



# Guideline

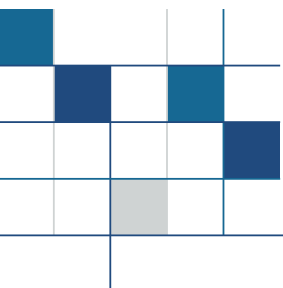
## Dust emissions

Activities regulated under the:

- *Environmental Protection Act 1986*
- Environmental Protection Regulations 1987

July 2021

*For external consultation*



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DRAFT



# 1. Purpose

The purpose of this *Guideline: Dust emissions* (the guideline) is to ensure adequate information is provided to the Department of Water and Environmental Regulation (the department) for assessing applications with fugitive dust emissions, as regulated under the *Environmental Protection Act 1986* (EP Act).

# 2. Scope

Guidelines provide direction on how the department interprets and applies the legislation it administers.

Department guidelines are not mandatory; rather, their purpose is to assist applicants to provide information in the best possible manner to ensure efficient and effective assessment of their application.

Applications that do not align with the appropriate guidelines may result in protracted assessment timeframes and, if the information provided is not sufficient for the department to complete an assessment, the application may be declined or refused in accordance with the department's regulatory procedures (refer to Related documents).

The guideline applies to applications for a works approval or licence (including amendments) under Part V Division 3 of the EP Act with an identified dust emission component.

This document only covers the assessment of fugitive dust (dust which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening). For guidance on point source emissions of dust, please refer to the department's *Draft Guideline: Air emissions*.

This guideline informs applicants:

- what information they should include in an application involving dust emissions
- on criteria and considerations for the assessment of dust emissions
- how to use a screening tool to assess whether a detailed dust emissions analysis is required
- how to undertake a detailed analysis and dust emission modelling.

The guideline may also be referred to by way of technical support for:

- environmental impact assessments of proposals under Part IV of the EP Act
- consideration of fugitive dust emissions from premises that are not prescribed premises. (Note: generally, such assessments would be required by authorities other than the department, for example local government authorities.)

The applicant should consult the relevant authority regarding this guideline and any additional requirements.



The information in this guideline is general in nature. The department conducts all assessments on a case-by-case basis, considering the site-specific characteristics of the proposal.

The guideline does not discuss how the department assesses the risk of dust emission impacts for the proposed activity using the applicant's information. The department will follow its regulatory risk assessment framework to assess the proposal and provide a decision report.

The definitions and acronyms used in this document are listed in the Glossary.

### 3. Context

The guideline should be read in conjunction with other relevant department policies, guidelines and procedures that are available on our website (refer to the Related documents section for links). The department's application forms also indicate what information is required for applications with an identified dust emissions component.

If a proposal is in an area where ambient standards and limits have been defined under an Environmental Protection Policy (EPP), the EPP will take precedence over this guideline for those pollutants covered by the EPP.

If a proposal is in an area that has an established risk-based approach and regulatory context, such as the implementation of the Government of Western Australia's response to the *Port Hedland Dust Taskforce Report* recommendations, the established approach will take precedence over this guideline.

### 4. Legislation

The EP Act provides for the prevention, control and abatement of pollution and environmental harm in Western Australia, in accordance with (s.4A of the EP Act):

- the precautionary principle
- the polluter pays principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity
- the principle of waste minimisation.

Part V Division 1 of the EP Act has general provisions for the regulation of pollution and environmental harm. Section 49 states: 'A person who causes pollution or allows pollution to be caused commits an offence'. Furthermore, any person who emits, or causes an unreasonable emission to be emitted from any premises commits an offence.

Section 49 of the EP Act provides the obligation that any person is not to cause, or enable to be caused, pollution or unreasonable emissions.

Part V Division 3 of the EP Act provides the department with mechanisms for regulating dust emissions, by way of conditions on works approvals and licences applied to prescribed premises.



## 5. Environmental objective

This guideline aligns with the Environmental Protection Authority (EPA), *Environmental Factor Guideline – Air Quality*.

The EPA's objective for air quality is:

'To maintain air quality and minimise emissions so that environmental values are protected.'

'Environmental value' is defined in the EP Act as: 'a beneficial use, or an ecosystem health condition'. 'Beneficial use' is defined in the EP Act to include any portion of the environment conducive to public benefit, amenity, safety, health or aesthetic enjoyment that requires protection from the effects of emissions or environmental harm. The EPA's air quality objective recognises the link between air quality and the environmental values supported by good air quality. The EPA factor guideline also includes the principle of waste minimisation in accordance with the objectives of the EP Act.

## 6. Air quality and dust

### 6.1 Definition of air quality

The department has adopted the same definition for air quality as the EPA, which also recognises the impacts of dust:

- The chemical, physical, biological and aesthetic characteristics of air.
- 'Air' refers to all the air above the ground up to and including the stratosphere.
- 'Ambient air' is that portion of the atmosphere external to buildings to which the general public has access.

Activities generating dust can have adverse effects on ambient air quality and health and amenity of sensitive receptors.

### 6.2 Sources of dust emissions

Many activities can produce fugitive dust emissions. Activities that produce fugitive dust emissions and which the department regulates under Part V of the EP Act can include:

- bulk material storage and handling
- burial of waste
- construction activities
- crushing and screening processes (including material extracted from the ground, building and demolition material)
- manufacturing activities (e.g. asphalt, bricks and cement)
- mineral processing
- mining (coal and mineral sands).



Dust emissions that may be regulated by other authorised regulatory authorities (e.g. State Government or local government authority) and occur from any premises include:

- blasting
- extractive processes
- quarrying
- transport operations (e.g. helicopters, trains, vehicles).

### 6.3 Dust characteristics and impacts

Dust is particulate matter (PM) comprising very small solid particles of earth, organic matter, manufactured products or waste matter which may become airborne by natural forces (such as wind) and/or by mechanical processes (such as crushing, grinding, milling, conveying, stockpiling, ship loading or haulage).

It is well established that dust emissions can have adverse impacts on human health. These health impacts can be both short-term (acute) and long-term (chronic). Dust emissions can also have impacts on vegetation, soil and water quality, as well as amenity and social surroundings.

The characteristics of the dust emitted (including particle size, composition and colour) will influence the potential health or amenity impacts.

Fine dust particles (i.e. in the PM<sub>10</sub> and PM<sub>2.5</sub> size ranges) that are readily inhaled are associated with a range of chronic health effects. Both fine and coarse dust particles can cause acute health effects (e.g. eye or breathing irritation) and also deposit on surfaces leading to soiling. The composition and morphology of the dust is also important; for example, when it contains toxic materials such as metals or asbestos that can be inhaled or ingested. Reduced visibility is another effect of airborne particles.

## 7. Factors and criteria considered in dust emission assessments

### 7.1 Factors considered in assessments

Dust emissions are considered by the department in relation to their potential impact on human health, amenity and the environment.

In determining the risk posed by dust, the department considers:

- the location and proximity to sensitive receptors
- the management of dust sources and activities
- characteristics of the dust, including composition
- potential dust impacts from other nearby sources
- the topography and complexity of terrain





- the size and/or complexity of the facility
- whether the proposal is in a Strategic Industrial Area (SIA) (e.g. the Kwinana SIA, Kemerton SIA and Burrup SIA). Where there is overlap between SIA policy and this guideline then defer to the SIA policy
- whether the proposal is in an area that has an established risk-based approach and regulatory context, such as the implementation of the Government of Western Australia's response to the *Port Hedland Dust Management Taskforce Report* recommendations. Where there is overlap between an established risk-based approach and regulatory context and this guideline, then defer to the established risk-based approach.
- compliance history of existing premises.

The department may approve deviations to the assessment criteria on a case-by-case basis.

## 7.2 Criteria for dust and associated contaminants

The criteria used by the department for assessing health impacts of dust are based on:

- the National Environment Protection Council (NEPC)'s *National Environment Protection (Ambient Air Quality) Measure (NEPM)* (NEPC 2016) criteria for PM<sub>10</sub>, PM<sub>2.5</sub> and lead (Pb)
- the criteria for other metals, metalloids and asbestos contained in the department's *Draft Guideline: Air emissions*
- the National Occupational Health and Safety Commission (NOHSC) criterion for asbestos contained in the *Guidance note on the membrane filter method for estimating airborne asbestos fibres* (NOHSC:3003(2005)).

Dust criteria are summarised in *Table 1*.

*Table 1: Criteria for dust and associated contaminants*

Pollutant	Criteria	Source	Impact
PM <sub>10</sub>	50 µg/m <sup>3</sup> (24 hour average)	NEPC 2016	Health
	25 µg/m <sup>3</sup> (1 year average)		
PM <sub>2.5</sub>	25 µg/m <sup>3</sup> (24 hour average)		
	8 µg/m <sup>3</sup> (1 year average)		
Lead (Pb)	0.5 µg/m <sup>3</sup> (1 year average)		
Asbestos	0.01 fibres/ml	NOHSC:3003 (2005)	Health
Metals and metalloids	Refer to <i>Draft Guideline: Air emissions</i> .		Health



For metals and metalloids not listed in the *Draft Guideline: Air emissions*, applicants may follow the reference hierarchy in Table 2 to identify suitable alternative criteria.

Table 2: Reference hierarchy

Hierarchical rank	Jurisdiction/organisation
1	Western Australian guidelines (e.g. Department of Health guidance) Australian national guidelines (e.g. National Environment Protection Measures (NEPM), National Health and Medical Research Council (NHMRC) guidelines) Other Australian state and territory guidelines
2	World Health Organisation (WHO)
3	United Kingdom Department of Health
4	Netherlands National Institute for Public Health and the Environment (RIVM)
5	Health Canada
6	United States (e.g. Agency for Toxic substances Disease Registry, Environmental Protection Authority)

### 7.3 Guideline values for deposited dust

Table 3 provides the department's recommended guideline values for deposited dust.

Table 3: Recommended guideline values for deposited dust

Pollutant	Criteria	Source	Impact
Deposited dust	4 g/m <sup>2</sup> /30 days (maximum)	NSW EPA 2016	Amenity
	2 g/m <sup>2</sup> /30 days (above background)	NZ MfE 2016	

The following should be noted:

- This guideline value may or may not result in amenity impacts, depending on the nature and location of the sensitive receptors; for example, rural versus urban and industrial versus residential. The guideline value could also be high for some receptors, with amenity impacts occurring even when the guideline value is not reached; for example, some highly sensitive residential areas may find deposition rates of 2 g/m<sup>2</sup>/30 days (above background levels) objectionable and offensive. Also highly visible dust such as black coal dust will potentially cause amenity impacts at lower concentrations than many other dusts.
- The guideline value normally applies to insoluble matter, as dissolved material is generally not significant when assessing nuisance effects from the majority



of dust sources. However, an analysis of water-soluble emissions is recommended to be provided where these may be the cause of the amenity impact (e.g. particle emissions from a pulp and paper mill, milk powder plant or fertiliser works).

The department also expects estimates of background dust levels will be provided when calculating values to compare with any deposited dust guideline value. The guideline value should only be considered in conjunction with the results of other assessments, including complaints surveys and community consultation.

## 8. Assessment overview

The department's assessment process allows some dust emissions to be 'screened out' from further analysis and assessment. Section 9 details the steps for screening out emissions.

If an emission is not screened out, a detailed analysis should be completed. This process is outlined in Section 10.

Section 11 provides guidance on our reporting requirements for the screening and detailed analysis.

Figure 1 presents an overview of the assessment pathway.

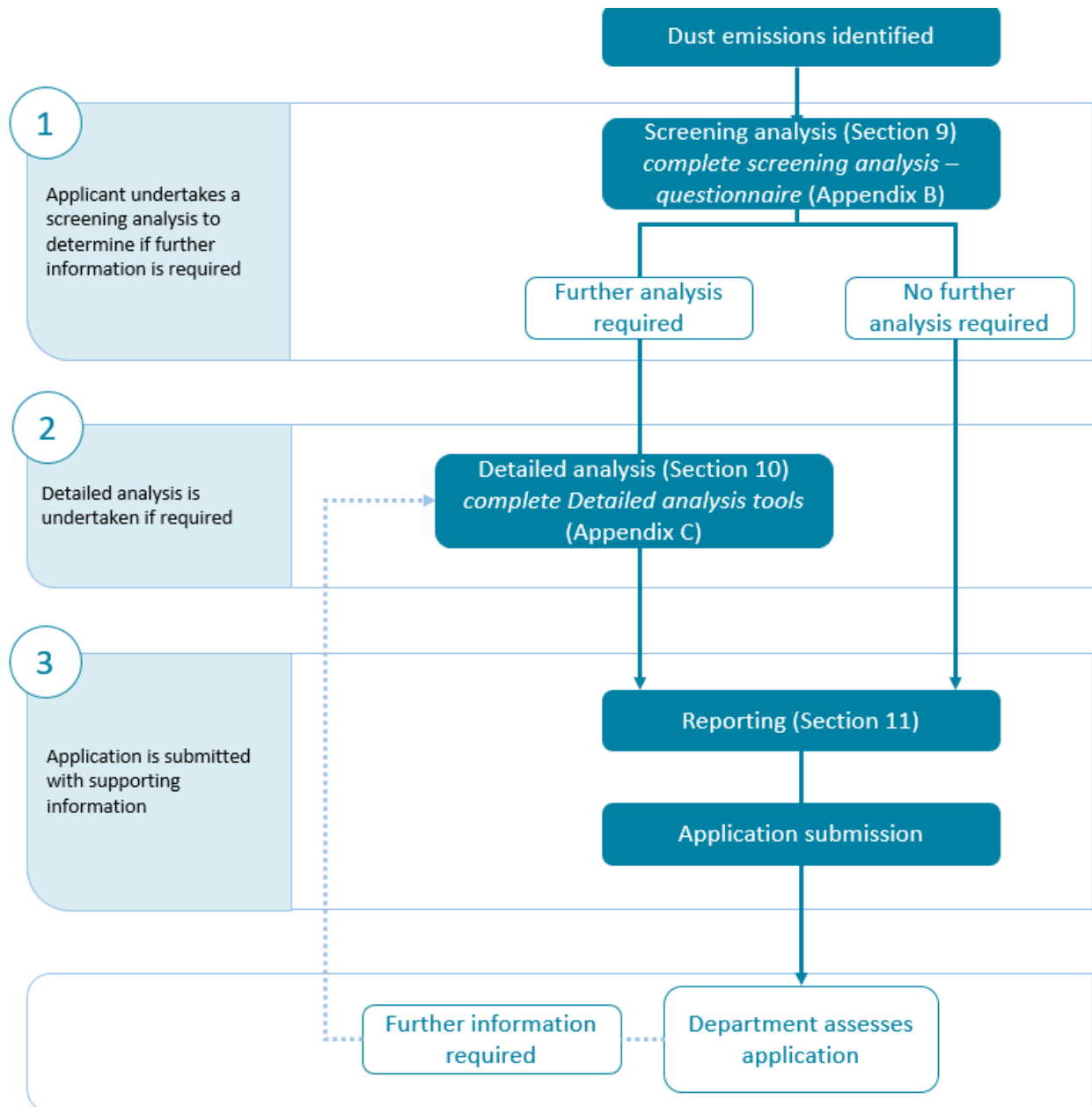


Figure 1: Overview of the assessment process

## 9. Screening analysis

The screening tool has been developed for applications for a works approval or licence (including amendments) with an identified dust emission component.

### 9.1 Screening overview

The department has developed a screening analysis to assist applicants to identify low-level dust emissions.



The screening analysis considers the separation distance to receptors and environmental siting or other factors (referred to as 'special case factors' in this guideline) in assessing the extent to which emissions may impact a receptor.

Special case factors include:

- dust impacts from other nearby sources
- presence of an existing elevated dust background
- complex terrain
- unusually large and/or complex facility when compared with other Australian operations
- unusual configuration of dust sources compared with other Australian operations
- whether the premises is in an SIA
- multiple industry categories which emit dust are present on the same site.

Generally, the impact of dust emissions on human health, amenity and the environment will decrease with distance from the source of emission. The closer an emission source is to a sensitive receptor, the more stringent controls and management systems need to be to ensure the potential impacts of the emission are acceptable.

Recommended separation distances for screening analysis have been adopted from *Guidance for the Assessment of Environmental Factors – Separation Distances between Industrial and Sensitive Land Uses (Guidance Statement No. 3)* (EPA 2005). For some activities, separation distances may be defined as 'case-by-case' or may not be provided. In these instances, the applicant may consider a comparison with published separation distances for similar activities.

Guidance on the measurement of the separation distances is provided in Appendix A, which is based on the method of *EPA Victoria 2013*.

The industry-specific separation distances between the activity boundary and the nearest sensitive receptor or land use is intended to screen for low dust risk, in the absence of special case factors. Separation distances are used as a trigger for detailed analysis and are not interpreted by the department to indicate a 'buffer' distance that must be met in all cases.

The screening analysis overview is shown in Figure 2.

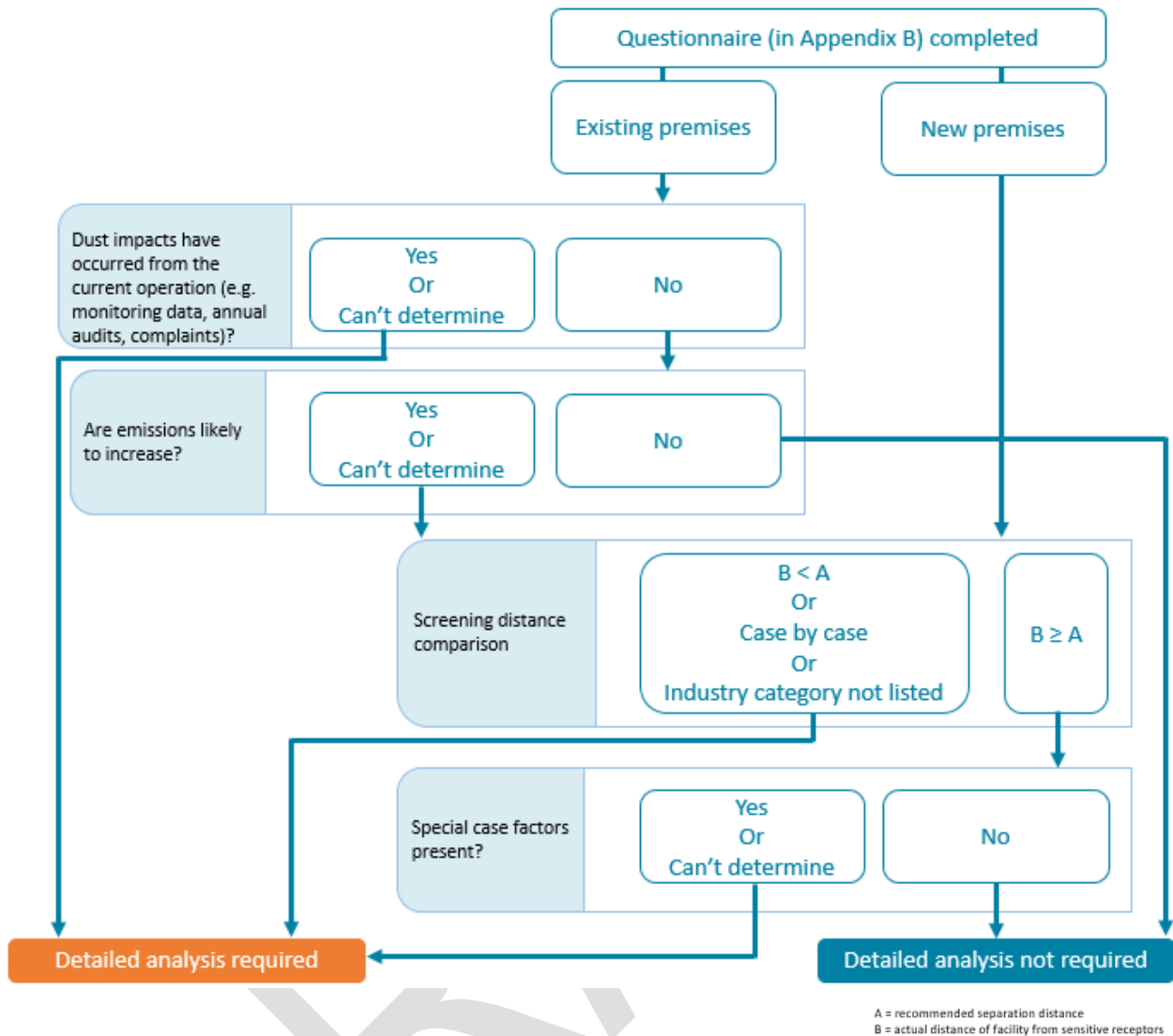


Figure 2: Screening analysis overview

## 9.2 Screening dust emissions

If the distance between the activity boundary and the nearest sensitive land use is within the relevant distance, a detailed analysis is required. If the premises lies beyond the separation distance, the applicant needs to complete the remainder of the screening analysis form in Appendix B, to identify if there are other dust emissions that trigger the need for a detailed dust emission report.

If the application meets all screening criteria, the dust emissions can be screened out as ‘not requiring a detailed analysis’. In this case the applicant is to submit the screening analysis and any supporting information relied upon to undertake that assessment (e.g. maps of sources and receptors, topographical maps and details of separation distance calculations/measurements) to the department for consideration.

Where the screening analysis indicates that dust emissions are likely low level, the department may still request additional information or a detailed analysis in the following cases where there is:



- past experience of the department regulating similar premises
- known changes of receptor proximity in future
- insufficient supporting information provided to the department.

An exemption may also be provided by the department for a detailed analysis if the applicant considers the dust risk to be low even though the separation distance is not met. In these cases, applicants should provide sufficient information with their application to enable the department to understand how the risk was assessed to be low. Such risk assessment should be conducted in accordance with the department's *Guidance Statement: Risk Assessments*.

## 10. Detailed analysis

When a screening analysis indicates the emission is not low level, applicants should conduct a detailed analysis. A detailed analysis will assist the department to conduct a dust impact risk assessment for the application.

The need for a detailed analysis does not imply that the potential dust impact is high. That is, the outcome of a detailed analysis may show a low risk of dust impact despite this not being identified in the screening analysis.

Tools to aid applicants in undertaking a detailed analysis are summarised in Table 4 and described in Appendix C. The tools provide information supporting the department's risk assessment process described in *Guidance Statement: Risk Assessments*, which requires identification and evaluation of all potential emission sources, pathways and impacts on receptors.

The four priority tools shown in Table 4 are:

- operational dust analysis (ODA)
- location review
- analysis of existing dust levels
- analysis of dust characteristics.

The use of the priority tools will ensure the department has the minimum information required to fully inform its review process.

In addition to the priority tools, applicants may select other tools in Table 4 that are most appropriate for the application.

The detailed analysis comprises three steps:

**Step 1:** Undertake an ODA, 'location review, analysis of existing dust levels' and 'analysis of dust characteristics' as described in Appendix C.

**Step 2:** Undertake further analysis using selected tools from Table 4 as required.

**Step 3:** Compile additional information to support the detailed analysis.

Tool selection will depend on a range of factors including:



- whether the application is for a new or existing premises
- the type of activity
- the availability and reliability of existing site-specific data.

Each tool has its own strengths and limitations. Consequently, the value of the results of individual tools is enhanced if multiple independent lines of evidence that support each other are provided. For example, the value of dust complaints information from residents is significantly improved if dust monitoring data independently confirms dust levels in the same area.

Tools that use observational/empirical data are generally of higher value than theoretical approaches.

The department expects that applications with potentially significant dust impacts will include multiple tools in the detailed analysis, including the use of site-specific data where possible.

The level of detail provided in the analysis report should be commensurate with the potential for dust impacts related to the proposed works.

Notes:

1. Table 7 in Appendix D enables the applicant to indicate which tools they have used in the detailed analysis.
2. Guidance material published by industry groups may include information and procedures relating to operational management that are aligned with the analysis tools in Table 4. If applicants intend to use alternative guidance material or tools to those described in this guideline, it is recommended they first discuss this with the department to ensure suitability for informing the department's assessment and decision-making processes.





Table 4: Summary of detailed analysis tools

Detailed analysis tool	New premises	Existing premises
<b>Emission source tools</b>		
<b>ODA (priority tool)</b>	Information on operations and dust sources with emissions that have the potential to create offsite dust impacts, together with proposed monitoring and management procedures	
<b>Analysis of dust characteristics (priority tool)</b>	Analysis of the characteristics of the dust (particle size distribution, composition and colour) and hence the potential health and amenity impacts	
<b>Pathway and receptor tools</b>		
<b>Location review (priority tool)</b>	Examination of the sensitive receptor distance in relation to the recommended separation distance, the nature of receptors and environmental factors such as local meteorology and topographical features	
<b>Analysis of existing dust levels (priority tool)</b>	Analysis of existing dust levels in ambient air, which can give an indication of cumulative impacts and the likelihood of an exceedance of dust criteria with contributions from proposed new premises or changes to existing premises	
<b>Complaints data analysis</b>		Analysis of dust complaint histories to indicate dust impacts from: <ul style="list-style-type: none"> <li>• the existing premises</li> <li>• other premises or sources in the area.</li> </ul>
<b>Community surveys</b>	Survey of community members to identify current or past dust issues related to other premises or sources in the area	Survey of community members to identify current or past dust issues related to: <ul style="list-style-type: none"> <li>• the existing premises</li> <li>• other premises or sources in the area</li> </ul>
<b>Dispersion modelling</b>	Use of computer modelling to estimate ground level concentrations of dust	
<b>Comparison with similar operations</b>	Analysis of data from facilities of similar size, throughput, operational conditions, topography, meteorology and emission sources	



## 11. Reporting

After the applicant completes the analyses, the relevant reports should be submitted along with the application form and the information set out below.

The screening analysis reporting consists of:

- a statement of the screening analysis outcome
- completed screening analysis form (Appendix B: Screening analysis)
- supplementary documentation supporting the outcomes of the screening analysis, including details on special case factors.

The detailed analysis reporting consists of:

- a detailed analysis summary report table (Appendix C)
- conclusions from the detailed analyses
- attachments including:
  - the ODA
  - location review
  - outcomes of other analysis tools selected from Table 4
  - any other supporting documentation.

The level of detail provided in the analysis report should be commensurate with the potential for dust impacts related to the proposed works.

When reviewing the dust analysis reports, the department may consider a range of additional factors such as:

- proposed technology
- any complaints recorded by the department (existing premises)
- the compliance history and annual audit compliance reports (existing premises).

Note: The department may also require additional analyses to be undertaken.



## Document implementation

This guideline comes into effect on the day it is published. Applications received after publication will be assessed in accordance with the information contained herein.

The guideline will not generally be used retrospectively, outside the department's normal licensing processes, to reassess existing facilities. However, in situations where there is evidence of unacceptable fugitive dust emission impacts from existing premises, the department may initiate a review of the licence, informed by this guideline, and new controls may be applied through licence conditions.

## Related documents

Non-department documents	
Author	Title
Department of State Development	<a href="#"><i>Port Hedland Dust Management Taskforce Report to Government (2016)</i></a>
Department of Jobs, Tourism, Science and Innovation	<a href="#"><i>Port Hedland Dust Management Taskforce Report – Government Response</i></a>
Department of Jobs, Tourism, Science and Innovation	<a href="#"><i>Strategic Industrial Areas</i></a>
EPA Victoria	<a href="#"><i>Guideline: Recommended separation distances for industrial residual air emissions (2013)</i></a>
EPA WA	<a href="#"><i>Environmental Factor Guideline – Air Quality (2016)</i></a>
EPA WA	<a href="#"><i>Guidance for the Assessment of Environmental Factors – Separation Distances between Industrial and Sensitive Land Uses (Guidance Statement No. 3) (2005)</i></a>
NZ MfE	<a href="#"><i>Good Practice Guide for Assessing and Managing Dust (2016)</i></a>
NEPC	<a href="#"><i>National Environment Protection (Ambient Air Quality) Measure</i></a>
NOHSC	<a href="#"><i>Guidance note on the membrane filter method for estimating airborne asbestos fibres (2005)</i></a>
NSW EPA	<a href="#"><i>Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2016)</i></a>
Standards Australia	<a href="#"><i>Australian Standard (AS) 3580 series Methods for sampling and analysis of ambient air</i></a>
WA Parliament	<a href="#"><i>Environmental Protection Act 1986</i></a>
WA Parliament	<a href="#"><i>Environmental Protection Regulations 1987</i></a>



<b>Department documents</b>
<a href="#"><i>Air Quality Modelling Guidance Notes</i></a>
<a href="#"><i>A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities</i></a>
<a href="#"><i>Guidance Statement: Risk Assessments</i></a>
<i>Guideline: Air emissions (DRAFT)</i>
<a href="#"><i>Guideline: Industry Regulation Guide to Licensing</i></a>
<a href="#"><i>Guideline: Odour emissions</i></a>
<a href="#"><i>Procedure: Prescribed premises works approvals and licences</i></a>

## Custodian and review

The currency of this document will be continuously evaluated, and reviewed no later than three years from the date of issue or sooner as required.

Document details	
Lead group (custodian)	Better Regulatory Practice Branch; Air Quality Branch; and Industry Regulation Division
Current version	Version 1
Corporate file number	DWERVT5232



# Appendices

## Appendix A: Separation distance measurement

### How to measure sensitive receptor distances

Sensitive receptor distances should be measured from the 'activity boundary' of the industrial activity to the nearest sensitive land use. The activity boundary is the area (within a convex polygon) that includes all current or proposed industrial activities including:

- stockpiles
- crushing and screening operations
- loading operations
- haulage operations
- buildings or other sources from which dust emissions may arise.

Measuring from the activity area allows for any separation that is provided within the property boundary of the industrial site to be considered. If an industry changes its use of the premises, or moves a relevant activity within the property boundary, these changes will be reassessed by the department to consider the adequacy of sensitive receptor distances.

Two methods to measure sensitive receptor distances are provided below. These methods of measurement differ depending on the measurement point chosen for the sensitive land use (e.g. property or activity boundary).

#### Method 1 - Activity boundary to property boundary

Method 1 measures the distance from the activity boundary of the industry to the property boundary of the nearest sensitive land use ('urban method'), as illustrated in Figure 3.

Method 1 should be applied where the nearest sensitive land use is either:

- in an urban area or township, or on a site less than 0.4 hectares (ha), or
- in a zone allowing subdivision to be less than 0.4 ha.

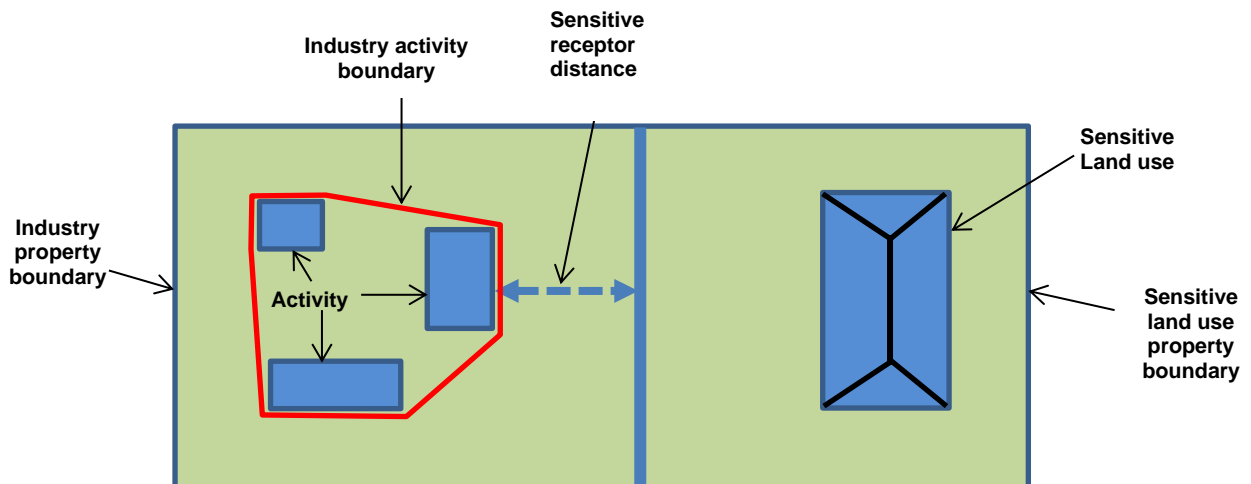


Figure 3: Method 1 – 'urban method'

## Method 2 - Activity boundary to activity boundary

Method 2 measures the separation distance from the activity boundary of the industry to the activity boundary of the nearest sensitive land use ('rural method'), as illustrated in Figure 4.

The activity boundary of the sensitive land use is the area (within a convex polygon) that includes all current or proposed sensitive uses (including residences, garages and carports, barbecue areas, clotheslines and swimming pools).

Method 2 should be applied where the nearest sensitive land use is both:

- not in an urban area or township
- on a site at least 0.4 ha, or in a zone requiring subdivisions to be at least 0.4 ha.

Irrespective, where offsite effects may be experienced, the industry producing emissions should be separated as far as possible from the nearest sensitive land use.

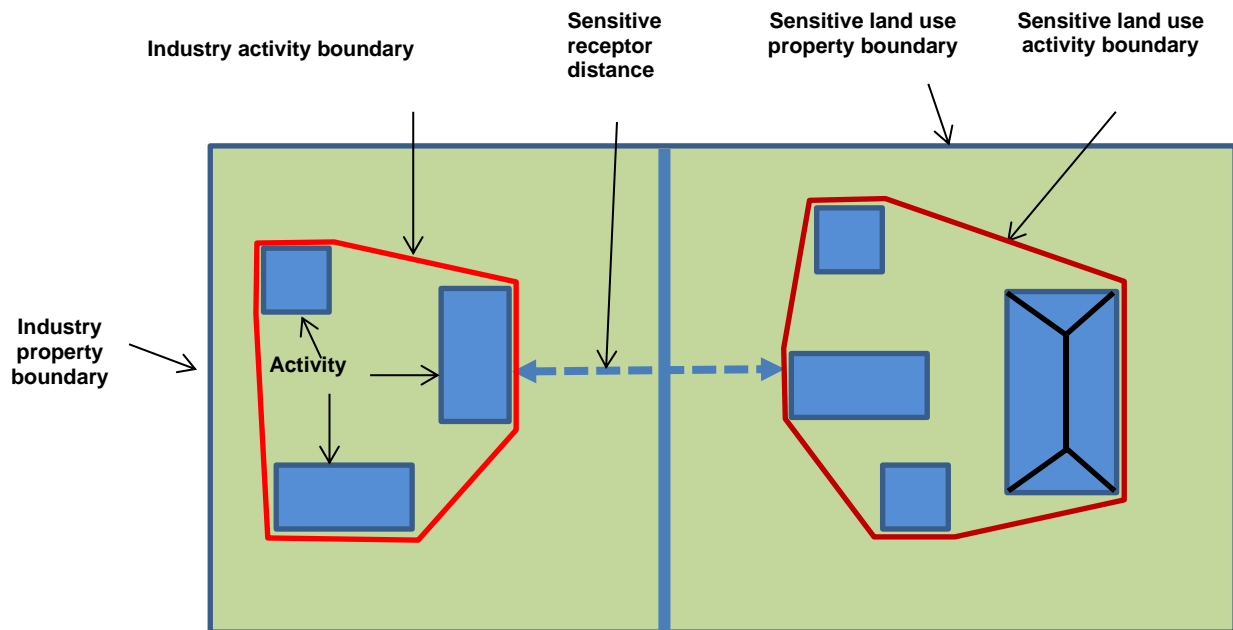


Figure 4: Method 2 - 'rural method'

Table 5 below illustrates which method should be used for measuring sensitive receptor distances in different circumstances.

Table 5: Selection of measurement method of sensitive receptor distance

		Site or subdivision size	
		Less than 0.4 ha	At least 0.4 ha
Urban area or township	Yes	Method 1	Method 1
	No	Method 1	Method 2

Source: Guideline: Recommended separation distances for industrial residual air emissions (EPA Victoria 2013).



## Appendix B: Screening analysis

### Screening analysis – instructions

Applicants undertake a screening analysis to assess whether further detailed analysis of dust emissions and impacts is required.

The screening analysis applies to new and existing premises.

The analysis primarily involves comparison of the **separation distance** in *Guidance Statement No. 3* with the **sensitive receptor distance** (Appendix A), together with consideration of other information.

Separation distances are not provided for some activities. In these instances, applicants are generally required to undertake a detailed analysis.

Applicants are required to provide sufficient information with their application to enable the department to substantiate the screening analysis.

The screening analysis comprises three steps:

**Step 1:** Complete the questionnaire below for new and existing premises.

**Step 2:** Refer to Figure 2: Screening analysis overview and the questionnaire responses to determine whether a detailed analysis is required.

**Step 3:** Compile information to support the screening analysis. This can include maps of sources and receptors, topographical maps, specifications for proposed emissions controls and details of **separation distance** measurements (Appendix A).

If an industry category is not listed in *Guidance Statement No. 3*, and the dust risk is considered to be low by the applicant, an exemption from the requirement for detailed analysis may be granted by the department. In these cases, the department should be contacted before commencing preparation of an application.

An electronic reporting template of the questionnaire for new or existing premises is available on the department website.

The screening analysis questionnaire below is to be completed and submitted with the application. The questionnaire can be used for existing and new premises.

The sequence of questions follows the flowchart presented in Figure 2: Screening analysis overview.

Applicants should provide sufficient information with their application to enable the department to substantiate the screening analysis.





<b>Screening analysis – questionnaire</b>	
<b>Q1. Description of dust emissions (new and existing premises)</b>	
Use the table below to provide brief information about activities and sources that emit dust.	
<b>Activity/dust source</b>	<b>Description, including proposed controls New source? (Yes or No)</b>
	Add more rows as required.
<b>Q2. Identification of current dust impacts (existing premises only)</b>	
Have dust impacts occurred as a result of the current operational configuration and/or practices? Please tick all applicable boxes: <input type="checkbox"/> Complaints <input type="checkbox"/> Dust diaries <input type="checkbox"/> Ambient monitoring data <input type="checkbox"/> Community feedback <input type="checkbox"/> Other _____	<input type="checkbox"/> <b>YES or Can't determine:</b> detailed analysis required
	<input type="checkbox"/> <b>NO:</b> Go to Question 3.
<b>Q3. Changes to emissions (existing premises only)</b>	
Are there proposed changes to the existing premises that are likely to increase the dust emissions, or change the configuration of any source in the facility?	<input type="checkbox"/> <b>YES or Can't determine:</b> Go to Question 4.
	<input type="checkbox"/> <b>NO:</b> detailed analysis not required



<p><b>Q4. Separation distance (new and existing premises)</b></p>	
<p><b>Separation distances</b> for categories of dust-generating activities are identified in <i>Guidance Statement No. 3</i>. Select the appropriate option from the list below.</p>	
<p><b>Option 1:</b> The <b>separation distance</b> is listed in <i>Guidance Statement No. 3</i> for this industry category and throughput level. <b>Separation distance (A)</b> = _____m <b>Sensitive receptor distance (B)</b> = ____m</p> <p><b>OR</b></p> <p><b>Option 2:</b> The <b>separation distance</b> for this industry category and throughput level is specified as 'case-by-case' in <i>Guidance Statement No. 3</i>.</p> <p><b>OR</b></p> <p><b>Option 3:</b> There is no entry for this industry category in <i>Guidance Statement No. 3</i>.</p>	<p><input type="checkbox"/> <b>B &lt; A:</b> detailed analysis required.</p> <p><input type="checkbox"/> <b>B ≥ A:</b> Go to Question 5.</p> <p><input type="checkbox"/> <b>Case-by-case:</b> detailed analysis required.</p> <p><input type="checkbox"/> <b>Industry category not listed:</b> detailed analysis required.</p>
<p><b>Q5. Special case factors (new and existing premises)</b></p>	
<p>Are there special case factors that might increase dust impacts beyond the <b>separation distance</b> shown in Question 4?</p> <p>Please tick all applicable special case factors:</p> <p><input type="checkbox"/> Dust impacts from other nearby sources</p> <p><input type="checkbox"/> Presence of an existing elevated dust background</p> <p><input type="checkbox"/> Complex terrain (Glossary)</p> <p><input type="checkbox"/> Unusually large and/or complex facility when compared with other Australian operations</p> <p><input type="checkbox"/> Unusual configuration of dust sources compared with other Australian operations</p> <p><input type="checkbox"/> The premises is in a Strategic Industrial Area (SIA) (Glossary)</p>	<p><input type="checkbox"/> <b>YES</b> or <b>Can't determine:</b> detailed analysis required.</p> <p><b>OR</b></p> <p><input type="checkbox"/> <b>NO:</b> detailed analysis not required.</p> <p>Justification should be provided to support a 'No' response.</p>



<p><input type="checkbox"/> Multiple industry categories which emit dust are present on the same site</p>	
<p><b>Special case factors – justification for 'NO' response.</b></p>	
<p><b>Additional comments.</b></p>	



## Appendix C: Detailed analysis tools

### Instructions

The screening analysis may indicate that a detailed analysis of the potential dust impact is required to allow the department to conduct a dust impact risk assessment for the application.

This appendix provides further information on the detailed analysis tools listed in Table 4. There are four priority tools, namely:

- ODA
- location review
- analysis of existing dust levels
- analysis of dust characteristics.

The use of the priority tools will ensure the department has the minimum information required to fully inform its review process. In addition to the priority tools, applicants may select other tools that are most appropriate for the application.

Tool selection will depend on a range of factors, including the type of activity and the availability and reliability of existing site-specific data.

Each tool has its own strengths and limitations. Consequently, the value of the results of individual tools is enhanced if multiple independent lines of evidence that support each other are provided. Tools that use observational/empirical data are generally of higher value than theoretical approaches.

The department expects that applications with potentially significant dust impacts will include multiple tools in the detailed analysis, including the use of site-specific data where possible.

The level of detail provided should be commensurate with the impact potential of the proposed works.

The detailed analysis comprises three steps:

**Step 1:** Undertake an ODA, location review, analysis of existing dust levels and analysis of dust characteristics (priority tools as described in Table 6).

**Step 2:** Undertake further analysis using selected tools from Table 6 as required.

**Step 3:** Compile additional information to support the detailed analysis.

A summary of tools selected should be provided by completing the form in Table 7.



Table 6: Detailed analysis tools

Detailed analysis – priority tools
<p><b>1. ODA</b></p>
<p>An ODA is a document detailing operations at a premises that are likely to emit dust, and how dust emissions are to be managed to minimise offsite dust impacts including:</p> <ul style="list-style-type: none"> <li>• dust controls</li> <li>• monitoring</li> <li>• corrective actions</li> <li>• contingency actions.</li> </ul> <p>The preparation of an ODA is a <b>priority component</b> of a detailed analysis. The ODA demonstrates the applicant’s understanding of potential dust sources at their premises, and the ongoing management of dust.</p> <p>An ODA:</p> <ul style="list-style-type: none"> <li>• is primarily intended as a management tool for the applicant</li> <li>• is risk-based and site-specific</li> <li>• should include normal and foreseeable abnormal conditions</li> <li>• may include outcome and/or management-based measures.</li> </ul> <p>Some industries may have an existing analysis tool, which has similar content and achieves the same outcomes as an ODA. Following consultation with the department, such documentation may be submitted as part of the application in lieu of an ODA.</p> <p>Dust sources, and the control options available, will vary depending on the industry category and the types of processes involved. Some common dust controls are shown in Appendix D.</p> <p>The required content of an ODA is provided in Table 8. It allows for different levels of management through the specification of both corrective and contingency actions for abnormal operating conditions.</p> <p>For some industries, management options may be more limited and the ODA will be less detailed as a result. Notwithstanding the type of operation, applicants should provide a clearly articulated and considered description of the controls to be implemented to mitigate identified dust emissions.</p> <p>Note: Supporting information, such as site detail maps and technical drawings, should accompany the ODA.</p>
<p><b>2. Location review</b></p>
<p>A location review considers the sensitive receptor distance, the nature of receptors, local meteorology and topographical features. The location review is a <b>priority component</b> of a detailed analysis.</p>



The sensitive receptor distance in relation to the recommended separation distance in *Guidance Statement No. 3* is an important component of the dust impact potential of an activity and should be reported.

In undertaking a risk assessment, the department will require a map showing the sensitive receptors' location in relation to the activity and the separation distance for the activity. Electronic copies of Google Earth (.kmz files), or inclusion of a map in the report that includes the activity boundary or, at a minimum, markers for the activity and receptor locations, are useful for the department assessment.

If a separation distance is defined as 'case-by-case', or if the industry category is not listed in *Guidance Statement No. 3*, the applicant may include a comparison with separation distances from other published guidance for similar activities.

The location review should also include information on local meteorology and topography, which can have important implications for how dust emissions disperse over nearby areas. For example, valleys can channel air flows from a source towards a receptor location. At a minimum, the location review should include a topographical map along with wind roses showing long-term wind data from the nearest Bureau of Meteorology (BoM) or department monitoring station, with commentary on the potential for complex topographical and meteorological effects. Wind roses from BoM showing only 9am and 3pm average conditions are not a reliable indicator of average wind conditions for daily periods, or for periods when emissions occur, and are not used in the department's assessment. Applicants may use data from their own weather stations provided the data can be shown to be valid.

### 3. Analysis of existing dust levels

This tool involves consideration of existing dust levels in ambient air, which can give an indication of cumulative impacts and the likelihood of an exceedance of dust criteria with contributions from proposed new premises or changes to existing premises. The analysis of existing dust levels is a priority component of a detailed analysis.

Information of dust levels can be obtained from published reports such as:

- the department's annual ambient air monitoring reports submitted to NEPC
- dust monitoring studies conducted by the department and/or industry.

Existing premises may have data collected and reported to the department for licensing and compliance purposes.

Where there are no representative data available, the applicant may consider conducting site-specific monitoring. Before commencing site-specific monitoring, applicants are encouraged to submit a dust monitoring plan to the department for review before commencing.

Requirements for ambient monitoring are listed below and should be read in conjunction with Appendix E: Ambient air monitoring guidance.



Ambient monitoring should:

- be conducted in accordance with the standards specified in Appendix E, with any deviations from the standard reported
- be conducted for a minimum of 12 months. Shorter periods because of time constraints may be accepted, but should include worst-case conditions (e.g. summer period) as far as possible
- include meteorological monitoring to facilitate the analysis and interpretation of the dust monitoring data. At a minimum, wind speed, direction and relative humidity should be collected
- ensure any dust compositional analysis undertaken (e.g. asbestos or metals analysis) is conducted by National Association of Testing Laboratories (NATA) accredited facilities
- achieve at least 90 per cent data recovery.

Reporting should include:

- existing ambient dust levels, with the source of the information/data specified
- a comparison of the existing ambient dust levels specified above with the dust criteria and/or trigger level specified in Sections 7.2 and 7.3
- an assessment of the likely changes to existing ambient dust levels as a result of contributions from the new premises or changes to existing premises.
- assessment of meteorological data to identify dust sources in the area and their potential contribution to dust impacts at receptors
- for site-specific monitoring, reporting should also include:
  - maps showing the location of the premises, monitoring equipment and sensitive receptors
  - data recovery rate
  - laboratory analytical reports, where relevant
  - raw and processed data
  - compliance with the Australian standards specified in Appendix E.

#### **4. Analysis of dust characteristics**

This tool considers the characteristics of dust that can be emitted, including particle size distribution (PSD), composition and colour, which can influence the potential health or amenity impacts as described in Section 6.3.

The analysis of dust characteristics is a priority component of a detailed analysis.

The types of information relevant to this analysis include PSD testing, local geology, laboratory analytical results and product quality testing.



The applicant should provide information on the characteristics of the dust that may be emitted from the premises as follows:

- Particle size:
  - Does the dust include very small particles up to 10 micrometres ( $\mu\text{m}$ ) in diameter that could impact on health ( $\text{PM}_{10}$  and  $\text{PM}_{2.5}$ )?
  - is there a mix of particle sizes that could reduce visibility or readily deposit on to surfaces, thereby causing amenity issues?
- Dust colour:
  - Is the dust of similar colour to the underlying soils in the area or is it different? For example, black coal dust will potentially cause amenity impacts at lower concentrations than many other dusts.
- Dust composition:
  - Does the dust potentially contain asbestos or metals, for example, lead-bearing ore, that might increase the risk of health impacts?

#### **Detailed analysis – optional tools**

### **5. Complaints data**

Complaints data analysis is the assessment of dust complaints made in the vicinity of existing premises. The analysis can help identify likely dust sources in the area and levels of impact. Such analysis can also be used as a benchmark against which ongoing performance of an existing premises can be measured.

Complaints data may be held by the applicant or be available from local councils or nearby premises. Applicants are expected to review publicly/readily available information.

The presence of dust complaints from a community in the vicinity of a dust source may indicate an unreasonable level of ambient dust. However, caution should be applied in interpreting complaints data as several factors may influence complainant behaviour, and the extent of dust impact inferred from this data may be over or underestimated.

The absence of complaints does not necessarily indicate the absence of a dust problem.

The number and details of dust complaints received (attributable to the premises), and the actions taken by the occupier of the premises in response to those complaints, should be considered for both screening and detailed analyses.

The department may refer to its internal complaints databases, and other sources of information, when reviewing applications for existing premises. All reasonable efforts will be made by the department to validate internally sourced complaint information used in the screening analyses.





Reporting of complaints data analyses should include:

- details of how the data was obtained
- a data summary showing the number of complainants, the total number of complaints and the dates and times complaints were made
- verification of the source of the dust
- actions taken in response to complaints (if known)
- discussion of the dust impacts reported, likely dust sources
- the meteorological conditions at the time of complaints
- map(s) showing the location of dust complaints and potential sources in the area.

## **6. Community survey/diary studies**

Community telephone or door-to-door surveys and diary studies can provide valuable information regarding the level and extent of dust impacts from existing sources.

Surveys and diary studies:

- may show whether dust levels experienced at a site have altered over time
- can be used to gauge the level of community dissatisfaction with previous dust episodes
- can capture information regarding dust episodes that did not trigger the lodging of complaints.

The design, execution and analysis of surveys requires highly specialised knowledge, and should be undertaken by those with demonstrated expertise in this field.

Caution should be applied in designing survey questionnaires and interpreting results, as responses that rely on memory recall may result in oversights.

Surveys should:

- have a clearly defined purpose
- be undertaken over a short timespan to limit opportunities for community members to share their responses, which may bias the survey.

A guarantee of anonymity of respondents is an important principle to encourage participation in the survey.

Reporting of community survey and diary study analyses should include:

- qualifications and experience of those designing, conducting and reporting on the survey or diary study
- details of the survey or diary study plan including purpose, methods, target population and timeframes



- a copy of the survey questionnaire or instructions provided to diarists:
  - a copy of the raw survey/diary data
  - interpretation of the survey/diary results
- conclusions reached.

## 7. Dispersion modelling

Because of the large uncertainties in estimating fugitive dust emission rates, modelling of fugitive dust emissions is generally not a reliable reflection of risk in a quantitative sense.

If undertaken, modelling should be conducted in accordance with the department's *Draft Guideline: Air emissions (Section 10 – Detailed analysis)* and *Air Quality Modelling Guidance Notes*.

Modelling can also provide a framework where relative changes to emissions can be compared. This approach is referred to as 'comparative' modelling, which is discussed further in the department's *Guideline: Odour emissions*.

If modelling indicates an increase in ground-level impacts and current air quality monitoring indicates criteria are already being exceeded, this suggests that unless greater effort is placed into improving mitigation of dust emissions then exceedances will continue, potentially at an increased rate.

## 8. Comparison with similar operations

This tool allows for the performance of similar facilities to be used in support of a new application. It involves gathering information on the extent of impact and source characteristics of a similar operation.

The outputs of this tool may be incorporated into other detailed analysis tools such as the 'location review' tool. Points for consideration when comparing dust studies or experience of similar operations include:

- size
- operational throughput
- operational conditions, technology levels and management
- similarity of the surrounding topography
- meteorology
- emission sources
- seasonal or other temporal factors that affect dust emissions
- the aim of referenced studies
- completeness of the data.



Table 7: Summary of detailed analysis tools used by the applicant

Detailed analysis tool	Tick if used	Comments
<b>Source</b>		
<b>ODA (priority tool)</b>	<input type="checkbox"/>	
<b>Analysis of dust characteristics (priority tool)</b>	<input type="checkbox"/>	
<b>Pathway and receptor</b>		
<b>Location review (priority tool)</b>	<input type="checkbox"/>	
<b>Analysis of existing dust levels (priority tool)</b>	<input type="checkbox"/>	
<b>Complaints data analysis</b>	<input type="checkbox"/>	
<b>Community survey</b>	<input type="checkbox"/>	
<b>Dispersion modelling</b>	<input type="checkbox"/>	
<b>Comparison with similar operations</b>	<input type="checkbox"/>	



Table 8: Required content of an ODA

<b>Dust emission operations review</b>
<p>Identification of all existing or proposed operations on the premises likely to emit dust. This review should consider:</p> <ul style="list-style-type: none"> <li>• all normal and foreseeable abnormal conditions</li> <li>• hours and days of operation.</li> </ul>
<b>Dust sources and emissions</b>
<p>Description of major dust sources associated with the existing or proposed operations including location of dust sources on site, plotted to scale on a site detail map.</p>
<b>Process controls</b>
<p>Identification of process controls (mitigation, monitoring and management<sup>1</sup>) to be implemented for dust sources. Include details of the type and frequency of controls for each source for all normal operating conditions. Critical operational parameters should be selected for monitoring that:</p> <ul style="list-style-type: none"> <li>• are indicative of process performance</li> <li>• can be surrogate parameters<sup>2</sup> that are continuously monitored</li> <li>• can be used to identify malfunctions that result in dust emissions (triggers).</li> </ul>

<sup>1</sup> This may include specific actions/programs established by the applicant.

<sup>2</sup> Operational parameters that are readily and continuously measured or observed/estimated, and better suited to detecting upset conditions than measuring dust directly.



### Triggers and corrective actions

Specification of monitored parameters (operational and/or environmental)<sup>3</sup> that will be used to initiate corrective actions when predetermined trigger levels are reached.

Specification of corrective actions, which are implemented in case of process malfunction, that may lead to increased dust emissions. Their purpose is to bring the process back to normal operating conditions.

This section should include:

- a list of parameters adopted for the process
- details of the pre-determined trigger level(s) for each parameter
- details of the corrective actions to be implemented when a predetermined trigger level is reached.

### Corrective action evaluation

Evaluation of each corrective action to assess its effectiveness in response to the issue that triggered it.

Evaluation procedures should include:

- selection of parameters to evaluate the effectiveness of corrective actions. These parameters may be the same or different to those specified in the **Process controls** and the **Triggers and corrective action** sections above.
- the method to be used to monitor those parameters.
- the decision protocol that will be used to establish the necessary monitoring duration before either:
  - resuming normal process operations (corrective action successful)

### Contingency actions

Specification of contingency actions that will be implemented if corrective actions are not successful. These should include:

- the actions to be taken with sequence of implementation
- the decision protocol used to verify if normal operations can be resumed.

<sup>3</sup> This may include dust monitoring on and off site and predictive meteorological monitoring.



### Residual dust impact potential

The residual dust impact potential is to be determined by the applicant using a rating of low, medium, high or extreme, based on the likelihood and consequence of dust from operations impacting on sensitive receptors.

The risk rating matrix (Table 2) in the department's *Guidance Statement: Risk Assessments* can be used for this assessment to provide a systematic framework for rating the impact potential. The residual dust impact potential should be rated by the applicant for each process, under both normal and foreseeable abnormal conditions.

The applicant needs to consider their proposed controls, corrective and contingency actions, and information from the location review (Table 6, Section 2) in the rating.

Upon submission of the proposal, the department will follow its regulatory risk assessment framework to assess dust impacts based on the information provided by the applicant.



## Appendix D: Common dust controls

This appendix provides general information on a range of dust controls. The selection of controls is the responsibility of the applicant based on their assessment of site-specific features of their operation.

<p><b>Site layout/design</b></p>
<p>Site design features can decrease the risk of dust emissions, and reduce the dust control measures required. A smart layout should be considered in the planning stage of proposed activities. Some common site design considerations include:</p> <ul style="list-style-type: none"> <li>• placing dust sources and access routes at a location on site furthest away from sensitive receptors to increase separation distances</li> <li>• shielding stockpiles from wind by locating them near buildings and considering topographical features, e.g. hills</li> <li>• minimising dust lift-off by storing material in bunkers which have the open end facing downwind.</li> </ul>
<p><b>Stockpiles</b></p>
<ul style="list-style-type: none"> <li>• dust suppression using water sprinklers with effective surface coverage</li> <li>• chemical stabilisers to reduce dust emissions when stockpiled material will not be disturbed for long periods</li> <li>• measuring and controlling moisture content to the appropriate dust extinction moisture (DEM) level</li> <li>• covering of stockpiles</li> <li>• stockpile stacking (e.g. capping with wet ore) and ore reclaiming techniques</li> <li>• limiting double handling (reduces risk of drying out)</li> <li>• limiting stockpile numbers and size (size as relevant to surface area) on site</li> <li>• reducing drop height from conveyors and stackers</li> <li>• locate stockpiles near wind breaks such as buildings or topographical features</li> <li>• orientation of stockpiles and bunkers to minimise impact by prevailing winds.</li> </ul>

**Conveyors**

- water sprinklers at transfer points
- covered conveyors
- reducing drop height
- regular clean up, particularly at transfer points to reduce spillage build-up.

**Vehicle movements and transportation**

- reducing speed limits on site and on access routes
- limitation of load size and overload prevention
- covering of loads
- wheel and truck wash-down facilities to avoid track out
- sealed surface or adding gravel/rubble to improve surface
- locating access routes away from sensitive receptors
- minimising travel distances by optimal site layout
- sealed parking areas for onsite vehicles
- fewer, larger vehicles
- regular cleaning of roads and trafficable surfaces
- water suppression
- chemical stabilisation (rather than wet suppression) for better binding of particles and reducing dust lift-off.

**Crushing and screening**

- water sprays, particularly at crusher feed/discharge and transfer points
- location of plant away from sensitive receptors (plant layout/design)
- reducing drop heights for materials e.g. use of chutes
- enclosing crushers and screening operations
- dust exhaust systems, particularly at crusher feed/discharge and transfer points
- closure/locking devices (e.g. clamps, fasteners)
- good housekeeping, including regular plant maintenance and clean up.





<b>Blasting</b>
<ul style="list-style-type: none"> <li>• avoid blasting during adverse weather conditions</li> <li>• minimising the blast area</li> <li>• use of dust reducing blasting techniques</li> <li>• wet drilling.</li> </ul>
<b>Meteorological factors</b>
<ul style="list-style-type: none"> <li>• shielding of dust sources during site design and layout planning by considering topography and buildings for shielding dust sources based on prevailing wind conditions</li> <li>• predictive weather forecasting for wind speed and direction to trigger dust controls or cease work</li> <li>• minimise scheduled works during driest months of the year, where possible.</li> </ul>
<b>Vegetation clearing</b>
<ul style="list-style-type: none"> <li>• retaining vegetation along site boundaries</li> <li>• staged clearing and progressive rehabilitation/revegetation</li> <li>• use of water, chemical dust suppressants or hydromulch on exposed areas.</li> </ul>
<b>General</b>
<ul style="list-style-type: none"> <li>• avoiding crushing and screening operations during adverse weather conditions.</li> </ul>



## Appendix E: Ambient air monitoring guidance

The table below provides guidance on the standard methods and equipment for ambient air monitoring of dust, compositional analysis, meteorological monitoring and equipment siting requirements. As these standards are updated regularly, the Standards Australia website should be checked for the most up to date standards.

Non-standard methods may be considered by the department on a case-by-case basis.

For additional guidance on monitoring requirements, please refer to *A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DEC, 2011).

<b>Monitoring methods for particulate matter</b>	
<b>High volume sampler</b>	<i>Pollutants monitored</i>
	<ul style="list-style-type: none"> <li>• particulate matter (PM<sub>2.5</sub>, PM<sub>10</sub>, TSP)</li> <li>• metals</li> </ul>
	<i>Applicable standards</i>
	<p>From the <i>Methods for sampling and analysis of ambient air</i> series:</p> <ul style="list-style-type: none"> <li>• AS/NZS 3580.9.6 <i>Determination of suspended particulate matter – PM<sub>10</sub> high volume sampler with size selective inlet - Gravimetric method</i></li> <li>• AS/NZS 3580.9.3 <i>Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method</i></li> <li>• AS/NZS 3580.9.14 <i>Determination of suspended particulate matter – PM<sub>2.5</sub> high volume sampler with size selective inlet – Gravimetric method</i></li> </ul> <p>Methods for metal analysis:</p> <ul style="list-style-type: none"> <li>• AS/NZS 3580.9.15 <i>Determination of suspended particulate matter – Particulate metals high or low volume sampler gravimetric collection – Inductively coupled plasma (ICP) spectrometric method</i></li> </ul>
<b>Tapered Element Oscillating Microbalance (TEOM)</b>	<i>Pollutants monitored</i>
	<ul style="list-style-type: none"> <li>• particulate matter (PM<sub>2.5</sub>, PM<sub>10</sub>)</li> </ul>
	<i>Applicable standards</i>
	<p>From the <i>Methods for sampling and analysis of ambient air</i> series:</p> <ul style="list-style-type: none"> <li>• AS 3580.9.8 <i>Determination of suspended particulate matter – PM<sub>10</sub> continuous direct mass method using a tapered element oscillating microbalance analyser</i></li> </ul>



<b>Monitoring methods for particulate matter</b>	
	<ul style="list-style-type: none"> <li>AS/NZS 3580.9.13 <i>Determination of suspended particulate matter – PM<sub>2.5</sub> continuous direct mass method using a tapered element</i></li> </ul>
<b>Beta attenuation monitor (BAM)</b>	<i>Pollutants monitored</i>
	<ul style="list-style-type: none"> <li>particulate mass (PM<sub>2.5</sub>, PM<sub>10</sub>)</li> </ul>
	<i>Applicable standards</i>
	From the <i>Methods for sampling and analysis of ambient air</i> series: <ul style="list-style-type: none"> <li>AS/NZS 3580.9.12 <i>Determination of suspended particulate matter – PM<sub>2.5</sub> beta attenuation monitors</i></li> <li>AS/NZS 3580.9.11 <i>Determination of suspended particulate matter – PM<sub>10</sub> beta attenuation monitors</i></li> </ul>
<b>Dust gauge</b>	<i>Pollutants monitored</i>
	<ul style="list-style-type: none"> <li>deposited dust</li> </ul>
	<i>Applicable standards</i>
	<ul style="list-style-type: none"> <li>AS/NZS 3580.10.1 <i>Methods for sampling and analysis of ambient air Determination of particulate matter – Deposited matter – Gravimetric method</i></li> </ul>
<b>Membrane filtration method</b>	<i>Pollutants monitored</i>
	<ul style="list-style-type: none"> <li>asbestos</li> </ul>
	<i>Applicable standards</i>
	<ul style="list-style-type: none"> <li>NOHSC:3003 <i>Guidance note on the membrane filter method for estimating airborne asbestos fibres 2<sup>nd</sup> Edition</i></li> </ul>



<b>Meteorological monitoring and equipment siting</b>	
<b>Meteorology</b>	<i>Parameters</i>
	<ul style="list-style-type: none"> <li>• wind speed and direction</li> <li>• rainfall</li> <li>• relative humidity</li> <li>• temperature</li> </ul>
	<i>Applicable standards</i>
	<ul style="list-style-type: none"> <li>• <i>AS 3580.14 Methods for sampling and analysis of ambient air Meteorological monitoring for ambient air quality monitoring applications</i></li> </ul>
<b>Siting of equipment</b>	<i>Applicable standards</i>
	<ul style="list-style-type: none"> <li>• <i>AS/NZS 3580.1.1 Methods for the sampling and analysis of ambient air Guide to siting air monitoring equipment</i></li> </ul>

DRAFT



# Glossary

**Ambient air quality**

The quality of air in the outdoor environment. This is typically measured away from direct sources of pollution and generally close to ground level (hence often referred to as ground-level concentrations).

**Beneficial use**

As defined under s.3(1) of the EP Act to mean a use of the environment, or any portion thereof, which is:

- (a) conducive to public benefit, public amenity, public safety, public health or aesthetic enjoyment and which requires protection from the effects of emissions or of activities referred to in paragraph (a) or (b) of the definition of environmental harm in s.3A(2) of the EP Act; or
- (b) identified and declared under s.35(2) of the EP Act to be a beneficial use to be protected under an approved policy.

**BoM**

Bureau of Meteorology

**Complex terrain**

Topographic features that may influence the dust plume pathway, such as hills and valleys.

**Deposited dust**

Particulate matter that settles out from suspension in the air.

**Dust**

Dust is particulate matter (PM) comprising small, dry, solid particles which may become airborne by natural forces (such as wind) and/or by mechanical processes (such as crushing, grinding, milling, conveying, stockpiling, ship loading or haulage).

**Environment**

As defined under s.3(1) of the EP Act and subject to subsection (2), means living things, their physical, biological and social surroundings, and interactions between all of these.

**Environmental harm**

As defined under s.3A(2) of the EP Act to mean direct or indirect –

- (a) harm to the environment involving removal or destruction of, or damage to native vegetation; or the habitat of native vegetation or indigenous aquatic or terrestrial animals; or



- (b) alteration of the environment to its detriment or degradation or potential detriment or degradation; or
- (c) alteration of the environment to the detriment or potential detriment of an environmental values; or
- (d) alteration of the environment of a prescribed kind.

**Environmental value**

As defined under s.3(1) of the EP Act means –

- (a) a beneficial use; or
- (b) an ecosystem health condition;

**EP Act**

*Environmental Protection Act 1986 (WA)*

**EPA**

Environmental Protection Authority

**EPP**

Environmental Protection Policy as defined in the EP Act; current examples include:

- *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy Approval Order 1999*
- *Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Policy Order (No. 2) 2003.*

**Fugitive dust**

Dust which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

**NEPC**

National Environment Protection Council

**NEPM**

National Environment Protection Measure

**NOHSC**

National Occupational Health and Safety Commission

**Occupier**

As defined in s.3(1) of the EP act to mean a person in occupation or control of premises, or part of premises with several occupiers, whether or not that person is the owner of (parts of) premises.

**ODA**

Operational dust analysis.

**PM<sub>10</sub>**

Particulate matter with an aerodynamic diameter of less than or equal to 10 µm.



<b>PM<sub>2.5</sub></b>	Particulate matter with an aerodynamic diameter of less than or equal to 2.5 µm.
<b>Point source</b>	A source from which emissions emanate from a specific opening such as a stack, chimney or pipe.
<b>Potentially significant</b>	If dust emissions are not screened out, they are potentially significant and require further analysis.
<b>Premises</b>	As defined under s.3(1) of the EP Act to mean residential, industrial or other premises of any kind whatsoever and includes land, water and equipment.
<b>Prescribed premises</b>	As defined under s.3(1) of the EP Act to mean premises prescribed for the purposes of Part V of the EP Act.
<b>Sensitive receptor distance</b>	The actual distance measured between the activity boundary of a facility and a sensitive receptor (see Appendix A).
<b>Sensitive receptors/ Sensitive land use</b>	<p>Places where people live or regularly spend time, and which are therefore sensitive to emissions from industry with implications for human health or amenity. They include, but are not limited to, residences, healthcare establishments, places of accommodation, places of study, childcare facilities, shopping centres, places of recreation, and some public buildings.</p> <p>Commercial, industrial and institutional land uses that require high levels of amenity, or are sensitive to particular emissions, may also be considered sensitive land uses.</p>
<b>Social surroundings</b>	As defined under s.3(2) of the EP Act for the purposes of the definition of environment, the social surroundings are a person's aesthetic, cultural, economic or social surroundings to the extent that those surroundings directly affect or are affected by physical or biological surroundings.
<b>Strategic industrial area (SIA)</b>	Industrial land areas designed for investment in downstream processing and other heavy or strategic industrial activities.



**TSP**

Total suspended particles (all particle sizes suspended in air).

**Unreasonable emission**

As defined under s.49(1) of the EP Act to mean an emission which unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person.

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