BURO HAPPOLD

Air Quality Technical Note

Project	Wrexham AFC Kop Development
Subject	Air Quality Technical Note
Project no	065004
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Revision	Description	Issued by	Date	Approved (signature)
C01	Issue for planning	KB	28/07/25	K Woolley

1 Executive summary

This technical note has been produced to support an additional planning application for the Wrexham A.F.C Kop Development. The permitted development provides for the addition of a new standing terrace with capacity for up to 5,500 spectators, including a viewing platform for disabled supporters, raising the overall capacity of the stadium to approximately 15,500 for league games. It will also include provision for new hospitality space for both match and non-match days, club offices, community space and a club store. This technical note supports an application for additional measures to increase the capacity of the new Kop Stand capacity for up to 7,750 spectators.

The impacts of construction work on dust soiling and human health have been assessed. This assessment identified a medium risk of dust soiling and low risk of impacts to human health. Mitigation measures are recommended within the assessment based on the level of risk identified. Provided these are implemented and secured within a dust management plan, or equivalent, the residual effects are considered to be not significant.

The Proposed Amendments will lead to an additional increase in annual average daily traffic (AADT) of 92 due to the additional spectators. This increase in operational traffic is below the Institute of Air Quality Management (IAQM) screening thresholds for detailed assessment. Therefore, air quality effects associated with traffic generation are considered not significant.

The heating and hot water strategy will remain unchanged from the permitted development and will not lead to any on-site air pollutant emissions.

Air pollutant concentrations on-site are likely to comply with the relevant Air Quality Objectives (the 1-hour NO_2 and 24-Hour PM_{10} objectives). Therefore, the Application Site is deemed to be suitable for the intended use.

Overall, as the Proposed Amendments will not lead to any significant air quality effects. Therefore, air quality should not be considered as a constraint to the planning permission as the Proposed Development conforms to both national and local planning policy.

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2 Context

2.1 Purpose of this Note

Buro Happold has been appointed by Wrexham A.F.C to produce this air quality technical note to support an additional application for the Kop Development. This note assesses the potential impacts of the Proposed Amendments on air quality during construction and operation.

2.2 Previous Assessment

An air quality assessment was carried out by Ramboll based on the Permitted Development comprising of a new Stand with capacity for up to 5,500 spectators, including a viewing platform for disabled supporters (referred to as the "Previous Assessment"). This would raise the overall capacity of the stadium to approximately 15,500 for league games. This is approximately the same capacity that existed at the stadium prior to the existing Kop Stand being vacated, due to it being unfit for continued use. It also includes provision for new hospitality space for both match and non-match days, club offices, community space and a club store.

The conclusion of this assessment was:

"The construction of the proposed development has the potential to lead to fugitive dust emissions in the absence of appropriate mitigation. Based on the risk of dust impacts and the sensitivity of the site, mitigation appropriate to a medium risk site is recommended. With the mitigation in place, construction dust effects will not be significant.

Only the short term NAQOs are relevant for the proposed use of the site. Air quality across the proposed development would be expected to meet all relevant NAQOs. Development traffic is below the threshold for an assessment to be necessary and therefore will have an insignificant impact on local air quality.

Whilst no mitigation is required to reduce the direct air quality impacts of the development, mitigation measures are proposed to support sustainable travel. "

2.3 Proposed Amendments

The Proposed Amendments comprise of increasing the capacity of the new proposed Kop Stand by 2,250 spectators, from 5,500 to 7,750.

3 Baseline

3.1 Air quality management areas

Air quality management areas are zones designated by a local authority that have been identified as having exceedance of an air quality objective (AQO). The Application Site is not within an AQMA and there are no AQMAs within Wrexham.

3.2 Local authority monitoring

Wrexham County Borough Council (WCBC) undertake air quality monitoring in the vicinity of the Application Site. The monitoring results are presented in the most recent North Wales Combined Authority annual status report[1]. The monitoring locations and recorded 2023 annual average NO_2 concentration are presented in Figure 1. The monitored concentrations are considered in relation to the UK Air Quality Objectives (AQOs)[2]. For nitrogen dioxide (NO_2) the annual average AQO is 40 µg/m^3. All monitoring locations were compliant with this AQO by a significant margin in 2023 and

[1] North Wales Combined Authority. (2024). North Wales Authorities Collaborative Project 2024 Air Quality Progress Report. https://www.conwy.gov.uk/en/Resident/Environmental-problems/assets-Air-Quality/documents/NW-Authorities-Collaborative-Project-2024-Air-Quality-Progress-Report.pdf

[2] As prescribed in the Air Quality (England) Regulations 2000 and the subsequent Air Quality (England) (Amendment) Regulations 2002.

over the last five years. The nearest location, Site 46 on Regent Street ~350m to the South of the Application Site, recorded an annual average NO_2 concentration of 18 µg/m^3. This is less than 50% of the AQO. The Application Site is further from the roadside than this location so is likely to experience lower NO_2 concentrations.

The nearest automatic monitoring station is along Victoria Road, ~600m to the south of the Application Site. This station is also capable of monitoring particulate matter (PM_{10} and $PM_{2.5}$), as well as having the capability to assess compliance with short term AQOs. This station has complied with the annual average NO_2, PM_{10} and $PM_{2.5}$ AQOs, the 1-hour NO_2 AQO and the 24-hour PM_{10} AQO every year for at least the last five years.

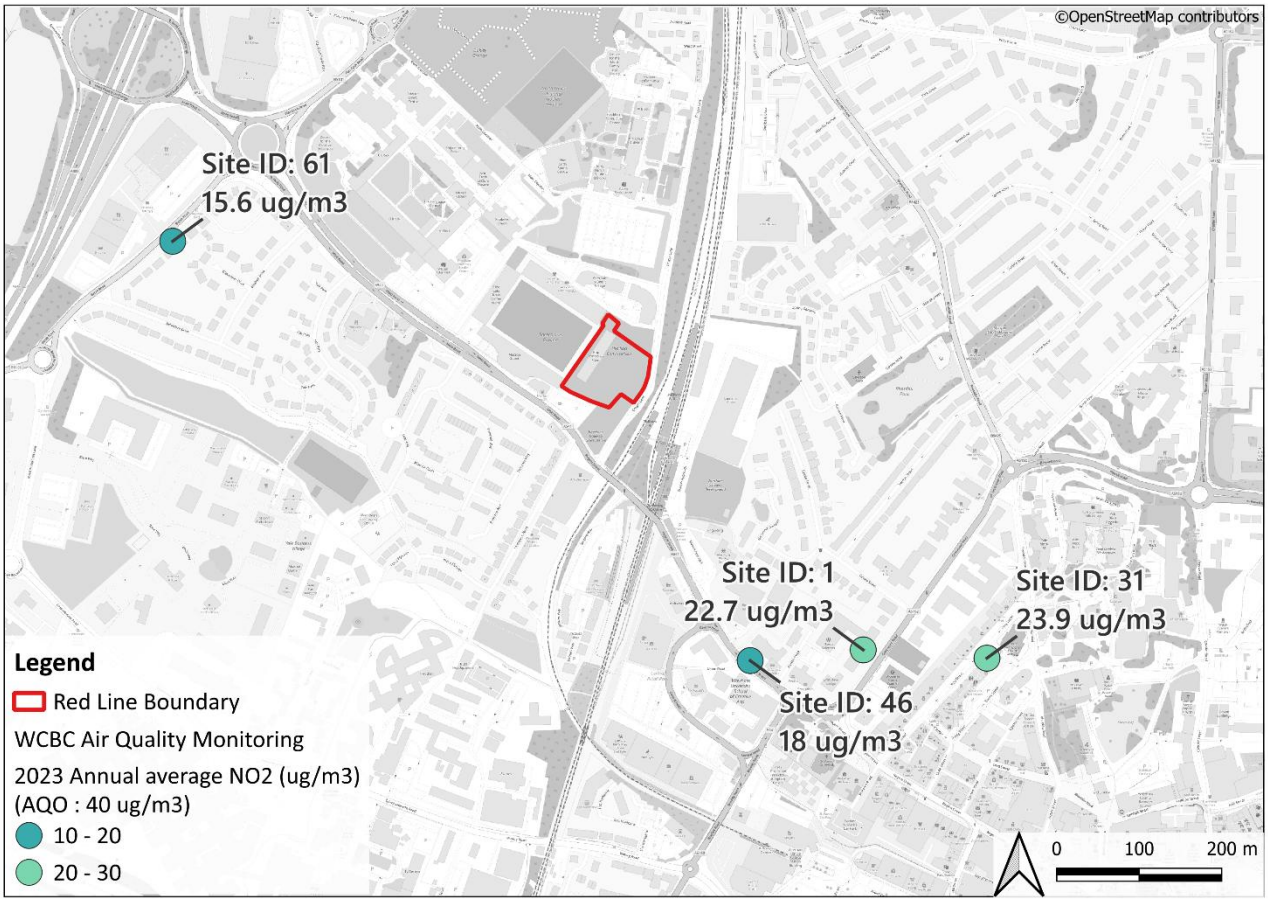


Figure 1 Nearby local authority air quality monitoring and 2023 annual average NO_2 concentration.

3.3 Background Concentrations

Defra model background air pollution data for NO_2, PM_{10}, and $PM_{2.5}$ for each 1km-by-1km Ordinance Survey grid square[3]. Background pollutant concentrations are modelled from the reference year of 2021 and based upon ambient monitoring and meteorological data from 2021 with projections for future years up to 2040. Modelled background concentrations for the 2023 baseline year and the 2027 opening year, in the grid square where the Application Site lies (332500, 350500) are presented in Table 1. Background concentrations are well in compliance with the relevant AQOs. Background concentrations are predicted to improve by a small margin from the baseline year to the opening year.

Table 1 Defra modelled background air pollutant concentrations in the grid square 332500, 350500.

Year	Annual mean background concentrations (µg/m^3)			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
Baseline year (2023)	7.76	9.92	10.4	5.94
Opening year (2027)	7.46	9.52	10.3	5.88

[3] Defra. (2024). Background Mapping data for local authorities - 2021. https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021

4 Assessment of Impacts

4.1 Construction dust impact assessment

Construction dust impacts are considered in relation to the IAQM guidance on the on the assessment of dust from demolition and construction version 2.2[4]. This guidance has been updated since the Previous Assessment, which utilised version 1.1[5]. Due to the Proposed Amendments and the updated guidance, the construction dust risk assessment has been undertaken again.

In accordance with screening criteria in the IAQM guidance, an assessment is required as sensitive human receptors are located within 250 m of the Application Site boundary. A receptor refers to a location that may be affected by dust emissions during demolition and construction. An assessment is screened in as there are residential buildings and commercial buildings within the 250 m radius, as shown in Figure 2.

4.1.1 Potential dust emission magnitude

There are no designated ecological sites within 250 m of the Application Site boundary or 50 m of the routes used by construction vehicles on the public highway. Hence, the ecological impacts of construction dust are screened out of this assessment.

Potential construction dust impacts arise from earthworks, construction and trackout. Demolition of the old Stand has already taken place and is therefore not included in the assessment. The IAQM guidance defines criteria to categorise the potential dust emission magnitude of each activity. The dust emission magnitudes for the Proposed Development are presented in Table 2.

Table 2 Classification of magnitude of dust emissions.

Activity	Dust emission magnitude	Justification
Earthworks	Small	The total Application Site area is estimated to be 6,600 m^2. This within the small IAQM threshold in version 2.2 of the guidance (<18,000 m^2). The subsoil is a layered subsoil of sand and gavel[6]. These larger soil sizes are less prone to suspension compared to smaller sizes.
Construction	Medium	Total construction volume is estimated to be 57,000 m^3, which is within the medium IAQM threshold (25,000 m^3 – 100,000 m^3). The primary construction material is steel which has a low potential for dust release.
Trackout	Medium	In line with the Previous Assessment, the trackout dust emission magnitude is considered medium. As a reasonable worst case assumption, it is assumed that the maximum outward daily heavy duty vehicle movement will be between 20-50. This is in the medium IAQM criteria. There will be a tarmac haul road through the site entrance gate to the exit gate, which will help minimise trackout of dust onto the road network.

4.1.2 Sensitivity of the area

The sensitivity of the area takes into account the following factors:

[4] IAQM. (2024). Guidance on the assessment of dust from demolition and construction. Version 2.2. https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf
[5] IAQM. (2014). Guidance on the assessment of dust from demolition and construction. Version 1.1. https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf
[6] British Geological Survey. (2025). UK Soil Observatory. https://mapapps2.bgs.ac.uk/ukso/home.html

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees or other vegetation, to reduce the risk of wind-blown dust.

Figure 2 presents an overview of identified construction dust receptors within 50 m of the Application Site. In determining the area sensitivity, the following has been considered:

- Within 50 meters of the Application Site boundary, there are several residential properties, including the Wrexham Student Village and houses along Mold Road. Overall, there are estimated to be over 100 high sensitivity receptors within 50 m of the boundary. There is also the Turf Public House within 20m of the boundary, which is considered a medium sensitivity receptor to dust soiling.
- There are over ten high sensitivity receptors (residential properties along Mold Road) within 20 m of the trackout route. Therefore, the sensitivity to dust soiling effects from trackout is considered high.
- Defra-modelled background PM_{10} level in the baseline year (2023) at the Application Site is 10.4 µg/m^3 (see Table 1). This, combined with the number of receptors in the vicinity of the Application Site, equates to a low sensitivity to health effects from PM_{10}.

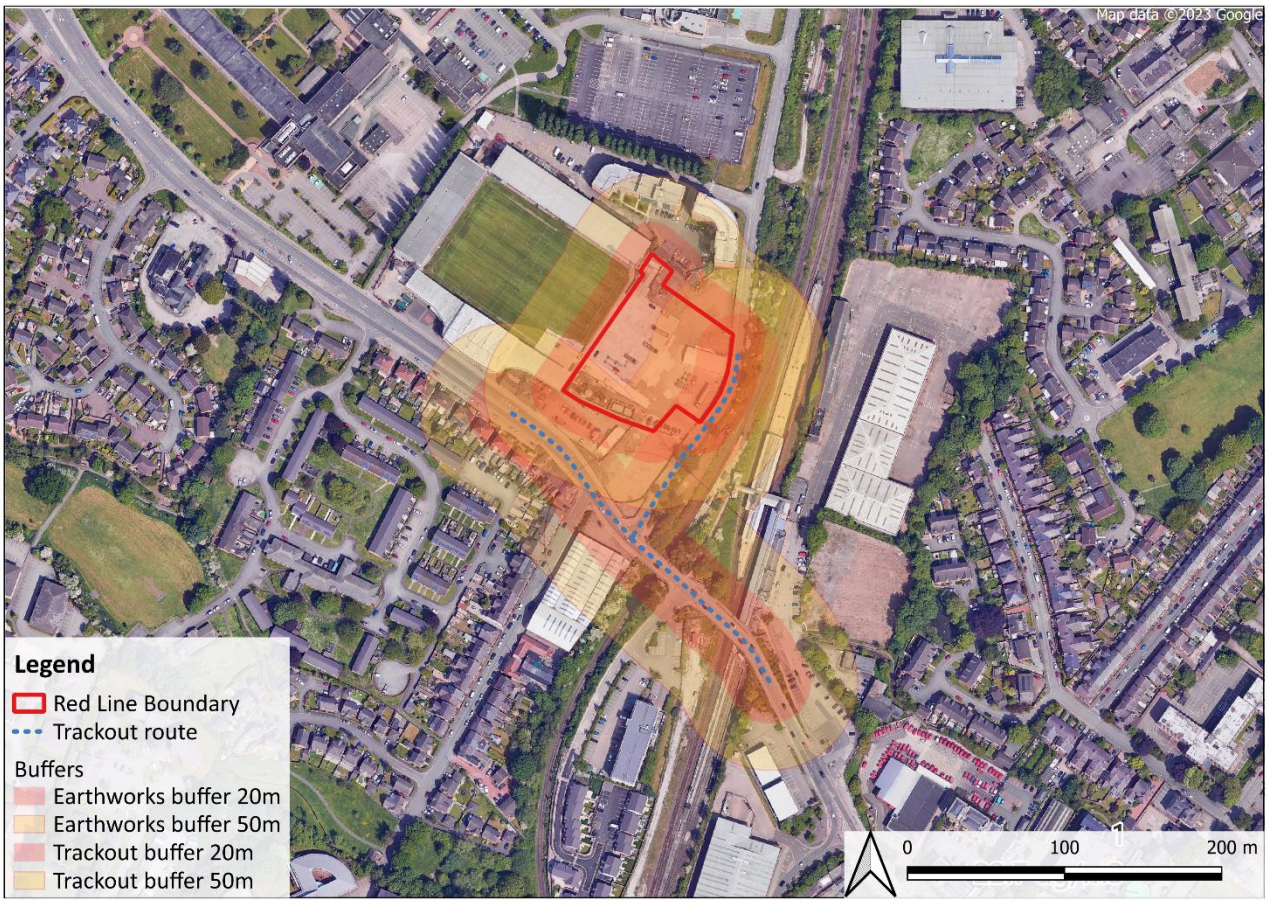


Figure 2 Construction dust buffers for area sensitivity.

Considering the number and sensitivity of receptors, the sensitivity of the surrounding area to potential construction impacts is presented in Table 3, which is in line with the IAQM criteria.

Table 3 Sensitivity of area to dust impacts.

Potential impact	Sensitivity of surroundings		
	Earthworks	**Construction**	**Trackout**
Dust soiling	High	High	High
Human health	Low	Low	Low

4.1.3 Risks of dust impacts

The risks of dust impacts for relevant construction activities are summarised in Table 4. These results consider both the potential dust emission magnitude and the sensitivity of the area.

Table 4 Risk of construction dust impact.

Source	Sensitivity	Earthworks	Construction	Trackout
Magnitude		Small	Medium	Medium
Dust soiling	High	Low Risk	Medium Risk	Medium Risk
Human health	Low	Negligible Risk	Low Risk	Low Risk

4.1.4 Mitigation measures

The IAQM guidance sets out the recommended mitigations measures to be implemented in order to mitigate the potential impacts during the construction phase. The mitigation measures for the Proposed Development are outlined in Appendix A. These should be included within a Dust Management Plan, or similar plan.

The IAQM guidance indicates that the potential dust effects during the construction phase are considered to be temporary and short term in nature as they will only arise particular times when certain activities and meteorological conditions combine to create the predicted level of magnitude. With the implementation of the dust control and mitigation measures outlined in Appendix A, construction dust effects will be not significant.

4.2 Traffic impacts

Traffic generation is considered in relation to the traffic thresholds presented in the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance on land-use planning and development control[7]. Where traffic generated by a Proposed Development is below these thresholds, air quality effects due to traffic can be screened out as insignificant.

Outside of an AQMA, these thresholds are:

- 500 AADT for light duty vehicles; or
- 100 AADT for heavy duty vehicles.

4.3 Construction traffic

Several embedded mitigation measures will be implemented to minimise air quality impacts generation during construction, as outlined in the construction environment management plan prepared by the project contractor, McLaren. For example, deliveries will be carefully managed to prevent congestion due to multiple deliveries arriving at the same time. This will be done through a delivery booking system which will be in effect from the first day of site activities. Furthermore, a full traffic management plan will be implemented. There will be no onsite staff parking available for the construction works. Space is allocated off-site to allow construction staff to park and a shuttle bus service will be provided, helping to minimise individual trips during construction.

[7] IAQM. (2017). Land-Use Planning & Development Control: Planning for Air Quality. https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

Considering this and the scale of the construction works, it is deemed likely that the construction traffic generated will be below the EPUK and IAQM threshold of 100 AADT for heavy duty vehicles. Furthermore, air quality impacts associated with construction traffic will be temporary and short term in nature. In line with the Previous Assessment, construction traffic impacts are scoped out of detailed assessment.

Therefore, the Proposed Amendments are deemed to be non-material with regards to air quality. The outcomes of the Previous Assessment that there will not be significant air quality effects arising from construction traffic remains valid.

4.4 Operational traffic

The project transport consultants, Buro Happold, have derived that the additional spectators introduced by the Proposed Amendments will lead to an additional 92 AADT for light duty vehicles. This is in addition to the additional 383 AADT considered in the Previous Assessment, equating to 475 AADT in total. This is below the 500 AADT threshold for detailed assessment outlined in the IAQM guidance.

As the traffic generated is below the IAQM screening criteria, it is deemed that air quality effects arising from operational traffic will be not significant.

4.5 Building emissions

The heating and hot water strategy will remain unchanged from the Previous Assessment. Heating and cooling will be via VRF heat pump systems, and hot water generation via air to water heat pump systems. Therefore, the energy strategy will not utilise any combustion and not give rise to any on-site air pollutant emissions and the outcomes of the Previous Assessment that there will not be significant air quality effects arising from the energy strategy remains valid.

4.6 Site suitability

To determine the significance of predicted air quality impacts based upon a site suitability assessment, the EPUK and IAQM guidance states: "Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means."

The proposed use is as a sports stadium, with additional uses including hospitality and retail. Therefore, only the short-term AQOs (i.e. the 1-hour NO_2 and 24-hour PM_{10} objectives) apply with regards to site suitability, in line with Defra Local Air Quality Management Technical Guidance TG(22)[8]. Local air quality monitoring indicates that concentrations in the vicinity of the Application Site comply with both the short-term and the annual average air quality objectives, by a significant margin. The façade of the Proposed Development is further from the roadside than many of these monitoring locations. Therefore, it is reasonable to assume that concentrations will also be compliant at the Proposed Development façade. As such, the overall effect is considered to be not significant, as was the case with the Previous Assessment.

5 Conclusion

Potential air quality impacts associated with the Proposed Amendments to the Wrexham AFC Kop Development have been assessed. The Proposed Amendments involve the increase in capacity of the new proposed Kop Stand by 2,000 spectators, from 5,500 to 7,500.

With the implementation of the construction dust mitigation measures, which have been informed by a construction dust risk assessment, air quality effects associated with construction dust will be not significant. As traffic generated during operation will be below the EPUK and IAQM thresholds for detailed assessment, air quality effects associated with traffic generation will be not significant. The heating and hot water strategy remains unchanged and will not lead to any on-site air pollutant emissions. As the Application Site is likely to comply with the relevant AQOs, effects associated with exposure of future users of the Proposed Development to air pollution are deemed to be not significant.

Therefore, as all air quality effects will be not significant, air quality should not be considered a constraint to planning permission.

[8] Defra. (2022). Local Air Quality Management Technical Guidance (TG22). https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

Appendix A

Activity	Level of desirability	Mitigation Measure
Communication	Highly recommended	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
Communication	Highly recommended	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.
Communication	Highly recommended	Display the head or regional office contact information.
Communication	Highly recommended	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM continuous monitoring and/or visual inspections.
Site Management	Highly recommended	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.
Site Management	Highly recommended	Make the complaints log available to the local authority when asked.
Site Management	Highly recommended	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.
Monitoring	Highly recommended	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.
Monitoring	Highly recommended	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.
Monitoring	Highly recommended	Agree dust deposition, dust flux, or real-time PM continuous monitoring locations 10 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.
Monitoring	Desirable	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 100 m of site boundary, with cleaning to be provided if necessary.
Preparing and maintaining the site	Highly recommended	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Preparing and maintaining the site	Highly recommended	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
Preparing and maintaining the site	Highly recommended	Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
Preparing and maintaining the site	Highly recommended	Avoid site runoff of water or mud.
Preparing and maintaining the site	Highly recommended	Keep site fencing, barriers and scaffolding clean using wet methods.

Activity	Level of desirability	Mitigation Measure
Preparing and maintaining the site	Highly recommended	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.
Preparing and maintaining the site	Highly recommended	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicles/machinery and sustainable travel	Highly recommended	Ensure all vehicles switch off engines when stationary - no idling vehicles.
Operating vehicles/machinery and sustainable travel	Highly recommended	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
Operating vehicles/machinery and sustainable travel	Desirable	Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph 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).
Operating vehicles/machinery and sustainable travel	Desirable	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	Highly recommended	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.
Operations	Highly recommended	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate
Operations	Highly recommended	Use enclosed chutes and conveyors and covered skips.
Operations	Highly recommended	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Operations	Highly recommended	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.
Waste Management	Highly recommended	Avoid bonfires and burning of waste materials.
Construction	Highly recommended	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.
Construction	Desirable	Avoid scabbling (roughening of concrete surfaces) if possible.
Construction	Desirable	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.
Construction	Desirable	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	Highly recommended	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.
Trackout	Highly recommended	Avoid dry sweeping of large areas.
Trackout	Highly recommended	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
Trackout	Highly recommended	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.

Activity	Level of desirability	Mitigation Measure
Trackout	Highly recommended	Record all inspections of haul routes and any subsequent action in a site log book.
Trackout	Highly recommended	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Trackout	Highly recommended	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Trackout	Highly recommended	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.
Trackout	Highly recommended	Access gates to be located at least 10 m from receptors where possible.