

3. AIR QUALITY

3.1 Introduction

- 3.1.1 The potential for SO₂, NO₂ and smoke emitted from the diesel-powered equipment during the construction phase is expected to be minimal as the number of such plant required on-site will be limited and under normal operation, equipment with proper maintenance is unlikely to cause significant dark smoke emissions. Notwithstanding, plant should be regularly maintained to minimise emissions.
- 3.1.2 The principal source of air pollution during the construction phase will be dust from exposed site areas, stockpiling, movement of vehicles along unpaved roads, excavation and handling of construction materials, all of which will be particularly relevant during the dry seasons.
- 3.1.3 However, the closest residential sensitive receivers to the proposed PAFF are low rise residential properties at Lung Kwu Tan and high rise residential blocks at Melody Gardens in Tuen Mun, both some 2 and 3km away respectively. In addition, the sensitive receivers are shielded from the PAFF site by topography. There is also a planned Holiday Camp to the east along Lung Man Road but this is about 550m away and as such not within the study area. However, the Shiu Wing Steel facility, cement plant and proposed Eco Park at Tuen Mun Area 38 adjacent to the site are considered to be sensitive to construction dust and as such dust predictions have been undertaken for these.

3.2 Relevant Legislation

- 3.2.1 Air quality is regulated through Annex 4 of the Technical Memorandum on EIA Process (TMEIA) which specifies compliance with the Air Quality Objectives (AQO) and other standards established under the Air Pollution Control Ordinance (APCO). The APCO and all regulations specified by this Ordinance, for example the Air Pollution Control (Construction Dust) Regulation, should be complied with. The 24 hour Total Suspended Particulates (TSP) AQO is 260 µg/m³.
- 3.2.2 In addition to the Air Quality Objectives, the TMEIA stipulates a criteria to meet the hourly TSP concentration of 500 µg/m³ measured at 298°K (25°C) and 101.325 kPa (1 atmosphere) for construction dust impact assessment.
- 3.2.3 The Air Pollution Control (Construction Dust) Regulation defines notifiable and regulatory works for achieving the purpose of dust control for a number of activities. The Regulation requires any notifiable work shall require advance notice to EPD. It also requires the contractor to ensure that the notifiable work and regulatory work will be carried out in accordance to the Schedule of the Regulation. Dust control and suppression measures are provided in the Schedule. Notifiable works are site formation; reclamation; demolition, foundation and superstructure construction for buildings; and road construction. Regulatory works are building renovation, road opening and resurfacing, slope stabilisation, and other activities including stockpiling, dusty material handling, excavation, concrete production, etc. This project is expected to include both notifiable and regulatory works.

3.2.4 The proposed PAFF is classed as a specified process under Part IV of the APCO and falls within the category “Organic Chemical Works” described in Schedule 1 of the Ordinance. The following relevant clause relates to the tank farm of the proposed PAFF:

“Works, not being a chemical process described in any other process of the following kinds in which:

- (b) any organic liquids, including liquid fuel are stored in tanks having an installed capacity exceeding 100m³.”

3.3 Mitigation Measures During Construction

3.3.1 Dust predictions at adjacent sensitive receivers show that some exceedances of both the 1-hour (500 µg/m³) and 24-hour (260 µg/m³) criteria could arise at Shiu Wing Steel and the EcoPark. As such twice daily watering of the site and watering of the construction area every 1.5 hours in the vicinity of SR3c during the works of site formation, stock piling, dusty material handling and excavation has been recommended. Also, in accordance with the Air Pollution Control (Construction Dust) Regulation, the Contractor will be required to ensure that dust control measures stipulated in the Regulation should be implemented to control dust emissions. Based upon this, the following dust control measures are recommended. These measures are also summarised in the Environmental Mitigation Implementation Schedules in Appendix A.

- (i) watering of the construction area every 1.5 hours in the vicinity of SR1, SR3a, SR3c and SR3d during site formation, stock piling, dusty material handling and excavation works;
- (ii) The Contractor shall, to the satisfaction of EPD, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the site boundary, dust levels are kept to acceptable levels;
- (iii) The Contractor shall not burn debris or other materials on the works areas;
- (iv) provide site hoarding not less than 2.4m at site boundary;
- (v) in hot, dry or windy weather, a watering programme shall maintain all exposed road surfaces and dust sources wet;
- (vi) dust creating activities shall be reprogrammed to avoid periods of high winds;
- (vii) where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used in dry conditions during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created;
- (viii) open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading;

- (ix) during transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards;
- (x) no earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site;
- (xi) areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable;
- (xii) all stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy conditions; and
- (xiii) provide awareness training in the need to minimise dust.

3.3.2 If the above measures are not sufficient to manage dust generation, upon the advice of the ETL, the Contractor shall liaise with the ES regarding other mitigation measures and consult the IEC for their effectiveness, and then propose these measures to the FSR for approval prior to the implementation of the measures.

3.4 EM&A Requirements

3.4.1 EM&A is recommended during the construction phase only and the effective management of dust arisings during the construction phase will be monitored through the site audit programme.

3.4.2 The aims of the dust audit are:

- ◆ to ensure that appropriate measures, including but not limited to those measures stipulated above, as being implemented with the aim to minimise and control dust arisings from the site; and
- ◆ to encourage good site practices.

3.4.3 The Contractor shall be required to pay attention to the environmental standard and guidelines detailed in Section 3.2 and carry out appropriate dust management measures.

3.4.4 During the site inspections and the document review procedures as mentioned in Chapter 11 of this Manual, the ES shall pay special attention to the issues relating to dust management and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong (see above Section 3.2).

3.4.5 The Contractor's dust management practices should be audited with reference to the checklist detailed in Table 3.1 below:

Table 3.1 Dust Management Checklist

Activities	Timing	Monitoring Frequency	If non-compliance, Action Required
Twice daily watering programme of exposed areas.	Throughout the works	Twice daily	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to initiate watering more frequently. Corrective action shall be undertaken within 48 hours. The ETL shall ensure that corrective action has been taken.
No burning of material on-site.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to cease burning material. The Contractor shall immediately suspend burning on site.
Watering programme of exposed areas in hot, dry or windy weather.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to initiate watering not less than once daily. Corrective action shall be undertaken within 48 hours. The ETL shall ensure that corrective action has been taken.
Dusty activities shall not be programme in periods of high winds	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to reschedule the works accordingly.
Water spraying during rock or concrete breaking.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to implement spraying. Corrective action shall be undertaken within 48 hours. The ETL shall ensure that corrective action has been taken.
Dropping heights shall be minimised to 2m.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to reduce dropping height. The ETL shall ensure that corrective action has been taken.



Activities	Timing	Monitoring Frequency	If non-compliance, Action Required
Demolition material/waste in dump trucks are properly covered before leaving the site.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to comply. The Contractor shall prevent trucks shall leaving the site until the waste are properly covered. The ETL shall ensure that corrective action has been taken.
Stockpiles contained so as not to cause a dust nuisance.	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to cover the spoil or implement watering. The ETL shall ensure that corrective action has been taken.
Wheel washing facilities are used and effective	Throughout the works	Weekly	The ETL shall inform the Contractor, FSR and IEC of the non-compliance. The FSR shall instruct the Contractor to use wheel washing facilities. The ETL shall ensure that corrective action has been taken.

Note: ETL – Environmental Specialist, IEC – Independent Checker (Environmental), FSR – Franchisee Site Representative

- 3.4.6 Should any ad hoc spot check monitoring be required of the Total Suspended Particulates (TSP) levels, this shall comprise monitoring of 1-hour TSP levels measured by direct reading methods. Any ad hoc monitoring shall be carried out by the Environmental Team Leader (ETL) (see Section 1) to ensure that construction works are not generating dust which exceeds the acceptable level.
- 3.4.7 Other relevant data including weather conditions and any other special phenomena and work progress of the concerned site shall be recorded in detail by the ETL. A sample data sheet is shown in Figure 3.1.
- 3.4.8 The Contractor is responsible for provision of the monitoring equipment if required and shall ensure that direct reading samplers with an appropriate calibration kit are available for carrying out ad hoc measurements if required. Calibration of dust monitoring equipment shall be conducted by the ETL in accordance with the manufacturer's recommendations. The calibration data shall be properly documented for future reference by concerned parties, such as the IEC.
- 3.4.9 Wind data monitoring equipment shall also be provided for logging wind speed and wind direction near to the dust monitoring locations if monitoring is required. The equipment installation location shall be proposed by the Contractor in consultation with the ETL and agreed with the FSR, in consultation with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- (i) the wind sensors should be installed on masts at an elevated level 10 m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- (ii) the wind data should be captured by a data logger to be down-loaded for processing at least once a month;
- (iii) the wind data monitoring equipment should be re-calibrated at least once every six months; and
- (iv) wind direction should be divided into 16 sectors of 22.5 degrees each.

3.4.10 In exceptional situations, the ETL may propose alternative methods to obtain representative wind data upon approval from the FSR and agreement from the IEC.

3.4.11 When selecting sites for ad hoc monitoring, the following preferred locations and factors shall be considered:

- (i) the site boundary or locations close to the major dust emission source; and
- (ii) the prevailing meteorological conditions.

3.4.12 The ETL shall agree with the FSR, in consultation with the IEC, the position of the ad hoc monitoring.



Figure 3.1 Data Sheet for TSP Monitoring

Monitoring Location:	
Details of Location:	
Sampler Identification:	
Date & Time of Sampling:	
Elapsed-time	Start (min.)
Meter Reading	Stop (min.)
Total Sampling Time (min.):	
Weather Conditions:	
Site Conditions:	
Initial Flow Rate, Qsi	Pi (mmHg):
	Ti (°C):
	Hi (in.):
	Qsi (Std. m ³):
Final Flow Rate, Qsf	Pf (mmHg):
	Tf (°C):
	Hf (in.):
	Qsf (Std. m ³):
Average Flow Rate (Std. m ³):	
Total Volume (Std. m ³):	
Filter Identification No.:	
Initial Wt. of Filter (g):	
Final Wt. of Filter (g):	
Measured TSP Level (Φg/m ³):	

	<u>Name & Designation</u>	<u>Signature</u>	<u>Date</u>
Field Operator	:	_____	_____
Laboratory Staff	:	_____	_____
Checked by	:	_____	_____