

MTR Corporation Limited

West Island Line Project

Environmental Monitoring and Audit Report No.79

(March 2016)

Verified by:



Sam Tsoi

Position: Independent Environmental Checker

Date:

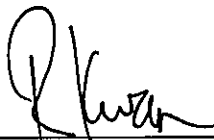
22 March 2016

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Certified by:  \_\_\_\_\_

Position: Environmental Team Leader

Date: 22 MAR 2016

## ***EXECUTIVE SUMMARY***

The West Island Line Project commenced on 10 July 2009. The EM&A programme for the West Island Line Project commenced on 10 August 2009, the commencement date of construction of the Project. This is the seventy ninth monthly Environmental Monitoring and Audit (EM&A) Report for West Island Line Project. This Report presents the results of EM&A works and the impact monitoring for the construction works undertaken during the period of 10 February 2016 to 9 March 2016. The major construction activities in the reporting period included entrance construction and reinstatement work of playground at Works Area L1. All the construction works for the WIL project had been substantially completed. Sai Ying Pun Station (SYP) Entrance B3 at Works Areas L1 is expected to open to public tentatively by the end of March 2016.

Impact monitoring for noise were conducted in accordance with the EM&A Manual in the reporting period, no exceedance was found and there was no breach of Limit Levels for noise monitoring.

No environmental notification of summon and prosecution was received in the reporting period. No environmental complaint relating to construction work was received in the reporting period.

Site inspections were conducted by the Environmental Team on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the Project. No non-conformance to the environmental requirements was identified by the Environmental Team in the reporting period.

The Environmental Permit (EP-313/2008/J) issued by EPD on 1 September 2014 is being used for the WIL Project.

In the reporting period, there was no reporting change of circumstances which may affect the compliance with the recommendations of the EIA Report.

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## 1 INTRODUCTION

### 1.1 Project Background

MTR Corporation Limited (MTRCL) proposed to build a new railway line, the West Island Line (WIL) which is an extension of the Island Line to the Western District. The route length of the fully underground WIL is approximately 3 km with three new underground stations namely Sai Ying Pun Station (SYP), HKU Station (HKU) and Kennedy Town Station (KET).

### 1.2 Project Programme

The West Island Line Project commenced on 10 July 2009. Commencement of construction was on 10 August 2009. The commencement of operation of the Project was on 28 December 2014. Both KET and HKU stations have been in service since 28 December 2014. Service of SYP station has also been in service since 28 March 2015, except the entrance B3.

### 1.3 Coverage of the EM&A Report

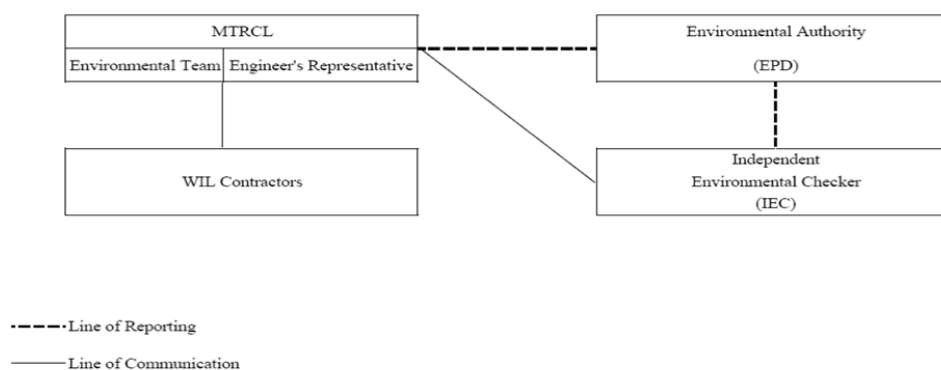
The EM&A programme for the West Island Line Project commenced on 10 August 2009. This is the seventy ninth Monthly Environmental Monitoring and Audit (EM&A) Report for the Project. This Report presents the results of EM&A works and the impact monitoring for the construction works undertaken during the period of 10 February 2016 to 9 March 2016.

## 2 PROJECT INFORMATION

### 2.1 Project Management Organization and Contact Details

The WIL Project organization chart is presented in Figure 1. Contacts of key environmental personnel of the Project are shown in Tables 1a, 1b and 1c respectively.

**Figure 1** Project Organization



**Table 1a** Contact List of Key Personnel for Project Management

| Organization                                                    | Name               | Telephone |
|-----------------------------------------------------------------|--------------------|-----------|
| <b>Engineer's Representative</b><br>Project Manager – WIL Civil | Mr. Stephen Hamill | 3411 9811 |
| <b>Independent Environmental Checker</b>                        | Mr. Sam Tsoi       | 2268 3208 |
| <b>Environmental Team</b><br>Environmental Team Leader          | Mr. Richard Kwan   | 2688 1283 |
| <b>Contact 704 Contractor</b><br>Project Director               | Mr. C.C. Hau       | 3559 9003 |

**Table 1b** Contact List of Key Personnel for Emergency Response

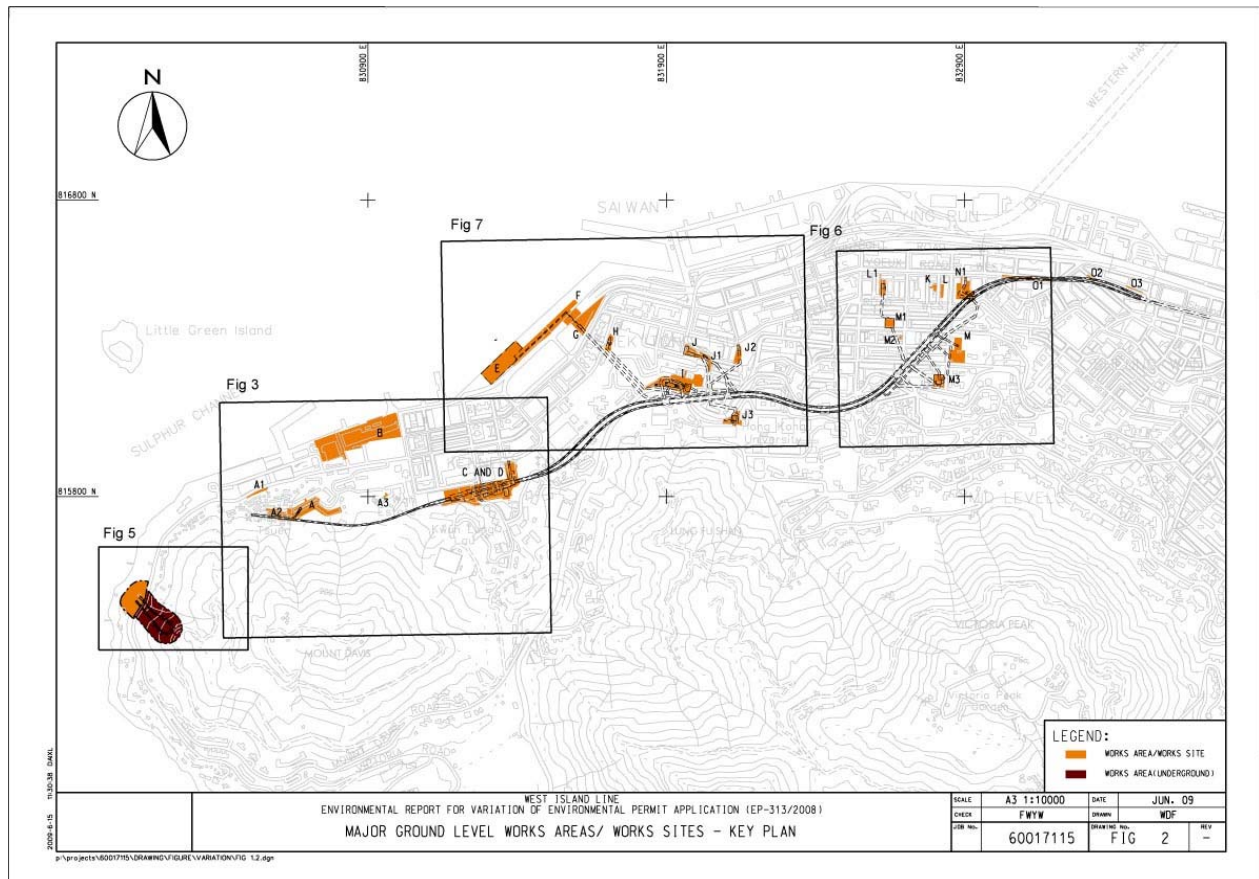
| Organization                                                               | Name                              | Telephone              |
|----------------------------------------------------------------------------|-----------------------------------|------------------------|
| <b>Engineer's Representative</b><br>Project Manager – WIL Civil            | Mr. Stephen Hamill                | 3411 9811              |
| <b>Independent Environmental Checker</b>                                   | Mr. Sam Tsoi                      | 2268 3208              |
| <b>Environmental Team</b><br>Environmental Team Leader                     | Mr. Richard Kwan                  | 2688 1283              |
| <b>Contact 704 Contractor</b><br>Project Director<br>Environmental Manager | Mr. C.C. Hau<br>Ms. Michelle Tang | 3559 9003<br>2496 6255 |

**Table 1c** Contact List of Environmental Authority

| Organization                                                                            | Name             | Telephone |
|-----------------------------------------------------------------------------------------|------------------|-----------|
| <b>Environmental Protection Department</b><br>Sr Env Protection Offr(Metro Assessment)3 | Mr. Richard Wong | 2835 1128 |

## 2.2 Project Works Areas and Environmental Monitoring Locations

The WIL Project works areas and the locations of environmental monitoring stations in this reporting period are shown in Figures 2 and 6 respectively. Table 2 shows the details of the active monitoring stations as reported in Sections 3.1 and 3.2 below.

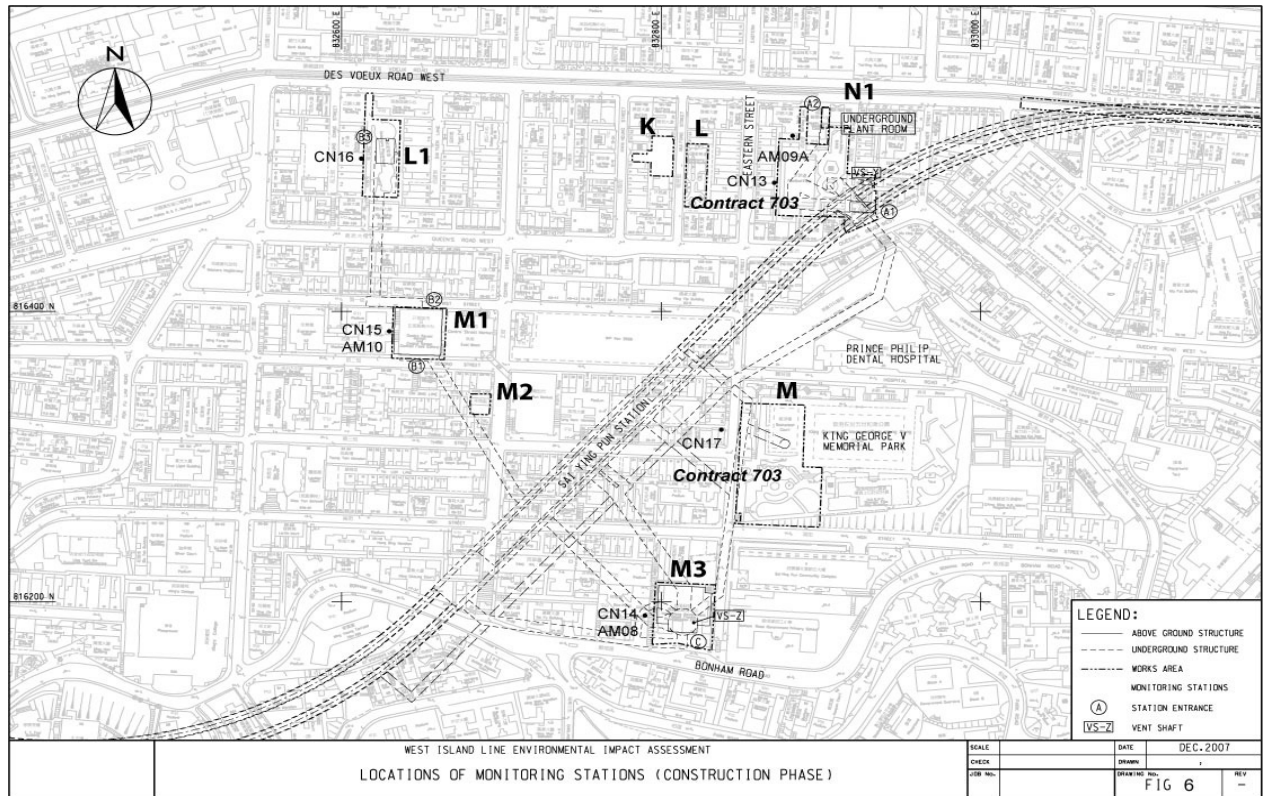


**Table 2** Summary of impact noise monitoring station

| ID   | Premise                    | Monitoring Location (Active)  |
|------|----------------------------|-------------------------------|
| CN16 | CN16- No.9-11 Ki Ling Lane | Building facing Works Area L1 |

**Note 1:** Final EM&A Report Part 1 approved by EPD on 11 August 2015 to terminate dust and noise monitoring for the WIL Project Works Areas except those for Works Areas B, L1, M1 and N1 after the WIL Operation.

**Note 2:** In view of completion of construction works for Works Area B, M1 and N1 in December 2015, no construction noise and air quality monitoring for the above areas will be conducted after this reporting month. A letter of notification to EPD has been issued on 15 January 2016.



### 2.3 Summary of EM&A Requirements

The EM&A programme requires environmental monitoring for air quality, noise, water quality and waste management as specified in the EM&A Manual.

In the reporting month, construction noise levels at the noise monitoring stations shown in Table 2 were monitored during the construction stage.

A summary of impact EM&A requirements as applicable to this EM&A Report is presented in Table 3 below.

**Table 3** Summary of impact EM&A Requirements

| Parameters  | Descriptions  | Locations          | Frequencies       | Duration                  |
|-------------|---------------|--------------------|-------------------|---------------------------|
| Air Quality | 24-hr TSP     | Shown in Table 2   | Once every 6 days | During construction stage |
| Noise       | Leq(30min)    | Shown in Table 2   | Once a week       | During construction stage |
| Waste       | On-Site Audit | Active Works Sites | Monthly           | During construction stage |

| Parameters              | Descriptions                  | Locations          | Frequencies | Duration                  |
|-------------------------|-------------------------------|--------------------|-------------|---------------------------|
| Wastewater              | On-Site Audit                 | Active Works Sites | Monthly     | During construction stage |
| General Site Conditions | Environmental Site Inspection | Active Works Sites | Weekly      | During construction stage |

Environmental Quality Performance Limits for noise are shown in Appendix A. The Event Action Plan for noise is shown in Appendix B.

## **2.4 Implementation of Environmental Mitigation Measures**

The WIL Civil Works Contractors are required to implement the mitigation measures as specified in the EP, EIA Report and EM&A Manual. During the regular environmental site inspections, the Contractors' implementation of mitigation measures were inspected and reviewed. A schedule of the implementation of mitigation measures identified in the WIL EIA is given in Appendix C.

## **2.5 Construction Activities in the Reporting Month**

Major construction activities carried out by the respective WIL Civil Works Contractors during the reporting period include:

### Contract 704 - Works Area L1

- Entrance construction substantially completed
- Reinstatement work of playground

## **2.6 Construction Activities for the Coming Month**

According to the construction programme for the Civil Works Contracts, the scheduled major construction activities in the next reporting month are as follows:

### Contract 704 - Works Area L1

- Entrance construction substantially completed
- Reinstatement work of playground

# **3 IMPACT MONITORING**

## **3.1 Noise**

B&K 2236 sound level meters which complied with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1), specification as referred to in the Technical Memoranda to the NCO were used for the construction noise impact monitoring. The B&K sound level meters and B&K 4231 calibrator are verified by the certified laboratory or manufacturer on biennial basis and annual basis respectively to ensure they perform to the same level of accuracy

as stated in the manufacturer's specifications. Calibration certificates are attached in Appendix E.

Immediately prior to and following each set of measurements at any NSR, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. If the calibration levels before and after the measurement differ by more than 1.0dB the measurement shall be repeated to obtain a reliable result (note: maximum deviation during this initial baseline monitoring period was 0.3dB). Periods of prolonged or repeated overloading of the sound level meter detector were avoided by setting the meter with adequate headroom prior to commencing measurements. Measurements were recorded to the nearest 0.1 dB, with values of 0.05 being rounded up.

Impact noise monitoring of  $L_{A,eq30}$  was undertaken to measure construction noise levels in accordance with the EM&A Manual. The noise monitoring locations are shown in Section 2.2 above.

Monitoring results are presented in the following table (see Appendix D for graphical plot). No exceedance was found. Monitoring schedules are shown in Appendix F.

| CN16- No.9-11 Ki Ling Lane |       |          |                   |                     |                      |
|----------------------------|-------|----------|-------------------|---------------------|----------------------|
| Date                       | Time  | Leq(dBA) | Limit Level (dBA) | Compliance (Yes/No) | Weather Conditions   |
| 11/2/2016                  | 15:00 | 72.9     | 75                | Yes                 | Fine, wind<2m/s      |
| 17/2/2016                  | 15:00 | 73.4     | 75                | Yes                 | Fine, wind<2m/s      |
| 24/2/2016                  | 15:00 | 71.7     | 75                | Yes                 | Fine, wind<2m/s      |
| 2/3/2016                   | 15:00 | 69.3     | 75                | Yes                 | Fine, wind<2m/s      |
| 8/3/2016                   | 15:00 | 70.2     | 75                | Yes                 | Cloudy,<br>wind<2m/s |

### 3.2 *Action taken in Event of Exceedence*

There was no exceedance in noise monitoring parameter recorded in the reporting period, therefore no action was taken.

## 4 **LANDSCAPE AND VISUAL**

### 4.1 *Monitoring Requirements*

Monitoring of the implementation of the landscape and visual mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

The landscape and visual monitoring and audit have been conducted once a month throughout the construction stage covering the entire project site areas.

## 4.2 Audit Results

Monthly monitoring and audit was undertaken in accordance with the EM&A Manual. Because all construction activities have been substantially completed, except for Works Area L1, and there is no retained tree in Works Area L1, the monthly audit is no longer required. There was no landscape and visual monitoring and audit required in this reporting period.

There is no compensatory tree planting carried out in the reporting period.

## 5 WASTE MANAGEMENT

Mitigation measures on waste management have been implemented in accordance with the Waste Management Plans for the respective civil works contracts submitted under the Environmental Permit. The C&D materials are to be disposed of at the public filling reception facilities while C&D wastes are to be disposed of at the landfills. Quantities of wastes disposed in the reporting period are summarized in the following table:

| Amount of Construction Wastes Disposed |                                          |                                  |                                    |                                                         |
|----------------------------------------|------------------------------------------|----------------------------------|------------------------------------|---------------------------------------------------------|
| Contract No.                           | Inert C&D Materials to Public Fill (ton) | Inert C&D Materials Reused (ton) | Non-inert Waste to Land-fill (ton) | Chemical Waste to designated treatment facility (litre) |
| 704<br>Feb 2016                        | 0                                        | 0                                | 127.37                             | 0                                                       |
| WIL<br>Cumulative                      | 723,476.9                                | 1,737,203.9                      | 35759.32                           | 3,679m <sup>3</sup> + 777kg + 51,125 litres             |

^ACM disposal from buildings demolition

## 6 WATER QUALITY

Monitoring of the implementation of the water quality mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

Weekly site inspection will be conducted throughout the construction stage covering the entire project site areas to ensure the recommended mitigation measures are properly implemented.

In the reporting period, the water quality mitigation measures were implemented in accordance with the requirements as stipulated in the EM&A Manual.

Water sample was taken for Works Area L1 in the reporting period. Result was in compliance with the requirement under the WPCO licence.

## **7 CULTURAL HERITAGE**

No Archaeological Watching Brief monitoring and no vibration monitoring is conducted in this reporting month.

## **8 RECORD OF ENVIRONMENTAL COMPLAINTS**

No complaint was received in the reporting period. Number of cumulative complaints for the entire project period is 211 cases and all cases had been closed.

## **9 RECORD OF NON-COMPLIANCES**

There was no non-compliance identified in the reporting period.

## **10 NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

No summon or prosecution related to environmental issue was received or made against the Project in the reporting period.

Number of cumulative environmental prosecution since commencement of construction is one summon in 2010.

## **11 STATUS OF STATUTORY SUBMISSIONS**

### **11.1 Submissions required under Environmental Permit**

Submissions in the reporting period include: Condition 6.1 - EM&A Report No. 78.

### **11.2 Statutory Permits and Licenses**

The status of valid relevant environmental permits and licenses in the report month is shown below:

| <b>Description</b>                                                | <b>Status</b>              |
|-------------------------------------------------------------------|----------------------------|
| Environmental Permit for West Island Line Project (EP-313/2008/J) | Issued on 1 September 2014 |
| <u>Contract 704</u>                                               |                            |

|                                           |                                                                                                                                   |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Wastewater Discharge License              | WT00022679-2015<br>WT00007998-2010 (surrendered)                                                                                  |
| Registration as a Chemical Waste Producer | Licence no. 5213-112-G2525-03<br>Approved on 25 May 2011<br>Licence no. 5213-112-G2712-01<br>Approved on 15 Oct 2015              |
| Disposal of Construction Waste            | Billing Account no. 7010555 activated on 8 April 2010, Billing Account no. 7011159 (by vessel) activated on 10 September 2010     |
| Construction Noise Permit                 | GW-RS1465-15 (21-Jan-16 to 20-Jul-16)<br>GW-RS1386-15 (16-Dec-15 to 12-Jun-16)<br>GW-RS0928-15 (28-Aug-15 to 26-Feb-16) (expired) |

## 12 SITE INSPECTIONS

### 12.1 Observations

Regular site inspections were undertaken by the ET in accordance with the EM&A Manual. The contractors' performance on environmental matters was assessed. The inspection findings and the associated recommendations on improvement to the environmental protection and pollution control works were raised to the contractors for reference and/ or action.

Observations against the implementation of the mitigation measures recommended in the EP/EIA are summarized as follows:

| Item | Description                                                                                                                             | Follow-up Status |
|------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------|
|      | <u>Contract 704</u>                                                                                                                     |                  |
| 1    | The contractor was reminded to provide adequate dust control measures such as watering.                                                 | On-going         |
| 2    | The contractor was reminded to properly implement wastes sorting                                                                        | Ongoing          |
| 3    | The contractor was reminded to provide sufficient movable noise barriers/acoustic fabric to minimize noise nuisance to nearby residents | On-going         |
| 4    | Water sample tests were conducted in the reporting month for Works Area L1, results were satisfactory                                   | N/A              |

### 12.2 Other Notable Events

#### WIL Operation

Operation of WIL commenced on 28 December 2014; and Sai Ying Pun Station also opened to

public on 29 March 2015. The construction works for WIL have been substantially completed and SYP Entrance B3 (i.e. Works Areas L1) is expected to open to public tentatively by the end of March 2016. A notification letter to EPD regarding commencement of service of SYP Entrance B3 has been issued on 7 March 2016.

#### Termination of Impact Monitoring

After the WIL Operation, a Final EM&A Report (part 1) for the Works Areas proposed to terminate the construction stage air and noise monitoring together with the regular site inspections had been submitted in February 2015.

In accordance with clauses 2.16, 9.19 and 11.1 under EM&A Manual of the Project, impact monitoring of construction noise and air quality as well as site inspection shall be carried out when construction activities are underway. In view of completion of construction works for Works Area B, M1 and N1 in December 2015, no construction noise and air quality monitoring as well as regular site inspection for the above areas will be conducted after this reporting month. A letter of notification to EPD has been issued on 15 January 2016.

#### Works Area B

Regular soil monitoring had been conducted at 3-month intervals in accordance with EP Condition 3.2.8 in order to monitor any possible migration of contaminants beneath and across the additional concrete paving during temporary use of Works Area B. Soil monitoring has been ceased since June 2015 as no longer use of the works area and commencement on removal of additional concrete paving. Removal of additional concrete paving has been completed in accordance with the approved method statement for removal of additional concrete paving under EP Condition 3.3.2(c).

### **13 FUTURE KEY ISSUES**

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

No key issue is expected in the coming month.

#### **13.2 Solid and Liquid Waste Management Status**

Based on the findings of the weekly site inspection, the Contractors' performance in solid and liquid waste management were acceptable and compliance with the EIA requirements were demonstrated. Solid wastes and liquid waste were properly disposed of. The current management standard should be maintained.

#### **13.3 Effectiveness and Efficiency of Mitigation Measures**

Based on the environmental monitoring results, the effectiveness and efficiency of the mitigation measures implemented were found to be satisfactory. The current practice should be maintained.

### **14 CONCLUSIONS**

The Report presents the results of EM&A works and the impact monitoring for the construction works undertaken during the period of 10 February 2016 to 9 March 2016. The major construction activities in the reporting period included entrance construction and reinstatement works of playground at Works Area L1. All the construction works for the WIL project had been substantially completed.

Impact monitoring for noise was conducted in accordance with the EM&A Manual in the reporting period, no exceedance was found and there was no breach of Limit Levels for noise monitoring.

No environmental complaint relating to construction work was received in the reporting period. In addition, no environmental notification of summon and prosecution was received in the reporting period.

Site inspections were conducted by the Environmental Team on a weekly basis to monitor proper implementation of environmental pollution control and mitigation measures for the Project. No non-conformance to the environmental requirements was identified by the Environmental Team in the reporting period.

The Environmental Permit (EP-313/2008/J) issued by EPD on 1 September 2014 is being used for the WIL Project.

In the reporting period, there was no reporting change of circumstances which may affect the compliance with the recommendations of the EIA Report.

It is concluded from the environmental monitoring and audit works for the West Island Line Project that the construction works were undertaken in an appropriately environmentally sensitive manner in the reporting period. The environmental protection and pollution control measures provided by the contractors were generally acceptable.

## Appendix A

### Environmental Quality Performance Limits

### Action and Limit Levels for Construction Noise

| Time Period                                                                   | Action Level                              | Limit Level (dB(A)),<br>Leq(30min)                               |
|-------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------|
| 0700-1900 hr on normal weekdays                                               | When one documented complaint is received | 75*                                                              |
| 0700-2300 hr on holidays including Sundays and 1900-2300 hr on all other days |                                           | Subject to requirements stipulated in Construction Noise Permits |
| 2300-0700 hr of next day                                                      |                                           |                                                                  |

\* Limit for school is 70 dB(A) and 65 dB(A) during school examination periods.

Appendix B  
Event Action Plans

**Table 2.4 Event and Action Plan for Construction Noise Monitoring**

| EVENT               | ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | ET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | IEC                                                                                                                                                                                                                                                                                                                        | ER                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CONTRACTOR                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Action Level</b> | <ol style="list-style-type: none"> <li>1. Notify IEC and ER</li> <li>2. Carry out investigation</li> <li>3. Report the results of investigation to the IEC and ER</li> <li>4. Discuss jointly with the ER and Contractor and formulate remedial measures</li> <li>5. Increase monitoring frequency to check mitigation effectiveness</li> </ol>                                                                                                                                                                                                                                                        | <ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly</li> <li>3. Supervise the implementation of remedial measures</li> </ol>                                                       | <ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify Contractor</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented</li> </ol>                                                                                                                                                                               | <ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to ER with copy to IEC</li> <li>2. Implement noise mitigation proposals</li> </ol>                                                                                                                                                                                                                                                |
| <b>Limit Level</b>  | <ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD and Contractor</li> <li>2. Identify source</li> <li>3. Repeat measurement to confirm findings</li> <li>4. Increase monitoring frequency</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented</li> <li>6. Inform IEC, ER, EPD the causes and actions taken for the exceedances</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results</li> <li>8. If exceedance stops, cease additional monitoring</li> </ol> | <ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET and Contractor on the potential remedial actions</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly</li> <li>3. Supervise the implementation of remedial measures</li> </ol> | <ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing</li> <li>2. Notify Contractor</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem</li> <li>4. Ensure remedial measures are properly implemented</li> <li>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</li> </ol> | <ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance</li> <li>2. Submit proposals for remedial actions to ER with copy to IEC</li> <li>3. Implement the agreed proposals</li> <li>4. Revise and resubmit proposals if problem still not under control</li> <li>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated</li> </ol> |

## Appendix C

### Implementation of Environmental Mitigation Measures

**Table C1 Project Implementation Schedule for All Works Areas (Status as of 9 August 2015)**

| EIA Ref.                                          | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
|---------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------|-------------------------|--------------------------------|-----------------------|
| <b>Airborne Noise Impact (Construction Phase)</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                 |                               |                         |                                |                       |
| S 3.55                                            | S 2.23    | <p>The following good site practices shall be implemented:</p> <ul style="list-style-type: none"> <li>- Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program</li> <li>- Silencers or mufflers on construction equipment shall be utilized and shall be properly maintained during the construction program</li> <li>- Mobile plant, if any, shall be sited as far from NSRs as possible</li> <li>- Machines and plant (such as trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum</li> <li>- Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs</li> <li>- Material stockpiles and other structures shall be effectively utilized, wherever practicable, in screening noise from on-site construction activities.</li> </ul> | To reduce construction noise impact                             | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |
| S 3.56-3.57, Table 3.10                           | S 2.23    | <p>Quieter plant shall be used for the following PME:</p> <ul style="list-style-type: none"> <li>- Truck</li> <li>- Crane/ Mobile Crane</li> <li>- Backhoe/Excavator/Wheel Loader/ Front-end-loader</li> <li>- Breaker</li> <li>- Concrete Mixer Truck</li> <li>- Pokers, vibratory, hand held</li> <li>- Pile Extractor</li> <li>- Roller, vibratory</li> <li>- Asphalt Paver</li> <li>- Hydraulic Breaker</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | To reduce construction noise impacts                            | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |

| EIA Ref.    | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure                                          | When to implement the measure? | Implementation Status |
|-------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|--------------------------------|-----------------------|
|             |           | <ul style="list-style-type: none"> <li>- Pile Rig</li> <li>- Crawler Crane</li> <li>- Sheet Piling Machine/ Piling, Hydraulic</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                 |                               |                                                                  |                                |                       |
| S 3.58-3.59 | S 2.23    | <p>Movable noise barrier shall be used for the following PME where practicable:</p> <ul style="list-style-type: none"> <li>- Breaker</li> <li>- Mini Backhoe</li> <li>- Generator, super silenced</li> <li>- Backhoe</li> <li>- Crane</li> <li>- Poker, vibratory, hand-held</li> <li>- Hydraulic Breaker</li> <li>- Wheel Loader</li> <li>- Crusher</li> <li>- Hand Held Breaker</li> <li>- Compressor</li> <li>- Grout Plant</li> <li>- Grout Mixer</li> <li>- Concrete Pump</li> <li>- Excavator</li> <li>- Lorry Crane</li> <li>- Mobile Crane</li> <li>- Crawler Crane</li> </ul> | To reduce construction noise impacts                            | MTRC / Contractor             | Works areas A, C, D, H, I, J, J1, L1, M1, N1, M3, O1, O2 and O3. | Construction phase             | Being implemented     |
| S 3.60      | S 2.23    | <p>Noise enclosure/acoustic shed shall be used for the following PME where practicable:</p> <ul style="list-style-type: none"> <li>- Air Compressor</li> <li>- Concrete Pump</li> <li>- Shotcrete Pump</li> <li>- Hand Held Breaker</li> <li>- Grout Pump</li> <li>- Concrete Corer</li> </ul>                                                                                                                                                                                                                                                                                         | To reduce construction noise impacts                            | MTRC / Contractor             | All works areas                                                  | Construction phase             | Being implemented     |
| S 3.61      | S 2.23    | Acoustic Enclosure shall be used for enclosing the rock drill as fully as possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | To reduce construction noise                                    | MTRC / Contractor             | Works areas H,                                                   | Construction phase             | Implemented           |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                              | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure                                                            | When to implement the measure? | Implementation Status |
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|          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | impacts                                                         |                               | N1 and M                                                                           |                                |                       |
| S 3.62   | S 2.23    | Noise insulating cover shall be used to cover the following PME: <ul style="list-style-type: none"> <li>- Breaker</li> <li>- Backhoe</li> <li>- Water pump, submersible (electric)</li> <li>- Crawler mounted rock drill trucks</li> <li>- Rock drill</li> <li>- Air compressor</li> <li>- Electric Winch</li> <li>- Concrete pump</li> <li>- Poker, vibratory, hand-held</li> <li>- Hand Held Breaker</li> <li>- Crane</li> <li>- Shotcrete pump</li> </ul> | To reduce construction noise impacts                            | MTRC / Contractor             | Works areas J1, N1, M1 and M3                                                      | Construction phase             | Being implemented     |
| S 3.63   | S 2.23    | Silencer shall be used for the ventilation fan                                                                                                                                                                                                                                                                                                                                                                                                               | To reduce construction noise impacts                            | MTRC / Contractor             | Works areas MA, A, C, D, G, H, I, J, J1, J2, J3, L1, M, M1, M3, N1, O1, O2 and O3. | Construction phase             | Being implemented     |
| S 3.64   | S 2.23    | Noise insulating fabric shall be applied where practicable to cover the following PME: <ul style="list-style-type: none"> <li>- Pile Rig</li> <li>- Drill rig</li> <li>- Pile Extractor</li> <li>- Power Rammer</li> <li>- Piling, earth auger</li> <li>- Piling, hydraulic</li> </ul>                                                                                                                                                                       | To reduce construction noise impacts                            | MTRC / Contractor             | Works areas MA, C, D, G, H, I, J, J1, J2, J3, L1, M, M1, M3, N1, O1, O2 and O3.    | Construction phase             | Implemented           |

| EIA Ref.                           | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                     | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure     | When to implement the measure?                                                              | Implementation Status                            |
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|                                    |           | - Sheet Piling Machine                                                                                                                                                                                                              |                                                                 |                               |                             |                                                                                             |                                                  |
| S 3.65                             | S 2.23    | Use of “Noise Control Curtain” - a noise insulating fabric to be mounted on the steel scaffold erected on the buildings to be demolished to an extent such that the line of sight between the noise source and NSR would be blocked | To reduce construction noise impacts                            | MTRC / Contractor             | Works area A                | Construction Phase – during the demolition of Block A & C of Kennedy Town Ex-Police Quarter | Implemented                                      |
| S 3.67-3.70, Figure 3.17 and 3.18. | S 2.23    | Temporary noise barriers shall be erected at the works areas of West of KET Station and SYP Entrance A1 & A2.                                                                                                                       | To reduce construction noise impacts                            | MTRC / Contractor             | Works areas C and N1        | Construction phase                                                                          | Implemented                                      |
| S 3.71                             | S 2.23    | Decking over would be provided to cover the excavation area.                                                                                                                                                                        | To reduce construction noise impacts                            | MTRC / Contractor             | Works areas J, J3, G and L1 | Construction phase                                                                          | Implemented                                      |
| S3.72                              | S 2.23    | Full enclosure of entire works area                                                                                                                                                                                                 | To reduce construction noise impacts                            | MTRC / Contractor             | Works area J2               | Construction Phase (after piling is completed)                                              | Alternative noise mitigation measure implemented |
| S3.73 – 3.74                       | S 2.23    | Use of concrete crusher instead of hydraulic breaker                                                                                                                                                                                | To reduce construction noise                                    | MTRC / Contractor             | Works area J2, M1 and       | Construction Phase                                                                          | Implemented                                      |

| EIA Ref.                                       | EM&A Ref.  | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                              | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure                                                                                                                                               | When to implement the measure? | Implementation Status                |
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|                                                |            |                                                                                                                                                                                                                                                                                                                                              | impacts                                                         |                               | M3                                                                                                                                                                    |                                |                                      |
| <b>Airborne Noise Impact (Operation Phase)</b> |            |                                                                                                                                                                                                                                                                                                                                              |                                                                 |                               |                                                                                                                                                                       |                                |                                      |
| S 3.50-3.51, Table 3.9                         | Appendix B | The maximum permissible sound power levels (Max SWLs) for the fixed plant shall be complied with during the selection of equipment and mitigation measures.                                                                                                                                                                                  | To comply with the noise criteria of Noise Control Ordinance    | MTRC / Contractor             | Vent shafts and chiller plants at KET Station, UNI Entrance C1 and SYP Entrance C, and vent shafts at KET Ex-Police Quarter, UNI Vent Shaft-Y and SYP Entrance A1&A2. | Design and operation phases    | To be implemented in operation phase |
| S 3.77                                         | Appendix A | <p>The following shall be considered as far as possible in the detailed design of fixed plant:</p> <ul style="list-style-type: none"> <li>- Choose quieter plant such as those which have been effectively silenced.</li> <li>- Include noise levels specification when ordering new plant (including chiller and E/M equipment).</li> </ul> | To comply with the noise criteria of Noise Control Ordinance    | MTRC / Contractor             | Vent shafts and chiller plants at KET Station, UNI Entrance                                                                                                           | Design and operation phases    | To be implemented in operation phase |

| EIA Ref.                                                | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                      | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure                                                                                   | When to implement the measure? | Implementation Status |
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|                                                         |           | <ul style="list-style-type: none"> <li>- Locate fixed plant/louver away from any NSRs as far as practicable.</li> <li>- Locate fixed plant in walled plant rooms or in specially designed enclosures.</li> <li>- Locate noisy machines in a basement or a completely separate building.</li> <li>- Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary.</li> </ul> |                                                                 |                               | C1 and SYP Entrance C, and vent shafts at KET Ex-Police Quarter, UNI Vent Shaft-Y and SYP Entrance A1&A2. |                                |                       |
| <b>Groundborne Noise Impact</b>                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |                               |                                                                                                           |                                |                       |
| S4.91                                                   | S3.1      | Ground-borne construction noise monitoring shall be conducted. The measurement locations shall be above the cutting face of the TBM, and shall be located as close to the cutting face as practicable.                                                                                                                                                                                                                               | To comply with the noise criteria of Noise Control Ordinance    | MTRC / Contractor             | Works areas of tunneling by TBM                                                                           | Construction phase             | Implemented           |
| S 4.88 & Table 4.10                                     | S 3.2     | Type 1a Trackform – Resilient Baseplate with stiffness of about 25 KN/mm shall be installed at both the west- and east-bounds starting from turnout in proximity of Hongway Garden towards the Sai Ying Pun Station and also the alignment under Po Shu Lau to Sai Wan Estate. A commissioning test shall be included in the Contract document in order to ensure compliance of the operational ground-borne noise criteria.         | To comply with the noise criteria of Noise Control Ordinance    | MTRC                          | Tunnel alignment                                                                                          | Operation phase                | Implemented           |
| <b>Landscape and Visual Impact (Construction Phase)</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |                               |                                                                                                           |                                |                       |
| Table 5.4                                               | Table 4.2 | Re-use of Existing Soil<br><br>Existing topsoil shall be re-used where possible for new planting areas within the project. The construction program shall consider                                                                                                                                                                                                                                                                   | To reduce the volume of soil for disposal                       | MTRC / Contractor             | All Works areas                                                                                           | Construction phase             | Implemented           |

| EIA Ref.  | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Objectives of the Recommended Measure & Main Concern to Address                          | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|           |           | using the soil removed from one phase for backfilling another. Suitable storage ground, gathering ground and mixing ground may be set up on-site as necessary.<br>▪                                                                                                                                                                                                                                                                                                                       |                                                                                          |                               |                         |                                |                       |
| Table 5.4 | Table 4.2 | No-intrusion Zone<br><br>To maximize protection to existing trees, ground vegetation and the associated understory habitats, construction contracts may designate "No-intrusion Zone" to various areas within the site boundary with rigid and durable fencing for each individual no-intrusion zone. The contractor should close monitor and restrict the site working staff not to enter the "no-intrusion zone", even for non-direct construction activities and storage of equipment. | To protect the existing trees, ground vegetation and the associated understory habitats. | MTRC / Contractor             | All Works areas         | Construction phase             | Implemented           |
| Table 5.4 | Table 4.2 | Decorative Hoarding<br><br>Erection of decorative screen hoarding should be designed to be compatible with the existing urban context.                                                                                                                                                                                                                                                                                                                                                    | To reduce visual impact due to construction                                              | MTRC / Contractor             | All Works areas         | Construction phase             | Implemented           |
| Table 5.4 | Table 4.2 | Minimize light pollution and control of night-time glare<br><br>All security floodlights for construction sites shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimize light pollution and night-time glare to nearby residences and GIC users. The Contractor shall consider other security measures which shall minimize the visual impacts.                                                                        | To minimize the visual impacts.                                                          | MTRC / Contractor             | All Works areas         | Construction phase             | Being Implemented     |
| Table 5.4 | Table 4.2 | Aesthetic design of the conveyor belt system<br><br>The removal of excavated material requires installation of a conveyor and a barging point. The conveyor will be covered, except the portion where it meets the barging point. The aim of covering or                                                                                                                                                                                                                                  | To minimize the visual intrusion as well as the air and noise quality issues             | MTRC / Contractor             | Works areas E & F       | Construction phase             | Implemented           |

| EIA Ref.  | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|           |           | enclosing the conveyor is to avoid noise and air quality issues; however, the conveyor where above-ground should be adequately screened and /or constructed of suitable materials and in colours/tones that minimize visual intrusion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                 |                               |                         |                                |                       |
| Table 5.4 | Table 4.2 | <p>Protection of Retained Trees</p> <p>All retained trees should be recorded photographically at the commencement of the Contract, and carefully protected during the construction period. Detailed tree protection specification shall be allowed and included in the Contract Specification, which specifying the tree protection requirement, submission and approval system, and the tree monitoring system.</p> <p>In addition, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas.</p> <p>All implementation of tree protection works and tree preservation measures shall be supervised by a landscape specialist on site.</p> | To protect the retained trees within the site boundary          | MTRC / Contractor             | All Works areas         | Construction phase             | Implemented           |
| Table 5.4 | Table 4.2 | <p>Protection of Registered Old and Valuable Trees</p> <p>Detailed tree protection measures as stipulated in WBTC No. 29/2004 – Registration of Old and Valuable Trees, and Guidelines for their Preservation, shall be allowed and included in the Contract Specification. All implementation of OVT protection measures shall be supervised by a landscape specialist on site.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                    | To protect the OVT within the site boundary                     | MTRC / Contractor             | All Works areas         | Construction phase             | Implemented           |

| EIA Ref.                                             | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                           | Objectives of the Recommended Measure & Main Concern to Address                                    | Who to implement the measure? | Location of the measure            | When to implement the measure?    | Implementation Status |
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| Table 5.4                                            | Table 4.2 | <p>Protection of Old Stone Wall-cum-trees</p> <p>Detailed tree protection specification shall be allowed and included in the Contract Specification, which specifying the tree protection requirement, submission and approval system, and the tree monitoring system. All implementation of Old stone wall-cum-trees protection measures shall be supervised by a landscape specialist on site.</p>                                      | To protect the existing trees-cum-wall                                                             | MTRC / Contractor             | All Works areas                    | Construction phase                | Implemented           |
| <b>Landscape and Visual Impact (Operation Phase)</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                    |                               |                                    |                                   |                       |
| Table 5.5                                            | Table 4.3 | <p>Tree Transplanting</p> <p>Trees of high to medium survival rate after transplanting to be affected by the works shall be transplanted where possible and practicable. Tree transplanting proposal including final location for transplanted trees will be submitted separately to seek relevant government department's approval.</p>                                                                                                  | Tree preservation                                                                                  | MTRC / Contractor             | All Works areas                    | Detail design and operation phase | Implemented           |
| Table 5.5                                            | Table 4.3 | <p>Compensation Tree Planting</p> <p>Compensatory tree planting should be provided to compensate for felled trees. Compensatory tree planting proposal including location of compensation will be submitted separately to seek relevant government department's approval.</p>                                                                                                                                                             | To reduce impact to existing trees.                                                                | MTRC / Contractor             | All Works areas                    | Detail design and operation phase | Implemented           |
| Table 5.5                                            | Table 4.3 | <p>Aesthetic landscape and architectural treatment on Station / Entrance / vent shaft</p> <p>All station entrances, vent shafts and all above ground structures shall be sensitively designed to ensure the element with colour, texture and tonal quality being compatible to the existing urban context, which shall include tree planting where space permits, to minimize the potential adverse landscape and visual impacts. For</p> | To ensure the elements are compatible to the existing urban context and minimize the landscape and | MTRC / Contractor             | Stations / Entrances / Vent Shafts | Detail design and operation phase | Implemented           |

| EIA Ref.                                             | EM&A Ref.    | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Objectives of the Recommended Measure & Main Concern to Address     | Who to implement the measure? | Location of the measure | When to implement the measure?              | Implementation Status |
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|                                                      |              | example, roof greening and vertical greening would be applied where possible subject to technical operational and maintenance constraints.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | visual impacts.                                                     |                               |                         |                                             |                       |
| Table 5.5                                            | Table 4.3    | Re-instatement of excavated Area<br>All excavated area and disturbed area for utilities diversion, temporary road diversion, and pipeline works shall be reinstated to former conditions or even better, to the satisfaction of the relevant Government departments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | To minimize the visual impacts.                                     | MTRC / Contractor             | All Works areas         | Operation phase                             | Implemented           |
| Table 5.5                                            | Table 4.3    | Re-provision of public open space<br>Every effort should be made to so that no public open space would be unnecessarily affected by the Project and if affected, they should be reprovided as far as possible and practicable. Sensitive design and re-provision of the affected Public Open Space (Forbes Street Playground, Hill Road Rest Garden, Ki Ling Lane Children's Playground, Mui Fong Street Children Playground, Sai Woo Lane Playground, Centre Street Market Sitting-out Area, King George V Memorial Park) incorporating replacement facilities for those provided at present, using materials of quality suitable for long term use and acceptable to relevant Government authority. Relevant government departments including LCSD and PlanD should be consulted on the design of the re-provisioned public open spaces at the early stage of the design process. | Re-provision of landscape amenity area and facilities               | Contractor                    | All Works areas         | Operation phase                             | Being implemented     |
| <b>Cultural Heritage Impact (Construction Phase)</b> |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                     |                               |                         |                                             |                       |
| S6.45, S6.51-6.55                                    | S 5.4 – 5.11 | The construction vibration control limits shall be followed.<br>Compliance monitoring of vibration limits shall be conducted and reported as a requirement of EM&A programme<br>The location and installation of the monitoring stations should be                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | To minimize vibration impacts on the identified vibration sensitive | MTRC / Contractor             | All Works Areas         | Detail design, construction and operational | Implemented           |

| EIA Ref.                                                  | EM&A Ref.  | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure?  | Location of the measure                     | When to implement the measure?        | Implementation Status |
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|                                                           |            | discussed and agreed with AMO before installation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | historical buildings.                                           |                                |                                             | phase                                 |                       |
| S6.46                                                     | S5.3       | Hoardings or boundary fencing shall be designed in a manner that responds to the existing urban context.                                                                                                                                                                                                                                                                                                                                                                                                            | To minimize visual impacts                                      | MTRC / Contractor              | All Works Area                              | Detailed design and operational phase | Implemented           |
| S6.44                                                     | S5.12-5.14 | Archaeological watching brief shall be conducted for the identification of any historical finds in the directly impacted works areas which might have a potential for finds and remains of archaeological interest to be found. Details of the frequency of inspection shall be provided to AMO for review and comment once the detailed construction programme has been finalized. The inspection should be carried out by the qualified archaeologist who have applied to the Antiquities Authority for a License | To identify any historical finds in the works areas             | MTRC / Qualified Archaeologist | Works Area C, H, I, J, J1, J2, J3, M and M2 | Construction phase                    | Implemented           |
| <b>Cultural Heritage Impact (Operation Phase)</b>         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |                                |                                             |                                       |                       |
| Table 6.2                                                 | 5.3        | Aboveground structures shall be designed in a manner that responds to the existing urban context.                                                                                                                                                                                                                                                                                                                                                                                                                   | To minimize visual impacts                                      | MTRC / Contractor              | Stations / Entrances / Vent Shafts          | Detail design and operation phase     | Implemented           |
| S6.60                                                     | S 5.15     | Recommended measures for mitigating operational phase landscape and visual impacts shall be implemented.                                                                                                                                                                                                                                                                                                                                                                                                            | To minimize potential visual impact on heritage sites           | MTRC / Contractor              | Stations / Entrances / Vent Shafts          | Detail design and operational phase   | Being implemented     |
| <b>Waste Management Implications (Construction Phase)</b> |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                 |                                |                                             |                                       |                       |
| S7.30                                                     | S 6.5      | Good site practices<br><br>- Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all                                                                                                                                                                                                                                                                                             | To reduce waste management impacts                              | MTRC / Contractor              | All works areas                             | Construction phase                    | Being implemented     |

| EIA Ref.      | EM&A Ref.     | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|               |               | <p>wastes generated at the site</p> <ul style="list-style-type: none"> <li>- Training of site personnel in proper waste management and chemical handling procedures</li> <li>- Provision of sufficient waste disposal points and regular collection of waste</li> <li>- Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers</li> <li>- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.</li> <li>- Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Centre.</li> </ul> |                                                                 |                               |                         |                                |                       |
| S7.31 & S7.32 | S 6.6 – S 6.7 | <p>Waste reduction measures</p> <ul style="list-style-type: none"> <li>- Sort C&amp;D waste from demolition of existing facilities to recover recyclable portions such as metals</li> <li>- 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</li> <li>- Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force</li> <li>- Proper storage and site practices to minimise the potential for damage or contamination of construction materials</li> </ul>     | To achieve waste reduction                                      | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |

| EIA Ref.      | EM&A Ref.     | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Objectives of the Recommended Measure & Main Concern to Address                                    | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|               |               | <ul style="list-style-type: none"> <li>- Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.</li> <li>- A recording system for the amount of wastes generated, recycled and disposed (including disposal sites) should be proposed</li> <li>- Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.</li> <li>- A Waste Management Plan shall be prepared by the Contractor prior to the commencement of construction work to provide an overall framework for waste management and reduction.</li> </ul>                                                                                                                                                |                                                                                                    |                               |                         |                                |                       |
| S7.34 & S7.35 | S 6.9 & S6.10 | <p>C&amp;D Material</p> <ul style="list-style-type: none"> <li>- In order to minimise impacts resulting from collection and transportation of C&amp;D material for off-site disposal, the excavated materials arising from station and tunnel construction shall be reused on-site as backfilling material and for landscaping works as far as practicable.</li> <li>- Surplus rock generated from the tunnelling works, shafts/adits construction and the stations cavern construction should be reused in reclamation and site formation projects either in the Mainland or Macau, or disposed of at a PFRF, as agreed with the Secretary of the Public Fill Committee, for other beneficial uses.</li> <li>- C&amp;D waste generated site clearance from the proposed works areas would require disposal to the designated landfill site.</li> </ul> | To minimize environmental impacts during the handling, transportation and disposal of C&D material | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Objectives of the Recommended Measure & Main Concern to Address                                       | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|          |           | <ul style="list-style-type: none"> <li>- In order to monitor the disposal of inert C&amp;D material and C&amp;D waste at PFRFs and landfills, respectively, and to control fly-tipping, a trip-ticket system shall be established in accordance with ETWB TCW No. 31/2004.</li> <li>- Material delivered to PFRFs should be of size less than 250mm or other sizes as agreed with the Secretary of the Public Fill Committee.</li> </ul>                                                                                                                                                                                                                                                  |                                                                                                       |                               |                         |                                |                       |
| S7.36    | S 6.11    | <p>General refuse</p> <ul style="list-style-type: none"> <li>- General refuse shall be stored in enclosed bins or compaction units separate from C&amp;D material and chemical wastes.</li> <li>- A reputable waste collector shall be employed by the contractor to remove general refuse from the site, separately from C&amp;D material and chemical wastes. Preferably an enclosed and covered area shall be provided to reduce the occurrence of 'wind blown' light material.</li> </ul>                                                                                                                                                                                             | To minimize environmental impacts during the handling, transportation and disposal of general refuse  | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |
| S7.37    | S 6.12    | <p>Chemical waste</p> <ul style="list-style-type: none"> <li>- Contractor would be required to register with the 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>.</li> <li>- Good quality containers compatible with the chemical wastes shall be used, and incompatible chemicals shall be stored separately.</li> <li>- Appropriate labels shall be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.</li> </ul> | To minimize environmental impacts during the handling, transportation and disposal of chemical refuse | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |

| EIA Ref.                                               | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Objectives of the Recommended Measure & Main Concern to Address                     | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status                |
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|                                                        |           | <ul style="list-style-type: none"> <li>The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, either to the approved Chemical Waste Treatment Centre, or another licensed facility, in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i>.</li> </ul>                                                                                                                                                                                                                                                                                                                                 |                                                                                     |                               |                         |                                |                                      |
| <b>Waste Management Implications (Operation Phase)</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     |                               |                         |                                |                                      |
| S7.39                                                  | S 6.11    | <p>General Refuse and Industrial Waste</p> <ul style="list-style-type: none"> <li>A reputable waste collector should be employed to remove general refuse and industrial wastes from the stations on a daily basis to minimise odour, pest and litter impacts.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  | Storage and handling of waste                                                       | MTRC                          | Stations and entrances  | Operational stage              | To be implemented in operation phase |
| S7.40                                                  | S 6.12    | <p>Chemical Waste</p> <ul style="list-style-type: none"> <li>The requirements given in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> should be followed in handling of these chemical wastes.</li> <li>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 wastes which would be collected by a licensed collector to a licensed facility for final treatment and disposal.</li> <li>The guidelines covered under the construction phase mitigation of chemical wastes should be referred.</li> </ul> | Storage and handling of the chemical waste to avoid environmental and health hazard | MTRC                          | Stations and entrances  | Operational stage              | To be implemented in operation phase |
| <b>Water Quality Impact (Construction Phase)</b>       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     |                               |                         |                                |                                      |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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| S9.31    | S 8.4     | <p>Construction Site Run-off and Drainage</p> <p>The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and sensitive uses of the coastal area i.e. WSD flushing water intakes along the harbour front, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> <li>- At the start of site establishment (including the barging facilities), perimeter cut-off drains to direct off-site water around the site shall be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers shall be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system would be undertaken by the contractor prior to the commencement of construction.</li> <li>- The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a site/sediment trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates</li> <li>- Sand/silt removal facilities such as sand/silt traps and sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities shall be based on the guidelines in Appendix A1 of ProPECC PN 1/94, which states that the retention time for silt/sand traps shall be 5</li> </ul> | To minimize water quality impacts                               | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|          |           | <p>minutes under maximum flow conditions. Sizes may vary depending upon the flow rate, but for a flowrate of 0.1m<sup>3</sup>/s a sedimentation basin of 30m<sup>3</sup> would be required and for a flow rate of 0.5 m<sup>3</sup>/s the basin would be 150m<sup>3</sup>. The detailed design of the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction.</p> <ul style="list-style-type: none"> <li>- All drainage facilities and erosion and sediment control structures shall be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit shall be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.</li> <li>- Measures shall be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations shall be discharged into storm drains via silt removal facilities.</li> <li>- If surface excavation works cannot be avoided during the wet season (April to September), temporarily exposed slope/soil surfaces shall be covered by a tarpaulin or other means, as far as practicable, and temporary access roads shall be protected by crushed stone or gravel, as excavation proceeds. Interception channels shall be provided (e.g. along the crest/ edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements shall always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94.</li> <li>- The overall slope of the site should be kept to a minimum to</li> </ul> |                                                                 |                               |                         |                                |                       |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|          |           | <p>reduce the erosive potential of surface water flows, and all trafficked areas and access roads protected by coarse stone ballast. An additional advantage accruing from the use of crushed stone is the positive traction gained during prolonged periods of inclement weather and the reduction of surface sheet flows</p> <ul style="list-style-type: none"> <li>- All vehicles and plant shall be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility shall be provided at every construction site exit where practicable. Wash-water shall have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road shall be paved with sufficient backfill toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.</li> <li>- Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.</li> <li>- Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers.</li> <li>- Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94.</li> </ul> |                                                                 |                               |                         |                                |                       |

| EIA Ref.      | EM&A Ref.     | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure                          | When to implement the measure? | Implementation Status |
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|               |               | <p>Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.</p> <ul style="list-style-type: none"> <li>- Bentonite slurries used in diaphragm wall construction shall be reconditioned and reused wherever practicable. Temporary enclosed storage locations shall be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC PN 1/94 shall be adhered to in the handling and disposal of bentonite slurries.</li> </ul>                                                                                                                                                                                                                                                                       |                                                                 |                               |                                                  |                                |                       |
| S9.32 & S9.33 | S 8.5 & S 8.6 | <p>General Construction Activities</p> <ul style="list-style-type: none"> <li>- Construction solid waste, debris and refuse generated on-site shall be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials shall be kept covered when not being used. Requirements of the solid waste management are described in Section 7 of this EIA Report.</li> <li>- Oils and fuels shall only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to nearby stormwater drain, all fuel tanks and storage areas shall be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund shall be drained of rainwater after a rain event.</li> </ul> | To minimize water quality impacts                               | MTRC / Contractor             | All works areas                                  | Construction phase             | Being implemented     |
| S9.34         | S 8.7         | <p>Sewage from Construction Workforce</p> <ul style="list-style-type: none"> <li>- Temporary sanitary facilities, such as portable chemical toilets, shall be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and would be responsible for appropriate disposal of waste matter and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | To minimize water quality impacts                               | MTRC / Contractor             | All works areas with on-site sanitary facilities | Construction phase             | Being implemented     |

| EIA Ref.                                      | EM&A Ref.   | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Objectives of the Recommended Measure & Main Concern to Address                                                 | Who to implement the measure? | Location of the measure              | When to implement the measure? | Implementation Status                |
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|                                               |             | maintenance of these facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                 |                               |                                      |                                |                                      |
| S9.35                                         | S 8.8       | <p>Tunnelling Wastewater Discharge</p> <p>Wastewater with a high level of suspended solids should be treated before discharge by settlement in tanks with sufficient retention time. Oil interceptors would also be required to remove the oil, lubricants and grease from the wastewater. In case of very high levels of suspended solids, an on-site pre-packaged treatment plant may be required with the addition of flocculants to improve the settlement of solids. A discharge licence under the WPCO would be required for discharge to the stormwater drain. It may be a stipulation of the WPCO licence to require the Contractor to monitor the quality / quantity of the discharge to show compliance with the conditions of the licence.</p> | To minimize water quality impacts                                                                               | MTRC / Contractor             | All works areas with tunneling works | Construction phase             | Implemented                          |
| S9.36                                         | S8.9        | <p>Groundwater Monitoring</p> <p>Monitoring of groundwater table shall be conducted on a weekly basis and recharge wells will be installed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | To control the potential impact on tree walls at Forbes Street due to groundwater drawdown induced by tunneling | MTRC / Contractor             | Works Areas C & D                    | Construction phase             | Implemented                          |
| <b>Water Quality Impact (Operation Phase)</b> |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                 |                               |                                      |                                |                                      |
| S9.27                                         | S8.10-S8.11 | <p>Runoff from Rail Track and operational tunnel drainage</p> <ul style="list-style-type: none"> <li>- The tunnel wall would be equipped with water-tight liner and designed for no seepage.</li> <li>- Standard designed silt trap or grease trap (if necessary) and oil interceptor would be provided to remove the oil, lubricants, grease, silt and grit from the tunnel runoff before discharge into</li> </ul>                                                                                                                                                                                                                                                                                                                                      | To control runoff from rail track and tunnel seepage                                                            | MTRC                          | Tunnels and rail tracks              | Operation phase                | To be implemented in operation phase |

| EIA Ref.              | EM&A Ref.   | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Objectives of the Recommended Measure & Main Concern to Address                                           | Who to implement the measure? | Location of the measure                                      | When to implement the measure? | Implementation Status                |
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| S9.37                 | S8.12-S8.14 | <p>stormwater drainage.</p> <ul style="list-style-type: none"> <li>- Track drainage channels discharge should pass through oil/grit interceptors/chambers to remove oil, grease and sediment before being pumped to the public stormwater drainage system.</li> <li>- The silt traps and oil interceptors should be cleaned and maintained regularly.</li> <li>- Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible.</li> </ul> |                                                                                                           |                               |                                                              |                                |                                      |
| S9.27                 | S8.15-S8.16 | <p>Sewage from Station</p> <ul style="list-style-type: none"> <li>- Sewage and wastewater effluents generated from the staff at stations and food and beverage outlets, if any, would be connected to the existing foul sewerage system.</li> <li>- Runoff from cleaning activities at the stations which would enter floor drains would also be connected to the foul sewer.</li> </ul>                                                                                                                                | To control sewage from stations                                                                           | MTRC                          | WIL Stations                                                 | Operation phase                | To be implemented in operation phase |
| <b>Hazard to Life</b> |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                           |                               |                                                              |                                |                                      |
| S10                   | S10.1       | Blasting activities regarding transport, storage and use of explosives should be supervised and audited by competent site staff to ensure strict compliance with the blasting permit conditions.                                                                                                                                                                                                                                                                                                                        | To ensure that the risks from the proposed explosives storage, handling and transport would be acceptable | MTRC / Contractor             | Works areas at which explosives would be stored and/or used. | Construction phase             | Implemented                          |

| EIA Ref.                                | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Objectives of the Recommended Measure & Main Concern to Address             | Who to implement the measure? | Location of the measure                        | When to implement the measure? | Implementation Status       |
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| S10                                     | S10.1     | Delivery vehicles shall not be permitted to remain unattended within the magazine. In addition, they shall not be allowed to park overnight, or when not in use, within the magazine and its audits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | To reduce the risk of fire within the magazine                              | MTRC / Contractor             | Explosive Magazine                             | Operational phase              | Implemented                 |
| S10                                     | S10.1     | Blast doors or heavy duty blast curtains should be installed at the access adits and shafts to prevent flyrock, and control the air over-pressure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | To reduce the risk of injury due to flyrock during the WIL construction     | MTRC / Contractor             | At suitable locations, access adits and shafts | Construction phase             | Implemented                 |
| S10                                     | S10.1     | Detonators shall not be transported in the same vehicle with other Class 1 explosives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | To reduce the risk of explosion during the transport of cartridged emulsion | MTRC / Contractor             | -                                              | Construction phase             | Implemented                 |
| <b>Air Quality (Construction Phase)</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                             |                               |                                                |                                |                             |
| Table 11.6                              | Table 9.5 | <p>Rock Crushing Plants</p> <p>The unloading process would be undertaken within enclosed rock crushing facility. Water spraying would be provided at the unloading point.</p> <p>The crushing process is the secondary crushing. The rock crushing plant is enclosed and water spraying system would be installed. Dust extraction and collection system with 80% dust removal efficiency would be provided.</p> <p>The crushed stone/rock would be screened by the screening and sorting facility before transporting to the temporary stockpile via enclosed conveyor. Water spraying system would be installed. Dust extraction and collection system with 80% dust removal efficiency would be provided.</p> | To minimize dust impacts                                                    | MTRC / Contractor             | Rock crushing plants at works areas B and E    | Construction phase             | Implemented at Works Area E |
| Table 11.7                              | Table 9.6 | <p>Temporary Stockpiles</p> <p>Kennedy Town Abattoir Site:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | To minimize dust impacts                                                    | MTRC / Contractor             | Temporary stockpiles at works                  | Construction phase             | Implemented                 |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
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|          |           | <p>Loading point – Loading of crushed materials from rock crushing facility onto stockpile</p> <ul style="list-style-type: none"> <li>- The transportation would be via an enclosed conveyor belt system and water spraying and flexible dust curtains would be provided at the loading point to suppress the dust impact.</li> </ul> <p>Storage of materials - Active area for loading &amp; unloading materials</p> <ul style="list-style-type: none"> <li>- The active area would be minimized to 20% of the total area of the stock piles. The 80% inactive area would be well covered with impervious sheeting. Water spraying system would be applied on the active area and watering with complete coverage of active area four times a day would be required.</li> </ul> <p>Transportation of materials to Barging Point 1</p> <ul style="list-style-type: none"> <li>- Wheel wash facilities provided at the site exit. The vehicles would be washed before leaving the stockpiles. The spoils would also be well covered before leaving the site in order to minimise generation of dusty materials.</li> <li>- The haul roads within the site would be all paved and water spraying would be provided to keep the wet condition.</li> </ul> <p>Western PCWA:</p> <p>Loading point – Loading of crushed materials from rock crushing facility onto stockpile</p> <ul style="list-style-type: none"> <li>- The transportation would be via an enclosed conveyor belt system and water spraying and flexible dust curtains would be provided at the loading point to suppress the dust impact.</li> </ul> <p>Storage of materials - Active area for loading &amp; unloading materials</p> <ul style="list-style-type: none"> <li>- Water spraying system would be applied on the active area and watering with complete of active area four times a day would be required.</li> </ul> |                                                                 |                               | areas B and E           |                                |                       |

| EIA Ref.   | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure               | When to implement the measure? | Implementation Status |
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|            |           | <p>Transportation of materials to Barging Point 2</p> <ul style="list-style-type: none"> <li>- The vehicles would be washed before leaving the stockpiles. The spoils would also be well covered before leaving the site in order to minimise generation of dusty materials.</li> <li>- The haul road would be paved and water spraying would be provided to keep the wet condition</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                 |                               |                                       |                                |                       |
| Table 11.8 | Table 9.7 | <p>Barging Facilities</p> <p>Kennedy Town Abattoir Site</p> <p>Transportation of spoils to Barging Point 1</p> <ul style="list-style-type: none"> <li>- All road surfaces within the barging facilities would be paved and water spraying would be provided to keep the wet condition.</li> </ul> <p>Unloading of spoil materials</p> <ul style="list-style-type: none"> <li>- The unloading process would be undertaken within enclosed tipping hall. Flexible dust curtains and water spraying would be provided at the discharge point for dust suppression.</li> </ul> <p>Vehicles leaving the barging facility</p> <ul style="list-style-type: none"> <li>- Vehicle wheel washing facilities provided at site exit</li> </ul> <p>Western PCWA</p> <p>Transportation of spoils to Barging Point 2</p> <ul style="list-style-type: none"> <li>- All road surfaces within the barging facilities would be paved and water spraying would be provided to keep the wet condition.</li> </ul> <p>Unloading of spoil materials from trucks to Barging Point 2</p> <ul style="list-style-type: none"> <li>- The unloading process should be undertaken within the enclosed tipping hall. Flexible dust curtains and water spraying would be provided at the discharge point for dust suppression.</li> </ul> <p>Unloading of spoil materials from enclosed tipping hall to Barging</p> | To minimize dust impacts                                        | MTRC / Contractor             | Barging points at works areas B and E | Construction phase             | Implemented           |

| EIA Ref.    | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure                                          | When to implement the measure? | Implementation Status |
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|             |           | <p>Point 3</p> <ul style="list-style-type: none"> <li>The tipping hall would be enclosed structure. The conveyor from tipping hall to the Barging Point 3 would be enclosed. Water spraying and flexible dust curtains would be provided at the receiving point of the tipping hall. Flexible dust curtains and water spraying would be provided at the discharge point of barging facilities for dust suppression.</li> </ul> <p>Vehicles leaving the barging facility</p> <ul style="list-style-type: none"> <li>Vehicle wheel washing facilities provided at site exit</li> </ul> |                                                                 |                               |                                                                  |                                |                       |
| Table 11.9  | S 9.26    | <p>Rock Crushing Plant at Kennedy Town Abattoir Site</p> <ul style="list-style-type: none"> <li>Dust extraction and collection system (80% dust removal efficiency) should be installed at the rock crushing facility and the discharge point is located at least 39m away from the west boundary of the rock crushing facility under the preliminary design</li> </ul>                                                                                                                                                                                                              | To minimize dust impacts                                        | MTRC / Contractor             | Rock Crushing Plant at works area B - Kennedy Town Abattoir Site | Construction phase             | N/A                   |
| Table 11.10 | S 9.27    | <p>Works areas at KET station construction site</p> <p>Active operating area of 50%</p> <p>Watering four times a day with complete coverage of active construction area</p>                                                                                                                                                                                                                                                                                                                                                                                                          | To minimize dust impacts                                        | MTRC / Contractor             | Works area A, C and D                                            | Construction phase             | Implemented           |
| Table 11.10 | S9.27     | <p>Open work areas at temporary magazine site</p> <p>Active operating area of 50%</p> <p>Watering two times a day with complete coverage of active construction area</p>                                                                                                                                                                                                                                                                                                                                                                                                             | To minimize dust impacts                                        | MTRC / Contractor             | Open works area at magazine site                                 | Construction phase             | Implemented           |
| S 11.42     | S 9.28    | For both rock crushing plants, the requirements and mitigation measures stipulated in the <i>Guidance Note on the Best Practicable</i>                                                                                                                                                                                                                                                                                                                                                                                                                                               | To minimize dust impacts                                        | MTRC / Contractor             | Rock crushing                                                    | Construction phase             | Implemented           |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
|----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------|-------------------------|--------------------------------|-----------------------|
|          |           | <i>Means for Mineral Works (Stone Crushing Plants) BPM 11/1 should be followed and implemented.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                 |                               | plants                  |                                |                       |
| S 11.42  | S 9.28    | <p>Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices:</p> <ul style="list-style-type: none"> <li>- Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.</li> <li>- Use of frequent watering for particularly dusty construction areas and areas close to ASRs.</li> <li>- 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.</li> <li>- Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs.</li> <li>- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.</li> <li>- Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.</li> <li>- 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.</li> <li>- Imposition of speed controls for vehicles on unpaved site roads. 8 kilometers per hour is the recommended limit.</li> <li>- Where possible, routing of vehicles and positioning of</li> </ul> | To minimize dust impacts                                        | MTRC / Contractor             | All works areas         | Construction phase             | Being implemented     |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | Implementation Status |
|----------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------|-------------------------|--------------------------------|-----------------------|
|          |           | <p>construction plant shall be at the maximum possible distance from ASRs.</p> <ul style="list-style-type: none"> <li>- Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) shall be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.</li> <li>- Cement or dry PFA delivered in bulk shall be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed.</li> <li>- Loading, unloading, transfer, handling or storage of bulk cement or dry PFA shall be carried out in a totally enclosed system or facility, and any vent or exhaust shall be fitted with an effective fabric filter or equivalent air pollution control system.</li> </ul> |                                                                 |                               |                         |                                |                       |

**Table C2 Implementation Schedule Specific for Works Area MA - Underground Magazine Site  
(Status as of 9 August 2015)**

| EIA Ref.                                      | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                               | Objectives of the Recommended Measure & Main Concern to Address                 | Who to implement the measure? | Location of the measure | When to implement the measure?                         | Reference   |
|-----------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------|-------------------------|--------------------------------------------------------|-------------|
| <b>Ecological Impact (Construction Phase)</b> |           |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                 |                               |                         |                                                        |             |
| App.2.3 – S. 6.1                              |           | Proposed works shall be designed to avoid or minimize direct impacts to natural habitats in the works area wherever possible.                                                                                                                                                                                                                                                                                                                 | To protect the natural habitats in the works area                               | MTRC / Contractor             | Works Area MA           | Design and construction of the magazine site           | Implemented |
| App.2.3 – S. 6.2                              |           | Planting of vegetation shall be provided to compensate for the unavoidable loss of tall shrubland and woodland habitats. It shall be provided to re-vegetate the areas which would be 1m beyond the security fencing and temporarily affected by the construction works (e.g. slope works, erecting security fence) after the construction phase. The plant species selected for re-vegetation shall make reference to the existing habitats. | To compensate for the ecological impacts associated with the loss of vegetation | MTRC / Contractor             | Works Area MA           | Construction phase of the magazine site                | Implemented |
| App.2.3 – S. 6.2                              |           | Suitable plants, preferably with native species, shall be planted within the boundary of the completed magazine site to compensate for unavoidable loss of understorey vegetation resulting from the proposed works on-site after the decommissioning of the magazine site. The compensatory planting shall make use of native plant species with flowers/fruits to attract wildlife.                                                         | To compensate for the ecological impacts associated with the loss of vegetation | MTRC / Contractor             | Works Area MA           | After completing the construction of the magazine site | Implemented |
| App.2.3 – S. 6.3                              |           | The two individuals of Hong Kong Pavetta ( <i>Pavetta hongkongensis</i> ) located within the footprint of the proposed tunnel portal and access entrance shall be transplanted to a suitable nearby tall shrubland or woodland habitats. Transplantation shall be supervised by a suitably qualified ecologist/horticulturalist                                                                                                               | To protect the 2 species from the proposed works within the works area          | MTRC / Contractor             | Works Area MA           | Prior to the construction phase of the magazine site   | Implemented |
| App.2.3 – S. 6.4                              |           | The trees located within the works area shall be preserved as far as practicable. If tree felling is unavoidable, feasibility of tree transplantation and compensatory planting shall be explored shall be implemented.                                                                                                                                                                                                                       | To protect the existing trees within the works area                             | MTRC / Contractor             | Works Area MA           | Prior to the construction phase of the                 | Implemented |

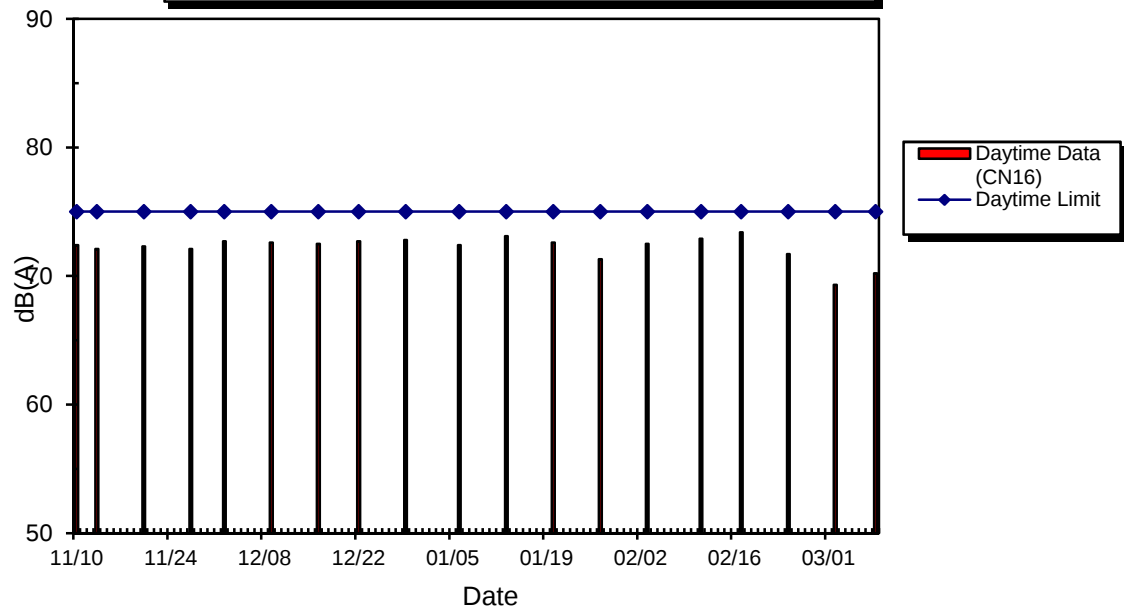
| EIA Ref.         | EM&A Ref. | Recommended Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Objectives of the Recommended Measure & Main Concern to Address                              | Who to implement the measure? | Location of the measure | When to implement the measure?                        | Reference   |
|------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------|-------------------------|-------------------------------------------------------|-------------|
|                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                              |                               |                         | magazine site                                         |             |
| App.2.3 – S. 6.5 |           | All the existing trees and species of conservation importance (i.e. the two identified Silver-back <i>Artocarpus</i> , <i>Artocarpus hypargyreus</i> ) located near the proposed works site shall be fenced off and the trunk shall be protected with hessian sacking as far as possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | To protect the existing trees and the species of conservation importance near the works area | MTRC / Contractor             | Works Area MA           | Construction and operation phase of the magazine site | Implemented |
| App.2.3 – S. 6.6 |           | Noise control measures including the use of quiet excavation methods, quiet construction plant and temporary noise barriers shall be implemented                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | To minimize the noise disturbance to the wildlife near the works area                        | MTRC / Contractor             | Works Area MA           | Construction and operation phase of the magazine site | Implemented |
| App.2.3 – S. 6.7 |           | Standard good site practice measures shall be implemented, including <ul style="list-style-type: none"> <li>• Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimise disturbance to natural habitats.</li> <li>• Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works.</li> <li>• Waste skips should be provided to collect general refuse and construction wastes. The wastes would be disposed of timely and properly off-site.</li> <li>• General drainage arrangements should include sediment and oil traps to collect and control construction site run-off.</li> <li>• Open burning on works sites is illegal, and should be strictly prohibited.</li> </ul> | To minimize ecological impacts                                                               | MTRC / Contractor             | Works Area MA           | Construction and operation phase of the magazine site | Implemented |

**Table C3 Implementation Schedule Specific for Works Area B – Kennedy Town Abattoir and Incinerator Area  
(Status as of 9 August 2015)**

| <b>Recommended Mitigation Measures</b>                                                                                                                                                                                                                                         | <b>Objectives of the Recommended Measure &amp; Main Concern to Address</b>                                                        | <b>Who to implement the measure?</b> | <b>Location of the measure</b> | <b>When to implement the measure?</b>       | <b>Reference</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------|---------------------------------------------|------------------|
| The existing ground slab/pavement within the works area shall be kept intact.                                                                                                                                                                                                  | To minimize human health risk associated with the contaminated soil and groundwater in the works area.                            | MTRC / Contractor                    | Works Area B                   | Construction phase                          | Implemented      |
| A reinforced concrete paving of no less than 200mm thick for the cleared site shall be provided after the demolition and clearance works. A debonding layer shall be placed between the existing and new concrete slabs to allow the latter to be removed prior to the former. | To minimize human health risk associated with the contaminated soil and groundwater in the works area.                            | MTRC / Contractor                    | Works Area B                   | Construction phase                          | Implemented      |
| Monthly site inspection shall be conducted to ensure the integrity of the existing and/or the new paving layer. Any surface cracks identified shall be filled out such that underneath soil would not be exposed.                                                              | To minimize human health risk associated with the contaminated soil and groundwater in the works area.                            | MTRC / Contractor                    | Works Area B                   | Construction phase                          | Implemented      |
| A clear void between the structure slab of the site office and the ground surface shall be created, i.e. the site office is a raised structure.                                                                                                                                | To allow ventilation by natural air movements to dilute the contaminant vapour released from the soil and groundwater.            | MTRC / Contractor                    | Works Area B                   | During the construction of the site offices | Implemented      |
| Incorporate gas-resistant membranes into the raised floor of the site office.                                                                                                                                                                                                  | To prevent contaminant vapour under the floor slab from entering the site office to protect the staff working in the site office. | MTRC / Contractor                    | Works Area B                   | During the construction of the site offices | Implemented      |
| Site hoardings shall be erected around the works area, and they shall be properly maintained to restrict access of trespassers.                                                                                                                                                | To protect the trespassers from the contaminated soil and groundwater in the works area.                                          | MTRC / Contractor                    | Works Area B                   | Construction phase                          | Implemented      |

Appendix D  
Impact Monitoring Graphical Plots

**WIL-CN16 Noise Level at No. 9-11 Ki Ling Lane  
(Nov 2015 - Mar 2016)**



## Appendix E

### Calibration Details



## CERTIFICATE OF CALIBRATION

Certificate No.: 14CA1016 01-01

Page 1 of 2

### Item tested

|                       |                            |            |
|-----------------------|----------------------------|------------|
| Description:          | Sound Level Meter (Type 1) | Microphone |
| Manufacturer:         | B & K                      | B & K      |
| Type/Model No.:       | 2250                       | 4189       |
| Serial/Equipment No.: | 2551244                    | 2550229    |
| Adaptors used:        | -                          | -          |

### Item submitted by

Customer Name: MTR Coporation Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 16-Oct-2014

Date of test: 17-Oct-2014

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 20-Jun-2015  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 09-Apr-2015  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 09-Apr-2015  | CEPREI        |

### Ambient conditions

Temperature:  $22 \pm 1$  °C  
Relative humidity:  $60 \pm 10$  %  
Air pressure:  $1000 \pm 10$  hPa

### Test specifications

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

### Test results

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

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

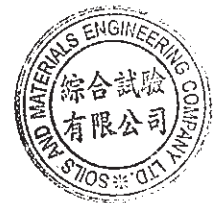
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 18-Oct-2014

Company Chop:



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



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 14CA1016 01-01

Page 2 of 2

### 1, Electrical Tests

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

| Test:                   | Subtest:                                         | Status: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--------------------------------------------------|---------|---------------------------|-----------------|
| Self-generated noise    | A                                                | Pass    | 0.3                       | 2.1             |
|                         | C                                                | Pass    | 0.8                       |                 |
|                         | Lin                                              | Pass    | 1.6                       |                 |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       | 2.2             |
|                         | Reference SPL on all other ranges                | Pass    | 0.3                       |                 |
|                         | 2 dB below upper limit of each range             | Pass    | 0.3                       |                 |
|                         | 2 dB above lower limit of each range             | Pass    | 0.3                       |                 |
|                         | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
| Linearity range for SPL | A                                                | Pass    | 0.3                       |                 |
|                         | C                                                | Pass    | 0.3                       |                 |
|                         | Lin                                              | Pass    | 0.3                       |                 |
|                         | Single Burst Fast                                | Pass    | 0.3                       |                 |
| Time weightings         | Single Burst Slow                                | Pass    | 0.3                       |                 |
|                         | Single 100µs rectangular pulse                   | N/A     | N/A                       |                 |
| Peak response           | Crest factor of 3                                | Pass    | 0.3                       |                 |
| R.M.S. accuracy         | Single burst 5 ms at 2000 Hz                     | Pass    | 0.3                       |                 |
| Time weighting I        | Repeated at frequency of 100 Hz                  | Pass    | 0.3                       |                 |
|                         | 1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz | Pass    | 0.3                       |                 |
| Time averaging          | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass    | 0.3                       |                 |
|                         | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                       |                 |
| Pulse range             | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                       |                 |
| Sound exposure level    | SPL                                              | Pass    | 0.3                       |                 |
| Overload indication     | Leq                                              | Pass    | 0.4                       |                 |

### 2, Acoustic tests

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

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

### 3, Response to associated sound calibrator

N/A

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

Calibrated by:

Date:

Fung Chi Yip  
17-Oct-2014

- End -

Checked by:

Date:

Lam Tze Wai  
18-Oct-2014

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



Test Data for Sound Level Meter

Page 1 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2551244  
Serial No. 2550229

Date 17-Oct-2014

Report: 14CA1016 01-01

### SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

|                            |      |    |
|----------------------------|------|----|
| Noise level in A weighting | 12.2 | dB |
| Noise level in C weighting | 13.7 | dB |
| Noise level in Lin         | 19.5 | dB |

### LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals. (SLM set to LEQ/SPL)

| Reference/Expected level | Actual level   |            | Tolerance | Deviation      |            |
|--------------------------|----------------|------------|-----------|----------------|------------|
|                          | non-integrated | integrated |           | non-integrated | integrated |
| dB                       | dB             | dB         | +/- dB    | dB             | dB         |
| 94.0                     | 94.0           | 94.0       | 0.7       | 0.0            | 0.0        |
| 99.0                     | 99.0           | 99.0       | 0.7       | 0.0            | 0.0        |
| 104.0                    | 104.0          | 104.0      | 0.7       | 0.0            | 0.0        |
| 109.0                    | 109.0          | 109.0      | 0.7       | 0.0            | 0.0        |
| 114.0                    | 114.0          | 114.0      | 0.7       | 0.0            | 0.0        |
| 119.0                    | 119.0          | 119.0      | 0.7       | 0.0            | 0.0        |
| 124.0                    | 124.0          | 124.0      | 0.7       | 0.0            | 0.0        |
| 129.0                    | 129.0          | 129.0      | 0.7       | 0.0            | 0.0        |
| 134.0                    | 134.0          | 134.0      | 0.7       | 0.0            | 0.0        |
| 135.0                    | 135.0          | 135.0      | 0.7       | 0.0            | 0.0        |
| 136.0                    | 136.0          | 136.0      | 0.7       | 0.0            | 0.0        |
| 137.0                    | 137.0          | 137.0      | 0.7       | 0.0            | 0.0        |
| 138.0                    | 138.0          | 138.0      | 0.7       | 0.0            | 0.0        |
| 139.0                    | 139.0          | 139.0      | 0.7       | 0.0            | 0.0        |
| 140.0                    | 140.0          | 140.0      | 0.7       | 0.0            | 0.0        |
| 89.0                     | 89.0           | 89.0       | 0.7       | 0.0            | 0.0        |
| 84.0                     | 84.0           | 84.0       | 0.7       | 0.0            | 0.0        |
| 79.0                     | 79.0           | 79.0       | 0.7       | 0.0            | 0.0        |
| 74.0                     | 74.0           | 74.0       | 0.7       | 0.0            | 0.0        |
| 69.0                     | 69.0           | 69.0       | 0.7       | 0.0            | 0.0        |
| 64.0                     | 64.0           | 64.0       | 0.7       | 0.0            | 0.0        |
| 59.0                     | 59.0           | 59.0       | 0.7       | 0.0            | 0.0        |
| 54.0                     | 53.9           | 53.9       | 0.7       | -0.1           | -0.1       |
| 49.0                     | 49.0           | 49.0       | 0.7       | 0.0            | 0.0        |



Test Data for Sound Level Meter

Page 2 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2551244  
Serial No. 2550229

Date 17-Oct-2014

Report: 14CA1016 01-01

|      |      |      |     |      |      |
|------|------|------|-----|------|------|
| 44.0 | 43.9 | 43.9 | 0.7 | -0.1 | -0.1 |
| 39.0 | 39.0 | 39.0 | 0.7 | 0.0  | 0.0  |
| 34.0 | 33.9 | 33.9 | 0.7 | -0.1 | -0.1 |
| 33.0 | 33.0 | 33.0 | 0.7 | 0.0  | 0.0  |
| 32.0 | 32.0 | 32.0 | 0.7 | 0.0  | 0.0  |
| 31.0 | 31.0 | 31.0 | 0.7 | 0.0  | 0.0  |
| 30.0 | 30.0 | 30.0 | 0.7 | 0.0  | 0.0  |

Measurements for an indication of the reference SPL on all other ranges which include it

| Other ranges | Expected level | Actual level | Tolerance | Deviation |
|--------------|----------------|--------------|-----------|-----------|
| dB           | dB             | dB           | +/- dB    | dB        |
| 20-140       | 94.0           | 94.0         | 0.7       | 0.0       |

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

| Ranges | Reference/Expected level | Actual level | Tolerance | Deviation |
|--------|--------------------------|--------------|-----------|-----------|
| dB     | dB                       | dB           | +/- dB    | dB        |
| 20-140 | 30.0                     | 30.0         | 0.7       | 0.0       |
|        | 138.0                    | 138.0        | 0.7       | 0.0       |

## FREQUENCY WEIGHTING TEST

The frequency response of the weighting networks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 54.6           | 54.5         | 1.5           | 1.5 | -0.1      |
| 63.1      | 94.0       | 67.8           | 67.7         | 1.5           | 1.5 | -0.1      |
| 125.9     | 94.0       | 77.9           | 77.9         | 1.0           | 1.0 | 0.0       |
| 251.2     | 94.0       | 85.4           | 85.3         | 1.0           | 1.0 | -0.1      |
| 501.2     | 94.0       | 90.8           | 90.7         | 1.0           | 1.0 | -0.1      |
| 1995.0    | 94.0       | 95.2           | 95.2         | 1.0           | 1.0 | 0.0       |
| 3981.0    | 94.0       | 95.0           | 95.0         | 1.0           | 1.0 | 0.0       |
| 7943.0    | 94.0       | 92.9           | 92.9         | 1.5           | 3.0 | 0.0       |
| 12590.0   | 94.0       | 89.7           | 89.2         | 3.0           | 6.0 | -0.5      |

Frequency weighting C:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 91.0           | 91.0         | 1.5           | 1.5 | 0.0       |



Test Data for Sound Level Meter

Page 3 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2551244  
Serial No. 2550229

Date 17-Oct-2014

Report: 14CA1016 01-01

|         |      |      |      |     |     |      |
|---------|------|------|------|-----|-----|------|
| 63.1    | 94.0 | 93.2 | 93.2 | 1.5 | 1.5 | 0.0  |
| 125.9   | 94.0 | 93.8 | 93.8 | 1.0 | 1.0 | 0.0  |
| 251.2   | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0  |
| 501.2   | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0  |
| 1995.0  | 94.0 | 93.8 | 93.8 | 1.0 | 1.0 | 0.0  |
| 3981.0  | 94.0 | 93.2 | 93.2 | 1.0 | 1.0 | 0.0  |
| 7943.0  | 94.0 | 91.0 | 91.0 | 1.5 | 3.0 | 0.0  |
| 12590.0 | 94.0 | 87.8 | 87.3 | 3.0 | 6.0 | -0.5 |

Frequency weighting Lin:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 94.0           | 94.0         | 1.5           | 1.5 | 0.0       |
| 63.1      | 94.0       | 94.0           | 94.0         | 1.5           | 1.5 | 0.0       |
| 125.9     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 251.2     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 501.2     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 1995.0    | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 3981.0    | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 7943.0    | 94.0       | 94.0           | 94.0         | 1.5           | 3.0 | 0.0       |
| 12590.0   | 94.0       | 94.0           | 93.5         | 3.0           | 6.0 | -0.5      |

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

| Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|------------|----------------|--------------|---------------|-----|-----------|
| dB         | dB             | dB           | +             | -   | dB        |
| 116.0      | 115.0          | 115.0        | 1.0           | 1.0 | 0.0       |

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

| Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|------------|----------------|--------------|---------------|-----|-----------|
| dB         | dB             | dB           | +             | -   | dB        |
| 116.0      | 111.9          | 111.9        | 1.0           | 1.0 | 0.0       |

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)



Test Data for Sound Level Meter

Page 4 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2551244  
Serial No. 2550229

Date 17-Oct-2014

Report: 14CA1016 01-01

|                | Ref. Level | Expected level | Tone burst signal | Tolerance | Deviation |
|----------------|------------|----------------|-------------------|-----------|-----------|
| Time weighting | dB         | dB             | Indication(dB)    | +/- dB    | dB        |
| Slow           | 118.0+6.6  | 118.0          | 118.0             | 0.5       | 0.0       |

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)

Test frequency: 2000 Hz

Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

| Ref. Level | Single burst indication |             | Tolerance | Deviation |
|------------|-------------------------|-------------|-----------|-----------|
| dB         | Expected (dB)           | Actual (dB) | +/- dB    | dB        |
| 120.0      | 111.2                   | 111.1       | 2.0       | -0.1      |

Repeated at 100 Hz

| Ref. Level | Repeated burst indication |             | Tolerance | Deviation |
|------------|---------------------------|-------------|-----------|-----------|
| dB         | Expected (dB)             | Actual (dB) | +/- dB    | dB        |
| 120.0      | 117.3                     | 117.2       | 1.0       | -0.1      |

TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

| Repetition Time | Level of tone burst | Expected Leq | Actual Leq | Tolerance | Deviation | Remarks      |
|-----------------|---------------------|--------------|------------|-----------|-----------|--------------|
| msec            | dB                  | dB           | dB         | +/- dB    | dB        |              |
| 1000            | 110.0               | 110.0        | 109.9      | 1.0       | -0.1      | 60s integ.   |
| 10000           | 100.0               | 100.0        | 99.9       | 1.0       | -0.1      | 6min. integ. |

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference r/r

Test frequency: 4000 Hz

Integration time: 10 sec

The integrating sound level meter set to Leq:

| Duration | Rms level of    | Expected | Actual | Tolerance | Deviation |
|----------|-----------------|----------|--------|-----------|-----------|
| msec     | tone burst (dB) | dB       | dB     | +/- dB    | dB        |
| 10       | 120.0           | 90.0     | 89.9   | 1.7       | -0.1      |

The integrating sound level meter set to SEL:

| Duration | Rms level of    | Expected | Actual | Tolerance | Deviation |
|----------|-----------------|----------|--------|-----------|-----------|
| msec     | tone burst (dB) | dB       | dB     | +/- dB    | dB        |
| 10.0     | 120.0           | 100.0    | 99.9   | 1.7       | -0.1      |



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2551244  
Serial No. 2550229

Date 17-Oct-2014

Report: 14CA1016 01-01

OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

| Level            | Level reduced by | Further reduced | Difference | Tolerance | Deviation |
|------------------|------------------|-----------------|------------|-----------|-----------|
| at overload (dB) | 1 dB             | 3 dB            | dB         | dB        | dB        |
| 134.6            | 133.6            | 130.6           | 3.0        | 1.0       | 0.0       |

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as follow  
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range

Test frequency: 4000 Hz  
Integration time: 10 sec  
Single burst duration: 1 msec

| Rms level        | Level reduced by | Expected level | Actual level | Tolerance | Deviation |
|------------------|------------------|----------------|--------------|-----------|-----------|
| at overload (dB) | 1 dB             | dB             | dB           | dB        | dB        |
| 141.6            | 140.6            | 100.6          | 100.5        | 2.2       | -0.1      |

ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

| Frequency | Expected level | Actual level  | Tolerance (dB) |     | Deviation |
|-----------|----------------|---------------|----------------|-----|-----------|
| Hz        | dB             | Measured (dB) | +              | -   | dB        |
| 1000      | 94.0           | 94.0          | 0.0            | 0.0 | 0.0       |
| 125       | 77.9           | 77.7          | 1.0            | 1.0 | -0.2      |
| 8000      | 92.9           | 94.2          | 1.5            | 3.0 | 1.3       |

-----END-----



## CERTIFICATE OF CALIBRATION

Certificate No.: 14CA1120 03-01

Page 1 of 2

### Item tested

|                       |                            |            |
|-----------------------|----------------------------|------------|
| Description:          | Sound Level Meter (Type 1) | Microphone |
| Manufacturer:         | B & K                      | B & K      |
| Type/Model No.:       | 2250                       | 4189       |
| Serial/Equipment No.: | 2749852                    | 2695393    |
| Adaptors used:        | -                          | -          |

### Item submitted by

Customer Name: MTR Corporation Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 20-Nov-2014

Date of test: 21-Nov-2014

### Reference equipment used in the calibration

|                                 |          |            |              |               |
|---------------------------------|----------|------------|--------------|---------------|
| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
| Multi function sound calibrator | B&K 4226 | 2288444    | 20-Jun-2015  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 09-Apr-2015  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 09-Apr-2015  | CEPREI        |

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $60 \pm 10$  %  
Air pressure:  $1010 \pm 10$  hPa

### Test specifications

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

### Test results

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

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

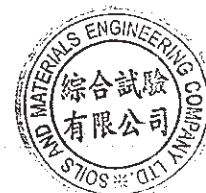
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 22-Nov-2014

Company Chop:



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



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 14CA1120 03-01

Page 2 of 2

### 1, Electrical Tests

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

| Test:                   | Subtest:                                         | Status: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--------------------------------------------------|---------|---------------------------|-----------------|
| Self-generated noise    | A                                                | Pass    | 0.3                       |                 |
|                         | C                                                | Pass    | 0.8                       | 2.1             |
|                         | Lin                                              | Pass    | 1.6                       | 2.2             |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
|                         | Reference SPL on all other ranges                | Pass    | 0.3                       |                 |
|                         | 2 dB below upper limit of each range             | Pass    | 0.3                       |                 |
|                         | 2 dB above lower limit of each range             | Pass    | 0.3                       |                 |
|                         | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
| Linearity range for SPL | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
|                         | A                                                | Pass    | 0.3                       |                 |
|                         | C                                                | Pass    | 0.3                       |                 |
| Frequency weightings    | Lin                                              | Pass    | 0.3                       |                 |
|                         | Single Burst Fast                                | Pass    | 0.3                       |                 |
|                         | Single Burst Slow                                | Pass    | 0.3                       |                 |
| Peak response           | Single 100µs rectangular pulse                   | N/A     | N/A                       |                 |
| R.M.S. accuracy         | Crest factor of 3                                | Pass    | 0.3                       |                 |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass    | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass    | 0.3                       |                 |
| Time averaging          | 1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz | Pass    | 0.3                       |                 |
|                         | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass    | 0.3                       |                 |
| Pulse range             | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                       |                 |
| Sound exposure level    | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                       |                 |
| Overload indication     | SPL                                              | Pass    | 0.3                       |                 |
|                         | Leq                                              | Pass    | 0.4                       |                 |

### 2, Acoustic tests

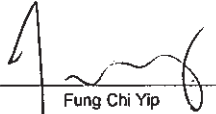
The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

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

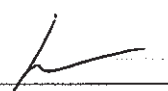
### 3, Response to associated sound calibrator

N/A

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

Calibrated by:   
Date: 21-Nov-2014

- End -

Checked by:   
Date: 22-Nov-2014

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



Test Data for Sound Level Meter

Page 1 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2749852  
Serial No. 2695393

Date 21-Nov-2014

Report: 14CA1120 03-01

## SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

|                            |      |    |
|----------------------------|------|----|
| Noise level in A weighting | 11.9 | dB |
| Noise level in C weighting | 14.0 | dB |
| Noise level in Lin         | 20.0 | dB |

## LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals. (SLM set to LEQ/SPL)

| Reference/Expected level | Actual level   |            | Tolerance | Deviation      |            |
|--------------------------|----------------|------------|-----------|----------------|------------|
|                          | non-integrated | integrated |           | non-integrated | integrated |
| dB                       | dB             | dB         | +/- dB    | dB             | dB         |
| 94.0                     | 94.0           | 94.0       | 0.7       | 0.0            | 0.0        |
| 99.0                     | 99.0           | 99.0       | 0.7       | 0.0            | 0.0        |
| 104.0                    | 104.0          | 104.0      | 0.7       | 0.0            | 0.0        |
| 109.0                    | 109.0          | 109.0      | 0.7       | 0.0            | 0.0        |
| 114.0                    | 114.0          | 114.0      | 0.7       | 0.0            | 0.0        |
| 119.0                    | 119.0          | 119.0      | 0.7       | 0.0            | 0.0        |
| 124.0                    | 124.0          | 124.0      | 0.7       | 0.0            | 0.0        |
| 129.0                    | 129.0          | 129.0      | 0.7       | 0.0            | 0.0        |
| 134.0                    | 134.0          | 134.0      | 0.7       | 0.0            | 0.0        |
| 135.0                    | 135.0          | 135.0      | 0.7       | 0.0            | 0.0        |
| 136.0                    | 136.0          | 136.0      | 0.7       | 0.0            | 0.0        |
| 137.0                    | 137.0          | 137.0      | 0.7       | 0.0            | 0.0        |
| 138.0                    | 138.0          | 138.0      | 0.7       | 0.0            | 0.0        |
| 139.0                    | 139.0          | 139.0      | 0.7       | 0.0            | 0.0        |
| 140.0                    | 140.0          | 140.0      | 0.7       | 0.0            | 0.0        |
| 89.0                     | 89.0           | 89.0       | 0.7       | 0.0            | 0.0        |
| 84.0                     | 84.0           | 84.0       | 0.7       | 0.0            | 0.0        |
| 79.0                     | 79.0           | 79.0       | 0.7       | 0.0            | 0.0        |
| 74.0                     | 74.0           | 74.0       | 0.7       | 0.0            | 0.0        |
| 69.0                     | 69.0           | 69.0       | 0.7       | 0.0            | 0.0        |
| 64.0                     | 64.0           | 64.0       | 0.7       | 0.0            | 0.0        |
| 59.0                     | 59.0           | 59.0       | 0.7       | 0.0            | 0.0        |
| 54.0                     | 54.0           | 54.0       | 0.7       | 0.0            | 0.0        |
| 49.0                     | 49.0           | 49.0       | 0.7       | 0.0            | 0.0        |



Test Data for Sound Level Meter

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Sound level meter type: 2250 Serial No. 2749852 Date 21-Nov-2014  
Microphone type: 4189 Serial No. 2695393  
Report: 14CA1120 03-01

|      |      |      |     |      |      |
|------|------|------|-----|------|------|
| 44.0 | 44.0 | 44.0 | 0.7 | 0.0  | 0.0  |
| 39.0 | 39.0 | 39.0 | 0.7 | 0.0  | 0.0  |
| 34.0 | 34.0 | 34.0 | 0.7 | 0.0  | 0.0  |
| 33.0 | 32.9 | 32.9 | 0.7 | -0.1 | -0.1 |
| 32.0 | 31.9 | 31.9 | 0.7 | -0.1 | -0.1 |
| 31.0 | 30.9 | 30.9 | 0.7 | -0.1 | -0.1 |
| 30.0 | 30.0 | 30.0 | 0.7 | 0.0  | 0.0  |

Measurements for an indication of the reference SPL on all other ranges which include it

| Other ranges | Expected level | Actual level | Tolerance | Deviation |
|--------------|----------------|--------------|-----------|-----------|
| dB           | dB             | dB           | +/- dB    | dB        |
| 20-140       | 94.0           | 94.0         | 0.7       | 0.0       |

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

| Ranges | Reference/Expected level | Actual level | Tolerance | Deviation |
|--------|--------------------------|--------------|-----------|-----------|
| dB     | dB                       | dB           | +/- dB    | dB        |
| 20-140 | 30.0                     | 30.0         | 0.7       | 0.0       |
|        | 138.0                    | 138.0        | 0.7       | 0.0       |

## FREQUENCY WEIGHTING TEST

The frequency response of the weighting networks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 54.6           | 54.6         | 1.5           | 1.5 | 0.0       |
| 63.1      | 94.0       | 67.8           | 67.8         | 1.5           | 1.5 | 0.0       |
| 125.9     | 94.0       | 77.9           | 77.9         | 1.0           | 1.0 | 0.0       |
| 251.2     | 94.0       | 85.4           | 85.4         | 1.0           | 1.0 | 0.0       |
| 501.2     | 94.0       | 90.8           | 90.8         | 1.0           | 1.0 | 0.0       |
| 1995.0    | 94.0       | 95.2           | 95.2         | 1.0           | 1.0 | 0.0       |
| 3981.0    | 94.0       | 95.0           | 95.0         | 1.0           | 1.0 | 0.0       |
| 7943.0    | 94.0       | 92.9           | 92.9         | 1.5           | 3.0 | 0.0       |
| 12590.0   | 94.0       | 89.7           | 89.2         | 3.0           | 6.0 | -0.5      |

Frequency weighting C:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 91.0           | 91.0         | 1.5           | 1.5 | 0.0       |



Test Data for Sound Level Meter

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Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2749852  
Serial No. 2695393

Date 21-Nov-2014

Report: 14CA1120 03-01

|         |      |      |      |     |     |      |
|---------|------|------|------|-----|-----|------|
| 63.1    | 94.0 | 93.2 | 93.2 | 1.5 | 1.5 | 0.0  |
| 125.9   | 94.0 | 93.8 | 93.8 | 1.0 | 1.0 | 0.0  |
| 251.2   | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0  |
| 501.2   | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0  |
| 1995.0  | 94.0 | 93.8 | 93.8 | 1.0 | 1.0 | 0.0  |
| 3981.0  | 94.0 | 93.2 | 93.2 | 1.0 | 1.0 | 0.0  |
| 7943.0  | 94.0 | 91.0 | 91.0 | 1.5 | 3.0 | 0.0  |
| 12590.0 | 94.0 | 87.8 | 87.3 | 3.0 | 6.0 | -0.5 |

Frequency weighting Lin:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 94.0           | 94.1         | 1.5           | 1.5 | 0.1       |
| 63.1      | 94.0       | 94.0           | 94.0         | 1.5           | 1.5 | 0.0       |
| 125.9     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 251.2     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 501.2     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 1995.0    | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 3981.0    | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 7943.0    | 94.0       | 94.0           | 94.0         | 1.5           | 3.0 | 0.0       |
| 12590.0   | 94.0       | 94.0           | 93.5         | 3.0           | 6.0 | -0.5      |

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

| Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|------------|----------------|--------------|---------------|-----|-----------|
| dB         | dB             | dB           | +             | -   | dB        |
| 116.0      | 115.0          | 115.0        | 1.0           | 1.0 | 0.0       |

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

| Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|------------|----------------|--------------|---------------|-----|-----------|
| dB         | dB             | dB           | +             | -   | dB        |
| 116.0      | 111.9          | 111.9        | 1.0           | 1.0 | 0.0       |

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)



Test Data for Sound Level Meter

Page 4 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2749852  
Serial No. 2695393

Date 21-Nov-2014

Report: 14CA1120 03-01

|                | Ref. Level | Expected level | Tone burst signal | Tolerance | Deviation |
|----------------|------------|----------------|-------------------|-----------|-----------|
| Time weighting | dB         | dB             | indication(dB)    | +/- dB    | dB        |
| Slow           | 118.0+6.6  | 118.0          | 117.9             | 0.5       | -0.1      |

**TIME WEIGHTING IMPULSE TEST**

Time weighting l is tested on the reference range (Set the SLM to LAImax)

Test frequency: 2000 Hz

Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

| Ref. Level | Single burst indication |             | Tolerance | Deviation |
|------------|-------------------------|-------------|-----------|-----------|
| dB         | Expected (dB)           | Actual (dB) | +/- dB    | dB        |
| 120.0      | 111.2                   | 111.1       | 2.0       | -0.1      |

Repeated at 100 Hz

| Ref. Level | Repeated burst indication |             | Tolerance | Deviation |
|------------|---------------------------|-------------|-----------|-----------|
| dB         | Expected (dB)             | Actual (dB) | +/- dB    | dB        |
| 120.0      | 117.3                     | 117.2       | 1.0       | -0.1      |

**TIME AVERAGING TEST**

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

| Repetition Time | Level of tone burst | Expected Leq | Actual Leq | Tolerance | Deviation | Remarks      |
|-----------------|---------------------|--------------|------------|-----------|-----------|--------------|
| msec            | dB                  | dB           | dB         | +/- dB    | dB        |              |
| 1000            | 110.0               | 110.0        | 109.9      | 1.0       | -0.1      | 60s integ.   |
| 10000           | 100.0               | 100.0        | 99.9       | 1.0       | -0.1      | 6min. integ. |

**PULSE RANGE AND SOUND EXPOSURE LEVEL TEST**

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz

Integration time: 10 sec

The integrating sound level meter set to Leq:

| Duration | Rms level of tone burst | Expected | Actual | Tolerance | Deviation |
|----------|-------------------------|----------|--------|-----------|-----------|
| msec     | (dB)                    | dB       | dB     | +/- dB    | dB        |
| 10       | 120.0                   | 90.0     | 90.0   | 1.7       | 0.0       |

The integrating sound level meter set to SEL:

| Duration | Rms level of tone burst | Expected | Actual | Tolerance | Deviation |
|----------|-------------------------|----------|--------|-----------|-----------|
| msec     | (dB)                    | dB       | dB     | +/- dB    | dB        |
| 10.0     | 120.0                   | 100.0    | 100.0  | 1.7       | 0.0       |



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: 2250  
Microphone type: 4189

Serial No. 2749852  
Serial No. 2695393

Date 21-Nov-2014

Report: 14CA1120 03-01

OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz  
Amplitude: 2 dB below the upper limit of the primary indicator range.  
Burst repetition frequency: 40 Hz  
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

| Level            | Level reduced by | Further reduced | Difference | Tolerance | Deviation |
|------------------|------------------|-----------------|------------|-----------|-----------|
| at overload (dB) | 1 dB             | 3 dB            | dB         | dB        | dB        |
| 134.3            | 133.3            | 130.3           | 3.0        | 1.0       | 0.0       |

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as follow  
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range

Test frequency: 4000 Hz  
Integration time: 10 sec  
Single burst duration: 1 msec

| Rms level        | Level reduced by | Expected level | Actual level | Tolerance | Deviation |
|------------------|------------------|----------------|--------------|-----------|-----------|
| at overload (dB) | 1 dB             | dB             | dB           | dB        | dB        |
| 140.9            | 139.9            | 99.9           | 99.9         | 2.2       | 0.0       |

ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

| Frequency | Expected level | Actual level  | Tolerance (dB) |     | Deviation |
|-----------|----------------|---------------|----------------|-----|-----------|
| Hz        | dB             | Measured (dB) | +              | -   | dB        |
| 1000      | 94.0           | 94.0          | 0.0            | 0.0 | 0.0       |
| 125       | 77.9           | 77.8          | 1.0            | 1.0 | -0.1      |
| 8000      | 92.9           | 93.2          | 1.5            | 3.0 | 0.3       |

-----END-----



## CERTIFICATE OF CALIBRATION

Certificate No.: 15CA1110 01

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: B & K  
Type/Model No.: 4231  
Serial/Equipment No.: 2309393  
Adaptors used: -

### Item submitted by

Customer: MTR Corporation Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 10-Nov-2015

Date of test: 11-Nov-2015

### Reference equipment used in the calibration

| Description:            | Model:   | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2341427    | 15-Apr-2016  | SCL           |
| Preamplifier            | B&K 2673 | 2743150    | 22-Apr-2016  | CEPREI        |
| Measuring amplifier     | B&K 2610 | 2346941    | 22-Apr-2016  | CEPREI        |
| Signal generator        | DS 360   | 61227      | 16-Apr-2016  | CEPREI        |
| Digital multi-meter     | 34401A   | US36087050 | 17-Apr-2016  | CEPREI        |
| Audio analyzer          | 8903B    | GB41300350 | 17-Apr-2016  | CEPREI        |
| Universal counter       | 53132A   | MY40003662 | 16-Apr-2016  | CEPREI        |

### Ambient conditions

Temperature:  $22 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1010 \pm 5$  hPa

### Test specifications

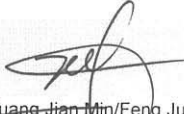
- 1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
-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

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

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

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 12-Nov-2015

Company Chop:



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



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 15CA1110 01

Page: 2 of 2

### 1, Measured Sound Pressure Level

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

| Frequency<br>Shown<br>Hz | Output Sound Pressure<br>Level Setting<br>dB | Measured Output<br>Sound Pressure Level<br>dB | (Output level in dB re 20 $\mu$ Pa)     |
|--------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------|
|                          |                                              |                                               | Estimated Expanded<br>Uncertainty<br>dB |
| 1000                     | 94.00                                        | 94.06                                         | 0.10                                    |

### 2, Sound Pressure Level Stability - Short Term Fluctuations

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

At 1000 Hz STF = 0.002 dB

Estimated expanded uncertainty 0.005 dB

### 3, Actual Output Frequency

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

At 1000 Hz Actual Frequency = 1000.0 Hz

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

### 4, Total Noise and Distortion

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

At 1000 Hz TND = 0.5 %

Estimated expanded uncertainty 0.7 %

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

Calibrated by:

Date:

Fung Chi Yip  
11-Nov-2015

- End -

Checked by:

Date:

Lam Tze Wai  
12-Nov-2015

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

## Appendix F

### Monitoring Schedules

### Noise Impact Monitoring

1. The noise impact monitoring schedule for the present reporting period is shown in Section 3.1.
2. The noise impact monitoring schedule for the next reporting period will commence on 10 March 2016 and will be conducted at a frequency of once a week when construction activities are underway.