



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 2013 -

CLIENTS:

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Department

and

Highways Department

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CERTIFIED BY:

Raymond Dai
Environmental Team Leader

DATE:

10 September 2013

Ref.: AACWBIECEM00_0_4345L.13

12 September 2013

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 2013)
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 2013 received by email on 10 September 2013.

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

c.c.	HyD	Mr. Cyrus Wong	by fax: 2761 1508
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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 2013](#) 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 2013 to August 2013](#). 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:

- [Excavation and Lateral Support at ME4](#)

Noise Monitoring

- iii. [Noise monitoring during daytime was conducted at M2b - Noon-day gun area on a weekly basis. No exceedance was recorded in the reporting period.](#)

Air quality monitoring

- iv. [Due to hoisting of Gale signal no.8, the 1hr TSP monitoring event was rescheduled from 14 Aug 2013 to 15 Aug 2013.](#)
- v. [1-hour and 24-hour Total Suspended Particulates \(TSP\) monitoring were conducted at CMA3a - CWB PRE Site Office Area. No exceedance was recorded in the reporting period.](#)

Water Quality monitoring

- vi. [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**.](#)
- vii. [Due to the enforcement of Strong Wind Signal No. 3 on 1 Aug 2013, water quality monitoring at flood tide was cancelled.](#)
- viii. [Due to the enforcement of Strong Wind Signal No. 3 on 14 Aug 2013, water quality monitoring at flood tide was cancelled.](#)
- ix. [Two action level DO exceedances were recorded at C7 in this reporting month. The exceedance was considered not related to project works.](#)

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	2	0	0	0	0	0	0	0	0	0	0	0
Total		2	0	0	0	0	0	0	0	0	0	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.

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Future Key Issues

- xii. In coming reporting month, the principal work activity is anticipated as follows:
- [Excavation and Lateral Support 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 2013 to August 2013](#). 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.
- 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 2.3**:

Table 2.3 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	2566 2192



Party	Role	Post	Name	Contact No.	Contact Fax
		Contractor's Representative	Mr. Andrew Wong	3557 6407	
		Head of construction	Mr. Roger Cheung	3557 6371	
		Environmental Officer	Mr. Daniel Sin	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:

- Excavation and Lateral Support at ME4

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

- Excavation and Lateral Support 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 Pre-treatment, ELS and rock breaking works at TS4/ME4	GW-RS0434-13	23 Apr 2013	23 Apr 2013 to 16 Oct 2013	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 (Dumping by Vessel)	7011761	21 Jun 2013	17 Jul 2013 to 16 Oct 2013	Valid
Water Discharge Licence (Discharge at TS4)	WT00011718-2012	10 Jan 2013	10 Jan 2013 to 31 Jan 2014	Valid
Dumping Permit (Type 1 – Open Sea Disposal)	EP/MD/14-034	16 Jul 2013	24 Jul 2013 to 23 Jan 2014	Valid
Dumping Permit (Type 1 – Open Sea Disposal and Type 2 – Confined Marine Disposal)	EP/MD/14-035	16 Jul 2013	24 Jul 2013 to 23 Aug 2013	Expired
	EP/MD/14-049	23 Aug 2013	24 Aug 2013 to 23 Sep 2013	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 No exceedance was recorded in the reporting month. Noise monitoring results measured in this reporting period are reviewed and summarized. 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

- 5.2.2 Due to hoisting of Gale signal no.8, the 1hr TSP monitoring event was rescheduled from 14 Aug 2013 to 15 Aug 2013.
- 5.2.3 No exceedance was recorded in the reporting month. Air quality monitoring results measured in this reporting period are reviewed and summarized. Details of air quality monitoring results and graphical presentation can be referred in [Appendix 5.3](#).

5.1 Water quality monitoring Results

- 5.3.2 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 The DO levels at C7 were monitored during the construction period to avoid aggravation of odour nuisance from seawater arising from temporary reclamation in the CBTS in the reporting month. [Two action level DO exceedances were recorded](#) and no odour complaint was received in the reporting period.

- 5.3.3 Water quality monitoring location at C7 was finely adjusted to the outside of the inner silt curtain frame since 31 Dec 2012.
- 5.3.4 Due to the enforcement of Strong Wind Signal No.3 on 1 Aug 2013, water quality monitoring at flood tide was cancelled.
- 5.3.5 Due to the enforcement of Strong Wind Signal No.3 on 14 Aug 2013, water quality monitoring at flood tide was cancelled.
- 5.3.6 Two action level DO exceedances were recorded at C7 in this reporting month. The exceedances were considered not related to project works.
- 5.3.7 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	2	0	0	0	0	0	0	0	0	0	0	0
Total		2	0	0	0	0	0	0	0	0	0	0	0

5.2 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	218 NIL	32,670 6,267	TM38 TKO137	N/A
Inert C&D materials recycled, m3	NIL NIL 1082 NIL NIL	25,395.7 1,228 1416 352 1,049	TS2 WDII Lun Ku Tan WENT Landfill HY/2011/03 (HZM)	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. No exceedance was recorded in the reporting month.

6.2 Air quality monitoring

6.2.1 No exceedance was recorded in the reporting month.

6.3 Water quality monitoring

6.3.1 Two action level DO exceedances were recorded at C7 in this reporting month. The exceedances were considered not related to project works.

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 \(July 2013\)](#) of Wan Chai Development Phase II (WDII) the key works in [August 2013](#) are as follows:

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

[Marine Works](#)

- [Filling works up to +4.0mPD between CH290 to CH370.](#)
- [Pre-bored H-pile footing at north side for construction of steel bridge over temporary open channel between CH220 and CH260.](#)
- [Reinstatement of existing seawall at Expo Drive East.](#)
- [Construction of RC structure proposed box culvert Bay 8 and Bay 9.](#)
- [Backfilling to temporary water channel for subsequent demolition of promenade deck and pumping station at HKCEC Water Channel.](#)

[Cross-Harbour Watermains Installation \(CHA & CHB\) and Marine Works at TST](#)

- [Connection of pipeline D to existing mains at Wan Chai .](#)
- [Connection of Pipeline C to exiting mains at Wan Chai.](#)
- [Connection of Pipeline F to exiting mains at TST.](#)
- [Disconnection and capping to existing mains at TST.](#)

[Cooling Watermains, Salt Watermains and Sewer \(On Land\)](#)

- [XHWM-Stage 4.](#)
- [Additional Washout Chamber at VIP drop-off.](#)
- [Reinstatement works at B6-2A and B6-3 at Northwest of HKCEC.](#)
- [Reinstatement of roadworks at B6-4 West Foyer of HKCEC.](#)
- [Works at Zone A1-5C, A1-5A2 and A3-5C.](#)
- [Mainlaying works at A1-5C.](#)
- [Mainlaying works at Zone A5-5, A5-2, A4-2B, A1-5A2.](#)
- [Advance works for mainlaying works in Zone C1-2.](#)
- [Mainlaying works at Zone X2-1 when instruction from the Engineer had been received.](#)
- [Temporary ducting and cabling works at junction between Expo Drive East and Expo Drive Central.](#)

- Temporary ducting and cabling works at junction between Convention Avenue and Fleming Road.

Tunnel Works

- Installation of pre-bored H-pile in CWB Stage 2 Atrium, Link.
- Filling of the existing open water channel and Dome.
- Construction of the south Common D-wall.
- Demolition of the Promenade Deck.
- Installation of dewatering wells, observation wells and piezometers at CWB stage 1.
- ELS for Stage 1 CWB.

E&M Works

- Operation attendance of 60 day for P5.

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

- Full commissioning for P7 cooling water system.
- Full commissioning for P9 cooling water system.
- Remedial works for P8 discharge pipe at WCR1 area.
- Remaining DN800 salt watermins (CHS8A) installation and backfilling works inside Ex-pet Garden.
- All mainlaying works and prepare for connection with the existing DN600 salt watermins at Hung Hing Road.
- All civil works of SWIC and commence wet test of the Pumping Station.
- Facade works for the external wall of WSD Salt Water Pumping Station.
- Construction of Bay 5 Box Culvert N1.
- ABWF works in Ferry Pier.
- Installation of moveable ramp system and disabled lift installation.
- Canopy installation and waterproofing works on Observation Deck.
- Curtain wall (glass) installation.
- Site delivery of critical E&M equipment especially the switchboard.
- LV cable ducting laying for subsequent cable installation by HEC.
- Rockfilling and levelling stone installation for seawall construction at both WCR4 & TWCR4.
- Geotextile installation for temporary reclamation at TWCR4 and commence filing works.
- Precast concrete seawall installation at WCR4 & TWCR4.
- Backfilling and road reinstatement works at Hung Hing Road & Wan Shing Street for successful implementation of HHR Flyover Diversion (Stage 1).

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

- Construction of EVA

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

- Sheet piling works
- Utility diversion works

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

- D-wall and Barrette Construction
- Construction works for Box Culvert T1
- Demolition of parapet at IEC Link
- Construction of dewatering well for Cut & Cover Tunnel
- Removal of marine platform
- Construction of pile cap, column & cross head (Marine)
- ELS for Cut & Cover Tunnel
- Installation of dewatering well
- Laying of 1500 ϕ pipe
- Launching of segments
- Unloading segments from derrick
- Extraction of temporary pile from marine section

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

- Site survey
- Marine ground investigation
- Dredging
- Demolition of the existing Expo Drive West Bridge
- ELS for box culvert La at Lung King Street

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

- Nil

7.0.3. From the [Monthly EM&A report \(July 2013\)](#) of Central-Wan Chai Bypass (CWB) the key works in [August 2013](#) 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
- Hoarding erection and modification
- Installation of couplers, UU detection, trial trench, pre-drilling
- Excavation
- Drainage works
- Tunnel works
- Trough structure construction and associated drilling and grouting
- Road works
- OHVD installation
- Bridges construction
- Scaffolding / false-work erection
- Profile barrier 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

- Installation of pre-bored H-pile in CWB Stage 2 Atrium Link.
- Filling of the existing open water channel and Dome
- Construction of the south Common D-wall.
- Demolition of the Promenade Deck.
- Installation of dewatering wells, observation wells and piezometers at CWB stage 1
- ELS for Stage 1 CWB

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

- Continue wall construction at Tunnel Portion 1
- Commence D-Wall construction at Tunnel Portion 2

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

- ELS works, pipe roofing works and tunnel construction at TS4
- Cut and cover tunnel construction at TPCWAE
- Construction of OHVD at TS1
- Excavation and tunnel lining construction for mined tunnel
- Post Diaphragm Wall Works, ELS works and Installation of King Post at TS2

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)
- D-wall and Barrette Construction
- Construction works for Box Culvert T1
- Construction of Pile cap (Land)
- Demolition of parapet at IEC Link
- Construction of dewatering well for Cut & Cover Tunnel
- Removal of marine platform
- Construction of pile cap, column & cross head (Marine)
- ELS for Cut & Cover Tunnel
- Installation of dewatering well
- Laying of 1500 pipe
- Launching of segments
- Unloading segments from derrick
- Extraction of temporary pile from marine section

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

- Stitching Works
- Foam Concreting Works
- Other Miscellaneous Works in precast unit

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

- Hoarding erection

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

- Tree Pruning works
- Tree removal works,
- Tree transplanting works,
- Instrumentation works,
- Ground investigation works,



- Erection of site hoarding and Concrete works.

7.0.4. According to the construction programme of Wan Chai Development Phase II, Central-Wan Chai Bypass, the major construction activity under Wan Chai Development Phase II were the reclamation works at HKCEC and WanChai East, rock filling work at Expo Drive East Bridge, and marine bored piling at MTR Tunnel Crossing. Tunnel works at Central Interchange, cross-harbour water mains and WCR1 in the reporting month. The major environmental impact was water quality impact at Causeway Bay and Wan Chai. Land-based construction activity were tunnel works and sheet piling works at Central, land based bored piling works at North Point and tunnel works at Wan Chai East.



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 finding was observed 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 2013	0
November 2011 to July 2013	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	Excavation and Lateral Support at ME4	<ul style="list-style-type: none"> Noise barrier shall be implemented Watering of any dust generating activities

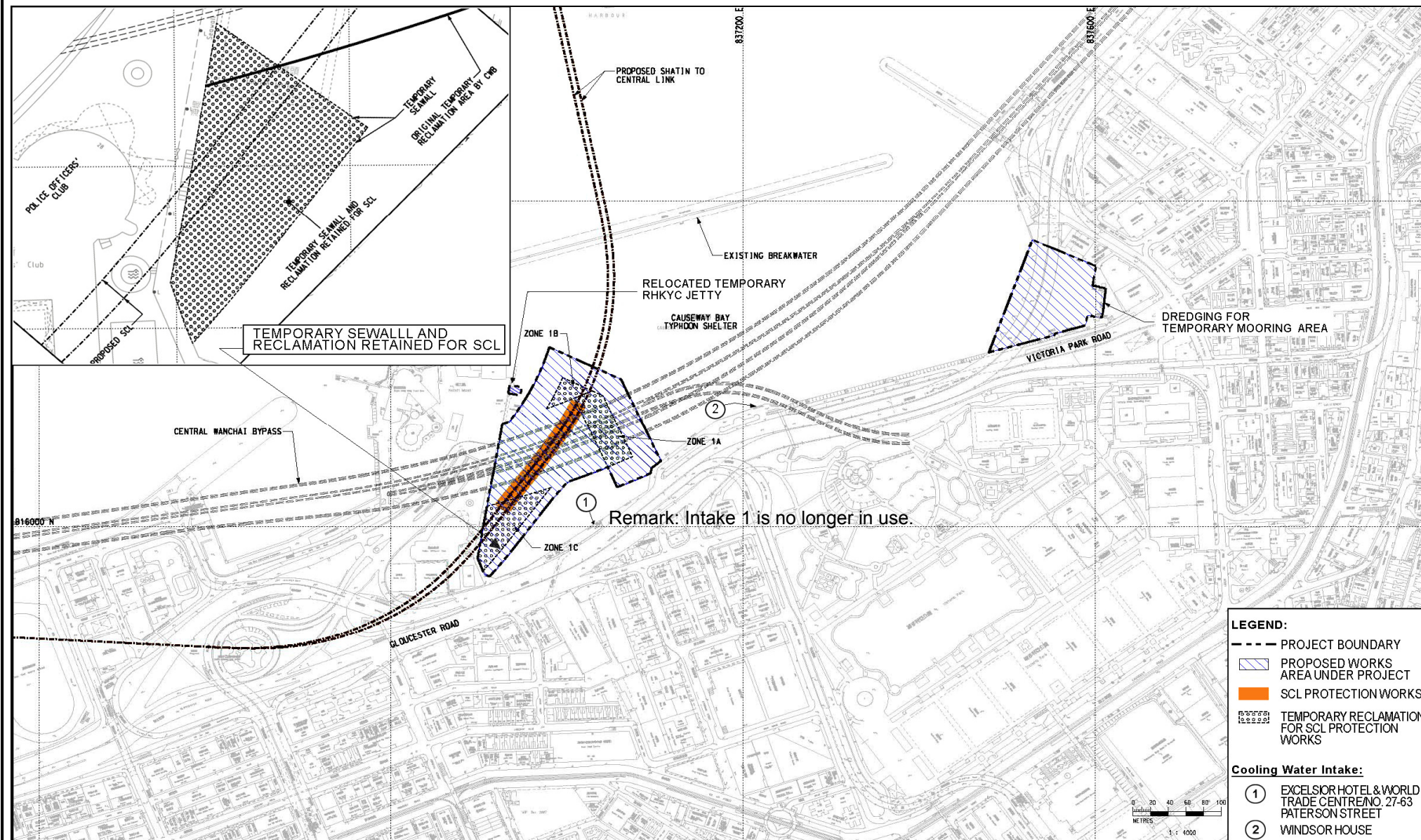


Lam Geotechnics Limited

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





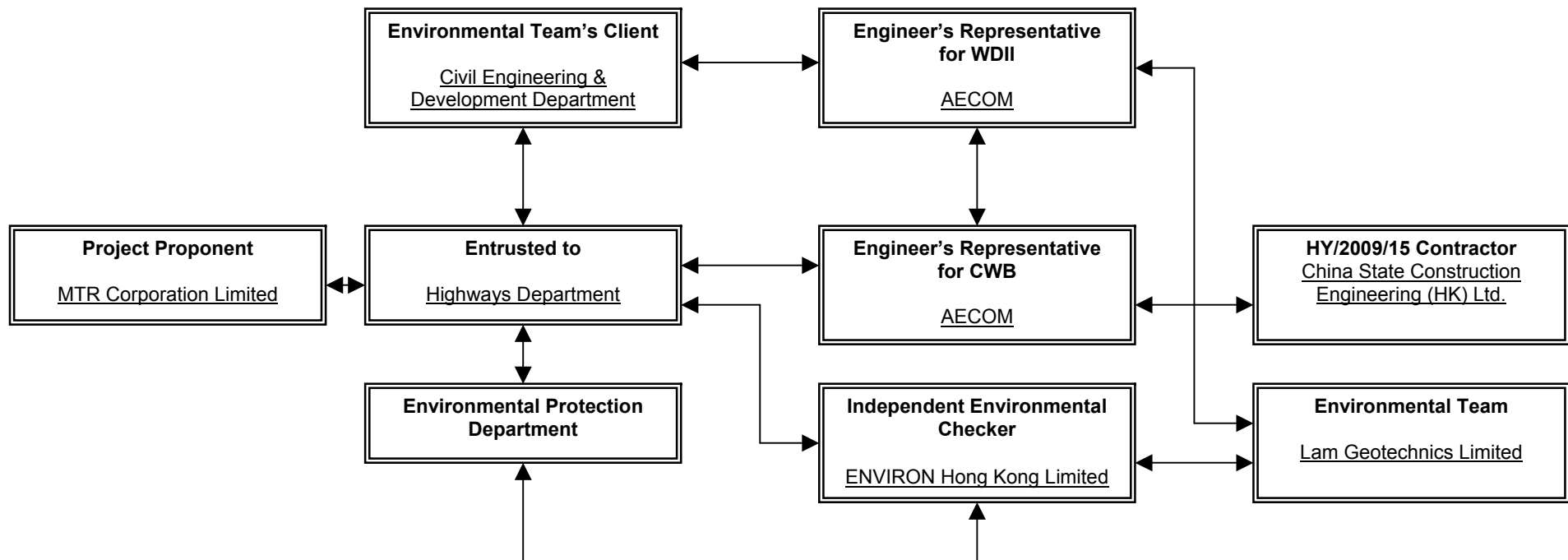
Lam Geotechnics Limited

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 2.2

Project Organization Chart

Project Organization Chart



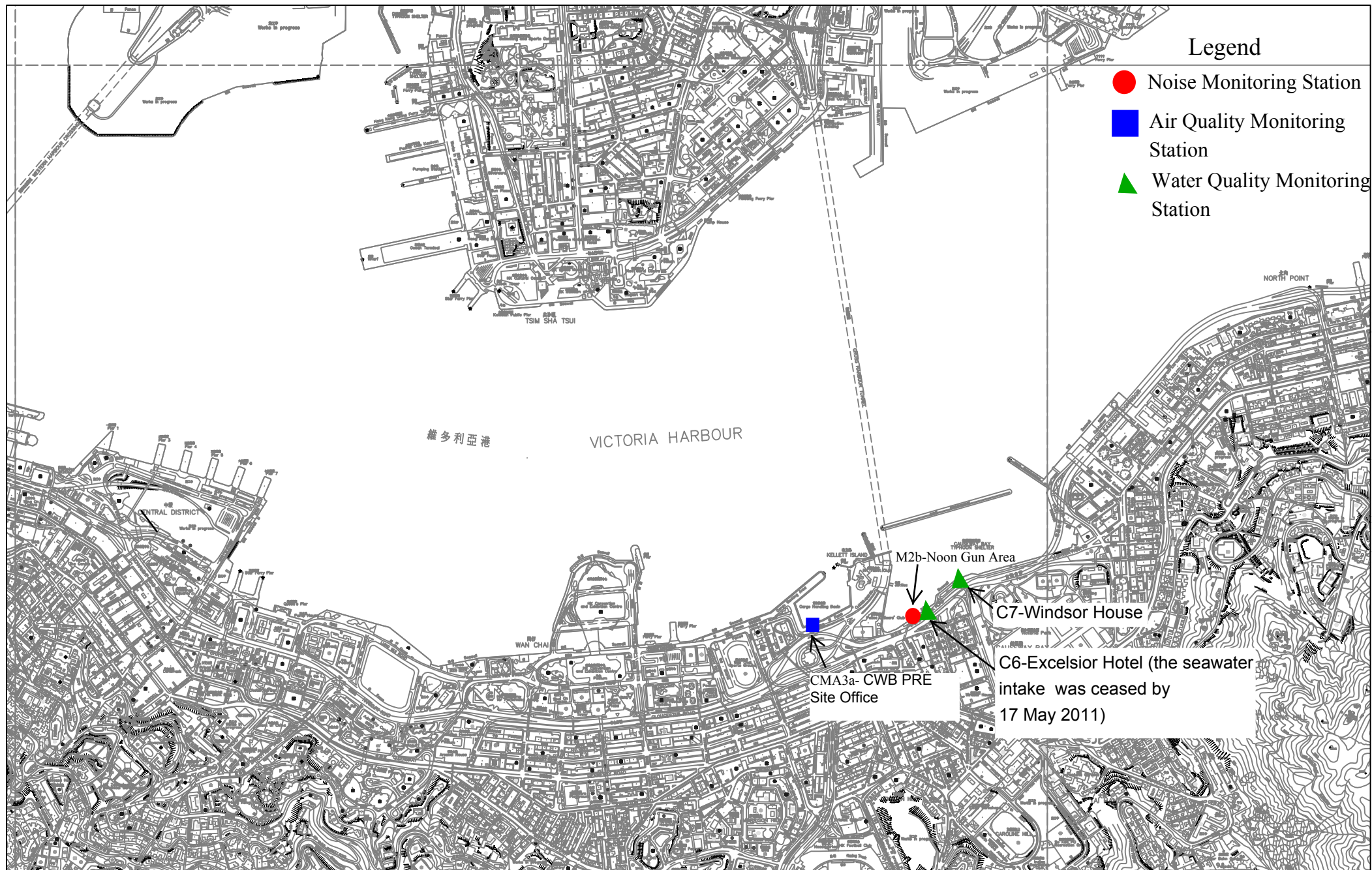


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(Shatin to Central Link (SCL) Protection
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Figure 2.3

Locations of Monitoring Stations





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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)

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>					
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	<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



Calibration Certificate

Certificate No. 33624

Page 1 of 4 Pages

Customer : Lam Geotechnics Limited

Address : 11/F, Centre Point, 181-185 Gloucester Road, Wanchai, Hong Kong.

Order No. : Q31494

Date of receipt : 30-May-13

Item Tested

Description : Digital Sound Level Meter

Manufacturer : B&K

Model : Type 2236

Serial No. : 2100736

Test Conditions

Date of Test : 3-Jun-13

Supply Voltage : --

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

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

Test Specifications

Calibration check.

Ref. Document/Procedure : Z01.

Test Results

All results were within the IEC 651 Type 1, IEC 804 Type 1 & IEC 1260 Class 1 specification.

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

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C127181	SCL-HKSAR
S024	Sound Level Calibrator	30620	NIM-PRC & SCL-HKSAR

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

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

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

Calibrated by : 
Liam Wong

Approved by : 
Dorothy Cheuk

Date: 3-Jun-13

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646



Calibration Certificate

Certificate No. 33624

Page 2 of 4 Pages

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Parameter	Frequency Wt.	Freq. Response		
20 - 100	SPL	dBA	F	94.0	93.8
			S		93.8
		dB	F		93.8
		dB	F		93.9
		1 kHz	F		93.8
40 - 120	SPL	dBA	F	94.0	93.9
		1 kHz	F		93.9
	SPL	dBA	F	114.0	113.8
			S		113.8
		dB	F		113.9
		dB	F		113.9
		1 kHz	F		113.8

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.1 dB

3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	113.9	0.0	± 0.7 dB
130	104.0	103.9	0.0	
120	94.0	93.9 (Ref.)	--	
110	84.0	83.9	0.0	
100	74.0	73.9	0.0	
100	64.0	63.9	0.0	
100	54.0	53.9	0.0	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 33624

Page 3 of 4 Pages

3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	83.9	0.0	± 0.4 dB
	94.0	93.9 (Ref.)	- -	
	95.0	94.9	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.6	- 39.4 dB, ± 1.5 dB
63 Hz	-26.4	- 26.2 dB, ± 1.5 dB
125 Hz	-16.3	- 16.1 dB, ± 1 dB
250 Hz	-8.8	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1 dB
4 kHz	+0.9	+ 1.0 dB, ± 1 dB
8 kHz	-1.2	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.8	- 6.6 dB, + 3 dB $\sim -\infty$

Uncertainty : ± 0.1 dB

5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 ²	40.0	39.8	
1/10 ³	40.0	39.7	± 1.0 dB
1/10 ⁴	40.0	39.5	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 33624

Page 4 of 4 Pages

6. Filter Response

Filter Setting		Attenuation (dB)	IEC 1260 Class 1 Spec.
125	Hz	-63.6	< - 61
250	Hz	-44.8	< - 42
500	Hz	-21.0	< - 17.5
707	Hz	-3.7	- 2 ~ - 5
1	kHz (Ref.)	0.0 (Ref.)	--
1.414	kHz	-4.1	- 2 ~ - 5
2	kHz	-21.4	< - 17.5
4	kHz	-45.0	< - 42
8	kHz	-63.9	< - 61

Uncertainty : ± 0.2 dB

Remark : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 996 hPa

4. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

----- END -----



Calibration Certificate

Certificate No. 31707

Page 1 of 2 Pages

Customer : Lam Geotechnics Limited

Address : 11/F, Centre Point, 181-185 Gloucester Road, Wanchai, Hong Kong.

Order No. : Q30699

Date of receipt : 13-Mar-13

Item Tested

Description : Sound Level Calibrator

Manufacturer : Cesva

Model : CB-5

Serial No. : 0035092

Test Conditions

Date of Test : 20-Mar-13

Supply Voltage : --

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

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

Test Specifications

Calibration check.

Calibration procedure : F21, Z02.

Test Results

All results were within the IEC 942 Class1 specification.

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

Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	30259	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	30620	NIM-PRC & SCL-HKSAR
S041	Universal Counter	28347	SCL-HKSAR

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

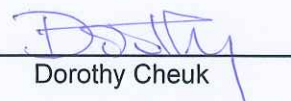
The test equipment used for calibration are traceable to International System of Units (SI).

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

Calibrated by :


Liam Wong

Approved by :


Dorothy Cheuk

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

Date: 20-Mar-13



Calibration Certificate

Certificate No. 31707

Page 2 of 2 Pages

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	93.94	± 0.3 dB

Uncertainty : ± 0.2 dB

2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.001 kHz	± 2 %

Uncertainty : $\pm 3.6 \times 10^{-6}$

3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.3 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

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

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

4. Atmospheric Pressure : 1003 hPa.

----- END -----



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MS EMILY KONG
CLIENT: LAM GEOTECHNICS LIMITED
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG

WORK ORDER: HK1316903
LABORATORY: HONG KONG
DATE RECEIVED: 25/06/2013
DATE OF ISSUE: 03/07/2013

PROJECT: --

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: Turbidity
Equipment Type: Turbidimeter
Brand Name: XIN RUI
Model No.: WGZ-3B
Serial No.: 1203008
Equipment No.: --
Date of Calibration: 03 July, 2013

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.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd
11/F Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsglobal.com


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

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1316903
Date of Issue: 03/07/2013
Client: LAM GEOTECHNICS LIMITED



Equipment Type: Turbidimeter
Brand Name: XIN RUI
Model No.: WGZ-3B
Serial No.: 1203008
Equipment No.: --
Date of Calibration: 03 July, 2013

Date of next Calibration: 03 October, 2013

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.13	--
4	3.82	-4.5
40	38.37	-4.1
80	80.45	0.6
400	383.8	-4.1
800	840.4	5.1
Tolerance Limit ($\pm\%$)		10.0

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


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Information supplied by customer:

CONTACT: DEREK LO

WORK ORDER: HK1310006

CLIENT: LAM GEOTECHNICS LIMITED

DATE RECEIVED: 13/07/2013

DATE OF ISSUE: 15/07/2013

ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG

PROJECT: ---

METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

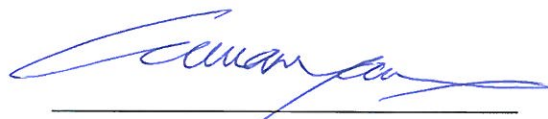
COMMENTS

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:	15 July, 2013

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: HK1310006

DATE OF ISSUE: 15th July, 2013

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203010
Equipment No.:	--
Date of Calibration:	15 July, 2013
Date of next Calibration:	15 October, 2013

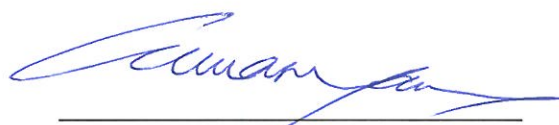
Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	0
4	3.76	-6.0
10	10.3	+3.0
40	38.6	-3.5
100	104	+4.0
400	386	-3.5
1000	989	-1.1
	Tolerance Limit (±%)	10.0

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



Mr. Peter Lee

Director

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MS EMILY KONG
CLIENT: LAM GEOTECHNICS LIMITED
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG

WORK ORDER: HK1310783
LABORATORY: HONG KONG
DATE RECEIVED: 22/04/2013
DATE OF ISSUE: 02/05/2013

PROJECT: --

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: Turbidity
Equipment Type: Turbidimeter
Brand Name: XIN RUI
Model No.: WGZ-3B
Serial No.: 1203016
Equipment No.: --
Date of Calibration: 29 April, 2013

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.

ISSUING LABORATORY: HONG KONG

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Mr. Fung Lim Chee, Richard
General Manager -
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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1310783
Date of Issue: 02/05/2013
Client: LAM GEOTECHNICS LIMITED



Equipment Type: Turbidimeter
Brand Name: XIN RUI
Model No.: WGZ-3B
Serial No.: 1203016
Equipment No.: --
Date of Calibration: 29 April, 2013

Date of next Calibration: 29 July, 2013

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	-0.43	--
4	3.99	-0.2
40	40.63	1.6
80	78.50	-1.9
400	401.9	0.5
800	836.9	4.6
Tolerance Limit ($\pm\%$)		10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Information supplied by customer:

CONTACT: DEREK LO

WORK ORDER: HK1310007

CLIENT: LAM GEOTECHNICS LIMITED

DATE RECEIVED: 30/07/2013

DATE OF ISSUE: 31/07/2013

ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,
WANCHAI, HONG KONG

PROJECT: ---

METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

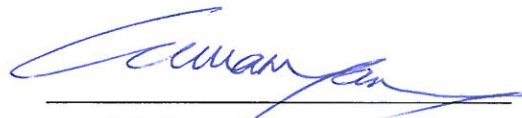
COMMENTS

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:	31 July, 2013

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: HK1310007

DATE OF ISSUE: 31st July, 2013

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1203016
Equipment No.:	--
Date of Calibration:	31 July, 2013
Date of next Calibration:	30 October, 2013

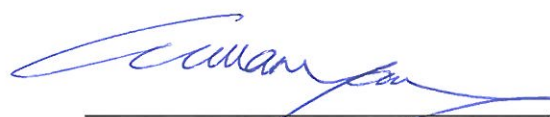
Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.02	+0.2
4	3.85	-3.8
10	9.68	-3.2
40	42.1	+5.2
100	96.0	-4.0
400	387	-3.2
1000	985	-1.5
	Tolerance Limit ($\pm\%$)	10.0

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



Mr. Peter Lee

Director

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1316245
LABORATORY: HONG KONG
DATE RECEIVED: 18/06/2013
DATE OF ISSUE: 26/06/2013

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
Equipment Type: Multimeter
Brand Name: YSI
Model No.: Professional plus
Serial No.: 11F100420
Equipment No.: --
Date of Calibration: 25 June, 2013

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.

ISSUING LABORATORY: HONG KONG

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Greater China & Hong Kong

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1316245
Date of Issue: 26/06/2013
Client: LAM GEOTECHNICS LIMITED



Equipment Type: Multimeter
Brand Name: YSI
Model No.: Professional plus
Serial No.: 11F100420
Equipment No.: --
Date of Calibration: 25 June, 2013

Date of next Calibration: 25 September, 2013

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.85	2.99	0.14
6.09	5.94	-0.15
7.37	7.47	0.10
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	3.89	-0.11
7.0	6.99	-0.01
10.0	9.97	-0.03
Tolerance Limit (\pm pH unit)		0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.01	--
10	10.33	3.3
20	20.96	4.8
30	32.22	7.4
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)
9.0	9.8	0.8
25.0	25.2	0.2
41.0	41.4	0.4
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.



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1314154
LABORATORY: HONG KONG
DATE RECEIVED: 27/05/2013
DATE OF ISSUE: 04/06/2013

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
Equipment Type: Multimeter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 13A100242
Equipment No.: --
Date of Calibration: 31 May, 2013

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.

ISSUING LABORATORY: HONG KONG

Address

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1314154
Date of Issue: 04/06/2013
Client: LAM GEOTECHNICS LIMITED



Equipment Type: Multimeter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 13A100242
Equipment No.: --
Date of Calibration: 31 May, 2013

Date of next Calibration: 31 August, 2013

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.22	2.24	0.02
5.76	5.65	-0.11
7.90	8.00	0.10
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	3.97	-0.03
7.0	7.05	0.05
10.0	9.95	-0.05
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	9.60	-4.0
20	19.49	-2.6
30	30.05	0.2
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	9.7	-0.8
20.0	19.4	-0.6
38.0	38.3	0.3
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.



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1317591
LABORATORY: HONG KONG
DATE RECEIVED: 03/07/2013
DATE OF ISSUE: 12/07/2013

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
Equipment Type: Sonde Environmental Monitoring System
Brand Name: YSI
Model No.: Professional plus
Serial No.: 11F100597
Equipment No.: --
Date of Calibration: 10 July, 2013

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.

ISSUING LABORATORY: HONG KONG

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1317591
 Date of Issue: 12/07/2013
 Client: LAM GEOTECHNICS LIMITED



Equipment Type: Sonde Environmental Monitoring System
 Brand Name: YSI
 Model No.: Professional plus
 Serial No.: 11F100597
 Equipment No.: --
 Date of Calibration: 10 July, 2013 Date of next Calibration: 10 October, 2013

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.52	4.63	0.11
6.72	6.53	-0.19
7.80	7.71	-0.09
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	3.92	-0.08
7.0	7.08	0.08
10.0	10.07	0.07
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	9.49	-5.1
20	19.02	-4.9
30	29.29	-2.4
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)
10.0	11.2	1.2
22.5	23.6	1.1
39.0	38.8	-0.2
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.



TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE.
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WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jul 15, 2013 Rootmeter S/N 0438320 Ta (K) - 300
Operator Tisch Orifice I.D. - 0005 Pa (mm) - 759.46

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.3910	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8800	7.9	5.00
4	NA	NA	1.00	0.8380	8.8	5.50
5	NA	NA	1.00	0.6930	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9884	0.7106	1.4090		0.9958	0.7159	0.8888
0.9843	1.0013	1.9926		0.9916	1.0087	1.2570
0.9822	1.1161	2.2278		0.9895	1.1244	1.4054
0.9811	1.1708	2.3365		0.9884	1.1795	1.4740
0.9760	1.4084	2.8180		0.9832	1.4188	1.7777
Qstd slope (m) = 2.01968				Qa slope (m) = 1.26469		
intercept (b) = -0.02746				intercept (b) = -0.01732		
coefficient (r) = 0.99999				coefficient (r) = 0.99999		
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 : 25-Jun-13

Calibration Due Date : 25-Aug-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	304	Kelvin	Pressure, P_a
			1012 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m_c	2.01145	Intercept, b_c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	19-Jul-13				

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.)	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31)
	H (inches of water)					
	(up)	(down)	(difference)	X-axis		Y-axis
1	5.8	5.8	11.6	1.6893	58	57.3879
2	4.8	4.8	9.6	1.5381	49	48.4829
3	4.0	4.0	8.0	1.4053	41	40.5673
4	2.4	2.4	4.8	1.0917	25	24.7362
5	1.5	1.5	3.0	0.8659	14	13.8523

By Linear Regression of Y on X

Slope, m = 52.6106 Intercept, b = -32.3377

Correlation Coefficient* = 0.9991

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Henry

Date : 25-Jun-13

Checked by : Derek Lo

Date : 25-Jun-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a

Equipment no. : EL333

Calibration Date : 22-Aug-13

Calibration Due Date : 22-Oct-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	305	Kelvin	Pressure, P_a
			1010 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 RSP						
Calibration Point	Manometer Reading			Q_{std}	Continuous Flow	IC
	H (inches of water)			($m^3 / min.$)	Recorder, W	($W(P_a/1013.3 \times 298/T_a)^{1/2}/35.31$)
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis
1	5.8	5.8	11.6	1.6778	58	57.2371
2	4.8	4.8	9.6	1.5275	49	48.3555
3	4.0	4.0	8.0	1.3956	42	41.4476
4	2.4	2.4	4.8	1.0841	25	24.6712
5	1.6	1.6	3.2	0.8877	14	13.8159

By Linear Regression of Y on X

Slope, m = 54.5515 Intercept, b = -34.6041

Correlation Coefficient* = 0.9999

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Henry

Date : 22-Aug-13

Checked by : Derek Lo

Date : 22-Aug-13



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 2013**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug	3-Aug
		Noise (Daytime)		24hr TSP	1hr TSP	
	Impact WQM Mid-ebb 16:56 Mid-flood 23:41			Impact WQM Mid-ebb 9:05		Impact WQM Mid-ebb 10:32 Mid-flood 17:48
4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug	10-Aug
		Noise (Daytime)	24hr TSP	1hr TSP		
	Impact WQM Mid-ebb 11:40 Mid-flood 18:41		Impact WQM Mid-ebb 12:45 Mid-flood 19:25		Impact WQM Mid-ebb 13:52 Mid-flood 20:19	
11-Aug	12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug
		24hr TSP		1hr TSP Noise (Daytime)		
	Impact WQM Mid-flood 9:31 Mid-ebb 15:43		Impact WQM	Impact WQM Mid-ebb 6:35		Impact WQM Mid-ebb 9:01 Mid-flood 16:29
18-Aug	19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug
	24hr TSP	1hr TSP	Noise (Daytime)			24hr TSP
	Impact WQM Mid-ebb 10:49 Mid-flood 17:58		Impact WQM Mid-ebb 12:23 Mid-flood 19:10		Impact WQM Mid-ebb 13:47 Mid-flood 20:17	
25-Aug	26-Aug	27-Aug				
	1hr TSP	Noise (Daytime)				
	Impact WQM Mid-flood 9:42 Mid-ebb 15:38					

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

**Tentative Environmental Monitoring Schedule
September 2013**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			28-Aug Noise (Daytime) Impact WQM Mid-flood 23:05	29-Aug Impact WQM Mid-ebb 6:59	30-Aug 24hr TSP Impact WQM Mid-ebb 9:10 Mid-flood 21:35	31-Aug
1-Sep	2-Sep Impact WQM Mid-ebb 10:35 Mid-flood 17:40	3-Sep Noise (Daytime)	4-Sep Noise (Daytime) Impact WQM Mid-ebb 11:45 Mid-flood 18:20	5-Sep 24hr TSP 1hr TSP Mid-ebb 12:54 Mid-flood 19:08	6-Sep	7-Sep
8-Sep	9-Sep Impact WQM Mid-flood 8:40 Mid-ebb 14:45	10-Sep Noise (Daytime)	11-Sep 24hr TSP Noise (Daytime) Impact WQM Mid-ebb 3:47 Mid-flood 10:33	12-Sep 1hr TSP	13-Sep Impact WQM Mid-ebb 6:06 Mid-flood 13:32	14-Sep
15-Sep	16-Sep Impact WQM Mid-ebb 9:41 Mid-flood 16:50	17-Sep 24hr TSP Noise (Daytime)	18-Sep 1hr TSP Impact WQM Mid-ebb 11:19 Mid-flood 17:58	19-Sep Noise (Daytime)	20-Sep	21-Sep Impact WQM Mid-ebb 13:23 Mid-flood 19:30
22-Sep	23-Sep 24hr TSP Impact WQM Mid-flood 8:42 Mid-ebb 14:34	24-Sep 1hr TSP	25-Sep Noise (Daytime) Impact WQM Mid-ebb 3:44 Mid-flood 10:19	26-Sep Noise (Daytime)	27-Sep Impact WQM Mid-ebb 5:49 Mid-flood 18:22	



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 5.2

Noise Monitoring Results and Graphical Presentations



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

Location: M2b - Noon-day gun area

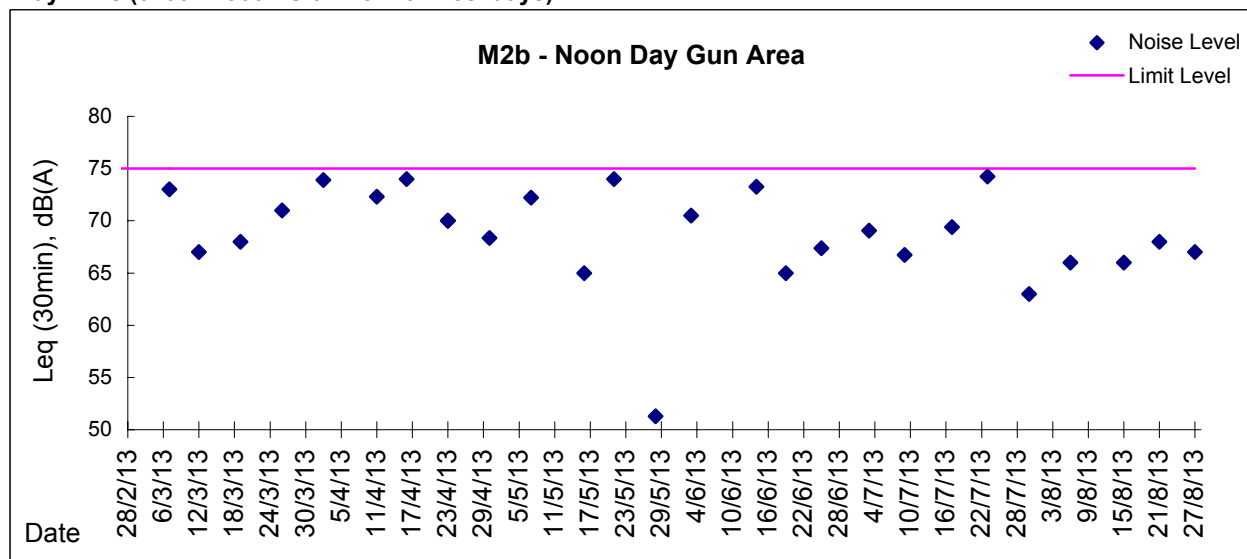
Date	Time	Weather	Measurement Noise Level			Baseline Level	Construction Noise Level	Limit Level
			Leq	L10	L90	Leq	Leq	Leq
			Unit: dB(A), (30-min)					
30/07/13	10:00	Fine	68.9	70.0	67.0	68	63	75
06/08/13	10:00	Fine	69.7	70.5	68.0	68	66	75
15/08/13	13:00	Cloudy	69.9	71.0	68.0	68	66	75
21/08/13	16:10	Cloudy	71.0	72.5	67.5	68	68	75
27/08/13	15:00	Fine	70.5	71.3	67.0	68	67	75

*Due to adverse weather condition, noise monitoring was rescheduled from 13 Aug 2013 to 15 Aug 2013



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		
1-Aug-13	8:00	Rainy	006582	2.6612	2.8199	166.66	190.66	24.00	1.46	1.46	1.46	2107	75
7-Aug-13	8:00	Fine	007146	2.6401	2.7530	193.66	217.65	23.99	1.43	1.43	1.43	2058	55
13-Aug-13	8:00	Rainy	006925	2.6707	2.7767	220.85	244.85	24.00	1.43	1.43	1.43	2056	52
19-Aug-13	8:00	Rainy	007020	2.6287	2.7504	247.66	271.66	24.00	1.43	1.41	1.42	2042	60
24-Aug-13	8:00	Rainy	007029	2.6262	2.7340	274.67	298.67	24.00	1.40	1.40	1.40	2019	53

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		
2-Aug-13	8:07	Rainy	006841	2.6383	2.6460	190.66	191.66	1.00	1.41	1.41	1.41	85	91
2-Aug-13	9:13	Rainy	007144	2.6375	2.6436	191.66	192.66	1.00	1.41	1.41	1.41	85	72
2-Aug-13	10:29	Rainy	007145	2.6502	2.6540	192.66	193.66	1.00	1.41	1.41	1.41	85	45
8-Aug-13	8:09	Fine	006922	2.6501	2.6517	217.65	218.65	1.00	1.41	1.41	1.41	85	19
8-Aug-13	9:14	Fine	006923	2.6458	2.6482	218.65	219.65	1.00	1.41	1.41	1.41	85	28
8-Aug-13	10:23	Fine	006924	2.6220	2.6281	219.65	220.65	1.00	1.41	1.41	1.41	85	72
15-Aug-13	8:45	Cloudy	007017	2.6744	2.6802	244.85	245.85	1.00	1.43	1.43	1.43	86	68
15-Aug-13	9:53	Cloudy	007018	2.6473	2.6543	245.85	246.85	1.00	1.43	1.43	1.43	86	82
15-Aug-13	13:06	Cloudy	007035	2.6235	2.6312	246.85	247.85	1.00	1.41	1.41	1.41	85	91
20-Aug-13	8:45	Fine	007052	2.6643	2.6755	271.66	272.66	1.00	1.43	1.43	1.43	86	131
20-Aug-13	9:53	Fine	007053	2.6582	2.6673	272.66	273.66	1.00	1.43	1.43	1.43	86	106
20-Aug-13	13:06	Fine	007054	2.6469	2.6554	273.66	274.66	1.00	1.41	1.43	1.42	85	100
26-Aug-13	8:32	Fine	006645	2.6327	2.6399	298.67	299.67	1.00	1.33	1.31	1.32	79	91
26-Aug-13	9:45	Fine	006646	2.6473	2.6530	299.67	300.67	1.00	1.37	1.37	1.37	82	69
26-Aug-13	10:49	Fine	006649	2.6508	2.6595	300.67	301.67	1.00	1.42	1.42	1.42	85	102

Due to hoisting of Gale Signal no.8, the 1 hr TSP monitoring was rescheduled from 14 Aug 2013 to 15 Aug 2013.

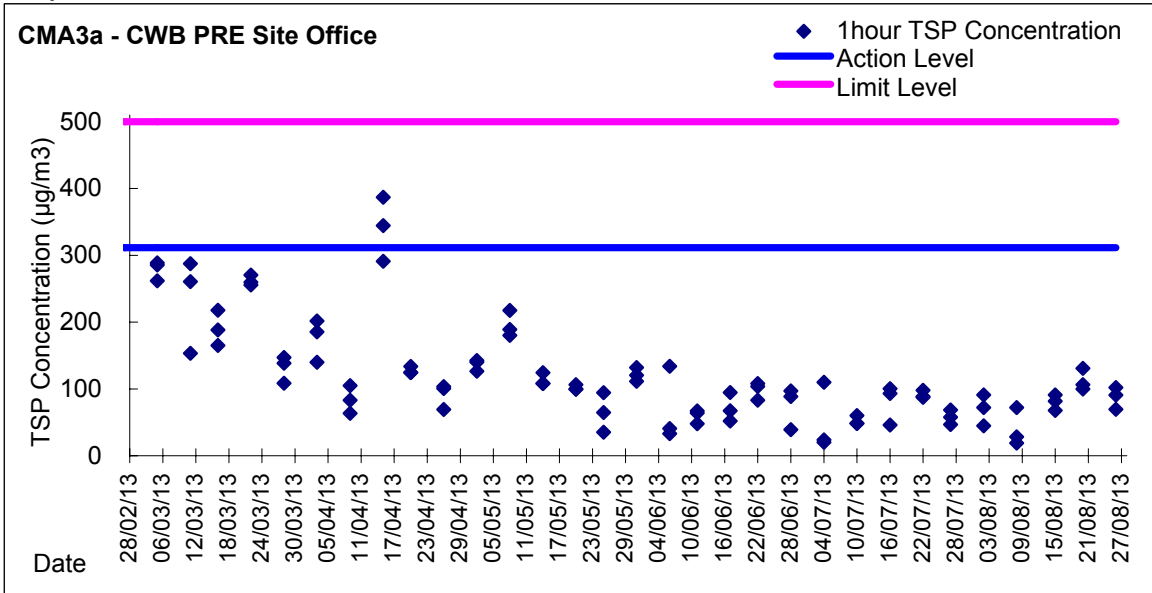


Contract No. HK/2011/07

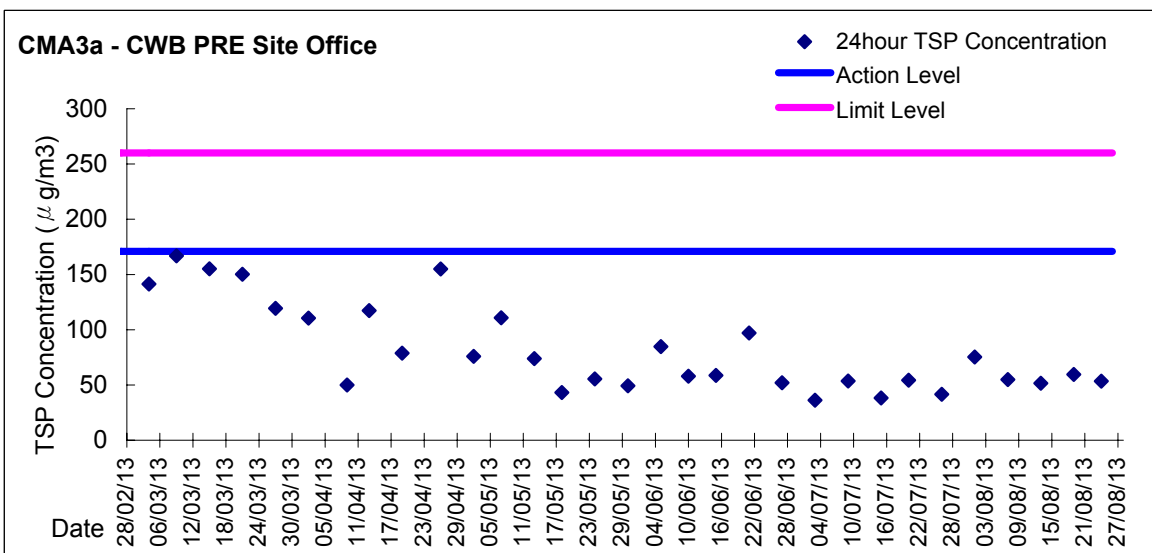
Wanchai Development Phase II and Central Wanchai Bypass

(Shatin to Central Link (SCL) Protection Works at Causeway Bay Typhoon Shelter)

Graphic Presentation of 1 hour TSP Result



Graphic Presentation of 24 hour TSP Result





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 5.4
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							
					°C		-		ppt		%		mg/L		NTU		mg/L							
			m		Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average						
29/7/2013	0:10	Fine	Middle	1.5	28.30	28.30	28.30	7.75	7.75	7.76	26.84	26.84	26.84	83.7	84.2	83.2	5.57	5.64	5.56	2.21	2.08	2.11	<2	<2
	0:11		Middle	1.5	28.30	28.30		7.76	7.76		26.84	26.84		83.5	81.2		5.60	5.41		2.12	2.02		<2	
1/8/2013	-	Strong Wind Signal No. 3	Middle	-	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	#DIV/0!
	-		Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
3/8/2013	16:50	Cloudy	Middle	1.5	28.60	28.60	28.60	7.92	7.92	7.92	28.88	28.88	28.88	51.2	51.7	50.8	3.40	3.47	3.38	1.78	1.78	1.75	3	3.50
	16:52		Middle	1.5	28.60	28.60		7.91	7.91		28.88	28.88		50.7	49.7		3.35	3.28		1.73	1.69		4	
5/8/2013	18:13	Fine	Middle	1.0	29.40	29.40	29.40	8.05	8.05	8.04	27.39	27.39	27.40	81.7	83.5	82.5	5.36	5.48	5.40	2.62	2.54	2.39	4	3.50
	18:14		Middle	1.0	29.40	29.40		8.02	8.02		27.40	27.40		82.8	82.0		5.43	5.33		2.21	2.17		3	
7/8/2013	19:11	Cloudy	Middle	1.0	29.10	29.10	29.10	8.09	8.08	8.07	29.00	29.05	29.05	81.7	82.8	82.7	5.34	5.43	5.41	2.84	2.67	2.55	3	3.50
	19:12		Middle	1.0	29.10	29.10		8.06	8.06		29.07	29.07		82.9	83.2		5.42	5.45		2.32	2.37		4	
9/8/2013	20:00	Cloudy	Middle	1.0	30.00	30.00	30.00	8.07	8.07	8.06	27.88	27.88	27.89	71.9	72.1	72.1	4.66	4.67	4.67	2.53	2.62	2.59	4	4.00
	20:01		Middle	1.0	30.00	30.00		8.04	8.04		27.89	27.89		72.2	72.0		4.68	4.67		2.64	2.55		4	
12/8/2013	10:52	Fine	Middle	1.5	29.40	29.40	29.45	7.90	7.90	7.90	31.59	31.59	31.61	55.8	55.9	56.4	3.58	3.58	3.62	3.54	3.54	3.52	4	3.50
	10:57		Middle	1.5	29.50	29.50		7.90	7.90		31.63	31.63		56.6	57.4		3.63	3.68		3.55	3.46		3	
14/8/2013	-	Strong Wind Signal No. 3	Middle	-	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	#DIV/0!
	-		Middle	-	-	-		-	-		-	-		-	-		-	-		-	-		-	
17/8/2013	15:27	Fine	Middle	1.5	28.00	28.00	28.05	7.69	7.69	7.69	24.61	24.61	24.61	42.4	43.0	42.7	2.86	2.93	<u>2.90</u>	3.56	3.60	3.60	<2	<2
	15:28		Middle	1.5	28.10	28.10		7.69	7.69		24.61	24.61		42.7	42.5		2.91	2.90		3.62	3.63		<2	
19/8/2013	17:05	Cloudy	Middle	1.5	28.60	28.60	28.60	7.74	7.74	7.75	22.12	22.12	22.12	42.2	43.5	43.0	2.89	2.99	<u>2.96</u>	4.62	4.60	4.60	<2	<2
	17:07		Middle	1.5	28.60	28.60		7.76	7.76		22.12	22.12		42.5	43.6		2.97	2.99		4.59	4.59		<2	
21/8/2013	19:00	Foggy	Middle	1.0	29.60	29.60	29.60	7.78	7.78	7.75	26.62	26.61	26.61	53.3	52.6	52.4	3.51	3.46	3.45	3.20	3.24	3.21	<2	<2
	19:01		Middle	1.0	29.60	29.60		7.73	7.72		26.61	26.61		52.3	51.5		3.44	3.39		3.27	3.14		<2	
23/8/2013	18:25	Cloudy	Middle	1.0	28.20	28.20	28.20	7.76	7.76	7.76	24.45	24.45	24.45	52.2	55.7	54.5	3.56	3.80	3.72	2.31	2.27	2.28	<2	<2
	18:26		Middle	1.0	28.20	28.20		7.76	7.76		24.45	24.45		55.5	54.4		3.76	3.74		2.24	2.29		<2	
26/8/2013	11:07	Fine	Middle	1.5	27.80	27.80	27.85	7.98	7.98	7.98	25.09	25.09	25.09	54.3	54.5	54.5	3.71	3.72	3.72	3.96	3.96	3.95	4	4.00
	11:08		Middle	1.5	27.90	27.90		7.98	7.98		25.08	25.08		54.1	55.1		3.69	3.76		3.95	3.92		4	

Remarks:

Single underline denotes exceedance over Action Level.

Double underline denotes exceedance over Limit Level.

Due to the hoisting of Strong Wind Signal No.3, the water quality monitoring event during flood-tide on 1 Aug 2013 and 14 Aug 2013 were cancelled



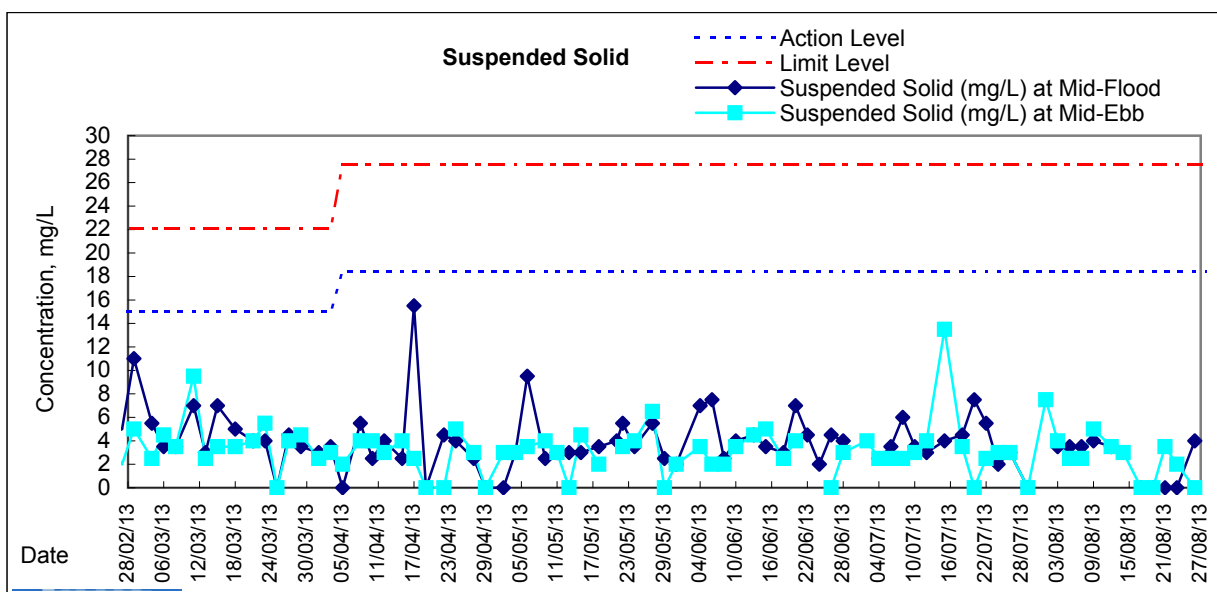
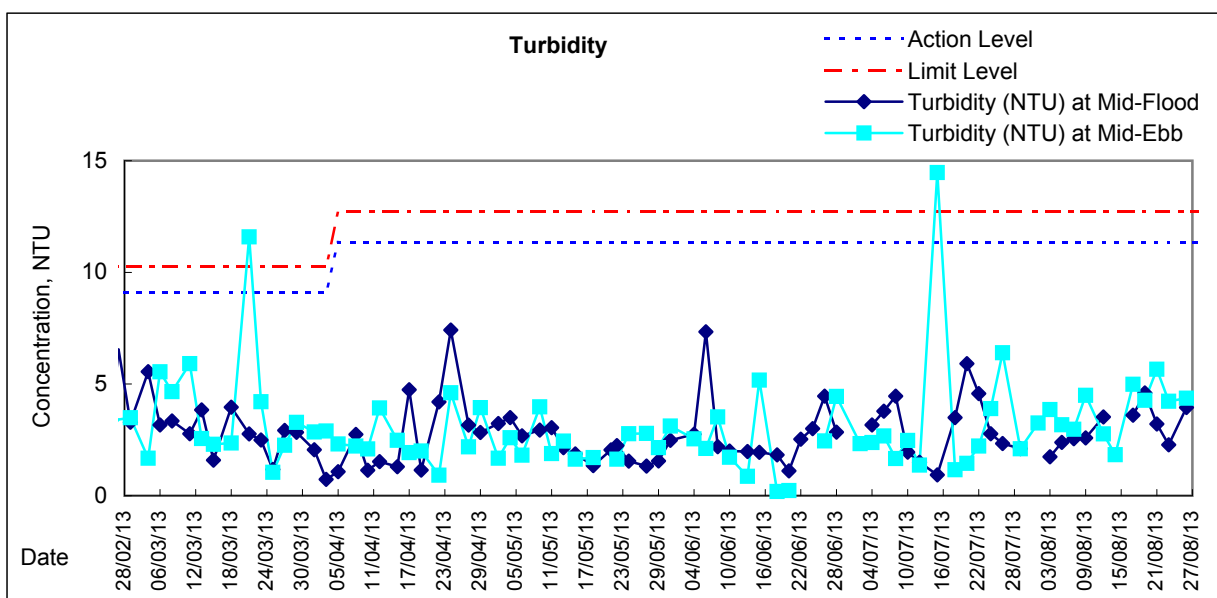
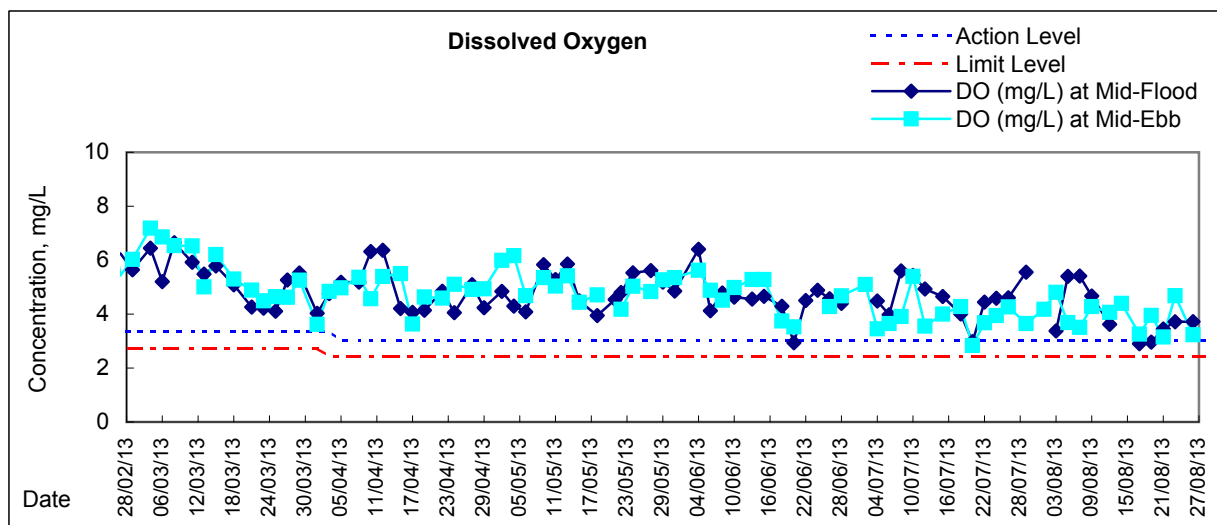
Water Monitoring Result at C7 - Windsor House
Mid-Ebb Tide

Date	Time	Weater Condition	Sampling Depth		Water Temperature		pH		Salinity		DO Saturation		DO		Turbidity		Suspended Solids	
			m		°C		~		ppt		%		mg/L		NTU		mg/L	
					Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	Value	Average
29/7/2013	16:12	Fine	Middle	2	29.50	29.50	7.75	7.75	29.44	29.44	55.7	56.4	3.60	3.65	2.12	2.10	<2	<2
	16:14		Middle	2	29.80	29.80	7.75	7.75	29.44	29.44	56.7	57.1	3.67	3.68	2.09	2.10	<2	<2
1/8/2013	11:02	Fine	Middle	2	28.60	28.60	7.91	7.91	29.69	29.69	64.1	63.8	4.21	4.19	3.33	3.32	7	7.50
	11:04		Middle	2	28.60	28.60	7.91	7.91	29.69	29.69	63.6	63.0	4.18	4.14	3.18	3.18	8	7.50
3/8/2013	11:52	Cloudy	Middle	2	27.80	27.80	7.98	7.98	28.07	28.07	68.7	68.4	4.57	4.59	3.86	3.83	4	4.00
	11:54		Middle	2	27.80	27.80	7.99	7.99	28.07	28.07	67.7	67.6	4.55	5.51	3.85	3.87	4	4.00
5/8/2013	12:40	Fine	Middle	2	28.60	28.60	7.82	7.82	28.46	28.46	55.1	55.7	3.64	3.69	3.17	3.18	2	2.50
	12:42		Middle	2	28.70	28.70	7.83	7.83	28.46	28.46	55.9	56.1	3.69	3.71	3.18	3.18	3	2.50
7/8/2013	11:35	Fine	Middle	2	29.80	29.80	7.89	7.89	30.50	30.50	53.9	54.9	3.46	3.52	2.97	2.97	2	2.50
	11:37		Middle	2	29.80	29.80	7.89	7.89	30.50	30.50	55.3	54.6	3.55	3.50	2.97	2.98	3	2.50
9/8/2013	15:10	Fine	Middle	2	30.20	30.20	7.99	7.99	29.06	29.06	66.1	67.8	4.24	4.34	4.50	4.50	5	5.00
	15:12		Middle	2	30.20	30.20	7.99	7.99	29.09	29.09	67.0	66.2	4.28	4.25	4.49	4.49	5	5.00
12/8/2013	15:37	Fine	Middle	2	29.80	29.80	8.06	8.06	31.10	31.10	63.1	64.1	4.03	4.09	2.80	2.83	3	3.50
	15:38		Middle	2	29.80	29.80	8.06	8.06	31.11	31.11	63.7	63.7	4.07	4.07	2.72	2.72	4	3.50
15/8/2013	4:21	Cloudy	Middle	2	27.00	27.00	8.08	8.08	29.26	29.26	64.5	64.8	4.36	4.38	1.86	1.83	3	3.00
	4:22		Middle	2	27.00	27.00	8.08	8.08	29.26	29.26	65.5	65.5	4.43	4.43	1.81	1.84	3	3.00
17/8/2013	10:52	Fine	Middle	2	27.80	27.80	7.78	7.78	24.16	24.16	47.5	47.2	3.26	3.24	4.97	4.99	<2	<2
	10:54		Middle	2	27.80	27.80	7.78	7.78	24.16	24.16	47.0	48.0	3.22	3.32	4.99	5.00	<2	<2
19/8/2013	11:45	Cloudy	Middle	2	27.60	27.60	7.79	7.79	20.85	20.85	54.8	56.7	3.85	3.98	4.30	4.27	<2	<2
	11:47		Middle	2	27.60	27.60	7.78	7.78	20.85	20.85	56.8	56.7	3.99	3.99	4.26	4.26	<2	<2
21/8/2013	13:02	Fine	Middle	2	28.60	28.60	7.85	7.85	26.69	26.69	46.5	47.0	3.11	3.13	5.64	5.65	3	3.50
	13:04		Middle	2	28.60	28.60	7.86	7.86	26.70	26.70	47.4	47.8	3.17	3.20	5.67	5.69	4	3.50
23/8/2013	15:25	Fine	Middle	2	27.50	27.50	8.00	8.00	22.73	22.73	67.5	67.2	4.70	4.67	4.21	4.25	2	2.00
	15:27		Middle	2	27.50	27.50	8.00	8.00	22.74	22.74	67.2	67.1	4.68	4.67	4.24	4.22	2	2.00
26/8/2013	15:32	Fine	Middle	2	27.50	27.50	8.02	8.02	25.22	25.22	46.7	47.3	3.21	3.24	4.37	4.36	<2	<2
	15:34		Middle	2	27.50	27.50	8.02	8.02	25.23	25.23	47.5	47.0	3.26	3.23	4.37	4.36	<2	<2

Remarks:

Single underline denotes exceedance over Action Level.

Double underline denotes exceedance over Limit Level.





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>



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Wanchai Development Phase II and Central Wanchai Bypass
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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.)



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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	<p>Repeat in-situ measurement to confirm findings;</p> <p>Identify source(s) of impact;</p> <p>Inform IEC and Contractor;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>Discuss mitigation measures with IEC and Contractor;</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p> <p>Repeat measurement on next day of exceedance.</p>	<p>Discuss with ET and Contractor on the mitigation measures;</p> <p>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</p> <p>Assess the effectiveness of the implemented mitigation measures.</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p>	<p>Discuss with IEC on the proposed mitigation measures;</p> <p>Make agreement on the mitigation measures to be implemented.</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p>	<p>Inform the ER and confirm notification of the non-compliance in writing;</p> <p>Rectify unacceptable practice;</p> <p>Check all plant and equipment;</p> <p>Consider changes of working methods;</p> <p>Discuss with ET and IEC and propose mitigation measures to IEC and ER;</p> <p>Implement the agreed mitigation measures.</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p>
Action level being exceeded by more than one consecutive sampling days	<p>Identify source(s) of impact;</p> <p>Inform IEC and Contractor;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>Discuss mitigation measures with IEC and Contractor;</p> <p>Ensure mitigation measures are implemented;</p> <p>Prepare to increase the monitoring frequency to daily;</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p> <p>Repeat measurement on next working day of exceedance.</p>	<p>Discuss with ET and Contractor on the mitigation measures;</p> <p>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</p> <p>Assess the effectiveness of the implemented mitigation measures.</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p>	<p>Discuss with IEC on the proposed mitigation measures;</p> <p>Make agreement on the mitigation measures to be implemented;</p> <p>Assess the effectiveness of the implemented mitigation measures.</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p>	<p>Inform the Engineer and confirm notification of the non-compliance in writing;</p> <p>Rectify unacceptable practice;</p> <p>Check all plant and equipment;</p> <p>Consider changes of working methods;</p> <p>Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days;</p> <p>Implement the agreed mitigation measures.</p> <p>(The above actions should be taken within 1 working day after the exceedance is identified)</p>



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



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Appendix 6.2

Summary of Notification of Exceedances



Ref no.	Date	Tidal	Location	Parameters (Unit)	Measured	Action Level	Limit Level	Follow-up action	
X_10C578	17-Aug-13	Mid-flood	C7	DO(mg/L)	2.90	3.02	2.44	Possible reason:	Natural variation or changes of water quality in the vicinity of the water quality monitoring station Immediate repeated in-situ measurements had conducted to confirm the exceedances. Checking with contractor's works on 17 August 2013, no marine works was conducted on that day. Checking with contractor's inspection record, the silt screen and silt curtain were in proper condition on that day. No further exceedance was recorded in the next consecutive monitoring. In view that the silt screen and silt curtain for filling were in proper condition, the exceedance was considered not project related.
				Turbidity	3.60	11.35	12.71	Action taken / to be taken:	
				SS	<2	18.42	27.54	Remarks / Other Obs:	
X_10C579	19-Aug-13	Mid-flood	C7	DO(mg/L)	2.96	3.02	2.44	Possible reason:	Natural variation or changes of water quality in the vicinity of the water quality monitoring station Immediate repeated in-situ measurements had conducted to confirm the exceedances. Checking with contractor's works on 19 August 2013, no marine works was conducted on that day. Checking with contractor's inspection record, the silt screen and silt curtain were in proper condition on that day. No further exceedance was recorded in the next consecutive monitoring. In view that the silt screen and silt curtain for filling were in proper condition, the exceedance was considered not project related.
				Turbidity	4.60	11.35	12.71	Action taken / to be taken:	
				SS	<2	18.42	27.54	Remarks / Other Obs:	



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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
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Appendix 8.1

Construction Programme of Individual Contracts

Activity ID	Activity Name	Orig. Dur.	Start	Finish	2012					2013				2014	
					Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Shatin to Central Link - Protection Works at CBTS															
Submissions Complying with EP															
A1000	EM&A Manual (EP condition 2.5)														
A1010	Baseline Monitoring Report (EP condition 3.3)														
A1020	Monthly EM&A (EP condition 3.4)														
A1030	A dedicated web site (EP condition 4.2)														
A1040	Management organization of main construction companies (EP condition 2.5)	1d	14-Oct-11*	14-Oct-11											
A1050	Work schedule and location plans (EP condition 2.6)	1d	28-Oct-11*	28-Oct-11											
A1060	Silt curtain deployment plan (EP condition 2.7)	1d	28-Oct-11*	28-Oct-11											
A1070	Silt screen deployment plan (EP condition 2.8)	1d	28-Oct-11*	28-Oct-11											
Zone 1A															
A1080	Rockfill, trimming and levelling (below seabed)	17d	18-Nov-11*	04-Dec-11											
A1090	Sea wall block installation (above seabed)	25d	19-Jan-12*	15-Feb-12											
A1100	Temporary reclamation	25d	02-Mar-12*	26-Mar-12											
A1110	Removal of reclamation	113d	29-Jul-13*	21-Nov-13											
Zone 1B															
A1120	Rockfill, trimming and levelling (below seabed)	56d	18-Nov-11*	16-Jan-12											
A1130	Sea wall block installation (above seabed)	65d	19-Jan-12*	26-Mar-12											
A1140	Temporary reclamation	65d	31-Jan-12*	05-Apr-12											
A1150	Removal of reclamation	113d	29-Jul-13*	21-Nov-13											
Zone 1C															
A1160	Rockfill, trimming and levelling (below seabed)	21d	18-Nov-11*	08-Dec-11											
A1170	Sea wall block installation (above seabed)	25d	19-Jan-12*	15-Feb-12											
A1180	Temporary reclamation	15d	16-Feb-12	01-Mar-12											
A1190	Removal of reclamation	113d	29-Jul-13*	21-Nov-13											
Temporary Mooring Area															
A1200	Dredging	12d	18-Nov-11*	29-Nov-11											

Remaining Work
 Critical Remaining Work
 Actual Progress

Milestone
 Milestone
 Milestone

China State Construction Engineering (Hong Kong) Ltd

HY/2009/15 - Shatin to Central Link - Protection Works at CBTS



中國建築工程(香港)有限公司
CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LTD.