

2 EM&A ON NEW DISTRIBUTOR ROADS SERVING THE PLANNED KTD

2.1 Introduction

- 2.1.1 This section details the specific EM&A requirements for Schedule 2 DP1: New Distributor Roads Serving the Planned KTD. The requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of this DP are presented. The project organisation, site environmental audit and reporting requirements are stipulated in Chapters 1, 14 & 15 of this Manual respectively.

2.2 Air Quality Impact

- 2.2.1 Monitoring and audit of the TSP levels shall be carried out during the construction phase by the ET to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.
- 2.2.2 1-hour and 24-hour average TSP levels shall be measured to indicate the impacts of construction dust on air quality. The 24-hour average TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the United States Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon agreement from the Engineer's Representative (ER) and the IEC, 1-hour average TSP levels can be measured by direct reading methods to indicate short-term impacts.
- 2.2.3 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, other local atmospheric factors affecting or affected by site conditions and work progress of the concerned site etc. shall be recorded in detail. 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.

Monitoring Equipment

- 2.2.4 High volume samplers (HVSs) in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:
- 0.6 - 1.7 m³ per minute (20 - 60 standard cubic feet per minute) adjustable flow range;
 - Equipped with a timing / control device with ± 5 minutes accuracy for 24 hours operation;
 - Installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
 - Capable of providing a minimum exposed area of 406 cm²;
 - Flow control accuracy: $\pm 2.5\%$ deviation over 24-hour sampling period;
 - Equipped with a shelter to protect the filter and sampler;
 - Incorporated with an electronic mass flow rate controller or other equivalent devices;
 - Equipped with a flow recorder for continuous monitoring;
 - Provided with a peaked roof inlet;
 - Incorporated with a manometer;
 - Able to hold and seal the filter paper to the sampler housing at horizontal position;
 - Easy to change the filter;
 - Capable of operating continuously for 24-hour period.

- 2.2.5 The ET shall be responsible for the provision of the monitoring equipment. The ET shall provide sufficient number of HVSs with appropriate calibration kit for carrying out the baseline, regular impacts monitoring and ad-hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc, shall be clearly labelled.
- 2.2.6 Initial calibration of the dust monitoring equipment shall be conducted upon installation and prior to commissioning, and at bi-monthly intervals subsequently. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by the concerned parties such as the IEC. All the data shall be converted into standard temperature and pressure condition.
- 2.2.7 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded on the data sheet as shown in **Appendix B**.
- 2.2.8 If the ET proposes to use a direct reading dust meter to measure 1-hour average TSP levels, he/she shall submit sufficient information to the ER and the IEC to prove that the instrument is capable of achieving a comparable result as that of the HVS before it may be used for the monitoring works. The instrument shall also be calibrated regularly, and the 1-hour sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.
- 2.2.9 Wind data monitoring equipment shall also be provided by the ET and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the ER in consultation with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:
- (i) The wind sensors shall be installed 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
 - (ii) The wind data shall be captured by a data logger. The data shall be downloaded for analysis at least once a month;
 - (iii) The wind data monitoring equipment shall be re-calibrated at least once every six months; and
 - (iv) Wind direction should be divided into 16 sectors of 22.5 degrees each.
- 2.2.10 In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IEC.

Laboratory Measurement / Analysis

- 2.2.11 A clean laboratory with constant temperature and humidity control and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory shall be HOKLAS accredited or other internationally accredited laboratory.
- 2.2.12 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the IEC. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the IEC.
- 2.2.13 The IEC shall conduct regular audit of the measurement performed by the laboratory so as to ensure the accuracy of measurement results. The ET shall provide the ER and the IEC with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for their reference.

- 2.2.14 Filter paper of size 8"x10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hour and be pre-weighed before use for the sampling.
- 2.2.15 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1mg. The balance shall be regularly calibrated against a traceable standard.
- 2.2.16 All the collected samples shall be kept in a good condition for 6 months before disposal.

Monitoring Locations

- 2.2.17 The proposed dust monitoring locations are shown in **Figure 2.1**. The selected monitoring locations are the ASRs located near to the construction site(s) of this DP. The proposed air quality monitoring locations are listed in **Table 2.1** below.

Table 2.1 Proposed Air Quality Monitoring Locations

Location	ASR ID in EIA	Description
AM1	A29	Rhythm Garden
AM2	A32	Lee Kau Yan Memorial School
AM3	A40	Sky Tower
AM4	A47	Grand Waterfront
AM5	A58	CCC Kei To Secondary School
AM6	PA15	Site 1B4 (Planned)

- 2.2.18 The status and locations of the ASRs may change after issuing this Manual. The ET shall propose updated monitoring locations and seek approval from EPD, and agreement from the ER and the IEC before baseline monitoring commences.
- 2.2.19 When alternative monitoring locations are proposed, the following criteria, as far as practicable, shall be followed:
- (i) At the site boundary or such locations close to the major dust emission source;
 - (ii) Close to the ASRs;
 - (iii) Proper position/sitting and orientation of the monitoring equipment; and
 - (iv) Take into account the prevailing meteorological conditions.
- 2.2.20 The ET shall agree with the ER on the position of the HVS for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:
- (i) A horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
 - (ii) No two samplers shall be placed less than 2 metres apart;
 - (iii) The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
 - (iv) A minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;

- (v) A minimum of 2 metres of separation from any supporting structure, measured horizontally is required;
- (vi) No furnace or incinerator flue is nearby;
- (vii) Airflow around the sampler is unrestricted;
- (viii) The sampler is more than 20 metres from the dripline;
- (ix) Any wire fence and gate, to protect the sampler, shall not cause any obstruction during monitoring;
- (x) Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- (xi) A secured supply of electricity is needed to operate the samplers.

Baseline Monitoring

- 2.2.21 Baseline monitoring shall be carried out to determine the ambient 1-hour and 24-hour average TSP levels at the monitoring locations prior to the commencement of the construction works. During the baseline monitoring, there shall not be any construction or dust generating activities in the vicinity of the monitoring stations. The baseline monitoring will provide data for the determination of the appropriate Action Levels with the Limit Levels set against statutory or otherwise agreed limits.
- 2.2.22 Before commencing the baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.
- 2.2.23 Baseline monitoring shall be carried out at all of the designated monitoring locations for at least 14 consecutive days prior to the commissioning of the construction works to obtain daily 24-hour TSP samples. One-hour sampling shall also be done at least 3 times per day. Baseline monitoring shall be carried out under typical weather conditions. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources shall also be recorded throughout the baseline monitoring period.
- 2.2.24 In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring location shall be approved by the ER and agreed with the IEC.
- 2.2.25 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the ER, the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to the ER and the IEC for agreement and EPD for approval.
- 2.2.26 Baseline checking of ambient TSP levels shall be carried out every three months at each monitoring location, when no dusty works activities are in operation. If the ET considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring may be carried out to update the baseline levels. The revised baseline levels, and hence the revised Action and Limit Levels, shall be agreed with the ER, EPD and the IEC.

Impact Monitoring

- 2.2.27 The ET shall carry out impact monitoring during the construction phase of the DP. For regular impact monitoring, a sampling frequency of at least once in every six days shall be strictly observed at all of the monitoring stations for 24-hour TSP monitoring. For 1-hour TSP monitoring, the sampling frequency of at least three times in every six days shall be undertaken when the highest dust impact occurs.
- 2.2.28 Before commencing the impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the impact monitoring results.
- 2.2.29 The specific time to start and stop the 24-hour TSP monitoring shall be clearly defined for each location and be strictly followed by the field operator.
- 2.2.30 In case of non-compliance with the Action and Limit Levels, more frequent monitoring, as specified in the Event and Action Plan in **Table 2.2**, shall be conducted within 24 hours after the non-compliance is known. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

Event and Action Plan

- 2.2.31 The baseline monitoring results form the basis for determining the Action and Limit Levels for the impact monitoring. The ET shall compare the impact monitoring results with the Action and Limit Levels for 1-hour and 24-hour average TSP. **Table 2.2** shows the Action and Limit Levels to be used. Should non-compliance of the Action and Limit Levels occurs, action in accordance with the Event and Action Plan in **Table 2.3** shall be carried out.

Table 2.2 Action and Limit Levels for Construction Dust Monitoring

Parameter	Action Level ⁽¹⁾	Limit Level
24-hour average TSP	BL ≤ 200 µg m ⁻³ , AL = (BL * 1.3 + LL)/2 BL > 200 µg m ⁻³ , AL = LL	260 µg m ⁻³
1-hour average TSP	BL ≤ 384 µg m ⁻³ , AL = (BL * 1.3 + LL)/2 BL > 384 µg m ⁻³ , AL = LL	500 µg m ⁻³

Note: (1) BL = Baseline level, AL = Action Level, LL = Limit Level.

Table 2.3 Event and Action Plan for Construction Dust Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level being exceeded by one sampling	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Inform Contractor, IEC and ER; 3. Repeat measurement to confirm finding. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Action Level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Inform Contractor, IEC and ER; 3. Increase monitoring frequency to daily; 4. Discuss with IEC and Contractor on remedial actions required; 5. Assess the effectiveness of Contractor's remedial actions; 6. If exceedance continues, arrange meeting with IEC and ER; 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise implementation of remedial measures; 5. Conduct meeting with ET and IEC if exceedance continues. 	<ol style="list-style-type: none"> 1. Discuss with ET and IEC on proper remedial actions; 2. Submit proposals for remedial actions to ER and IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Limit Level being exceeded by one sampling	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Inform Contractor, IEC, ER, and EPD; 3. Repeat measurement to confirm finding; 4. Assess effectiveness of Contractor's remedial actions and keep EPD, IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise implementation of remedial measures; 5. Conduct meeting with ET and IEC if exceedance continues. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Discuss with ET and IEC on proper remedial actions; 3. Submit proposals for remedial actions to ER and IEC within three working days of notification; 4. Implement the agreed proposals.
Limit Level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> 1. Notify IEC, ER, Contractor and EPD; 2. Repeat measurement to confirm findings; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Discuss with ET, ER and IEC on proper remedial actions;

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	3. Carry out analysis of Contractor's working procedures to identify source and investigate the causes of exceedance; 4. Increase monitoring frequency to daily; 5. Arrange meeting with IEC, ER and Contractor to discuss the remedial actions to be taken; 6. Assess effectiveness of Contractor's remedial actions and keep EPD, IEC and ER informed of the results; 7. If exceedance stops, cease additional monitoring.	3. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.	agree with the Contractor on the remedial measures to be implemented; 4. Supervise 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.	3. Submit proposals for remedial actions to IEC within three working days of notification; 4. Implement the agreed proposals; 5. Submit further remedial actions if problem still not under control; 6. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.

Mitigation Measures

- 2.2.32 Mitigation measures for construction dust are recommended in the EIA Report. The Contractor shall be responsible for the design and implementation of these measures.
- 2.2.33 In order to ensure compliance with the acceptable criteria at the ASRs at all time, requirements of the *Air Pollution Control (Construction Dust) Regulation* shall be adhered to during the construction period. Misting for any stockpile of materials and provision of windbreaks on three sides are proposed to prevent wind erosion. An environmental monitoring and auditing program shall be implemented to monitor the construction process in order to enforce controls and modify methods of work if dusty conditions are arisen. In addition, the following good site practices are recommended to minimise dust and other air pollutants impacts during excavation, transportation, and loading and unloading of dusty material:
- Stockpiling site(s) should be lined with impermeable sheeting and banded. Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.
 - Misting for the dusty material should be carried out before being loaded into the vehicle.
 - Any vehicle with an open load carrying area should have properly fitted side and tail boards.
 - Material having the potential to create dust should not be loaded from a level higher than the side and tail boards and should be dampened and covered by a clean tarpaulin.
 - The tarpaulin should be properly secured and should extend at least 300 mm over the edges of the sides and tailboards. The material should also be dampened if necessary before transportation.
 - The vehicles should be restricted to maximum speed of 10 km per hour and confined haulage and delivery vehicle to designated roadways inside the site. On-site unpaved roads should be compacted and kept free of loose materials.
 - Vehicle washing facilities should be provided at every vehicle exit point.
 - The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores.
 - Every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet.
 - Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides.
 - Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.
- 2.2.34 The implementation schedule for the recommended air quality impact mitigation measures is presented in **Appendix A1**.

2.3 Noise Impact

Noise Parameters

Construction Phase

- 2.3.1 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.
- 2.3.2 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.

Monitoring Equipment

- 2.3.3 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.
- 2.3.4 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.
- 2.3.5 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.

Monitoring Locations

- 2.3.6 The locations of construction and operational noise monitoring stations are summarized in **Table 2.4** and shown in **Figure 2.2**. These locations represent the worst affected sensitive receivers during construction.

Table 2.4 Noise Monitoring Stations

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

- 2.3.7 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.
- 2.3.8 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.
- 2.3.9 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.

Baseline Monitoring

Construction Phase

- 2.3.10 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.
- 2.3.11 There shall not be any construction activities in the vicinity of the stations during the baseline monitoring.
- 2.3.12 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.

Impact Monitoring

Construction Phase

- 2.3.13 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.
- 2.3.14 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.
- 2.3.15 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.
- 2.3.16 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 2.6**, 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.

Event and Action Plan

Construction Phase

- 2.3.17 The Action and Limit levels for construction noise are defined in **Table 2.5**. Should non-compliance of the criteria occur, action in accordance with the Event and Action Plan in **Table 2.6** shall be implemented.

Table 2.5 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.

Mitigation Measures

Construction Phase

- 2.3.18 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 25mm thick internal sound absorptive lining to achieve the maximum screening effect.
- 2.3.19 In addition, the good site practices listed below should 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.
- 2.3.20 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.
- 2.3.21 The implementation schedule for the recommended mitigation measures is presented in **Appendix A1**.

Table 2.6 Event/Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level being exceeded	<ol style="list-style-type: none"> 4. Notify ER, IEC and Contractor; 5. Carry out investigation; 6. Report the results of investigation to the IEC, ER and Contractor; 7. Discuss with the IEC and Contractor on remedial measures required; 8. 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>

2.4 Water Quality Impact

Introduction

- 2.4.1 No off-site marine water quality impact would be expected from the Project and given that there would not be any marine-based works for the proposed works, water quality monitoring is not considered necessary. However, it is recommended that regular site audits (at least once per week) be undertaken to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented. Proposed mitigation measures for containing and minimizing water quality impacts are listed in the implementation schedule given in **Appendix A1**.

Site Audits

- 2.4.2 Implementation of regular site audits (at least once per week) is to ensure that the recommended mitigation measures are to be properly undertaken. It can also provide an effective control of any malpractices and therefore achieve continual improvement of environmental performance on site.

- 2.4.3 Site audits shall include site inspections and monitoring audits.

Site Inspections

- 2.4.4 Site inspections shall be carried out by the ET and shall be based on the mitigation measures for water pollution control recommended in the implementation schedule as attached in **Appendix A1**. In the event that the recommended mitigation measures are not fully or properly implemented, deficiency shall be recorded and reported to the site management. Suitable actions are to be carried out to:

- Investigate the problems and the causes;
- Issue action notes to the Contractor which is responsible for the works;
- Implement remedial and corrective actions immediately;
- Re-inspect the site conditions upon completion of the remedial and corrective actions; and
- Record the event and discuss with the Contractor for preventive actions.

Monitoring Audits

- 2.4.5 Monitoring audits are to be undertaken to ensure that a valid discharge license has been issued by EPD prior to the discharge of effluent from the Project site. Parameters included in the WPCO licence, will also be included in the monitoring programme. The chemical testing of water samples collected in the monitoring programme should be undertaken by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. The audit results reflect whether the effluent quality is in compliance with the discharge license requirements and that the recommended water quality mitigation measures are properly implemented. In case of non-compliance, suitable actions should be undertaken to:

- Notify the site management for the non-compliance;
- Identify the sources of pollution;
- Check the implementation status of the recommended mitigation measures;
- Investigate the operating conditions of the on-site treatment systems;
- Implement corrective and remedial actions to improve the effluent quality;
- Increase monitoring frequency until the effluent quality is in compliance with the discharge licence requirements; and
- Record the non-compliance and propose preventive measures.

2.5 Waste Management Implications

Introduction

- 2.5.1 Waste management will be the Contractor's responsibility to ensure that all wastes produced during the construction works of the Project are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements.
- 2.5.2 Waste materials generated during the construction works, such as, general refuse and chemical wastes, are recommended to be audited at regular intervals (at least once per week) to ensure that proper storage, transportation and disposal practices are being implemented. This monitoring of waste management practices will ensure that these solid and liquid wastes are not disposed into the nearby harbour waters. The Contractor will be responsible for the implementation of any mitigation measures to minimise waste or redress problems arising from the waste materials.

Waste Control and Mitigation Measures

- 2.5.3 Mitigation measures for waste management are summarised below. With the appropriate handling, storage and removal of waste arisings during the construction works as defined below, the potential to cause adverse environmental impacts will be minimised.

Good Site Practices

- 2.5.4 Adverse impacts related to waste management are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction works include:
- 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 wastes generated at the site;
 - Training of site personnel in proper waste management and chemical waste handling procedures;
 - Provision of sufficient waste disposal points and regular collection for disposal;
 - Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
 - Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
 - A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites).

Waste Reduction Measures

- 2.5.5 Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:
- Sorting C&D waste from construction activities to recover recyclable portions such as metals;
 - 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;
 - Encouraging collection of aluminium cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force;
 - Recycling any unused chemicals or those with remaining functional capacity;
 - Proper storage and site practices to minimise the potential for damage or contamination of construction materials;
 - Planning and stocking construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.
- 2.5.6 In addition to the above measures, specific mitigation measures are recommended below for the identified waste arisings to minimise environmental impacts during handling, transportation and disposal of these wastes.

Construction and Demolition Material

- 2.5.7 The C&D material should be sorted on-site into inert C&D material (that is, public fill) and C&D waste. The inert C&D material would require disposal to the designated public fill reception facility. C&D waste, such as steel and other metals should be re-used or recycled and, as a last resort, disposed of to landfill. It is recommended that a suitable area be designated to facilitate the sorting process and a temporary stockpiling area will be required for the separated materials.
- 2.5.8 In order to monitor the disposal of public fill and C&D waste at public filling facilities and landfills, respectively, and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements and implemented by the ET. The IEC should be responsible for auditing the results of the system.

General Refuse

- 2.5.9 General refuse should be stored in enclosed bins or compaction units separate from C&D material. A licensed waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D material. Effective collection and storage methods (including enclosed and covered area) of site wastes would be required to prevent waste materials from being blown around by wind, wastewater discharge by flushing or leaching into the marine environment, or creating odour nuisance or pest and vermin problem.

Chemical Wastes

- 2.5.10 After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.
- 2.5.11 **Table 2.7** provides a summary of the various waste types likely to be generated during the construction works, together with the recommended handling and disposal methods.

Table 2.7 Summary of Waste Handling Procedures and Disposal Routes

Waste Type	Generated From Works Item	Total Quantity Generated	Quantity to be disposed off-site / re-used	Handling	Disposal
C&D Material	Distributor roads serving the planned Kai Tak Development	2,217 m ³ in total	Public fill / on-site reuse	Dust and water Dust quality mitigation measures	Sort on-site into Inert C&D material to be disposed off-site to the designated public fill reception facility, C&D material should be reused as far as practicable
Chemical Wastes	Lubrication oil, fuel etc. from operation, maintenance, and servicing of construction plant	Few cubic metres per month (preliminary estimate)	Few cubic metres per month (preliminary estimate)	Recycle on-site or by licensed companies Stored on-site within suitably designed containers	Chemical Waste Treatment Facility or other licensed facility
General Refuse	Waste paper, discarded containers etc. generated from workforce	Few cubic metres per month (preliminary estimate)	Few cubic metres per month (preliminary estimate)	Provide on-site refuse collection points	Refuse station for compaction and containerisation and then to landfill

- 2.5.12 The implementation schedule of the recommended mitigation measures is presented in **Appendix A1**.

2.6 Land Contamination Impact

- 2.6.1 The EIA study has evaluated the potential land contamination issues that may pose impacts on the construction of the new distributor roads. As indicated in the EIA study, no potential land contamination associated with Roads D1, D2 & D3 is anticipated; however potential land contamination impacts in association with the proposed Road D4 alignment were revealed from the land contamination investigations.
- 2.6.2 The proposed Road D4 alignment would encroach upon a small part of the sites of the ex-GFS building, the Radar Station and the EMSD Kowloon Bay Vehicle Repairing and Maintenance Workshop. Based on the findings of land contamination assessment, the extent of identified contamination within the ex-GFS building and the Radar Station does not fall within the alignment of Road D4, therefore adverse environmental impact of the ex-GFS building and the Radar Station in respect of land contamination on Road D4 is not anticipated. Therefore upon completion of any necessary decontamination works at the EMSD Kowloon Bay Vehicle Repairing and Maintenance Workshop, no adverse residual environmental impact in respect of land contamination on Road D4 is anticipated.
- 2.6.3 However, it should be noted that some small parts of the ex-GFS building and Radar Station including the transformer room and the generator room etc. were still under operation during the previous land contamination site investigation (SI), SI at those areas was not possible due to site accessibility and safety issues. For these remaining areas with potential land contamination concerns, a supplementary land contamination SI was recommended to be carried out upon the cessation of the operations under the Kai Tak Development Project. A supplementary sampling plan providing the sampling and laboratory analysis information for the supplementary SI in these areas has been provided in the respective CAR and CAR/RAP for Radar Station and ex-GFS building respectively.
- 2.6.4 During site investigation, no exceedances in Dutch B level were found among the soil samples collected in the areas surrounding the inaccessible areas in both Radar Station and ex-GFS building, contamination, if any, within those inaccessible areas are considered localized and surmountable and its impacts on the surrounding environment are considered to be minimal. It should be noted that those inaccessible areas do not fall within the alignment of Road D4 and thus any contamination identified within those inaccessible areas in the future would not affect the assessment on DP1 Project presented in this section.
- 2.6.5 For Electrical and Mechanical Services Department (EMSD) Kowloon Bay Vehicle Maintenance Workshop, EMSD as the current occupant shall conduct a detailed land contamination assessment and complete the necessary remediation prior to handing over the site back to the Government for construction of the proposed Road D4. The implementation schedule of the recommended mitigation measures is presented in **Appendix A1**.
- 2.6.6 With proper implementation and completion of the appropriate remediation action by EMSD for the Kowloon Bay Vehicle Maintenance Workshop site next to a section of Road D4, further mitigation measures with regards to land contamination would not be necessary for the construction and operation of this project. Hence, no environmental monitoring and audit requirements with regards to land contamination will be required for this project.

2.7 Impact on Cultural Heritage

- 2.7.1 The proposed Road D1 is situated in an area of archaeological potential. The archaeological investigation recently conducted for KTD confirmed that there is no archaeological potential in the vicinity of Road D1 except the area around Trench AA3. Further archaeological investigation and rescue excavation for the area around Trench AA3 will be conducted as the mitigation recommendations for KTD. No further archaeological investigation or mitigation will be required for Road D1. Proposed Road D1 is not in the vicinity of any built heritage resources and no adverse impacts will arise from the construction of Road D1.
- 2.7.2 The alignment of Roads D3 and D4 are in the vicinity of Fire Station C together with its adjacent pole, runway and seawall. However, the construction of Roads D3 and Road D4 would not encroach onto the site of Fire Station C and its adjacent wind pole. Besides, the construction of Roads D3 and Road D4 would also not affect the seawall and the shape of the runway, no adverse impacts on built heritage resources will arise from the construction of Roads D3 and D4. Besides, since the proposed Roads D2, D3 and D4 are all located on reclaimed land, the construction of the proposed Roads D2, D3 and D4 will not cause any adverse impacts on archaeological resources.
- 2.7.3 No mitigation will be required for the proposed DP1 Project and no EM&A requirements will be necessary.

2.8 Landscape and Visual Impact

Introduction

- 2.8.1 The EIA has recommended landscape and visual mitigation measures to be undertaken during both the construction and operational phases of the project. This section outlines the monitoring and audit of these measures.
- 2.8.2 The sensitive receivers are shown in **Figure 2.4A, 2.4B, 2.5A, 2.5B, 2.6A, 2.6B**.

Monitoring Details

- 2.8.3 The design, implementation and maintenance of landscape and visual mitigation measures should be checked to ensure that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest possible date and without compromise to the intention of the mitigation measures.
- 2.8.4 Site inspection and audit is necessary in the operation stage.

Table 2.8 Monitoring Programme

Stage	Monitoring Task	Monitoring Report	Form of Approval	Frequency
Design	Monitoring of design works against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken during detailed design and tender stages, to ensure that they fulfil the intentions of the mitigation measures. Any changes to the design, including design changes on site should also be checked.	Report by ER confirming that the design conforms to requirements of EP	Approved by Client	At Completion of Design Stage
Construction	Monitoring of the contractor's operations during the construction period.	Report on Contractor's compliance, by ET	Counter-signature of report by IEC	Weekly
Establishment Works	Monitoring of the planting works during the 24-month Establishment period after completion of the construction works.	Report on Contractor's compliance, by ET	Counter-signature of report by IEC	3 months

Design

- 2.8.5 The mitigation measures proposed within the EIA to mitigate the landscape and visual impacts of the scheme should be embodied into the detailed engineering design and landscape design drawings and contract documents. Designs should be checked to ensure that the measures are fully incorporated and that potential conflicts with civil engineering, geo-technical, structural, lighting, signage, drainage, underground utility and operational requirements are resolved prior to construction.

Construction & Establishment Period

- 2.8.6 The implementation of landscape construction works and subsequent maintenance operations during the 12-month establishment period must be supervised by fully qualified Landscape Resident Site Staff (Registered Landscape Architect or Professional Member of the Hong Kong Institute of landscape Architects).
- 2.8.7 Measures to mitigate landscape and visual impacts during construction should be checked to ensure compliance with the intended aims of the measures.
- 2.8.8 The progress of the engineering works shall be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken.

Baseline Monitoring

- 2.8.9 A one off survey shall be conducted prior to commencement of any construction works. A photographic record of the site at the time of the contractor's possession of the site shall be prepared by the Contractor and approved by the ER. The approved photographic Record shall be submitted to the Project proponent, ET, IEC and EPD for record.

Event/Action Plan for Landscape and Visual Works

- 2.8.10 Should non-compliance of the landscape and visual impacts occur, actions in accordance with the action plan stated in **Table 2.9** should be carried out.

Table 2.9 Event and Action Plan for Landscape and Visual Impact

EVENT ACTION LEVEL	ACTION			
	ET	IEC	ER	CONTRACTOR
Design Check	<ul style="list-style-type: none"> Check final design conforms to the requirements of EP and prepare report. 	<ul style="list-style-type: none"> Check report. Recommend remedial design if necessary 	<ul style="list-style-type: none"> Undertake remedial design if necessary 	
Non-conformity on one occasion	<ul style="list-style-type: none"> Identify Source Inform IEC and ER Discuss remedial actions with IEC, ER and Contractor Monitor remedial actions until rectification has been completed 	<ul style="list-style-type: none"> Check report Check Contractor's working method Discuss with ET and Contractor on possible remedial measures Advise ER on effectiveness of proposed remedial measures. Check implementation of remedial measures. 	<ul style="list-style-type: none"> Notify Contractor Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> Amend working methods Rectify damage and undertake any necessary replacement
Repeated Non-conformity	<ul style="list-style-type: none"> Identify Source Inform IEC and ER Increase monitoring frequency Discuss remedial actions with IEC, ER and Contractor Monitor remedial actions until rectification has been completed If non-conformity stops, cease additional monitoring 	<ul style="list-style-type: none"> Check monitoring report Check Contractor's working method Discuss with ET and Contractor on possible remedial measures Advise ER on effectiveness of proposed remedial measures Supervise implementation of remedial measures. 	<ul style="list-style-type: none"> Notify Contractor Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> Amend working methods Rectify damage and undertake any necessary replacement

Mitigation Measures

- 2.8.11 The landscape and visual impact assessment of the EIA recommends a series on mitigation measures, as noted below:

Landscape and Visual Mitigation Measures during Construction Phase

- All existing trees should be carefully protected during construction (CM1),
- Trees unavoidably affected by the works should be transplanted where practical. Detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBC 2/2004 and 3/2006. Final locations of transplanted trees should be agreed prior to commencement of the work (CM2),
- Control of night-time lighting (CM3),
- Erection of decorative screen hoarding (CM4).

Landscape and Visual Mitigation Measures during Operation Phase

- Compensatory tree planting should be incorporated into the proposed projects where trees are affected (OM1),
- Tall buffer screen tree / shrub / climber planting should be incorporated to soften hard engineering structures and facilities (OM2),
- Sensitive streetscape design should be incorporated along all new roads to reflect the new urban development in Kai Tak (OM3),
- Structure, ornamental tree / shrub / climber planting should be provided along roadside amenity strips and central dividers to enhance the townscape quality, where space is available (OM4),
- Aesthetically pleasing design as regard to the form, material and finishes should be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)