Land at Berth 31, Port of Barry

Chapter 4: Air Quality

Appendix 4A

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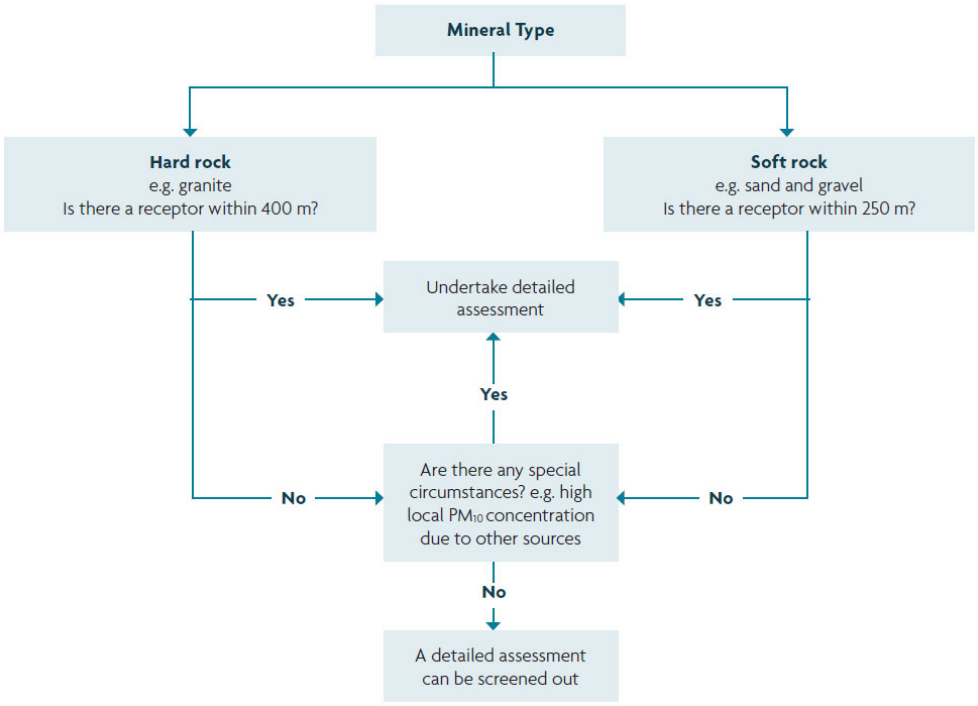
Appendix 4A – IAQM Assessment Methodology

This appendix outlines the steps and matrices used within the IAQM methodology for further assessment of effects from dust emissions, this reference source relating to quarrying (in the absence of similar guidance for wood processing). The screening criteria within the IAQM guidance is presented in the Figure below.

Figure 2: Screening Flow Chart



In accordance with the IAQM methodology, if there are relevant receptors within these distances then further assessment for both dust deposition and PM_{10} will be required.

Further Assessment: PM_{10}

Guidance for undertaking further assessment of PM_{10} would incorporate the following key elements, taken from the IAQM guidance:

- determine existing background ambient concentrations of PM_{10}, using publicly available data where site specific data is unavailable;
- if background is <17µg/m^3, it is considered there is little risk of the Process Contribution (PC) from the Quarry to cause an exceedance of the annual mean objective;
- if background is >17µg/m^3, undertake further assessment as follows;
- estimate expected PC of PM_{10} at sensitive receptors from site activities;

- estimate total predicted environmental concentration (PEC) by adding background concentration to the PC;
- undertake a prediction of likely PM_{10} impacts and resulting effects at relevant sensitive receptors;
- compare the PEC with the annual mean AQS objectives for PM_{10}; and
- determine overall PM_{10} impact on surrounding area. The significance of this overall impact is determined using professional judgement. For example, a moderate impact at one receptor may not mean that the overall impact has a significant effect; other factors need to be considered.

Further Assessment: Dust Deposition

Step 1 – Site Characteristics and Baseline Conditions

This is site specific and has been presented within the dust assessment. When identifying receptors in the locale of the development, the sensitivities of people can be determined using the general principles in Table A/1 alongside professional judgement.

Table A1 Sensitivities of People to Dust Soiling Effects

Sensitivity	Comments	Examples
High	Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics or value of their property would be diminished by soiling. People or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land.	Dwellings, medium and long-term car parks, car show rooms
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home The appearance, aesthetics or value of their property could be diminished by soiling People or property would reasonably be expected to be present continuously, or regularly for extended periods as part of the normal pattern of use of the land	Parks, places of work
Low	The enjoyment of amenity would not reasonably expected There is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.	Playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads

Step2 – Estimation of Dust Impact Risk

Step 2 provides a series of assessment matrices which are used to estimate the 'Pathway Effectiveness' and the estimation of 'Dust Impact Risk'.

The 'Dust Impact Risk' is determined for each of the following operational activities:

- Delivery of materials;
- materials handling;
- on-site transportation;
- material processing (e.g. screening and sorting);
- stockpiles and other exposed surfaces; and
- off-site transportation (e.g. onto external road network).

The 'Residual Source Emission' is based upon the scale of anticipated operations and is classified as Small, Medium or Large for each relevant operational activity, taking into account designed-in mitigation.

The Site specific factors considered to determine the 'Effectiveness of the Pathway' are distance and direction of receptors relative to the prevailing wind directions. For each receptor within the defined screening criteria distance, the wind directions from each source are calculated, with the resulting frequency of moderate to high wind speeds assigned to the categories in Table A/2 below.

Table A2 Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Distant	Receptor is between 200m and 400m from the dust source
Intermediate	Receptor is between 100m and 200m from the dust source
Close	Receptor is less than 100m from the dust source

The categorisation shown in Table A/3 is applied to the distance from each receptor to the source.

Table A3 Categorisation of Receptor Distance to Source

Frequency Category	Criteria
Infrequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are less than 5% (dry days only)
Moderately Frequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are between 5% and 12% (dry days only)
Frequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are between 12% and 20% (dry days only)
Very Frequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are greater than 20% (dry days only)

The 'Pathway Effectiveness' is then classified using the 'Frequency of Potentially Dusty Winds' from Table A/2 and the 'Receptor Distance from Source' from Table A/3, as shown in Table A/4.

Table A4 Determination of Pathway Effectiveness

Receptor Distance Category	Frequency of Potentially Dusty Winds			
	Infrequent	**Moderately Frequent**	**Frequent**	**Very Frequent**
Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

Estimation of Dust Impact Risk

The 'Residual Source Emissions' and the 'Pathway Effectiveness' are combined to predict the 'Dust Impact Risk' as shown in Table A/ 5.

Table A5 Estimation of Dust Impact Risk

Pathway Effectiveness	Residual Source Emission		
	Small	**Medium**	**Large**
Highly Effective	Ineffective	Moderately Effective	Highly Effective
Moderately Effective	Ineffective	Moderately Effective	Highly Effective
Ineffective	Ineffective	Ineffective	Moderately Effective

Step 3 – Estimation of Magnitude of Disamenity Effects

The likely disamenity effect at each receptor is determined using the 'Dust Impact Risk' from Table A/ 6 and the 'Receptor Sensitivity' from Table A/1, as shown in Table A/6.

Table A6 Magnitude of Effect

Dust Impact Risk	Receptor Sensitivity		
	Low	Medium	High
High Risk	Slight Adverse Effect	Moderate Adverse Effect	Moderate Adverse Effect
Medium Risk	Negligible	Slight Adverse Effect	Moderate Adverse Effect
Low Risk	Negligible	Negligible	Slight Adverse Effect
Negligible Risk	Negligible	Negligible	Negligible

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