

6 NOISE IMPACT

6.1 Introduction

6.1.1 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of noise impacts during the construction phase of the Project are presented. The proposed mitigation measures during construction and operation phase of the Project are also described in this section.

6.1.2 Construction noise impacts from this Project are predicted at the identified Noise Sensitive Receivers (NSRs). Noise mitigation measures would be required to reduce noise levels to the stipulated standard. A noise monitoring programme shall be undertaken to ensure such mitigation measures would be implemented properly.

6.2 Noise Parameters

Construction Phase

6.2.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{eq} (30 minutes) shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, L_{eq} (5 minutes) shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.

6.2.2 Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet based on the one presented in the EM&A Guidelines for Development Projects in Hong Kong is shown in **Appendix B**. The ET Leader may modify the data record sheet for this EM&A programme, of which the format should be agreed by the ER and the IEC.

6.3 Monitoring Equipment

6.3.1 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB.

6.3.2 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

6.3.3 The ET is responsible for the provision of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

6.4 Monitoring Locations

- 6.4.1 The locations of construction noise monitoring stations are summarized in **Table 6.1** and shown in **Figure 2.2**. These locations represent the worst affected sensitive receivers during construction phase of the Project.

Table 6.1 Noise Monitoring Stations

| Noise Monitoring Station | NSR ID in EIA Report | Noise Monitoring Location |
|--------------------------|----------------------|--|
| M1 | N4 | Buddhist Chi King Primary School |
| M2 | N5 | S.K.H Kowloon Bay Kei Lok Primary School |
| M3 | N10 | Rhythm Garden |
| M4 | N11 | Cognitio College |
| M5 | N13 | Lee Kau Yan Memorial School |
| M6 | N14 | Nam Yuen |
| M7 | N23 | Holly Carpenter Primary School |
| M8 | N27 | CCC Kei To Secondary School |
| M9 | N28 | Po Leung Kuk Ngan Po Ling College |
| M10 | PN34 | Site 1B1 (Planned) |
| M11 | PN38 | Site 1B4 (Planned) |

- 6.4.2 The status and locations of noise sensitive receivers may change after issuing this Manual. If such case exists, the ET Leader shall propose updated monitoring locations and seek approval from EPD and agreement from the ER and the IEC before baseline monitoring commences.
- 6.4.3 When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:
- (i) Monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts;
 - (ii) Monitoring at the noise sensitive receivers as defined in the Technical Memorandum; and
 - (iii) Assurance of minimal disturbance to the occupants during monitoring.
- 6.4.4 The monitoring station shall normally be at a point 1 m from the exterior of the sensitive receiver building facade and be at a position 1.2 m above the ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3 dB(A) shall be made to the free field measurements. The ET shall agree with the IEC on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

6.5 Baseline Monitoring

Construction Phase

- 6.5.1 The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least two weeks. Before commencing the baseline monitoring, the ET shall develop and submit to the IEC the baseline monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.
- 6.5.2 There shall not be any construction activities in the vicinity of the stations during the baseline monitoring.
- 6.5.3 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the ER, EPD and IEC to agree on an appropriate set of data to be used as a baseline reference and submit to the ER and IEC for agreement and EPD for approval.

6.6 Impact Monitoring

Construction Phase

- 6.6.1 Noise monitoring shall be carried out at all the designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:
- one set of measurements between 0700 and 1900 hours on normal weekdays.
- 6.6.2 If construction works are extended to include works during the hours of 1900 – 0700 as well as public holidays and Sundays, additional weekly impact monitoring shall be carried out during respective restricted hours periods. Applicable permits under NCO shall be obtained by the Contractor.
- 6.6.3 If a school exists near the construction activity, noise monitoring shall be carried out at the monitoring stations for the schools during the school examination periods. The ET Leader shall liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.
- 6.6.4 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 6.3**, shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or demonstrated to be unrelated to the construction activities.

6.7 Event and Action Plan

Construction Phase

- 6.7.1 The Action and Limit levels for construction noise are defined in **Table 6.2**. Should non-compliance of the criteria occur, action in accordance with the Event and Action Plan in **Table 6.3** shall be implemented.

Table 6.2 Action and Limit Levels for Construction Noise

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

Notes: If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

* 70 dB(A) and 65 dB(A) for schools during normal teaching periods and school examination periods, respectively.

6.8 Mitigation Measures

Construction Phase

6.8.1 To alleviate the construction noise impact on the affected NSRs, movable noise barriers and acoustic mats are proposed to be provided for particular items of plant and construction works. It is anticipated that a movable noise barrier with a cantilevered upper portion located within 5m from any static or mobile plant can provide 5 dB(A) noise reduction for mobile plant and 10 dB(A) noise reduction for static plant. The barrier material shall have a surface mass of not less than 14 kg/m² on skid footing with 25 mm thick internal sound absorptive lining to achieve the maximum screening effect.

6.8.2 In addition, the good site practices listed below shall be adopted by all the Contractors to further ameliorate the noise impacts.

- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program.
- Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction program.
- Mobile plant, if any, should be sited as far away from NSRs as possible.
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

6.8.3 If the above measures are not sufficient to restore the construction noise quality to acceptable levels upon the advice of ET Leader, the contractor shall liaise with the ET Leader to identify further mitigation measures. They shall be proposed to ER for approval, and the contractor shall then implement these additional mitigation measures.

Operation Phase

6.8.4 The following direct mitigation measures, as shown in **Figure 2.3**, have been proposed in the EIA.

- Low noise surfacing on Road L2; and
- Low noise surfacing on Road L4.

6.8.5 The EIA report has provided the maximum allowable sound power levels for fixed noise sources. The SWL criteria shall be implemented and refined by the Contractor. The Contractor should also carry out a noise commissioning test for all fixed noise sources before operation of the Project, in order to ensure compliance of the operational airborne noise levels with the TM's stipulated noise standard.

6.8.6 The implementation schedule for the recommended mitigation measures is presented in **Appendix A4**.

Table 6.3 Event/Action Plan for Construction Noise

| EVENT | ACTION | | | |
|-----------------------------|---|---|--|---|
| | ET | IEC | ER | CONTRACTOR |
| Action Level being exceeded | <ol style="list-style-type: none"> 1. Notify ER, IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> | <ol style="list-style-type: none"> 1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Advise the ER on the effectiveness of the proposed remedial measures. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> | <ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> |
| Limit Level being exceeded | <ol style="list-style-type: none"> 1. Inform IEC, ER, Contractor and EPD; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contractor's working procedures; 6. Discuss with the IEC, Contractor and ER on remedial measures required; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> | <ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures; 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> | <ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated. <p>(The above actions should be taken within 2 working days after the exceedance is identified)</p> |