OTTERPOOL PARK

Environmental Statement Appendix 6.3: IAQM Construction Phase Methodology and Mitigation Measures

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CONTENTS

TABLES

1 IAQM Construction Phase Methodology and Mitigation Measures

1.1 Methodology

Step 1 screens the requirement for a more detailed assessment. An assessment will normally be required where there is:

- a 'human receptor' within 350m of the boundary of the site;
- an 'ecological receptor' within 50m of the boundary of the site; or

either a human or ecological receptor within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s) for large sites, up to 200m from medium sites and 50m from small sites.

Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Step 2 assesses the risk of potential dust impacts for each of the four types of construction activity. A site is allocated a risk category (Step 2C) based on two steps:

Step 2A: The scale and nature of the works, which determines the magnitude of potential dust emissions as small, medium or large; and

Step 2B: The sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity.

Step 2C: The magnitude of potential unmitigated dust emissions is determined based on the criteria shown in Table 1

Table 1: IAQM Guidance for Construction Dust Magnitude of Impact

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level;
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than ten heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• Greater than 50 Heavy Duty Vehicle (HDV) (greater than 3.5 tonnes) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m^3 - 50,000m^3 • Potentially dusty construction material • Demolition activities 10-20m above ground level
	Earthworks	• Total site area 2,500m2 to 10,000m2 • Moderately dusty soil type (e.g. silt)

Magnitude	Activity	Criteria
		• Five to ten heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10-50 HDV (greater than 3.5 tonnes) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Demolition	• Total building volume less than 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground • Demolition during wetter months
	Earthworks	• Total site area less than 2,500m^2 • Soil type with large grain size (e.g. sand) • Less than five heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV (greater than 3.5 tonnes) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length less than 50m

Step 2D - The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM10, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table 2 provides guidance on determining the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table 2: IAQM Guidance on the Sensitivity of Types of Receptor to Dust Soiling, Health Effects and Ecological Effects

	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to Dust Soiling Effects	• users can reasonably expect an enjoyment of a high level of amenity; or • the appearance, aesthetics or value of their property would be diminished by soiling; and the 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. • indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	• 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; or • the appearance, aesthetics or value of their property could be diminished by soiling; or • the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • indicative examples include parks and places of work.	• the enjoyment of amenity would not reasonably be expected; or • property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or • 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. • indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.
Sensitivities of People to the Health Effects of PM10	• locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	• locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight	• locations where human exposure is transient • indicative examples include public footpaths, playing fields, parks and shopping streets.

	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
	• Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of the assessment.	hours or more in a day). • indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.	
Sensitivities of Ecological Receptors to Dust Effects	• locations with an international or national designation and the designated features may be affected by dust soiling; or • locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. • indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.	• locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • locations with a national designation where the features may be affected by dust deposition. • indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.	• locations with a local designation where the features may be affected by dust deposition. • indicative example is a local Nature Reserve with dust sensitive features.

Following identification of the receptor sensitivity, the sensitivity of the area to dust soiling, human health and ecological impacts is determined using Table 3, for each of the four activities (demolition, construction, earthworks and trackout).

Table 3: IAQM Guidance on Sensitivity of the Area in Terms of Dust Soiling, Human Health Impacts and Ecological Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
Dust Soiling Effects							
High	**n/a**	**Greater than 100**	High	High	Medium	Low	Low
	n/a	**10-100**	High	Medium	Low	Low	Low
	n/a	**1-10**	Medium	Low	Low	Low	Low
Medium	**n/a**	**Greater than 1**	Medium	Low	Low	Low	Low
Low	**n/a**	**Greater than 1**	Low	Low	Low	Low	Low
Health Impacts							
High	**Greater than 32**	**Greater than 100**	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32	**Greater than 100**	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28	**Greater than 100**	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	Less than 24	**Greater than 100**	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
Medium	**n/a**	**Greater than 10**	High	Medium	Low	Low	Low
	n/a	**1-10**	Medium	Low	Low	Low	Low
Low	**n/a**	**Less than 1**	Low	Low	Low	Low	Low
Ecological Impacts							
High	**n/a**	**n/a**	High	Medium	n/a	n/a	n/a
Medium	**n/a**	**n/a**	Medium	Low	n/a	n/a	n/a
Low	**n/a**	**n/a**	Low	Low	n/a	n/a	n/a

In the case of high sensitivity receptors with high occupancy (such as schools or hospitals), receptor number is approximate of the number of people likely to be present. In the case of residential dwellings, receptor number is just the number of properties.

Step 2C - The risk of impacts with no mitigation applied is then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity (determined in Steps 2A and 2B, respectively) for each construction activity. The matrices presented in Table 4 provide a method of assigning the level of risk for each activity.

Table 4: IAQM Risk of Dust Impacts Matrix

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction Activities			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk

Sensitivity of Area	Dust Emission Magnitude		
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 - Step 3 requires the identification of site specific mitigation measures to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with negligible risk, mitigation measures beyond those required by legislation are not required.

Step 4 - Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction phase of a proposed development. This is based on professional judgement but takes account of the significance of the effects for each of the potential dust generating activities.

For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation.

1.2 Mitigation Measures

In order to mitigate against the impacts of construction dust at receptors, Best Practice Measures (BPM) should be adopted. Based on the risk ratings presented in the air quality chapter, mitigation measures have been proposed to reduce the potential impacts, as summarised in Table 5.

The identified mitigation measures would be incorporated into the Code of Construction Practice (CoCP) reflecting the requirements of Best Practice Measures. An outline CoCP has been prepared for submission with the planning applications. This will be developed in more detail prior to commencement of works and should outline environmentally sensitive areas, mitigation measures to protect such areas, and method statements for specific construction activities.

Table 5: IAQM Construction Dust Mitigation measures for a high risk site

Mitigation Measure	High Risk Measures H=Highly recommended D=Desirable
Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H
Display the head or regional office contact information.	H
Dust Management	

Mitigation Measure	High Risk Measures H=Highly recommended D=Desirable
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority.	H
Site Management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
Make the complaints log available to the local authority when asked.	H
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H
Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	H
Monitoring	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	H
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	H
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible, commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	H
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
Erect solid screens or barriers around dusty activities or the site boundary so that are at least as high as any stockpiles on site.	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	H
Avoid site runoff of water or mud.	H

Mitigation Measure	High Risk Measures H=Highly recommended D=Desirable
Keep site fencing, barriers and scaffolding clean using wet methods.	H
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as described below.	H
Cover, seed or fence stockpiles to prevent wind whipping.	H
Operating vehicle/machinery and sustainable travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H
Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required, these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Authority, where appropriate).	H
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	H
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
Use enclosed chutes and conveyors and covered skips.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	H
Waste Management	
Avoid bonfires and burning of waste materials.	H
Demolition	

Mitigation Measure	High Risk Measures H=Highly recommended D=Desirable
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	H
Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H
Bag and remove any biological debris or damp down such material before demolition.	H
Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	H
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	H
38. Only remove the cover in small areas during work and not all at once.	H
Construction	
Avoid scabbling (roughening of concrete surfaces) if possible.	H
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	H
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	H
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	D
Trackout	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	H
Avoid dry sweeping of large areas.	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	H

Mitigation Measure	High Risk Measures H=Highly recommended D=Desirable
Record all inspections of haul routes and any subsequent action in a site log book.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	H
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	H
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	H
Access gates to be located at least 10m from receptors where possible.	H

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