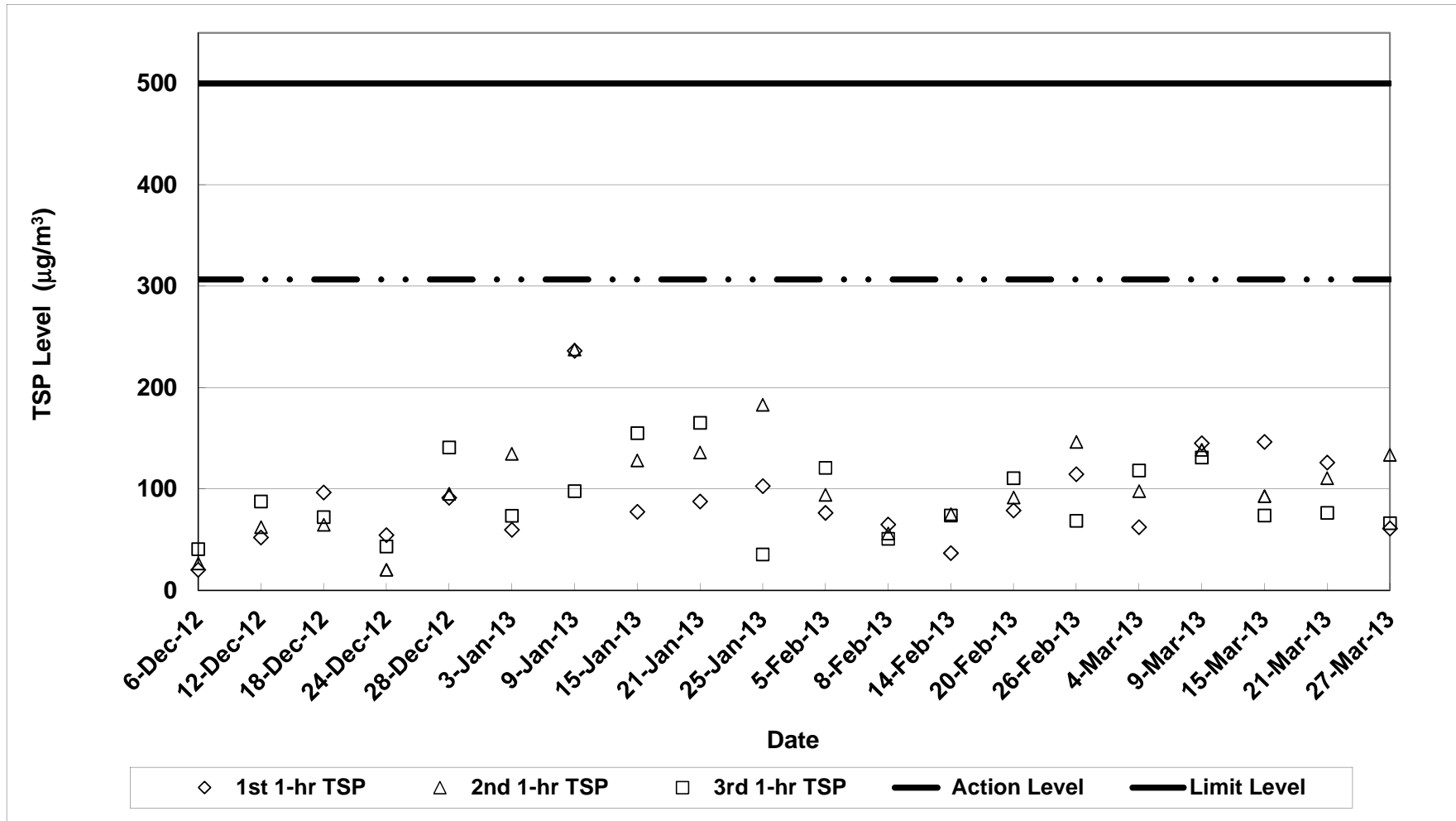
Monitoring Results

Air Quality Impact Monitoring Results (1-Hour TSP)

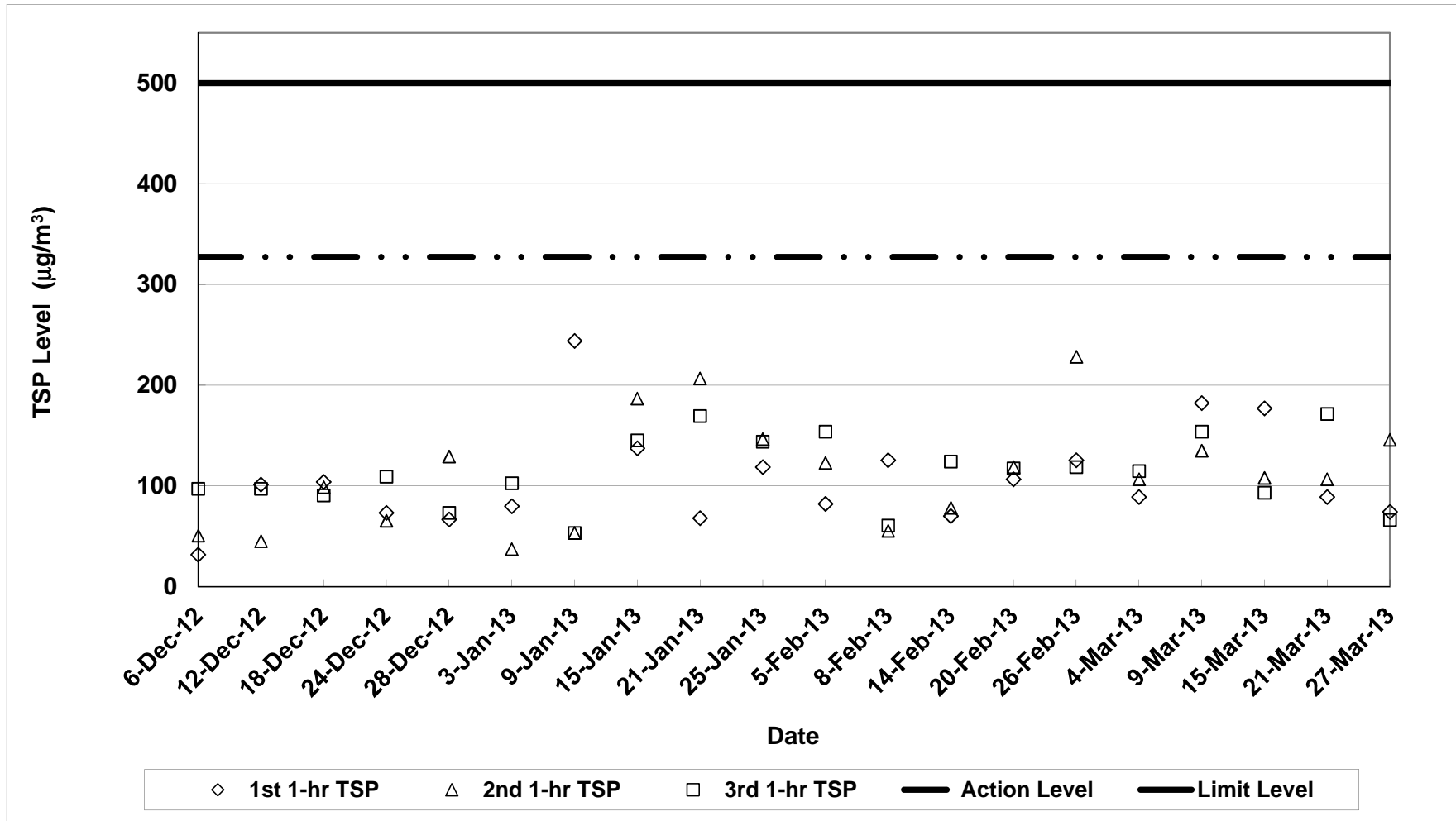
Location	Monitoring Date	Weather Conditions	Wind Speed with Direction (m/s)	Temp (°C)	Timer-1	Timer-F	Time (mins)	Flow-I (CFM)	Flow-F (CFM)	Flow-I (m³/min)	Flow-F (m³/min)	Flow-avg (m³/min)	Volume (m³)	Weight-I (g)	Weight-F (g)	Weight-diff. (g)	1-hr TSP (µg/m³)	Average 1-Hr TSP (µg/m³)	Action/Limit Levels (µg/m³)	Observation / Site Condition	Other Possible Dust Sources
Sik Sik Yuen Ho Fung College - Intake (ASR1)	4-Mar-13	Sunny	0.3E	18	649642	649742	60.0	40	40	1.31	1.31	1.31	78.56	2.8877	2.8926	0.0049	62.4	92.9	306.6/500	Rock breaking and excavation work	Vehicles
		Sunny	0.3E	18	649742	649842	60.0	40	40	1.31	1.31	1.31	78.56	2.9029	2.9106	0.0077	98.0				
		Sunny	0.3E	18	649842	649942	60.0	40	40	1.31	1.31	1.31	78.56	2.9002	2.9095	0.0093	118.4				
	9-Mar-13	Sunny	0.3E	22	649442	645042	60.0	40	40	1.31	1.31	1.31	78.56	2.8847	2.8961	0.0114	145.1	138.3	306.6/500	Excavation work	Vehicles
		Sunny	0.3E	22	645042	645142	60.0	40	40	1.31	1.31	1.31	78.56	2.8947	2.8956	0.0109	138.7				
		Sunny	0.3E	22	645142	645242	60.0	40	40	1.31	1.31	1.31	78.56	2.8759	2.8862	0.0103	131.1				
	15-Mar-13	Sunny	0.3E	21	650242	650342	60.0	40	40	1.31	1.31	1.31	78.56	2.8542	2.8657	0.0115	146.4	104.4	306.6/500	Rock breaking and excavation work	Vehicles
		Sunny	0.3E	21	650342	650442	60.0	40	40	1.31	1.31	1.31	78.56	2.8769	2.8842	0.0073	92.9				
		Sunny	0.3E	21	650442	650542	60.0	40	40	1.31	1.31	1.31	78.56	2.8758	2.8816	0.0058	73.8				
	21-Mar-13	Cloudy	0.7E	20	650642	650642	60.0	40	40	1.31	1.31	1.31	78.56	2.7997	2.8096	0.0099	126.0	104.4	306.6/500	Excavation work	Vehicles
		Cloudy	0.7E	20	650642	650742	60.0	40	40	1.31	1.31	1.31	78.56	2.7978	2.8065	0.0087	110.7				
		Cloudy	0.7E	20	650742	650842	60.0	40	40	1.31	1.31	1.31	78.56	2.8021	2.8081	0.0060	76.4				
27-Mar-13	Cloudy	0.7E	21	650942	650942	60.0	40	40	1.31	1.31	1.31	78.56	2.7334	2.7892	0.0558	61.1	87.0	306.6/500	Nil	Vehicles	
	Cloudy	0.7E	21	650942	651042	60.0	40	40	1.31	1.31	1.31	78.56	2.7911	2.8016	0.0105	133.6					
	Cloudy	0.7E	21	651042	651142	60.0	40	40	1.31	1.31	1.31	78.56	2.7946	2.7998	0.0052	66.2					
Hong Hoi Chee Hong Temple - Intake (ASR3)	4-Mar-13	Sunny	0.3E	18	618190	618290	60.0	40	40	1.23	1.23	1.23	74.00	2.8817	2.8883	0.0066	89.2	103.6	327.4/500	Crane operation and steel bending	Vehicles
		Sunny	0.3E	18	618290	618390	60.0	40	40	1.23	1.23	1.23	74.00	2.8915	2.8994	0.0079	106.8				
		Sunny	0.3E	18	618390	618490	60.0	40	40	1.23	1.23	1.23	74.00	2.8999	2.8984	0.0068	114.9				
	9-Mar-13	Sunny	0.2E	22	618590	618590	60.0	40	40	1.23	1.23	1.23	74.00	2.8905	2.9040	0.0135	182.4	157.2	327.4/500	Crane operation and concrete work	Vehicles
		Sunny	0.2E	22	618590	618690	60.0	40	40	1.23	1.23	1.23	74.00	2.8678	2.8778	0.0100	135.1				
		Sunny	0.2E	22	618690	618790	60.0	40	40	1.23	1.23	1.23	74.00	2.8757	2.8871	0.0114	154.0				
	15-Mar-13	Sunny	0.3E	21	618790	618890	60.0	40	40	1.23	1.23	1.23	74.00	2.8716	2.8847	0.0131	177.0	126.1	327.4/500	Crane operation and steel bending	Vehicles
		Sunny	0.3E	21	618890	618990	60.0	40	40	1.23	1.23	1.23	74.00	2.8887	2.8867	0.0080	108.1				
		Sunny	0.3E	21	618990	619090	60.0	40	40	1.23	1.23	1.23	74.00	2.8915	2.8884	0.0069	83.2				
	21-Mar-13	Cloudy	0.4E	20	619190	619190	60.0	40	40	1.23	1.23	1.23	74.00	2.7326	2.7994	0.0668	89.2	122.5	327.4/500	Crane operation and steel bending	Vehicles
		Cloudy	0.4E	20	619190	619290	60.0	40	40	1.23	1.23	1.23	74.00	2.8030	2.8109	0.0079	106.8				
		Cloudy	0.4E	20	619290	619390	60.0	40	40	1.23	1.23	1.23	74.00	2.7904	2.8031	0.0127	171.6				
27-Mar-13	Cloudy	0.3E	21	619390	619490	60.0	40	40	1.23	1.23	1.23	74.00	2.8075	2.8130	0.0055	74.3	95.5	327.4/500	Crane operation and steel bending	Vehicles	
	Cloudy	0.3E	21	619490	619590	60.0	40	40	1.23	1.23	1.23	74.00	2.8006	2.8114	0.0108	145.9					
	Cloudy	0.3E	21	619590	619690	60.0	40	40	1.23	1.23	1.23	74.00	2.8035	2.8054	0.0049	86.2					
Long Beach Gardens - Outfall (ASR8)	4-Mar-13	Sunny	0.5E	18	612634	612634	60.0	40	40	1.26	1.26	1.26	75.53	2.8998	2.8962	0.0064	94.7	86.1	336.6/500	Crane operation and concrete work	Vehicles
		Sunny	0.5E	18	612634	612634	60.0	40	40	1.26	1.26	1.26	75.53	2.8903	2.8958	0.0055	72.8				
		Sunny	0.5E	18	612634	612634	60.0	40	40	1.26	1.26	1.26	75.53	2.8792	2.8868	0.0076	100.6				
	9-Mar-13	Sunny	0.3E	22	612634	612734	60.0	40	40	1.26	1.26	1.26	75.53	2.8948	2.9042	0.0094	124.5	112.1	336.6/500	Crane operation and concrete work	Vehicles
		Sunny	0.3E	22	612734	612834	60.0	40	40	1.26	1.26	1.26	75.53	2.8805	2.8888	0.0083	109.9				
		Sunny	0.3E	22	612834	612934	60.0	40	40	1.26	1.26	1.26	75.53	2.8889	2.8966	0.0077	101.9				
	15-Mar-13	Sunny	0.5E	21	613034	613034	60.0	40	40	1.26	1.26	1.26	75.53	2.8999	2.8983	0.0084	111.2	90.9	336.6/500	Crane operation and steel bending	Vehicles
		Sunny	0.5E	21	613034	613134	60.0	40	40	1.26	1.26	1.26	75.53	2.8700	2.8771	0.0071	94.0				
		Sunny	0.5E	21	613134	613234	60.0	40	40	1.26	1.26	1.26	75.53	2.8797	2.8848	0.0051	67.5				
	21-Mar-13	Cloudy	0.9E	20	613234	613334	60.0	40	40	1.26	1.26	1.26	75.53	2.8765	2.8889	0.0124	164.2	98.9	336.6/500	Crane operation and concrete work	Vehicles
		Cloudy	0.9E	20	613334	613434	60.0	40	40	1.26	1.26	1.26	75.53	2.8825	2.8873	0.0048	63.5				
		Cloudy	0.9E	20	613434	613534	60.0	40	40	1.26	1.26	1.26	75.53	2.8796	2.8848	0.0052	68.8				
27-Mar-13	Cloudy	0.8E	21	613534	613634	60.0	40	40	1.26	1.26	1.26	75.53	2.7811	2.7860	0.0049	84.9	71.5	336.6/500	Crane operation and excavation work	Vehicles	
	Cloudy	0.8E	21	613634	613734	60.0	40	40	1.26	1.26	1.26	75.53	2.7728	2.7800	0.0072	95.3					
	Cloudy	0.8E	21	613734	613834	60.0	40	40	1.26	1.26	1.26	75.53	2.7811	2.7852	0.0041	54.3					
Greenview Terrace - Outfall (ASR9)	4-Mar-13	Sunny	0.5E	18	605180	605280	60.0	40	40	1.22	1.22	1.22	73.36	2.8778	2.8822	0.0044	60.0	91.8	329.2/500	Crane operation and concrete work	Vehicles
		Sunny	0.5E	18	605280	605380	60.0	40	40	1.22	1.22	1.22	73.36	2.8741	2.8819	0.0078	106.3				
		Sunny	0.5E	18	605380	605480	60.0	40	40	1.22	1.22	1.22	73.36	2.8785	2.8865	0.0080	109.0				
	9-Mar-13	Sunny	0.3E	22	605480	605580	60.0	40	40	1.22	1.22	1.22	73.36	2.8599	2.8706	0.0107	145.8	147.2	329.2/500	Crane operation and concrete work	Vehicles
		Sunny	0.3E	22	605580	605680	60.0	40	40	1.22	1.22	1.22	73.36	2.8725	2.8815	0.0090	122.7				
		Sunny	0.3E	22	605680	605780	60.0	40	40	1.22	1.22	1.22	73.36	2.8792	2.8909	0.0127	173.1				
	15-Mar-13	Sunny	0.5E	21	605780	605880	60.0	40	40	1.22	1.22	1.22	73.36	2.8771	2.8896	0.0125	170.4	130.9	329.2/500	Crane operation and steel bending	Vehicles
		Sunny	0.5E	21	605880	605980	60.0	40	40	1.22	1.22	1.22	73.36	2.8784	2.8862	0.0078	106.3				
		Sunny	0.5E	21	605980	606080	60.0	40	40	1.22	1.22	1.22	73.36	2.8713	2.8798	0.0085	115.9				
	21-Mar-13	Cloudy	1.1E	20	606080	606180	60.0	40	40	1.22	1.22	1.22	73.36	2.8599	2.8725	0.0126	171.7	96.3	329.2/500	Crane operation and concrete work	Vehicles
		Cloudy	1.1E	20	606180	606280	60.0	40	40	1.22	1.22	1.22	73.36	2.7854	2.7995	0.0141	55.9				
		Cloudy	1.1E	20	606280	606380	60.0	40	40	1.22	1.22	1.22	73.36	2.7943	2.7988	0.0045	61.3				
27-Mar-13	Cloudy	0.7E	21	606380	606480	60.0	40	40	1.22	1.22	1.22	73.36	2.7879	2.7921	0.0042	57.2	75.9	329.2/500	Crane operation and excavation work	Vehicles	
	Cloudy	0.7E	21	606480	606580	60.0	40	40	1.22	1.22	1.22	73.36	2.7808	2.7894	0.0086	117.2					
	Cloudy	0.7E	21	606580	606680	60.0	40	40	1.22	1.22	1.22	73.36	2.7884	2.7923	0.0039	53.2					

Note:
 Italic font and yellow shaded indicates an exceedance of Action Level
 Bold font and red shaded area indicates an exceedance of Limit Level

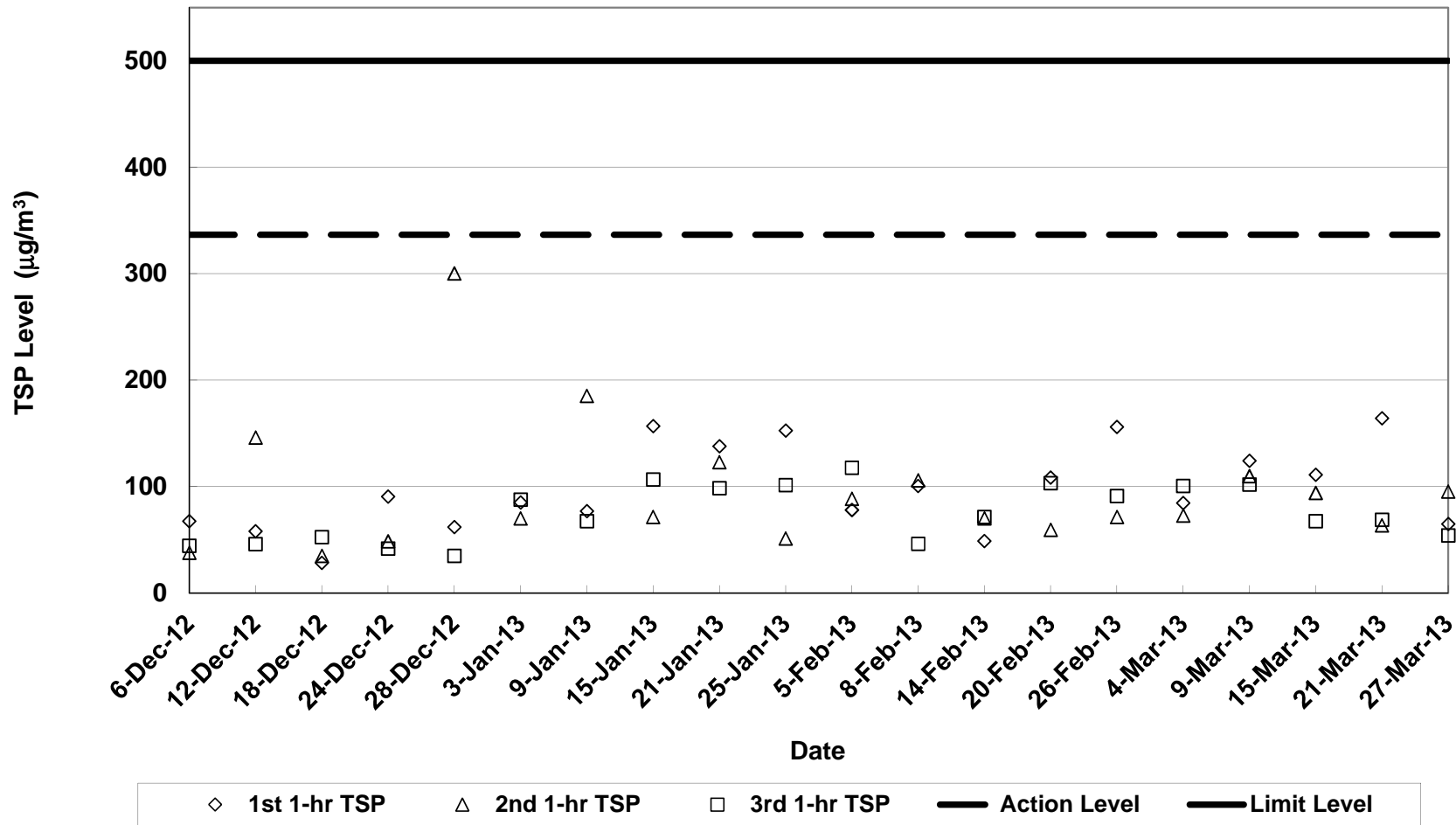
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Air Quality Monitoring (1-hr TSP) Results at Sik Sik Yuen Ho Fung College - Intake (ASR1)
 Dec-12 to Mar-13**



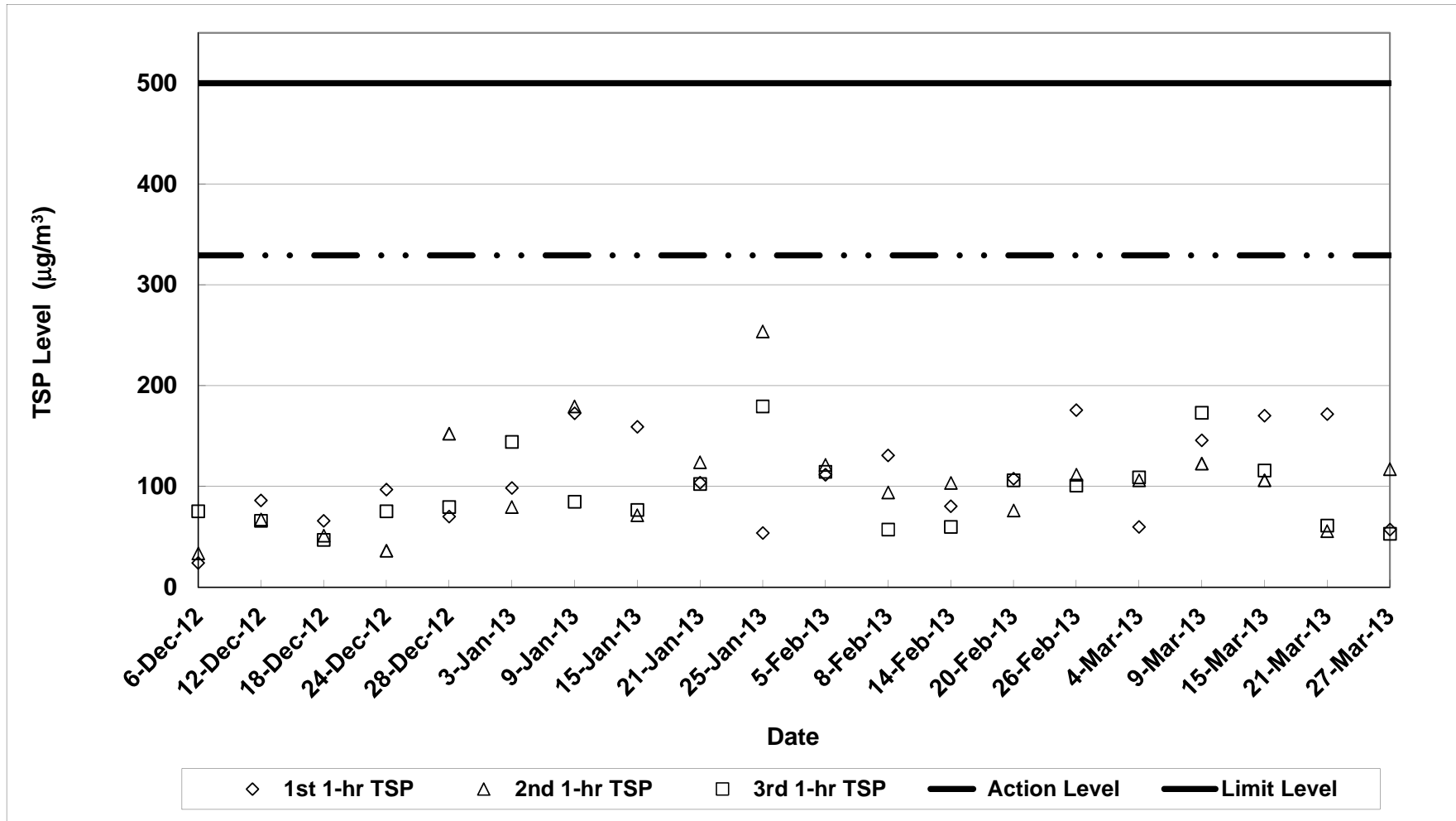
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Air Quality Monitoring (1-hr TSP) Results at Hong Hoi Chee Hong Temple - Intake (ASR3)
 Dec-12 to Mar-13**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Air Quality Monitoring (1-hr TSP) Results at Long Beach Gardens - Outfall (ASR8)
 Dec-12 to Mar-13**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Air Quality Monitoring (1-hr TSP) Results at Greenview Terrace - Outfall (ASR9)
 Dec-12 to Mar-13**



Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel

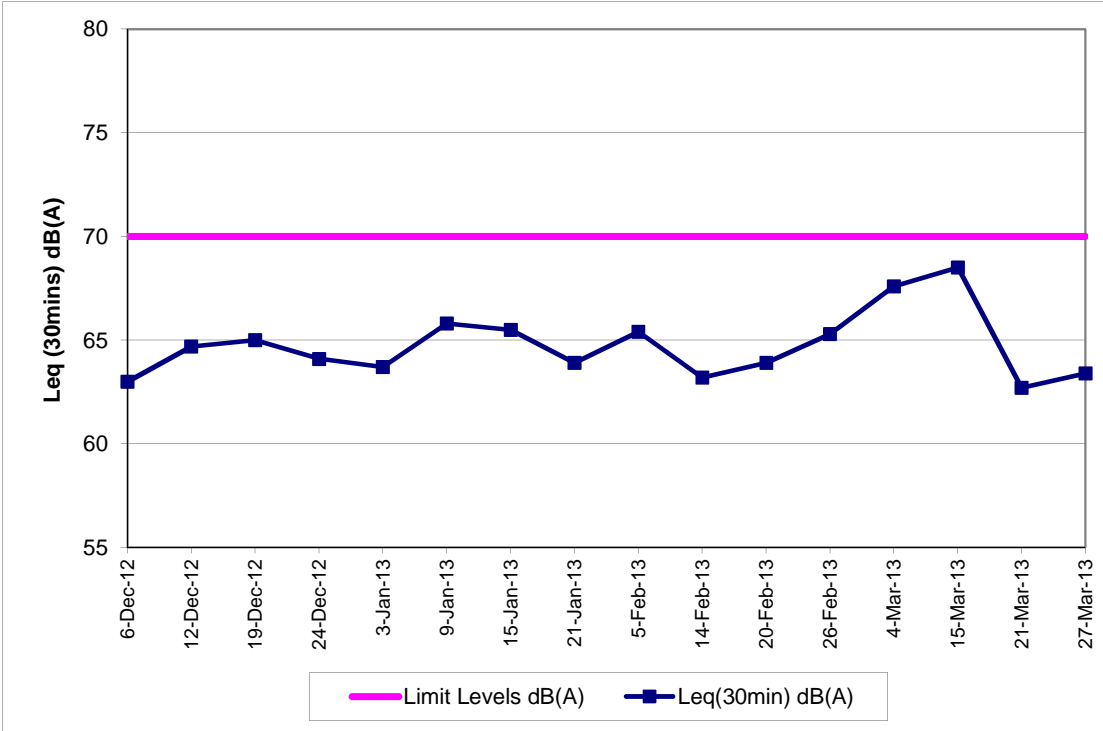
Noise Impact Monitoring Results

Monitoring Locations	Date	Weather Conditions	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Start Time	End Time	BL ¹ dB(A)	LL ²	L _{eq(30min)}	L _{10(30min)}	L _{90(30min)}	CNL ³	Observation / Site Condition	Other Noise Sources
									dB(A)	dB(A)	dB(A)	dB(A)	dB(A)		
Sik Sik Yuen Ho Fung College NSR 1	4-Mar-13	Sunny	18	0.3	E	15:00	15:30	66.1	70	67.6	70.5	60.8	-	Rock Breaking and excavation work	Traffic noise
	15-Mar-13	Sunny	21	0.3	E	13:05	13:35		70	68.5	72.4	60.8	-	Rock Breaking and excavation work	Traffic noise
	21-Mar-13	Cloudy	20	0.7	E	13:40	14:10		70	62.7	65.1	57.8	-	Excavation work	Traffic noise
	27-Mar-13	Cloudy	21	0.7	E	16:50	17:20		70	63.4	66.1	58.2	-	Nil	Traffic noise
Hong Hoi Chee Hong Temple NSR 3	4-Mar-13	Sunny	18	0.3	E	14:20	14:50	57.9	75	63.8	66.9	57.9	-	Crane operation and steel bending	Traffic noise
	15-Mar-13	Sunny	21	0.3	E	13:46	14:16		75	68.9	71.3	62.0	-	Crane operation and steel bending	Traffic noise
	21-Mar-13	Cloudy	20	0.4	E	14:22	14:52		75	66.7	69.8	57.3	-	Crane operation and steel bending	Traffic noise
	27-Mar-13	Cloudy	21	0.3	E	16:10	16:40		75	61.5	63.5	56.9	-	Crane operation and steel bending	Traffic noise
Squatters NSR 6	4-Mar-13	Sunny	18	0.3	E	13:27	13:57	61.2	75	70.6	73.6	61.8	-	Crane operation and rock breaking	Birds
	15-Mar-13	Sunny	21	0.2	E	16:10	16:40		75	55.6	60.5	45.9	-	Crane operation	Birds and aircraft noise
	21-Mar-13	Cloudy	20	0.4	E	15:18	15:48		75	70.9	74.0	63.9	-	Crane operation and rock breaking	Birds
	27-Mar-13	Cloudy		0.3	E	15:20	15:50		75	60.5	63.0	54.6	-	Excavation work	Birds and insect noise
Long Beach Gardens NSR 8	4-Mar-13	Sunny	18	0.5	E	10:57	11:27	60.9	75	62.8	64.1	61.4	-	Crane operation and concrete work	Traffic noise
	15-Mar-13	Sunny	21	0.5	E	14:38	15:08		75	64.3	66.3	61.8	-	Crane operation and steel bending	Traffic noise
	21-Mar-13	Cloudy	20	0.9	E	16:05	16:35		75	64.6	66.1	62.1	-	Crane operation and concrete work	Traffic noise
	27-Mar-13	Cloudy	21	0.8	E	13:44	14:14		75	62.9	64.3	61.4	-	Crane operation and excavation work	Traffic noise
Greenview Terrace NSR 9	4-Mar-13	Sunny	18	0.5	E	10:10	10:40	59.7	75	62.8	64.5	60.7	-	Crane operation and concrete work	Traffic noise
	15-Mar-13	Sunny	21	0.5	E	15:19	15:49		75	66.0	68.4	62.0	-	Crane operation and steel bending	Traffic noise
	21-Mar-13	Cloudy	20	1.1	E	16:45	17:15		75	65.2	67.2	62.0	-	Crane operation and concrete work	Traffic noise
	27-Mar-13	Cloudy	21	0.7	E	14:25	14:55		75	62.7	64.6	62.0	-	Crane operation and excavation work	Traffic noise

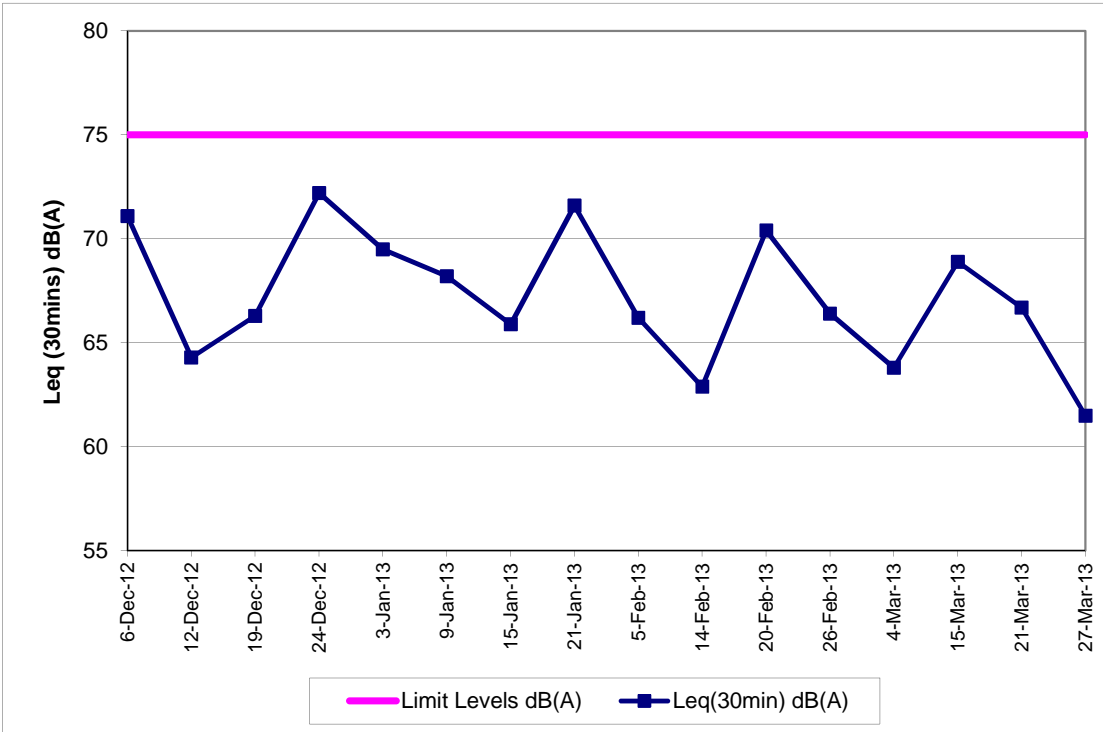
1: Baseline Noise Level
2: Limit Level
3: Corrected Noise Level

Note:
The limit level of NSR1 is 65dB(A) during school examination period.
Red Bold indicates an exceedance of Limit Level

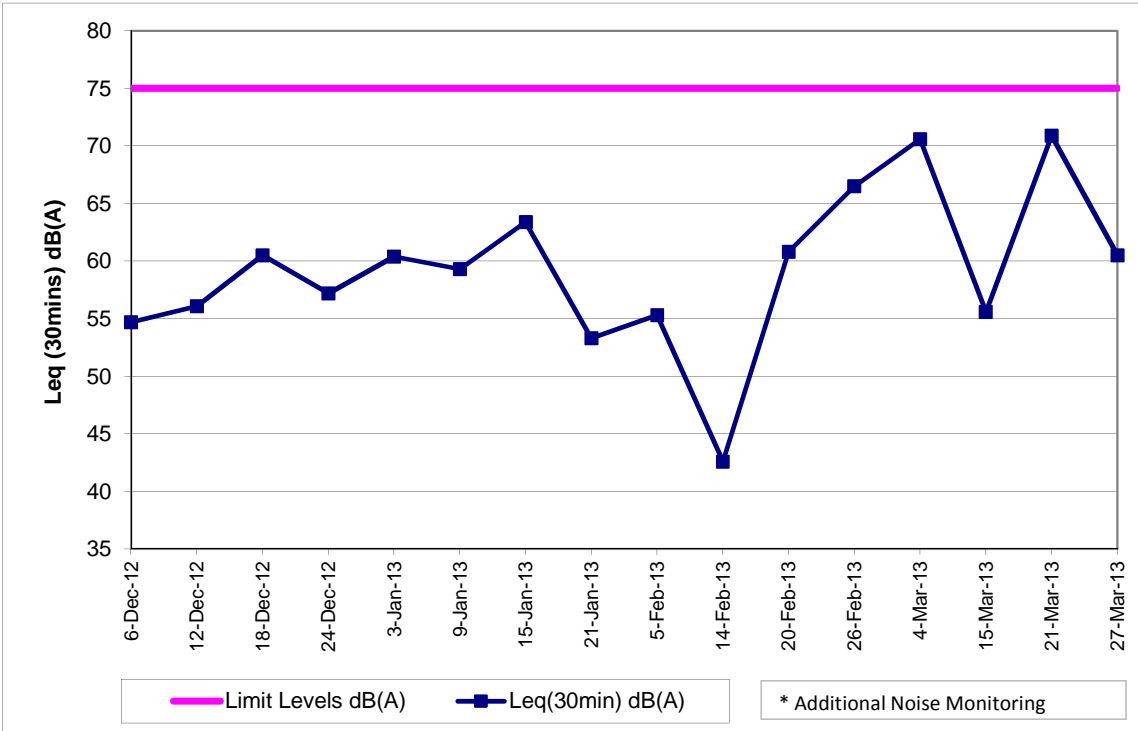
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Noise Monitoring Results at Sik Sik Yuen Ho Fung College (NSR 1)
 Dec-12 to Mar-13**



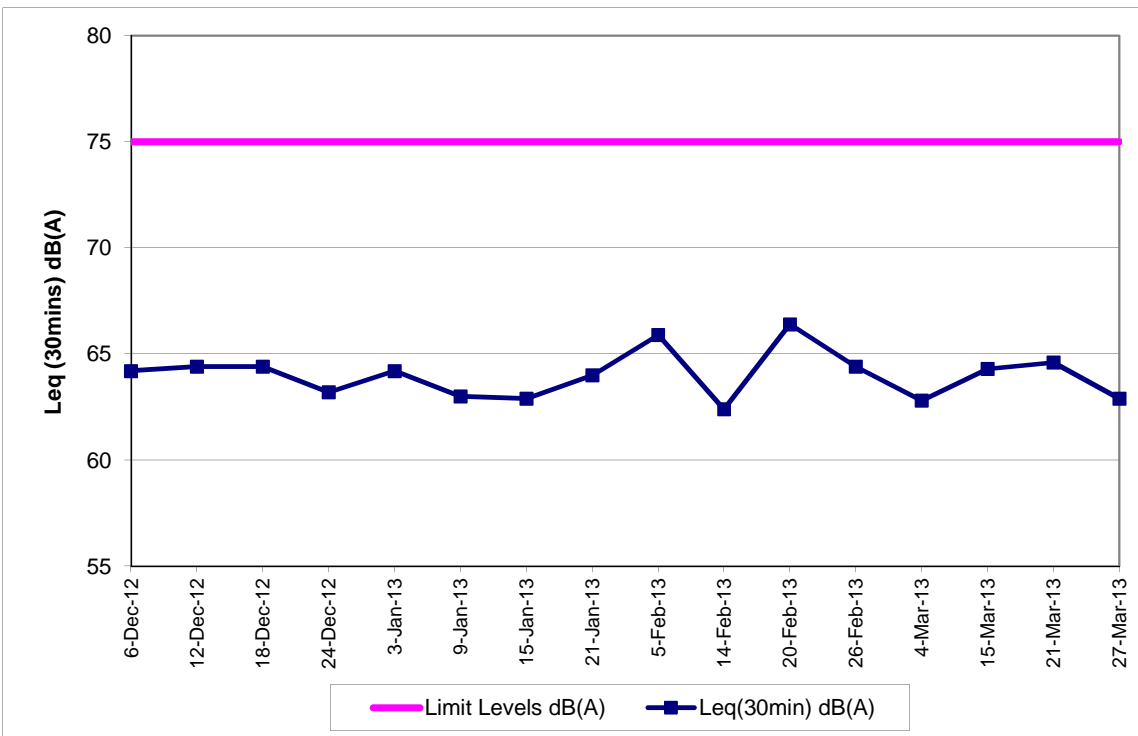
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Noise Monitoring Results at Hong Hoi Chee Hong Temple (NSR 3)
 Dec-12 to Mar-13**



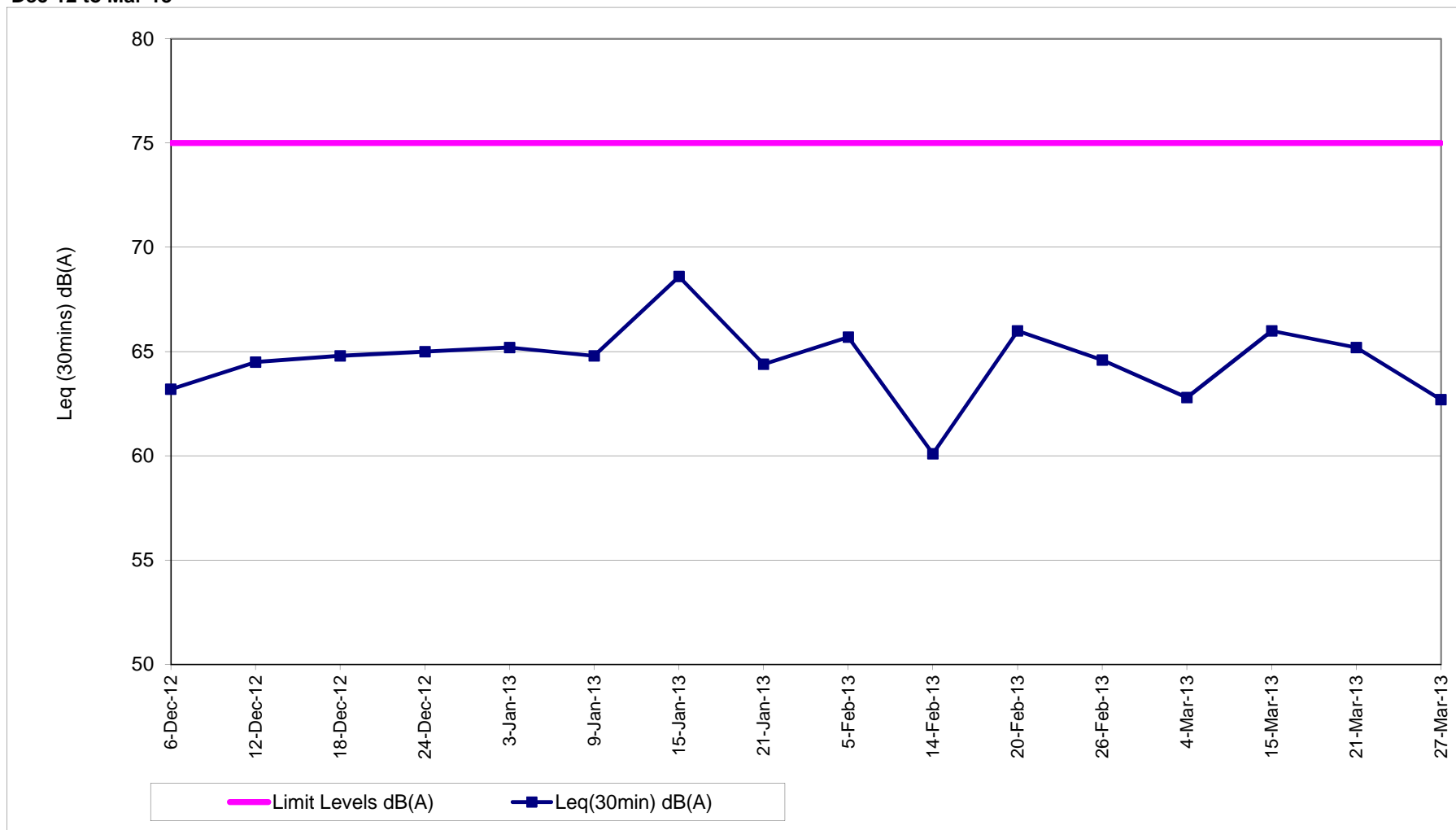
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Noise Monitoring Results at Squatters (NSR 6)
Dec-12 to Mar-13**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Noise Monitoring Results at Long Beach Gardens (NSR 8)
Dec-12 to Mar-13**



Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Noise Monitoring Results at Greenview Terrace (NSR 9)
Dec-12 to Mar-13

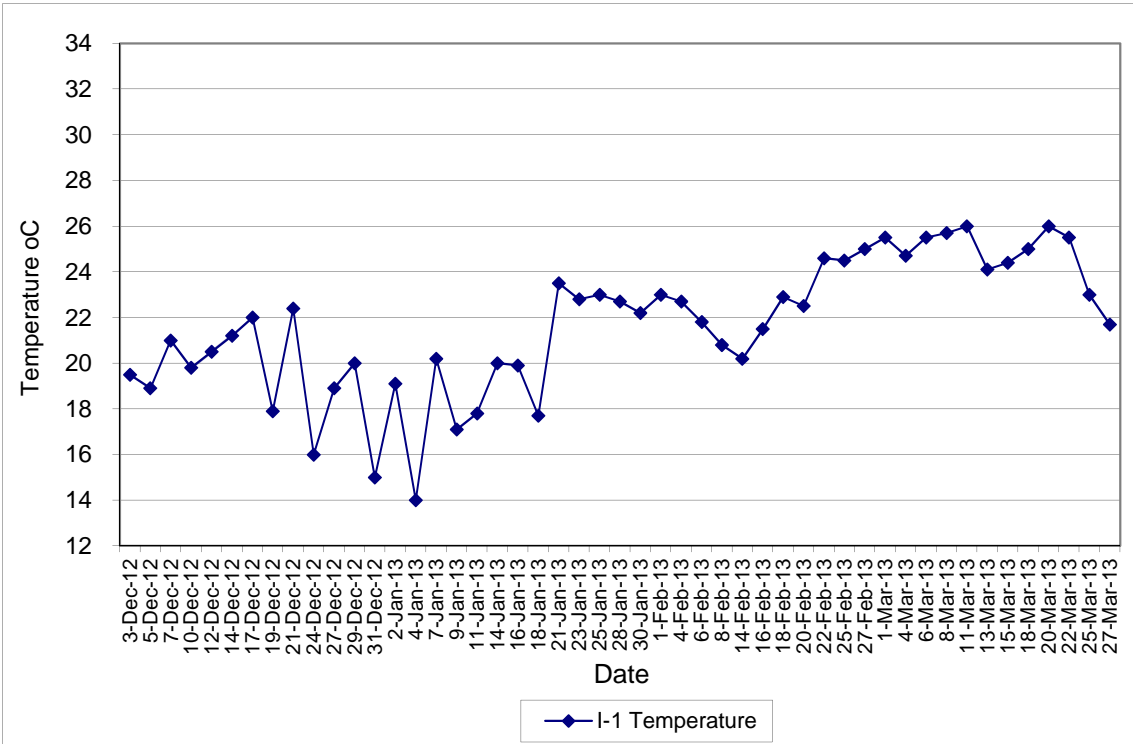


Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel

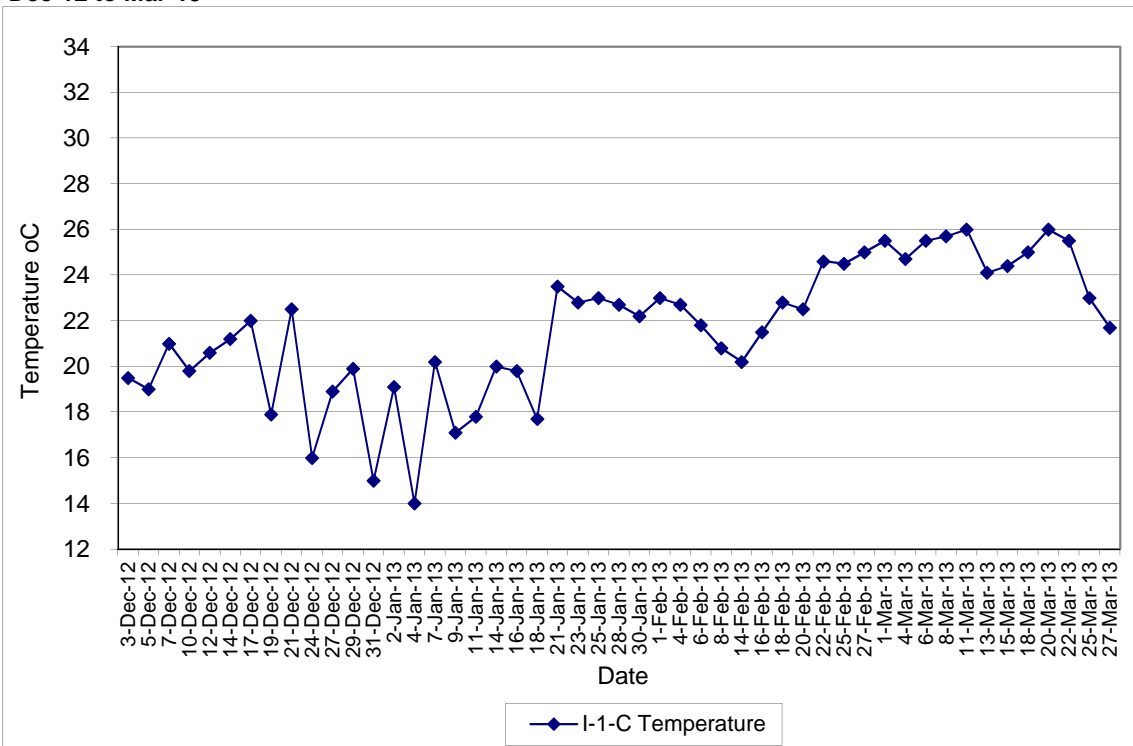
Water Quality Impact Monitoring Results

Monitoring Locations	Date	Start Time	Weather	Water Depth(m)	Temp			DO (mg/L)			Action/Limit Level of DO(mg/L)	pH			Turbidity (NTU)			Action/Limit Level of Tby	SS (mg/L)			Action/Limit Level of SS(mg/L)	Remarks	Action to be taken
					1	2	Avg	1	2	Avg		1	2	Avg	1	2	Avg		1	2	Avg			
Sik Sik Yuen Ho Fung College I-1	1-Mar-13	13:10	Cloudy	<1	25.50	25.50	25.50	9.21	9.24	9.23	3.42 / 3.34	7.69	7.69	7.69	4.10	4.15	4.13	9.75 / 12.47	3.80	3.60	3.70	8.85 / 10.17	Excavation work	Nil
	4-Mar-13	15:21	Sunny	<1	24.70	24.70	24.70	9.15	9.17	9.16		7.70	7.70	7.70	3.35	3.38	3.37		2.70	3.10	2.90		Rock breaking and excavation work	Nil
	6-Mar-13	16:28	Sunny	<1	25.50	25.50	25.50	9.29	9.33	9.31		7.75	7.75	7.75	2.90	2.95	2.93		3.80	4.00	3.90		Rock breaking and excavation work	Nil
	8-Mar-13	13:21	Sunny	<1	25.70	25.70	25.70	8.55	8.52	8.54		7.77	7.77	7.77	1.92	2.06	1.99		2.20	2.30	2.25		Excavation work and dump truck movement	Nil
	11-Mar-13	13:20	Sunny	<1	26.00	26.00	26.00	8.68	8.73	8.71		7.75	7.75	7.75	3.40	3.46	3.43		2.60	3.10	2.85		Excavation work	Nil
	13-Mar-13	10:23	Sunny	<1	24.10	24.10	24.10	7.91	7.95	7.93		7.85	7.85	7.85	2.98	2.96	2.97		2.50	2.80	2.65		Excavation work and rock breaking	Nil
	15-Mar-13	13:26	Sunny	<1	24.40	24.40	24.40	7.94	7.99	7.97		7.77	7.77	7.77	2.86	2.89	2.88		3.10	2.30	2.70		Excavation work and rock breaking	Nil
	18-Mar-13	14:29	Cloudy	<1	25.00	25.00	25.00	8.29	8.32	8.31		7.71	7.71	7.71	4.42	4.39	4.41		2.70	2.70	2.70		Excavation work	Nil
	20-Mar-13	10:26	Cloudy	<1	26.00	26.00	26.00	7.66	7.69	7.68		7.85	7.85	7.85	4.62	4.60	4.61		2.50	2.30	2.40		Excavation work	Nil
	22-Mar-13	13:52	Cloudy	<1	25.50	25.50	25.50	7.93	8.00	7.97		7.78	7.78	7.78	2.70	2.63	2.67		<2.00	<2.00	<2.00		Excavation work and concrete work	Nil
	25-Mar-13	10:40	Cloudy	<1	23.00	23.00	23.00	7.81	7.79	7.80		7.70	7.70	7.70	2.65	2.69	2.67		<2.00	<2.00	<2.00		Nil	Nil
	27-Mar-13	17:10	Cloudy	<1	21.70	21.70	21.70	7.95	7.98	7.97		7.75	7.75	7.75	3.67	3.71	3.69		2.50	2.30	2.40		Nil	Nil
	Sik Sik Yuen Ho Fung College I-1-C	1-Mar-13	13:00	Cloudy	<1	25.50	25.50	25.50	9.12	9.17		9.15	-/-	7.69	7.69	7.69	4.27		4.35	4.31	-/-		4.00	4.70
4-Mar-13		15:08	Sunny	<1	24.70	24.70	24.70	9.06	9.10	9.08	7.70	7.70		7.70	3.50	3.60	3.55	2.60	2.30	2.45		Nil	Nil	
6-Mar-13		16:17	Sunny	<1	25.50	25.50	25.50	9.22	9.26	9.24	7.75	7.75		7.75	3.04	3.12	3.08	4.00	4.30	4.15		Nil	Nil	
8-Mar-13		13:10	Sunny	<1	25.70	25.70	25.70	8.66	8.68	8.67	7.77	7.77		7.77	2.12	2.10	2.11	<2.00	<2.00	<2.00		Nil	Nil	
11-Mar-13		13:08	Sunny	<1	26.00	26.00	26.00	8.62	8.65	8.64	7.75	7.75		7.75	3.50	3.57	3.54	2.70	2.90	2.80		Nil	Nil	
13-Mar-13		10:12	Sunny	<1	24.10	24.10	24.10	7.86	7.88	7.87	7.85	7.85		7.85	2.86	2.90	2.88	2.10	2.50	2.30		Nil	Nil	
15-Mar-13		13:14	Sunny	<1	24.40	24.40	24.40	7.88	7.91	7.90	7.77	7.77		7.77	2.90	2.97	2.94	2.50	2.70	2.60		Nil	Nil	
18-Mar-13		14:18	Cloudy	<1	25.00	25.00	25.00	8.22	8.26	8.24	7.71	7.71		7.71	4.27	4.30	4.29	2.30	2.80	2.55		Nil	Nil	
20-Mar-13		10:15	Cloudy	<1	26.00	26.00	26.00	7.59	7.63	7.61	7.85	7.85		7.85	4.73	4.86	4.80	<2.00	<2.00	<2.00		Nil	Nil	
22-Mar-13		13:40	Cloudy	<1	25.50	25.50	25.50	7.89	7.93	7.91	7.78	7.78		7.78	2.66	2.73	2.70	<2.00	<2.00	<2.00		Nil	Nil	
25-Mar-13		10:30	Cloudy	<1	23.00	23.00	23.00	7.86	7.89	7.88	7.70	7.70		7.70	2.74	2.78	2.76	<2.00	<2.00	<2.00		Nil	Nil	
27-Mar-13		16:59	Cloudy	<1	21.70	21.70	21.70	7.86	7.89	7.88	7.75	7.75		7.75	3.80	3.87	3.84	4.00	3.20	3.60		Nil	Nil	
Hong Hoi Chee Hong Temple I-2		1-Mar-13	13:31	Cloudy	<1	25.50	25.50	25.50	9.07	9.03	9.05	3.66 / 3.63		7.72	7.72	7.72	1.50	1.55	1.53	6.63 / 6.99		<2.00	<2.00	<2.00
	4-Mar-13	14:40	Sunny	<1	24.80	24.80	24.80	9.12	9.09	9.11	7.71		7.71	7.71	1.18	1.21	1.20	<2.00	<2.00		<2.00	Crane operation and steel bending	Nil	
	6-Mar-13	16:05	Sunny	<1	25.60	25.60	25.60	9.24	9.19	9.22	7.77		7.77	7.77	1.15	1.19	1.17	<2.00	<2.00		<2.00	Crane operation and concrete work	Nil	
	8-Mar-13	13:46	Sunny	<1	25.50	25.50	25.50	8.62	8.59	8.61	7.75		7.75	7.75	0.50	0.62	0.56	<2.00	<2.00		<2.00	Crane operation and concrete work	Nil	
	11-Mar-13	13:45	Sunny	<1	26.10	26.10	26.10	8.64	8.58	8.61	7.72		7.72	7.72	1.77	1.79	1.78	<2.00	<2.00		<2.00	Crane operation and steel bending	Nil	
	13-Mar-13	10:46	Sunny	<1	24.20	24.20	24.20	7.63	7.61	7.62	7.88		7.88	7.88	1.10	1.07	1.09	<2.00	<2.00		<2.00	Crane operation and steel bending	Nil	
	15-Mar-13	14:06	Sunny	<1	24.20	24.20	24.20	7.90	7.85	7.88	7.75		7.75	7.75	1.20	1.18	1.19	3.20	2.50		2.85	Crane operation and steel bending	Nil	
	18-Mar-13	14:55	Cloudy	<1	25.00	25.00	25.00	8.34	8.29	8.32	7.73		7.73	7.73	1.27	1.29	1.28	<2.00	<2.00		<2.00	Crane operation and concrete work	Nil	
	20-Mar-13	10:50	Cloudy	<1	26.10	26.10	26.10	7.66	7.63	7.65	7.86		7.86	7.86	1.60	1.64	1.62	<2.00	<2.00		<2.00	Crane operation and steel bending	Nil	
	22-Mar-13	14:18	Cloudy	<1	25.60	25.60	25.60	7.73	7.68	7.71	7.75		7.75	7.75	1.20	1.17	1.19	<2.00	<2.00		<2.00	Crane operation and concrete work	Nil	
	25-Mar-13	11:03	Cloudy	<1	22.90	22.90	22.90	7.99	8.02	8.01	7.72		7.72	7.72	1.30	1.35	1.33	<2.00	<2.00		<2.00	Crane operation and concrete work	Nil	
	27-Mar-13	16:29	Cloudy	<1	21.80	21.80	21.80	7.75	7.79	7.77	7.77		7.77	7.77	2.66	2.64	2.65	2.60	2.40		2.50	Crane operation and steel bending	Nil	
	Hong Hoi Chee Hong Temple I-2-C	1-Mar-13	13:20	Cloudy	<1	25.50	25.50	25.50	9.10	9.07	9.09		-/-	7.72	7.72	7.72	1.53	1.48	1.51		-/-	<2.00	<2.00	<2.00
4-Mar-13		14:28	Sunny	<1	24.80	24.80	24.80	9.24	9.26	9.25	7.71	7.71		7.71	1.10	1.14	1.12	<2.00	<2.00	<2.00		Nil	Nil	
6-Mar-13		15:52	Sunny	<1	25.60	25.60	25.60	9.36	9.31	9.34	7.77	7.77		7.77	1.20	1.18	1.19	<2.00	<2.00	<2.00		Nil	Nil	
8-Mar-13		13:35	Sunny	<1	25.50	25.50	25.50	8.60	8.63	8.62	7.75	7.75		7.75	0.57	0.66	0.62	<2.00	<2.00	<2.00		Nil	Nil	
11-Mar-13		13:33	Sunny	<1	26.10	26.10	26.10	8.76	8.78	8.77	7.72	7.72		7.72	1.62	1.71	1.67	2.20	2.40	2.30		Nil	Nil	
13-Mar-13		10:35	Sunny	<1	24.20	24.20	24.20	7.69	7.72	7.71	7.88	7.88		7.88	1.20	1.15	1.18	<2.00	<2.00	<2.00		Nil	Nil	
15-Mar-13		13:55	Sunny	<1	24.30	24.30	24.30	8.01	8.06	8.04	7.75	7.75		7.75	1.30	1.22	1.26	<2.00	<2.00	<2.00		Nil	Nil	
18-Mar-13		14:43	Cloudy	<1	25.00	25.00	25.00	8.37	8.39	8.38	7.73	7.73		7.73	1.33	1.30	1.32	<2.00	<2.00	<2.00		Nil	Nil	
20-Mar-13		10:40	Cloudy	<1	26.10	26.10	26.10	7.73	7.70	7.72	7.85	7.86		7.86	1.70	1.72	1.71	<2.00	<2.00	<2.00		Nil	Nil	
22-Mar-13		14:07	Cloudy	<1	25.60	25.60	25.60	7.80	7.76	7.78	7.75	7.75		7.75	1.10	1.14	1.12	<2.00	<2.00	<2.00		Nil	Nil	
25-Mar-13		10:52	Cloudy	<1	22.90	22.90	22.90	7.93	7.96	7.95	7.72	7.72		7.72	1.41	1.37	1.39	<2.00	<2.00	<2.00		Nil	Nil	
27-Mar-13		16:18	Cloudy	<1	21.80	21.80	21.80	7.77	7.71	7.74	7.77	7.77		7.77	2.58	2.61	2.60	3.00	3.00	3.00		Nil	Nil	
Squatters I-3		1-Mar-13	14:02	Cloudy	<1	25.60	25.60	25.60	9.06	9.09	9.08	3.65 / 3.51		7.73	7.73	7.73	2.03	2.06	2.05	3.99 / 4.18		<2.00	<2.00	<2.00
	4-Mar-13	13:50	Sunny	<1	24.80	24.80	24.80	9.20	9.23	9.22	7.75		7.75	7.75	1.32	1.27	1.30	<2.00	<2.00		<2.00	Crane operation and rock breaking	Nil	
	6-Mar-13	15:20	Sunny	<1	25.60	25.60	25.60	9.13	9.10	9.12	7.77		7.77	7.77	1.63	1.66	1.65	<2.00	<2.00		<2.00	Crane operation, rock breaking and excavation work	Nil	
	8-Mar-13	14:16	Sunny	<1	25.50	25.50	25.50	8.58	8.65	8.62	7.75		7.74	7.75	1.32	1.30	1.31	<2.00	<2.00		<2.00	Crane operation and excavation work	Nil	
	11-Mar-13	14:20	Sunny	<1	26.10	26.10	26.10	8.61	8.57	8.59	7.71		7.71	7.71	2.08	2.11	2.10	2.70	2.40					

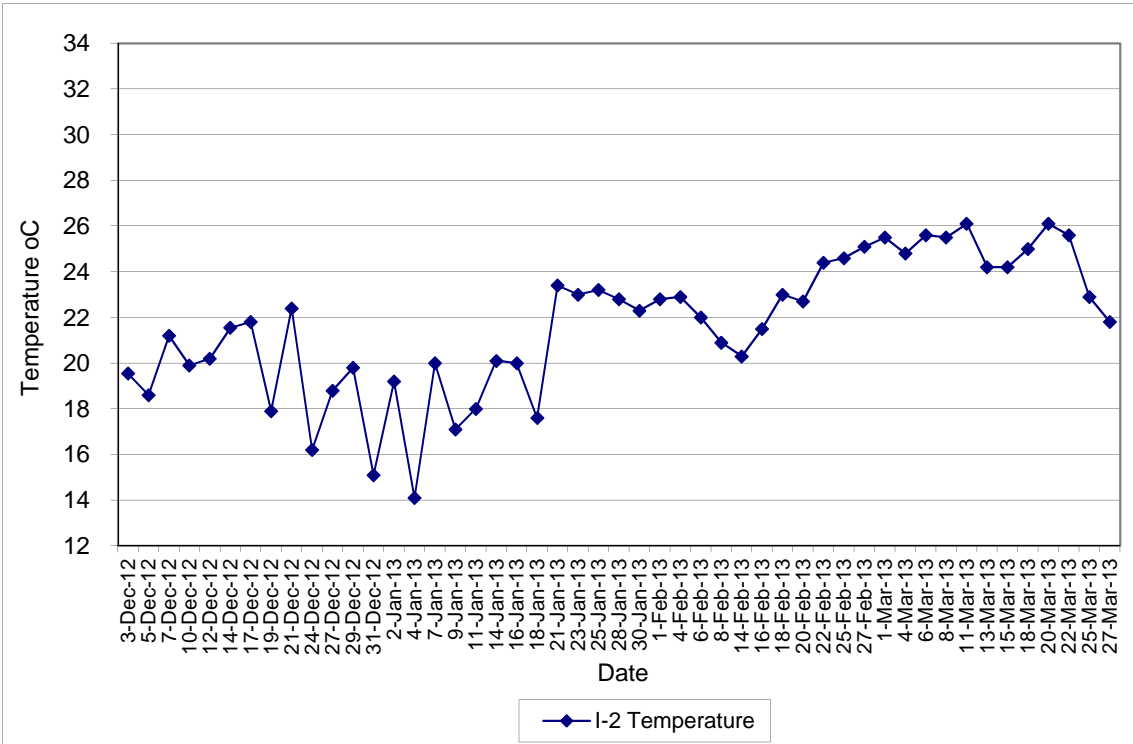
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)
 Dec-12 to Mar-13**



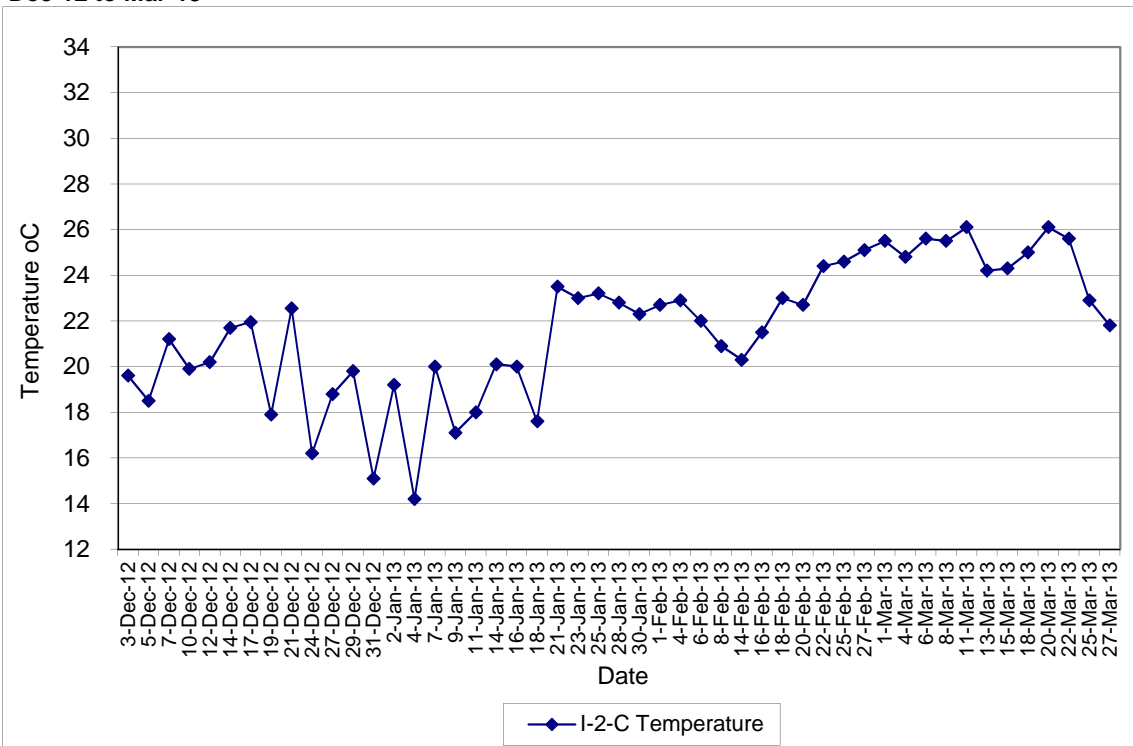
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)
 Dec-12 to Mar-13**



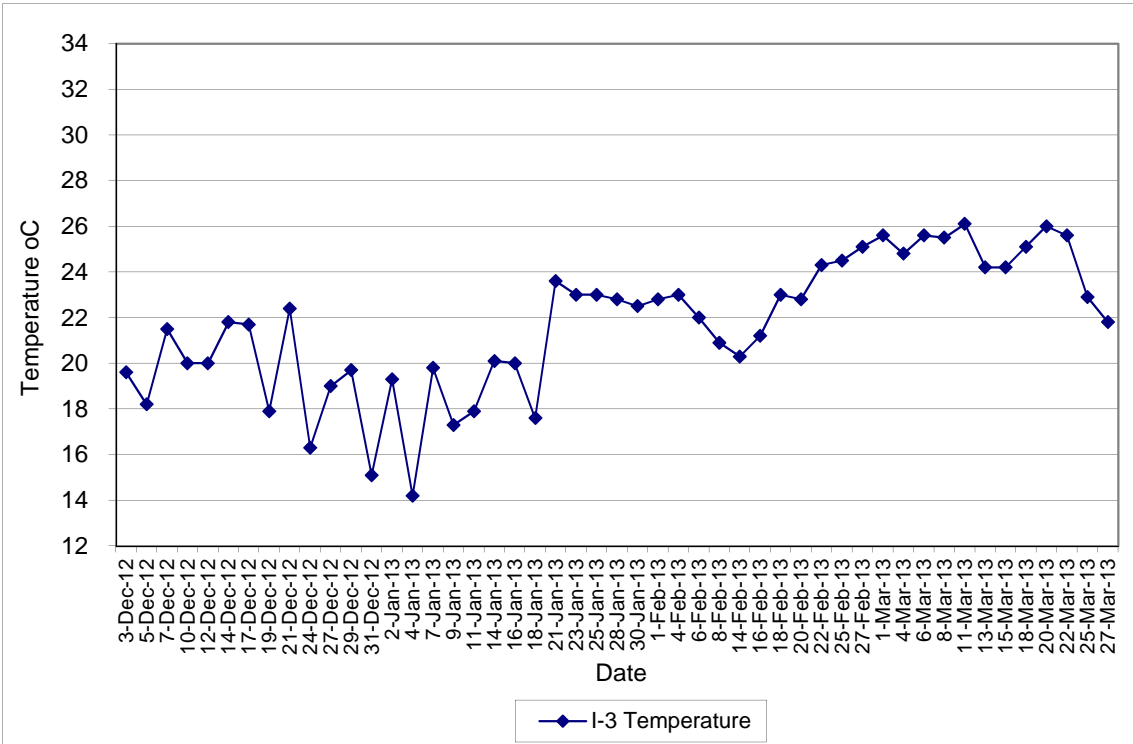
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Hong Hoi Chee Hong Temple (I-2)
 Dec-12 to Mar-13**



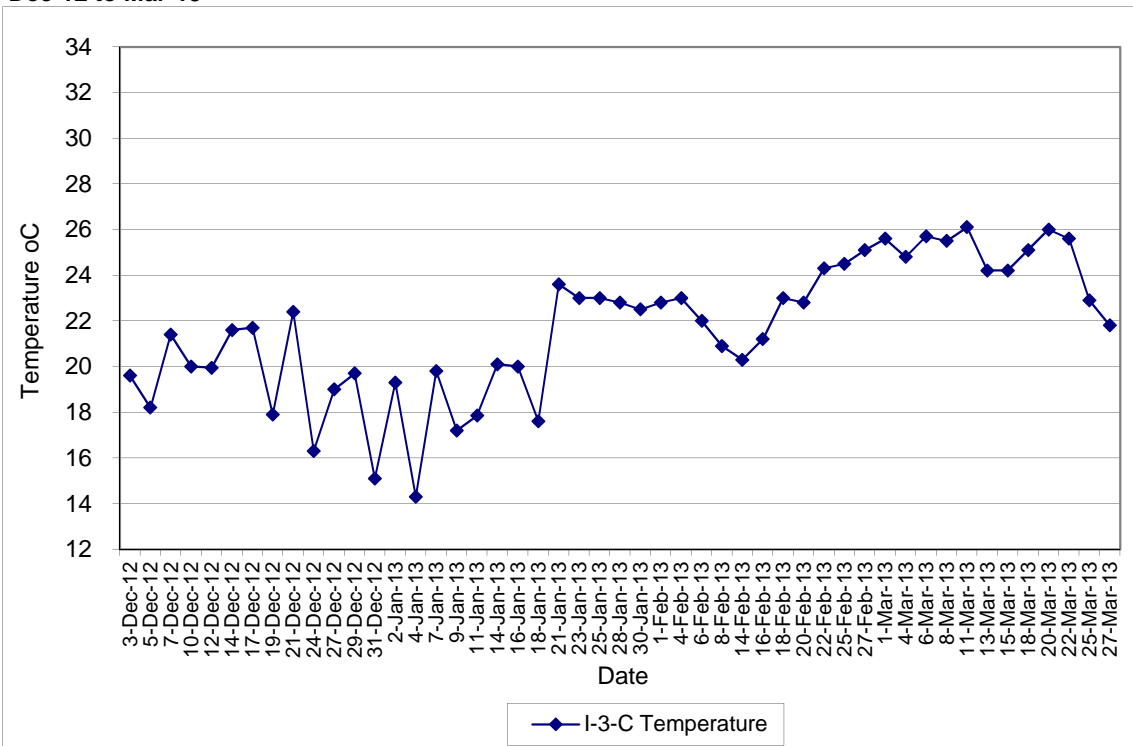
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)
 Dec-12 to Mar-13**



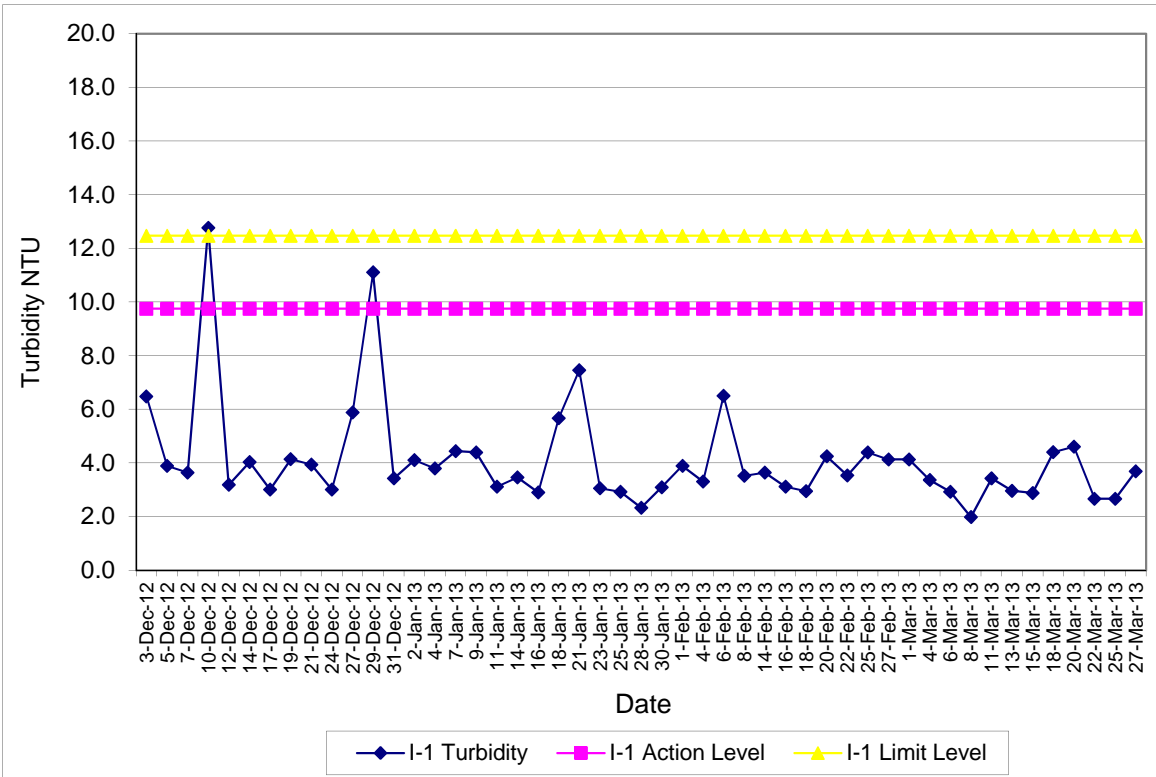
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Squatters (I-3)
 Dec-12 to Mar-13**



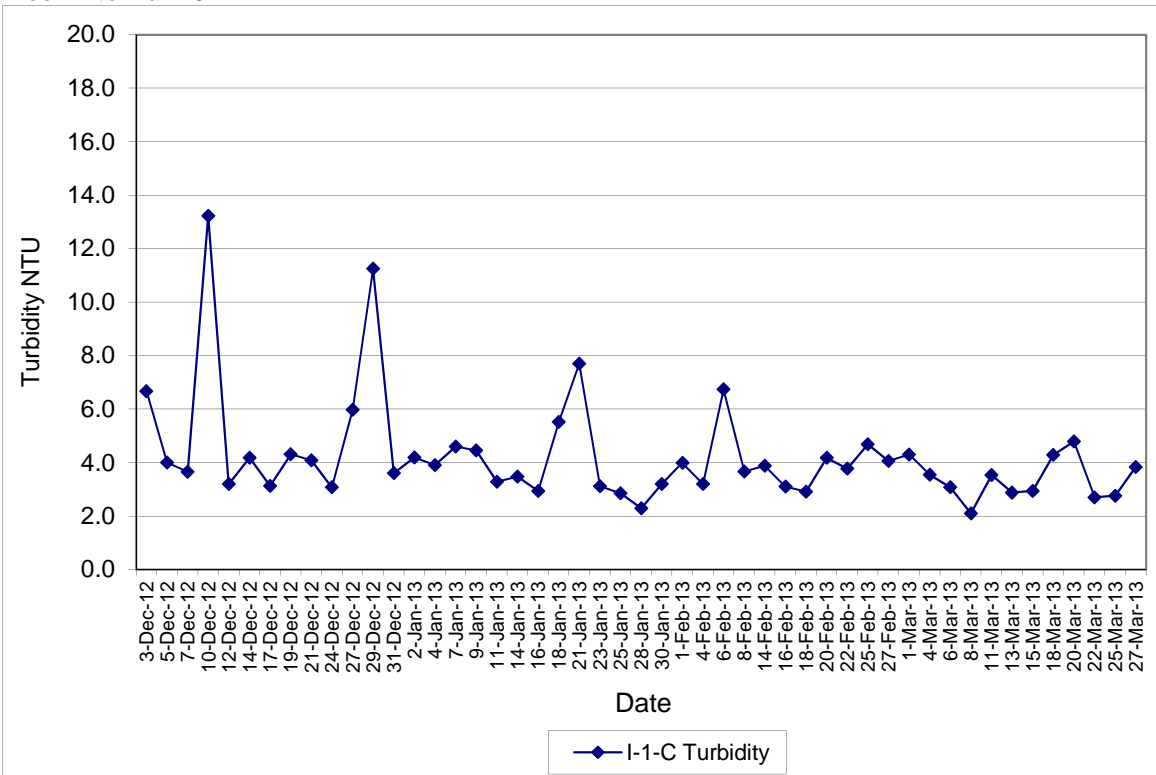
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Squatters (I-3-C)
 Dec-12 to Mar-13**



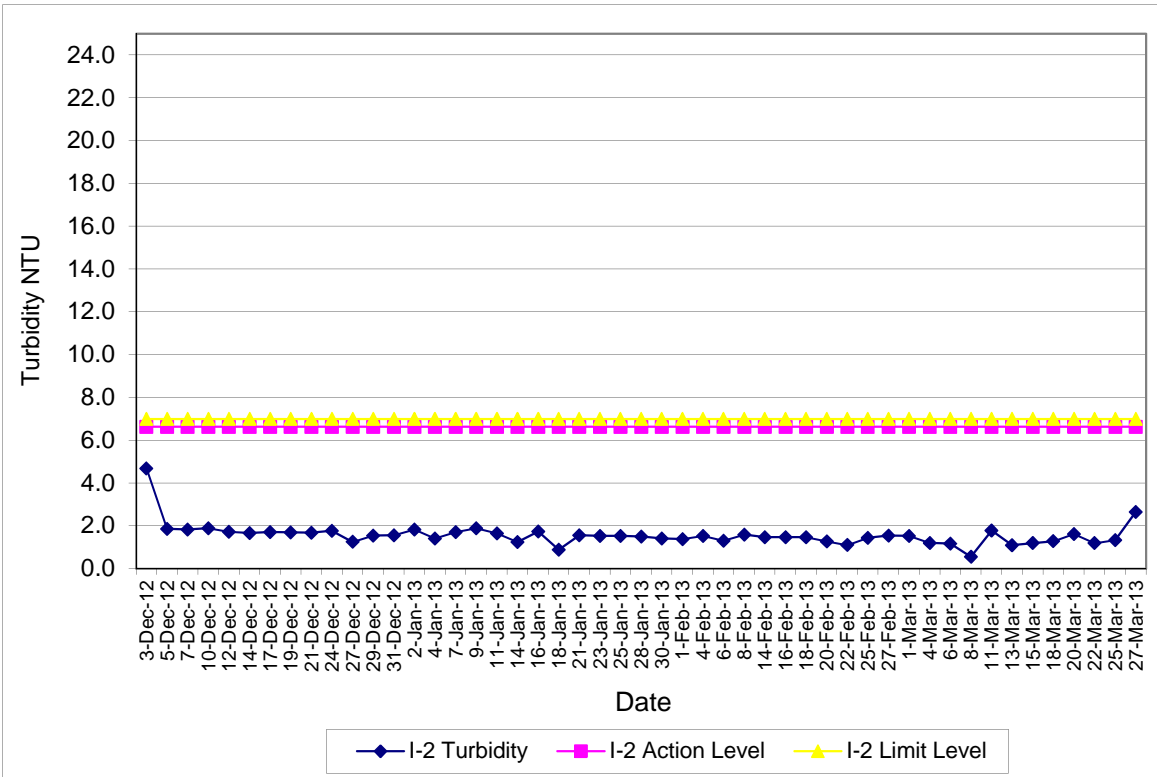
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)
 Dec-12 to Mar-13**



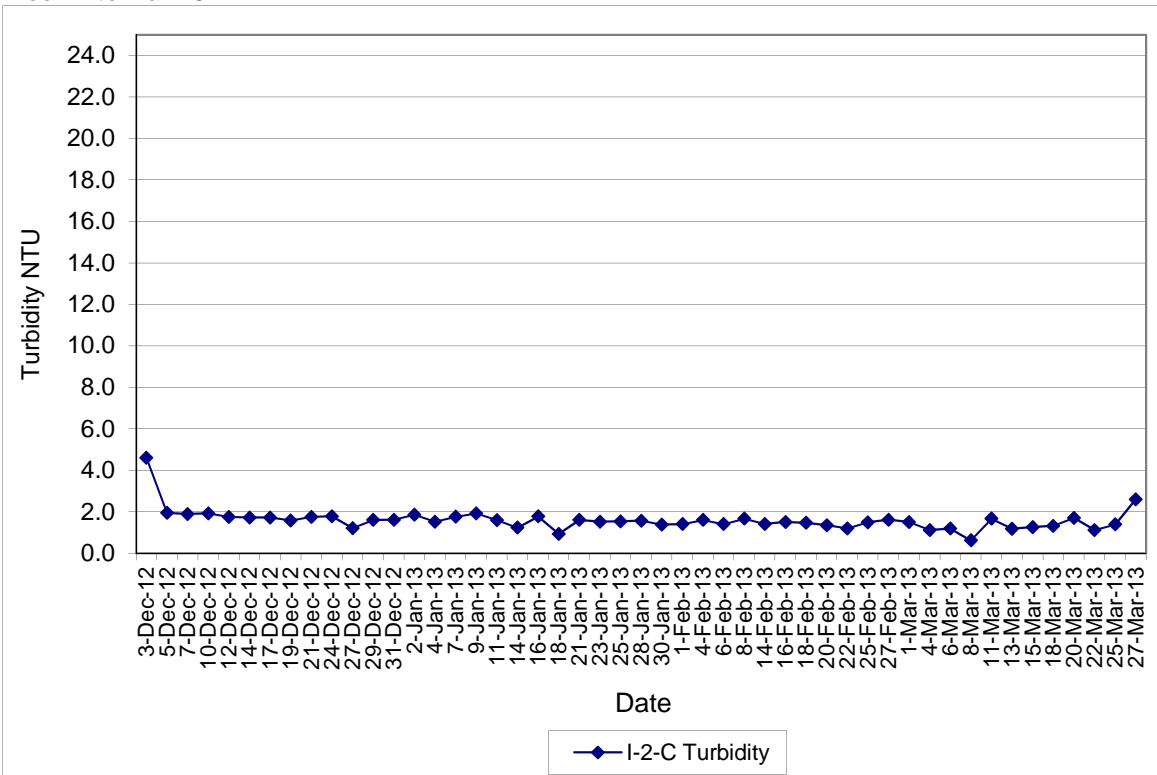
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)
 Dec-12 to Mar-13**



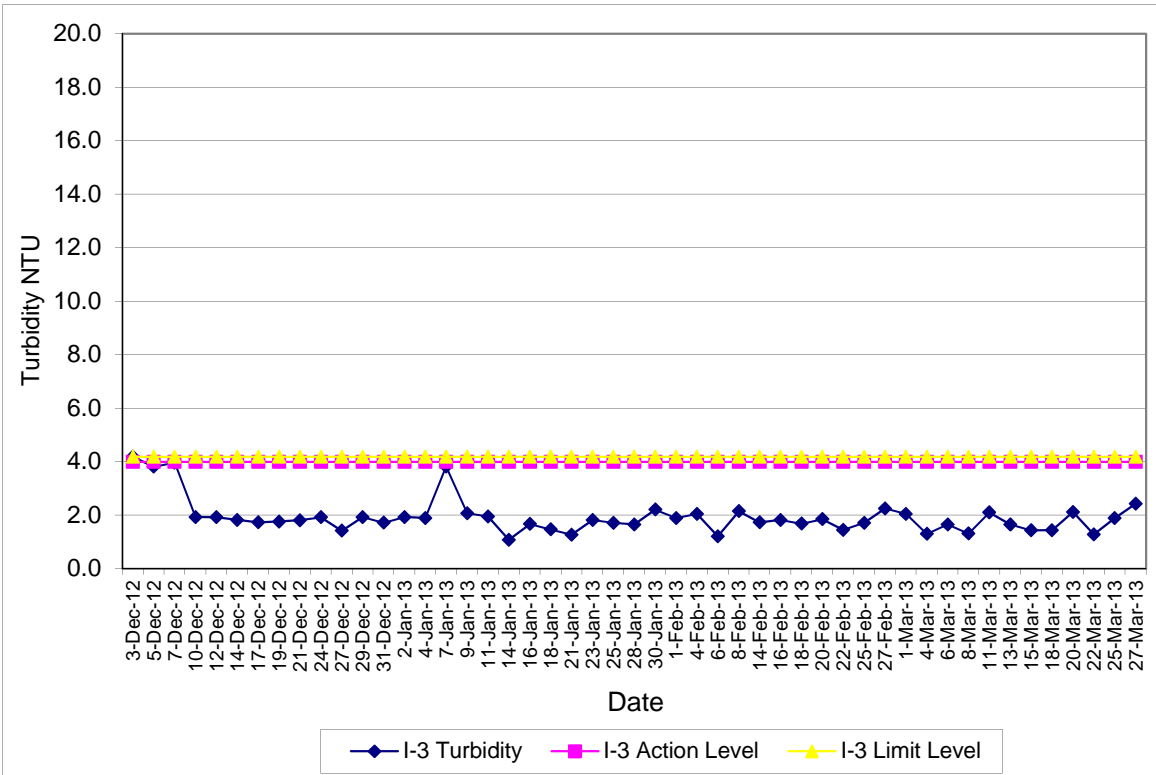
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Hong Hoi Chee Hong Temple (I-2)
 Dec-12 to Mar-13**



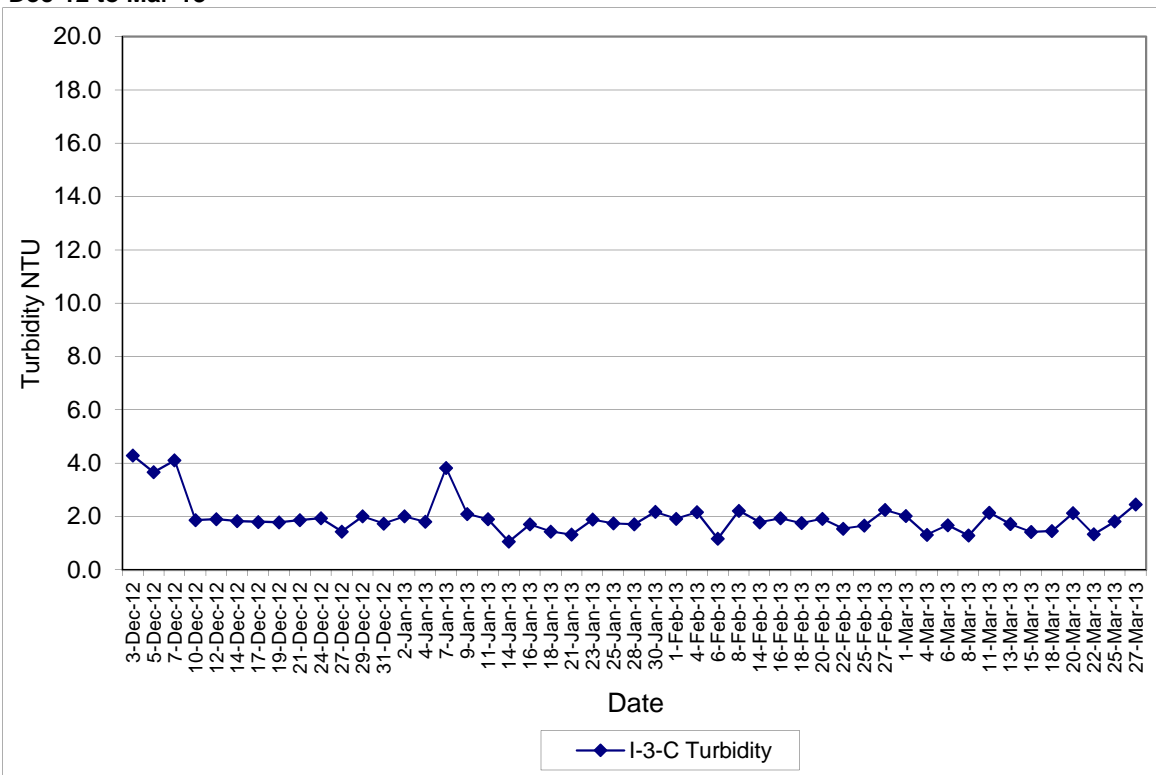
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)
 Dec-12 to Mar-13**



Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Squatters (I-3)
Dec-12 to Mar-13

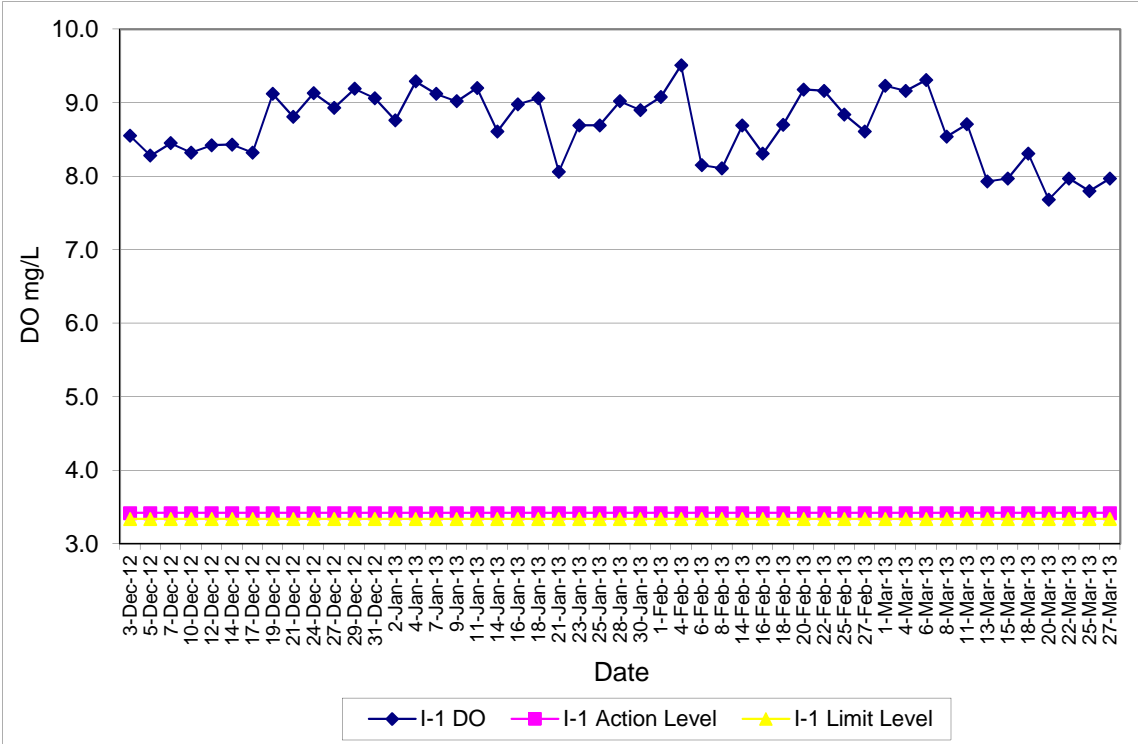


Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Squatters (I-3-C)
Dec-12 to Mar-13

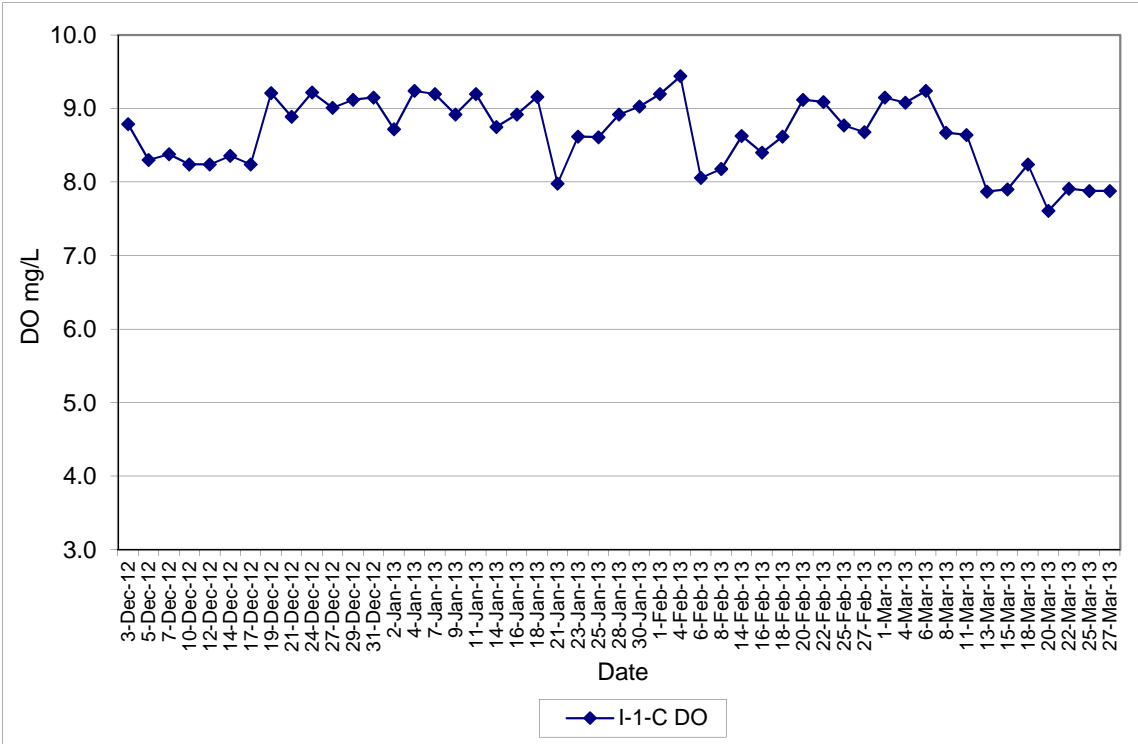


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)
 Dec-12 to Mar-13**

Note: Exceedances of Action / Limit Levels occur when the levels of DO are below the respective limit levels.

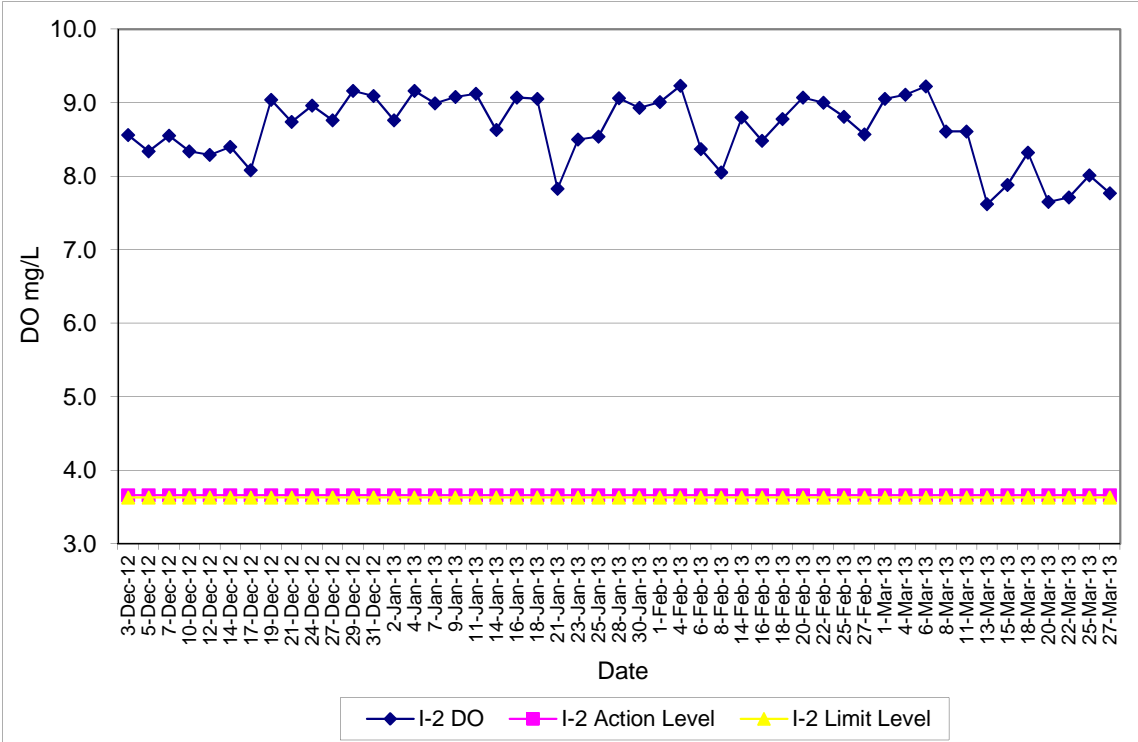


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)
 Dec-12 to Mar-13**

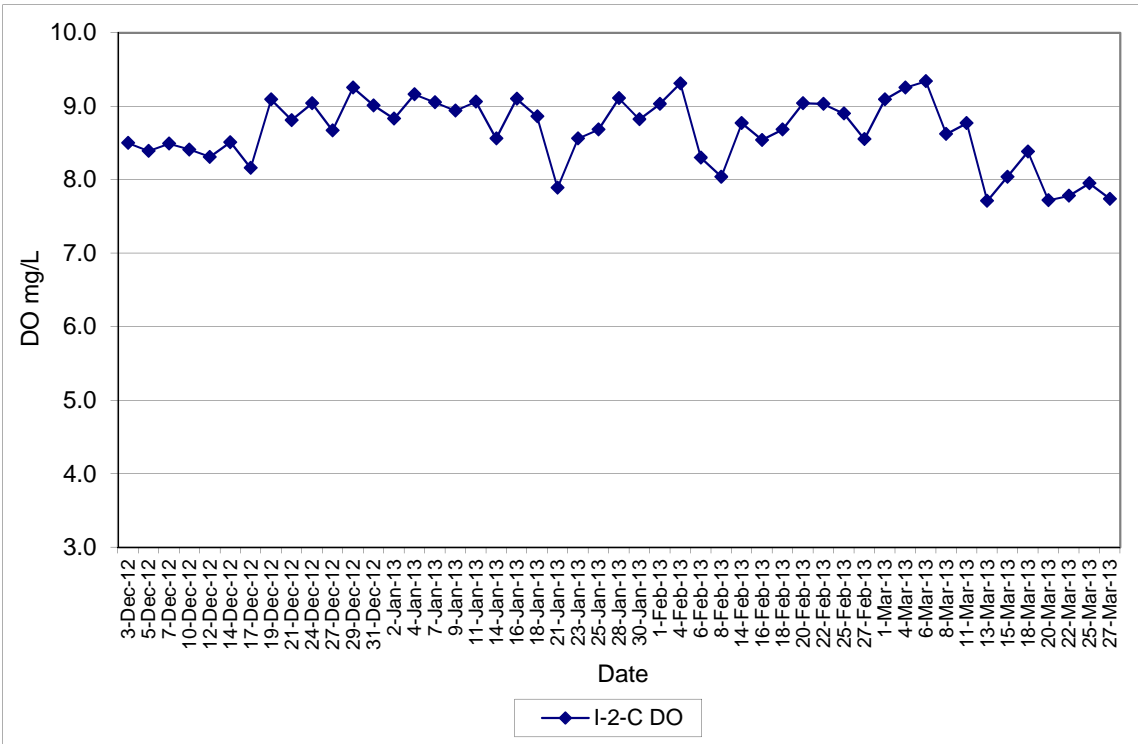


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Hong Hoi Chee Hong Temple (I-2)
Dec-12 to Mar-13**

Note: Exceedances of Action / Limit Levels occur when the levels of DO are below the respective limit levels.



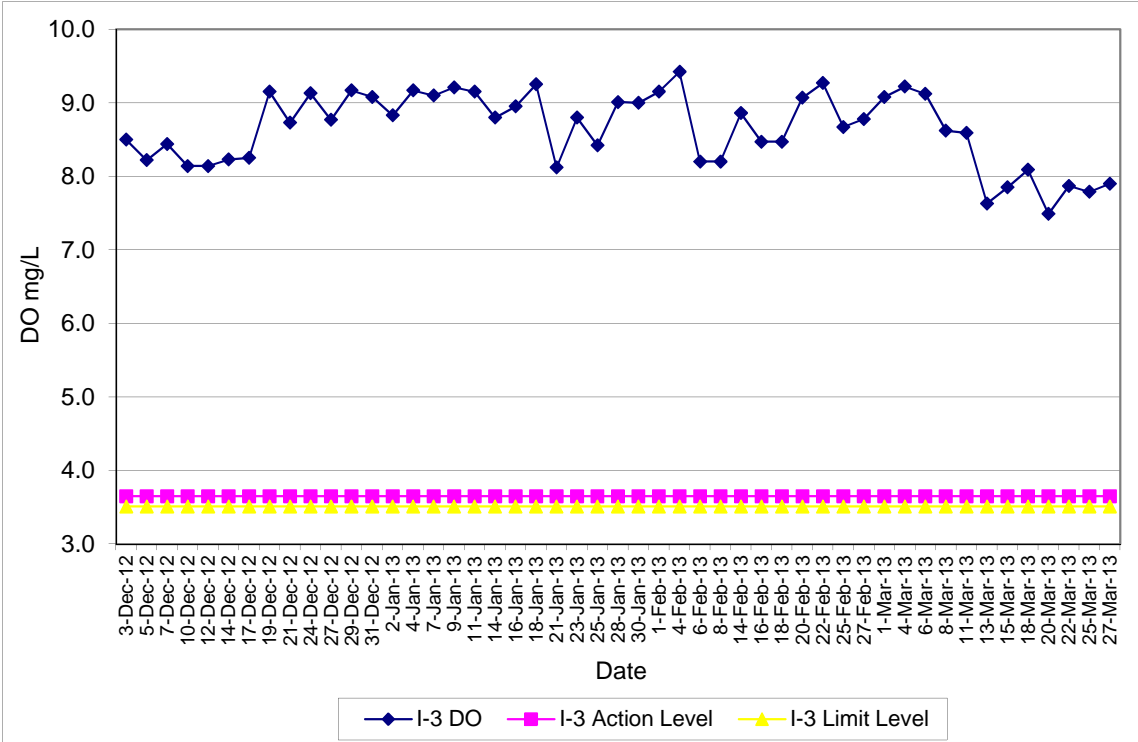
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)
Dec-12 to Mar-13**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Squatters (I-3)**

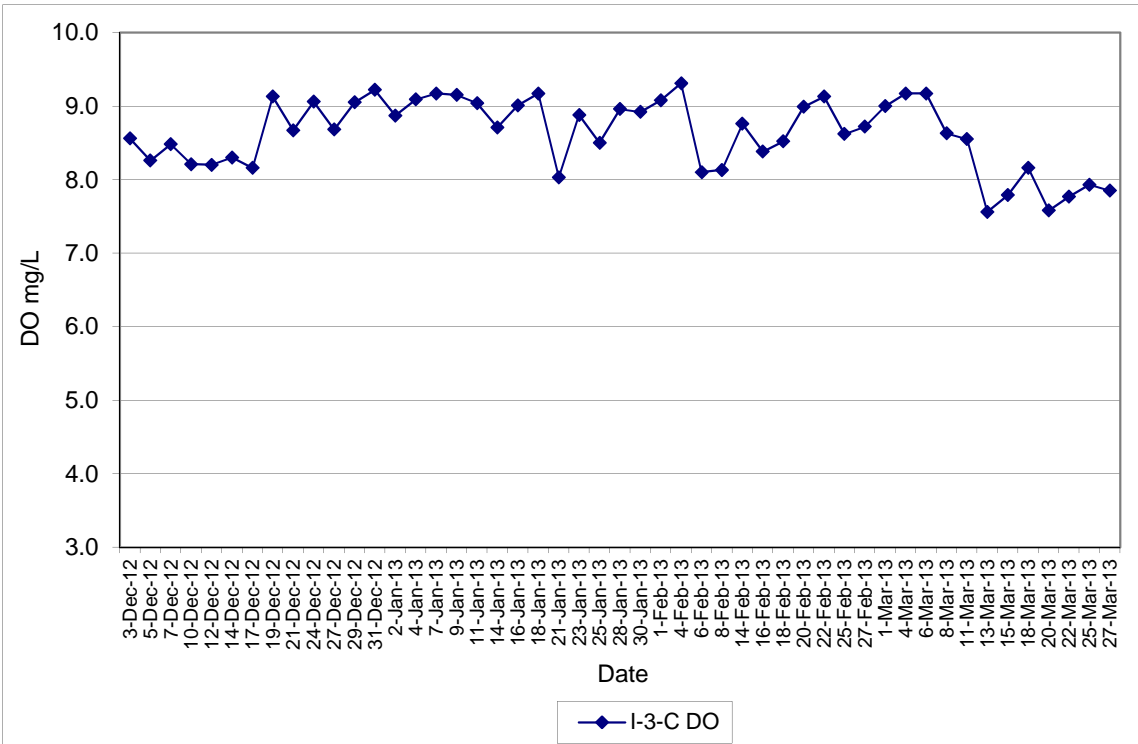
Dec-12 to Mar-13

Note: Exceedances of Action / Limit Levels occur when the levels of DO are below the respective limit levels.

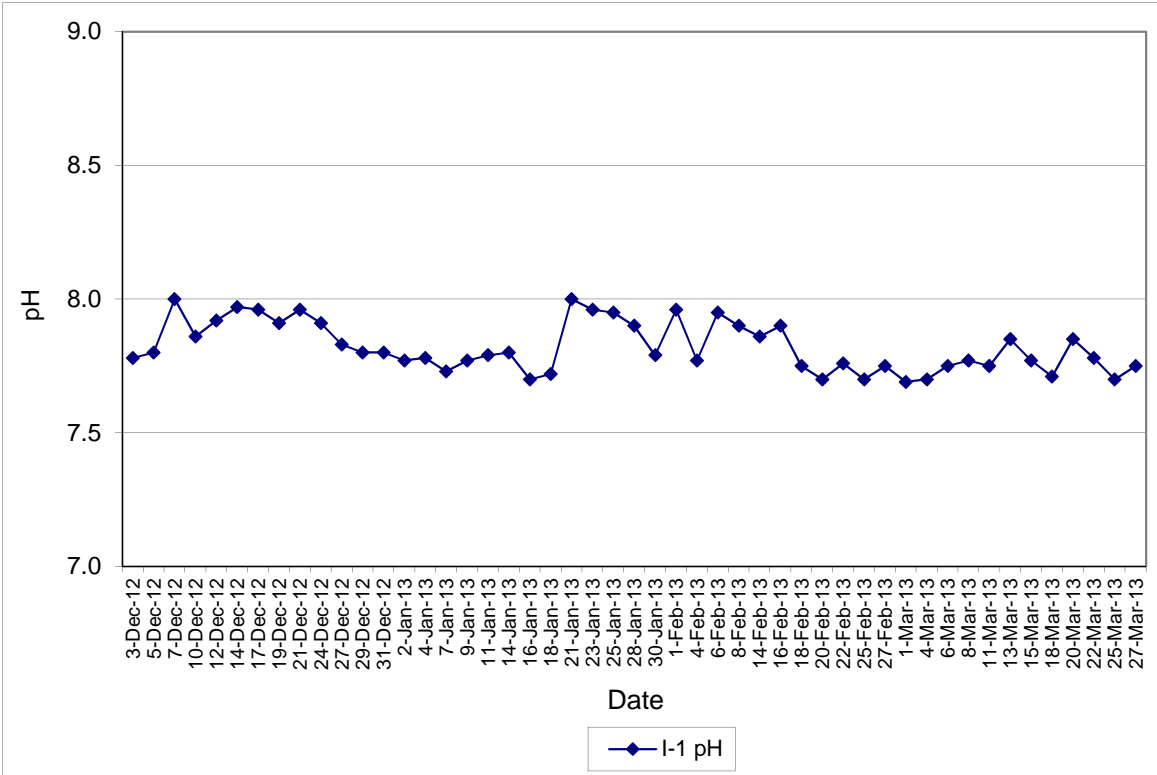


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Squatters (I-3-C)**

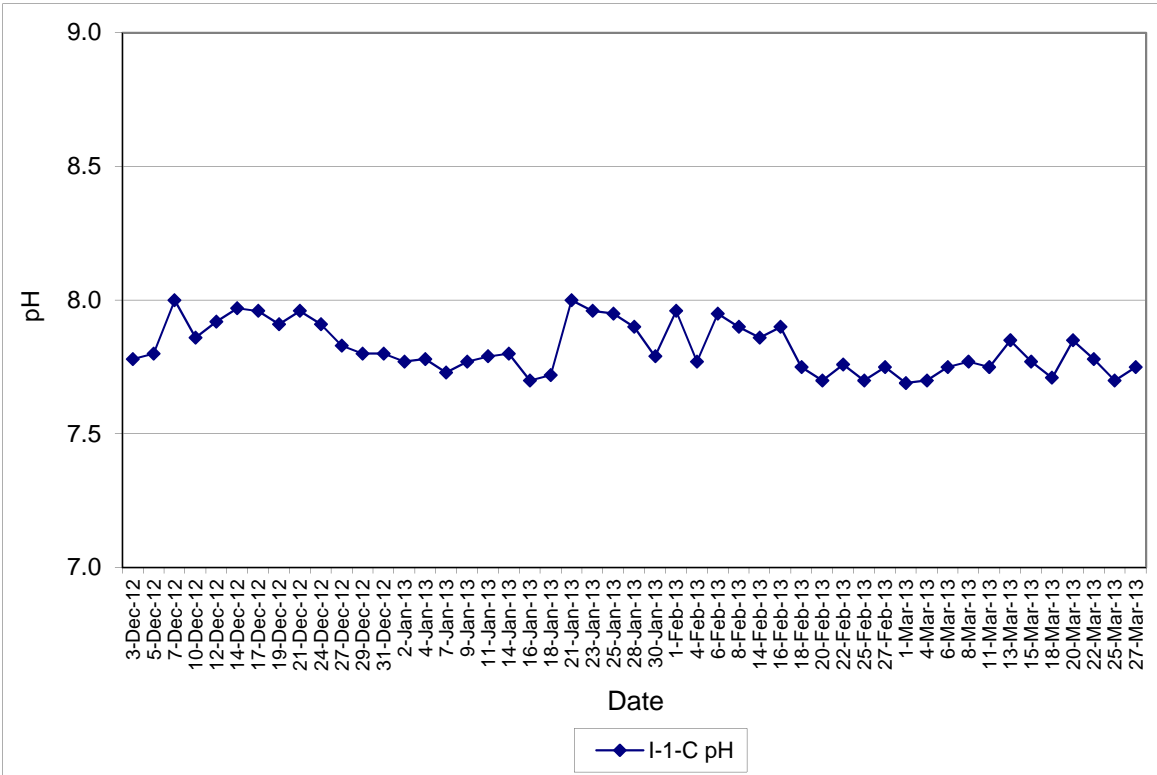
Dec-12 to Mar-13



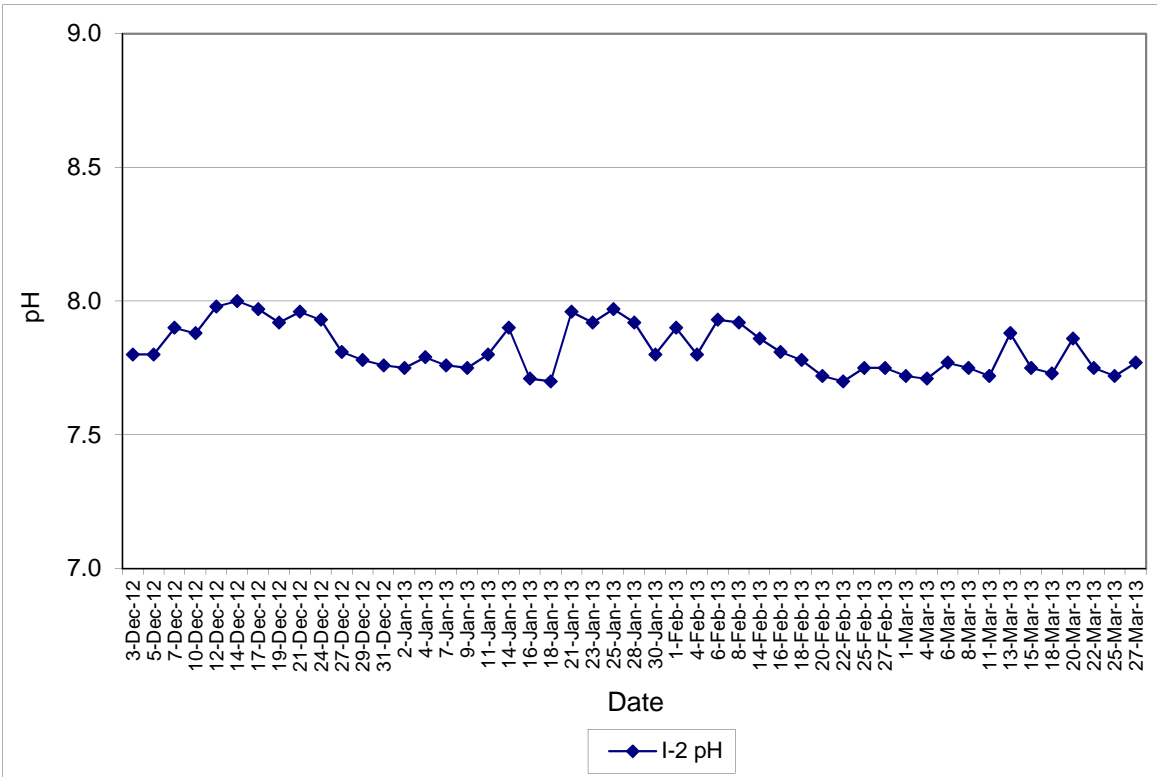
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)
 Dec-12 to Mar-13**



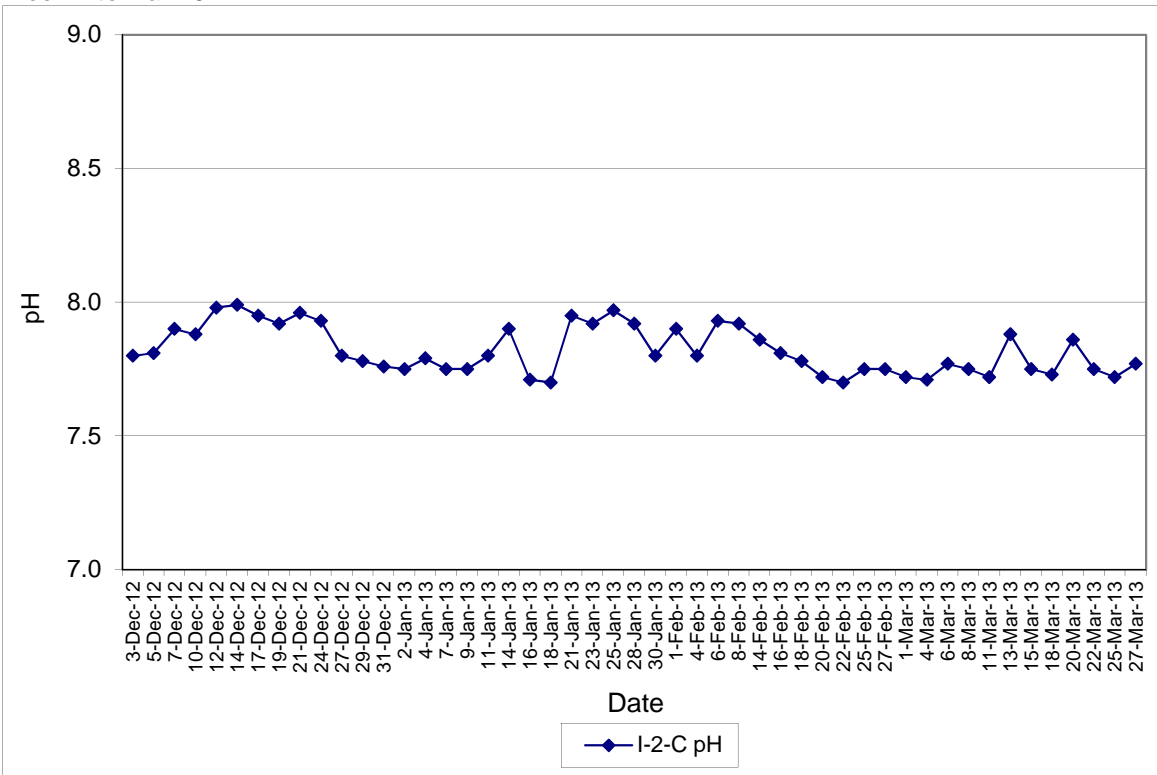
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)
 Dec-12 to Mar-13**



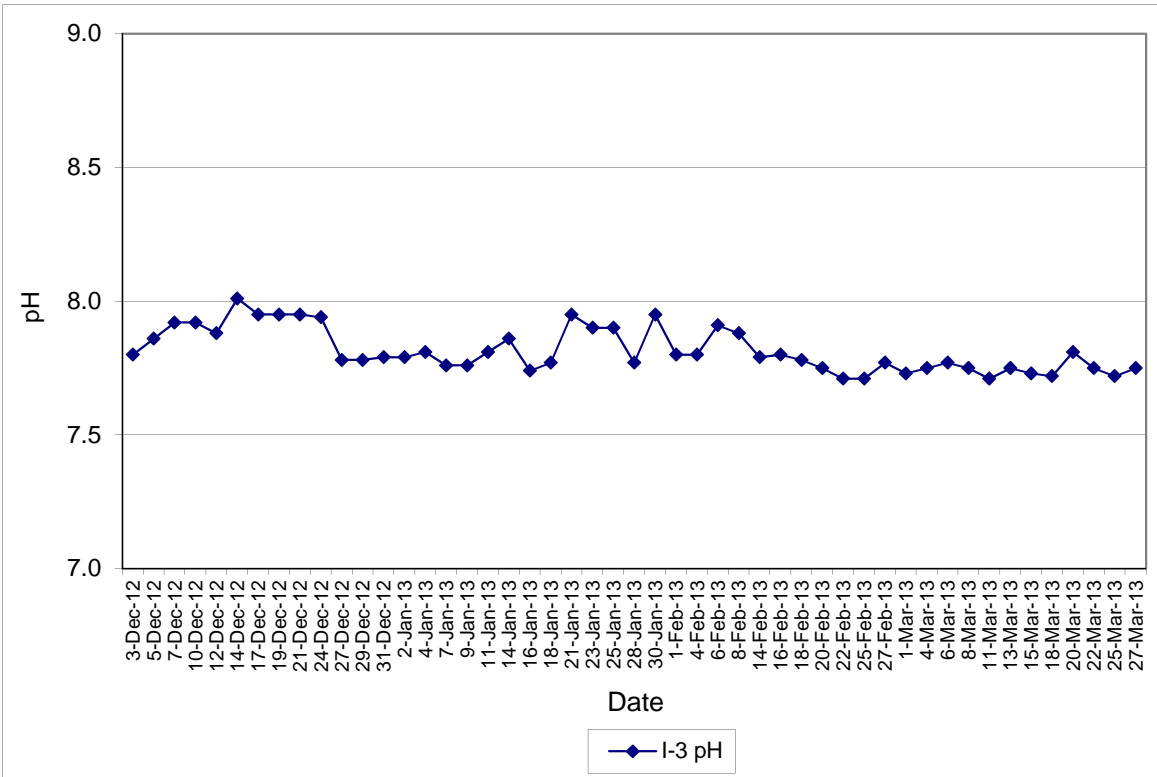
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Hong Hoi Chee Hong Temple (I-2)
Dec-12 to Mar-13**



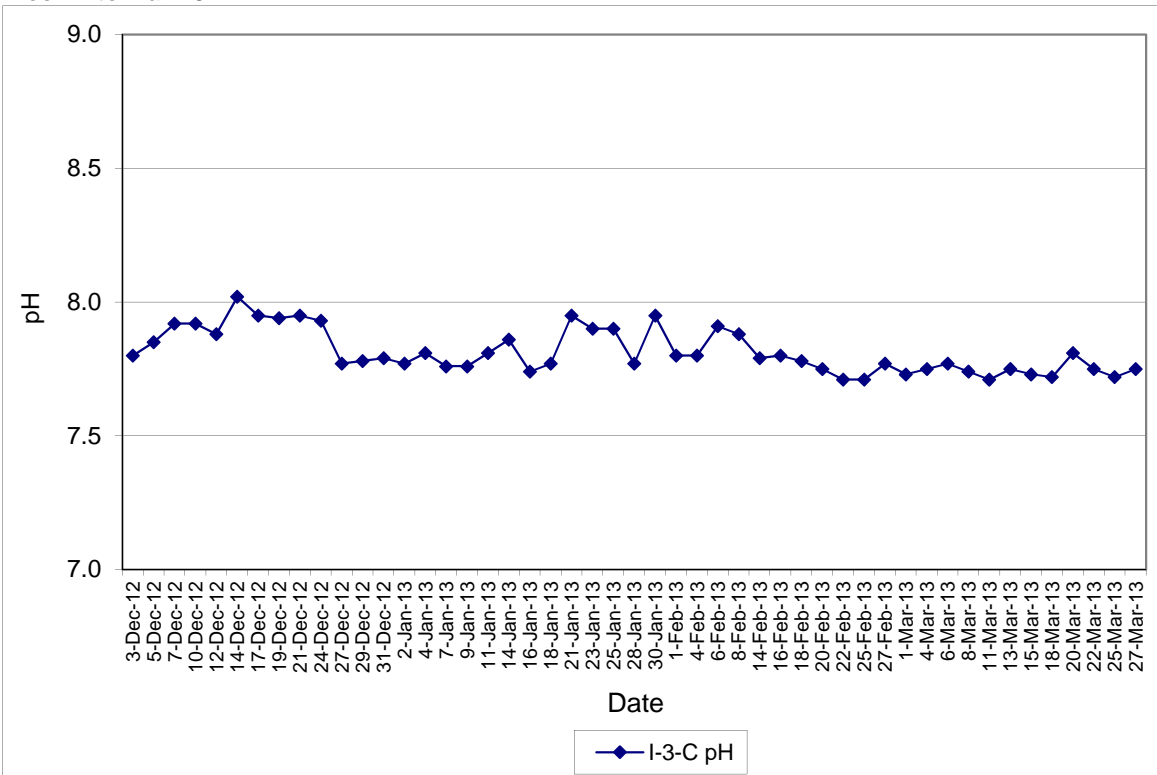
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)
Dec-12 to Mar-13**



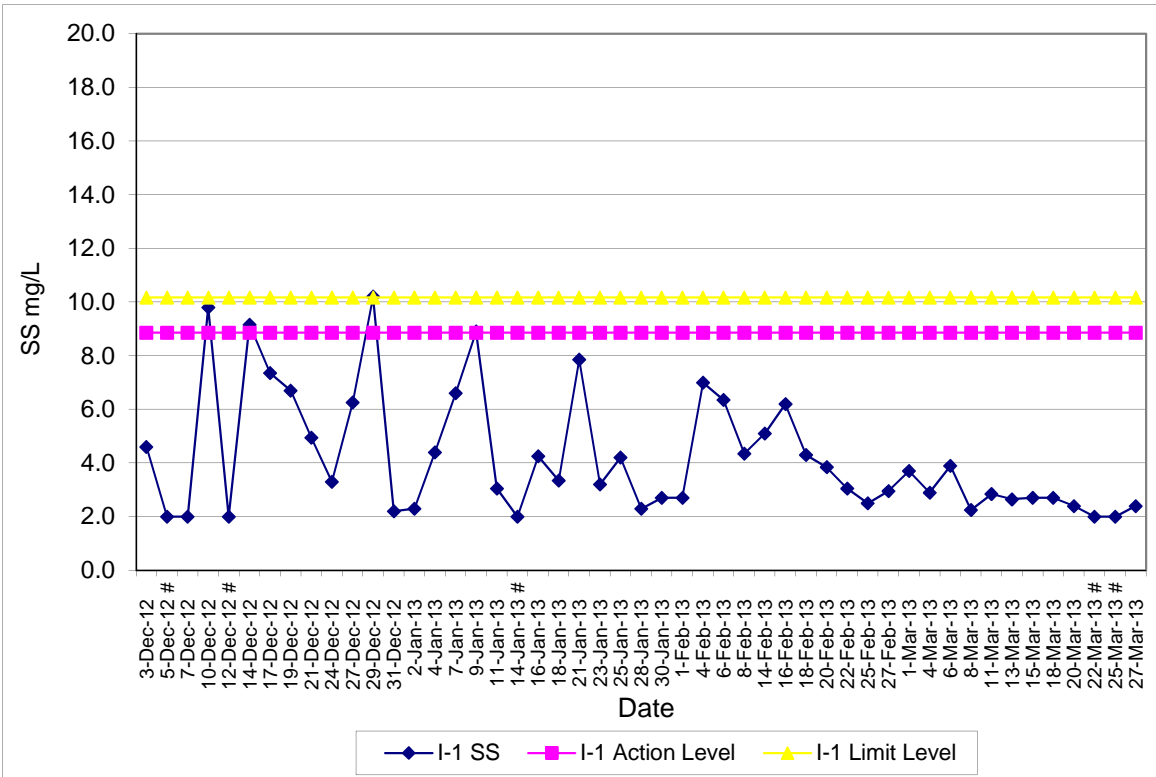
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Squatters (I-3)
Dec-12 to Mar-13**



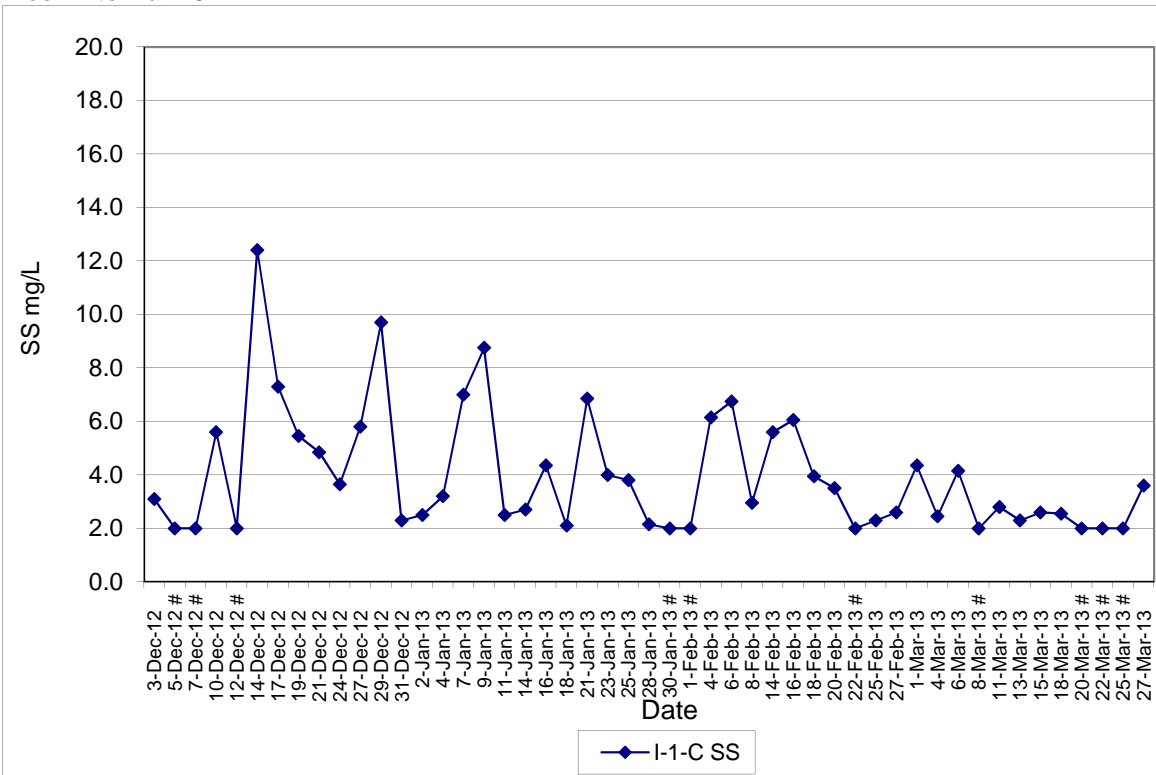
**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Squatters (I-3-C)
Dec-12 to Mar-13**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Sik Sik Yuen Ho Fung College (I-1)
Dec-12 to Mar-13**

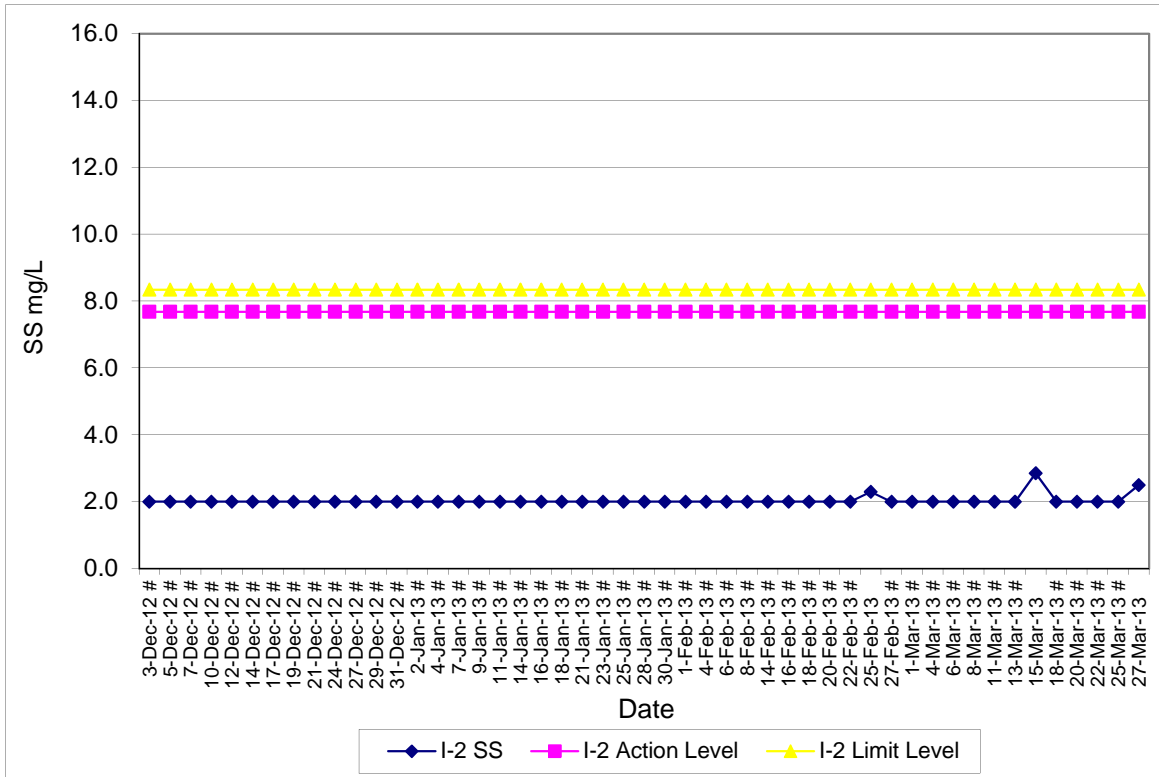


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Sik Sik Yuen Ho Fung College (I-1-C)
Dec-12 to Mar-13**

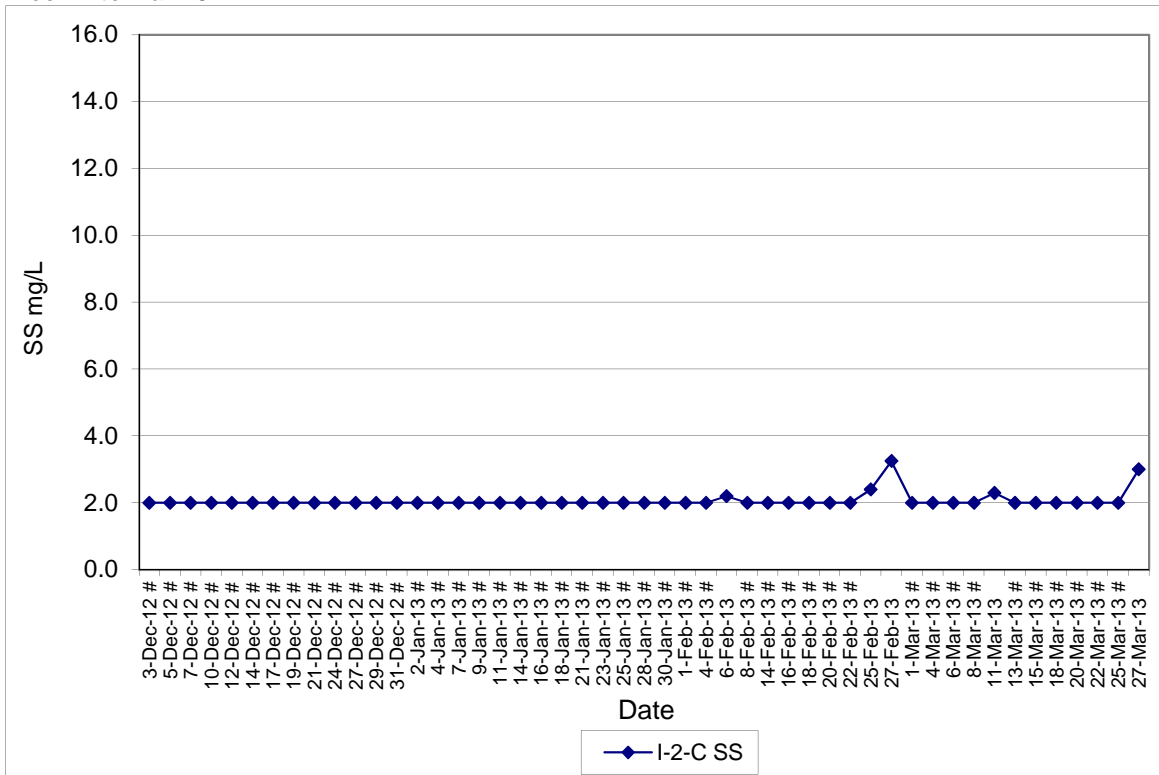


Note:# - For average SS level smaller than 2 mg/L, the level is plotted as 2 mg/L in the graph

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Hong Hoi Chee Hong Temple (I-2)
Dec-12 to Mar-13**

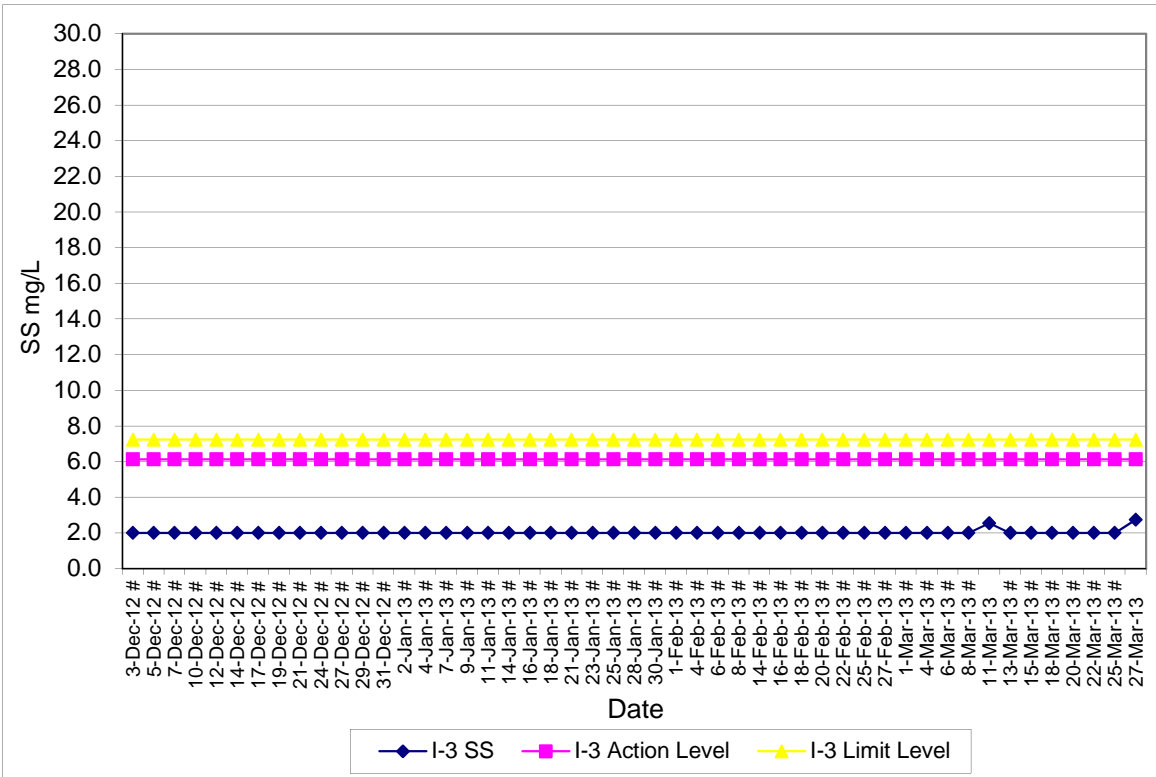


**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
Water Quality Results at Hong Hoi Chee Hong Temple (I-2-C)
Dec-12 to Mar-13**

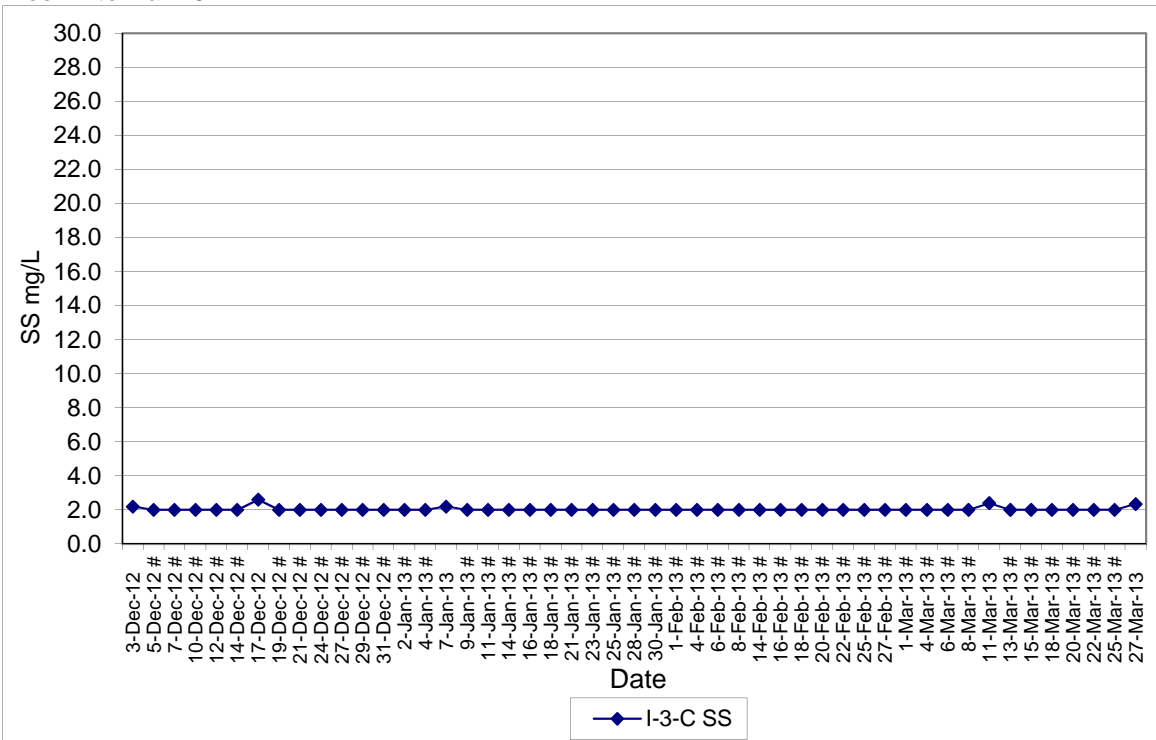


Note:# - For average SS level smaller than 2 mg/L, the level is plotted as 2 mg/L in the graph

**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Squatters (I-3)
 Dec-12 to Mar-13**



**Contract No. DC/2007/12 - Design and Construction of Tsuen Wan Drainage Tunnel
 Water Quality Results at Squatters (I-3-C)
 Dec-12 to Mar-13**



Note:# - For average SS level smaller than 2 mg/L, the level is plotted as 2 mg/L in the graph


Appendix J

Interim Notifications of Environmental Quality Limits Exceedances

Interim Notification of Environmental Quality Limit Exceedance

Incident Report on Limit Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	15-Mar-13
Time	2:06 p.m.
Monitoring Location	Hong Hoi Chee Hong Temple (I-2)
Parameter	Suspended Solids (SS)
Action & Limit Levels (mg/L)	7.68 / 8.34
Measured Level (mg/L)	2.85
Control Station	I-2-C
Measured Level at the Control Station (mg/L)	<2.00
Possible reason for Action or Limit Level Non-compliance	The measured SS level was lower than the baseline action / limit level, but higher than 130% of the SS level of the control station (I-2-C). Remedial works for air vent shaft and main adit, dismantling steel brackets of in-situ staircase at lower man access shaft, erecting formwork for top slab of vortex shaft, casting of granular bedding, erecting formwork and concreting of draw pit adjacent to man access shaft, concreting for upstand concrete plinth of trash grill, and installation of handrail and cable riser at lower man access shaft were undertaken during the monitoring day. No direct disturbance was observed from the site. Therefore, the exceedance was considered to be contributed by natural variation. Since the exceedance was non-project related, no further action was required.
Actions taken / to be taken	The following mitigation measure was provided on-site during monitoring: (1) Existing stream was disconnected and stream water was diverted from upstream to downstream so that the works area was maintained in dry condition.
Remarks	None

Prepared by: Fan Cheong Tsang
 Designation: Environmental Team Leader
 Signature: 
 Date: 27-Mar-13

Photographic record for exceedance of Suspended Solids (SS) recorded at Hong Hoi Chee Hong Temple (I-2) on 15-Mar-13



Photo taken at I-2




Photo of I-2-C

Interim Notification of Environmental Quality Limit Exceedance

Incident Report on Action Level Non-compliance

Project	Tsuen Wan Drainage Tunnel
Date	20-Mar-13
Time	10:26 AM
Monitoring Location	Sik Sik Yuen Ho Fung College (I-1)
Parameter	Suspended Solids (SS)
Action & Limit Levels (mg/L)	8.85 / 10.17
Measured Level (mg/L)	2.40
Control Station	I-1-C
Measured Level at the Control Station (mg/L)	<2.00
Possible reason for Action or Limit Level Non-compliance	The measured SS level was lower than the baseline action / limit level, but higher than 120% of the SS level of the control station (I-1-C). Site cleaning and tidying, construction of concrete pavement and installation of handrail were undertaken during the monitoring day. No direct disturbance was observed from the site. Therefore, the exceedance was considered to be contributed by natural variation. Since the exceedance was non-project related, no further action was required.
Actions taken / to be taken	The following mitigation measures were provided on-site during monitoring: (1) Wastewater was collected and diverted to Main Tunnel.
Remarks	None

Prepared by: Fan Cheong Tsang
 Designation: Environmental Team Leader
 Signature: 
 Date: 3-Apr-13

Photographic record for exceedance of Suspended Solids (SS) recorded at Sik Sik Yuen Ho Fung College (I-1) on 20-Mar-13



Photo taken at I-1



Photo taken at I-1-C

Appendix K

Complaint Log

COMPLAINT LOG

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
1	CIR-001	9 March 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/04846-09) regarding to muddy effluent discharged from the outfall of the construction site from a public on 9 March 2009. Site investigation was also carried out by EPD with the Contractor on the same day.	<p><u>Findings/ Observations</u> In the afternoon on 9 March 2009, the Contractor was carrying out regular maintenance for removing silt accumulated in the wastewater treatment plant. During the maintenance works, some residual silt inside the plant was accidentally leaked out to the outfall discharge outlet. The reason was that a flexible pipe for disposing silt was found connecting to the concrete platform of the outfall discharge outlet.</p> <p><u>Conclusion/Remedial Action</u> The complaint was valid and it was due to maintenance works at the wastewater treatment plant at the outfall area. The contractor had cleaned up the silt at discharge outlet and the channel at the outfall area on 12 March 2009 as shown in the attached photo. The ET will closely inspect the discharge outlet and the channel during the routine site inspections and provide advice to the Contractor. The Contractor was also advised to provide mitigation measures during any occasion of the maintenance work on the wastewater treatment plant.</p> <p>The discharge pipe of the treatment plant should be plugged and ensure not functioned when carrying out maintenance works on the wastewater treatment plant in order to prevent the discharge of silt or muddy water to the outlet.</p> <p>Flexible pipe for discharge of sludge should not be placed on the concrete platform under the outfall discharge outlet. For disposal of slit or sludge in the wastewater treatment plant, tanker should be used.</p>	Closed
2	CIR-002	8 May 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/09755-09) regarding to construction dust from the outfall	<p><u>Findings/ Observations</u> Regular 1-hour TSP monitoring, in accordance with EM&A Manual, is performed by Environmental Team. The monitoring station concerned is ASR9 (i.e. at the podium level of Greenview Terrace facing to the construction site).</p> <p>The closest date for the 1-hour TSP concentration monitoring was on 6</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				construction site on 8 May 2009. Site investigation was also carried out by EPD with the Contractor on 14 May 2009.	May 2009 and 12 May 2009 at Greenview Terrace, ASR9. Soil nailing works and loading & unloading excavated materials were observed during monitoring. In accordance with the EM&A Manual and the Baseline Monitoring Report, all 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels. No exceedance was recorded on 6 and 12 May 2009. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. It was confirmed that the air quality mitigation measures as recommended in EIA have been provided by the Contractor. The mitigation measures are as follows: <ul style="list-style-type: none"> • Water spraying was provided to the exposed surface. • Several automatic sprinklers were provided at the outfall construction site for water spraying of the haul road. • Water spraying was provided during dust generating works (e.g. rock breaking and soil nailing works). <u>Conclusion/Remedial Action</u> Based on the site inspection and monitoring results, the complaint is considered not justifiable since no action & limit level exceedance on construction dust are identified. Air quality mitigation measures as recommended in EIA have been implemented in order to control and minimise the air quality impact and nuisance arising from the construction activities. Nevertheless, in view of the recent dry and sunny weather, the haul road and the exposed area would be dry very quickly. The Contractor was recommended to provide more frequent water spraying especially in the dry and sunny weather.	
3	CIR-003	14 May 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP/RW/080206) regarding to daytime construction rock breaking at 7:15 am	The closest date to the complaint for the 1-hour TSP monitoring & daytime construction noise monitoring was on 12, 18 and 27 May 2009 at Greenview Terrace, ASR9 and NSR9. Soil nailing, excavation, rock breaking, loading and unloading the materials were observed during monitoring period. The measured noise levels complied with the limit level in accordance with the EIAO-TM. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels. No 1-hour TSP	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				<p>and dusty at the outfall construction site on 14 May 2009.</p>	<p>exceedance was recorded. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Air quality mitigation measures as recommended in EIA have been implemented by the Contractor. However, noise mitigation measures could be further improved. Based on our site inspection and monitoring results, the complaint for dust is considered not justifiable since no action & limit level exceedance on construction dust is identified. Air quality mitigation measures as recommended in EIA have also been implemented in order to control and minimise the air quality impact arising from the construction activities. In view of the recent dry and sunny weather, the haul road and the exposed area would be dry very quickly. The Contractor was recommended to enhance water spraying especially in the dry and sunny weather. On the other hand, the complaint for noise is considered due to works and the Contractor was agreed to improve the on-site noise mitigation measures such as the following measures. ET's site inspection and the joint inspection with relevant parties was conducted on 29 May 2009 and 4 June 2009 respectively to confirm all the below measures have been implemented.</p> <ul style="list-style-type: none"> • For the idling plant, it should be switched off to reduce noise level generated. • The sound insulation sheets and noise insulation materials should be placed to enclose the breaking tip tightly and also aside or surrounding the breaking activities as recommended in the following photos 1-3 in noise mitigation measures. • Noise monitoring frequency was increased in order to check the effectiveness of the mitigation measures. The additional measurement was taken on 27 May, 8 June, 10 June and 12 June 2009 after all the measures implemented. The noise levels ($L_{eq, 30 \text{ min}}$) were 70.9 dB (A), 70.5 dB (A), 70.3 dB (A) and 70.3 dB (A) respectively, which comply with the limit level in accordance with the EIAO-TM. Soil nailing, excavation and rock breaking were observed during monitoring period. 	

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					The measures were well in place and seemed effective during the measurement.	
4	CIR-004	10 July 2009 at Outfall	Public through EPD	EPD has received a complaint (EPD ref: EP3/N22/RW/15137-09) regarding to construction dust from the outfall construction site on 10 July 2009.	<p><u>Findings/ Observations</u> 1-hour TSP concentration monitoring was on 10 July 2009 at Greenview Terrace, ASR9. Soil nailing works, concrete breaking, excavation and loading & unloading excavated materials were observed during monitoring. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels. No exceedance was recorded on 10 July 2009.</p> <p>The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. It was confirmed that the air quality mitigation measures as recommended in EIA have been provided by the Contractor. The mitigation measures are as follows:</p> <ul style="list-style-type: none"> • Water spraying was provided to the exposed surface. • Automatic sprinklers were provided at the outfall construction site for water spraying of the haul road. • Water spraying was provided during dust generating works (e.g. rock breaking and soil nailing works). • Tarpaulin was used for covering the dusty works in the Portal area. <p><u>Conclusion/Remedial Action</u> The complaint is considered not justifiable since no action & limit level exceedance on construction dust are identified</p>	Closed
5 & 6	CIR-005	29 July 2009 & 11 August 2009 at Outfall	Public through SOR	SOR has received two complaints (SOR ref: (DC/2007/12)/M45/500/02480, 02500) from Greenview Terrace regarding to daytime construction noise exceedance	<p><u>Findings/ Observations</u> Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. According to the noise monitoring results from 6 July 2009 to 31 August 2009 at NSR 9, the measured noise levels complied with the limit level in accordance with the EIAO-TM. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels from 6 July 2009 to 25 August 2009.</p> <p><u>Conclusion/Remedial Action</u> The dust complaint on 22 July 2009 was due to the soil nailing works. The</p>	Same Case with Complaint No. 11

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				<p>recorded at NSR9 on 8, 22, 23, 27 and 29 July 2009 and a large amount dust generated at the outfall construction site. The complaint dates were corresponded to 29 July and 11 August 2009.</p>	<p>Contractor was reminded enhance the dust mitigation measures during soil nailing works. A designated staff was provided to spray water continuously during soil nailing. A nylon bag was placed on the drilling hole and keeping wet to suppress dust. A sprinkler was added at the hillside of the site and water spraying was provided continuously during operation of drilling to suppress dust.</p> <p>The documented complaint for noise is considered to trigger the action level and the Contractor was also reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are proposed as follows:</p> <ul style="list-style-type: none"> • A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level. • The designated staff was reminded to record all the weather condition including raining and wind speed. • Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible. • Movable noise barriers were placed on site and the movable noise barriers were also modified. • Existing 25 ton rock breaker had been replaced by the another breaker. • The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap. • A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace. <p>From the additional monitoring data and monitoring data under regular EM&A requirements, noise level ($L_{eq, 30 \text{ min}}$) between 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency was maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August</p>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					2009. Noise levels ($L_{eq, 30 \text{ min}}$) were also re-measured after the implementation of the mitigation measures. Noise level ($L_{eq, 30 \text{ min}}$) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures. In our investigation, there was no exceedance of the measured noise level at Greenview Terrace.	
7	CIR-006	12 August 2009 at Outfall	Public through SOR	SOR has received a complaint (SOR ref: (DC/2007/12)/M45/5 00/02527) from Greenview Terrace, via Apple Daily regarding to daytime construction noise level ($L_{eq(30\text{min})}$) was sometimes more than 80 dB(A) and a large amount dust generated at the outfall construction site. The complaint date was corresponded to 12 August 2009.	<p><u>Findings/ Observations</u> Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. According to the noise monitoring results from 6 July 2009 to 31 August 2009 at NSR 9, the measured noise levels complied with the limit level in accordance with the EIAO-TM. All 1-hour TSP concentrations at ASR9 were below the established Action and Limit Levels from 6 July 2009 to 25 August 2009.</p> <p><u>Conclusion/Remedial Action</u> The dust complaint was considered not justifiable since no action & limit level exceedance on construction dust were identified. However, it was a recurrent case from Greenview Terrace. The Contractor was recommended to enhance water spraying continuously especially in rock breaking activities. On the other hand, there was no noise levels ($L_{eq(30\text{min})}$) from the measurement taken from ET was more than 80 dB(A). However, it was a recurrent case from Greenview Terrace. The Contractor was reminded to enhance the on-site noise mitigation measures. The enhanced mitigation measures are proposed as follows:</p> <ul style="list-style-type: none"> • A staff from the Contractor was designated to take the reading of L_{eq} (5mins) at the roof of Greenview Terrace. In case of the L_{eq} (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level. • The designated staff was reminded to record all the weather condition including raining and wind speed. • Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as 	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>much as possible.</p> <ul style="list-style-type: none"> • Movable noise barriers were placed on site and the movable noise barriers were also modified. • Existing 25 ton rock breaker had been replaced by the another breaker. • The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap. • A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace. <p>From the additional monitoring data and monitoring data under regular EM&A requirements, noise level ($L_{eq, 30 \text{ min}}$) from 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency was maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels ($L_{eq, 30 \text{ min}}$) were also re-measured after the implementation of the mitigation measures. Noise level ($L_{eq, 30 \text{ min}}$) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures.</p>	
8	CIR-007	14 August 2009 at Outfall	Public through EPD	<p>EPD has received a complaint (EPD ref: EP3/N22/RW/17978-09) from Greenview Terrace regarding to daytime construction noise from the outfall construction site. The complaint date was corresponded to 14 August 2009.</p>	<p><u>Findings/ Observations</u> Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. According to the noise monitoring results from 6 July 2009 to 31 August 2009 at NSR 9, the measured noise levels complied with the limit level in accordance with the EIAO-TM.</p> <p><u>Conclusion/Remedial Action</u> This was a recurrent case from Greenview Terrace. The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are proposed as follows:</p> <ul style="list-style-type: none"> • A staff from the Contractor was designated to take the reading of L_{eq} 	Same Case with Complaint No. 11

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>(5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level.</p> <ul style="list-style-type: none"> • The designated staff was reminded to record all the weather condition including raining and wind speed. • Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible. • Movable noise barriers were placed on site and the movable noise barriers were also modified. • Existing 25 ton rock breaker had been replaced by the another breaker. • The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap. • A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace. <p>From the additional monitoring data and monitoring data under regular EM&A requirements, noise level ($L_{eq, 30 \text{ min}}$) from 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency would be maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels ($L_{eq, 30 \text{ min}}$) were also re-measured after the implementation of the mitigation measures. Noise level ($L_{eq, 30 \text{ min}}$) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures.</p>	
9	CIR-008	17 August 2009 at Portion D of the Site	Public through SOR	SOR has received a complaint (SOR ref:(DC/2007/12)/M4 5/500/02546) from Long Bench Garden	<p><u>Findings/ Observations</u></p> <p>Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in August 2009. The monitoring results from 3 August 2009 to 31 August 2009 at NSR 8 showed the measured noise levels complied with the limit level in accordance with the EIAO-TM. The contractor and the environmental</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				regarding to noise nuisance generated from the daytime construction work (rock-breaking) in Portion D of the Site. The complaint date was corresponded to 17 August 2009.	team were also undertaken site investigation on the subject area in response to the complaint. Noise mitigation measures should be enhanced continuously due to this complaint. <u>Conclusion/Proposed Action</u> The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures are recommended as follows: <ul style="list-style-type: none"> • Movable noise barriers had been placed towards the direction of Long Bench Garden, particular for the pipe pile works in the portal. • Tools box talk for construction team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible. • The existing noisy 25 ton rock breaker had been replaced by the other breaker. • A joint filler wall had been fixed on the vertical face of west bound to absorb the noise generated towards Long Beach Garden. Noise monitoring frequency was increased twice per week by ET due to this complaint. The measured noise levels were complied with the limit level in accordance with the EIAO-TM. No further complaint was received from Long Bench Garden within the reporting month.	
10	CIR-009	22 August 2009 at Outfall	Public through SOR	A complaint (SOR ref: (DC/2007/12)/M45/500/02628) was received from Greenview Terrace regarding to daytime construction noise level (Leq(30min)) was sometimes exceeded 75 dB(A)	<u>Findings/ Observations</u> Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and August 2009. The monitoring results from 6 July 2009 to 31 August 2009 at NSR 9 showed the measured noise levels complied with the limit level in accordance with the EIAO-TM. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Noise mitigation measures should be enhanced continuously due to this complaint. <u>Conclusion/Proposed Action</u> The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise	Same Case with Complaint No. 11

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				<p>at the outfall construction site. The complaint date was corresponded to 22 August 2009.</p>	<p>mitigation measures continuously. The enhanced mitigation measures are recommended as follows:</p> <ul style="list-style-type: none"> • A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level. • The designated staff was reminded to record all the weather condition including raining and wind speed. • Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible. • Movable noise barriers were placed on site and the movable noise barriers were also modified. • Existing 25 ton rock breaker had been replaced by the another breaker. • The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap. • A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace. <p>From the additional monitoring data and monitoring data under regular EM&A requirements, noise level ($L_{eq, 30 \text{ min}}$) from 6 July to 31 August 2009 was in the range of 71 to 74 dB(A) to the nearest integer. The noise monitoring frequency was maintained in twice per week to check whether the mitigation measures are effective. From the information of the Contractor, all the mitigation measures were implemented on 31 August 2009. Noise levels ($L_{eq, 30 \text{ min}}$) were also re-measured after the implementation of the mitigation measures. Noise level ($L_{eq, 30 \text{ min}}$) from 4 Sep to 28 Sep 2009 was in the range of 70 to 73 dB(A) to the nearest integer after the implementation of the mitigation measures. In our investigation, there was no exceedance of the measured noise level at Greenview Terrace.</p>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
11	CIR-010	24 September 2009 at Outfall	Public through SOR	A complaint (SOR ref: (DC/2007/12)/M45/500/02749) was received from Greenview Terrace regarding to daytime construction noise level (Leq(30min)) was sometimes exceeded 75 dB(A) at the outfall construction site.	<p><u>Findings/ Observations</u> Soil nailing, excavation, rock breaking and drilling, loading and unloading the materials were generally observed during monitoring period in July and September 2009. The monitoring results from 6 July 2009 to 29 October 2009 at NSR 9 showed the measured noise levels complied with the limit level in accordance with the EIAO-TM. The contractor and the environmental team were also undertaken site investigation on the subject area in response to the complaint. Noise mitigation measures have been enhanced continuously due to this complaint.</p> <p><u>Conclusion/Proposed Action</u> The documented complaint for noise is considered to trigger the action level and the Contractor was reminded to enhance the on-site noise mitigation measures continuously. The enhanced mitigation measures were implemented as follows:</p> <ul style="list-style-type: none"> • A staff from the Contractor was designated to take the reading of Leq (5mins) at the roof of Greenview Terrace. In case of the Leq (5min) exceed 73 dB(A), the Contractor would re-schedule the noisy plants to mitigate the escalation of noise level. • The designated staff was reminded to record all the weather condition including raining and wind speed. • Tools box talk for the Contractor's Team was carried out for reminding that the movable barrier should be placed to the breaking activities as much as possible. • Movable noise barriers were placed on site and the movable noise barriers were also modified. • Existing 25 ton rock breaker had been replaced by the another breaker. • The breaking tap of the 25 ton rock breaker had been replaced by another breaking tap. • A joint filler wall was installed at the vertical face of westbound to mitigate the noise rebound from the vertical face to high level of Greenview Terrace. 	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>From the additional monitoring data above and the regular monitoring under EM&A requirements, the measured noise levels were complied with the limit level in accordance with the EIAO-TM. From the noise level on 25 September 2009 and 2 October 2009, the trend of noise level seemed to be increased since the decoration work at 14/F Greenview Terrace was the domain noise source during the monitoring. The noise level during that time would be considered for reference only. There was no exceedance of the measured noise level at Greenview Terrace in our investigation.</p>	
12	CIR-011	2 October 2009 at I-3	Public through EPD	<p>EPD has received a complaint (EPD ref: EP3/N22/RW/22016-09) regarding to construction dust at the Intake-3 on 2 October 2009.</p>	<p><u>Findings/ Observations</u></p> <p>There is no representative air monitoring location as stated in the EM&A Manual. The contractor and the environmental team were undertaken site investigation on the subject area at 08-Oct-09 in response to the complaint. Air quality mitigation measures as recommended in EIA have been implemented by the Contractor. However, the dust impact by exposed area could be further improved. The mitigation measures during the site investigation were observed as follows:</p> <ul style="list-style-type: none"> • Water spraying was provided to the exposed surface. • Wheel washing facilities for dump trucks was provided at the site exit. • Water spraying was provided during excavation and loading/unloading works <p><u>Conclusion/Proposed Action</u></p> <p>Based on our site inspection, the complaint for dust is considered justifiable as it is due to windy erosion on the exposed surface. Air quality mitigation measures as recommended in EIA have also been implemented in order to control and minimise the air quality impact arising from the construction activities. In view of the recent dry season, the haul road and the exposed area would be dry very quickly. The Contractor was recommended to provide water spraying more frequently especially in the dry season.</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
13	(DC/2007/12)/M45/500/2923 & email on 11 November 2009 from MCSJV	9 November 2009 at Outfall	Greenview Terrace through EPD	Movable noise barrier was not placed close enough to the piling machine.	<p><u>Immediate Action</u> The rig was re-orientated and the barrier was placed closed to the drilling head.</p> <p><u>Follow-up Action</u></p> <ul style="list-style-type: none"> • Training was conducted to the operator to ensure that the workers aware that the barrier should be placed closed not the drilling head not the machine itself. • In order to prevent future occurrence, a permit to dig system was adopted. It should be checked by the Contractor and endorsed by the SOR before starting the drilling rig. <p>The follow up action was checked and a permit to dig system has been implemented.</p>	Closed
14	(DC/2007/12)/M45/500/2978 & email on 19 November 2009 from MCSJV	18 November 2009 at Outfall	Greenview Terrace through EPD	Rock-breaking activity carried out in the eastern area of Portion D, closest to Greenview Terrace, was not totally screened and line of sight of the breaker was observed from the NSR.	<p><u>Follow up Action</u></p> <ul style="list-style-type: none"> • The bamboo scaffold was extended further away from stage 3 scaffold to further screen off the activities to the Greenview. The length of the extension was about 8 to 10 m. • A strong reminded was given to the relevant staff and sub-contractor and the barrier should be placed in the right orientation before breaking. • The mitigation measures were strictly followed as stated in the proposal. <p>The follow up action and relevant records was checked.</p>	Closed
15.	CIR-12	19 January 2010 at Intake-3 construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/01270-10) regarding effluent discharge at Intake-3 construction site on 19 January 2010.	<p><u>Findings/ Observations</u> The effluent discharge on 19 January 2010 was due to the leakage of Gabion wall at I3. The water from the rock drilling work was flowing through the gap of the Gabion Wall to the watercourses at I3.</p> <p><u>Immediate Action</u> The contractor had sealed the gap at the Gabion Wall immediately after the incident.</p> <p><u>Conclusion/Proposed Action</u> Based on our site inspection, the complaint was due to leakage of Gabion</p>	Closed.

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					wall. The area would be checked and maintained continuously to avoid recurrence case. The above identified mitigation measures have been implemented by the Contractor on 22 January 2010 and ET has also checked the implementation on 31 January 2010. The ET will closely inspect the watercourses during the routine site inspections and provide advice to the Contractor.	
16	CIR-13	19 January 2010 at Intake-3 construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/01319-10) regarding daytime construction noise at Intake-3 construction site on 19 January 2010.	<p><u>Findings/ Observations</u></p> <p>The monitoring station concerned is NSR6 (i.e. at Squatter facing to the construction site). Excavation, soil nailing, rock drilling and breaking, loading and unloading the materials were generally observed during monitoring period in mid-January 2010. The measured noise levels in January 2010 complied with the limit level in accordance with the EM&A Manual. These cases would also be treated as two action level exceedances on noise. The Contractor and the Environmental Team were also undertaken site investigation on the subject area in response to complaint. The noise mitigation measures during the site investigation were recommended as follows:</p> <ul style="list-style-type: none"> • Sound insulation sheets were installed covering the working area during breaking and rock drilling in order to block the line of sight to the NSR. • Noise insulation materials were used to enclose the drilling rig tightly. <p><u>Conclusion/Proposed Action</u></p> <p>Based on the site inspection and monitoring results, the complaint was due to noise generated by rock breaking work. The identified mitigation measures have been discussed with the Contractor and the Contractor has submitted the remedial proposal. The proposal was implemented by the Contractor on 25 January 2010 and ET has also checked the implementation on 31 January 2010. The Contractor was also advised to review the mitigation measures from time to time near the NSR at I3. The ET will closely inspect the area during the routine site inspections and provide advice to the Contractor.</p>	Closed.
17	CIR-13	21 January 2010 at Intake-3	Public through	EPD has received a public complaint (EPD ref:	Refers to Investigation /Mitigation Action for Complaint No. 16.	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
		construction site	EPD	EP3/N22/RW/01444-10) regarding daytime construction noise at Intake-3 construction site on 21 January 2010.		
18	CIR-14	27 August 2010 near Intake-2 construction site	Public through DSD	DSD has received a public complaint regarding choked sewage manhole (MH1) at Lo Wai Road construction site on 27 August 2010.	<p><u>Findings/ Observations</u> During DSD inspection on 30 August 2010, improper discharge from the site to manhole, MH3, which is located downstream of MH1 was observed. ET had received those information from the Contractor on 09 September 2010. Site investigation was also carried out by SOR's representative with the Contractor on 01 September 2010. Checking with the site log, the construction activity at Lo Wai on 27 August 2010 was pipe jacking only. No site formation works was undertaken. The contractor and SOR's representative have undertaken site investigation on the subject area on 01 September 2010. On-site flow test at Portion G had conducted.</p> <ul style="list-style-type: none"> ● Maeda works area is located at the lower section of Lo Wai Road and manhole MH3 is adjacent to the works area. MH1 (choked sewage manhole) is located at the upper section of Lo Wai Road. MH2 manhole is located middle section of Lo Wai Road. MH1 and MH2 are outside the works area. ● Water flow test for manhole MH2 and MH3 and no blockage was observed. ● Sewage overflow was found at MH1 during the joint site inspection on 01 September 2010 ● It was reported that there were water pipes connected between the site and the MH3. Discharge was found in MH3 during DSD inspection. ● The contractor claimed that the purpose of the water pipes was to direct the storm water and underground water inside the concrete pipe "pipe jacking". ● There was no discharge license for that portion. The Contractor had stopped on 01 September 2010 the water pumping to MH3 and 	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>apply the discharge license for the Lo Wai site.</p> <p><u>Conclusion/Proposed Action</u> Based on the joint site inspection, the choked manhole MH1 was not due to works activities. The Contractor had clean up the choked manhole MH1 and no sewage overflow from MH1 was observed. The Contractor was requested to divert the storm water to desilting system prior to discharge while no such discharge can be made until a valid discharge license is granted. The ET will closely inspect the vicinity area during the routine site inspections and provide advice to the Contractor as necessary.</p>	
19&20	CIR-15	17 November 2010 at outfall construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/24002-10 and EP3/N22/RW/24006-10) regarding daytime construction noise about derrick barge squeaking and rock breaking at Outfall construction site on 17 November 2010.	<p><u>Findings/ Observations</u> Drilling, excavation, marine mud dredging, rock breaking, mucking-out process and crane operation were observed during site inspections on 2 and 17 December 2010. The monitoring results measured on 15 November 2010 and 25 November at NSR 9 showed that the measured noise levels complied with the limit level (75 dB(A)) in accordance with the EIAO-TM. As part of the investigation of the noise complaints, the Contractor and the ET conducted additional site inspections and reviewed and audited the current noise mitigation practices and the Contractor's environmental performance on-site.</p> <p><u>Conclusion / Proposed Action</u> The documented complaints for noise triggered the action level of the noise monitoring. The Contractor had implemented the following on-site noise mitigation measures:</p> <ul style="list-style-type: none"> ● Erection of temporary noise insulation sheet at the rim of the spiral ramp construction site; ● Moveable barriers for rock breaker; ● Wrapping noise absorptive material at the rock breaker head; ● Tailor made noise enclosure for drilling rig; ● Semi-enclosed muck out process at muck hopper; ● Use of rock splitter (which is a relatively quieter method in contrast to rock breaker); and ● Noise insulation blanket enclosing the crane engine of derrick barge. <p>Noise monitoring was increased to twice per week and the results were</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					reported in the Complaint Investigation Report submitted on 24 December 2010. The measured noise level after implementation of the noise mitigation measures ranged from 69 to 73 dB(A) to the nearest integer and complied with the limit level in accordance with the EIAO-TM. The results showed that noise mitigation measures were effective. The contractor was advised to review the mitigation measures from time to time near the NSR 9. The ET would closely inspect the area during the routine site inspections and provide advice to the Contractor.	
21	CIR-16	10 January 2011 at outfall construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/00484-11) regarding dark smoke emission from derrick barge and construction noise and dust at Outfall construction site on 10 January 2011.	<p><u>Findings/ Observations</u></p> <p>1. <u>Dark Smoke Emission from Derrick Barge</u> Dark smoke emitted from the derrick barge was promptly investigated after the receipt of the complaint. The issue was found specific to the mechanical operation of the barge working at the site at that moment. The derrick barge being complained was then replaced by another barge without the relevant mechanical issue. No further complaint was received since then.</p> <p>2. <u>Construction Dust</u> Regular 1-hour TSP monitoring, in accordance with EM&A Manual, was carried out by the Environmental Team (ET). The monitoring station concerned is ASR 9, located at the podium level of Greenview Terrace facing the construction site. In January, 1 hour TSP concentration monitoring had been conducted on 4, 10, 14, 20 and 26 January 2011 at Greenview Terrace (ASR). Rock breaking, drilling and excavation were observed during monitoring. No exceedance was recorded.</p> <p>The contractor and the environmental team were also undertaken site investigation at the subject area on 21 January 2011 in response to the complaint. It was confirmed that the air quality mitigation measures as recommended in EIA had been provided by the Contractor. The mitigation measures are as follows:</p> <ul style="list-style-type: none"> ● Water spraying surrounding the spiral ramp; ● Water spraying for rock drilling and rock breaking; ● Water spraying for C&D material before loading and unloading to 	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>derrick barge;</p> <ul style="list-style-type: none"> ● Water spraying for the exposed surface and the haul road; ● Water spraying for trucks and vehicles at the site exit. <p>3. <u>Construction Noise</u></p> <p>The documented complaints for noise triggered the action level of the noise monitoring. The Contractor had implemented the following on-site noise mitigation measures:</p> <ul style="list-style-type: none"> ● Extension of Temporary noise insulation barrier (made of noise blanket) at the rim of the spiral ramp construction site facing Greenview Terrace; ● Movable noise barriers to surround the rock breaking activities at the spiral ramp where it is in safe ground condition; ● Tailor made noise enclosure for rock drilling machine; ● Semi-enclosed muck out process at muck hopper (with noise curtain underneath); ● Use of temporary noise enclosure for piling work at Castle Peak Road; ● Noise insulation blanket enclosing the crane engine of derrick barge; ● Additional noise blanket along the railings of the spiral ramp; and ● Use of rock splitter (which is a relatively quieter method in contrast to rock breaker). <p>Noise monitoring has been increased to twice per week and the results will be reported in the Complaint Investigation Report to be submitted in mid-February 2011. The measured noise level after implementation of the noise mitigation measures ranged from 71 to 74 dB(A) to the nearest integer and complied with the limit level in accordance with the EIAO-TM. The results showed that noise mitigation measures were effective. The contractor was advised to review the mitigation measures from time to time near the NSR 9. The ET would closely inspect the area during the routine site inspections and provide advice to the Contractor.</p> <p><u>Conclusion / Proposed Action</u></p> <p>1. <u>Dark Smoke Emission from Derrick Barge</u> Dark smoke emitted from the derrick barge was considered a stand-alone</p>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>incident and was specific to the derrick barge being complained. No further complaint was received after the barge was replaced by another.</p> <p>2. <u>Construction Dust</u> Based on our site inspection and monitoring results, the complaint was considered not justifiable since no action and limit level exceedance on construction dust were identified. Air quality mitigation measures as recommended in EIA were implemented in order to control and minimize the air quality impact and nuisance arising from the construction activities. Nevertheless, the Contractor was reminded to enhance the air quality mitigation measures such as increasing the water spraying frequency and ensure proper functioning of the automatic sprinklers at the Outfall construction site.</p> <p>3. <u>Construction Noise</u> Noise measurement results between 10 and 28 January 2011 were below the limit level (75 dB(A)) and complied with the noise criterion. The Contractor had implemented various mitigation measures on site to alleviate the construction noise impact. The ET will remind the Contractor to enhance and maintain the normal functioning of the measures continuously to minimize the impact. The Contractor should also closely liaise with the nearby residents and inform the progress of the construction and the implementation of the environmental mitigation measures at the Outfall construction site.</p>	
22	CIR-17	30 June 2011 at Intake-3 construction site	Public through EPD	EPD has received a public complaint (EPD ref: EP3/N22/RW/12759-11) regarding construction dust and daytime construction noise from the Intake-3 construction site on 30 June	<p>1. <u>Findings / Observations</u> Checking with the site log, construction activities conducted at I-3 were breaking / mucking out and rock splitting inside the shaft, curing of planter wall, backfilling at tree pit, slope reinstatement and backfilling at PB wall, monitoring of de-deformation monitoring point, and general site cleaning and housekeeping. The Contractor and ET undertook site investigations on the subject area on 8 and 20 July 2011. The following dust and noise mitigation measures were implemented during site investigations: <u>Dust Mitigation Measures (implemented prior to the complaint)</u></p> <ul style="list-style-type: none"> ● All the main haul road was paved; 	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
				2011.	<ul style="list-style-type: none"> ● Material transported by a dump truck was covered with impervious sheeting; ● Exposed soil slope surface near the PB wall was covered by tarpaulin sheets; ● Hoardings (with 2.4 m high) were provided along the site boundary next to the access road; ● Regular watering on haul roads by sprinklers was observed; ● Vehicle speed limit of 5 km per hour was implemented within the construction site; ● Water spraying for dust suppression of on-going “dusty” activities (essentially including drilling and rock breaking within the shaft of about 16.5 m below ground) was observed; <p><u>Construction Noise Mitigation Measures (implemented prior to the complaint)</u></p> <ul style="list-style-type: none"> ● Temporary noise barriers (about 4 m high) were erected on the shaft concrete block wall; ● Quiet plant (rock splitter) was employed for shaft excavation; ● Noise from generator was screened by a temporary noise barrier; and ● Breaker heads of rock breaking machine were wrapped with sound insulating materials. <p>2. <u>Conclusion / Proposed Action</u></p> <p>As there are no substantial noise sources at I-3 other than the project construction activities, it is considered that the noise complaint is project-related. In accordance with the Event / Action Plan for Construction Noise specified in the EM&A Manual, noise monitoring frequency at the squatters (NSR 6) near I-3 were increased to twice per week (from 11 July 2011 to 30 July 2011) due to this complaint. The measured noise levels ($L_{eq, 30 \text{ min}}$) are shown in the following table. The measured noise levels, ranged from 60.0 dB(A) to 68.9 dB(A), are well below the limit level (75 dB(A)) in accordance with the EIAO-TM. During the site investigations on 8 and 20 July 2011, the above noise mitigation measures were continuously implemented. No further noise complaint was received in July 2011. Thus, with the consideration of the noise measurement results</p>	

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status																																																
					<p>and implementation of the above noise mitigation measures, the construction noise is considered acceptable. The Contractor will maintain the noise mitigation measures mentioned above to minimise noise nuisance.</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Start Time</th> <th>End Time</th> <th>L_{eq}, dB(A)</th> <th>Limit Level, dB(A)</th> <th>Major Construction Noise Sources</th> </tr> </thead> <tbody> <tr> <td>6-Jul-11</td> <td>11:17</td> <td>11:47</td> <td>60.0</td> <td>75</td> <td>Crane operation</td> </tr> <tr> <td>14-Jul-11</td> <td>16:00</td> <td>16:30</td> <td>67.0</td> <td>75</td> <td>Drilling and rock breaking</td> </tr> <tr> <td>15-Jul-11</td> <td>17:00</td> <td>17:30</td> <td>68.9</td> <td>75</td> <td>Drilling and rock breaking</td> </tr> <tr> <td>18-Jul-11</td> <td>13:30</td> <td>14:00</td> <td>65.7</td> <td>75</td> <td>Drilling and crane operation</td> </tr> <tr> <td>20-Jul-11</td> <td>13:10</td> <td>13:40</td> <td>68.1</td> <td>75</td> <td>Drilling and rock breaking</td> </tr> <tr> <td>28-Jul-11</td> <td>13:35</td> <td>14:05</td> <td>64.9</td> <td>75</td> <td>Drilling and excavation</td> </tr> <tr> <td>30-Jul-11</td> <td>09:10</td> <td>09:40</td> <td>63.6</td> <td>75</td> <td>Drilling and crane operation</td> </tr> </tbody> </table> <p>Remark: The location of powered mechanical equipment (PME) will change occasionally and the utilization time for each PME may not be constant.</p> <p>As observed during the site investigation on 8 July 2011, dust suppression measures aforementioned were implemented on site. Additional dust control measures have been implemented at I-3 by the Contractor in early July 2011 to further suppress dust emission:</p> <ol style="list-style-type: none"> 1) Tailor-made frame with blankets has been installed for the drilling rig; 2) Water hoses have been installed to the drilling rig within the tailor-made frame during drilling; and 3) Water smog device installed at the edge of intermediate platform of 	Date	Start Time	End Time	L _{eq} , dB(A)	Limit Level, dB(A)	Major Construction Noise Sources	6-Jul-11	11:17	11:47	60.0	75	Crane operation	14-Jul-11	16:00	16:30	67.0	75	Drilling and rock breaking	15-Jul-11	17:00	17:30	68.9	75	Drilling and rock breaking	18-Jul-11	13:30	14:00	65.7	75	Drilling and crane operation	20-Jul-11	13:10	13:40	68.1	75	Drilling and rock breaking	28-Jul-11	13:35	14:05	64.9	75	Drilling and excavation	30-Jul-11	09:10	09:40	63.6	75	Drilling and crane operation	
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Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>the shaft.</p> <p>The Contractor have continuously applied all the above mentioned dust suppression measures to minimise airborne dust generation, as observed during the site investigation on 20 July 2011. No dust dispersion from the construction site was observed during the site investigations on 8 and 20 July 2011. In addition, no further construction dust complaint is received in July 2011. As such, it is considered that the dust suppression measures implemented on site are adequate to minimise dust nuisance. The Contractor will maintain these measures on site for construction dust control.</p> <p>3. <u>Follow Up Action(s)</u></p> <p>For this complaint, the Contractor has implemented adequate mitigation measures for construction dust and noise control. As no further complaint is received in July 2011, it is considered that the complaint is closed. Nevertheless, the ET will continuously review the condition of the site during the routine site inspections, inspect proper functioning of the aforementioned construction dust and noise mitigation measures, and provide advice to the Contractor to be vigilant and tailor mitigation measures in advance of future planned site work activities.</p>	
23	CIR-18	2 September 2011 at Sheung Kok Shan near Intake 2	Mr. Cheung through EPD	EPD have received a complaint from Mr. Cheung, who lived in Sheung Kok Shan, concerning construction noise arising from the use of the TBM at night time. He alleged that the noise emanated from the tunnelling works had caused	<p>1. <u>Findings / Observations</u></p> <p>According to the approved EIA Report, it is recommended to restrict the tunnel boring machine (TBM) operation in the non-restricted period for tunnel section from chainage 1295 m to 1449 m. Checking with the site log, the Contractor has strictly followed the EIA recommendation for the TBM operation within the non-restricted period between the chainage 1295 m to 1449 m. TBM moved from CH1449 on 11 August 2011 and passed through CH1295 on 23 August 2011, and the Contractor resumed night time TBM operation afterwards. TBM was operating at night time (from 01:10 to 07:00) on 26 August 2011 (about 55 m away from the EIA restricted zone and about 22 m away from Mr. Cheung's house, which is located near CH1218).</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status																		
				nuisance to him since 26 August 2011.	<p>First verbal complaint from Mr. Cheung was received in the morning of 26 August 2001 by the Contractor. The Contractor had stopped TBM night time operation from 26 August to 01 September 2011 accordingly. On 01 September 2011, TBM was located 38 m away from Mr. Cheung's house and the Contractor attempted to resume the night time operation.</p> <p>Second verbal complaint from Mr. Cheung was received on 02 September 2011 by EPD. The Contractor took immediate measure to stop the night time operation from 02 to 07 September 2011. On 08 September 2011, TBM moved 109 m away from Mr. Cheung's house. The Contractor attempted to resume night time operation and no further complaint was received after that.</p> <p>2. <u>Mitigation Measure Implemented after Receiving the Complaints</u></p> <p>Night time operation of the TBM was restricted as shown in the following table:</p> <table border="1"> <thead> <tr> <th>Period</th> <th>Night Time Operation¹</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>25 - 26 Aug 2011</td> <td>From 01:10 to 07:00 (26 Aug)</td> <td>The Contractor received a verbal complaint in the morning (26 Aug 2011). The Contractor began to stop night time TBM operation. TBM was located about 22 m away from Mr. Cheung's house.</td> </tr> <tr> <td>26 - 27 Aug 2011</td> <td>-</td> <td>No night time TBM operation</td> </tr> <tr> <td>27 - 28 Aug 2011</td> <td>-</td> <td>No night time TBM operation</td> </tr> <tr> <td>28 - 29 Aug 2011</td> <td>-</td> <td>No night time TBM operation</td> </tr> <tr> <td>29 - 30 Aug 2011</td> <td>-</td> <td>No night time TBM operation</td> </tr> </tbody> </table>	Period	Night Time Operation ¹	Remark	25 - 26 Aug 2011	From 01:10 to 07:00 (26 Aug)	The Contractor received a verbal complaint in the morning (26 Aug 2011). The Contractor began to stop night time TBM operation. TBM was located about 22 m away from Mr. Cheung's house.	26 - 27 Aug 2011	-	No night time TBM operation	27 - 28 Aug 2011	-	No night time TBM operation	28 - 29 Aug 2011	-	No night time TBM operation	29 - 30 Aug 2011	-	No night time TBM operation	
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Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action			Status
					30 - 31 Aug 2011	-	No night time TBM operation	
					31 Aug - 01 Sep 2011	--	No night time TBM operation. TBM was located about 38 m away from Mr. Cheung's house.	
					01 - 02 Sep 2011	From 23:00 (01 Sep) to 04:50 (02 Sep)	The Contractor attempted to resume night time TBM operation on 01 Sep 2011. ET received a complaint via EPD in the morning (2 Sep 2011). The Contractor began to stop night time TBM operation on 02 Sep 2011.	
					02 - 03 Sep 2011	-	No night time TBM operation	
					03 - 04 Sep 2011	-	No night time TBM operation	
					04 - 05 Sep 2011	-	No night time TBM operation	
					05 - 06 Sep 2011	-	No night time TBM operation	
					06 - 07 Sep 2011	-	No night time TBM operation	
					07 - 08 Sep 2011	From 06:00 to 07:00 (08 Sep 2011)	TBM was located about 109 m away from Mr. Cheung's house. The Contractor attempted to resume TBM night time operation and no further complaint was received.	
					Remark: 1. "Night Time" refers to 23:00 to 07:00 of the following day. 3. <u>Conclusion / Proposed Action</u> Having reviewed the timing of the complaints and periods of TBM operation during the night time on 25 - 26 August 2011 and 1 - 2			

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>September 2011, it is believed that the complaints are related to the TBM operation during the night time. The Contractor has undertaken swift and appropriate action in response to Mr. Cheung's complaints. The night time operation of the TBM was restricted following the complaint. As the TBM continues to operate during the day time and moves further away from Mr. Cheung's house, the ground-borne noise nuisance upon Mr. Cheung gradually fades away. It is considered that the nuisance caused by TBM night time operation is then imperceptible from the complainant. No further complaint is received after 2 September 2011. As such, no further action is required.</p> <p>4. <u>Follow Up Action(s)</u></p> <p>For this complaint, the Contractor has implemented adequate mitigation measure (that is, restricting the TBM to operate during the day time only) for ground-borne noise control. The TBM has moved further away from Mr. Cheung's house and no further complaint is received after the Contractor resumed the TBM night time operation (08 September 2011). Thus, it is considered that the complaint is closed.</p>	
24	CIR-19	8 February 2012 at Intake-3 Construction Site	Mr. Cheng through SOR	SOR has received a public complaint regarding daytime construction noise from the Intake-3 construction site on 8 February 2012.	<p>1) <u>Findings / Observations</u></p> <p>Checking with the site log, construction activities conducted at I-3 in that morning was rock breaking by hydraulic breaker at the proposed access road. The Contractor and ET undertook site investigations on the subject area on 9 February 2012. The following noise mitigation measures were implemented during site investigations:</p> <p><u>Construction Noise Mitigation Measures (implemented prior to the complaint)</u></p> <ol style="list-style-type: none"> 1) Noise barrier on the top of vortex shaft was maintained; 2) Silent type breaker tip was utilized; and 3) Breaker tip was wrapped by acoustic insulating material. 	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status																								
					<p>2) <u>Conclusion / Proposed Action</u></p> <p>As there are no substantial noise sources at I-3 other than the project construction activities, it is considered that the noise complaint is project-related. In accordance with the Event / Action Plan for Construction Noise specified in the EM&A Manual, noise monitoring frequency at the squatters (NSR 6) near I-3 were increased to twice per week (from 10 February 2012 to 29 February 2012) due to this complaint. The measured noise levels ($L_{eq, 30 \text{ minutes}}$) are shown in the following table. The measured noise levels, ranged from 59.5 dB(A) to 68.1 dB(A), are well below the limit level (75 dB(A)) in accordance with the EIAO-TM. During the site investigations on 9 and 23 February 2012, the above noise mitigation measures were continuously implemented. No further noise complaint was received in February 2012. Thus, with the consideration of the noise measurement results and implementation of the above noise mitigation measures, the construction noise is considered acceptable. The Contractor will maintain the noise mitigation measures mentioned above to minimise noise nuisance.</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Start Time</th> <th>End Time</th> <th>L_{eq}, dB(A)</th> <th>Limit Level, dB(A)</th> <th>Major Construction Noise Sources</th> </tr> </thead> <tbody> <tr> <td>7-Feb-2012</td> <td>13:28</td> <td>13:58</td> <td>60.2</td> <td>75</td> <td>Crane operation and rock breaking</td> </tr> <tr> <td>10-Feb-2012</td> <td>15:15</td> <td>15:45</td> <td>62.1</td> <td>75</td> <td>Crane operation and excavation works</td> </tr> <tr> <td>13-Feb-2012</td> <td>13:35</td> <td>14:05</td> <td>68.1</td> <td>75</td> <td>Crane operation and rock breaking</td> </tr> </tbody> </table>	Date	Start Time	End Time	L_{eq} , dB(A)	Limit Level, dB(A)	Major Construction Noise Sources	7-Feb-2012	13:28	13:58	60.2	75	Crane operation and rock breaking	10-Feb-2012	15:15	15:45	62.1	75	Crane operation and excavation works	13-Feb-2012	13:35	14:05	68.1	75	Crane operation and rock breaking	
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					17-Feb-2012	16:20	16:50	60.2	75	Crane operation and excavation works	
					20-Feb-2012	13:33	14:03	66.4	75	Crane operation and rock breaking	
					23-Feb-2012	14:30	15:00	64.3	75	Crane operation and rock breaking	
					27-Feb-2012	11:10	11:40	63.4	75	Crane operation and rock breaking	
					29-Feb-2012	13:26	13:56	59.5	75	Crane operation and rock breaking	
					Remark: The location of powered mechanical equipment (PME) will change occasionally and the utilization time for each PME may not be constant. Additional noise mitigation measures have been implemented at I-3 by the Contractor to further reduce the construction noise: ● Noise barrier comprised of acoustic blankets installed close to the rock breaking area was erected on the site. The Contractor have continuously applied all the above mentioned noise mitigation measures to minimise construction noise, as observed during the site investigation on 9 and 23 February 2012. No further construction noise complaint was received in February 2012. As such, it is considered that the noise mitigation measures implemented on site are adequate to minimise construction noise nuisance. The Contractor will maintain these measures on site for construction noise control.						

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status																												
					<p>3) <u>FOLLOW UP ACTION(S)</u></p> <p>For this complaint, the Contractor has implemented adequate mitigation measures for construction noise control. As no further complaint is received in February 2012, it is considered that the complaint is closed. Nevertheless, the ET will continuously review the condition of the site during the routine site inspections, inspect proper functioning of the aforementioned construction noise mitigation measures, and provide advice to the Contractor to be vigilant and tailor mitigation measures in advance of future planned site work activities. This case will be reported as an action level exceedance on noise and also in the complaint log in the monthly EM&A Report (February 2012).</p>																													
25	CIR-20	10 August 2012 at Intake-3 Construction Site	Mr. Cheng through ICC	1823 Call Centre (ICC) received a verbal complaint regarding the deterioration of water quality at Tso Kung Tam due to the construction works at Intake 3 construction site on 10 August 2012.	<p>1) <u>Findings / Observations</u></p> <p>Routine water quality monitoring upstream (I-3-C) and downstream (I-3) of the construction site at Intake 3 has been carried out since the commencement of construction works. Monitoring was conducted on 8 August 2012 and 10 August 2012. The results, as presented in the following table, indicate full compliance of water quality at I-3 with the action / limit levels of the water quality monitoring programme.</p> <table border="1"> <thead> <tr> <th rowspan="2">Date</th> <th rowspan="2">Parameters</th> <th colspan="2">Stations</th> <th rowspan="2">Action Level</th> <th rowspan="2">Limit Level</th> <th rowspan="2">Exceedance</th> </tr> <tr> <th>Impact (I-3)</th> <th>Control (I-3-C)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">8 August 2012</td> <td>Water Temperature (°C)</td> <td>31.6</td> <td>31.7</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>pH</td> <td>7.91</td> <td>7.92</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Dissolved Oxygen (mg/L)</td> <td>6.89</td> <td>6.85</td> <td>3.65</td> <td>3.51</td> <td>No</td> </tr> </tbody> </table>	Date	Parameters	Stations		Action Level	Limit Level	Exceedance	Impact (I-3)	Control (I-3-C)	8 August 2012	Water Temperature (°C)	31.6	31.7	-	-	-	pH	7.91	7.92	-	-	-	Dissolved Oxygen (mg/L)	6.89	6.85	3.65	3.51	No	Closed
Date	Parameters	Stations		Action Level	Limit Level			Exceedance																										
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8 August 2012	Water Temperature (°C)	31.6	31.7	-	-	-																												
	pH	7.91	7.92	-	-	-																												
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Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status
					<p>Clear flowing stream water was visually observed during the monitoring at I-3 on 10 August 2012. No significant water pollution source from the construction site was identified.</p> <p>2) <u>Conclusion / Proposed Action</u> Based on the site observation and the water quality monitoring data collected at I-3 and I-3-C on 8 and 10 August 2012, it is concluded that the construction works at I-3 did not generate unacceptable water quality impact at Tso Kung Tam. As such, the concerned complaint is not considered related to the construction works at Intake 3. No further action is, therefore, required.</p> <p>3) <u>FOLLOW UP ACTION(S)</u> Prior to the receipt of this complaint, the Contractor has already implemented adequate mitigation measures for construction effluent discharge. As no unacceptable water quality impact from the construction works was identified during the investigation, the complaint is considered as non-project related and is closed. Nevertheless, the ET will continuously monitor the water quality at Intake 3 under the current EM&A programme, review the condition of the site during the routine site inspections, and inspect proper functioning of the waste water treatment facilities.</p>	
26	CIR-21	5 September 2012 at Chung Kee Store at Lo Wai Road (NSR 3)	Through ICC	1823 Call Center (ICC) received a complaint (5 September 2012) regarding daytime construction noise nuisance generated by the power supply	<p>1) <u>Findings / Observations</u> Checking with the site log, an air compressor was located opposite to Chung Kee Store on 5 September 2012. As there was no other powered mechanical equipment located nearby and the construction was only undertaken during the daytime, it is considered that the complaint is about the noise nuisance generated from the air compressor during the daytime operation.</p>	Closed

Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action	Status																		
				machine opposite to Chung Kee Store at Lo Wai Road.	<p>In response to the complaint, the Contractor has implemented the following measures:</p> <ul style="list-style-type: none"> The concerned air compressor (AC1) located opposite to Chung Kee Store near the Vortex Drop Shaft (VDS) entrance (as "L1" shown in the attached I-2 layout plan) was de-mobilised for maintenance on 7 September 2012 and replaced by another air compressor (AC2); A layer of acoustic sheet was installed next to AC2 at L1 to minimise the noise nuisance, as observed during the site investigation on 11 September 2012; A third air compressor (AC3) was mobilized on site and placed behind the sub-contractor's office container (as "L2" shown in the attached I-2 layout plan) that screened off the noise from AC3 and minimised potential noise nuisance to the public. AC3 had been operated for another stage of construction activities since 14 September 2012 (as observed during the site investigation on 20 September 2012); and AC2 at L1 had ceased operation since 14 September 2012 and was demobilised off-site on 18 September 2012. As observed during the site investigation on 20 September 2012, no air compressor or other mechanical equipment was located at L1. <p>Regular daytime construction noise monitoring is currently undertaken by the ET at NSR 3 (that is, Hong Hoi Chee Hong Temple) in accordance with the contract specific EM&A Manual. According to the Manual, the complaint was considered as an exceedance of action level of construction air-borne noise. Following the Event / Action Plan for air-borne noise in the Manual, the noise monitoring frequency at NSR 3 was increased from once to twice per week between 10 September and 26 September 2012. The noise measurement results (as $L_{eq(30-minute)}$) at NSR 3 in September 2012 were presented in the following table:</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Start Time</th> <th>End Time</th> <th>L_{eq}, dB(A)</th> <th>Limit Level, dB(A)</th> <th>Dominant Noise Sources</th> </tr> </thead> <tbody> <tr> <td>4-Sep-12</td> <td>15:50</td> <td>16:20</td> <td>62.6</td> <td>75</td> <td>Drilling</td> </tr> <tr> <td>10-Sep-12</td> <td>14:05</td> <td>14:35</td> <td>62.2</td> <td>75</td> <td>Drilling and concrete work</td> </tr> </tbody> </table>	Date	Start Time	End Time	L_{eq} , dB(A)	Limit Level, dB(A)	Dominant Noise Sources	4-Sep-12	15:50	16:20	62.6	75	Drilling	10-Sep-12	14:05	14:35	62.2	75	Drilling and concrete work	
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Complaint No.	Log Ref.	Date/Location	Complainant	Details of Complaint	Investigation / Mitigation Action						Status	
					14-Sep-12	11:00	11:30	64.1	75	Drilling		
					17-Sep-12	15:20	15:50	64.3	75	Drilling		
					20-Sep-12	14:02	14:32	64.8	75	Drilling and concrete work		
					24-Sep-12	13:20	13:50	63.7	75	Drilling and concrete work		
					26-Sep-12	16:00	16:30	64.6	75	Drilling and concrete work		
				<p>The measured noise levels, ranged from 62.2 dB(A) to 64.8 dB(A), are below the limit level (75 dB(A)) in accordance with the approved EIA Report and the Contract Specific EM&A Manual.</p> <p>2) <u>Conclusion / Proposed Action</u> With the consideration of the noise measurement results and implementation of the above noise mitigation measures, construction noise nuisance is considered minimised with no further complaint received. As the concerned air compressor has been demobilised and the air compressor currently deployed on site is screened by a site container to minimise construction noise nuisance to the public, no further action is considered necessary.</p> <p>3) <u>Follow Up Actions</u> As the noise source of complaint was removed from the site and no further complaint was received, it is considered that the complaint is closed. Nevertheless, the ET will continuously review the condition of the site during the routine site inspections, inspect proper functioning of the construction noise mitigation measures implemented on site, and provide advice to the Contractor to be vigilant and tailor mitigation measures in advance of future planned site work activities. This case will be reported as an action level exceedance on construction noise.</p>								

Signed by Environmental Team Leader:



Date:

29 March 2013