



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

CONTRACT NO: HK/2011/07

**WANCHAI DEVELOPMENT PHASE II AND CENTRAL
WANCHAI BYPASS
SAMPLING, FIELD MEASUREMENT AND TESTING WORK
(STAGE 2)**

**ENVIRONMENTAL PERMIT NO. EP- 416/2011 AND FEP-
01/416/2011**

**SHATIN TO CENTRAL LINK (SCL) PROTECTION WORKS AT
CAUSEWAY BAY TYPHOON SHELTER (CBTS)**

MONTHLY ENVIRONMENTAL MONITORING & AUDIT REPORT

- AUGUST 2014 -

CLIENTS:

**Civil Engineering and Development
Department**

and

Highways Department

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CERTIFIED BY:

Raymond Dai
Environmental Team Leader

DATE:

8 September 2014

Ref.: AACWBIECEM00_0_5662L.14

10 September 2014

By Post and Fax (2691 2649)

AECOM Asia Company Limited
11/F, Tower 2
Grand Central Plaza
138 Shatin Rural Committee Road
Shatin, New Territories
Hong Kong

Attention: Mr. Conrad Ng

Dear Sir,

**Re: Shatin to Central Link – Protection Works at Causeway Bay Typhoon Shelter
Monthly Environmental Monitoring and Audit Report (August 2014)
for EP-416/2011 & FEP-01/416/2011**

Reference is made to the Environmental Team's submission of the captioned Monthly Environmental Monitoring and Audit (EM&A) Report for August 2014 received by email 8 September 2014.

Please be informed that we have no adverse comment on the captioned submission. We write to verify the captioned submission in accordance with Condition 3.4 in the captioned Environmental Permit.

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

Yours sincerely,



David Yeung
Independent Environmental Checker

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	AECOM	Mr. Peter Poon	by fax: 3912 3010
	AECOM	Mr. Frankie Fan	by fax: 2587 1877
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EXECUTIVE SUMMARY

- i. This is the Environmental Monitoring and Audit (EM&A) Monthly Report – August 2014 specific for Environmental Permit no. EP-416/2011 and Further Environmental Permit no. FEP-01/416/2011 on Shatin to Central Link (SCL) Protection Works at Causeway Bay Typhoon Shelter (CBTS). The Shatin to Central Link (SCL) protection works inside the Causeway Bay Typhoon Shelter (CBTS) is entrusted to the Central-Wanchai Bypass (CWB) project and will be carried out concurrently with the construction of the CWB under contract no. HY/2009/15. The construction impact of the SCL protection works on the environment is monitored together with that of the CWB by the Environmental Team (ET) employed under Contractor No. HK/2011/07. This EM&A report captures the environmental monitoring findings and information recorded during the period July 2014 to August 2014. The cut-off date of reporting is on the 27th of each reporting month.
- ii. In the reporting period, the principal work activity is included as follows:
 - Post tunnel construction works at ME4
 - Removal of temporary reclamation at ME4

Noise Monitoring

- iii. Noise monitoring during daytime was conducted at M2b - Noon gun area on a weekly basis.
- iv. One limit level exceedance was recorded at M2b – Noon gun area on 5 August 2014 in the reporting period. After investigation, the exceedance was concluded as not related to designated project work under EP416.

Air quality monitoring

- v. 1-hour and 24-hour Total Suspended Particulates (TSP) monitoring were conducted at CMA3a - CWB PRE Site Office Area.
- vi. No action or limit exceedance was recorded in the reporting period.

Water Quality monitoring

- vii. Water quality monitoring at C7 was conducted three days per week during the reporting period. The action and limit level exceedance of water quality monitoring are summarized in **Table I**.
- viii. Due to hoisting of rainstorm warning, the water quality monitoring on 1 August 2014 during flood tide, 13 August 2014 and 20 August 2014 during ebb tide were cancelled.
- ix. One limit level exceedance was recorded on 25 August 2014 during ebb tide in the reporting period. After the investigation, the exceedance was concluded as not project related.

Table I Summary of Water Quality Monitoring Exceedances in Reporting Month

Contract no.	Water quality monitoring Station	Mid-flood						Mid-ebb					
		DO		Turbidity		SS		DO		Turbidity		SS	
		AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
HY/2009/15	C7	0	0	0	0	0	0	0	0	0	1	0	0
Total		0	0	0	0	0	0	0	0	0	1	0	0

Complaints, Notifications of Summons and Successful Prosecutions

- x. There was no complaint received in this reporting period.

Site Inspections and Audit

- xi. The Environmental Team (ET) conducted weekly site inspections for Contract no. HY/2009/15 - Shatin to Central Link (SCL) Protection Works at Causeway Bay Typhoon Shelter (CBTS), in this reporting period. No non-conformance was identified during the site inspections.

Future Key Issues

- xii. In coming reporting month, the principal work activity is anticipated as follows:
- Post tunnel construction works at ME4.
 - Removal of temporary reclamation at ME4

1 INTRODUCTION

1.1 Scope of the Report

- 1.1.1. Lam Geotechnics Limited (LGL) has been appointed to work as the Environmental Team (ET) under Environmental Permit no. EP-416/2011 and Further Environmental permit nos. FEP-01/416/2011 to implement the Environmental Monitoring and Audit (EM&A) programme as stipulated in the EM&A Manual of the approved Environmental Impact Assessment (EIA) Report for Shatin to Central Link (SCL) Protection Works at Causeway Bay Typhoon Shelter (CBTS) (Register No.: AEIAR-159/2011) and in the EM&A Manual of the approved EIA Report for Shatin to Central Link Protection Works at Causeway Bay Typhoon Shelter (Register No. AEIAR-159/2011).
- 1.1.2. This report presents the environmental monitoring and auditing work carried out in accordance to the Section 7.5 of EM&A Manual and Environmental Monitoring and Audit Requirements of Environmental permit nos. EP-416/2011 and Further Environmental permit nos. FEP-01/416/2011.
- 1.1.3. This report documents the finding of EM&A works for Environmental Permit (EP) no. EP-416/2011, Further Environmental Permit (FEP) nos. FEP-01-416/2011 during the period [July 2014 to August 2014](#). The cut-off date of reporting is at 27th of each reporting month.

1.2 Structure of the Report

- Section 1** ***Introduction*** – details the scope and structure of the report.
- Section 2** ***Project Background*** – summarizes background and scope of the project, site description, project organization and contact details of key personnel during the reporting period.
- Section 3** ***Status of Regulatory Compliance*** – summarizes the status of valid Environmental Permits / Licenses during the reporting period.
- Section 4** ***Monitoring Requirements*** – summarizes all monitoring parameters, monitoring methodology and equipment, monitoring locations, monitoring frequency, criteria and respective event and action plan and monitoring programmes.
- Section 5** ***Monitoring Results*** – summarizes the monitoring results obtained in the reporting period.
- Section 6** ***Compliance Audit*** – summarizes the auditing of monitoring results, all exceedances environmental parameters.



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- Section 7** ***Cumulative Construction Impact due to the Concurrent Projects*** – summarizes the relevant cumulative construction impact due to the concurrent activities of the concurrent Projects.
- Section 8** ***Site Inspection*** – summarizes the findings of weekly site inspections undertaken within the reporting period, with a review of any relevant follow-up actions within the reporting period.
- Section 9** ***Complaints, Notification of summons and Prosecution*** – summarizes the cumulative statistics on complaints, notification of summons and prosecution
- Section 10** ***Conclusion***

2 PROJECT BACKGROUND

2.1 Background

- 2.1.1. The “Shatin to Central Link Protection Works at Causeway Bay Typhoon Shelter” (hereafter called “the Project”) is a Designed Project (DP) under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO). The Environmental Impact Assessment (EIA) Reports for Shatin to Central Link Protection Works at CBTS (Register No. AEIAR-159/2011) has been approved on 25 Feb 2011.
- 2.1.2. The key purpose of the SCL Protection Works and associated works at CBTS involves the construction of a 160m tunnel box by cut-and-cover method at the crossing above the Central – Wan Chai Bypass (CWB) tunnels. Temporary reclamation is required and has been authorized under the Foreshore and Sea-bed (reclamations) Ordinance. With the presence of the Protection Works, future construction of the SCL on both sides of the CWB tunnels is protected and ensured feasible without damaging or unduly affecting the CWB tunnels which could be operational by then. This arrangement will also minimize public nuisance and impact to the surrounding environment as it can reduce the reclamation area for subsequent construction of the SCL after CWB is completed. Nevertheless, the Protection Works cannot serve to function for any railway service or operation before the completion of SCL.
- 2.1.3. The SCL is strategically important for connecting the existing railway lines into an integrated rail network. The east-west connection will allow the setup of a 57km East-West Corridor across the city connecting Wu Kai Sha with Tuen Mun via Kowloon; whilst the north-south connection will operate over a 41km North-South Corridor with services originating in Lok Ma Chau or Lo Wu travelling via the existing East Rail Line (EAL) to Admiralty. This will enable a direct transportation linkage between Mainland China and Hong Kong Island.

2.2 Scope of the Project and Site Description

- 2.2.1. The study area encompasses existing developments in Causeway Bay Typhoon Shelter as shown in **Figure 2.1**. The scope of the Project includes:
- Temporary reclamation, which occupies about 0.7ha of Government foreshore and sea-bed (of which 0.3ha is already authorized under CWB project, i.e. additional reclamation of 0.4ha is required).
 - Dredging works at the southeast corner of the CBTS to provide space for temporary relocation of anchorage area due to the additional temporary reclamation for the Project.
 - Construction of a section of the twin track railway tunnel structure (approximately 160m long) above the proposed CWB located entirely offshore within the CBTS.
 - Relocation of the temporary Royal Hong Kong Yacht Club (RHKYC) jetty within the CWB temporary reclamation to a new location.

- Removal of the temporary reclamation, except the small area at the southwest corner of the reclamation (which will be removed by the SCL project upon completion of the future SCL tunnels connecting to the proposed South Ventilation Building (SOV)).

2.2.2. The Project contains Schedule 2 DP that, under the EIAO, requires Environmental Permits (EPs) to be granted by the DEP before they may either be constructed or operated. **Table 2.1** summarises the DP under this Project. [Figure 2.1](#) shows the location of this Schedule 2 DP.

Table 2.1 Schedule 2 Designated Projects under this Project

Item	Designated Project	EIAO Reference	Reason for inclusion
DP1	Temporary reclamation, which occupies about 0.7ha of Government foreshore and sea-bed	Schedule 2, Part I, C.12	A dredging operation which is less than 100m from a seawater intake point

2.3 Project Organization and Contact Personnel

2.3.1 Civil Engineering and Development Department and Highways Department are the overall project controllers for the construction phase of the Project, Project Engineer, Contractor(s), Environmental Team and Independent Environmental Checker are appointed to manage and control environmental issues.

2.3.2 The proposed project organization and lines of communication with respect to environmental protection works are shown in **Figure 2.2**. Key personnel and contact particulars are summarized in **Table 2.2**

Table 2.2 Contact Details of Key Personnel

Party	Role	Post	Name	Contact No.	Contact Fax
AECOM	Engineer's Representative for WDII	Principal Resident Engineer	Mr. Frankie Fan	2587 1778	2587 1877
	Engineer's Representative for CWB	Principal Resident Engineer	Mr. Peter Poon	3912 3388	3912 3010
MTR Corporation Limited	Permit Holder	Environment Manager	Mr. Richard Kwan	2688 1179	2993 7577
		Environmental Engineer I	Miss. Viola Tong	3127 6296	
		Environmental Engineer II	Mr. Chris Mak	3127 6297	
China State Construction Engineering (HK) Ltd.	Contractor under Contract no. HY/2009/15	Project Director	Mr. K C Cheung	3557 6399	2566 2192
		Site Manager	Mr. J H Chen	3557 6368	
		Contractor's Representative	Mr. Gene Cheung	3557 6407	
		Head of construction	Mr. Roger Cheung	3557 6371	
		Environmental Officer	Mr. Andy Mak	3557 6347	
ENVIRON Hong Kong Limited	Independent Environmental Checker (IEC)	Independent Environmental Checker (IEC)	Mr. David Yeung	3465 2888	3465 2899
Lam Geotechnics Limited	Environmental Team (ET)	Environmental Team Leader (ETL)	Mr. Raymond Dai	2882 3939	2882 3331

2.3.3 In this reporting period, the principal work activity is included as follows:

- Post tunnel construction works at ME4.
- Removal of temporary reclamation at ME4

2.3.4 In coming reporting month, the principal work activity is anticipated as follows:

- Post tunnel construction works at ME4.
- Removal of temporary reclamation at ME4

3 STATUS OF REGULATORY COMPLIANCE

3.1 Status of Environmental Licensing and Permitting under the Project

3.1.1. A summary of the current status on licences and/or permits on environmental protection pertinent to the Project is shown in **Table 3.1**.

Table 3.1 Summary of the current status on licences and/or permits on environmental protection pertinent to the Project

Permits and/or Licences	Reference No.	Issued Date	Status
Environmental Permit	EP-416/2011	4 April 2011	Valid
Further Environmental Permit	FEP-01/416/2011	11 Nov 2011	Valid

3.1.2. Summary of the current status on licences and/or permits on environmental protection pertinent and submission under FEP-01/416/2011 for contract no. HY/2009/15 showed in Table 3.2 and Table 3.3.

Table 3.2 Cumulative Summary of Valid Licences and Permits under Contract no. HY/2009/15

Permits and/or Licences	Reference No.	Issued Date	Valid Period/ Expiry Date	Status
Further Environmental Permit	FEP-01/416/2011	11 Nov 2011	N/A	Valid
Notification of Works Under APCO	321822	24 Sep 2010	N/A	Valid
Construction Noise Permit (CNP) for Non Piling works	GW-RS0649-14	26 Jun 2014	1 Jun 2014 to 31 Dec 2014	Cancelled
	GW-RS0721-14	16 Jul 2014	18 Jul 2014 to 15 Jan 2015	Valid
Registration as a Chemical Waste Producer	WPN: 5213-147-C1169-35	15 Nov 2010	N/A	Valid
Billing Account under Waste Disposal Ordinance	7011553	30 Sep 2010	27 Sep 2010 to 27 Jan 2016	Valid
Billing Account under Waste Disposal Ordinance (Disposal by Vessel)	7011761	30 Jun 2014	17 Jul 2014 to 16 Oct 2014	Valid
Water Discharge Licence (Discharge at TS4)	WT00018542-2014	17 Mar 2014	17 Mar 2014 to 31 Jan 2016	Valid



Permits and/or Licences	Reference No.	Issued Date	Valid Period/ Expiry Date	Status
Dumping Permit (Type 1 – Open Sea Disposal)	EP/MD/15-063	16 Jul 2014	28 Jul 2014 to 27 Jan 2015	Valid

Table 3.3 Summary of submission status under EP/416/2011 and FEP-01/416/2011

EP Condition	FEP Condition	Submission	Date of Submission
2.3	2.1	Notification of setting up of ENPC	Submitted to EPD on 21 Nov 2011
2.4	-	Notification of setting up of CLG	Submitted to EPD on 21 Nov 2011
2.5	2.2	Notification of work commencement date	Submitted to EPD on 21 Oct 2011
2.5	-	Organization chart	Submitted to EPD on 17 Oct 2011
2.6	2.2	Work schedule and Location Plans	Submitted to EPD on 27 Oct 2011
2.7	2.3	Silt Curtain Deployment Plan	Re-submitted to EPD on 15 Dec 2011
2.8	2.4	Silt Screen Deployment Plan	Re-submitted to EPD on 15 Dec 2011
3.3	-	Baseline Monitoring Report	Submitted to EPD on 14 Nov 2011

4 Monitoring Requirements

4.1 Noise Monitoring

NOISE MONITORING STATIONS

- 4.1.1. The noise monitoring stations for the Project are listed and shown in **Table 4.1** and [Figure 2.3](#). [Appendix 4.1](#) shows the established Action/Limit Levels for the monitoring works.

Table 4.1 Noise Monitoring Stations

Station	Description
M2b	Noon Gun Area

NOISE MONITORING PARAMETERS, FREQUENCY AND DURATION

- 4.1.2. The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{eq} (30 minutes) shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, L_{eq} (5 minutes) shall be employed for comparison with the Noise Control Ordinance (NCO) criteria. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.
- 4.1.3. Noise monitoring shall be carried out at all the designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:
- One set of measurements between 0700 and 1900 hours on normal weekdays.

MONITORING EQUIPMENT

- 4.1.4. As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB.
- 4.1.5. Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

4.2 Air quality monitoring

AIR QUALITY MONITORING STATIONS

- 4.2.1. The air quality monitoring stations for the Project are listed and shown in **Table 4.2** and **Figure 2.3. Appendix 4.1** shows the established Action/Limit Levels for the monitoring works.

Table 4.2 Air quality monitoring Stations

Station ID	Monitoring Location	Description
CMA3a	CWB PRE Site Office	Causeway Bay

AIR QUALITY MONITORING PARAMETERS, FREQUENCY AND DURATION

- 4.2.2. One-hour and 24-hour TSP levels should be measured to indicate the impacts of construction dust on air quality. The 24-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B.
- 4.2.3. All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and any other local atmospheric factors affecting or affected by site conditions, etc., shall be recorded down in detail.
- 4.2.4. For regular impact monitoring, the sampling frequency of at least once in every six-days, shall be strictly observed at all the monitoring stations for 24-hour TSP monitoring. For 1-hour TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs.

SAMPLING PROCEDURE AND MONITORING EQUIPMENT

- 4.2.5. High volume samplers (HVSs) in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:
- 0.6 – 1.7 m³ per minute adjustable flow range;
 - Equipped with a timing / control device with +/- 5 minutes accuracy for 24 hours operation;
 - Installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
 - Capable of providing a minimum exposed area of 406 cm²;
 - Flow control accuracy: +/- 2.5% deviation over 24-hour sampling period;
 - Equipped with a shelter to protect the filter and sampler;
 - Incorporated with an electronic mass flow rate controller or other equivalent devices;
 - Equipped with a flow recorder for continuous monitoring;
 - Provided with a peaked roof inlet;
 - Incorporated with a manometer;

- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easily changeable filter; and
- Capable of operating continuously for a 24-hour period.

4.2.6. Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The concern parties such as IEC shall properly document the calibration data for future reference. All the data should be converted into standard temperature and pressure condition.

LABORATORY MEASUREMENT / ANALYSIS

4.2.7. A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS accredited.

4.2.8. Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling.

4.2.9. After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

4.2.10. All the collected samples shall be kept in a good condition for 6 months before disposal.

4.2.11. Current calibration certificates of equipments are presented in **Appendix 4.2**.

4.3 Water Quality Monitoring

4.3.1. The EIA Report has identified that the key water quality impact would be associated with the dredging works during the construction phase. Marine water quality monitoring for dissolved oxygen (DO), suspended solid (SS) and turbidity is therefore recommended to be carried out at selected WSD flushing water intakes. The impact monitoring should be carried out during the proposed dredging works to ensure the compliance with the water quality standards.

Water Quality Monitoring Station

4.3.2. It is proposed to monitor the water quality at one cooling water intakes along the seafront of the Victoria Harbour. The proposed water quality monitoring stations of the Project are shown in **Table 4.3** and **Figure 2.3**. **Appendix 4.1** shows the established Action/Limit Levels for the monitoring works.

Table 4.3 Marine Water Quality Stations for Water Quality Monitoring

Cooling Water Intake			
Station ID	Monitoring Location	Easting	Northing
C7	Windsor House	837193.7	816150.0

WATER QUALITY PARAMETERS

- 4.3.3. Monitoring of dissolved oxygen (DO), turbidity and suspended solids (SS) shall be carried out at WSD flushing water intakes and cooling water intakes. DO and Turbidity are measured in-situ while SS is determined in laboratory.
- 4.3.4. In association with the water quality parameters, other relevant data shall also be measured, such as monitoring location/position, time, sampling depth, water temperature, pH, salinity, dissolved oxygen (DO) saturation, weather conditions, sea conditions, tidal stage, and any special phenomena and work underway at the construction site etc.

SAMPLING PROCEDURES AND MONITORING EQUIPMENT

- 4.3.5. The interval between two sets of monitoring should not be less than 36 hours except where there are exceedances of Action and/or Limit Levels, in which case the monitoring frequency will be increased. **Table 4.4** shows the proposed monitoring frequency and water quality parameters. Duplicate in-situ measurements and water sampling should be carried out in each sampling event. For selection of tides for in-situ measurement and water sampling, tidal range of individual flood and ebb tides should be not less than 0.5m.

Table 4.4 Marine Water Quality Monitoring Frequency and Parameters

Activities	Monitoring Frequency ¹	Parameters ²
During the 4-week baseline monitoring period	Three days per week, at mid-flood and mid-ebb tides	Turbidity, Suspended Solids (SS), Dissolved Oxygen (DO), pH, Temperature, Salinity
During marine construction works	Three days per week, at mid-flood and mid-ebb tides	Turbidity, Suspended Solids (SS), Dissolved Oxygen (DO), pH, Temperature, Salinity
After completion of marine construction works	Three days per week, at mid-flood and mid-ebb tides	Turbidity, Suspended Solids (SS), Dissolved Oxygen (DO), pH, Temperature, Salinity

Notes:

- For selection of tides for in-situ measurement and water sampling, tidal range of individual flood and ebb tides should be not less than 0.5m.
- Turbidity should be measured in situ whereas SS should be determined by laboratory.

DISSOLVED OXYGEN AND TEMPERATURE MEASURING EQUIPMENT

- 4.3.6. The instrument should be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and use a DC power source. It should be capable of measuring:
- a dissolved oxygen level in the range of 0-20 mg/l and 0-200% saturation
 - a temperature of 0-45 degree Celsius
- 4.3.7. It should have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables should be available for replacement where necessary. (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).
- 4.3.8. Should salinity compensation not be build-in in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

TURBIDITY MEASUREMENT INSTRUMENT

- 4.3.9. The instrument should be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment should use a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU and be complete with a cable (e.g. Hach model 2100P or an approved similar instrument).

SAMPLER

- 4.3.10. A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres, and can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).

SAMPLE CONTAINER AND STORAGE

- 4.3.11. Water samples for suspended solids measurement should be collected in high-density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to ALS Technichem (HK) Pty Ltd. as soon as possible after collection for analysis.

WATER DEPTH DETECTOR

- 4.3.12. A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station. This unit can either be handheld or affixed to the bottom of the workboat, if the same vessel is to be used throughout the monitoring programme.

SALINITY

- 4.3.13. A portable salinometer capable of measuring salinity in the range of 0-40 ppt shall be provided for measuring salinity of the water at each of monitoring location.

MONITORING POSITION EQUIPMENT

- 4.3.14. A hand-held or boat-fixed type digital Global Positioning System (GPS) with waypoint bearing indication or other equivalent instrument of similar accuracy shall be provided and used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

CALIBRATION OF IN-SITU INSTRUMENTS

- 4.3.15. All in-situ monitoring instrument shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or equivalent before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.
- 4.3.16. For the on site calibration of field equipment by the ET, the BS 127:1993, "Guide to Field and on-site test methods for the analysis of waters" should be observed.
- 4.3.17. Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.
- 4.3.18. Current calibration certificates of equipments are presented in [Appendix 4.2](#).

LABORATORY MEASUREMENT / ANALYSIS

- 4.3.19. Analysis of suspended solids has been carried out in a HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd. Water samples of about 1L shall be collected at the monitoring stations for carrying out the laboratory SS determination. The SS determination work shall start within 24 hours after collection of the water samples. The SS determination shall follow APHA 19ed or equivalent methods subject to the approval of IEC and EPD.

5 MONITORING RESULTS

5.0.1. Overall layout showing work area, latest status of work commencement and monitoring stations is shown in [Figure 2.1](#) and [Figure 2.3](#).

5.0.2. The environment monitoring schedules for reporting month and coming month are presented in [Appendix 5.1](#).

5.1 Noise Monitoring Results

The noise monitoring station is shown in **Table 5.1** below.

Table 5.1 Noise Monitoring Station

Station	Description
M2b	Noon Gun Area

5.1.1 One limit level exceedance at M2b – Noon Gun Area was recorded on 5 August 2014 in the reporting period. After investigation, the exceedance was concluded as not related to designated project work under EP416.

5.1.2 Details of noise monitoring results and graphical presentation can be referred in [Appendix 5.2](#)

5.2 Air quality monitoring Results

The air quality monitoring station is shown in **Table 5.2** below.

Table 5.2 Air quality monitoring Station

Station	Description
CMA3a	CWB PRE Site Office

5.2.1 No action or limit level exceedance was recorded in the reporting month.

5.2.2 Air quality monitoring results in this reporting period are reviewed and summarized. Details of air quality monitoring results and graphical presentation can be referred in [Appendix 5.3](#).

5.3 Water quality monitoring Results

5.3.1 The water quality monitoring station is summarized in **Table 5.3** below.

Table 5.3 Water quality monitoring Station

Station Ref.	Location	Easting	Northing
Cooling Water Intake			
C7	Windsor House	837193.7	816150.0

5.3.2 Water quality monitoring location at C7 was finely adjusted to the outside of the inner silt curtain frame since 31 Dec 2012.

- 5.3.3 One limit level exceedance was recorded at C7-Windsor House on 25 August 2014 during ebb tide in the reporting month.
- 5.3.4 After investigation, the exceedance was considered to be contributed by changes in water quality in the vicinity of the water quality monitoring station and not related to project.
- 5.3.5 Water quality monitoring results measured in this reporting period are reviewed and summarized. Details of water quality monitoring results and graphical presentation can be referred in Table 5.4 and [Appendix 5.4](#).

Table 5.4 Summary of Water Quality Monitoring Exceedance in Reporting Month

Contract no.	Water quality monitoring Station	Mid-flood						Mid-ebb					
		DO		Turbidity		SS		DO		Turbidity		SS	
		AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
HY/2009/15	C7	0	0	0	0	0	0	0	0	0	1	0	0
Total		0	0	0	0	0	0	0	0	0	1	0	0

5.4 Waste Monitoring Results

5.4.1. Inert C&D wastes were disposed of in this reporting month. Details of the waste flow table are summarized in **Table 5.5**.

Table 5.5 Details of Waste Disposal

Waste Type	Quantity this month	Cumulative Quantity-to-Date	Disposal / Dumping Grounds	Remarks
Inert C&D materials disposed, m3	NIL NIL	32,670 6,267	TM38 TKO137	N/A
Inert C&D materials recycled, m3	NIL NIL NIL NIL NIL	25,395.7 1,228 1416 352 1,049	TS2 WDII Lun Ku Tan WENT Landfill HY/2011/03 (H2M)	N/A
Non-inert C&D materials disposed, m3	NIL	NIL	N/A	N/A
Non-inert C&D materials recycled, m3	NIL	NIL	N/A	N/A
Chemical waste disposed, kg	NIL	NIL	N/A	N/A
Marine Sediment (Type 1 – Open Sea Disposal) , m3	NIL (Bulk Volume)	10,640 (Bulk Volume)	Cheung Chau South	Dredging from SCL Protection Works (CBTS)
Marine Sediment (Type 1 – Open Sea Disposal (Dedicate Sites) & Type 2 – Confined Marine Disposal) , m3	NIL (Bulk Volume)	7,500 (Bulk Volume)	East of Sha Chau	Dredging from SCL Protection Works (CBTS)
Marine Sediment (Type 3 – Special Treatment / Disposal contained in geosynthetic Containers), m3	NIL	NIL	N/A	N/A



6 Compliance Audit

6.0.1. The Event Action Plan for construction noise, air qualities are presented in [Appendix 6.1](#).

6.1 Noise Monitoring

6.1.1. One limit level exceedance was recorded at M2b – Noon Gun Area on 5 August 2014 in the reporting month. After the investigation, the exceedance was concluded as not related to designated project work under EP416.

6.2 Air quality monitoring

6.2.1 No action or limit exceedance was recorded in the reporting month.

6.3 Water quality monitoring

6.3.1. One limit exceedance was recorded at C7- Windsor House on 25 August 2014 during ebb tide in the reporting month. After investigation, the exceedance was considered to be contributed by changes in water quality in the vicinity of the water quality monitoring station and not related to project.

6.4 Review of the Reasons for and the Implications of Non-compliance

6.4.1. There was no non-compliance from the site audits in the reporting period. The observations and recommendations made in each individual site audit session were presented in Section 8.

6.5 Summary of action taken in the event of and follow-up on non-compliance

6.5.1 There was no particular action taken since no project-related non-compliance was recorded from the site audits and environmental monitoring in the reporting period.

7 Cumulative Construction Impact due to the Concurrent Projects

7.0.1. According to Condition 3.4 of the EP-416/2011, this section addresses the relevant cumulative construction impact due to the concurrent activities of the current projects including the Wan Chai Development Phase II (WDII) and Central-WanChai Bypass (CWB).

7.0.2. From the [Monthly EM&A report \(July 2014\)](#) of Wan Chai Development Phase II (WDII) the key works in [August 2014](#) are as follows:

Contract no. HK/2009/01 – Wan Chai Development Phase II – Central –Wanchai Bypass at HKCEC

- [Rock trimming works](#)

Contract no. HK/2009/02 – Wan Chai Development Phase II – Central – Wan Chai Bypass at Wan Chai East

- [Covered walkway at Expo Drive East](#)
- [Road works on Hung Hing Road](#)
- [ABWF works at WSD Salt Water Pumping Station](#)
- [Backfilling works for Tunnel Portion 1](#)
- [ABWF and E&M works at Ferry Pier](#)
- [Concreting works and steelworks for Temporary Covered Walkway](#)
- [Capping beam construction](#)
- [Reclamation at WCB2](#)
- [Installation of Bridge 2](#)
- [Site haul road construction and commence at-grade road construction](#)

Contract no. HY/2009/15 – Central-Wanchai Bypass – Tunnel (Causeway Bay Typhoon Shelter Section)

- [EVA construction at Eastern Breakwater](#)
- [Reinstatement of Eastern Breakwater](#)
- [Removal of Seawall Blocks at TS2, TPCWAE & TS4](#)
- [Demolition of D-Wall at TS2, TPCWAE & TS4](#)

Contract no. HK/2010/06 – Wan Chai Development Phase II – Central – Wan Chai Bypass over MTR Tsuen Wan Line

- [Nil](#)

Contract no. HY/2009/19- Wan Chai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link

- Construction of Dolphin Cap

Contract no. HK/2012/08 – Wan Chai Development Phase II – Central- Wan Chai Bypass at Wan Chai West

- ELS for box culvert La at Lung King Street
- Filling for seawall rock mound formation
- Filling for reclamation
- Dredging

Contract no. HY/2010/08 –Central - Wan Chai Bypass (CWB) –Tunnel (Slip Road 8)

- Dredging works (works commence subject to handover from other Contract)

7.0.3. From the [Monthly EM&A report \(July 2014\)](#) of Central-Wan Chai Bypass (CWB) the key works in [August 2014](#) are as follows:

Contract no. HY/2009/18 - Central - Wan Chai Bypass (CWB) - Central Interchange under FEP-05/364/2009/A

- Excavation of trial pit
- Transplanting of trees
- Drainage works
- Tunnel works including scaffolding erection, excavation, OHVD installation, roadside barriers, top and base slab construction, extract sheet pile, waterproofing and backfill
- Trough structure construction and associated drilling and grouting
- Road works
- Bridges construction

Contract no. HK/2009/01 - Wan Chai Development Phase II - Central - Wan Chai Bypass at Hong Kong Convention and Exhibition Centre - Tunnel Works under FEP-02/364/2009

- Construction of central wall and middle wall at top-down portion at Bay 1 to Bay 3 would be commenced.
- Stage 1 OHVD
- Stage 2 excavation.
- Stage 3 foundation works
- Installation of pre-bored H piles
- Sewage works at the downstream of manhole

Contract no. HK/2009/02 - Wan Chai Development Phase II - Central - Wan Chai Bypass at Wan Chai East (CWB Tunnel) under FEP-01/364/2009

- Remaining load transfer for 2 king posts to tunnel roof slab.
- ELS removal at Strut Level S3, S2A and S2.
- Backfilling to Tunnel Portion 1.
- Utility bridge load transfer for SWIC Intake Culvert & DSD Sewage Outfall.
- Pump test for Tunnel Portion 2 excavation.
- Bored pile construction.

Contract no. HY/2009/15 - Central-Wanchai Bypass – Tunnel (Causeway Bay Typhoon Shelter Section) under FEP-06/364/2009/A

- Dismantling of struts and backfilling at TS4 & TPCWAE
- Mined Tunnel drill-and-break works and installation of steel ribs at East and West Portal

Contract no. HY/2009/19 - Central - Wanchai Bypass Tunnel (North Point Section) and Island Eastern Corridor Link under FEP-07/364/2009/A

- Road works at Watson Road
- Bored piling (Land)
- Removal/ Installation of strut at ELS
- Construction of Dolphin Cap
- ELS for Cut & Cover Tunnel and EVB
- Excavation of ELS continue
- Laying of 1350 ϕ pipe
- Pre-bored H-pile for Admin. Building continue
- Parapet construction continue
- Wing slab extension continue
- Construction of TD bridge continue
- Construction of Bridge E
- Construction of Bridge F4 and F5
- Dismantling of Launching Girder
- Construction of Pump Sump E
- IECL Road modification and removal of Median Barrier

Contract no. HK/2010/06 - Wan Chai Development Phase II - Central - Wan Chai Bypass over MTR Tsuen Wan Line under FEP-08/364/2009/A

- Sealing of cross wall opening
- Reinstatement of roof slab at turret openings
- Removal of turrets

Contract no. HK/2012/08 – Wan Chai Development Phase II – Central- Wan Chai Bypass at Wan Chai West under FEP-09/364/2009B

- Diaphragm wall construction
- Bored-pile construction

Contract no. HY/2010/08 –Central - Wan Chai Bypass (CWB) –Tunnel (Slip Road 8) under FEP-10/364/2009B

- Tree & root pruning works
- Tree transplanting works,
- Tree works within off-site nursery compound,
- Drainage improvement works,
- Sheet piling works,
- Erection of noise absorption sheetings,
- Pipe piling, jet grout, ground pre-treatment & pre-boring works,
- Construction of Bowling Green Office &
- Temporary Traffic Arrangement & paving works for Victoria Park Road

Contract no. HY/2011/08 – Central - Wan Chai Bypass (CWB) –Tunnel Buildings, Systems and Fittings, and Works Associated with Tunnel Commissioning under FEP-11/364/2009B

- No physical construction activity on site

7.0.1. According to the construction programme of Wan Chai Development Phase II, Central-Wan Chai Bypass and Island Eastern Corridor Link projects, the major construction activity under Wan Chai Development Phase II were marine works at HKCEC areas, tunnel works at Wan Chai East and filling works at Wan Chai West. The major construction activities under Central-Wan Chai Bypass and Island Eastern Corridor Link Projects were bridge construction and tunnel works at Central Interchange, land base bored piling works at Victoria Park Road and ELS, segment launching works and tunnel works at North Point area. The major environmental impact was water quality impact at Causeway Bay and Wan Chai. Marine-based construction activities were filling works at WanChai West and removal of temporary reclamation at TS4, TS2 and EX-PCWA at Wan Chai East in the reporting month.



8 Environmental Site Audit

- 8.0.1. During this reporting period, weekly environmental site audits were conducted for the SCL Protection Works under the Contract no. HY/2009/15. No non-conformance was identified during the site audits.
- 8.0.2. Five site inspections for Contract no. HY/2009/15 was carried out during this reporting period. No observation was found during the reporting period.

9 COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTION

9.0.1. There was no environmental complaint and prosecution recorded in the reporting period.

9.0.2. The details of cumulative complaint log and updated summary of complaints are presented in **Appendix 9.1**

9.0.3. Cumulative statistic on complaints and successful prosecutions are summarized in **Table 9.1** and **Table 9.2** respectively.

Table 9.1 Cumulative Statistics on Complaints

Reporting Period	No. of Complaints
August 2014	0
November 2011 to July 2014	0
Total	0

Table 9.2 Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Prosecutions this period (Offence Date)	Cumulative No. Project-to-Date
Air	-	0	0
Noise	-	0	0
Water	-	0	0
Waste	-	0	0
Total	-	0	0

10. CONCLUSION

- 10.0.1. The EM&A programme was carried out in accordance with the EM&A Manual requirements, minor alternations to the programme proposed were made in response to changing circumstances.
- 10.0.2. The scheduled construction activities and the recommended mitigation measures for the coming month are listed in **Table 10.1**. The construction programmes of individual contracts are provided in **Appendix 10.1**.

Table 10.1 Summary of Key Construction Activities of Individual Contract(s) to be commenced in Coming Reporting Month

Contract No.	Key Construction Works	Recommended Mitigation Measures
HY/2009/15	<ul style="list-style-type: none"> • Post tunnel construction works at ME4 • Removal of temporary reclamation at ME4 	<ul style="list-style-type: none"> • Watering for any dust or exposed surface

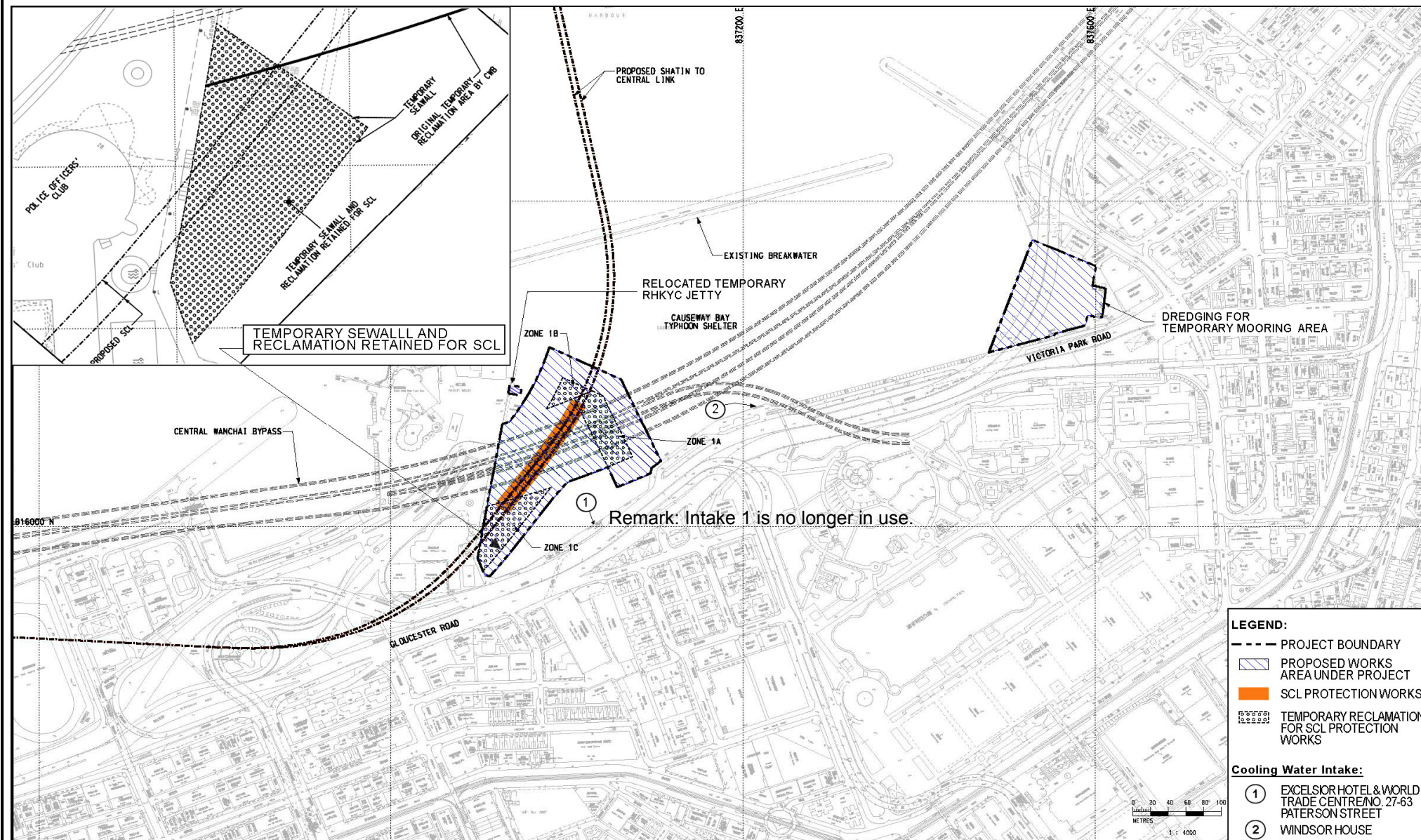


Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Figure 2.1

Project Layout





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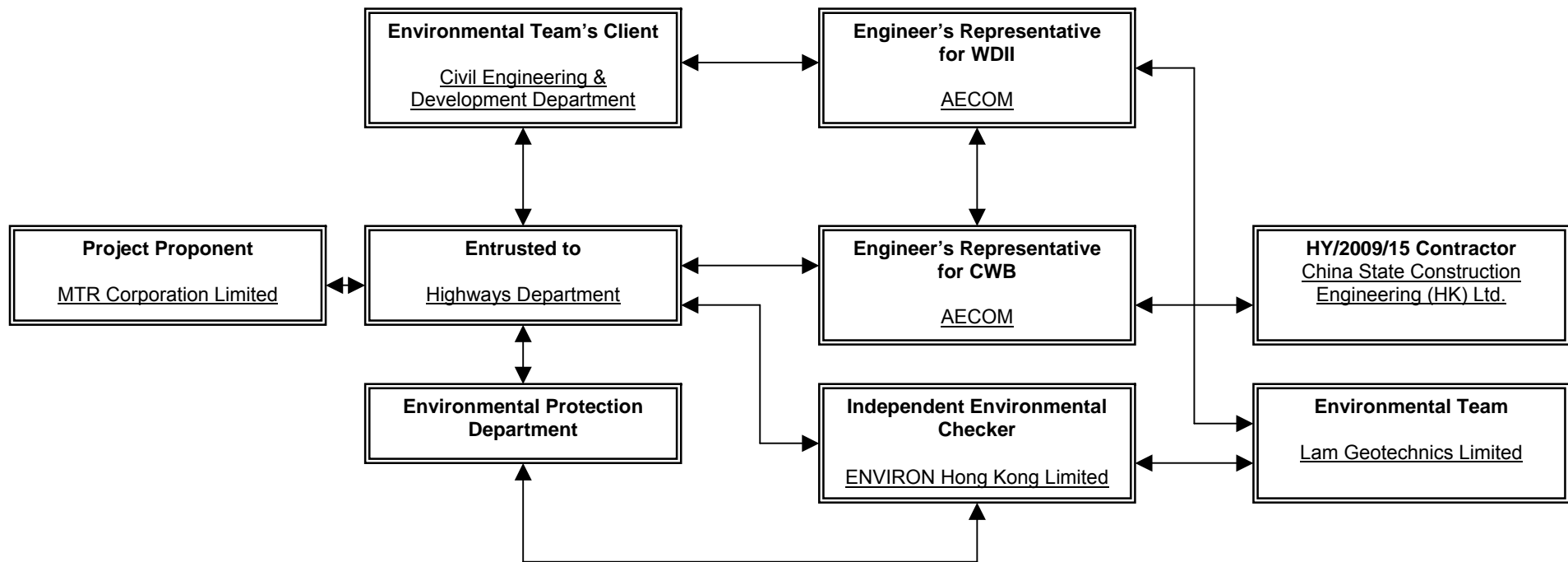
Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Figure 2.2

Project Organization Chart



Project Organization Chart





Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Figure 2.3

Locations of Monitoring Stations



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 3.1

Environmental Mitigation Implementation Schedule

IMPLEMENTATION SCHEDULE OF THE PROPOSED MITIGATION MEASURES

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve?
Water Quality Impact (Construction Phase)						
3.142	Dredging should be carried out by closed grab dredger.	To minimize release of sediment and contaminants during dredging.	Contractor	Dredging works areas in Causeway Bay Typhoon Shelter (CBTS)	Construction Phase	EIAO-TM, WPCO
S3.142	All temporary reclamation works should adopt an approach where temporary seawalls will first be formed to enclose each phase of the temporary reclamation. Installation of diaphragm wall on temporary reclamation as well as any bulk filling will proceed behind the completed seawall. Any gaps that may need to be provided for marine access should be shielded by silt curtains to control sediment plume dispersion away from the site. Demolition of temporary reclamation including the demolition of the diaphragm wall and dredging to the existing seabed levels	To minimize loss of fines and contaminants during temporary reclamations	Contractor	Temporary reclamation works areas in CBTS	Construction Phase	EIAO-TM, WPCO

	should be carried out behind the temporary seawall. Temporary seawall should be removed after completion of all excavation and dredging works for demolition of the temporary reclamation.					
S3.142	During construction of the temporary reclamation, temporary seawall should be partially constructed to protect the nearby seawater intakes from further dredging activities. For example, the seawalls along the southeast and northeast boundaries of PW1.1 should be constructed first (above high water mark) so that the seawater intake at the inner water would be protected from the impacts from the remaining dredging activities along the northwest boundary.	To minimize water quality impact upon the cooling water intakes in CBTS from temporary reclamation works	Contractor	Temporary reclamation works areas in CBTS	Construction Phase	EIAO-TM, WPCO
S3.142	Silt curtains should be deployed to fully enclose the closed grab dredger during any dredging operation within the CBTS.	To minimize loss of fines and contaminants during dredging in CBTS	Contractor	Dredging works areas in CBTS	Construction Phase	EIAO-TM, WPCO
S3.142	Silt screens will be installed at all the cooling water intakes within the CBTS during temporary reclamation and dredging within the typhoon shelter.	To minimize water quality impact upon the cooling water intakes in CBTS from marine construction activities	Contractor	Cooling water intakes inside CBTS	Construction Phase	EIAO-TM, WPCO
S3.143	No more than two closed grab dredgers should be operated for dredging within the CBTS at	To minimize loss of fines and contaminants	Contractor	Temporary reclamation and	Construction Phase	EIAO-TM, WPCO

	any time. Moreover, the combined production rate of all concurrent dredging works to be undertaken within the CBTS shall not exceed 6,000 m ³ per day at all times throughout the entire construction period.	dredging in CBTS		dredging works areas in CBTS		
S3.145	<p>The following good site practices should be undertaken during sand filling, public filling and dredging:</p> <ul style="list-style-type: none"> • mechanical grabs, if used, should be designed and maintained to avoid spillage and sealed tightly while being lifted. For dredging of any contaminated mud, closed watertight grabs must be used; • all vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; • all hopper barges and dredgers should be fitted with tight fitting seals to their bottom openings to prevent leakage of material; • construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the 	To minimize loss of fines and contaminants from dredging / filling	Contractor	Temporary reclamation and dredging works areas in CBTS	Construction Phase	EIAO-TM, WPCO

	site or dumping grounds; and <ul style="list-style-type: none"> loading of barges and hoppers should be controlled to prevent splashing of dredged material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation. 					
S3.146	The following mitigation measures are proposed to minimize the potential water quality impacts from the construction works at or close to the seafront: <ul style="list-style-type: none"> Temporary storage of construction materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction and demolition materials should be located well away from the seawater front and storm drainage during carrying out of the works. Stockpiling of construction and demolition materials and dusty materials should be covered and located away from the seawater front and storm drainage. Construction debris and spoil should be covered up and/or disposed of as soon as 	To minimize release of construction wastes from construction works at or close to the seafront	Contractor	Construction works at or close to the seafront	Construction Phase	EIAO-TM, WPCO

	possible to avoid being washed into the nearby receiving waters.					
S3.147	Silt curtains should be installed around the working area for the marine piling works for construction of the temporary jetty as necessary to minimize the release of sediment and construction wastes. All wastewater generated from the piling activities should be collected by a derrick lighter or other collection system and be treated before controlled discharge. Spoil from the piling activities should be collected by sealed hopper barges for proper disposal.	To minimize water quality impacts from piling works for construction of the temporary jetty	Contractor	Piling area at the piling location	Construction Phase	EIAO-TM, WPCO
S3.148	Regular maintenance of and refuse collection should be performed at the silt screens deployed at the seawater intakes at regular intervals on a daily basis. The Contractor should be responsible for keeping the water behind the silt screen free from floating rubbish and debris during the impact monitoring period.	To avoid the pollutant and refuse entrapment problems at the silt screens to be installed at the water intakes	Contractor	Proposed silt screens at cooling water intakes inside CBTS	Construction Phase	EIAO-TM, WPCO
S3.149	It is recommended that collection and removal of floating refuse should be performed within the marine construction areas at regular intervals on a daily basis. The Contractor should be	To minimize water quality impacts from illegal dumping and littering from marine vessels and runoff from	Contractor	All marine works areas	Construction Phase	EIAO-TM, WPCO, WDO

	responsible for keeping the water within the site boundary and the neighbouring water free from rubbish during the dredging works.	the coastal areas				
S3.150 to 3.169	The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed where practicable.	To minimize water quality impacts from construction site runoff and general construction activities	Contractor	All construction works areas	Construction Phase	EIAO-TM, WPCO, TM-DSS, WDO, ProPECC PN 1/94
S3.170	There is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge licence. All the runoff and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the TM-DSS. Minimum distances of 100 m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., can minimise water consumption	To minimize water quality impact from effluent discharges from construction sites	Contractor	All construction works areas	Construction Phase	EIAO-TM, WPCO, TM-DSS

	and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the WPCO license which is under the ambit of Regional Office (RO) of EPD.					
S3.171 & 3.172	Construction work force sewage discharges on site are expected to be connected to the existing trunk sewer or sewage treatment facilities. If disposal of sewage to public sewerage system is not feasible, appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers over the construction site to prevent direct disposal of sewage into the water environment. The Contractor shall also be responsible for waste disposal and maintenance practices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment.	To minimize water quality impacts due to sewage generated from construction workforce	Contractor	All construction works areas	Construction Phase	EIAO-TM, WPCO, TM-DSS, WDO
S3.173	Contractor must register as a chemical waste producer if	To minimize water quality	Contractor	All construction	Construction Phase	EIAO-TM, WPCO, TM-

	chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	impact from accidental spillage of chemical		works areas		DSS, WDO
S3.174	Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	To minimize water quality impact from accidental spillage of chemical	Contractor	All construction works areas	Construction Phase	EIAO-TM, WPCO, TM-DSS, WDO
S3.175	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The "Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes" published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: <ul style="list-style-type: none"> Suitable containers should 	To minimize water quality impact from accidental spillage of chemical	Contractor	All construction works areas	Construction Phase	EIAO-TM, WPCO, TM-DSS, WDO

	<p>be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport.</p> <ul style="list-style-type: none"> • Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. • Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area. 					
S4. 30	<p>The following good site practices should be implemented:</p> <ul style="list-style-type: none"> • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program • Mobile plant, if any, should be sited as far from NSRs as possible • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum 	To reduce construction noise impact	Contractor	All works areas	Construction phase	EIAO-TM, NCO

	<ul style="list-style-type: none"> Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. 					
S4.31 – S4.32 & Table 4.7	<p>The following quiet PME are recommended for the construction activities:</p> <p>Air Compressor Bulldozer Concrete Pump Concrete Lorry Mixer Crane Dump Truck Excavator Generator Hand-held Breaker Poker Vibrator Roller Trucks</p>	To reduce construction noise impact	Contractor	All works areas	Construction phase	EIAO-TM, NCO
S4.33 – S4.35 & Table 4.8	<p>Movable noise barrier should be used for the following PME:</p> <p>Air Compressor Bar Bender Bentonite Plants Concrete pump Diaphragm Wall Rigs Excavator</p>	To reduce construction noise impact	Contractor	Affected works areas showing exceedance during un-mitigated scenario	Construction phase	EIAO-TM, NCO

	Poker Vibrator					
Construction Dust Impact						
S5.43	Watering once on construction areas for every working hour	To minimize dust impact	Contractor	Temporary reclamation area in CBTS	Construction phase	APCO
S5.43	Covering/paving the southwest retained area of temporary reclamation once filling is completed	To minimize dust impact	Contractor	southwest retained area of temporary reclamation	Construction phase	phase APCO
S5.44	<p>Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices:</p> <p>Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.</p> <p>Use of frequent watering for particularly dusty construction areas and areas close to ASRs.</p> <p>Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines.</p>	To minimize dust impacts	Contractor	Temporary reclamation area in CBTS	Construction phase	APCO and Air Pollution Control (Construction Dust) Regulation

	<p>Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs.</p> <p>Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.</p> <p>Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.</p> <p>Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading points, and use of water sprinklers at the loading area where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods.</p> <p>Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit.</p> <p>Imposition of speed controls for vehicles on site haul roads.</p> <p>Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.</p>					
--	---	--	--	--	--	--

	<p>Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.</p> <ul style="list-style-type: none"> • Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise. 					
Waste Management implications (Construction Phase)						
6.62	<p>Good Site Practices and Waste Reduction Measures</p> <ul style="list-style-type: none"> - Prepare a Waste Management Plan approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites; - Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures; - Provision of sufficient waste disposal points and regular collection of waste; - Appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; - Regular cleaning and 	To enhance water management practice and achieve waste reduction.	Contractor	All Work Sites	Construction Phase	<p>Waste Disposal Ordinance (Cap. 354) Land (Miscellaneous Provisions) Ordinance (Cap. 28) ETWB TC(W) No.31/2004</p>

	<p>maintenance programme for drainage systems, sumps and oil interceptors; and</p> <ul style="list-style-type: none"> - Separation of chemical wastes for special handling and appropriate treatment. 					
6.63	<p>Good Site Practices and Waste Reduction Measures (con't)</p> <ul style="list-style-type: none"> - Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.); - Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; - Encourage collection of aluminum cans by providing separate labeled bins to enable this waste to be segregated from other general refuse generated by the workforce; - Proper storage and site practices to minimize the potential for damage or contamination of construction materials; - Plan and stock construction 	To achieve waste reduction	Contractor	All Work Sites	Construction Phase	<p>Waste Disposal Ordinance (Cap. 354)</p> <p>Land (Miscellaneous Provisions) Ordinance (Cap. 28)</p>

	materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste; and - Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.					
6.64	<i>Good Site Practices and Waste Reduction Measures (con't)</i> - The Contractor shall prepare and implement an EMP in accordance with ETWB TCW No. 19/2005. Such management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the Engineer for approval. The Contractor should implement the waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor, preferably in a monthly basis.	To enhance water management practice and achieve waste reduction.	Contractor	All Work Sites	Construction Phase	ETWB TCW No. 19/2005

6.66	<i>Storage, Collection and Transportation of Waste</i> - Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimizing the potential of pollution; - Maintain and clean storage areas routinely; - Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; and - Different locations should be designated to stockpile each material to enhance reuse.	To minimize potential adverse environmental impacts arising from waste storage	Contractor	Work Sites	Construction Phase	-
6.67	<i>Storage, Collection and Transportation of Waste (con't)</i> - Waste haulier with appropriate permits should be employed by the Contractor for the collection and transportation of waste from works areas to respective disposal outlets.	To minimize potential adverse environmental impacts arising from waste collection and disposal	Contractor	Waste storage area.	Construction Phase	-
6.68	<i>Storage, Collection and Transportation of Waste (con't)</i> - Implementation of trip ticket system with reference to ETWB TC(W) No.31/2004 to monitor disposal of waste and to control fly-tipping at PFRFs or landfills.	To minimize potential adverse environmental impacts arising from waste collection and disposal	Contractor	Work Sites	Construction Phase	ETWB TC(W) No.31/2004

	A recording system for the amount of waste generated, recycled and disposed (including disposal sites) should be proposed.					
6.70 – 6.73	Sorting of C&D Materials <ul style="list-style-type: none"> - Sorting to be performed to recover the inert materials, reusable and recyclable materials before disposal off-site. - Specific areas should be provided by the Contractors for sorting and to provide temporary storage areas for the sorted materials. - The C&D materials should at least be segregated into inert and non-inert materials, in which the inert portion could be reused and recycled as far as practicable before delivery to PFRFs as mentioned for beneficial use in other projects. While opportunities for reusing the non-inert portion should be investigated before disposal of at designated landfills. - Possibility of reusing the spoil in the Project will be continuously investigated in the construction stage. 	To minimize potential adverse environmental impacts during the handling, transportation and disposal of C&D materials	Contractor	All work Sites	Construction Phase	ETWB TCW No. 31/2004 ETWB TCW No. 33/2002 ETWB TCW No. 19/2005
6.75	Sediments <ul style="list-style-type: none"> - The basic requirements and procedures for dredged 	To ensure the sediment to be disposed of in an	Contractor	All works areas with sediments	Construction Phase	PNAP 252

	sediment disposal specified under PNAP 252 shall be followed. MFC manages disposal facilities in Hong Kong for the dredged sediment, while EPD is the authority issuing marine dumping permits under the <i>Dumping at Sea Ordinance</i> .	authorized and least impacted way		concern		
6.76	<p>Sediments (con't)</p> <p>- The Project Proponent should agree in advance with MFC of CEDD on the site allocation by submitting a Construction & Demolition Material Management Plan. The contractor for the dredging works shall then apply for the site allocations of marine sediment disposal based on the prior agreement with MFC/CEDD. A request for reservation of sediment disposal space has been submitted to MFC for onward discussions of disposal approaches and feasible disposal sites. The Project Proponent is also responsible for application of all necessary permits from the relevant authorities, including the dumping permit as required under DASO from EPD, for the disposal of dredged sediment prior to the commencement of the dredging works.</p>	To determine the best handling and disposal option of the sediments	MTR / Contractor	All works areas with sediments concern	Prior to the start of dredging works	PNAP 252; Dumping at Sea Ordinance

6.77 – 6.81	<p><i>Sediments (con't)</i></p> <ul style="list-style-type: none"> - Requirements of the Air Pollution Ordinance (Construction Dust) Regulation, where relevant, shall be adhered to during dredging, transportation and disposal of sediments. - Stockpiling of contaminated sediments should be avoided as far as possible. If temporary stockpiling of contaminated sediments is necessary, the dredged sediment should be covered by tarpaulin and the area should be placed within earth bunds or sand bags to prevent leachate from entering the ground, nearby drains and/or surrounding water bodies. The stockpiling areas should be completely paved or covered by linings in order to avoid contamination to underlying soil or groundwater. Separate and clearly defined areas should be provided for stockpiling of contaminated and uncontaminated materials. Leachate, if any, should be collected and discharged according to the Water Pollution Control Ordinance (WPCO). - In order to minimise the potential odour / dust emissions during dredging and 	To ensure handling of sediments are in accordance to statutory requirements	Contractor	Work Sites, Sediment disposal sites	Construction Phase	PNAP 252 Dumping at Sea Ordinance
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	<p>transportation of the sediment, the dredged sediments should be properly covered when placed on barges. Loading of the dredged sediment to the barge should be controlled to avoid splashing and overflowing of the sediment slurry to the surrounding water.</p> <ul style="list-style-type: none"> - The barge transporting the sediments to the designated disposal sites should be equipped with tight fitting seals to prevent leakage and should not be filled to a level that would cause overflow of materials or laden water during loading or transportation. In addition, monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the DEP. - In order to minimise the exposure to contaminated materials, workers should wear appropriate personal protective equipments (PPE) when handling contaminated sediments. Adequate washing and cleaning facilities should also be provided on site. 					
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6.82	<i>Sediments (con't)</i> The dredging work and associate sediment handling under this Project will be undertaken together with the CWB project by Highways Department and geosynthetic containment will be adopted to handle Type 3 sediments.	To ensure handling of sediments are in accordance to statutory requirements	Contractor	Work Sites, Sediment disposal sites	Construction Phase	PNAP 252 Dumping at Sea Ordinance
6.86	<i>Containers for Storage of Chemical Waste</i> The Contractor should register with EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> . Containers used for storage of chemical waste should: <ul style="list-style-type: none"> - Be compatible with the chemical wastes being stored, maintained in good condition and securely sealed; - Have a capacity of less than 450 litters unless the specifications have been approved by EPD; and 	To register with EPD as a Chemical waste producer and store chemical waste in appropriate containers	Contractor	Chemical waste storage area	Construction Phase	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

	- Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation.					
6.87	Chemical Waste Storage Area - Be clearly labeled to indicate corresponding chemical characteristics of the chemical waste and used for storage of chemical waste only; - Be enclosed on at least 3 sides; - Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; - Have adequate ventilation; - Be covered to prevent rainfall from entering; and - Be properly arranged so that incompatible materials are adequately separated.	To prepare appropriate storage areas for chemical waste at works areas	Contractor	Chemical waste storage area	Construction Phase	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
6.88	Labelling of Chemical Waste - Lubricants, waste oils and other chemical wastes would be generated during the maintenance of vehicles and mechanical equipments. Used	To clearly label the chemical waste at works areas	Contractor	Chemical waste storage area	Construction Phase	Code of Practice on the Packaging, Labelling and Storage of Chemical

	lubricants should be collected and stored in individual containers which are fully labeled in English and Chinese and stored in a designated secure place.					Wastes
6.89	<i>Collection and Disposal of Chemical Waste</i> - A trip-ticket system should be operated in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> to monitor all movements of chemical waste. The Contractor shall employ a licensed collector to transport and dispose of the chemical wastes, to either the approved CWTC at Tsing Yi, or another licensed facility, in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> .	To monitor the generation, reuse and disposal of chemical waste	Contractor	Work Sites with chemical waste production	Construction Phase	Waste Disposal (Chemical Waste) (General) Regulation
6.90	<i>General Refuse</i> - General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical waste. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes. Preferably, an enclosed and	To properly store and separate from other C&D materials for subsequent collection and disposal	Contractor	All Work Sites	Construction Phase	-

	covered area should be provided to reduce the occurrence of windblown light material.					
6.91	General Refuse (con't) - The recyclable component of general refuse, such as aluminum cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials.	To facilitate recycling of recyclable portions of refuse	Contractor	All Work Sites	Construction Phase	-
6.92	General Refuse (con't) - The Contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the sites as reminders.	To raise workers' awareness on recycling issue	Contractor	All Work Sites	Construction Phase	-



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 4.1

Action and Limit Level



Action and Limit Level

Action and Limit Level for Air Quality Monitoring

1-hour TSP Level in $\mu\text{g}/\text{m}^3$		24-hour TSP Level in $\mu\text{g}/\text{m}^3$	
Action Level	Limit Level	Action Level	Limit Level
311.3	500	171.0	260

Action and Limit Level for Noise Monitoring

Time Period	Action Level	Limit Level
07:00 – 19:00 hours on normal weekdays	When one documented complaint is received.	75 dB(A)/ 70 dB(A)/ 65 dB(A) ^{Note 1}

Note 1:

- 70dB(A) and 65 dB(A) for schools during normal teaching periods and school examination periods, respectively.
- If works are to be carried out during the restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Action and Limit Level for Water Quality Monitoring

Parameters	Dry Season		Wet Season	
	Action Level	Limit Level	Action Level	Limit Level
Cooling Water Intake				
SS in mg/L	15.00	22.13	18.42	27.54
Turbidity in NTU	9.10	10.25	11.35	12.71
DO in mg/L	3.36	2.73	3.02	2.44

Remarks: - Contractor shall implement additional improvement measures in case of oxygen depletion (i.e. DO level <2 mg/L) detected within CBTS.



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 4.2

Copies of Calibration Certificates



CERTIFICATE OF CALIBRATION

Certificate No.: 14CA0529 01-01 Page 1 of 2

Item tested

Description:	Sound Level Meter (Type 1)	Microphone
Manufacturer:	B & K	B & K
Type/Model No.:	2236	4188
Serial/Equipment No.:	2100736	2157055
Adaptors used:	-	-

Item submitted by

Customer Name: Lam Geotechnics Limited
Address of Customer: -
Request No.: -
Date of receipt: 29-May-2014

Date of test: 29-May-2014

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	22-Jun-2014	CIGISMEC
Signal generator	DS 360	33873	09-Apr-2015	CEPREI
Signal generator	DS 360	61227	09-Apr-2015	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 10 %
Air pressure: 1000 ± 10 hPa

Test specifications

1. The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of $\pm 20\%$.
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsiveness of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:


Huang Jian Min / Feng Jun Qi

Date: 30-May-2014

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 14CA0529 01-01

Page 2 of 2

1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertainty (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	2.1
	C	Pass	1.0	
	Lin	Pass	2.0	
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	2.2
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
Linearity range for SPL Frequency weightings	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
	Single Burst Fast	Pass	0.3	
Time weightings	Single Burst Slow	Pass	0.3	
	Single 100µs rectangular pulse	Pass	0.3	
Peak response	Crest factor of 3	Pass	0.3	
R.M.S. accuracy	Single burst 5 ms at 2000 Hz	Pass	0.3	
Time weighting I	Repeated at frequency of 100 Hz	Pass	0.3	
	1 ms burst duty factor 1/10 ³ at 4kHz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass	0.3	
	Single burst 10 ms at 4 kHz	Pass	0.4	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	SPL	Pass	0.3	
Overload indication	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertainty (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date:

Fung Chi Yip

29-May-2014

- End -

Checked by:

Date:

Lam Tze Wai

30-May-2014

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



CERTIFICATE OF CALIBRATION

Certificate No.: 14CA0529 01-02

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Rion Co., Ltd.
Type/Model No.: NC-73
Serial/Equipment No.: 10465798
Adaptors used: -

Item submitted by

Customer: Lam Geotechnics Limited
Address of Customer: -
Request No.: -
Date of receipt: 29-May-2014

Date of test: 30-May-2014

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	13-May-2015	SCL
Preamplifier	B&K 2673	2239857	10-Apr-2015	CEPREI
Measuring amplifier	B&K 2610	2346941	08-Apr-2015	CEPREI
Signal generator	DS 360	61227	09-Apr-2015	CEPREI
Digital multi-meter	34401A	US36087050	17-Dec-2014	CEPREI
Audio analyzer	8903B	GB41300350	07-Apr-2015	CEPREI
Universal counter	53132A	MY40003662	11-Apr-2015	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 10 %
Air pressure: 1000 ± 10 hPa

Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

Details of the performed measurements are presented on **page 2** of this certificate.

Approved Signatory:

Huang Jian Min/Feng Jun Qi

Date: 30-May-2014

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 14CA0529 01-02

Page: 2 of 2

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	(Output level in dB re 20 μ Pa)
			Estimated Expanded Uncertainty dB
1000	94.00	94.57	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.001 dB

Estimated expanded uncertainty 0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz Actual Frequency = 965.6 Hz

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.9 %

Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date: 30-May-2014

Fung Chi Yip

- End -

Checked by:

Date: 30-May-2014

Lam Tze Wai

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

**REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION****Information supplied by customer:****CONTACT: DEREK LO****WORK ORDER: HK1410093****CLIENT: LAM GEOTECHNICS LIMITED****DATE RECEIVED: 23/05/2014****DATE OF ISSUE: 30/05/2014****ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG****PROJECT: ---****METHOD OF PERFORMANCE CHECK/ CALIBRATION:**

Ref: APHA22nd ed 2130B

COMMENTS

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory. Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203010
Equipment No.:	--
Date of Calibration:	28 May, 2014

Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr. Peter Lee**Director**

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**REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION****WORK ORDER: HK1410093****DATE OF ISSUE: 28th May, 2014****CLIENT: LAM GEOTECHNICS LIMITED**

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203010
Equipment No.:	--
Date of Calibration:	28 May, 2014
Date of next Calibration:	28 August, 2014

Parameters:**Turbidity**Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.02	---
4	4.16	+4.0
10	9.80	-2.0
40	38.5	-3.75
100	104	+4.0
400	420	+5.0
1000	970	-3.0
	Tolerance Limit ($\pm\%$)	10.0

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

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**REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION**

Information supplied by customer:**CONTACT:** DEREK LO **WORK ORDER:** HK1410074**CLIENT:** LAM GEOTECHNICS LIMITED**DATE RECEIVED:** 30/04/2014**DATE OF ISSUE:** 04/05/2014**ADDRESS:** 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG**PROJECT:** ---

METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

COMMENTS

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory. Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203016
Equipment No.:	--
Date of Calibration:	04 May, 2014

Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr. Peter Lee
Director

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REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

WORK ORDER: HK1410074

DATE OF ISSUE: 04th May, 2014

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203016
Equipment No.:	--
Date of Calibration:	04 May, 2014
Date of next Calibration:	04 August, 2014

Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.02	---
4	3.90	-2.5
10	10.1	+1.0
40	41.0	+2.5
100	96.0	-4.0
400	414	+3.5
1000	970	-3.0
	Tolerance Limit ($\pm\%$)	10.0

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

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION****Information supplied by customer:**

CONTACT: DEREK LO **WORK ORDER:** HK1410202
CLIENT: LAM GEOTECHNICS LIMITED
DATE RECEIVED 1/8/2014
DATE OF ISSUE: 4/8/2014
ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG
PROJECT: ---

METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

COMMENTS

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203016
Equipment No.:	---
Date of Calibration:	04-Aug-14

Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr. Peter Lee
Director

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

WORK ORDER: HK1410202
DATE OF ISSUE: 4/8/2014
CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203016
Equipment No.:	---
Date of Calibration:	04-Aug-14
Date of next Calibration:	04-Nov-14

Parameters:**Turbidity**Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance (%)
0	0.02	---
4	3.96	-1.0
10	9.97	-0.3
40	40.0	-0.1
100	99	-1.2
400	400	0.0
1000	1004	0.4
	Tolerance Limit ($\pm\%$)	10.0

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

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**REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION****Information supplied by customer:****CONTACT: DEREK LO WORK ORDER: HK1410073****CLIENT: LAM GEOTECHNICS LIMITED****DATE RECEIVED: 30/04/2014****DATE OF ISSUE: 04/05/2014****ADDRESS: 11/E, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG****PROJECT: ---****METHOD OF PERFORMANCE CHECK/ CALIBRATION:**

Ref: APHA22nd ed 2130B

COMMENTS

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory. Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203025
Equipment No.:	--
Date of Calibration:	04 May, 2014

Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr. Peter Lee

Director

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REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

WORK ORDER: HK1410073

DATE OF ISSUE: 04th May, 2014

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203025
Equipment No.:	--
Date of Calibration:	04 May, 2014
Date of next Calibration:	04 August, 2014

Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.02	---
4	3.86	-3.5
10	10.3	+3.0
40	42.0	+5.0
100	97.0	-3.0
400	406	+1.5
1000	975	-2.5
	Tolerance Limit ($\pm\%$)	10.0

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

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION****Information supplied by customer:**

CONTACT: DEREK LO **WORK ORDER:** HK1410201
CLIENT: LAM GEOTECHNICS LIMITED
DATE RECEIVED 1/8/2014
DATE OF ISSUE: 4/8/2014
ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG
PROJECT: ---

METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

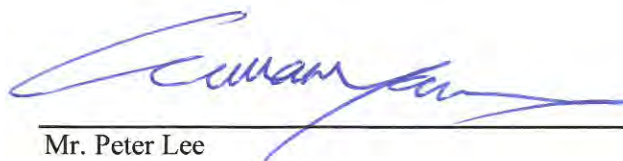
COMMENTS

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory.
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203025
Equipment No.:	---
Date of Calibration:	04-Aug-14

Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.



Mr. Peter Lee
Director

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

WORK ORDER: HK1410201
DATE OF ISSUE: 4/8/2014
CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203025
Equipment No.:	---
Date of Calibration:	04-Aug-14
Date of next Calibration:	04-Nov-14

Parameters:**Turbidity**Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance (%)
0	0.00	---
4	3.92	-2.0
10	9.87	-1.3
40	39.1	-2.3
100	100	0.0
400	400	0.0
1000	1000	0.0
	Tolerance Limit ($\pm\%$)	10.0

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MS PAULINE WONG
CLIENT: LAM ENVIRONMENTAL SERVICES LTD
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG
PROJECT: --

WORK ORDER: HK1412271
LABORATORY: HONG KONG
DATE RECEIVED: 22/04/2014
DATE OF ISSUE: 02/05/2014

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature
Description: Multimeter
Brand Name: YSI
Model No.: PROFESSIONAL PLUS
Serial No.: 11F100597
Equipment No.: --
Date of Calibration: 29 April, 2014

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1412271
Date of Issue: 02/05/2014
Client: LAM ENVIRONMENTAL SERVICES LTD



Description: Multimeter
Brand Name: YSI
Model No.: PROFESSIONAL PLUS
Serial No.: 11F100597
Equipment No.: --
Date of Calibration: 29 April, 2014

Date of next Calibration: 29 July, 2014

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.94	3.88	-0.06
6.10	5.90	-0.20
7.98	7.89	-0.09
Tolerance Limit (mg/L)		±0.20

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.16	+0.16
7.0	7.13	+0.13
10.0	10.06	+0.06
Tolerance Limit (pH Unit)		±0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.00	--
10	9.12	-8.8
20	18.80	-6.0
30	27.70	-7.7
Tolerance Limit (%)		±10.0

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

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

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	10.2	-0.3
25.5	25.3	-0.2
37.5	37.5	0.0
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



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR ALAN LI
CLIENT: LAM GEOTECHNICS LIMITED
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG
PROJECT: --

WORK ORDER: HK1423982
LABORATORY: HONG KONG
DATE RECEIVED: 28/07/2014
DATE OF ISSUE: 04/08/2014

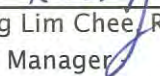
COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: pH, Dissolved Oxygen, Salinity and Temperature
Description: Multimeter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 11F100597
Equipment No.: --
Date of Calibration: 4 August 2014

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1423982
Date of Issue: 04/08/2014
Client: LAM GEOTECHNICS LIMITED



Description: Multimeter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 11F100597
Equipment No.: --
Date of Calibration: 4 August 2014

Date of next Calibration: 4 November 2014

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.71	3.79	+0.08
5.55	5.65	+0.10
7.40	7.52	+0.12
Tolerance Limit (mg/L)		±0.20

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.04	+0.04
7.0	6.90	-0.10
10.0	9.97	-0.03
Tolerance Limit (pH Unit)		±0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.0	--
10	10.07	+0.7
20	20.72	+3.6
30	30.87	+2.9
Tolerance Limit (%)		±10.0

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

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

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
12.0	11.9	-0.1
22.5	22.5	0.0
33.5	33.0	-0.5
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



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR ALAN LI
CLIENT: LAM ENVIRONMENTAL SERVICES LTD
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG
PROJECT: --

WORK ORDER: HK1424257
LABORATORY: HONG KONG
DATE RECEIVED: 30/07/2014
DATE OF ISSUE: 11/08/2014

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature
Equipment Type: Multimeter
Brand Name: YSI
Model No.: YSI Professional plus
Serial No.: 11F100420
Equipment No.: --
Date of Calibration: 05 August, 2014

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1424257
Date of Issue: 11/08/2014
Client: LAM ENVIRONMENTAL SERVICES LTD



Equipment Type: Multimeter
Brand Name: YSI
Model No.: YSI Professional plus
Serial No.: 11F100420
Equipment No.: --
Date of Calibration: 05 August, 2014 **Date of next Calibration:** 05 November, 2014

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.84	2.70	-0.14
4.80	4.72	-0.08
7.27	6.56	-0.71
Tolerance Limit (mg/L)		±0.20

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.18	+0.18
7.0	6.95	-0.05
10.0	9.90	-0.10
Tolerance Limit (pH unit)		±0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	11.03	+10.3
20	23.41	+17.1
30	33.68	+12.3
Tolerance Limit (%)		±10.0

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)
18.0	17.8	-0.2
27.5	27.6	+0.1
35.0	34.8	-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.



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR ALAN LI
CLIENT: LAM GEOTECHNICS LIMITED
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG
PROJECT: --

WORK ORDER: HK1423939
LABORATORY: HONG KONG
DATE RECEIVED: 25/07/2014
DATE OF ISSUE: 31/07/2014

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature
Equipment Type: YSI SONDE
Brand Name: YSI
Model No.: YSI Professional plus
Serial No.: 14E 100105
Equipment No.: --
Date of Calibration: 29 July, 2014

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1423939
Date of Issue: 31/07/2014
Client: LAM GEOTECHNICS LIMITED



Equipment Type: YSI SONDE
Brand Name: YSI
Model No.: YSI Professional plus
Serial No.: 14E 100105
Equipment No.: --
Date of Calibration: 29 July, 2014

Date of next Calibration: 29 October, 2014

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.60	3.45	-0.15
5.55	5.64	+0.09
7.31	7.26	-0.05
Tolerance Limit (\pm mg/L)		0.20

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	7.03	+0.03
10.0	9.99	-0.01
Tolerance Limit (\pm pH unit)		0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.25	-7.5
20	18.83	-5.9
30	28.03	-6.6
Tolerance Limit (\pm %)		10.0

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	11.0	+0.5
22.5	22.6	+0.1
33.5	33.6	+0.1
Tolerance Limit (\pm $^{\circ}$ 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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jul 14, 2014 Rootsmeter S/N 0438320 Ta (K) - 298
Operator Tisch Orifice I.D. - 0005 Pa (mm) - 749.3

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	1.3870	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8760	7.9	5.00
4	NA	NA	1.00	0.8340	8.8	5.50
5	NA	NA	1.00	0.6860	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9817	0.7078	1.4042	0.9957	0.7179	0.8919
0.9775	0.9944	1.9859	0.9915	1.0086	1.2613
0.9754	1.1135	2.2203	0.9894	1.1294	1.4101
0.9743	1.1683	2.3286	0.9882	1.1849	1.4790
0.9692	1.4128	2.8084	0.9830	1.4330	1.7837
Qstd slope (m) = 1.99175			Qa slope (m) = 1.24720		
intercept (b) = -0.00041			intercept (b) = -0.00026		
coefficient (r) = 0.99991			coefficient (r) = 0.99991		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

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

For subsequent flow rate calculations:

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



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a

Equipment no. : EL333

Calibration Date : 21-Jun-14

Calibration Due Date : 21-Aug-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	301	Kelvin	Pressure, P _a
			1003 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m _c	2.01968	Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	15-Jul-14				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	5.5	5.5	11.0	1.6392	61	60.3860
2	4.4	4.4	8.8	1.4676	52	51.4766
3	3.7	3.7	7.4	1.3469	43	42.5672
4	2.4	2.4	4.8	1.0874	26	25.7383
5	1.5	1.5	3.0	0.8626	14	13.8591

By Linear Regression of Y on X

Slope, m = 61.3367 Intercept, b = -39.7515

Correlation Coefficient* = 0.9987

Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Felix Li

Date : 21-Jun-14

Checked by : Pauline Wong

Date : 21-Jun-14



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a

Equipment no. : EL333

Calibration Date : 22-Aug-14

Calibration Due Date : 22-Oct-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1009 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m _c	1.99175	Intercept, b _c	-0.00041
Last Calibration Date	14-Jul-14	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	14-Jul-15				

Calibration of TSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	5.6	5.6	11.2	1.6630	62	61.3557
2	4.3	4.3	8.6	1.4573	51	50.4700
3	3.8	3.8	7.6	1.3699	44	43.5428
4	2.5	2.5	5.0	1.1112	27	26.7194
5	1.4	1.4	2.8	0.8316	15	14.8441

By Linear Regression of Y on X

Slope, m = 57.5058 Intercept, b = -34.6006

Correlation Coefficient* = 0.9959

Calibration Accepted = Yes/No**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by : Felix Li

Date : 22-Aug-14

Checked by : Pauline Wong

Date : 22-Aug-14



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 5.1

Monitoring Schedules for Reporting Month and Coming Reporting Month

**Wan Chai Development Phase II and Central-Wan Chai Bypass
Sampling, Field Measurement and Testing Works (Stage 2)**

**Environmental Monitoring Schedule
August 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug
	24hr TSP Noise (Daytime) Impact WQM Mid-ebb 13:19 Mid-flood 20:01	1hr TSP				24hr TSP
			Impact WQM Mid-ebb 14:21 Mid-flood 20:56		Impact WQM Mid-ebb 15:25	
3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug
	1hr TSP				24hr TSP	1hr TSP
Impact WQM Mid-flood 23:25	Impact WQM Mid-ebb 6:00	Noise (Daytime)	Impact WQM Mid-flood 0:58 Mid-ebb 8:22		Impact WQM Mid-ebb 10:12 Mid-flood 17:30	
10-Aug	11-Aug	12-Aug	13-Aug	14-Aug	15-Aug	16-Aug
		Noise (Daytime)		24hr TSP	1hr TSP	
	Impact WQM Mid-ebb 12:38 Mid-flood 19:28		Impact WQM Mid-flood 20:06		Impact WQM Mid-flood 9:24 Mid-ebb 15:34	
17-Aug	18-Aug	19-Aug	20-Aug	21-Aug	22-Aug	23-Aug
	Noise (Daytime)		24hr TSP	1hr TSP		
Impact WQM Mid-flood 23:37	Impact WQM Mid-ebb 6:50		Impact WQM Mid-flood 16:39		Impact WQM Mid-ebb 10:42 Mid-flood 17:45	
24-Aug	25-Aug	26-Aug	27-Aug			
	Noise (Daytime)	24hr TSP	1hr TSP			
	Impact WQM Mid-ebb 12:24 Mid-flood 18:56		Impact WQM Mid-ebb 13:26 Mid-flood 19:43			

Remark:

Due to hoisting of amber rainstorm warning signal, the water monitoring event on 1 August 2014 during flood tide was cancelled

Due to hoisting of amber rainstorm warning signal, the water monitoring event on 13 August 2014 during ebb tide was cancelled

Due to hoisting of amber rainstorm warning signal, the water monitoring event on 20 August 2015 during ebb tide was cancelled

**Wan Chai Development Phase II and Central-Wan Chai Bypass
Sampling, Field Measurement and Testing Works (Stage 2)**

**Tentative Environmental Monitoring Schedule
September 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				28-Aug	29-Aug	30-Aug
					Impact WQM Mid-ebb 14:32 Mid-flood 20:41	
31-Aug	1-Sep	2-Sep	3-Sep	4-Sep	5-Sep	6-Sep
	24hr TSP Noise (Daytime) Impact WQM Mid-ebb 4:12 Mid-flood 10:47	1hr TSP Noise (Daytime)		Impact WQM Mid-ebb 7:50 Mid-flood 15:26		24hr TSP Impact WQM Mid-ebb 9:51 Mid-flood 17:05
7-Sep	8-Sep	9-Sep	10-Sep	11-Sep	12-Sep	13-Sep
	VC 24hr TSP 1hr TSP Impact WQM Mid-ebb 11:32 Mid-flood 18:15		Noise (Daytime) Impact WQM Mid-ebb 13:03 Mid-flood 19:26	Noise (Daytime)	24hr TSP Impact WQM Mid-flood 8:22 Mid-ebb 14:28	1hr TSP
14-Sep	15-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep
	Noise (Daytime) Impact WQM Mid-ebb 4:40 Mid-flood 11:25	Noise (Daytime)	Impact WQM Mid-ebb 7:18 Mid-flood 19:55	24hr TSP	1hr TSP Impact WQM Mid-ebb 9:25 Mid-flood 16:43	
21-Sep	22-Sep	23-Sep	24-Sep	25-Sep	26-Sep	27-Sep
	Noise (Daytime) Impact WQM Mid-ebb 11:24 Mid-flood 17:50	Noise (Daytime)	24hr TSP Impact WQM Mid-ebb 12:28 Mid-flood 18:33	Disney 1hr TSP	Impact WQM Mid-ebb 13:35 Mid-flood 19:28	
28-Sep						



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Appendix 5.2

Noise Monitoring Results and Graphical Presentations



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

Location: M2b - Noon-day gun area

Date	Time	Weather	Measurement Noise Level			Baseline Level	Construction Noise Level	Limit Level
			Leq	L10	L90	Leq	Leq	Leq
			Unit: dB(A), (30-min)					
28/07/14	10:10	Fine	72.8	75.0	69.0	68	71	75
05/08/14	9:28	Fine	78.1	80.0	74.0	68	78	75
12/08/14	10:35	Fine	73.0	74.5	69.0	68	72	75
18/08/14	10:32	Fine	72.1	74.0	69.5	68	70	75
25/08/14	10:36	Fine	72.7	73.5	68.5	68	71	75

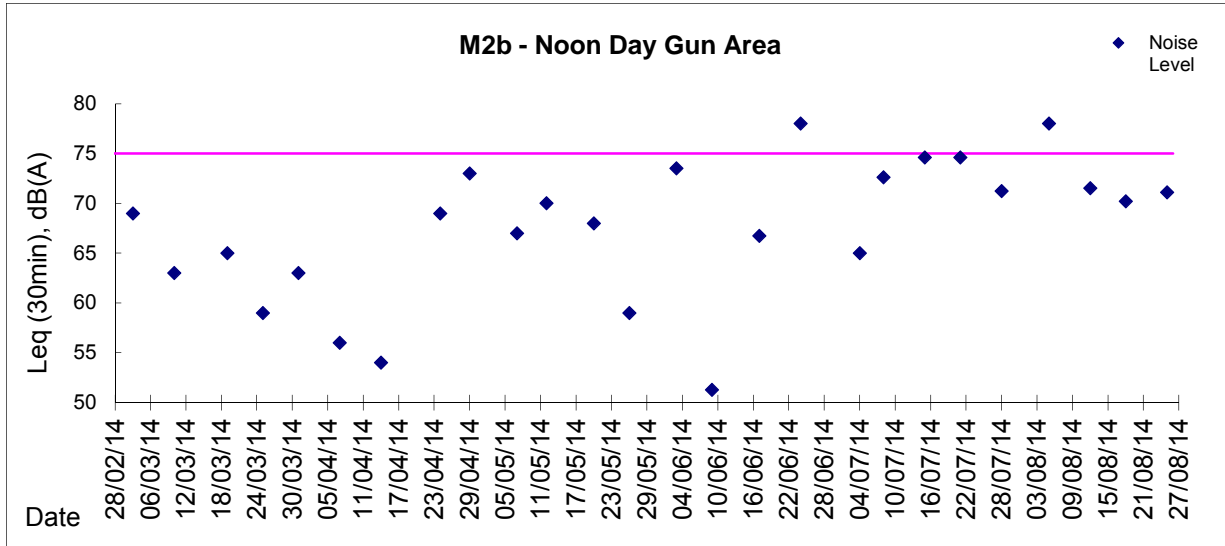


Contract No. HK/2011/07

Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection Works at Causeway Bay Typhoon Shelter)

Graphic Presentation of Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)





Lam Geotechnics Limited

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Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 5.3

Air Quality Monitoring Results and Graphical Presentations

Location: CMA3a - CWB PRE Site Office Area

Report on 24-hour TSP monitoring

Action Level ($\mu\text{g}/\text{m}^3$) - 171

Limit Level ($\mu\text{g}/\text{m}^3$) - 260

Date	Sampling Time	Weather Condition	Filter paper no.	Filter Weight, g		Elapse Time, hr		Sampling Time, hr	Flow Rate, m^3/min			Total Volume, m^3	TSP Level, $\mu\text{g}/\text{m}^3$
				Initial	Final	Initial	Final		Initial, Q_{si}	Final, Q_{sf}	Average		
28-Jul-14	8:00	Fine	009251	2.8568	3.0268	2050.38	2074.38	24.00	1.41	1.41	1.41	2027	84
2-Aug-14	8:00	Rainy	009389	2.8592	3.0655	2077.38	2101.38	24.00	1.41	1.41	1.41	2025	102
8-Aug-14	8:00	Fine	009560	2.8208	2.9248	2104.38	2128.38	24.00	1.41	1.41	1.41	2026	51
14-Aug-14	8:00	Rainy	009799	2.8262	2.9232	2131.38	2155.38	24.00	1.41	1.41	1.41	2030	48
20-Aug-14	8:00	Rainy	009254	2.8619	2.9474	2158.38	2182.38	24.00	1.41	1.41	1.41	2036	42
26-Aug-14	8:00	Fine	009761	2.8039	2.9185	2185.38	2209.38	24.00	1.37	1.37	1.37	1979	58

Report on 1-hour TSP monitoring

Action Level ($\mu\text{g}/\text{m}^3$) - 311.3

Limit Level ($\mu\text{g}/\text{m}^3$) - 500

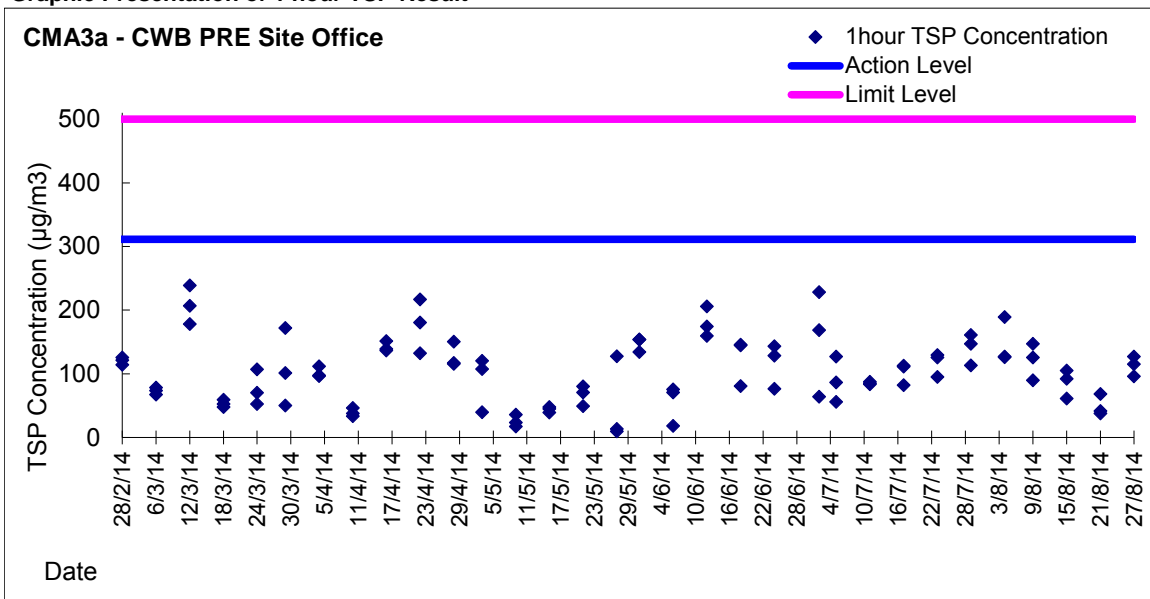
Date	Sampling Time	Weather Condition	Filter paper no.	Filter Weight, g		Elapse Time, hr		Sampling Time, hr	Flow Rate, m^3/min			Total Volume, m^3	TSP Level, $\mu\text{g}/\text{m}^3$
				Initial	Final	Initial	Final		Initial, Q_{si}	Final, Q_{sf}	Average		
29-Jul-14	8:48	Fine	009382	2.8551	2.8678	2074.38	2075.38	1.00	1.31	1.31	1.31	79	161
29-Jul-14	9:53	Fine	009384	2.8646	2.8733	2075.38	2076.38	1.00	1.27	1.30	1.28	77	113
29-Jul-14	13:00	Fine	009387	2.8558	2.8674	2076.38	2077.38	1.00	1.31	1.31	1.31	79	147
4-Aug-14	9:03	Rainy	009390	2.8432	2.8529	2101.38	2102.38	1.00	1.28	1.28	1.28	77	126
4-Aug-14	10:15	Rainy	009416	2.8617	2.8766	2102.38	2103.38	1.00	1.31	1.31	1.31	79	189
4-Aug-14	13:00	Rainy	009419	2.8583	2.8683	2103.38	2104.38	1.00	1.31	1.31	1.31	79	127
9-Aug-14	8:10	Fine	009805	2.8188	2.8259	2128.38	2129.38	1.00	1.31	1.31	1.31	79	90
9-Aug-14	9:15	Fine	009803	2.8318	2.8434	2129.38	2130.38	1.00	1.31	1.31	1.31	79	147
9-Aug-14	10:25	Fine	009801	2.8266	2.8365	2130.38	2131.38	1.00	1.31	1.31	1.31	79	126
15-Aug-14	8:35	Fine	009408	2.8424	2.8507	2155.38	2156.38	1.00	1.32	1.32	1.32	79	105
15-Aug-14	9:40	Fine	009410	2.8364	2.8437	2156.38	2157.38	1.00	1.32	1.32	1.32	79	92
15-Aug-14	10:47	Fine	009412	2.8614	2.8661	2157.38	2158.38	1.00	1.29	1.27	1.28	77	61
21-Aug-14	8:40	Rainy	009755	2.8176	2.8209	2182.38	2183.38	1.00	1.32	1.32	1.32	79	42
21-Aug-14	9:47	Rainy	009757	2.8084	2.8114	2183.38	2184.38	1.00	1.32	1.32	1.32	79	38
21-Aug-14	10:58	Rainy	009759	2.8040	2.8094	2184.38	2185.38	1.00	1.32	1.32	1.32	79	68
27-Aug-14	8:15	Cloudy	009788	2.8238	2.8323	2209.38	2210.38	1.00	1.23	1.23	1.23	74	115
27-Aug-14	9:20	Cloudy	009763	2.8031	2.8102	2210.38	2211.38	1.00	1.23	1.23	1.23	74	96
27-Aug-14	10:35	Cloudy	009765	2.8427	2.8521	2211.38	2212.38	1.00	1.23	1.23	1.23	74	127



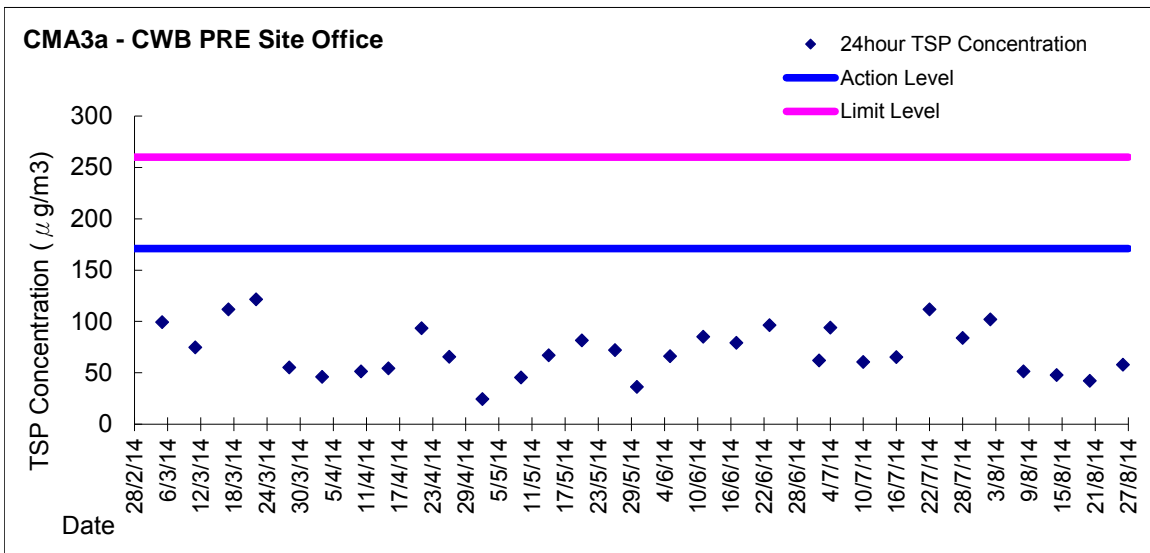
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Wanchai Development Phase II and Central Wanchai Bypass
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Graphic Presentation of 1 hour TSP Result



Graphic Presentation of 24 hour TSP Result





Lam Geotechnics Limited

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Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 5.4
Water Quality Monitoring Results and Graphical Presentation



**Water Monitoring Result at C7 - Windsor House
Mid-Flood Tide**

Date	Time	Weater Condition	Sampling Depth		Water Temperature		pH		Salinity		DO Saturation		DO		Turbidity		Suspended Solids							
			m		°C		-		ppt		%		mg/L		NTU		mg/L							
					Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average						
28/7/2014	19:38	Fine	Middle	1.5	27.90	27.90	27.95	8.19	8.19	8.19	30.14	30.14	30.14	63.1	63.5	63.0	4.17	4.19	4.16	1.34	1.30	1.40	3	3.00
	19:39		Middle	1.5	28.00	28.00		8.19	8.19		30.14	30.14		62.4	63.0		4.12	4.17		1.45	1.49		3	
30/7/2014	19:00	Fine	Middle	1.0	28.70	28.70	28.70	8.40	8.40	8.40	29.08	29.07	29.08	85.3	89.3	86.3	5.60	5.87	5.67	1.50	1.12	1.22	4	3.50
	19:01		Middle	1.0	28.70	28.70		8.40	8.40		29.09	29.09		85.7	84.9		5.62	5.57		1.16	1.08		3	
1/8/2014	-	Amber Rainstorm	Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
	-		Middle	-	-	-		-	-		-	-		-	-		-	-		-				
3/8/2014	1:45	Fine	Middle	1.5	28.30	28.30	28.35	8.13	8.13	8.12	28.02	28.02	28.03	58.1	54.0	55.3	3.86	3.59	3.68	2.39	2.66	2.48	7	6.50
	1:46		Middle	1.5	28.40	28.40		8.11	8.11		28.03	28.03		53.3	55.9		3.54	3.71		2.45	2.40		6	
6/8/2014	23:52	Cloudy	Middle	1.0	28.10	28.10	28.10	8.16	8.16	8.15	28.91	28.91	28.91	55.3	54.9	55.4	3.67	3.65	3.68	1.92	1.97	1.91	3	3.50
	23:53		Middle	1.0	28.10	28.10		8.14	8.14		28.91	28.91		56.0	55.5		3.70	3.69		1.89	1.87		4	
8/8/2014	15:57	Fine	Middle	1.5	29.10	29.10	29.10	8.02	8.02	8.02	28.00	28.00	28.00	74.6	73.4	74.4	4.90	4.82	4.88	3.12	3.07	3.11	2	2.00
	15:59		Middle	1.5	29.10	29.10		8.02	8.02		28.00	28.00		75.2	74.3		4.94	4.87		3.14	3.11		2	
11/8/2014	18:45	Cloudy	Middle	1.0	28.00	28.00	28.10	8.06	8.06	8.05	29.91	29.91	29.91	62.6	62.8	62.3	4.13	4.14	4.11	2.29	2.24	2.19	3	3.00
	18:46		Middle	1.0	28.20	28.20		8.04	8.04		29.90	29.90		62.1	61.7		4.08	4.07		2.13	2.11		3	
13/8/2014	18:57	Cloudy	Middle	1.0	25.10	25.10	25.10	7.88	7.88	7.89	20.85	20.85	20.85	64.5	65.1	65.2	4.73	4.77	4.78	4.37	4.81	4.57	3	3.00
	18:58		Middle	1.0	25.10	25.10		7.89	7.89		20.85	20.85		65.2	65.9		4.78	4.83		4.54	4.56		3	
15/8/2014	11:12	Fine	Middle	1.5	27.40	27.40	27.45	7.71	7.71	7.71	28.67	28.67	28.67	56.1	56.5	56.6	3.78	3.81	3.82	1.37	1.36	1.36	<2	<2
	11:14		Middle	1.5	27.50	27.50		7.71	7.71		28.66	28.66		57.2	56.7		3.85	3.82		1.35	1.36		<2	
17/8/2014	1:24	Cloudy	Middle	1.5	28.10	28.10	28.15	7.99	7.99	7.98	28.63	28.63	28.63	73.6	77.2	75.7	4.89	5.13	5.03	1.45	1.40	1.40	<2	<2
	1:25		Middle	1.5	28.20	28.20		7.97	7.97		28.63	28.63		77.1	75.0		5.12	4.98		1.36	1.39		<2	
20/8/2014	14:39	Cloudy	Middle	1.5	26.60	26.60	26.55	7.85	7.85	7.86	24.51	24.51	24.56	61.6	63.7	63.7	4.31	4.46	4.46	2.75	2.75	2.74	<2	<2
	14:41		Middle	1.5	26.50	26.50		7.86	7.86		24.61	24.61		64.7	64.6		4.53	4.52		2.74	2.73		<2	
22/8/2014	15:53	Fine	Middle	1.5	28.50	28.50	28.60	8.08	8.08	8.08	27.92	27.92	27.92	75.1	74.1	72.7	4.98	4.91	4.82	3.21	3.20	3.19	8	8.00
	15:55		Middle	1.5	28.70	28.70		8.08	8.08		27.91	27.91		71.5	70.1		4.75	4.65		3.18	3.17		8	
25/8/2014	18:49	Fine	Middle	1.0	28.00	28.00	28.10	8.05	8.05	8.06	29.86	29.86	29.87	77.8	71.9	74.5	5.14	4.74	4.90	2.34	2.39	2.26	6	6.50
	18:50		Middle	1.0	28.20	28.20		8.06	8.06		29.88	29.88		73.6	74.7		4.85	4.87		2.12	2.20		7	
27/8/2014	20:23	Fine	Middle	1.5	27.90	27.90	27.90	8.05	8.05	8.05	30.75	30.74	30.75	66.8	67.6	67.2	4.42	4.47	4.45	4.98	5.25	4.99	8	8.00
	20:24		Middle	1.5	27.90	27.90		8.05	8.05		30.75	30.75		66.4	68.1		4.39	4.51		4.81	4.90		8	

Remarks:

Due to hoisting of amber rainstorm warning signal, the water monitoring on 1 August 2014 during flood tide was cancelled.

Single underline denotes exceedance over Action Level.

Double underline denotes exceedance over Limit Level.



**Water Monitoring Result at C7 - Windsor House
Mid-Ebb Tide**

Date	Time	Weater Condition	Sampling Depth		Water Temperature		pH			Salinity		DO Saturation		DO		Turbidity			Suspended Solids					
					°C		-		ppt		%		mg/L		NTU		mg/L							
			m		Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average				
28/7/2014	14:04	Fine	Middle	2	29.10	29.10	29.25	8.23	8.23	8.22	28.26	28.26	28.25	70.9	72.6	72.5	4.65	4.75	4.75	2.19	2.18	2.19	3	3.00
	14:06		Middle	2	29.40	29.40		8.20	8.20		28.24	28.24		72.5	73.9		4.75	4.83		2.19	2.20		3	
30/7/2014	14:59	Fine	Middle	2	28.30	28.30	28.50	8.19	8.19	8.18	31.47	31.47	31.53	67.9	69.4	69.2	4.42	4.51	4.50	1.54	1.50	1.51	3	3.00
	15:01		Middle	2	28.70	28.70		8.17	8.17		31.58	31.58		69.6	69.7		4.52	4.53		1.49	1.49		3	
1/8/2014	15:07	Fine	Middle	2	29.70	29.70	29.80	8.25	8.25	8.24	29.21	29.21	29.21	79.4	79.2	79.4	5.12	5.12	5.12	1.61	1.60	1.60	5	4.50
	15:09		Middle	2	29.90	29.90		8.23	8.23		29.20	29.20		79.1	79.8		5.10	5.14		1.60	1.58		4	
4/8/2014	6:00	Cloudy	Middle	2	28.00	28.00	28.00	8.21	8.21	8.20	27.63	27.63	27.64	50.8	52.8	52.3	3.40	3.54	3.51	2.36	2.28	2.37	4	4.50
	6:01		Middle	2	28.00	28.00		8.19	8.19		27.64	27.64		53.3	52.3		3.57	3.51		2.38	2.44		5	
6/8/2014	9:42	Sunny	Middle	2	27.90	27.90	27.90	8.03	8.03	8.03	27.36	27.36	27.37	73.2	75.1	74.4	4.93	5.04	5.00	3.94	4.11	3.98	8	8.00
	9:44		Middle	2	27.90	27.90		8.03	8.03		27.37	27.37		73.6	75.5		4.95	5.08		3.93	3.92		8	
8/8/2014	11:24	Fine	Middle	2	27.90	27.90	28.00	7.92	7.92	7.92	28.11	28.11	28.11	64.9	66.9	65.5	4.34	4.41	4.37	2.77	2.61	2.70	2	2.00
	11:26		Middle	2	28.10	28.10		7.92	7.92		28.11	28.11		65.0	65.2		4.35	4.36		2.70	2.71		2	
11/8/2014	10:57	Fine	Middle	2	27.40	27.40	27.40	7.77	7.77	7.77	29.49	29.49	29.50	50.1	51.7	50.9	3.36	3.47	3.41	1.48	1.44	1.44	3	3.00
	10:59		Middle	2	27.40	27.40		7.77	7.77		29.50	29.50		51.2	50.6		3.43	3.39		1.43	1.42		3	
13/8/2014	-	Amber / Red Rainstorm	Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
	-		Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
15/8/2014	15:07	Fine	Middle	2	28.10	28.10	28.25	7.76	7.76	7.76	28.86	28.86	28.86	54.5	56.1	55.4	3.62	3.72	3.67	1.28	1.27	1.26	2	2.00
	15:09		Middle	2	28.40	28.40		7.75	7.75		28.85	28.85		56.0	54.8		3.71	3.63		1.24	1.26		<2	
18/8/2014	5:52	Fine	Middle	2	27.60	27.60	27.60	8.20	8.20	8.20	26.36	26.34	26.35	62.8	63.0	62.5	4.24	4.28	4.24	1.13	1.31	1.19	<2	<2
	5:53		Middle	2	27.60	27.60		8.20	8.20		26.34	26.34		61.7	62.3		4.20	4.23		1.22	1.11		<2	
20/8/2014	-	Amber Rainstorm	Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
	-		Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
22/8/2014	11:47	Cloudy	Middle	2	27.50	27.50	27.55	7.85	7.85	7.85	28.72	28.72	28.72	63.5	65.1	64.9	4.27	4.38	4.36	2.34	2.33	2.33	3	3.00
	11:50		Middle	2	27.60	27.60		7.85	7.85		28.71	28.71		65.6	65.3		4.41	4.39		2.33	2.33		3	
25/8/2014	14:17	Fine	Middle	2	28.40	28.40	28.40	7.96	7.96	7.96	28.67	28.67	28.67	72.6	73.4	72.8	4.81	4.86	4.82	15.32	15.67	<u>15.96</u>	8	8.00
	14:19		Middle	2	28.40	28.40		7.95	7.95		28.67	28.67		72.6	72.6		4.80	4.80		16.42	16.41		8	
27/8/2014	14:32	Fine	Middle	2	27.30	27.30	27.35	7.97	7.97	7.97	30.04	30.04	30.05	70.3	71.3	71.4	4.70	4.77	4.78	3.22	3.31	3.30	7	6.50
	14:34		Middle	2	27.40	27.40		7.97	7.97		30.05	30.05		72.0	72.1		4.81	4.82		3.32	3.34		6	

Remarks:

Due to hoisting of amber rainstormn warning signal, the water monitoring on 13 August 2014 during edd tide was cancelled

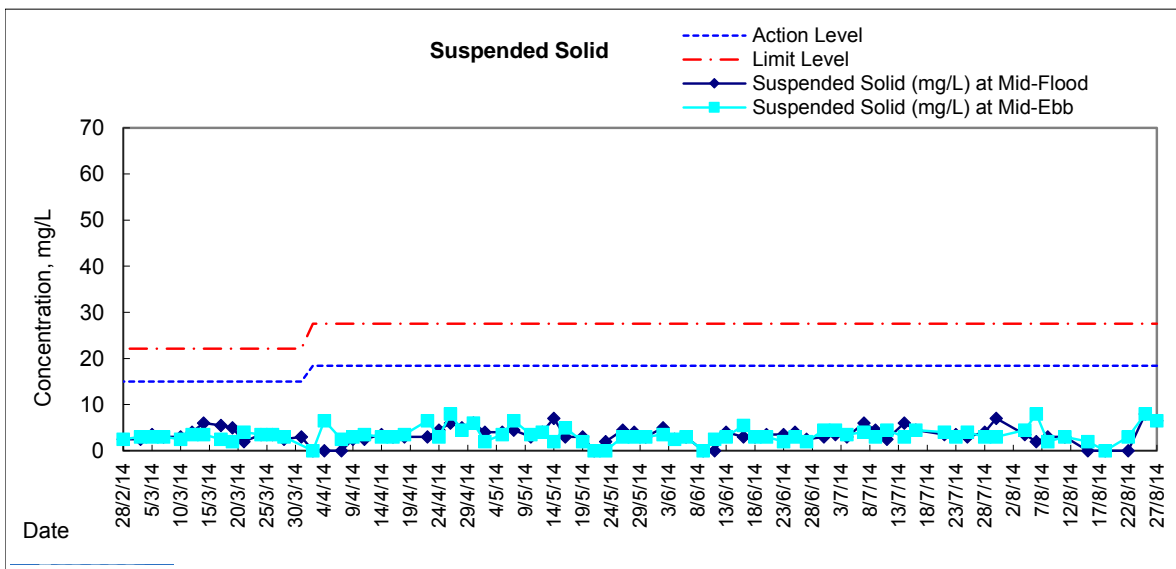
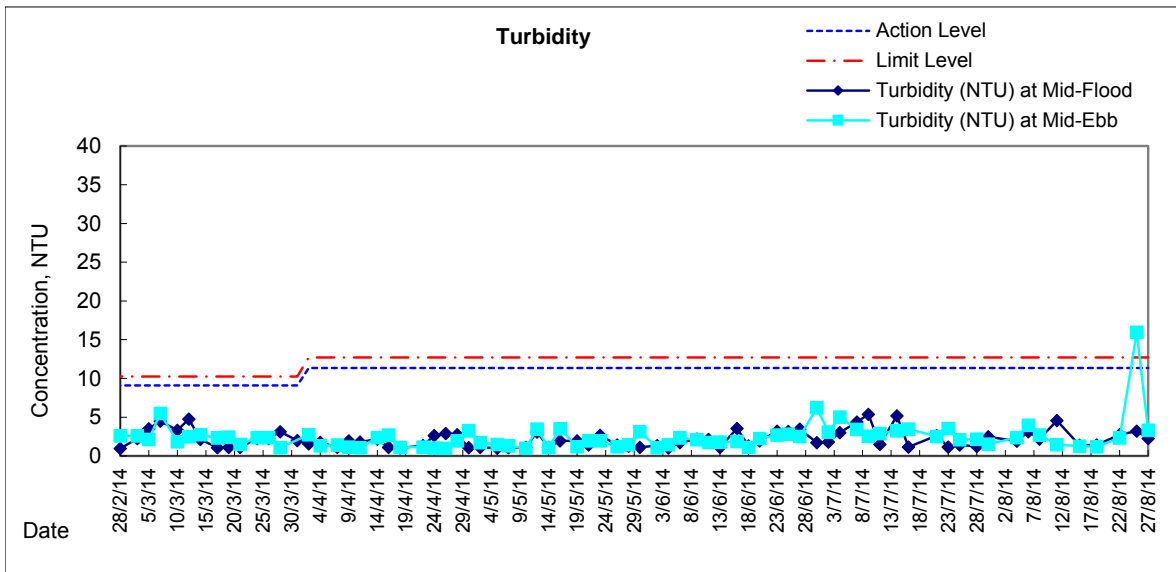
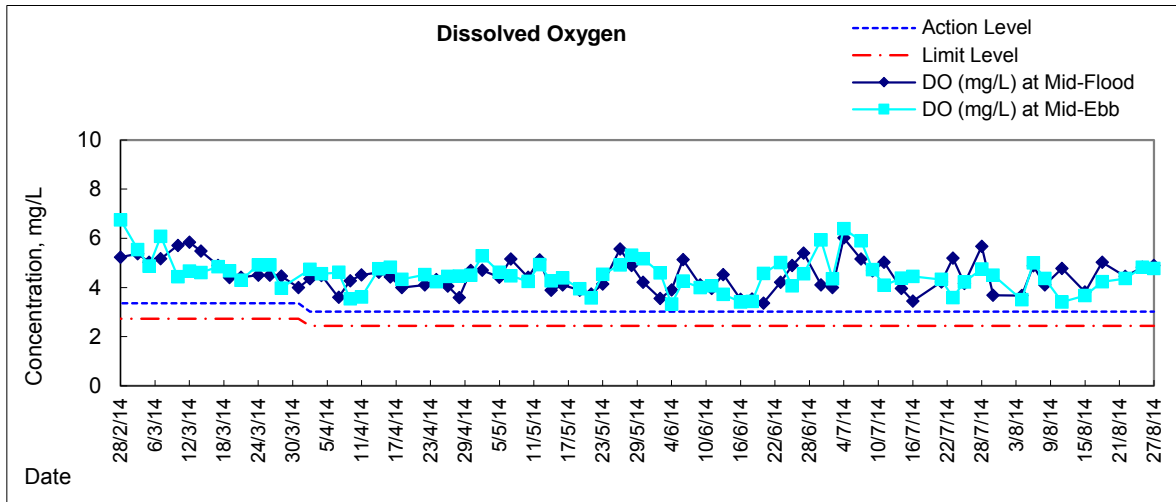
Due to hoisting of amber/red rainstormn warning signal, the water monitoring on 20 August 2014 during edd tide was cancelled

Single underline denotes exceedance over Action Level.

Double underline denotes exceedance over Limit Level.



Graphic Presentation of Water Quality Result of C7 - Windsor House





Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 6.1

Event Action Plans



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Event/Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	<ol style="list-style-type: none"> 1. Notify IEC, ER and Contactor 2. Carry out investigation 3. Report the results of investigation to the IEC, ER and Contactor 4. Discuss with the IEC and Contractor on remedial measures required 5. Increase monitoring frequency to check mitigation effectiveness <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>	<ol style="list-style-type: none"> 1. Review the investigation results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly 3. Advise the ER on the effectiveness of the proposed remedial measures <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented 4. Supervise the implementation of remedial measures <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER 2. Implement noise mitigation proposals <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>
Limit Level	<ol style="list-style-type: none"> 1. Inform IEC, ER, EPD and Contractor 2. Repeat measurement to confirm findings 3. Increase monitoring frequency 4. Identify source and investigate the cause of exceedance 5. Carry out analysis of Contractor's working procedures. Discuss with the IEC, Contractor and ER on remedial measures require 6. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results 7. If exceedance stops, cease additional monitoring <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented 4. Supervise the implementation of remedial measures 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification 3. Implement the agreed proposals 4. Submit further proposal if problem still not under control 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p>



Lam Geotechnics Limited

Contract No. HK/2011/07

Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Event / Action Plan for Construction Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of complaint and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Check monitoring data submitted by ET; 2. Check Contractor's working method. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Notify Contractor. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate. (The above actions should be taken within 2 working days after the exceedance is identified.)
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Submit proposals for remedial to ER within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate. (The above actions should be taken within 2 working days after the exceedance is identified.)
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC, ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. (The above actions should be taken within 2 working days after the exceedance is identified.)	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate. (The above actions should be taken within 2 working days after the exceedance is identified.)



Lam Geotechnics Limited

Contract No. HK/2011/07

Wanchai Development Phase II and Central Wanchai Bypass

(Shatin to Central Link (SCL) Protection

Works at Causeway Bay Typhoon Shelter)

2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none">1. Notify IEC, ER, Contractor and EPD;2. Identify source;3. Repeat measurement to confirm findings;4. Increase monitoring frequency to daily;5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;8. If exceedance stops, cease additional monitoring. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none">1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;3. Supervise the implementation of remedial measures. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none">1. Confirm receipt of notification of failure in writing;2. Notify Contractor;3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;4. Ensure remedial measures properly implemented;5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none">1. Take immediate action to avoid further exceedance;2. Submit proposals for remedial actions to IEC within three working days of notification;3. Implement the agreed proposals;4. Resubmit proposals if problem still not under control;5. Stop the relevant portion of works as determined by the ER until the exceedance is abated. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>
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Event and Action Plan for Marine Water Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	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; (The above actions should be taken within 1 working day after the exceedance is identified) Repeat measurement on next day of exceedance.	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented. (The above actions should be taken within 1 working day after the exceedance is identified)	Inform the ER 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 ER; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)
Action level being exceeded by more than one consecutive sampling days	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; (The above actions should be taken within 1 working day after the exceedance is identified) Repeat measurement on next working day of exceedance.	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	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 ER within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)



EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Limit level being exceeded by one sampling day	Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Inform IEC and Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	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 the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	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, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)
Limit level being exceeded by more than one consecutive sampling days	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, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. (The above actions should be taken within 1 working day after the exceedance is identified)	Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. (The above actions should be taken within 1 working day after the exceedance is identified)	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 the implemented mitigation measures; 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. (The above actions should be taken within 1 working day after the exceedance is identified)	Inform the ER 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 ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures; As directed by the Engineer, to slow down or to stop all or part of the marine work or construction activities. (The above actions should be taken within 1 working day after the exceedance is identified)



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 6.2

Summary of Notification of Exceedances



Ref. No.	Date	Time	Location	Construction Noise Level	Unit	Action Level	Limit Level	Follow-up action
X_10N174	5-Aug-14	9:28	M2b- Noon Day Gun Area	78	Leq(30-min)	when one documented complaint was received.	75	<p>Possible reason: Non EP-416 designated Project works (Concrete Breaking works and barge operation under EP-364 worksarea) was considered as major noise contribution.</p> <p>Action taken / to be taken: Repeat measurement to confirm result and reviewed the trend of noise measurement. Analysis of contractor's working procedure.</p> <p>Remarks / Other Obs: Despite reclamation removal works at ME4 area was conducted during monitoring, it is concluded that the exceedance was related to non EP-416 designated projects works and relevant rectifying actions were implemented under EP-364.</p>



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
Sampling, Field Measurement and Testing Work (Stage2)
Summary for Notification of Exceedance

Ref no.	Date	Tidal	Location	Parameters (Unit)	Measured	Action Level	Limit	Follow-up action	
X_10C612	25-Aug-14	Mid-ebb	C7	DO(mg/l)	4.82	3.02	2.44	Possible reason:	Natural variation or changes of water quality in the vicinity of water quality monitoring station.
				Turbidity	15.96	11.35	12.71	Action taken/ to be taken:	Immediate repeated in-situ measurement had conducted to confirm the exceedances. Checked with Contractor works.
				SS	8.00	18.42	27.54	Remarks/ Other Obs:	Dredging works was conducted during the monitoring date on 25 August 2014 at Victoria Harbour, contractor mitigation measures including use of frame type silt curtain was in place and effective. In addition, the installed silt screen at monitoring station was properly maintained. Fine particulates were observed in the vicinity of monitoring station and was considered not due to project works. Nevertheless, the particulates were cleared subsequently and turbidity level was restored to normal range within the same date on 25 August 2014 during flood tide. In view of exceedance was not continuous, it was considered the exceedance was not related to Project.



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 7.1

Complaint Log



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection Works at Causeway Bay Typhoon Shelter)

Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
--	--	--	--	--	--	--



Lam Geotechnics Limited

Contract No. HK/2011/07
Wanchai Development Phase II and Central Wanchai Bypass
(Shatin to Central Link (SCL) Protection
Works at Causeway Bay Typhoon Shelter)

Appendix 8.1

Construction Programme of Individual Contracts

Activity ID	Activity Name	Calendar	Original Duration	Start	Finish	Late Start	Late Finish	Total Float	Q4	Q1	Q2	Q3	Q4	2015	2016
OHVD Slab and Cable Trough Construction															
S3_5075	Demolish bulkhead wall between TS1 & TS2	7d/wk-1	47d	24-Feb-14	12-Apr-14	14-Jan-14	04-Mar-14	-38d							
S3_5080	TS2 - OHVD slab (access through temp. opening at CCT in Portion 6&22)	7d/wk-1	90d	13-Apr-14	18-Jul-14	05-Mar-14	09-Jun-14	-38d							
S3_6210	TS2 - cable trough (access through temp. opening at CCT in Portion 6&22)	7d/wk-1	90d	13-Apr-14	18-Jul-14	05-Mar-14	09-Jun-14	-38d							
S1_5655	Make good temporary access shaft and complete remaining OHVD at TS1(Portion 1,2,6,22)	7d/wk-1	24d	19-Jul-14	11-Aug-14	10-Jun-14	04-Jul-14	-38d							
S3_6212	Completion of Section 3 - TS1/TS2 Area (below -6mpd) KD8)	7d/wk-2	0d		11-Aug-14		04-Jul-14	-38d							
Works in TS4/ME4 Area (Portion 14A, 14B, 15, 23)															
TS4/ME4 - ELS Works & Rock Excavation															
TS4/ME4- West Portion Rock Excavation + Pipe Roofing Installation															
SZ7155	WB Area Rock excavation -25 up to -35mPD	7d/wk-1	28d	17-Jul-13 A	25-Oct-13	17-Apr-13	24-Apr-13	-177d							
TS4/ME4 - Mined Tunnel East Portal Works															
WB Tunnel															
SZ7115	WB - short portion CCT (base slab, Wall and Strut) to facilitate SR8 excavation (-35mPD)	7d/wk-1	20d	26-Oct-13	14-Nov-13	25-Apr-13	15-May-13	-177d							
SZ7100	WB Mined Tunnel "Heading/Bench" Excavation - 3.5 (Arch rib->Mining->Shotcrete)	7d/wk-1	24d	15-Nov-13	08-Dec-13	16-May-13	09-Jun-13	-177d							
SZ7105	WB Tunnel Lining (base slab & kicker and erect shutter then Lining) - 1.5m	7d/wk-1	21d	06-Dec-13	28-Dec-13	07-Jun-13	28-Jun-13	-177d							
EB Tunnel															
SZ7085	EB Mined Tunnel "Outer/Inner" Excavation - 4.5m (Arch rib->Mining->Shotcrete)	7d/wk-1	31d	16-Aug-13 A	21-Oct-13	04-Jun-13	07-Jun-13	-131d							
SZ7095	EB Tunnel Base Slab + Arc Concrete lining - 2.5m	7d/wk-1	21d	21-Oct-13	10-Nov-13	07-Jun-13	28-Jun-13	-131d							
SR8 Tunnel															
SZ7070	SR8 Mined Tunnel Full Face Excavation - 5m (Arch rib->Mining->Shotcrete)	7d/wk-1	21d	15-Nov-13	05-Dec-13	16-May-13	06-Jun-13	-177d							
S5_54712	SR8 Tunnel Base Slab + Arc Concrete lining - 1st 5m	7d/wk-1	21d	06-Dec-13	28-Dec-13	07-Jun-13	28-Jun-13	-177d							
TS4/ME4 - CCT RC Structure															
CCT - Area A															
SZ6820	TS4 Construct tunnel wall & OHVD + Roof slab	7d/wk-1	36d	14-Jun-13 A	04-Nov-13*	20-May-13	06-Jun-13	-146d							
S5_59785	Waterproofing on top of completed CCT box (incl. screeding) & mass concrete fill	7d/wk-1	12d	05-Nov-13	16-Nov-13	07-Jun-13	19-Jun-13	-146d							
S5_59820	Construct access shaft at TZ4	7d/wk-1	36d	05-Nov-13	10-Dec-13	26-Jul-13	30-Aug-13	-99d							
S5_59795	King Post Load Transfer - CWB top slab area A	7d/wk-1	12d	17-Nov-13	28-Nov-13	20-Jun-13	02-Jul-13	-146d							
CCT - Area B															
SZ6765	TS4 Construct tunnel base slab	7d/wk-1	24d	18-Oct-13*	10-Nov-13	18-Apr-13	12-May-13	-176d							
Prepared by William Caluza															
3 of 13															
Contract No. HY72009/15 - Central Wan Chai By Pass - Tunnel (Causeway Bay Typhoon Shelter Section)															
WORKS PROGRAMME REV. J															
Remaining Work															
Critical Remaining Work															
Milestone															
Summary															
Summary															
中國建築工程(香港)有限公司 CHINA STATE CONSTRUCTION ENGINEERING GROUP LTD															

3 of 13

- Remaining Work
- Remaining Work
- Critical Remaining Work
- ◆ Milestone
- ◆ Summary
- ◆ Summary

Contract No. HY/2009/15 - Central Wan Chai By Pass - Tunnel (Causeway Bay Typhoon Shelter Section)

WORKS PROGRAMME REV. J

Date	Revision	Checked	Approved
18-Oct-13	1ST Submission		KC

Prepared by William Caluza

Activity ID	Activity Name	Calendar	Original Duration	Start	Finish	Late Start	Late Finish	Total Float	2014				2015				2016			
									Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
S26770	TS4 Construct tunnel wall & OHVD - Roof slab	7d/wk-1	36d	30-Oct-13*	04-Dec-13*	30-Apr-13	06-Jun-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
S26785	Waterproofing on top of completed CCT box (incl. screeding) & mass concrete infill	7d/wk-1	12d	05-Dec-13	16-Dec-13	07-Jun-13	19-Jun-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
SS_59800	King Post Load Transfer - CWB top slab area B	7d/wk-1	12d	17-Dec-13	30-Dec-13	20-Jun-13	02-Jul-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
Slitching - CCT Area C																				
S26830	EB - CCT stitching (, base slab, wall & roof)	7d/wk-1	36d	05-Nov-13	10-Dec-13	23-Jun-13	29-Jul-13	-131d	█	█	█	█	█	█	█	█	█	█	█	
S26825	WB - CCT stitching (, base slab, wall & roof)	7d/wk-1	36d	21-Dec-13	28-Jan-14	23-Jun-13	29-Jul-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
S26835	SRB - CCT stitching (, base slab, wall & roof)	7d/wk-1	36d	21-Dec-13	28-Jan-14	23-Jun-13	29-Jul-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59780	Waterproofing on top of completed CCT box (incl. screeding) & mass concrete infill	7d/wk-1	4d	28-Jan-14	02-Feb-14	29-Jul-13	01-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59805	King Post Load Transfer - CWB top slab area C	7d/wk-1	4d	30-Jan-14	05-Feb-14	31-Jul-13	03-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SCL CCT RC Structure - Area A & B																				
S26775	Rockfill to underside of SCL tunnel / soil backfill in other areas	7d/wk-1	6d	31-Dec-13	06-Jan-14	03-Jul-13	08-Jul-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
S26745	ME4 - remove strut and construct SCL tunnel base slab	7d/wk-1	24d	07-Jan-14	30-Jan-14	09-Jul-13	01-Aug-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
S26750	ME4 - SCL tunnel, wall and roof slab (incl. removal of L4 struts & backfilling works)	7d/wk-1	36d	17-Jan-14	24-Feb-14	19-Jul-13	23-Aug-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
S26760	Waterproofing on top of completed CCT box (incl. screeding)	7d/wk-1	6d	24-Feb-14	01-Mar-14	23-Aug-13	28-Aug-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
SS_59810	King Post Load Transfer - SCL top slab area	7d/wk-1	6d	26-Feb-14	03-Mar-14	25-Aug-13	30-Aug-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
SCL CCT RC Structure - Area C																				
SS_59755	Rockfill to underside of SCL tunnel / soil backfill in other areas	7d/wk-1	2d	06-Feb-14	07-Feb-14	04-Aug-13	05-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59760	ME4 - remove strut and construct SCL tunnel base slab	7d/wk-1	6d	08-Feb-14	13-Feb-14	05-Aug-13	11-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59765	ME4 - SCL tunnel, wall and roof slab (incl. removal of L4 struts & backfilling works)	7d/wk-1	12d	14-Feb-14	25-Feb-14	12-Aug-13	23-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59825	Construct access shaft at TZ6	7d/wk-1	6d	26-Feb-14	03-Mar-14	25-Aug-13	30-Aug-13	-176d	█	█	█	█	█	█	█	█	█	█	█	
SS_59775	Waterproofing on top of completed CCT box (incl. screeding)	7d/wk-1	3d	28-Feb-14	02-Mar-14	26-Aug-13	28-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59790	King Post Load Transfer - SCL top slab area	7d/wk-1	3d	02-Mar-14	04-Mar-14	28-Aug-13	30-Aug-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
TS4/ME4 - Removal of Temporary Reclamation																				
TS4/ME4, Removal of Temporary Reclamation																				
S62755	Remaining backfilling works to sea bed level, -6mPD (TS4/ME4 Area)	7d/wk-1	6d	05-Mar-14	10-Mar-14	31-Aug-13	05-Sep-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
SS_59815	Reinstatement of vertical seawall	7d/wk-1	6d	05-Mar-14	10-Mar-14	31-Aug-13	05-Sep-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
S26880	Recharge water inside cofferdam concurrent with removal of strut L1 & L2	7d/wk-1	6d	11-Mar-14	16-Mar-14	06-Sep-13	11-Sep-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
S26845	Remove general fill /sea wall block south side	7d/wk-1	17d	13-Mar-14	29-Mar-14	08-Sep-13	25-Sep-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
S26885	Saw cut diaphragm wall (nos.) - south side	7d/wk-1	25d	25-Mar-14	22-Apr-14	21-Sep-13	17-Oct-13	-177d	█	█	█	█	█	█	█	█	█	█	█	
Prepared by William Calluza																				
Revision																				
Checked																				
Approved																				
18-Oct-13																				
1ST Submission																				
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Activity ID	Activity Name	Calendar	Original Duration	Start	Finish	Late Start	Late Finish	Total Float	2014				2015				2016																
									Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4												
S5_54717	Remove seawall block/general fill - north side	7d/wk-1	17d	23-Apr-14	11-May-14	18-Oct-13	03-Nov-13	-177d																									
S26855	Form T26	7d/wk-1	18d	23-Apr-14	12-May-14	06-Nov-13	23-Nov-13	-158d																									
S5_54722	Saw cut diaphragm wall (nos.) - north side	7d/wk-1	25d	07-May-14	31-May-14	30-Oct-13	23-Nov-13	-177d																									
S26860	Form T24	7d/wk-1	18d	14-May-14	31-May-14	06-Nov-13	23-Nov-13	-177d																									
S26875	Completion of Section 2 (With ME4 option) (KD7)	7d/wk-1	0d		31-May-14*		23-Nov-13	-177d																									
S26890	Completion of Section 7B (ME4) (KD13)	7d/wk-1	0d		31-May-14*		23-Nov-13	-177d																									
Re-Provision of Permanent Jetty & Floating Pontoon																																	
Re-Provision of Permanent Jetty & Floating Pontoon																																	
S6_5263	Provision of Temporary Jetty (Mobile Crane) (until permanent re-provision is completed)	6d/wk	160d	07-May-14	14-Nov-14	20-Jul-15	27-Jan-16	357d																									
S6_5260	Re-provision of permanent jetty and floating pontoon	6d/wk	72d	03-Jun-14	26-Aug-14	19-Oct-15	13-Jan-16	411d																									
S6_5265	Re-provision of permanent jetty and floating pontoon - RHKYC Inspection / Appvl	6d/wk	12d	01-Nov-14	14-Nov-14	14-Jan-16	27-Jan-16	357d																									
Phase 3 Mooring Re-Arrangement																																	
S5_55940	Phase 3 Mooring Re-Arrangements in area of TS4/ME4	6d/wk	12d	03-Jun-14	16-Jun-14	29-Jan-14	14-Feb-14	-97d																									
TS4 - OHVD / Cable Trough																																	
S5_6185	TS4 (incl. TS4+) - OHVD Slab - Area C (access through temp. opening at TZ4)	6d/wk	60d	02-Jan-15*	16-Mar-15	10-Jun-15	20-Aug-15	127d																									
S5_6190	TS4 (incl. TS4+) - Cable Trough (access through temp. opening at TZ4)	6d/wk	60d	17-Mar-15	01-Jun-15	21-Aug-15	02-Nov-15	127d																									
S5_59550	Completion of Section 5 - TS4/ME4 Area (KD10), below -20mPD	7d/wk-2	0d		02-Nov-15*		02-Nov-15	0d																									
Works in TPCWAE Area (Portion 20A, 20B)																																	
MT West Portal Works																																	
WB (West Bound) Tunnel																																	
S67820	WB Tunnel Base Slab - 5m Base slab + kicker wall	7d/wk-1	6d	15-Oct-13 A	24-Oct-13	19-Jun-13	25-Jun-13	-117d																									
S67800	WB Assemble arc lining shutter (outside)	7d/wk-1	6d	25-Oct-13	30-Oct-13	26-Jun-13	02-Jul-13	-117d																									
S67810	WB Tunnel Arc Concrete lining - 5m	7d/wk-1	18d	31-Oct-13	17-Nov-13	03-Jul-13	20-Jul-13	-117d																									
EB (East Bound) Tunnel																																	
S67785	EB Mined Tunnel "Inner" Excavation - 7m (Arch rib->Mining->Shotcrete)	7d/wk-1	27d	02-Sep-13 A	19-Oct-13	18-Jun-13	19-Jun-13	-118d																									
S67815	EB Tunnel Base Slab - 5m Base slab + kicker wall	7d/wk-1	6d	20-Oct-13	25-Oct-13	20-Jun-13	25-Jun-13	-118d																									
S67795	EB Assemble arc lining shutter (outside)	7d/wk-1	6d	26-Oct-13	31-Oct-13	26-Jun-13	02-Jul-13	-118d																									
S67805	EB Tunnel Arc Concrete lining - 5m	7d/wk-1	18d	01-Nov-13	18-Nov-13	03-Jul-13	20-Jul-13	-118d																									
CCT RC Structure																																	

Remaining Work

Remaining Work

Critical Remaining Work

Milestone

Summary

Summary

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Contract No. HY/2009/15 - Central Wan Chai By Pass - Tunnel (Causeway Bay Typhoon Shelter Section)

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Prepared by William Caluza

Date

18-Oct-13

Revision

1ST Submission

Checked

KC

Approved

CHINA STATE CONSTRUCTION ENGINEERING HONG KONG LTD.

中國建築工程(香港)有限公司

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Revision					KC