

香港電燈有限公司  
The Hongkong Electric Co., Ltd.



**Lamma Power Station Extension  
Construction Phase  
Monthly Environmental Monitoring & Audit Report**

**September 2016**

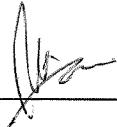
香港電燈有限公司  
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**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) ORDINANCE, CAP. 499**

**ENVIRONMENTAL PERMIT NO. EP-071/2000/C**

**LAMMA POWER STATION EXTENSION  
ENVIRONMENTAL MONITORING & AUDIT PROGRAMME  
AT CONSTRUCTION PHASE**

Report Title	Lamma Power Station Extension – Unit L10 Monthly EM&A Report (September 2016)
Date	11 October 2016
Certified by	 (Mr. IP Tat-Yan, Environmental Team Leader)
Verified by	 Mr. Y T Tang (AECOM Asia Company Limited, Independent Environmental Checker)

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## **EXECUTIVE SUMMARY**

This is the 78<sup>th</sup> monthly Environmental Monitoring and Audit (EM&A) report for the Project “Construction of Lamma Power Station Extension” prepared by the Environmental Team (ET). This report presents the results of impact monitoring on air quality and noise for the said project in September 2016.

The reclamation and submarine pipeline works were completed with the first gas-fired combined cycle unit (viz. Unit L9) commissioned in October 2006, working currently on base load operation. To cope with the scheduled retirement of the existing units at Lamma Power Station, the second gas-fired combined cycle unit (viz. Unit L10) is planned for commercial operation in early 2020 and the associated construction work commenced in January 2016.

Air and noise monitoring were performed. The results were checked against the established Action/Limit (AL) levels. An on-site audit was conducted once per week. The implementation status of the environmental mitigation measures, Event/Action Plan and environmental complaint handling procedures were also checked.

### **Construction Activities Undertaken**

Construction activities for Lamma Extension during the reporting month are tabulated as follows:

Item	Construction Activities
Unit L10 Piling Works	Interface core, grab excavation and bored pile construction works
Unit L10 Ground Treatment	Band drain construction work
Unit L10 Excavation and Lateral Support	Sheet pile work

### **Environmental Monitoring Works**

All monitoring work at designated stations was performed as scheduled satisfactorily.

#### *Air Quality*

No exceedance of Action/Limit levels on 1-hour TSP and 24-hour TSP for air quality was recorded in the month.

#### *Noise*

Construction work for Lamma Extension was carried out during the restricted hours including evening-time, holidays and night-time under valid Construction Noise Permit. No exceedance of Action and Limit levels for noise arising from the construction of Lamma Extension was recorded in the month.

## Site Environmental Audit

EPD officials from Regional Office (South) visited Lamma Power Station on 23/09/2016. EPD inspected the Lamma Extension Construction Site. There was no adverse comment from EPD regarding the construction site.

Site audits were carried out on a weekly basis to monitor environmental issues on the construction site. The site conditions were generally satisfactory. All required mitigation measures were implemented.

## Environmental Licensing and Permitting

Description	Permit No.	Valid Period		Issued To	Date of Issuance
		From	To		
Varied Environmental Permit	EP-071/2000/C	18/05/05	-	HEC	18/05/05
Construction Noise Permit	GW-RS0379-16	19/04/16	18/10/16	Contractor	19/04/16
Construction Noise Permit	PP-RS0019-16	26/07/16	19/01/17	Contractor	25/07/16
WPCO Discharge Licence	WT00023765-2016	07/03/16	31/03/21	Contractor	09/03/16
Registration of Chemical Waste Producer	WPN5113-912-S3180-19	21/01/16	-	Contractor	21/01/16
Waste Disposal Billing Account	Account No.: 7024247	03/02/16	-	Contractor	03/02/16

## Implementation Status of Environmental Mitigation Measures

Environmental mitigation measures for the construction activities as recommended in the EM&A manual were implemented in the reporting month.

## Environmental Complaints

No complaint against the construction activities was received in the reporting month.

## Future Key Issues

The future key issues to be considered in the coming month are as follows:

### Unit L10 Piling Works

- to continue monitoring the noise level during construction and to ensure compliance with the CNP's already obtained;
- to continue executing the preventive measures for avoiding noise exceedance and keep monitoring/ reviewing the performance;
- to monitor and review the sufficiency of the dust suppression measures provided and increase the resources accordingly if necessary;
- to recycle and reuse wastewater from bored pipe construction work and to ensure compliance with the WPCO discharge licence already obtained.

### Unit L10 Ground Treatment Works

- to continue monitoring the noise level during construction and to ensure compliance with the CNP's already obtained;
- to continue executing the preventive measures for avoiding noise exceedance and keep monitoring/ reviewing the performance;
- to monitor and review the sufficiency of the dust suppression measures provided and increase the resources accordingly if necessary.

#### Unit L10 Excavation and Lateral Support

- to continue monitoring the noise level during construction and to ensure compliance with the CNP's already obtained.
- to continue executing the preventive measures for avoiding noise exceedance and keep monitoring/ reviewing the performance;

#### **Concluding Remarks**

The environmental performance of the project was generally satisfactory.

## **1. INTRODUCTION**

### **1.1 Background**

The Environmental Team (hereinafter called the “ET”) was formed within the Hongkong Electric Co. Ltd (HEC) to undertake Environmental Monitoring and Audit for “Construction of Lamma Power Station Extension” (hereinafter called the “Project”). Under the requirements of Section 6 of Environmental Permit EP-071/2000/C, an EM&A programme for impact environmental monitoring set out in the EM&A Manual (Construction Phase) is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality, noise and water quality and regular environmental audits are required for the Project. With the completion of reclamation and submarine pipeline works, no further marine water quality monitoring would be required.

The Project involves the construction of a gas-fired power station employing combined cycled gas turbine technology, forming an extension to the existing Lamma Power Station. The key elements of the Project including the construction activities associated with the transmission system and submarine gas pipeline are outlined as follows.

- dredging and reclamation to form approximately 22 hectares of usable area;
- construction of six 300MW class gas-fired combined cycle units;
- construction of a gas receiving station;
- construction of a transmission system linking the Lamma Extension to load centres on Hong Kong Island;
- laying of a gas pipeline for the supply of natural gas to the new power station

This report summarizes the environmental monitoring and audit work for the Project for the month of September 2016.

### **1.2 Project Organisation**

An Environmental Management Committee (EMC) has been set up in HEC to oversee the Project. The management structure includes the following:

- Environmental Protection Department (The Authority);
- Environmental Manager (The Chairman of the Environmental Management Committee);
- Engineer;
- Independent Environmental Checker (IEC);
- Environmental Team (ET);
- Contractor.

The project organisation chart for the construction EM&A programme is shown in [Appendix A](#).

### 1.3 Construction Works undertaken during the Reporting Month

Construction activities for Unit L10 piling works were interface core, grab excavation and bored pile construction works. Construction activity for Unit L10 ground treatment works was band drain construction work. Construction activity for Unit L10 excavation and lateral support was sheet pile work. Layout plan for construction site is shown in [Figure 1.1](#).

The main construction activities carried out during the reporting month and the corresponding environmental mitigation measures are summarized in [Table 1.1](#). The implementation of major mitigation measures in the month is provided in [Appendix I](#).

Table 1.1 Construction Activities and Their Corresponding Environmental Mitigation Measures

Item	Construction Activities	Environmental Mitigation Measures
<b>Unit L10 Piling Works</b>		
1.	Interface core	<p><b>Noise</b></p> <ul style="list-style-type: none"> <li>– General noise mitigation measures employed at all work sites throughout the construction phase.</li> </ul> <p><b>Waste Management</b></p> <ul style="list-style-type: none"> <li>– Waste Management Plan submitted and implemented.</li> </ul>
2.	Grab excavation works	<p><b>Air</b></p> <ul style="list-style-type: none"> <li>– Dust suppression measures implemented.</li> </ul> <p><b>Noise</b></p> <ul style="list-style-type: none"> <li>– General noise mitigation measures employed at all work sites throughout the construction phase.</li> </ul> <p><b>Waste Management</b></p> <ul style="list-style-type: none"> <li>– Waste Management Plan submitted and implemented.</li> </ul>

Item	Construction Activities	Environmental Mitigation Measures
3.	Bored pile construction	<p><b>Water</b></p> <ul style="list-style-type: none"> <li>- All wastewater will be pumped to the sedimentation ponds for desilting process. After that, wastewater will be re-used for construction activities or pumped for storage. Discharging to communal storm drain is the last priority.</li> </ul> <p><b>Noise</b></p> <ul style="list-style-type: none"> <li>- General noise mitigation measures employed at all work sites throughout the construction phase.</li> </ul>
<b>Unit L10 Ground Treatment Works</b>		
4.	Band drain construction	<p><b>Air</b></p> <ul style="list-style-type: none"> <li>- Dust suppression measures implemented.</li> </ul> <p><b>Noise</b></p> <ul style="list-style-type: none"> <li>- General noise mitigation measures employed at all work sites throughout the construction phase.</li> </ul> <p><b>Waste Management</b></p> <ul style="list-style-type: none"> <li>- Waste Management Plan submitted and implemented.</li> </ul>
<b>Unit L10 Excavation and Lateral Support</b>		
5.	Sheet Pile Work	<p><b>Noise</b></p> <ul style="list-style-type: none"> <li>- General noise mitigation measures employed at all work sites throughout the construction phase.</li> </ul>

#### 1.4 Summary of EM&A Requirements

The detailed EM&A monitoring work for air quality and noise are described in Sections 2 and 3 respectively. Regular environmental site audits for air quality, noise, water quality and waste management were carried out.

The following environmental audits are summarized in Section 4 of this report:

- Environmental monitoring results;
- Waste Management Records;
- Weekly site audit results;
- The status of environmental licensing and permits for the Project;

- The implementation status of environmental protection and pollution control/mitigation measures.

Future key issues will be reported in Section 5 of this report.

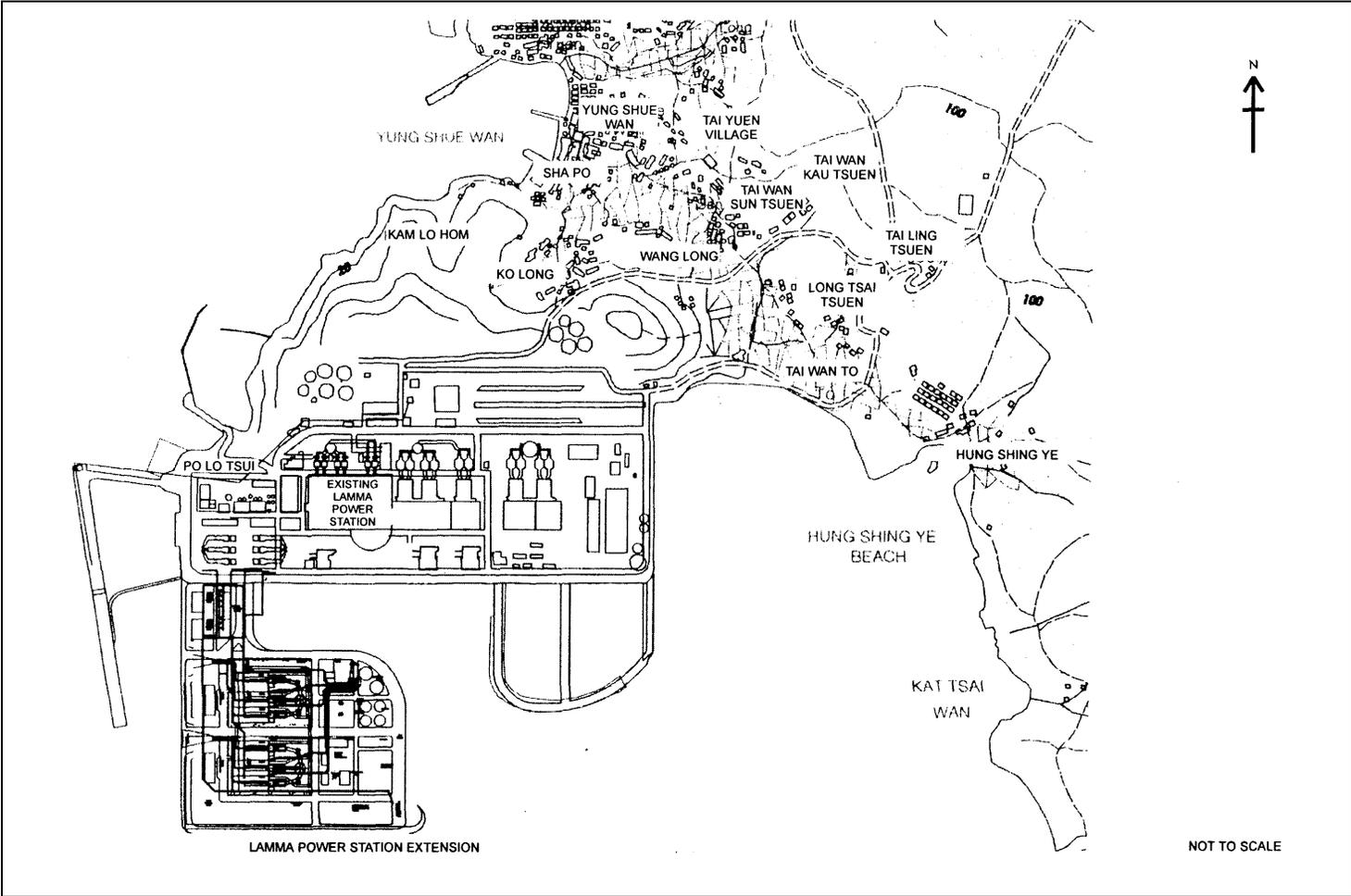


Figure 1.1 Layout of Work Site

## 2. AIR QUALITY

### 2.1 Monitoring Requirements

1-hour and 24-hour TSP monitoring at agreed frequencies were conducted to monitor air quality. The impact monitoring data were checked against the Action/Limit Levels as determined in the Baseline Monitoring Report (Construction Phase). [Appendix B](#) shows the established Action/Limit Levels for Air Quality.

### 2.2 Monitoring Locations

Three dust monitoring locations were selected for 1-hour TSP sampling (AM1, AM2 & AM3) while four monitoring locations were selected for 24-hour TSP sampling (AM1, AM2, AM3 and AM4). [Table 2.1](#) tabulates the monitoring stations. The locations of the monitoring stations are shown in [Figure 2.1](#).

Table 2.1 Air Quality Monitoring Locations

Location I.D.	Description
AM1	Reservoir
AM2	East Gate
AM3	Ash Lagoon
AM4	Tai Yuen Village

### 2.3 Monitoring Equipment

Continuous 24-hour TSP air quality monitoring was performed using the High Volume Air Samplers (HVAS), TEOM continuous dust monitor and the MINIVOL Portable Sampler at AM1&2, AM3 and AM4 respectively. TEOM continuous dust monitors were used to carry out 1-hour TSP monitoring at AM1, AM2 and AM3. [Table 2.2](#) summarises the equipment used in dust monitoring.

Table 2.2 Air Quality Monitoring Equipment

Equipment	Model and Make
<i>24-hour sampling:</i> HVAS Sampler	Model TE5170x Tisch Environmental Inc.
Continuous TSP Dust Meter	TEOM continuous dust monitor Thermo Scientific
MINIVOL Portable Sampler	AIRMETRICS
<i>1-hour sampling:</i> Continuous TSP Dust Meter	TEOM continuous dust monitor Thermo Scientific

## 2.4 Monitoring Parameters, Frequency and Duration

Table 2.3 summarises the monitoring parameters, duration and frequency of air quality monitoring. The monitoring schedule for the reporting month is shown in [Appendix C](#).

Table 2.3 Air Quality Monitoring Parameter, Duration and Frequency

Monitoring Stations	Parameter	Duration	Frequency
AM1	1-hour TSP	1	3 hourly samples every 6 days
	24-hour TSP	24	Once every 6 days
AM2	1-hour TSP	1	3 hourly samples every 6 days
	24-hour TSP	24	Once every 6 days
AM3	1-hour TSP	1	3 hourly samples every 6 days
	24-hour TSP	24	Once every 6 days
AM4	24-hour TSP	24	Once every 6 days

## 2.5 Monitoring Procedures and Calibration Details

HVAS and MINIVOL (24- hour TSP Monitoring):

### *Preparation of Filter Papers*

- Visual inspection of filter papers was carried out to ensure that there were no pinholes, tears and creases;
- The filter papers were then labeled before sampling.
- The filter papers were equilibrated at room temperature and relative humidity < 50% for at least 24 hours before weighing.

### *Field Monitoring*

- During collection of the sampled filter paper, the information on the elapse timer was logged. Site observations around the monitoring stations, which might have affected the monitoring results, were also recorded. Major pollution sources, if any, would be identified and reported. The flow record chart for the previous sampling was checked to see if there was any abnormality.
- The post-sampling filter papers were removed carefully from the filter holder and folded to avoid loss of fibres or dust particles from the filter papers;
- The filter holder and its surrounding were cleaned;
- A pre-weighed blank filter paper for the next sampling was put in place and aligned carefully. The filter holder was then tightened firmly to avoid leakage;
- A new flow record chart was loaded into the flow recorder;
- The programmable timer was set for the next 24 hrs sampling period;
- The post-sampling filter papers were equilibrated at room temperature and relative humidity < 50% for at least 24 hours before weighing.

TEOM continuous dust monitor (24- hour TSP and 1- hour TSP Monitoring):

- The following parameters of the TEOM model dust meters are regularly checked to ensure proper functionality:
  - Operation Mode;
  - Frequency of the tapered element;
  - Main flow;
  - Bypass flow.

### *Maintenance & Calibration*

- The monitoring equipment and their accessories are maintained in good working conditions.
- Monitoring equipment is calibrated at monthly intervals. Calibration details are shown in [Appendix F](#).

## **2.6 Results and Observations**

All dust monitoring works were conducted on schedule. All monitoring data and graphical presentation of the monitoring results are provided in [Appendix D](#). Key findings and observations are provided below:

### *1-hour TSP*

No exceedance of 1-hour TSP Action/Limit Level was recorded in the month.

### *24-hour TSP*

No exceedance of 24-hour TSP Action/Limit Level was recorded in the month.

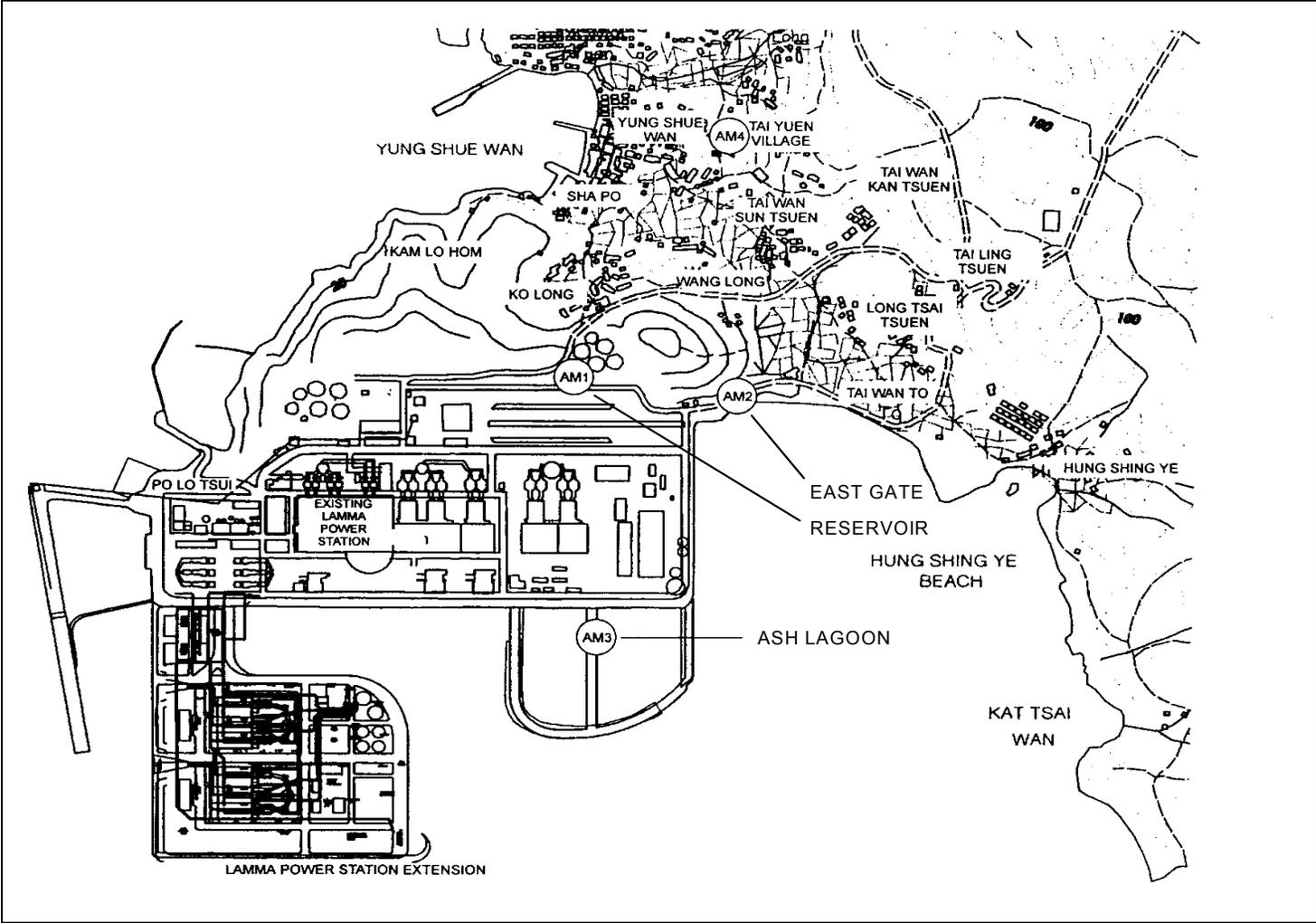


Figure 2.1 Location of Air Quality Monitoring Stations

### 3. NOISE

#### 3.1 Monitoring Requirements

Continuous noise alarm monitoring at Ash Lagoon/Ching Lam were carried out to calculate the noise contributed by the construction activities at the two critical NSR's, viz. Long Tsai Tsuen/Hung Shing Ye and the school within the village of Tai Wan San Tsuen. The impact monitoring data for construction noise were checked against the limit levels specified in the EM&A Manual. With the availability of the construction noise permits, impact monitoring for the construction work during the restricted hours was also carried out. Section 4 presents the details of the construction noise permits.

The impact noise monitoring data were checked against the limit levels specified in the EM&A Manual. [Appendix B](#) shows the established Action/Limit Levels for noise.

#### 3.2 Monitoring Locations

In accordance with the EM&A manual, the identified noise monitoring locations of Ash Lagoon and Ching Lam are shown in [Figure 3.1](#).

#### 3.3 Monitoring Equipment

The sound level meters used for noise monitoring complied with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). The noise monitoring equipment used is shown in [Table 3.1](#).

Table 3.1 Noise Monitoring Equipment

Equipment	Model
Sound level meters	B&K 2250
Sound level calibrator	B&K 4231

#### 3.4 Monitoring Parameters, Frequency and Duration

Continuous alarm monitoring was carried out at Ash Lagoon and Ching Lam. The measurement duration and parameter of noise monitoring were presented in [Table 3.2](#) as follows:

Table 3.2 Noise Monitoring Duration and Parameter

Location	Time Period	Frequency	Parameter
Ash Lagoon	Daytime: 0700-1900 hrs on normal weekdays	Daytime: 30 minutes	30-min $L_{Aeq}$
	Evening-time & holidays: 0700-2300 hrs on holidays; and 1900-2300 hrs on all other days	Evening-time & holidays: 5 minutes	5-min $L_{Aeq}$
Ching Lam	Night-time: 2300-0700 hrs of next day	Night-time: 5 minutes	5-min $L_{Aeq}$

### 3.5 Monitoring Procedures and Calibration Details

#### *Monitoring Procedures*

##### *Continuous Noise Monitoring for Lamma Extension Construction*

The measured noise levels (MNL's) were collected at the noise alarm monitoring stations at Ash Lagoon and Ching Lam. The notional background noise levels (viz. baseline noise data at Ash Lagoon and Ching Lam) were applied to correct the corresponding MNL's in 30-min/5-min  $L_{Aeq}$ .

A wind speed sensor was installed at Station Building Rooftop. The wind speed signal was used to determine whether the data from Ash Lagoon and Ching Lam noise alarm monitoring stations were affected. The instantaneous data was discarded in case the instantaneous wind speed exceeded 10 m/s. The 30-min/5-min  $L_{Aeq}$  was considered valid only if the amount of valid data was equal to or above 70%.

#### *Equipment Calibration*

The sound level meters and calibrators have been verified by the manufacturer or accredited laboratory. Equipment for continuous noise monitoring was calibrated at least once per month.

### **3.6 Results and Observations**

Continuous noise monitoring was conducted at the two monitoring stations at Ash Lagoon and Ching Lam.

All monitoring results and their graphical presentations are provided in [Appendix E](#). No exceedance of noise Action/Limit Level was recorded in the month.

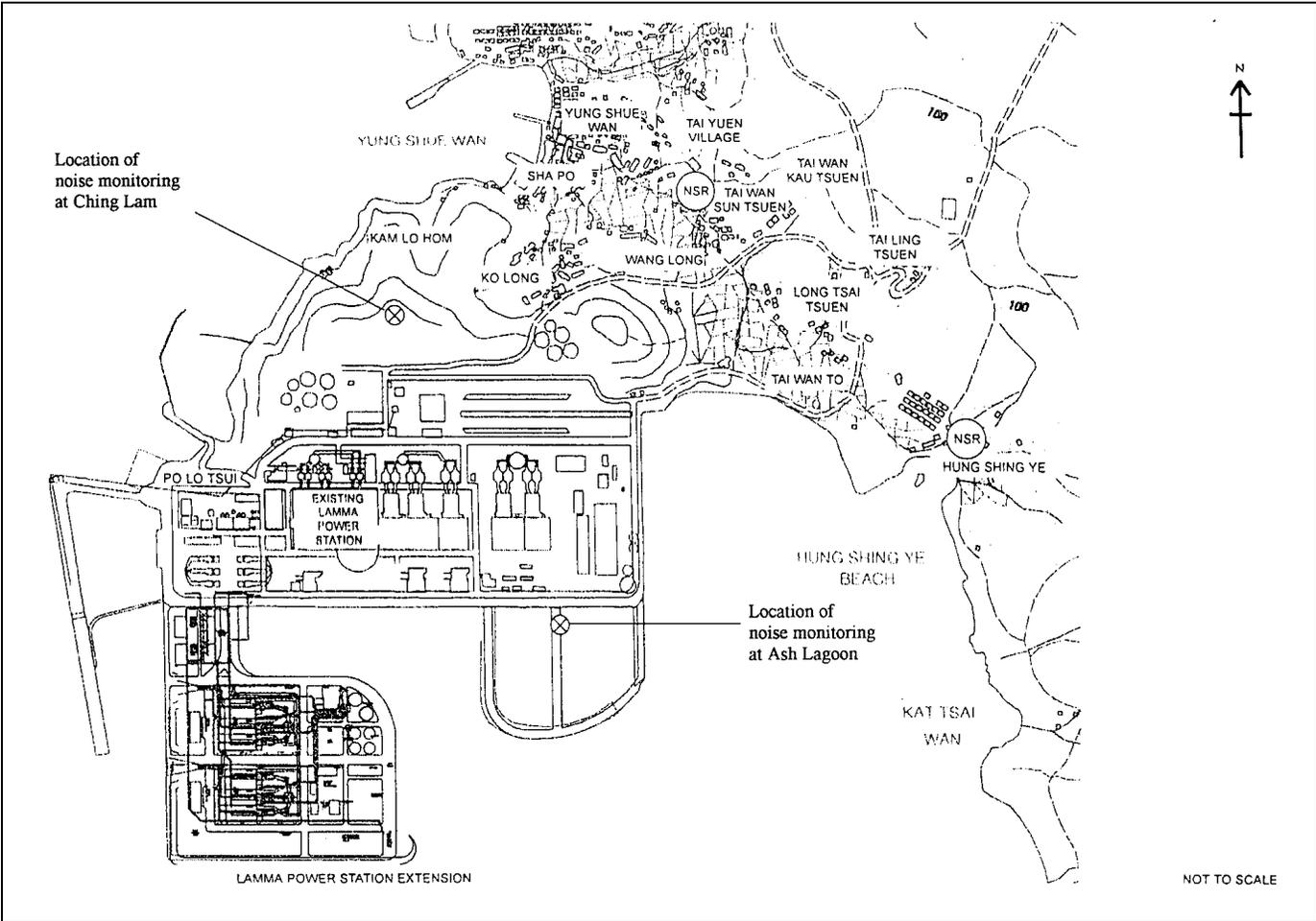


Figure 3.1 Location of Noise Monitoring Stations

## 4. ENVIRONMENTAL AUDIT

### 4.1 Review of Environmental Monitoring Procedures

The environmental monitoring procedures were regularly reviewed by the Environmental Team. No modification to the existing monitoring procedures was recommended.

### 4.2 Assessment of Environmental Monitoring Results

#### *Monitoring results for Air Quality and Noise*

The environmental monitoring results for Air Quality and Noise in the reporting month presented in sections 2, 3 and 4 respectively are summarized in [Table 4.1](#).

Table 4.1 Summary of AL Level Exceedances on Monitoring Parameters

Item	Parameter Monitored	Monitoring Period	No. of Exceedances In		Event/Action Plan Implementation Status and Results
			Action Level	Limit Level	
Air					
1	Ambient TSP (24-hour)	01/09/16-30/09/16	0	0	
2	Ambient TSP (1-hour)	01/09/16-30/09/16	0	0	
Noise					
1	Noise level at the critical NSR's predicted by the noise alarm monitoring system	01/09/16-30/09/16	0	0	

### 4.3 Waste Management

Wastes generated from this Project include inert construction and demolition (C&D) materials and non-inert C&D materials. Inert C&D materials comprise excavated materials and broken concrete. Non-inert C&D materials comprise general refuse, metals and paper/ cardboard packaging, plastics, chemical waste, etc.

No inert C&D material nor non-inert C&D material were disposed of in September 2016 as shown in [Table 4.2](#).

Table 4.2 Estimated Amounts of Waste in September 2016

Total Inert C&D Waste Materials	Non-inert C&D Materials		
	C&D Materials Recycled	C&D Waste Disposed of at Landfill	Chemical Waste
7871.79 Tonnes	0 Tonnes	4.26 Tonnes	0 Tonnes

The monthly waste flow table prepared by the contractor is attached in [Appendix K](#).

#### 4.4 Site Environmental Audit

EPD officials from Regional Office (South) visited Lamma Power Station on 23/09/2016. EPD inspected the Lamma Extension Construction Site. There was no adverse comment from EPD regarding the construction site.

Site audits were carried out by ET on a weekly basis to monitor environmental issues at the construction sites to ensure that all mitigation measures were implemented timely and properly. The site audit findings for the reporting month are summarized in [Appendix H](#). The site conditions were generally satisfactory. All required mitigation measures were implemented.

#### 4.5 Status of Environmental Licensing and Permitting

All permits/licenses obtained for the project are summarised in [Table 4.3](#).

Table 4.3 Summary of Environmental Licensing and Permit Status

Description	Permit No.	Valid Period		Highlights	Status
		From	To		
Varied Environmental Permit	EP-071/2000/C	18/05/05	-	The whole construction work site	Valid
Construction Noise Permit	GW-RS0379-16	19/04/16	18/10/16	Operation of PME during restricted hours (0000-2400 hrs. on general holidays (including Sundays), 0000-0700 hrs. and 1900-2400 hrs on any day not being a general holiday).	Valid
Construction Noise Permit	PP-RS0019-16	26/07/16	19/01/17	Percussive piling for Unit L10 piling foundation	Valid

Description	Permit No.	Valid Period		Highlights	Status
		From	To		
WPCO Discharge Licence*	WT00023765-2016	07/03/16	31/03/21	Foundation works for Unit L10	Valid
Registration of Chemical Waste Producer	WPN5113-912-S3180-19	21/01/16	-	Foundation works for Unit L10	Valid
Waste Disposal Billing Account	Account No.: 7024247	03/02/16	-	Foundation works for Unit L10	Valid

Note: \*- The last water quality monitoring results were reported under a separate cover by the contractor in August 2016, and the results were within the allowable limit.

#### 4.6 Implementation Status of Environmental Mitigation Measures

Mitigation measures detailed in the permits and the EM&A Manual (Construction Phase) are required to be implemented. An updated summary of the Environmental Mitigation Implementation Schedule (EMIS) is presented in [Appendix I](#).

#### 4.7 Implementation Status of Event/Action Plans

The Event/Action Plans extracted from the EM&A Manual (Construction Phase) are presented in [Appendix G](#).

#### 4.8 Implementation Status of Environmental Complaint Handling Procedures

In September 2016, no complaint against the construction activities was received.

Table 4.4 Environmental Complaints Received in September 2016

Case Reference / Date, Time Received / Date, Time Concerned	Descriptions /Actions Taken	Conclusion / Status
Nil	N/A	N/A

Table 4.5 Outstanding Environmental Complaints Carried Over

Case Reference / Date, Time Received / Date, Time Concerned	Descriptions /Actions Taken	Conclusion / Status
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Nil	N/A	N/A
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## **5. FUTURE KEY ISSUES**

### **5.1 Key Issues for the Coming Month**

Key issues to be considered in the coming month include:

#### Unit L10 Piling Works

##### *Noise Impact*

- To continue monitoring the noise level during construction and to ensure compliance with the CNP's already obtained.
- To continue executing the preventive measures for avoiding noise exceedance and keep monitoring/ reviewing the noise performance.

##### *Air Impact*

- To monitor and review the sufficiency of the dust suppression measures provided and increase the resources accordingly if necessary.

##### *Water Impact*

- To recycle and reuse wastewater from bored pipe construction work and to ensure compliance in accordance with the WPCO discharge licence already obtained.

#### Unit L10 Ground Treatment Works

##### *Noise Impact*

- To continue monitoring the noise level during construction and to ensure compliance with the CNP's already obtained.
- To continue executing the preventive measures for avoiding noise exceedance and keep monitoring/ reviewing the noise performance.

##### *Air Impact*

- To monitor and review the sufficiency of the dust suppression measures provided and increase the resources accordingly if necessary.

#### Unit L10 Excavation and Lateral Support

##### *Noise Impact*

- To continue monitoring the noise level during construction and to ensure compliance with the CNP's already obtained.
- To continue executing the preventive measures for avoiding noise exceedance and keep monitoring/ reviewing the noise performance.

### **5.2 Monitoring Schedules for the Next 3 Months**

The tentative environmental monitoring schedules for the next 3 months are shown in [Appendix C](#).

### **5.3 Construction Program for the Next 3 Months**

The tentative construction programs for the next 3 months are shown in [Appendix J](#).

## **6. CONCLUSION**

All monitoring work at designated stations was performed as scheduled satisfactorily. The environmental monitoring works and site inspection were performed as scheduled in the reporting month. All monitoring results were checked and reviewed.

No Action/Limit level exceedance on 1-hour and 24-hour TSP level was recorded in the reporting month.

No Action/Limit level exceedance on noise was recorded in the reporting month.

Environmental mitigation measures recommended in the EM&A manual for the construction activities were implemented in the reporting month. No complaint against the construction activities was received in the reporting month. No prosecution was received for this Project in the reporting period.

The environmental performance of the Project was generally satisfactory.

Appendix A Organization Chart

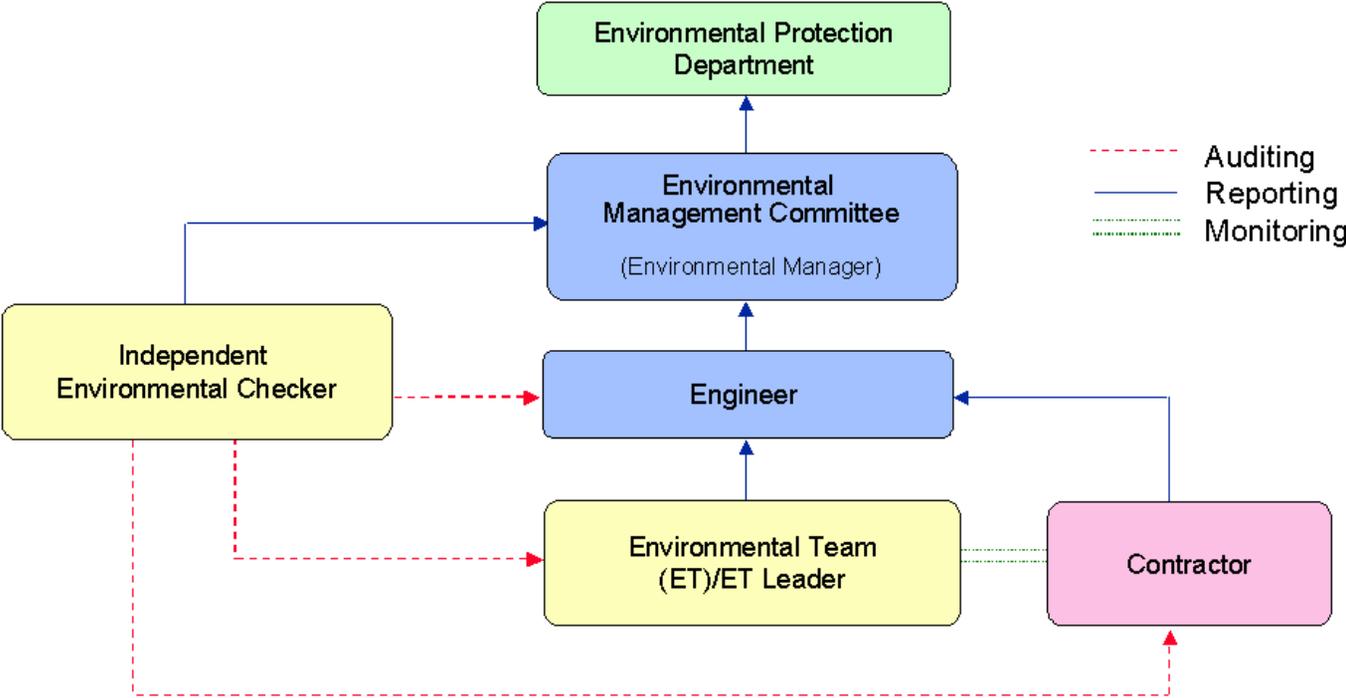


Figure A.1 Organisation of EM&A Programme at Construction Phase

## Appendix B Action and Limit Levels for Air Quality and Noise Monitoring

### B.1. Air

Table B.1 Action and Limit Levels for 1-hour and 24-hour TSP

	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
1-hour TSP*	340	500
24-hour TSP	190	260

\* No Action/Limit Level for 1-hour TSP is applied to AM4 where no real time dust monitor is installed.

### B.2. Noise

Table B.2 AL Levels for Construction Noise (Other than Percussive Piling)

Parameters	Action	Limit
Noise Levels at the NSR's at Long Tsai Tsuen/Hung Shing Ye and school within the village of Tai Wan San Tsuen predicted by the noise alarm monitoring system	When one or more documented complaints are received	a. 75 dB(A) in $L_{Aeq,30 \text{ min}}$ (07:00-19:00 hrs on normal weekdays) (Note 1)
Manual noise monitoring at the nearest Pak Kok Tsui residences to cable landing points N4 and N5		b. subject to statutory control under the Noise Control Ordinance (07:00-23:00 hrs on holidays and 19:00-23:00 hrs on all other days). Set to 60 dB(A) in $L_{Aeq,5 \text{ min}}$ c. subject to statutory control under the Noise Control Ordinance (23:00-07:00 hrs of next day). Set to 45 dB(A) in $L_{Aeq,5 \text{ min}}$
Note:		
1. For educational institution, the limit level shall be 70 dB(A), reduced to 65 dB(A) during examination periods.		

## Appendix C Environmental Monitoring Schedule

Table C.1 Monitoring schedule for 24hr and 1hr TSP monitoring for Lamma Extension Construction (September 2016 to December 2016)

24hr TSP Monitoring	1hr TSP Monitoring
06/Sep/2016	06/Sep/2016 1500hr to 1800hr
12/Sep/2016	12/Sep/2016 1500hr to 1800hr
18/Sep/2016	18/Sep/2016 1500hr to 1800hr
24/Sep/2016	24/Sep/2016 1500hr to 1800hr
30/Sep/2016	30/Sep/2016 1500hr to 1800hr
06/Oct/2016	06/Oct/2016 1500hr to 1800hr
12/Oct/2016	12/Oct/2016 1500hr to 1800hr
18/Oct/2016	18/Oct/2016 1500hr to 1800hr
24/Oct/2016	24/Oct/2016 1500hr to 1800hr
30/Oct/2016	30/Oct/2016 1500hr to 1800hr
05/Nov/2016	05/Nov/2016 1500hr to 1800hr
11/Nov/2016	11/Nov/2016 1500hr to 1800hr
17/Nov/2016	17/Nov/2016 1500hr to 1800hr
23/Nov/2016	23/Nov/2016 1500hr to 1800hr
29/Nov/2016	29/Nov/2016 1500hr to 1800hr
05/Dec/2016	05/Dec/2016 1500hr to 1800hr
11/Dec/2016	11/Dec/2016 1500hr to 1800hr
17/Dec/2016	17/Dec/2016 1500hr to 1800hr
23/Dec/2016	23/Dec/2016 1500hr to 1800hr
29/Dec/2016	29/Dec/2016 1500hr to 1800hr

## APPENDIX D AIR QUALITY MONITORING RESULTS

Site: Lamma Power Station Extension

Month: September 2016

24 hour TSP Measurement:-

Date	TSP concentration ( $\mu\text{g}/\text{m}^3$ )				Weather Information (From Hong Kong Observatory)		
	Reservoir (AM1)	East Gate (AM2)	Ash Lagoon (AM3)	Tai Yuen Village (AM4)	Mean Wind Speed (km/hr)	Prevailing Wind Dir. ( $^{\circ}$ )	Mean R.H. (%)
6/9/2016	15	17	10	13	7.3	050	90
12/9/2016	28	29	27	28	15.2	030	83
18/9/2016	42	42	40	29	12.7	010	66
24/9/2016	43	46	39	22	27.6	080	78
30/9/2016	103	108	70	71	7.5	010	78

1 hour TSP Measurement:-

Date	Time	TSP concentration ( $\mu\text{g}/\text{m}^3$ )		
		Reservoir (AM1)	East Gate (AM2)	Ash Lagoon (AM3)
06/09/2016	15:00-15:59	0	11	0
	16:00-16:59	1	16	3
	17:00-17:59	6	19	5
12/09/2016	15:00-15:59	16	12	16
	16:00-16:59	13	7	15
	17:00-17:59	15	31	26
18/09/2016	15:00-15:59	35	37	30
	16:00-16:59	37	46	34
	17:00-17:59	44	56	35
24/09/2016	15:00-15:59	41	47	41
	16:00-16:59	39	89	44
	17:00-17:59	48	72	45
30/09/2016	15:00-15:59	72	90	84
	16:00-16:59	79	87	87
	17:00-17:59	69	84	78

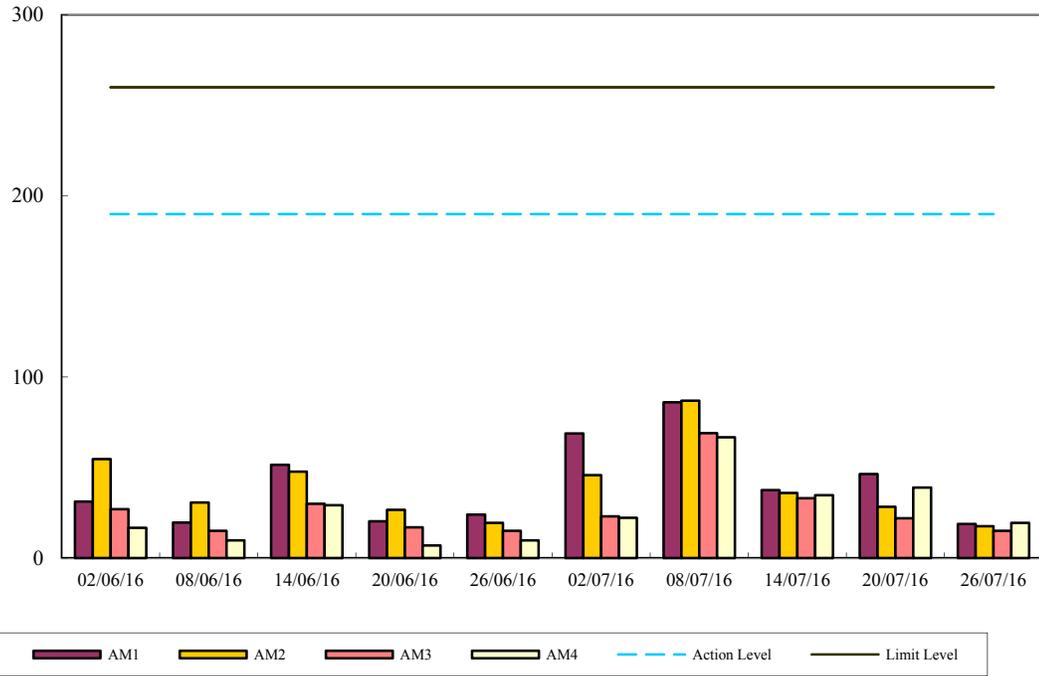
	1-hr TSP ( $\mu\text{g}/\text{m}^3$ )	24-hr TSP ( $\mu\text{g}/\text{m}^3$ )
Action Level	340	190
Limit Level	500	260

Calibration: Calibration details are shown in appendix F.

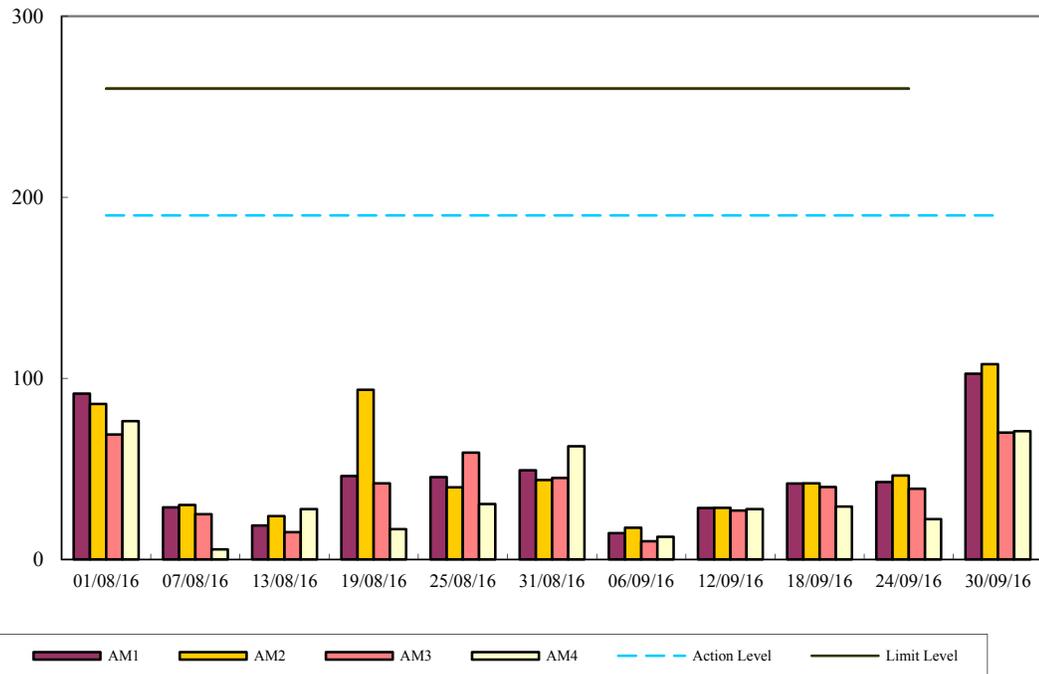
Equipment used:

Location	1-hr TSP	24-hr TSP
Reservoir and East Gate	TEOM	High Volume Air Sampler
Ash Lagoon	TEOM	TEOM
Tai Yuen Village	-	MINIVOL Portable Sampler

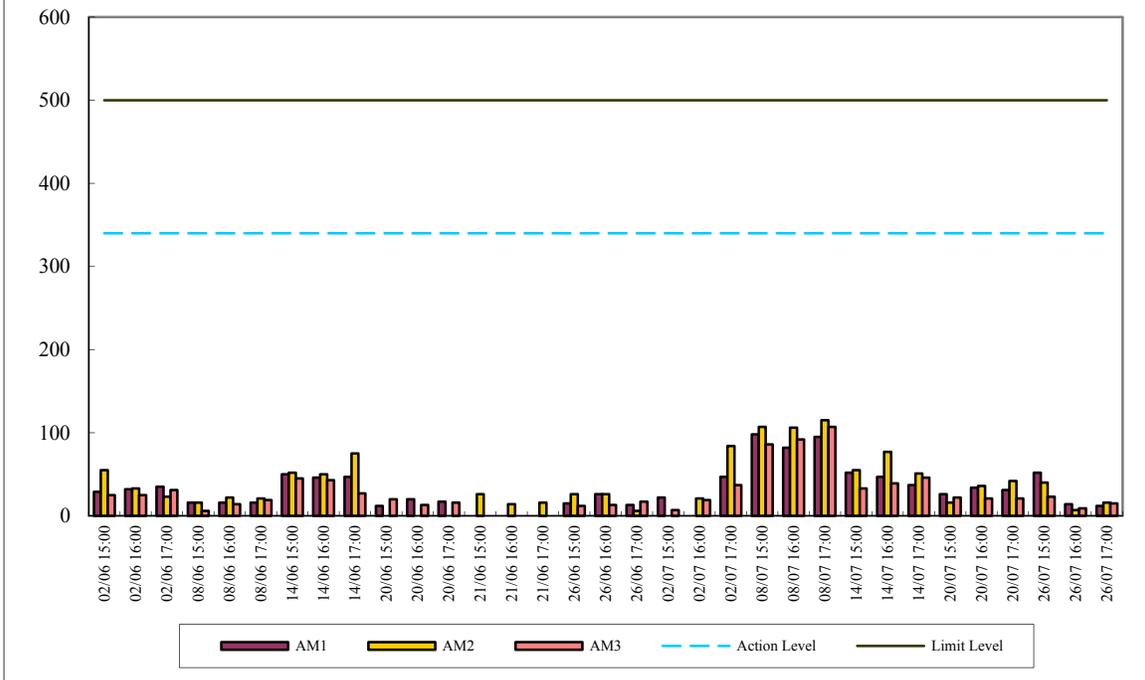
24-hr TSP Air Monitoring Data (June 2016 - July 2016)



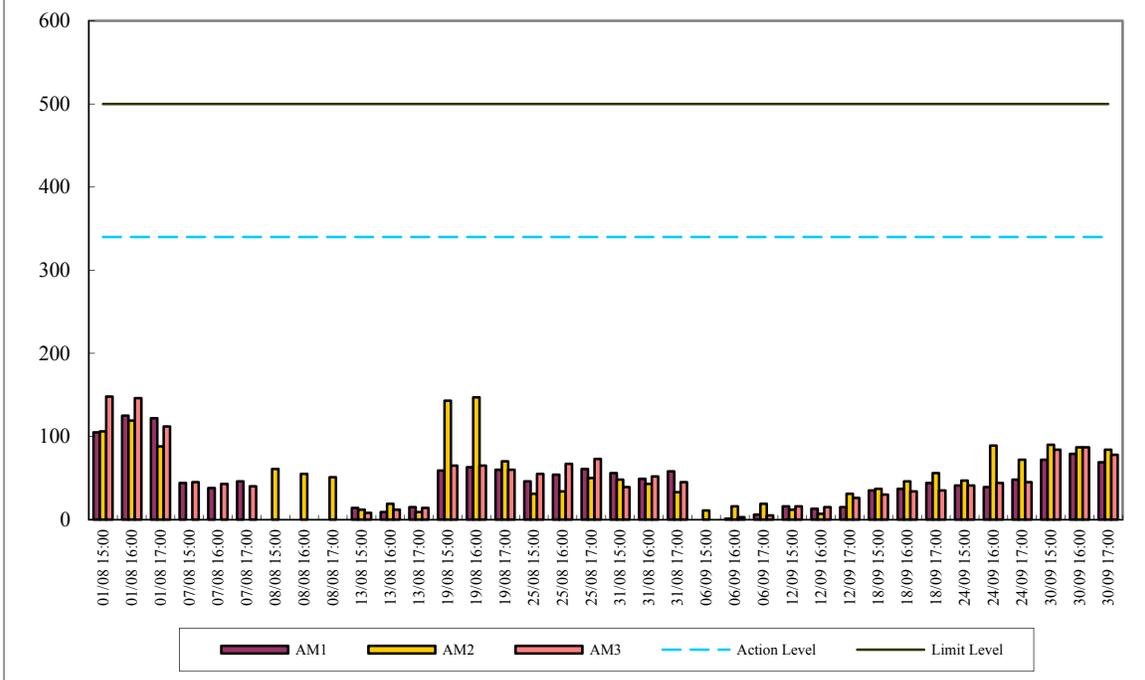
24-hr TSP Air Monitoring Data (August 2016 - September 2016)



1-hr TSP Air Monitoring Data (June 2016 - July 2016)



1-hr TSP Air Monitoring Data (August 2016 - September 2016)



**Appendix E**

**Continuous Noise Monitoring Results for September 2016**

Site: Lamma Power Station Extension Construction  
 Measurement Location: Ash Lagoon and Ching Lam  
 Measurement Parameter: 30-min Leq (07:00-19:00 hrs on normal weekdays)  
 5-min Leq (07:00-23:00 hrs on holidays and  
 19:00-23:00 hrs on all other days, and 23:00-  
 07:00 hrs of next day)  
 Noise Equipment Used: B&K 2250 sound level meters and B&K 4231 sound  
 level calibrator  
 Last Calibration Date: B&K 2250 sound level meters - 09/11/2015  
 B&K 4231 calibrator - 07/04/2016

Date	Time	Calculated Noise Level at NSR at Long Tsai Tsuen/Hung Shing Ye (dB(A))		Limit Noise Level (dB(A))	Calculated Noise Level at NSR at the school within Tai Wan San Tsuen (dB(A))		Limit Noise Level (dB(A))
		Max	Avg		Max	Avg	
01/09/2016	07:00-19:00	46	46	75	41	41	70
01/09/2016	19:00-23:00	30	25	60	26	20	60
01/09/2016	23:00-07:00	33	29	45	28	24	45
02/09/2016	07:00-19:00	---	---	75	---	---	70
02/09/2016	19:00-23:00	38	38	60	---	---	60
02/09/2016	23:00-07:00	39	33	45	35	29	45
03/09/2016	07:00-19:00	40	40	75	35	35	70
03/09/2016	19:00-23:00	---	---	60	---	---	60
03/09/2016	23:00-07:00	32	28	45	28	23	45
04/09/2016	07:00-23:00	28	28	60	23	23	60
04/09/2016	23:00-07:00	---	---	45	---	---	45
05/09/2016	07:00-19:00	---	---	75	---	---	70
05/09/2016	19:00-23:00	38	38	60	33	33	60
05/09/2016	23:00-07:00	---	---	45	---	---	45

06/09/2016	07:00-19:00	---	---	75	---	---	70
06/09/2016	19:00-23:00	---	---	60	---	---	60
06/09/2016	23:00-07:00	45	39	45	40	34	45
07/09/2016	07:00-19:00	57	54	75	52	46	75
07/09/2016	19:00-23:00	---	---	60	---	---	60
07/09/2016	23:00-07:00	---	---	45	---	---	45
08/09/2016	07:00-19:00	---	---	75	---	---	70
08/09/2016	19:00-23:00	---	---	60	---	---	60
08/09/2016	23:00-07:00	37	29	45	33	24	45
09/09/2016	07:00-19:00	---	---	75	---	---	70
09/09/2016	19:00-23:00	---	---	60	---	---	60
09/09/2016	23:00-07:00	32	20	45	27	16	45
10/09/2016	07:00-19:00	---	---	75	---	---	70
10/09/2016	19:00-23:00	---	---	60	---	---	60
10/09/2016	23:00-07:00	31	24	45	27	20	45
11/09/2016	07:00-23:00	36	22	60	31	31	60
11/09/2016	23:00-07:00	44	37	45	39	31	45
12/09/2016	07:00-19:00	---	---	75	---	---	70
12/09/2016	19:00-23:00	---	---	60	---	---	60
12/09/2016	23:00-07:00	---	---	45	---	---	45
13/09/2016	07:00-19:00	---	---	75	---	---	70
13/09/2016	19:00-23:00	20	20	60	15	15	60
13/09/2016	23:00-07:00	42	26	45	37	21	45
14/09/2016	07:00-19:00	42	42	75	37	37	70
14/09/2016	19:00-23:00	---	---	60	---	---	60

14/09/2016	23:00-07:00	33	25	45	28	20	45
15/09/2016	07:00-19:00	---	---	75	---	---	70
15/09/2016	19:00-23:00	30	28	60	26	23	60
15/09/2016	23:00-07:00	33	26	45	28	22	45
16/09/2016	07:00-23:00	28	26	60	24	22	60
16/09/2016	23:00-07:00	44	31	45	39	26	45
17/09/2016	07:00-19:00	---	---	75	---	---	70
17/09/2016	19:00-23:00	31	25	60	27	20	60
17/09/2016	23:00-07:00	37	33	45	32	29	45
18/09/2016	07:00-23:00	54	41	60	35	35	60
18/09/2016	23:00-07:00	44	37	45	38	32	45
19/09/2016	07:00-19:00	---	---	75	---	---	70
19/09/2016	19:00-23:00	39	39	60	34	34	60
19/09/2016	23:00-07:00	30	25	45	25	20	45
20/09/2016	07:00-19:00	40	40	75	36	36	70
20/09/2016	19:00-23:00	---	---	60	---	---	60
20/09/2016	23:00-07:00	43	30	45	37	25	45
21/09/2016	07:00-19:00	---	---	75	---	---	70
21/09/2016	19:00-23:00	---	---	60	---	---	60
21/09/2016	23:00-07:00	41	28	45	36	23	45
22/09/2016	07:00-19:00	33	33	75	28	28	70
22/09/2016	19:00-23:00	---	---	60	---	---	60
22/09/2016	23:00-07:00	---	---	45	41	37	45
23/09/2016	07:00-19:00	---	---	75	---	---	70
23/09/2016	19:00-23:00	40	37	60	26	26	60
23/09/2016	23:00-07:00	39	35	45	33	29	45

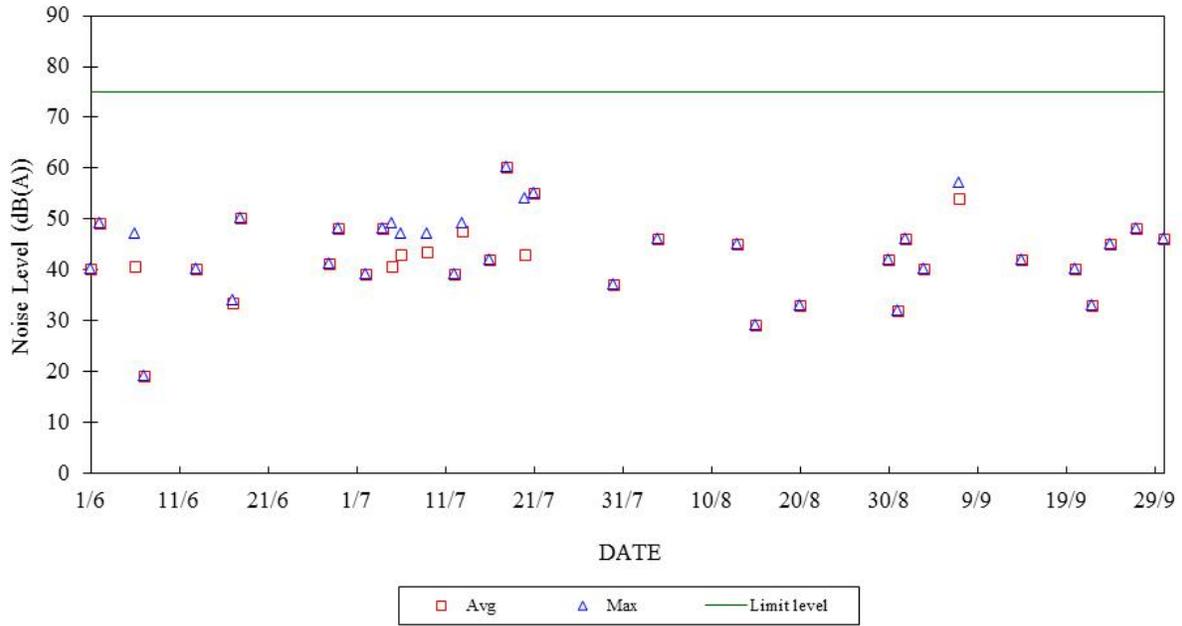
24/09/2016	07:00-19:00	45	45	75	41	41	70
24/09/2016	19:00-23:00	39	35	60	34	31	60
24/09/2016	23:00-07:00	37	29	45	32	24	45
25/09/2016	07:00-23:00	---	---	60	---	---	60
25/09/2016	23:00-07:00	40	32	45	35	27	45
26/09/2016	07:00-19:00	---	---	75	---	---	70
26/09/2016	19:00-23:00	34	31	60	29	27	60
26/09/2016	23:00-07:00	42	32	45	31	26	45
27/09/2016	07:00-19:00	48	48	75	28	28	70
27/09/2016	19:00-23:00	34	32	60	30	26	60
27/09/2016	23:00-07:00	39	30	45	34	26	45
28/09/2016	07:00-19:00	---	---	75	---	---	70
28/09/2016	19:00-23:00	34	33	60	---	---	60
28/09/2016	23:00-07:00	39	36	45	34	31	45
29/09/2016	07:00-19:00	---	---	75	---	---	70
29/09/2016	19:00-23:00	39	35	60	29	29	60
29/09/2016	23:00-07:00	42	31	45	34	27	45
30/09/2016	07:00-19:00	46	46	75	---	---	70
30/09/2016	19:00-23:00	38	32	60	32	28	60
30/09/2016	23:00-07:00	43	35	45	38	30	45

Note:

- a. "---" represents the measured noise monitoring data lower than the established notional background level/discarded under strong wind.
- b. Continuous noise monitoring was carried out at holidays & evening-time (07:00-23:00 hrs on holidays and 19:00-23:00 hrs on all other days) and night-time (23:00-07:00 hrs of next day) under construction noise permit.

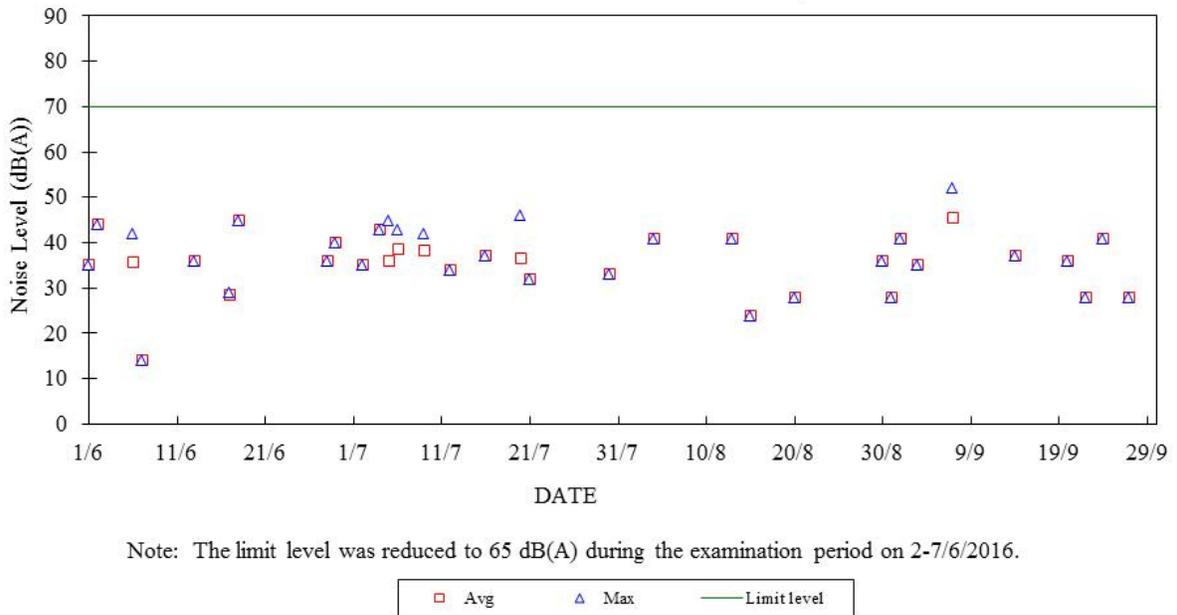
### Construction Noise Monitoring in June - September 2016

NSR at Long Tsai Tsuen/Hung Shing Ye  
07:00-19:00 hrs on Normal Weekdays

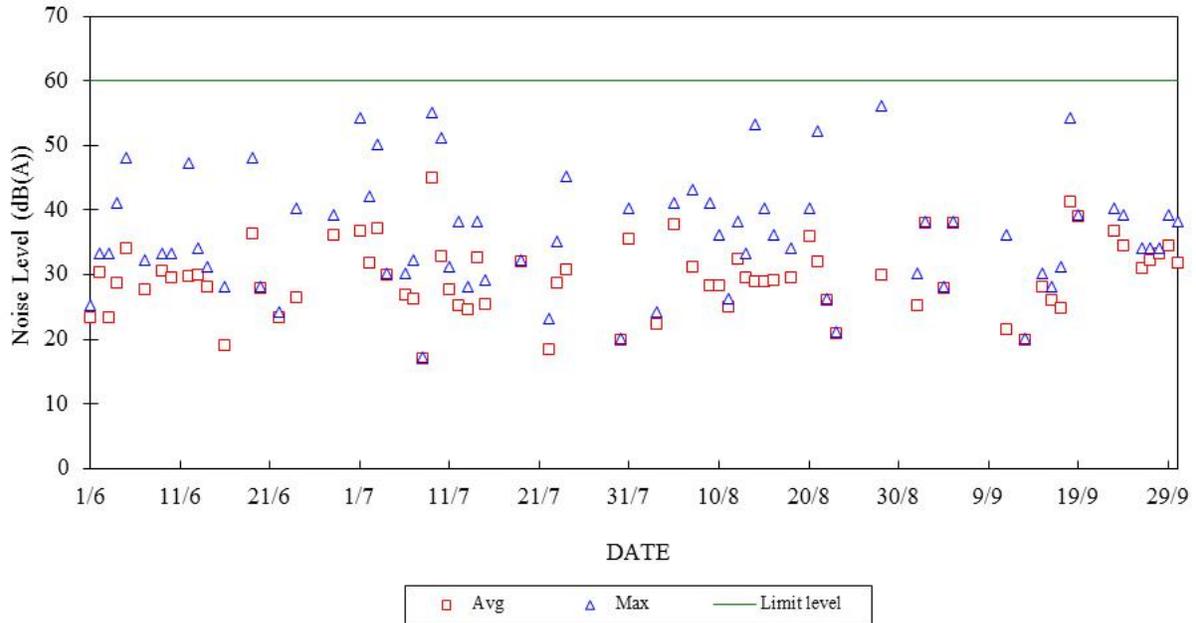


### Construction Noise Monitoring in June - September 2016

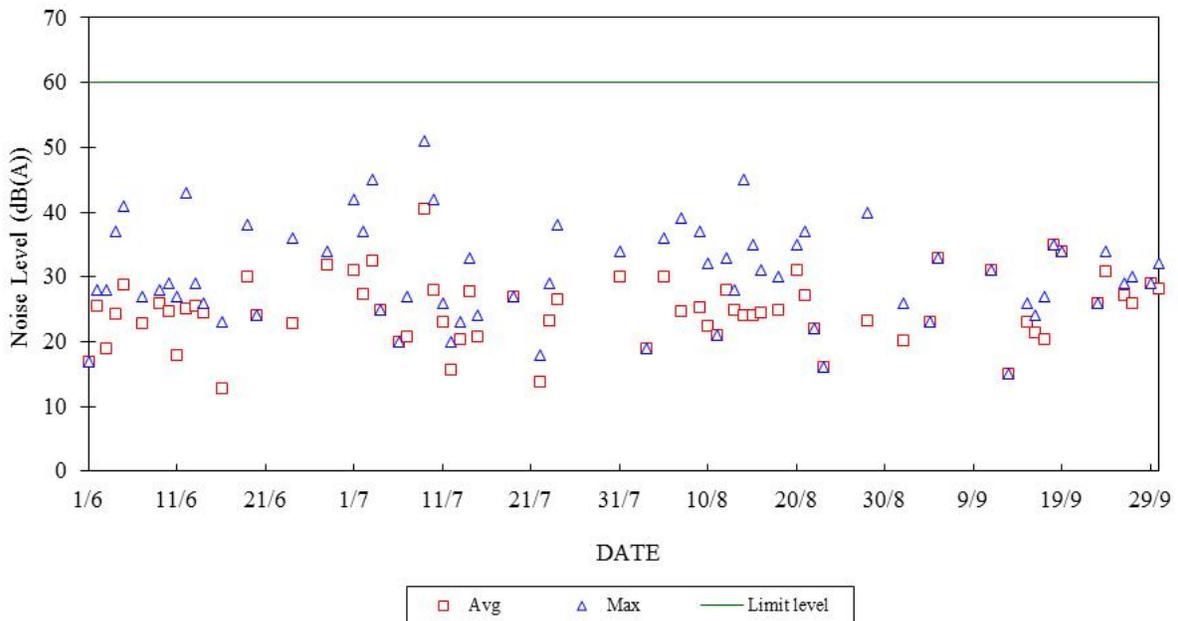
NSR at School within Tai Wan San Tsuen  
07:00-19:00 hrs on Normal Weekdays



**Construction Noise Monitoring in June - September 2016**  
 NSR at Long Tsai Tsuen/Hung Shing Ye  
 07:00-23:00 hrs on Holidays and 19:00-23:00 hrs on All Other Days

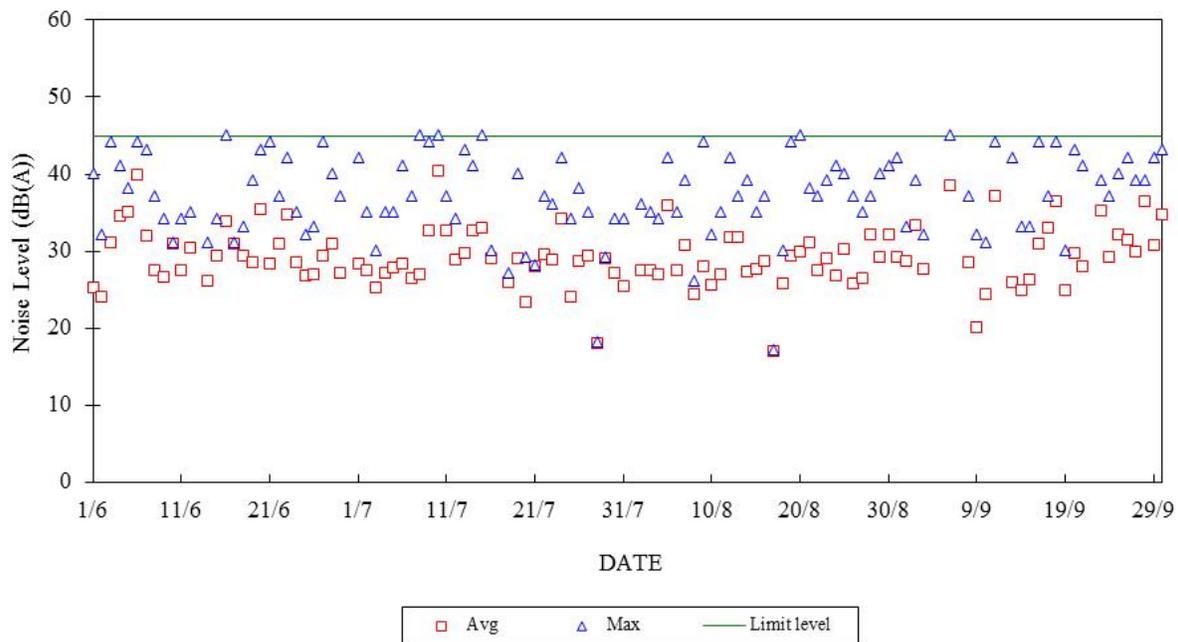


**Construction Noise Monitoring in June - September 2016**  
 NSR at School within Tai Wan San Tsuen  
 07:00-23:00 hrs on Holidays and 19:00-23:00 hrs on All Other Days



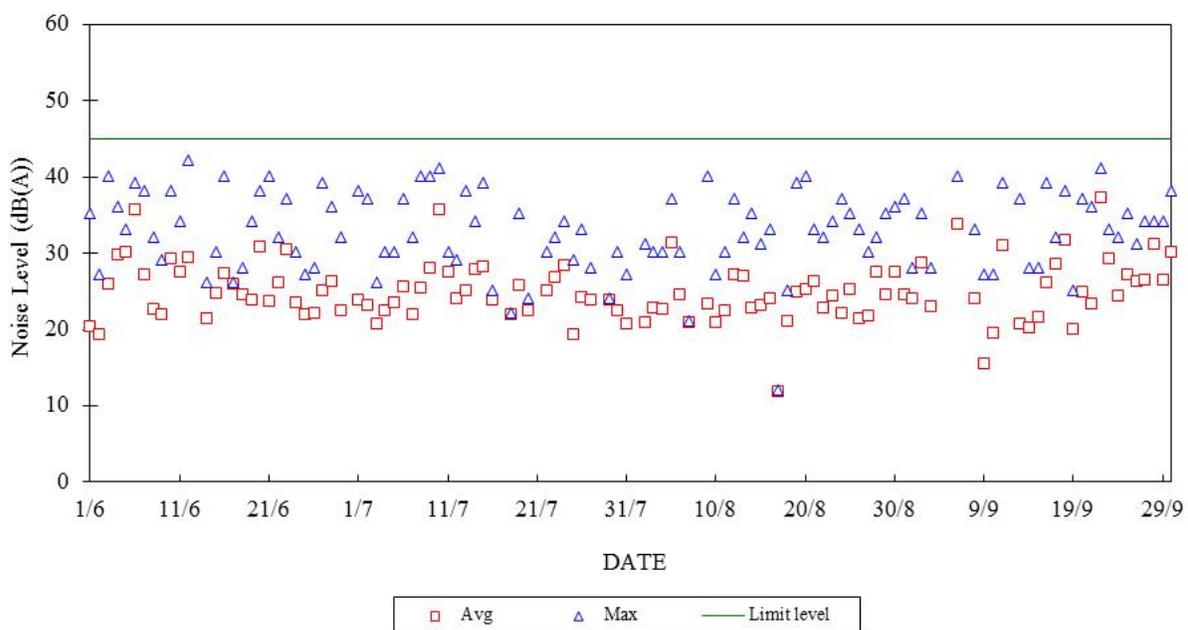
### Construction Noise Monitoring in June - September 2016

NSR at Long Tsai Tsuen/Hung Shing Ye  
23:00-07:00 hrs of Next Day



### Construction Noise Monitoring in June - September 2016

NSR at School within Tai Wan San Tsuen  
23:00-07:00 hrs of Next Day



# Appendix F

## The QA/QC Procedures and Results

**THE HONGKONG ELECTRIC CO., LTD.  
LAMMA POWER STATION EXTENSION  
TEOM CONTINUOUS DUST MONITOR  
DATA QUALITY ASSURANCE LOG SHEET**

Month: September

Year: 2016

Reservoir (AM1)				
Date	Frequency (Hz) (240 – 275)	Operation Mode (Mode 4)	Main Flow (l/min) (2.70 – 3.30)	Bypass Flow (l/min) (12.30 – 15.04)
6/9/2016	258.499	4	2.98	13.57
12/9/2016	258.320	4	2.94	13.41
18/9/2016	257.866	4	2.94	13.39
24/9/2016	272.493	4	2.94	13.38
30/9/2016	271.475	4	2.95	13.46

East Gate (AM2)				
Date	Frequency (Hz) (240 – 275)	Operation Mode (Mode 4)	Main Flow (l/min) (2.70 – 3.30)	Bypass Flow (l/min) (12.30 – 15.04)
6/9/2016	257.476	4	2.99	13.64
12/9/2016	257.175	4	2.96	13.66
18/9/2016	256.491	4	2.95	13.43
24/9/2016	255.931	4	2.97	13.54
30/9/2016	256.416	4	2.99	13.63

Ash Lagoon (AM3)				
Date	Frequency (Hz) (240 – 275)	Operation Mode (Mode 4)	Main Flow (l/min) (0.90 – 1.10)	Bypass Flow (l/min) (14.10 – 17.20)
6/9/2016	263.488	4	1.00	15.69
12/9/2016	263.426	4	1.00	15.69
18/9/2016	263.251	4	1.00	15.69
24/9/2016	256.253	4	1.00	15.69
30/9/2016	255.940	4	1.00	15.69

Maintenance Record			
	Reservoir	East Gate	Ash Lagoon
TEOM Filter Exchange	✓	✓	✓
Clean TSP Inlet	✓	✓	✓
Replace flow in-line filter			
Pump Repair			
Leak Check	✓	✓	✓
Flow Audit	✓	✓	✓
Flow Controller Calibration			
A/C filter cleaning	✓	✓	✓

Remarks:

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---



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Prepared by :                     

Checked by :

HIGH VOLUME AIR SAMPLER  
SITE VISIT LOG SHEET

Site Name: RE Site No.: AM1  
 Date of visit: 19-9-2016 Hour of Visit: 10:00  
 Staff name: W.M. TAM / W.H. MAN HVAS S/N: 0131  
 Used filter paper no.: MH 26 New filter paper no.: MH 28  
 Type of filter: Glass-fibre

I. Ambient Conditions

Temperature,  $T_a = 305.9$  K Pressure,  $P_a = 1001.8$  mb

II. Correction of manometer reading

Calibration orifice No.	Manometer reading at site conditions corresponds to $Q_{STD} = 40$ ft <sup>3</sup> /min. (inch H <sub>2</sub> O)
1535(10/2015)	$-H_a = 17.93(T_a/P_a) = 5.47$

Manometer reading before calibration: 5.50  
 Adjustment of flow controller (Y/N): N  
 Manometer reading after calibration: N/A

Note: Tolerance Limit of HVAS flow: " 1.0 ft<sup>3</sup>/min. Corresponding limits for manometer : " 0.2 inch H<sub>2</sub>O

III. General Conditions of HVAS

/  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

IV. Remarks

/  
 \_\_\_\_\_  
 \_\_\_\_\_

Conducted by: W.M. TAM / W.H. MAN Checked by: pleo

HIGH VOLUME AIR SAMPLER  
SITE VISIT LOG SHEET

Site Name: EG Site No.: AM2  
 Date of visit: 19-9-2016 Hour of Visit: 14:30  
 Staff name: W.M. TAM/W.H. MAN HVAS S/N: 0132  
 Used filter paper no.: MH27 New filter paper no.: MH29  
 Type of filter: Glass-fibre

I. Ambient Conditions

Temperature,  $T_a = 306.5$  K Pressure,  $P_a = 1004.3$  mb

II. Correction of manometer reading

Calibration orifice No.	Manometer reading at site conditions corresponds to $Q_{STD} = 40$ ft <sup>3</sup> /min. (inch H <sub>2</sub> O)
1535(10/2015)	$-H_a = 17.93(T_a/P_a) = 5.47$

Manometer reading before calibration: 5.70  
 Adjustment of flow controller (Y/N): Y  
 Manometer reading after calibration: 5.50

Note: Tolerance Limit of HVAS flow: " 1.0 ft<sup>3</sup>/min. Corresponding limits for manometer : " 0.2 inch H<sub>2</sub>O

III. General Conditions of HVAS

/  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

IV. Remarks

Carbon brush replaced.  
 \_\_\_\_\_  
 \_\_\_\_\_

Conducted by: W.M. TAM/W.H. MAN Checked by: Alp.

MINI VOLUME AIR SAMPLER  
SITE VISIT LOG SHEET

Site Name: TYV Site No.: AM4

Date of visit: 19-9-2016 Hour of Visit: 15:30

Staff name: W.M. TAM/W.H. MAN MINIVOL S/N: 3393

Used filter paper no.: M051 New filter paper no.: M052

Type of filter: Cellulose / Glass-fibre  
(Delete as appropriate)

I. Calibration is performed by using Drycal DC-2 Flow Calibrator  
5 Sl/min set point is recommended

5.02 Before 5.02 After

II. General Service of Mini Vol Air Sampler

1. Clean Rotameter: ✓
2. Clean / replace Pump Valves: X
3. Clean / replace Pump Diaphragms: X
4. Clean Impaction Inlet: ✓
5. Replace Timer Battery Every 6 months: X
6. Replace Inlet Filter: ✓

III. Remarks

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Conducted by: W.M. TAM/W.H. MAN

Checked by: Alex

THE HONGKONG ELECTRIC CO., LTD.  
LAMMA POWER STATION AND LAMMA EXTENSION  
NOISE MONITORING STATIONS  
SITE VISIT LOG SHEET

Location ~~Station Building Rooftop/Reservoir Area/Ching Lam/~~  
~~Ash Lagoon/No.2 Limestone Silo Roof/Hung Shing Ye\*~~

Date 21-9-2016 Time 10:30 hrs

Equipment B&K 2250 Serial No. 3008903

Staff Attended W.M.TAM | W.H.MAN

1. Calibration

Acoustic calibrator: B&K 4231 (SN: 27301119)

Noise level measured in calibration: 93.9 (94±1.0 dBA)

2. Weather Conditions

a. Sunny/~~fine~~/~~cloudy~~/~~showery~~/~~heavy rain~~\*

b. ~~Strong wind~~/~~breeze~~/~~calm~~\*

3. Beacon

Function normally (Yes/~~No~~): ✓

4. Remark/Observation

✓  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Note: \* - Please delete where inappropriate.

Conducted By: W.M.TAM | W.H.MAN Checked By: Terena Chu

THE HONGKONG ELECTRIC CO., LTD.  
LAMMA POWER STATION AND LAMMA EXTENSION  
NOISE MONITORING STATIONS  
SITE VISIT LOG SHEET

Location ~~Station Building Rooftop/Reservoir Area/Ching Lam/~~  
~~Ash Lagoon/No.2 Limestone Silo Roof/Hung Shing Ye\*~~

Date 22-9-2016 Time 10:40 hrs

Equipment B&K 2250 Serial No. 3008621

Staff Attended W.M. TAM / W.H. MAN

1. Calibration

Acoustic calibrator: B&K 4231 (S/N 2730419)

Noise level measured in calibration: 93.8 (94±1.0 dBA)

2. Weather Conditions

a. ~~Sunny/fine/cloudy/showery/heavy rain\*~~

b. ~~Strong wind/breeze/calm\*~~

3. Beacon

Function normally (Yes/~~No~~): /

4. Remark/Observation

/  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Note: \* - Please delete where inappropriate.

Conducted By: W.M. TAM / W.H. MAN Checked By: Teresa Chan

## Appendix G Event/Action Plans

Table G.1 Event and Action Plans for Air Quality

Event	Monitoring		Action	
	ET Leader	IEC	Engineer	Contractor
<b>Action Level</b>				
Exceedance of one sample	Identify source Inform Engineer and IEC verbally Repeat measurement to confirm finding	Check monitoring data submitted by ET and advise Engineer.	Notify Contractor Checking monitoring data and contractor's working methods	Rectify any unacceptable practice amend any working methods if appropriate
Exceedance of two or more consecutive samples	Identify source Inform Engineer and IEC verbally Repeat measurement to confirm finding Increase monitoring frequency Discuss with Engineer and Contractor on remedial actions required If exceedance continues, arrange meeting with Engineer If exceedance stops, discontinue additional monitoring	Check monitoring data submitted by ET and advise Engineer. Provide feedback to the Engineer on the remedial actions proposed by the ET / Contractor Advise Engineer on the effectiveness of the proposed remedial measures Verify the implementation of the remedial measures	Confirm receipt of notification of failure in writing Notify contractor Checking monitoring data and contractor's working methods Discuss proposed remedial actions with the ET and Contractor Ensure remedial actions properly implemented	Submit proposals for remedial actions to Engineer within 3 working days of notifications Implement the agreed proposals Amend proposal if appropriate
<b>Limit level</b>				
Exceedance of one sample	Repeat measurement to confirm finding. Identify the source(s) of the impact. If the exceedance is found to be valid and due to the Construction works, verbally advise the Contractor, Engineer and IEC, and inform the EPD of the exceedance, as soon as practicable. Increase monitoring frequency to daily Assess the effectiveness of the contractor's remedial actions and keep Engineer, IEC and EPD informed of the results	Check monitoring data submitted by ET and advise Engineer Provide feedback to the Engineer on the remedial actions proposed by the ET / Contractor Advise Engineer on the effectiveness of the proposed remedial measures Verify the implementation of the remedial measures	Confirm receipt of notification of failure in writing Notify Contractor Checking monitoring data and Contractor's working method Discuss with ET and Contractor on remedial actions to be provided Ensure remedial measures properly implemented	Take immediate action to avoid further exceedance Submit proposals for remedial actions to Engineer within 3 working days of notifications Implement the agreed proposals Amend proposal if appropriate
Exceedance of two or more	Identify source	Provide feedback to the Engineer on the remedial actions proposed by the	Confirm receipt of notification of	Take immediate action to

Event	Monitoring			Action		
	ET Leader	IEC	Engineer	Contractor		
consecutive samples	<p>If the exceedance is found to be valid and due to the construction works, verbally advise the Contractor, Engineer and IEC, and inform the EPD of the exceedance as soon as practicable.</p> <p>Repeat measurement to confirm finding</p> <p>Increase monitoring frequency to daily</p> <p>Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented</p> <p>Arrange meeting with Engineer and Contractor to discuss the remedial actions to be taken</p> <p>If exceedance stops, discontinue additional monitoring</p>	<p>ET / Contractor</p> <p>Advise Engineer on the effectiveness of the proposed remedial measures</p> <p>Verify the implementation of the remedial measures</p>	<p>failure in writing</p> <p>Checking monitoring data and Contractor's working methods</p> <p>Notify Contractor</p> <p>Discuss proposed remedial actions with ET and Contractor</p> <p>Ensure remedial measures properly implemented</p> <p>If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop the portion of work until the exceedance is abated</p>	<p>avoid further exceedance</p> <p>Submit proposals for remedial actions to Engineer within 3 working days of notifications</p> <p>Implement the agreed proposals</p> <p>Resubmit proposals if problem still not under control</p> <p>Stop the relevant portion of works as determined by the Engineer until the exceedance is abated</p>		

Table G.2 Event and Action Plans for Construction Noise

Exceedance	ET Leader	IEC	Engineer	Contractor
<b>Action Level</b>	Undertake noise measurement/check monitoring data to establish validity of complaint.	Review the analysed results submitted by the ET.	Notify Contractor of the complaint if proven.	Submit proposals for remedial actions to Engineer.
	If the complaint is valid, inform Engineer and IEC verbally.	Review the remedial measures proposed by the Contractor and advise the Engineer and ET accordingly.	Check Contractor's working methods and advise IEC and ET accordingly.	Amend proposals if required by the Engineer.
	Identify the source(s) of the noise.	Verify the implementation of the remedial measures.	Remind the Contractor of his contractual obligations and discuss remedial actions.	Implement the remedial actions immediately upon instruction from the Engineer.
	Discuss remedial actions required with Contractor and Engineer.		Keep the Contractor informed of the efficacy of remedial actions.	Liaise with the Engineer to optimise the effectiveness of the agreed mitigation.
	Increase manual monitoring frequency to assess efficacy of remedial measures.			
	If exceedance continues, review implementation of appropriate mitigation measures.			
<b>Limit Level</b>	Repeat manual measurement/check monitoring data to confirm findings.	Agree potential remedial actions with Engineer, ET and Contractor.	Notify Contractor of exceedance.	Take immediate action to avoid further exceedance.
	Identify the source(s) of the impact. If the exceedance is found to be valid and due to the Construction works, verbally advise the Contractor, Engineer and IEC, and inform the EPD of the exceedance, as soon as practicable.	Review Contractor's remedial actions / measures to ensure their effectiveness and advise the Engineer and ET accordingly.	Check Contractor's working methods and advise IEC and ET accordingly.  Discuss with Contractor the remedial actions to be implemented.	Submit proposals for remedial actions to Engineer.  Amend proposals if required by the Engineer.
	Discuss remedial actions required with Engineer.	Verify the implementation of the remedial measures	Keep the Contractor informed of the efficacy of remedial actions. If the exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop the portion of work until the exceedance is abated	Implement remedial actions immediately upon instruction from the Engineer. If the exceedance continues, consider what portion of the work is responsible and, as instructed by the Engineer, stop the portion of work until the exceedance is abated
	Increase manual monitoring frequency to assess efficacy of remedial measures.			

Table G.3 Event and Action Plans for Water Quality

<b>Exceedance</b>	<b>ET Leader</b>	<b>IEC</b>	<b>Engineer</b>	<b>Contractor</b>
Action level exceeded on one sampling day	Verbally inform the Contractor, and IEC. Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with Engineer and Contractor; Repeat measurement on next day of exceedance.	Provide feedback to the Engineer on the remedial actions proposed by the ET / Contractor Advise Engineer on the effectiveness of the proposed remedial measures Verify the implementation of the remedial measures	Discuss with Contractor the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures.	Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Propose and discuss mitigation measures with Engineer; Implement the agreed mitigation measures.
Action level exceeded on more than one consecutive sampling day	Repeat in-situ measurements to confirm findings; Identify source(s) of impact; Inform Contractor and IEC; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measure with Engineer and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance.	Provide feedback to the Engineer on the remedial actions proposed by the ET / Contractor Advise Engineer on the effectiveness of the proposed remedial measures Verify the implementation of the remedial measures	Discuss with ET and Contractor on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures.	Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Propose mitigation measures to Engineer within 3 working days and discuss with ET and Engineer; Implement the agreed mitigation measures.
Limit level exceeded on one sampling day	Verbally inform the Contractor, IEC and the EPD of the exceedance; Repeat in-situ measurement to confirm findings; Identify source(s) of impact; Check monitoring data, all plant,	Provide feedback to the Engineer on the remedial actions proposed by the ET / Contractor Advise Engineer on the effectiveness of the proposed remedial measures Verify the implementation of the remedial measures	Discuss with Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the	Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Propose mitigation measures to Engineer

<b>Exceedance</b>	<b>ET Leader</b>	<b>IEC</b>	<b>Engineer</b>	<b>Contractor</b>
	<p>equipment and Contractor's working methods;</p> <p>Discuss mitigation measure with Engineer 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>implemented mitigation measures.</p>	<p>within 3 working days and discuss with Engineer;</p> <p>Implement the agreed mitigation measures.</p>
<p>Limit level exceeded by more than one consecutive sampling day</p>	<p>Repeat in-situ measurement to confirm findings;</p> <p>Identify source(s) of impact;</p> <p>Inform Contractor, IEC and EPD;</p> <p>Check monitoring data, all plant, equipment and Contractor's working methods;</p> <p>Discuss mitigation measure with Engineer 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>Provide feedback to the Engineer on the remedial actions proposed by the ET / Contractor</p> <p>Advise Engineer on the effectiveness of the proposed remedial measures</p> <p>Verify the implementation of the remedial measures</p>	<p>Discuss with 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 works until no exceedance of the Limit Level.</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; Consider changes of working methods;</p> <p>Propose mitigation measures to Engineer within 3 working days and discuss with Engineer;</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</p>

## **Appendix H Summary of Site Audit Findings**

### Dates of Inspection

02/09/2016, 09/09/2016, 17/09/2016, 23/09/2016 and 28/09/2016.

### Summary of Findings

#### *General*

- No environmental deficiency identified.

#### *Air Quality*

- No environmental deficiency identified.

#### *Noise*

- No environmental deficiency identified.

#### *Water Quality*

- No environmental deficiency identified.

#### *Waste Management*

- No environmental deficiency identified.

## Summary of EMIS

### Power Station – (Part B of EIA Report)

#### Construction Phase Mitigation Measures and their Implementation

EM&A Log Ref.	Mitigation Measures	Implementation Status
	<b>AIR QUALITY</b>	
A1	For general construction works, the dust control measures stipulated under the Air Pollution Control (Construction Dust) Regulation shall be complied with, such as: <ul style="list-style-type: none"> <li>the haul roads shall be sprayed with water to keep the entire road surface wet.</li> <li>the load carried by vehicle shall be covered by impervious sheeting to ensure no leakage of dusty materials from the vehicle.</li> <li>the heights from which fill materials are dropped shall be controlled to a practical level to minimise the fugitive dust arising from unloading.</li> </ul>	C C C
A2	For the concrete batching plant, the following control measures are recommended: <ul style="list-style-type: none"> <li>loading, unloading, handling, transfer or storage of any dusty materials shall be carried out in a totally enclosed system.</li> <li>The materials which may generate airborne dust emissions shall be wetted by water spray system.</li> <li>All receiving hoppers shall be enclosed on three sides up to 3m above unloading point.</li> <li>All conveyor transfer points shall be totally enclosed.</li> </ul>	C C C C
	<b>WATER QUALITY</b>	
B1	Silt curtains shall be installed on the eastern, southern and north western sides of the reclamation site during dredging for the reclamation construction. This is a required mitigation measure for the construction works and shall be implemented prior to the commencement of bulk dredging. **	N/A
B3	As a necessary operational constraint combined bulk dredging and sand filling for site formation shall not be permitted at any time. In addition, sand filling for site platform shall take place behind constructed sea walls which pierce the water surface. **	N/A
B4	HEC shall ensure design to divert all storm drains away from Hung Shing Ye Bay. **	N/A
B5	Sand fill for the rubble mound seawalls shall be placed by controlled pumping down the trailer arm. **	N/A
B6	EM&A shall confirm the acceptability of any impacts during construction and should any unacceptable impacts be found then one or more of the following mitigation measures shall be implemented: ** <ul style="list-style-type: none"> <li>reducing the number of dredgers working at any one time;</li> <li>reducing the rate of working of the dredgers;</li> <li>temporary suspension of operations;</li> <li>phasing of the works so that dredging / filling is only undertaken at certain stages of the tidal cycle.</li> </ul>	N/A

EM&A Log Ref.	Mitigation Measures	Implementation Status
B7	<p>In addition to the above specific measures the following general working procedures shall be adopted. **</p> <ul style="list-style-type: none"> <li>• fully-enclosed or watertight grabs shall be used to minimise loss of sediment during the raising of loaded grabs through the water column;</li> <li>• the descent speed of grabs shall be controlled to minimise the seabed impact speed and to reduce the volume of over dredging;</li> <li>• barges shall be loaded carefully to avoid splashing of material;</li> <li>• all barges used for the transport of dredged materials shall be fitted with tight bottom seals in order to prevent leakage of material during loading and transport;</li> <li>• all barges shall be filled to a level which ensures that material does not spill over during loading and transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action;</li> <li>• the speed of trailer dredgers shall be controlled to prevent propeller wash from stirring up the sea bed sediments;</li> <li>• "rainbowing" sand fill from trailer dredgers shall not be permitted; and</li> <li>• the works shall cause no visible foam, oil, grease or litter or other objectionable matter to be present in the water within and adjacent to the dredging site and along the route to the disposal site.</li> </ul>	          
B8	<p>Cumulative impacts shall be assessed through EM&amp;A. Co-ordination with the EM&amp;A consultants for other projects to determine if any exceedances are caused by the other projects or by HEC's activities. Should monitoring results indicate exceedances at sensitive receivers due to HEC's activities, then the above described mitigation measures shall be implemented until impacts reduce to acceptable levels. **</p>	N/A
<b>NOISE</b>		
C1	General noise mitigation measures shall be employed at all work sites throughout the construction phase.	C
C2	Mitigate against general construction noise during Sunday's and public holidays, either at source with portable noise barriers, or by rescheduling of some PME's to less sensitive time periods.	C
C3	Mitigate against night time noise from dredging equipment, with silencers or mufflers. **	N/A
<b>LANDSCAPE &amp; VISUAL IMPACTS</b>		
D1	<p>The following mitigation measures shall be allowed for landscape and visual improvement:</p> <ul style="list-style-type: none"> <li>• Use rubble mound seawall along south and west edges of the reclamation to provide a more natural look.</li> <li>• Break the mass of main buildings by varying the height/division into smaller units.</li> <li>• Plant trees and vegetation for screening.</li> <li>• Adopt colour scheme to blend the buildings into the scenery.</li> </ul>	    

EM&A Log Ref.	Mitigation Measures	Implementation Status
<b>WASTE MANAGEMENT</b>		
E1	HEC to submit a Waste Management Plan for the construction phase to EPD. The Plan shall be verified by the IEC and shall describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities and shall take into account the recommendations of the EIA report.	C
<i>Dredging Waste</i>		
E2	All vessels for marine transportation of dredged sediment shall be fitted with tight fitting seals to their bottom openings to prevent leakage of materials. In addition, loading of barges and hoppers shall be controlled to prevent splashing of dredged material into the surrounding water, and barges or hoppers should under no circumstances be filled to a level which shall cause the overflowing of materials or polluted water during loading or transportation**	N/A
<i>Storage, Collection and Transport of Waste</i>		
E3	<ul style="list-style-type: none"> <li>• Minimise windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers.</li> </ul>	C
	<ul style="list-style-type: none"> <li>• Obtain the necessary waste disposal permits from the appropriate authorities, if they are required, in accordance with the Waste Disposal Ordinance (Cap.354), Waste Disposal (Chemical Waste) (General) Regulation (Cap.354), the Crown Land Ordinance (Cap 28), Dumping at Sea Ordinance (Cap 466) and Work Branch Technical Circular No. 22/92, Marine Disposal of Dredged Mud.</li> </ul>	C
	<ul style="list-style-type: none"> <li>• Disposal of waste at Licensed sites;</li> </ul>	C
	<ul style="list-style-type: none"> <li>• Develop procedures such as a ticketing system to facilitate tracking of marine mud and chemical waste, and to ensure that illegal disposal does not occur;</li> </ul>	C
	<ul style="list-style-type: none"> <li>• Segregate and sort the waste materials into 3 categories:               <ul style="list-style-type: none"> <li>• public fill (e.g. concrete and rubble) for re-use on-site or disposal at a public filling area;</li> <li>• re-use and/or recycling waste (e.g. steel and other metals);</li> <li>• waste which cannot be re-used and/or recycled (e.g. wood, glass and plastic) for landfill disposal.</li> </ul> </li> <li>• The sorting process shall be carefully monitored to avoid missing of the 3 categories. Different types of wastes shall be stockpiled and stored in different containers or skips to enhance re-use or recycling of materials and their proper disposal.</li> </ul>	C
<ul style="list-style-type: none"> <li>• Maintain records of the quantities of wastes generated and disposed off-site for each category of waste.</li> </ul>	C	
E4	Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes	C
<b>LAND CONTAMINATION</b>		
F1	No land Contamination mitigation measures are required during the construction phase.	N/A
<b>MARINE ECOLOGY</b>		

<b>EM&amp;A Log Ref.</b>	<b>Mitigation Measures</b>	<b>Implementation Status</b>
G1	All percussive piling works shall be conducted on reclaimed land to avoid noise impact to marine mammals**	N/A
G2	All construction related vessels shall approach the extension site from the north and via the East Lamma Channel to avoid disturbance to the finless porpoise**	N/A
G3	Rubble mound seawall to the south and west edges of the reclamation to enhance recolonisation of marine organisms**	N/A
G4	Artificial Reefs of a volume not less than 400 m <sup>3</sup> shall be deployed in a location to be decided upon consultation with the Director of Agriculture and Fisheries to serve the purpose of an Additional Habitat Enhancement Measure.**	N/A
<b>FISHERIES</b>		
H1	No Fisheries-specific mitigation measures are required during the construction phase.	N/A
<b>RISK ASSESSMENT</b>		
I1	No risk mitigation measures are required during the construction phase.	N/A

## Remarks:

- \*\* - No dredging and reclamation work would be involved for L10 construction
- C - Compliance with mitigation measure
- NC - Non-compliance with mitigation measure
- N/A - Not Applicable

**SUNLEY ENGINEERING & CONSTRUCTION CO., LTD.**

**Contract No. 15/8009 - Lamma Power Station Extension Foundation Works for Unit L10**

**Master Programme Revision 1**

ID	Item	Task Name	Duration	Start	Finish			
						M10	M11	M12
						10月	11月	12月
1		<b>1 Key Date</b>	<b>486 days</b>	<b>2016/1/1</b>	<b>2017/4/30</b>			
2	1.1	Commencement date	0 days	2016/1/1	2016/1/1			
3	1.2	Duration of works	486 days	2016/1/1	2017/4/30			
4	1.3	Possession date	0 days	2016/1/1	2016/1/1			
5	1.4	Completion of the Contract	0 days	2017/4/30	2017/4/30			
6								
7		<b>2 Total Contract Period</b>	<b>486 days</b>	<b>2016/1/1</b>	<b>2017/5/1</b>			
8								
9		<b>2.1 Preliminaries</b>	<b>37 days</b>	<b>2016/1/1</b>	<b>2016/2/6</b>			
10	2.1.1	Coordination with utility companies	14 days	2016/1/1	2016/1/14			
11	2.1.2	Condition survey	20 days	2016/1/1	2016/1/20			
12	2.1.3	Notification of commencement of works to Labour Department	7 days	2016/1/1	2016/1/7			
13	2.1.4	Notification of air pollution control for commencement of works to EPD	7 days	2016/1/1	2016/1/7			
14	2.1.5	Application of water discharge licence from EPD	7 days	2016/1/1	2016/1/7			
15	2.1.6	Application for billing account for disposal of construction waste from EPD	7 days	2016/1/1	2016/1/7			
16	2.1.7	CCTV for existing underground drainage pipe around site boundary	21 days	2016/1/1	2016/1/21			
17	2.1.8	Utility detection for existing underground cables	20 days	2016/1/1	2016/1/20			
18	2.1.9	Site clearance	21 days	2016/1/1	2016/1/21			
19	2.1.10	Erection of contractor's site office	21 days	2016/1/1	2016/1/21			
20	2.1.11	Installation of monitoring checkpoints	20 days	2016/1/18	2016/2/6			
21	2.1.12	Submission of BA10 for ELS & foundation works	0 days	2016/1/1	2016/1/1			
22								
23		<b>2.2 Section A</b>	<b>305 days</b>	<b>2016/1/1</b>	<b>2016/10/31</b>			
24		<b>2.2.1 Hoarding</b>	<b>90 days</b>	<b>2016/1/1</b>	<b>2016/3/30</b>			
25	2.2.1.1	Erection of Hoarding	90 days	2016/1/1	2016/3/30			
26		<b>2.2.2 Foundation Works at Unit L10</b>	<b>295 days</b>	<b>2016/1/11</b>	<b>2016/10/31</b>			
27		<b>2.2.2.1 Bored Pile - Temporary Steel Casing</b>	<b>56 days</b>	<b>2016/1/22</b>	<b>2016/3/17</b>			
28	2.2.2.1.1	Duration for delivery temporary steel casing	56 days	2016/1/22	2016/3/17			
29		<b>2.2.2.2 Bored Pile - Permanent Casing &amp; Double Wall Liner</b>	<b>172 days</b>	<b>2016/2/24</b>	<b>2016/8/13</b>			
30	2.2.2.2.1	Testing for double wall liner	0 days	2016/2/24	2016/2/24			
31	2.2.2.2.2	Duration for delivery permanent casing & double wall liner	160 days	2016/3/7	2016/8/13			
32		<b>2.2.2.3 Bored Pile - Plant Mobilization</b>	<b>56 days</b>	<b>2016/1/15</b>	<b>2016/3/11</b>			
33		<b>2.2.2.3.1 Crawler Crane</b>	<b>53 days</b>	<b>2016/1/15</b>	<b>2016/3/8</b>			
34	2.2.2.3.1.1	1st & 2nd set	0 days	2016/1/15	2016/1/15			
35	2.2.2.3.1.2	3rd set	0 days	2016/2/4	2016/2/4			
36	2.2.2.3.1.3	4th & 5th set	0 days	2016/2/19	2016/2/19			
37	2.2.2.3.1.4	6th set	0 days	2016/3/8	2016/3/8			
38		<b>2.2.2.3.2 Oscillator</b>	<b>35 days</b>	<b>2016/1/29</b>	<b>2016/3/4</b>			
39	2.2.2.3.2.1	1st & 2nd set	0 days	2016/1/29	2016/1/29			
40	2.2.2.3.2.2	3rd & 4th set	0 days	2016/2/24	2016/2/24			
41	2.2.2.3.2.3	5th set	0 days	2016/3/4	2016/3/4			
42		<b>2.2.2.3.3 RCD</b>	<b>7 days</b>	<b>2016/3/4</b>	<b>2016/3/11</b>			
43	2.2.2.3.3.1	1st & 2nd set	0 days	2016/3/4	2016/3/4			
44	2.2.2.3.3.2	3rd, 4th & 5th set	0 days	2016/3/11	2016/3/11			
45		<b>2.2.2.4 Predrilling</b>	<b>60 days</b>	<b>2016/1/11</b>	<b>2016/3/10</b>			
46	2.2.2.4.1	Predrilling works (38 nos.)	60 days	2016/1/11	2016/3/10			
47		<b>2.2.2.5 Bored Pile Construction</b>	<b>263 days</b>	<b>2016/2/12</b>	<b>2016/10/31</b>			
48	2.2.2.5.1	Bored pile construction (38 piles)	215 days	2016/2/12	2016/9/13			
49	2.2.2.5.2	Interface & sonic test	30 days	2016/8/25	2016/9/23			
50	2.2.2.5.3	Prepare & submit as-built record plan	7 days	2016/9/17	2016/9/23			
51	2.2.2.5.4	Submission of BA14	1 day	2016/9/23	2016/9/23			
52	2.2.2.5.5	Allow 14 days for selection of pile for concrete full core test	14 days	2016/9/24	2016/10/7			

Master Programme  
Revision 1

Task  Critical Task  Milestone  Summary 

SUNLEY ENGINEERING & CONSTRUCTION CO., LTD.

**Contract No. 15/8009 - Lamma Power Station Extension Foundation Works for Unit L10**

**Master Programme Revision 1**

ID	Item	Task Name	Duration	Start	Finish	Milestone		
						M10	M11	M12
						10月	11月	12月
53	2.2.2.5.6	Concrete full core test	14 days	2016/10/8	2016/10/21			
54	2.2.2.5.7	Compression test for concrete core	7 days	2016/10/22	2016/10/28			
55	2.2.2.5.8	Submission of log report & compression test report	4 days	2016/10/28	2016/10/31			
56	<b>2.2.2.6</b>	<b>Sheet Pile</b>	<b>92 days</b>	<b>2016/7/22</b>	<b>2016/10/21</b>			
57	2.2.2.6.1	Plant mobilization	0 days	2016/7/31	2016/7/31			
58	2.2.2.6.2	Delivery sheet pile material	0 days	2016/7/22	2016/7/22			
59	2.2.2.6.3	Installation of sheet pile - Type A (approx. 212 piles)	50 days	2016/8/1	2016/9/19			
60	2.2.2.6.4	Installation of sheet pile - Type B (approx. 100 piles)	24 days	2016/9/20	2016/10/13			
61	2.2.2.6.5	Prepare & submit as-built record plan	7 days	2016/10/14	2016/10/20			
62	2.2.2.6.6	Submission of BA14	1 day	2016/10/21	2016/10/21			
63	2.2.2.7	Completion of foundation works at Unit L10	0 days	2016/10/31	2016/10/31			
64	<b>2.2.3</b>	<b>New Site Facilities</b>	<b>198 days</b>	<b>2016/1/1</b>	<b>2016/7/16</b>			
65	2.2.3.1	Submission for design of site office A	90 days	2016/1/1	2016/3/30			
66	2.2.3.2	Approval for design of site office A	28 days	2016/3/31	2016/4/27			
67	2.2.3.3	Erection of site office A	50 days	2016/4/28	2016/6/16			
68	2.2.3.4	Erection of wasing facilities with shelter & container shower facilities	20 days	2016/5/28	2016/6/16			
69	2.2.3.5	Installation of earthing	30 days	2016/6/7	2016/7/6			
70	2.2.3.6	Installation of portable water pipes	30 days	2016/6/17	2016/7/16			
71	2.2.3.7	Installation of sewage drain pipes	30 days	2016/6/17	2016/7/16			
72	2.2.3.8	Completion of new site facilities	0 days	2016/7/16	2016/7/16			
73	2.2.4	Completion of section A	0 days	2016/10/31	2016/10/31			
74	2.2.5	Demobilization of plants	0 days	2016/10/21	2016/10/21			
75	2.3	Handover of site works area for Section A	0 days	2016/11/1	2016/11/1			
76								
77	<b>2.4</b>	<b>Section B</b>	<b>121 days</b>	<b>2016/1/1</b>	<b>2016/4/30</b>			
78	<b>2.4.1</b>	<b>Ground Treatment Works</b>	<b>121 days</b>	<b>2016/1/1</b>	<b>2016/4/30</b>			
79	2.4.1.1	Verification GI works (approx. 20 nos.)	14 days	2016/2/20	2016/3/4			
80	2.4.1.2	Plant mobilization	55 days	2016/1/1	2016/2/24			
81	2.4.1.3	Trial installation of band drain	5 days	2016/2/25	2016/2/29			
82	2.4.1.4	Installation of band drain (approx. 2477 nos.)	45 days	2016/3/1	2016/4/14			
83	2.4.1.5	Installation of steel plate & geotextile on existing U-channel	20 days	2016/3/28	2016/4/16			
84	2.4.1.6	Filling of surcharge (approx. 21000 m3)	20 days	2016/4/7	2016/4/26			
85	2.4.1.7	Installation of ground settlement markers	10 days	2016/4/21	2016/4/30			
86	2.4.2	Completion of section B	0 days	2016/4/30	2016/4/30			
87								
88	<b>2.5</b>	<b>Section C</b>	<b>229 days</b>	<b>2016/9/14</b>	<b>2017/4/30</b>			
89	<b>2.5.1</b>	<b>Hoarding</b>	<b>45 days</b>	<b>2016/11/1</b>	<b>2016/12/15</b>			
90	2.5.1.1	Erection of Hoarding	45 days	2016/11/1	2016/12/15			
91	<b>2.5.2</b>	<b>Foundation Works at 275kV Substation Building</b>	<b>229 days</b>	<b>2016/9/14</b>	<b>2017/4/30</b>			
92	2.5.2.1	Early start milestone	0 days	2016/10/6	2016/10/6			
93	<b>2.5.2.2</b>	<b>Bored Pile - Temporary Steel Casing</b>	<b>7 days</b>	<b>2016/9/14</b>	<b>2016/9/20</b>			
94	2.5.2.2.1	Duration for delivery temporary steel casing	7 days	2016/9/14	2016/9/20			
95	<b>2.5.2.3</b>	<b>Bored Pile - Permanent Casing &amp; Double Wall Liner</b>	<b>120 days</b>	<b>2016/9/26</b>	<b>2017/1/23</b>			
96	2.5.2.3.1	Duration for delivery permanent casing & double wall liner	120 days	2016/9/26	2017/1/23			
97	<b>2.5.2.4</b>	<b>Bored Pile - Plant Mobilization</b>	<b>14 days</b>	<b>2016/10/1</b>	<b>2016/10/15</b>			
98	<b>2.5.2.4.1</b>	<b>Crawler Crane</b>	<b>0 days</b>	<b>2016/10/1</b>	<b>2016/10/1</b>			
99	2.5.2.4.1.1	1st & 2nd set	0 days	2016/10/1	2016/10/1			
100	<b>2.5.2.4.2</b>	<b>Oscillator</b>	<b>0 days</b>	<b>2016/10/5</b>	<b>2016/10/5</b>			
101	2.5.2.4.2.1	1st & 2nd set	0 days	2016/10/5	2016/10/5			
102	<b>2.5.2.4.3</b>	<b>RCD</b>	<b>0 days</b>	<b>2016/10/15</b>	<b>2016/10/15</b>			
103	2.5.2.4.3.1	1st & 2nd set	0 days	2016/10/15	2016/10/15			
104	<b>2.5.2.5</b>	<b>Predrilling</b>	<b>21 days</b>	<b>2016/11/1</b>	<b>2016/11/21</b>			

Master Programme  
Revision 1

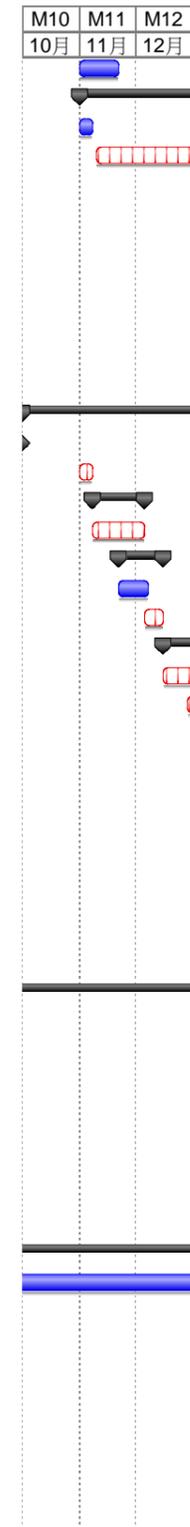
Task Critical Task Milestone Summary

SUNLEY ENGINEERING & CONSTRUCTION CO., LTD.

**Contract No. 15/8009 - Lamma Power Station Extension Foundation Works for Unit L10**

**Master Programme Revision 1**

ID	Item	Task Name	Duration	Start	Finish
105	2.5.2.5.1	Predrilling works (10 nos.)	21 days	2016/11/1	2016/11/21
106	<b>2.5.2.6</b>	<b>Bored Pile</b>	<b>181 days</b>	<b>2016/11/1</b>	<b>2017/4/30</b>
107	2.5.2.6.1	Installation of monitoring checkpoints	7 days	2016/11/1	2016/11/7
108	2.5.2.6.2	Bored pile construction (10 piles)	125 days	2016/11/10	2017/3/14
109	2.5.2.6.3	Interface & sonic test	20 days	2017/3/9	2017/3/28
110	2.5.2.6.4	Prepare & submit as-built record plan	7 days	2017/3/22	2017/3/28
111	2.5.2.6.5	Submission of BA14	1 day	2017/3/28	2017/3/28
112	2.5.2.6.6	Allow 14 days for selection of pile for concrete full core test	14 days	2017/3/29	2017/4/11
113	2.5.2.6.7	Concrete full core test	10 days	2017/4/12	2017/4/21
114	2.5.2.6.8	Compression test for concrete core	7 days	2017/4/21	2017/4/27
115	2.5.2.6.9	Submission of log report & compression test report	4 days	2017/4/27	2017/4/30
116	2.5.2.7	Completion of foundation works at 275kV substation building	0 days	2017/4/30	2017/4/30
117	<b>2.5.3</b>	<b>Trial Pile</b>	<b>212 days</b>	<b>2016/10/1</b>	<b>2017/4/30</b>
118	2.5.3.1	Early start milestone	0 days	2016/10/1	2016/10/1
119	2.5.3.2	Submission of BA10 for trial pile	7 days	2016/11/1	2016/11/7
120	<b>2.5.3.3</b>	<b>Predrilling</b>	<b>28 days</b>	<b>2016/11/8</b>	<b>2016/12/5</b>
121	2.5.3.3.1	Predrilling works (3 nos.)	28 days	2016/11/8	2016/12/5
122	<b>2.5.3.4</b>	<b>Ground Instrumentation</b>	<b>24 days</b>	<b>2016/11/22</b>	<b>2016/12/15</b>
123	2.5.3.4.1	Installation of magnetic extensometer in predrilled hole (3 nos.)	16 days	2016/11/22	2016/12/7
124	2.5.3.4.2	Installation of settlement plate	10 days	2016/12/6	2016/12/15
125	<b>2.5.3.5</b>	<b>Construction of Trial Pile</b>	<b>136 days</b>	<b>2016/12/16</b>	<b>2017/4/30</b>
126	2.5.3.5.1	Installation of trial pile (6 piles)	84 days	2016/12/16	2017/3/9
127	2.5.3.5.2	Dynamic pile test	72 days	2016/12/29	2017/3/10
128	2.5.3.5.3	Static load test	42 days	2017/3/11	2017/4/21
129	2.5.3.5.4	Prepare & submit as-built record plan	7 days	2017/4/17	2017/4/23
130	2.5.3.5.5	Submission of BA14	1 day	2017/4/23	2017/4/23
131	2.5.3.5.6	Cut off the piles to level +3.0mPD	7 days	2017/4/24	2017/4/30
132	2.5.3.6	Completion of trial pile	0 days	2017/4/30	2017/4/30
133	2.5.4	Completion of section C	0 days	2017/4/30	2017/4/30
134	2.5.5	Demobilization of plants	0 days	2017/4/30	2017/4/30
135	2.6	Handover of site works area for Section C	0 days	2017/5/1	2017/5/1
136					
137	<b>2.7</b>	<b>Section D</b>	<b>383 days</b>	<b>2016/1/15</b>	<b>2017/1/31</b>
138	<b>2.7.1</b>	<b>General Site Works</b>	<b>36 days</b>	<b>2016/3/1</b>	<b>2016/4/5</b>
139	2.7.1.1	Cable duct & draw pit	21 days	2016/3/1	2016/3/21
140	2.7.1.2	Reloaction of lamp pole (5 poles)	20 days	2016/3/17	2016/4/5
141	<b>2.7.2</b>	<b>G.I. Works</b>	<b>99 days</b>	<b>2016/3/4</b>	<b>2016/6/10</b>
142	2.7.2.1	Submission of BA10 for G.I. works	7 days	2016/3/4	2016/3/10
143	2.7.2.2	Carry out G.I. works (11 nos.)	85 days	2016/3/11	2016/6/3
144	2.7.2.3	Prepare & submit as-built record plan	7 days	2016/6/4	2016/6/10
145	2.7.2.4	Submission of BA14	1 day	2016/6/10	2016/6/10
146	<b>2.7.3</b>	<b>Ground Treatment Time</b>	<b>276 days</b>	<b>2016/5/1</b>	<b>2017/1/31</b>
147	2.7.3.1	9 months for monitoring settlement after completion of ground treatment	276 days	2016/5/1	2017/1/31
148	<b>2.7.4</b>	<b>External Works</b>	<b>227 days</b>	<b>2016/1/15</b>	<b>2016/8/28</b>
149	2.7.4.1	Repair & make good site office B & existing latrines	90 days	2016/3/1	2016/5/29
150	2.7.4.2	Removal of the employer's materials stored in E6 area as instructed by the Engineer	90 days	2016/1/15	2016/4/13
151	2.7.4.3	Installation of bund wall of sandbags	60 days	2016/5/1	2016/6/29
152	2.7.4.4	Construction of new type 3 road	60 days	2016/6/30	2016/8/28
153	2.7.5	Completion of section D	0 days	2017/1/31	2017/1/31
154					
155	2.8	Contract completion	0 days	2017/4/30	2017/4/30



## Monthly Waste Flow Table for September 2016

Project: Foundation Works for Lamna Power Station Extension Unit L10

Contractor: Sunley Engineering & Construction Co Ltd

Record by: Andy Fan

Year of Record: 2016

MM.YYYY	Actual Quantities of Inert C&D Materials Generated Monthly								Actual Quantities of Non-inert C&D Materials Generated Monthly					
	Excavated Materials			Non-excavated Materials					Metals (steel bar / metal strip) <sup>(1)</sup>	Metals (aluminum can) <sup>(1)</sup>	Paper / cardboard packaging <sup>(1)</sup>	Plastics <sup>(1) &amp; (4)</sup>	Chemical waste (wasted lubricant oil/oil container)	Other, e.g. general refuse
	Disposed in Public Fill	Disposed in Sorting Facilities	Others (e.g Reused in the Contract / Other Projects)	Broken Concrete or Construction Waste Collected by Recycled Company	Reused in the Contract	Reused in other Projects	Disposed in Public Fill	Disposed in Sorting Facilities						
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	
Jan 2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb 2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.86
Mar-2016	2382.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50
Apr-16	3888.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.70
May-16	7139.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90
Jun-16	6095.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00
Jul-16	6122.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00
Aug-16	7009.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.76
Sep-16	7871.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.26
Total	40509.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.98

Total Inert C&D Waste Materials Generated	Non-inert C&D Materials		
	C&D Materials Recycled	C&D Waste Disposed of at Landfill	Chemical Waste
40509.91 tonnes	0 tonnes	27.98 tonnes	0 tonnes

Where (A) Inert C&D materials include bricks, concrete, building debris, rubble and excavated spoil. In total, 40509.91 tonnes of inert C&D material were generated from the Project, of which 0 tonnes were reused in this and other contracts, and the remaining 40509.91 tonnes were disposed as public fill to Fill Banks.

(b) Non-inert C&D materials (construction wastes) include metals, paper / cardboard packaging waste, plastics and other wastes such as general refuse. Metals generated from the Project were grouped into construction wastes as the materials were not disposed of with others at the public fill

(c) 0 kg of metals, 0 kg of papers/ cardboard packing and 0 kg of plastics were sent to recyclers for recycling during the reporting period.

(d) Construction wastes other than metals, paper/cardboard packaging, plastics and chemicals were disposed of at Landfill.

Notes:

- (1) metal, paper & plastic were collected by recycler
- (2) The performance target of waste recycling are specified in the Contract.
- (3) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- (4) Plastics refer to plastic bottles/ containers, plastic/ foam from packaging material.
- (5) Broken concrete for recycling into aggregates.
- (6) Disposal of inert waste to public fill or sorting facilities will NOT be considered as recycled waste.