

South Tottenham PropCo Ltd

**30-48 Lawrence Road, South Tottenham, London, N15
4EG**

Air Quality Dust Management Plan

REPORT REF.

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HEAD OFFICE (LONDON): 3rd Floor, The Hallmark Building, 52-56 Leadenhall Street, London, EC3M 5JE **T** | 020 7680 4088

SUFFOLK: Suffolk Enterprise Centre, 44 Felaw Street, Ipswich, IP2 8SJ **T** | 01473 407 321

ESSEX: 1 - 2 Crescent Court, Billericay, Essex, CM12 9AQ **T** | 01277 657 677

NOTTINGHAM: Office 3, Garage Studios, 41-43 St Mary's Gate, Lace Market, Nottingham, NG1 1PU **T** | 0115 697 0940

KENT: Suite 10, Building 40, Churchill Business Centre, Kings Hill, Kent, ME19 4YU **T** | 01732 752 155

BRISTOL: Temple Studios, Temple Gate, Bristol, BS1 6QA **T** | 0117 456 4994

EDINBURGH: Lochside Way Edinburgh EH12 9DT **T** | 0131 516 8111

MANCHESTER: Chancery Place, 50 Brown Street, Manchester, M2 2JG **T** | 020 7680 4088

GLASGOW: 22 Montrose Street, Glasgow, G1 1RE **T** | 0141 648 7670

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Document Control Sheet

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Statement of Competence

The following authors of this report are Members of the Institute of Air Quality Management (IAQM) and possess the requisite qualifications, expertise, and experience to conduct robust air quality assessments and analyses in accordance with regulatory standards and best practices.

Assessor Name	Josh Willoughby
Title	Air Quality Consultant
Qualifications	AMIAQM AMIEnvSc
Experience	MSc Environmental Consultancy BSc Environmental Science

Reviewer Name	Peter Henshaw
Title	Associate (air quality)
Qualifications	CSci MIAQM MIEnvSc
Experience	MSc Environmental Diagnosis and Management BSc (Hons) Biological Sciences

Supervisor Name	Mark Chapman
Title	Technical Director (Air Quality)
Qualifications	CEnv MIAQM MIEnvSc
Experience	MSc Air Pollution Management and Control MSc Environmental Impact Assessment, Auditing and Management Systems BSc Science and the Environment

1 Introduction

- 1.1 Ardent Consulting Engineers (ACE) have been commissioned by South Tottenham PropCo Ltd ("the client") to produce an Air Quality Dust Management Plan (AQDMP) in support of a planning application for the Proposed Development at 30-48 Lawrence Road located within the London Borough of Haringey (LBH). The development description as presented within the planning application (HGY/2025/3108) is as follows:

"Alterations and extension to existing building to provide new self-storage facility (Use Class B8), new flexible workspace / incubator units and other works ancillary to the development"

- 1.2 The site is located on land approximate National Grid Reference (NGR): 533181, 189331.

2 Summary of Works and IAQM Dust Risk Assessment

Summary of Work to be Carried Out

2.1 The following summary of works is based on assumptions of the works anticipated to take place during the construction phase. The appointed construction contractor responsible for implementing this AQDMP will review and update this Plan accordingly if the work processes are likely to change.

2.2 The following sequence of works is expected to be undertaken with further detail provided below:

1. Earthworks
2. Construction
3. Landscaping and finishing.

Demolition

2.3 In relation to demolition, as per the development description, the proposals involve alterations and extensions to the existing building, as such, it is deemed that the scale of any demolition can be considered as part of the construction.

Earthworks

2.4 Earthworks are anticipated to include:

- Clearing vegetation;
- Excavating topsoil and subsoil; and
- Lay and check underground drainage/service requirements.

Construction

2.5 Construction related works are anticipated to include:

- Groundworks i.e. tarmacking, concreting, creating footpath; and
- Installation of cycle parking.

Landscaping/finishing

2.6 During the final finishing stage, the following will be carried out:

- Line painting of car park areas; and
- General hard and soft landscaping.

Temporary Works

2.7 It is expected that the contractor will be required to undertake some temporary works to facilitate the construction programme. It is anticipated that these may include the following:

- Erection of hoarding/fencing; and
- Installation/decommissioning of site cabins/welfare facilities.

Summary of IAQM Dust Risk Assessment

2.8 The risk of impacts, without mitigation, are summarised in Table 2-1 below, with the full procedure detailed within the Air Quality Assessment (report ref: 2504840-B-ACE-XX-00-RP-C-0801).

Table 2-1: Summary of Potential Unmitigated Dust Risks

Potential Impact		Risk			
		Earthworks	Construction	Trackout	Overall
Magnitude / Sensitivity		Small	Medium	Small	Medium
Dust Soiling	High	Medium	Medium	Low	Medium
Human Health	Low	Negligible	Low	Low	Low
Overall					Medium

3 Project Team and Responsibilities

Overall Responsibility

- 3.1 It is anticipated that the AQDMP will be provided to operators of the site, and they will be required to adopt the recommendations set out in the plan, wherever possible. Should any changes be required as a result of the proposed working methods set out, then the operators of the site will be required to agree changes with LBH, the Client and any other relevant parties involved in the authorisation of the construction works.
- 3.2 Contact details for any appointed operator at any time and their designated liaison representative will also be included in the updated AQDMP and will be submitted to LBH once confirmed.
- 3.3 The AQDMP will continue to be developed throughout the course of the operation of the site, considering any project changes or requirements set out by legislation, the Health and Safety Executive, LBH and other relevant bodies.

Person Responsible for On-Site Air Quality

- 3.4 A Site Manager will be appointed to be responsible for air quality. The AQDMP will be updated to include the contact details of the appointed Site Manager.

Support and Training

- 3.5 The appointed Site Manager will already have general experience and training in Air Quality.
- 3.6 Where necessary, additional support and training will be provided to the Site Manager and any supporting staff to ensure the AQDMP can be implemented precisely and ensure the staff have a good understanding of Air Quality and implementing the AQDMP.

4 Inventory and Timetable of Dust and Nitrogen Oxides (NOx) Generating Activities

4.1 Typical activities with a potential to generate dust and NOx emissions are listed in Table 4-1 below. It is recognised that some activities may not be applicable to this Site.

Table 4-1: Inventory of Dust and Emissions Generating Activities

Phase of Work	Activity which may give rise to emissions or dust
Earthworks	- Clearance of foliage/vegetation - Excavation of topsoil and subsoil - Movement/transfer of soil and waste to tipper vehicles/storage facilities - Heavy Goods Vehicle (HGV) emissions for collection and removal of waste from site - On-site machinery emissions i.e. excavators, tipper vehicles - Excavating and laying of drainage and services - Site traffic movements
Construction	- Vehicle emissions associated with material deliveries - Site traffic movement (limited) - Concrete/tarmac deliveries - Vehicle and plant emissions - Fencing activities
External Works	- Materials deliveries - Excavating and movement of materials (soil etc) - Seeding and planting - Vehicle emissions
Temporary Works	- Erection of hoarding/fencing - Installation/decommissioning of site cabins - Vehicle emissions - Deliveries

5 Dust and Emission Control Measures

Greater London Authority (GLA) Mitigation Measures

5.1 The following standard mitigation measures have been identified as being appropriate for a medium risk site, from the recommendations as set out within the GLA's 'The Control of Dust and Emissions during Construction and Demolition' guidance.

Table 5-1: Fugitive Dust Emission Mitigation Measures

Mitigation Measure
Site Management
- A stakeholder communications plan that includes community engagement before work commences on site will be developed and implemented. - A Dust Management Plan (DMP) will be developed and implemented. - The name and contact details of person(s) accountable for air quality and dust issues will be displayed on the site boundary. This may be the Site or Environment Manager. - Contact details for the head or regional office will be clearly displayed on the Site Boundary. - Record and respond to all dust and air quality pollutant complaints. - A complaints log will be made available to the Local Authority on a periodic basis (e.g. weekly) or when asked. - Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results and make an inspection log available to the local authority on a periodic basis (e.g. weekly) or when asked. - The frequency of inspections will be increased when activities with a high potential for dust release are taking place, or during prolonged dry or windy weather conditions to ensure dust and emissions are controlled. - Records will be kept of any exceptional incidents that cause dust and air quality pollutant emissions, either on or off-site, and the action taken to resolve the situation is recorded in the Log Book.

Mitigation Measure
Preparing And Maintaining the Site
• The Site layout will be planned so that machinery and dust generating activities are located away from receptors. • Solid screens or barriers will be erected around dust activities or the site boundary that are, at least, as high as any stockpiles on site. • The site or specific operations will be enclosed where there is a high potential for dust production and the site is active for an extensive period. • Green walls, screens or other green infrastructure will be installed to minimise the impact of dust and pollution. • Site runoff of water or mud will be avoided. • Site fencing barriers and scaffolding will be kept clean using wet methods. • Waste materials will be removed from the Site as soon as possible. • Stockpiles will be covered, seeded or fenced to prevent wind whipping. • Dust soiling checks of buildings within 100 m of Site boundary will be carried out. Cleaning will be provided if necessary. • Monitoring locations will be agreed with the local authority. • Baseline monitoring will commence at least three months before works phase begins, where possible. • Real-time dust and air quality pollutant monitors will be put in place across the site and ensure they are checked regularly.
Operating Vehicle / Machinery and Sustainable Travel
• All on-road vehicles will comply with the requirements of the London Low Emission Zone (LEZ). • All non-road mobile machinery (NRMM) will comply with Stage IIIB emissions criteria of Directive 97/68/EC and its subsequent amendments. This will apply to both variable and constant speed engines for both NOx and particulate matter (PM). An inventory of all NRMM will be registered on the NRMM register and alternative fuel sources to diesel will be investigated. • All vehicles visiting and entering the Site will switch off engines when stationary. No idling vehicles will be permitted.

Mitigation Measure
- The use of diesel or petrol powered generators will be avoided and mains electricity or battery powered equipment will be used, where possible. - A maximum speed limit of 10 mph on surfaced haul routes and work areas will be imposed.
- A Construction Logistics Plan will be produced to manage the sustainable delivery of goods and materials. - A Travel Plan will be implemented that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
Operations
- All cutting, grinding and sawing equipment will be fitted, or only used in conjunction with, suitable dust suppression techniques such as water sprays or local extraction systems, e.g. suitable local exhaust ventilation systems. - An adequate water supply for effective dust/particle matter mitigation (using recycled water where possible) will be accessible on-site.
Enclosed chutes, conveyors and covered skips will be used on-site.
- Drop heights will be minimised for conveyors, loading shovels, hoppers and other loading or handling equipment and use of fine water sprays on such equipment will be used wherever appropriate - Equipment will be readily available on-site to clean any dry spillage. Spillages will be cleaned up as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management
- Waste will be reused and recycled to reduce dust from materials. - No bonfires or burning of waste will be allowed on-site.
Earthworks
- Earthworks and exposed areas/soil stockpiles will be re-vegetated where possible to stabilise surfaces, as soon as practicable. - Hessian, mulches or tackifiers will be used where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. - Secure covers will only be removed in small areas during work and not all at once.

Mitigation Measure
Construction
Scabbling (concrete grinding) will be avoided where possible.
Sand and other aggregates will be stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case it will be ensured that appropriate additional control measures are in place.
Bulk cement and other fine powder materials will be delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
Bags holding smaller supplies of fine powder materials will be sealed after use and stored appropriately to prevent dust.
Trackout
Water-assisted dust sweeper will be used regularly on the access and local roads, as necessary, to remove any material tracked out of the site.
Dry sweeping of large areas will be avoided.
All vehicles entering and leaving the Site will be securely covered to prevent escape of materials during transport.
On-site haul routes will be inspected for integrity and necessary repairs to the surface will be instigated as soon as reasonably practicable
All inspections of haul routes and any subsequent action will be recorded in a site log book.
Hard surfaced haul routes will be installed, which will be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers and will be regularly cleaned.
A wheel washing system will be implemented.
Adequate area of hard surfaced road between the wheel wash facility and the site exit will be provided, wherever site size and layout permits.
Access gates will be located at least 10 m from receptors where possible.
Dust suppressants will be applied to locations where a large volume of vehicles enter and exit the construction site.

Dust Control Measures

- 5.2 All site activities will be controlled by Risk Assessment and Method Statements (RAMS). These will be project and activity specific and will be produced by the trade contractor and reviewed/approved by the Client. Dust control measures will be included where appropriate.

Requirements for Fuel

- 5.3 Every effort will be made to maximise the use of electric plant on site. However, it is inevitable that a number of off-road machines will be fuelled by gas-oil and that on-site storage of fuel will be required.
- 5.4 The layout of the Site for the construction activities will not be known until the site contractor has been appointed. It will be the responsibility of the contractor to establish an appropriate, safe location, away from receptors, within the site for the storage of fuel.
- 5.5 Gas bottles cages will be used to store any Liquified Petroleum Gas (LPG) cylinders. The cages will be located away from work areas, traffic routes and neighbouring receptors.
- 5.6 Gas-oil will be stored in a twin walled bowser. The location needs to be accessible by tanker to allow refilling. However, it will be in a position clear of work areas, vehicle routes and away from site boundaries close to receptors. A drip tray will be positioned under the filling point. A spill kit and fire-point will be located close by.
- 5.7 The contractor will ensure any oil storage locations are approved by LBH and will update this AQDMP to include a plan showing the storage locations.

Record of Dust Generating Episodes

- 5.8 The appointed contractor will be required to sign up to the 'Considerate Contractors Scheme'.

- 5.9 As required by the scheme and as detailed in Table 5-1, when dust generating activities are taking place or during periods of prolonged dry or windy weather, daily dust logs will be completed within the Air Quality logbook, making a record of the visual levels of dust on site and any subsequent action taken. The log will be made available to LBH on request.
- 5.10 When activities with a high potential to produce dust and emissions are being carried out during prolonged dry or windy conditions, hourly inspections at the boundary of such activities will be completed to ensure dust and emissions are controlled. Dust spoiling checks of buildings within 100 m will increase to a daily check. Any incidents will be reported to LBH.
- 5.11 The appointed Site Manager will immediately investigate any dust complaints from the surrounding areas that are attributed to site activities. The established contact at LBH will be notified of the incident/complaint within 24 hours.
- 5.12 If, following investigation, the complaint is valid and the incident is attributed to works on site then further controls (within industry best practice limits) will be implemented and a report will be produced and sent to LBH within 24 hours.
- 5.13 Details will be provided within the Air Quality Logbook.
- 5.14 The appointed contractor will organise dust monitoring using dust deposition, dust flux or real-time PM₁₀ continuous monitoring techniques. Monitoring positions and the type of monitoring will be agreed with LBH and the monitoring will commence at least three months before any works commence on site. This AQDMP will be updated to include details of the dust monitoring including dust monitoring equipment and monitoring positions. However, the following monitoring positions are recommended:
- At the southwestern corner of the Site; and
 - At the northeastern corner of the Site.

5.15 Trigger levels will be set and agreed with LBH as part of the dust monitoring survey. Where monitoring results show an exceedance of the agreed trigger levels, LBH will be informed immediately and appropriate mitigation measures implemented to reduce emissions.

Vehicle Emissions

5.16 It is envisaged that the majority of construction traffic will access the site via Lawrence Road.

5.17 No specific haul routes have been determined and if required, the contractor will agree suitable routes with LBH prior to work commencing on the site and update the AQDMP with this information accordingly.

5.18 To minimise vehicle related emissions of NO_x and particulate matter (PM₁₀ and PM_{2.5}) and associated impacts on local air quality a number of measures will be implemented, as detailed below.

5.19 The drivers of vehicles responsible for delivering construction materials to the site will be informed of the haul routes that should be taken to and from the site during the construction stage and these will be written into supplier and subcontractor contracts to ensure adherence.

5.20 Additionally, the following measures will also be implemented:

- All suppliers that the contractor employs will be obliged to adhere to a number of safety and environmental standards and programmes;
- Deliveries will be pre-booked and directed directly into the site where possible;
- Any unbooked/mistimed deliveries will be unconditionally turned away to prevent capacity on site being breached or excessive waiting/idling vehicles in the surrounding highway network;

- All workers will receive site induction training addressing agreed traffic routes to the site and rules for operating vehicles; and
- Dust suppression will be implemented through the regular use of water sprays, sheeting of haulage vehicles and use of wheel washers for vehicles departing the site. Regular patrols of the local highway network will be put in place and highway sweeping/cleaning along site entrance and access roads will be implemented to prevent deposits and mud/dust/debris building up.

Non-Road Mobile Machinery (NRMM) Statement

5.21 As part of the Control of Dust and Emissions during Construction and Demolition SPG, the GLA introduced new standards to reduce emissions of pollutants from NRMM carrying out construction and demolition activity.

5.22 NRMM is a broad category which includes mobile machines, and transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads. NRMM, particularly from the construction sector, is a significant contributor to London's air pollution. The NRMM Low Emission Zone uses the Mayor and London Borough's planning powers to control emissions from NRMM used on construction sites.

5.23 In a similar way to the Ultra-Low Emission Zone the NRMM Low Emission Zone requires that all engines with a net power rating between 37 kW and 560 kW meet an emission standard based on the engine emission "stage". The standards that need to be met depend on where the construction site is. The emissions requirements are only applicable to NRMM that is powered by diesel, including diesel hybrids.

5.24 CESAR Emissions Compliance Verification (ECV) identification will be used to ensure compliance with a minimum Stage IV NO_x and PM₁₀ emission criteria of The Non-

Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 and its subsequent amendments.

- 5.25 An inventory of all NRMM for demolition has been registered on the NRMM register and will be retained and maintained until occupation of the development. Compliance Certification has been awarded.

Roles and Responsibilities

- 5.26 The Primary Contractor will nominate a person to manage the NRMM requirements. It will be their responsibility to ensure that the site is compliant, which includes:

- Ensuring that all relevant Site workers are aware of the requirements, carrying out their roles and adequately equipped to do so.
- Keeping all relevant machinery emissions information and documentation centralised on site.
- Ensuring that the NRMM online register is kept up to date.

- 5.27 Each sub-contractor will nominate 1 person to be responsible for ensuring that the NRMM they are bringing to site is compliant and provide the Primary Contractor with the relevant details for each machine.

Primary Contractor Checks

- 5.28 The information provided by the sub-contractors will be checked by the Primary Contractor at least once per month, this will be included in the site monthly/weekly environmental audits. These checks will be documented on the Site NRMM inventory spreadsheet.

Sub-Contractors' Checks

- 5.29 The maximum amount of time an item of non-compliant NRMM can stay on site without an exemption is 5 days, therefore NRMM will be checked by the sub-contractor, and the Primary Contractor notified within the first 5 days of its arrival.

Site NRMM Inventory Spreadsheet

- 5.30 After being checked by the sub-contractor, NRMM emissions information will be passed to the Primary Contractor, who will keep the relevant information for all NRMM on site centralised on their own spreadsheets.

Managing Non-Compliant NRMM

- 5.31 If there is reason to believe that the item of NRMM is non-compliant, or the appropriate documentation is not available, an inspection will be carried out as soon as possible at a time when it is safe to do so. If during any of these checks an item of NRMM is found to be non-compliant, the contractor will arrange for it to be removed from site within 5 days of its arrival. If this is not possible then the Primary Contractor will apply for a 30 day exemption, explaining why the item of NRMM cannot be removed within the 5 day deadline. The application will include the intentions for the machine, for example when it is planned to be removed from site or a retrofit installed.
- 5.32 Records will be kept of actions taken to address any instances when non-compliant NRMM arrives on site.

6 Air Quality Monitoring

Purpose of Air Quality Monitoring

6.1 It is essential to give full and proper consideration to the purpose of monitoring during the construction works before any strategy is finalised. Monitoring may be conducted to fulfil a number of aims:

- To ensure that the construction activities do not give rise to any exceedances of the objectives for PM₁₀ and/or PM_{2.5}, or any exceedances of recognised threshold criteria for dust deposition/soiling;
- To ensure that the agreed mitigation measures to control dust emissions are being applied and are effective;
- To provide an "alert" system with regard to increased emissions of dust, and a trigger for cessation of site works or application of additional abatement controls;
- To supply a body of evidence to support the likely contribution of the site works if complaints; and
- To help to attribute any high levels of dust to specific activities on site in order that appropriate action may be taken

6.2 Careful consideration of the aims of air quality monitoring has assisted in devising an appropriate monitoring strategy. This has included:

- The choice of monitoring method(s);
- The number and location of monitoring sites;
- The duration of monitoring;
- The requirements for a baseline survey; and
- Whether the monitoring sites should remain in a static position throughout the construction works.

- 6.3 It is the case for this Plan that the principal purpose of the monitoring is to ensure that Dust and Air Quality mitigation measures are effective and to flag incidents where added measures, or temporary cessation of works, is necessary

Qualitative Monitoring

- 6.4 A “nominated representative” who is a member of the Principal Contractors team, will be identified as responsible for dust monitoring. The nominated representative will handle collating a body of evidence on the actual impact of site emissions during any reporting of complaints; such evidence is likely to be beneficial to both the Local Authority and the site operator.
- 6.5 An inspection for visible dust emissions in the vicinity of the site boundary (internal and external) will be conducted at least once on each working day. The results of this inspection will be clearly recorded in a clear and unambiguous manner

Visual Monitoring

- 6.6 Visual monitoring will involve observation of dust deposition onto a surface and dispersion on and off-site. Whilst such observations are necessarily influenced by subjective opinion, the approach is simple to implement and will be used effectively to minimise problems occurring. The monitoring involves seeing both the conditions likely to lead to dust release (weather and nature of construction activity) in addition to the observation of any effects.
- 6.7 Visual monitoring for dust will therefore also include perception of the potential for dust release and be associated with procedures described in an AQDMP and/or Construction Environmental Monitoring for conditions likely to increase the risk of dust release.
- 6.8 Obvious visual signs that a site is be operating at an increased risk of dust release relate to:

- Weather (i.e. dry periods with higher wind speeds); and
- Site operations (i.e. activities with increased potential for dust release)

6.9 When these conditions are occurring, the nominated representative will increase the frequency of visual assessments of dust release and monitoring of any visible surface soiling. This is particularly the case if the prevailing wind is in a direction towards sensitive receptors. In some cases, there may be an opportunity to change (or delay) potentially dusty site activities until the risk has reduced.

Visual Assessment of Any Dust Release

6.10 In its most basic form, this assessment will simply involve the nominated representative surveying the site for evidence of dust release. This will include seeing the movement of vehicles, stockpiling and demolition. It will be at once obvious if such operations are leading to the release of dust emissions and the size and frequency of such releases. Under such circumstances the nominated representative will take further mitigation as defined in the AQDMP or Construction Environmental Management Plan for the site. This approach is well-suited for finding the occurrence of short-lived (acute) dust events and allowing immediate action to prevent further releases.

Monitoring of Any Visible Surface Soiling

6.11 There are likely to be many surfaces on (and around) the boundary of a construction or demolition site where it will be obvious whether dust is being generated at a level where it is leading to visible surface soiling. These may include, but are not limited to:

- Car bonnets and roofs;
- Windowsills; and
- Street 'furniture' (such as lampposts and traffic bollards).

6.12 Where the above are not readily accessible, an "onsite" surface will be set up within the site boundary (e.g., a polished sheet of metal) on which dust deposition may be seen.

6.13 Where such visual inspections are conducted, consideration will be given to the periods of time over which dust can accumulate, and whether the surfaces were likely to have been clean before the construction activities started. The visual survey will also include access routes into the site, along which trackout of dust, and subsequent resuspension may occur

Quantitative Monitoring

6.14 For negligible and low-risk category sites, it is not normally be necessary to undertake any quantitative air quality monitoring, although in some circumstances it may be applicable to undertake occasional surveys (e.g., for Total Suspended Particles (TSP) or for PM₁₀ concentrations) using hand-held monitors during the Qualitative Monitoring Surveys as a means of demonstrating the efficacy of site controls.

6.15 For medium-risk sites, it is normally adequate to undertake surveys of dust flux over the site boundary, and/ or dust deposition/soiling rates around the site at nearby receptors. Due to the frequency of sample changes (every 2-4 weeks), such methods can have resource implications, and an approach based on continuous PM monitoring may be preferred.

6.16 For high-risk sites, it is normally necessary to supplement the monitoring for medium-risk sites with monitoring of ambient PM concentrations

6.17 The Site is classified as a medium-risk Site. While general mitigation will be implemented according to an overall Medium Risk Site, activity specific mitigation will be implemented according to the risk classification attributed to individual phases.

Air Quality Monitoring Techniques

- 6.18 There are a wide variety monitoring techniques available to measure both concentrations of airborne PM and dust flux, deposition, and soiling rates. These range from simple “passive” (unpowered) samplers that measure dust flux, dust deposition and soiling, to “active” (powered) samplers to measure specific dust fractions (e.g., PM₁₀).
- 6.19 Passive samplers include a variety of techniques that can be used to quantify dust flux and deposition rates or provide an indication of dust soiling rates.
- 6.20 For monitoring techniques that require laboratory analysis of samples, this will be conducted by a laboratory that has appropriate (e.g., UKAS) accreditation for the tests (assuming such accredited tests are available).
- 6.21 Active dust samplers include sophisticated, automatic analysers that supply real-time, high-resolution measurements of airborne PM concentrations that can be directly compared to Air Quality Objectives (AQOs), and other automatic analysers that measure real-time concentrations of airborne PM that are only indicative in comparison to the AQOs; there are also non-automatic samplers that measure concentrations of airborne PM.

Selection of Monitoring Techniques

- 6.22 As quantitative monitoring is necessary, the following questions have been asked in selecting appropriate monitoring techniques:
- Is there a requirement to conduct measurements that can be directly compared with the AQOs?
 - Is there a requirement to conduct real-time monitoring of PM concentrations?
 - Is there access to electrical power and secure sites?

- Are there reliable meteorological (wind speed and direction) data available that are characteristic of the site?

6.23 Other issues that have also been carefully considered in selecting the most appropriate monitoring strategy. For example, representative coverage, initial set up costs, the need for real-time information and resource requirements.

Baseline Monitoring

6.24 A period of baseline monitoring prior to the start of construction activities (including any demolition or site clearance works) is beneficial, as it allows existing conditions to be defined more accurately and can assist with the setting or interpretation of “trigger thresholds”.

6.25 The longer the period of baseline monitoring, the more robust the data will be. Where baseline monitoring is considered necessary, it will normally be necessary to undertake monitoring for a minimum period of three months prior to the start of onsite works. Careful consideration is to be given to seasonal variations; for example, a period of baseline monitoring conducted for three months during a wet, winter period, is unlikely to provide a robust baseline for construction activities carried out during a subsequent hot, dry summer.

6.26 The applicability of baseline monitoring has been carefully considered and justified. Where baseline monitoring is conducted, it will be conducted using the same techniques and same site locations (where practicable) as identified for the main study.

6.27 There is a specific need for baseline monitoring to decide site-specific Site Action Levels (SALs), or where there are specific sensitivities relating to exceedances of the AQOs. Baseline monitoring may not be needed, e.g., in areas where there is a large existing body of monitoring data (and where these sites are expected to continue to operate throughout the duration of the construction works), or where it may not be practicable to carry out baseline monitoring, e.g., if the risk assessment determines

that monitoring need only be carried out during a short-duration activity of the works (such as demolition, which may only extend over several weeks).

6.28 Where monitoring is only needed for the later stages of the construction works (e.g., where the demolition and earthworks activities are classified as “low-risk”, but construction activities are classified as “high-risk”) baseline monitoring will need to be undertaken before any site works commence.

Selection of Monitoring Locations

6.29 Several issues have been considered in the selection of suitable monitoring locations. These include:

- A decision on the number of sites that are to be established;
- Whether they are to remain in a permanent position throughout the entire construction works; and
- Whether monitoring is needed for direct comparison with AQOs.

6.30 Other practical issues have also been considered, such as the availability of electrical power, access to the monitoring sites, and security.

6.31 Care has been taken with regard to the microenvironment in positioning of samplers. Such as, sampler inlets being in a clear, unobstructed position, and some metres away from any large structures (such as walls of buildings) that might interrupt airflow; immediately above being open to the sky (free in an arc of at least 270°), with no overhanging trees or other structures.

6.32 As the principal aim of monitoring is to ensure that the agreed mitigation measures are being effectively applied, and that impacts upon the local community are minimised, where practicable monitoring at, or close to, the site boundary will be undertaken as this will record the highest dust emissions. Care has been taken to ensure that where needed, mains power supplies are available on a continual and reliable basis.

- 6.33 Where monitoring is needed to measure compliance with the AQOs, it is essential that a “reference equivalent” method is used. Where this is the case the monitoring station(s) will be situated close to the sensitive receptors (where the AQOs apply) rather than directly at the site fence line. Potential contributions from other (non-site) dust sources (such as roads or other dusty activities in the area) will also be considered as it is important that responsibility for the exceedance of SALs (or AQOs) is allocated appropriately.
- 6.34 The number of monitoring sites that can be practically set up is normally influenced by the technique that is to be used. Where monitoring of PM concentrations is to be conducted, a minimum of two sampling sites will be set up; it is the aim for these to be located upwind and downwind of the site, however in complex urban areas this may be difficult to determine; in such cases, samplers will be sited at opposite ends of the site, selected with regard to sources and receptors.
- 6.35 Such an approach allows analyses of source contributions to be conducted, if necessary (e.g., when trigger thresholds are exceeded), particularly if wind speed and direction data are available, and allows for coverage during variable weather conditions. Other considerations such as the proximity of the closest sensitive receptors to the site boundary and added sites will be considered to ensure there is adequate coverage over all meteorological conditions. Data from these added sites are useful in assigning source contributions (as the contribution of site dust emissions will fall off with increasing distance from the site boundary).
- 6.36 Where local meteorological data are not readily available, consideration will be given to installing appropriate wind speed and direction sensors at the site. Care will be taken to ensure that the sensors have a clear and unobstructed air flow around them. For large or long-term sites, consideration has been given to installing a meteorological station capable of recording wind speed, direction, humidity, and rainfall.

6.37 Where monitoring for dust deposition or dust soiling rates is conducted, a minimum of two sites (upwind and downwind of the site, in relation to the prevailing wind) will be set up based on the approach described above. For measurement of dust flux across a site, added samplers may be needed to enclose the site boundary and the location of the closest sensitive receptors may dictate that sites are included to ensure there is adequate coverage.

6.38 For construction works that extend over an extended period, the work may be conducted in different phases (and as discussed above, different risk categories may be assigned). In this case, the monitoring locations may remain unchanged throughout the duration of the works or may be moved as the phasing progresses. There are potential advantages and disadvantages with both approaches:

- If the sampling locations are moved
 - There may be substantial “downtimes” when the equipment is moved and re-commissioned (particularly when power supply is needed), and equipment may potentially be damaged, but with careful planning, such issues can be avoided; and
- If the sampling locations are not moved:
 - Monitoring during some stages of the works may be some considerable distance from the dust-raising activities and may not provide adequate information on maximum levels at the site boundary, or risks of exceedances at off-site receptors; and
 - As phases of the works proceed, new sensitive receptor locations may be introduced within close proximity to the revised site boundary.

6.39 The phasing of the work has been considered in the development of this Plan, and appropriate monitoring strategies are to be implemented to address the above issues.

Site Action Levels

- 6.40 It is customary to set SALs for PM concentrations and/or dust deposition/flux/soiling rates, as a mechanism to ensure that dust mitigation measures are both adequate and are being applied correctly. It can be useful practice for site operators to sign up to daily pollution forecasts so they become aware if moderate or high PM levels are likely; in these events added mitigation may be applied.
- 6.41 Historically, a SAL of $250 \mu\text{g}/\text{m}^3$, measured as a 15-minute mean PM_{10} concentration, has been widely adopted and this was cited in the 2012 IAQM Guidance. However, this metric was founded on quite limited data and was based on a study conducted by King's College on measurement data collected at Marylebone Road during 1999-2001, and the operation of a single construction site.
- 6.42 A more recent report by King's College has evaluated measurement data from nine construction sites. The monitoring was based on reference equivalent samplers, and the analysis included 1.8 million data points. The outcome of this research recommends a SAL of $190 \mu\text{g}/\text{m}^3$, measured as a 1-hour mean. This recommendation has been reviewed and is fully endorsed in the respective IAQM Guidance.
- 6.43 The SALs set out below will be applied to Air Quality Monitoring undertaken at the development site and will be reviewed in the future as more information becomes available.

Table 6-1: Site Action Levels

Monitoring Technique	SAL	Averaging Period
PM₁₀ automatic monitoring	$190 \mu\text{g}/\text{m}^3$	1-hour
Dust Deposition: Frisbee-type Deposition Gauges	$200 \text{ mg}/\text{m}^2/\text{day}$	4-weeks
Dust Deposition: Glass Slide Deposit Gauges	25 Soiling Units (SU) per week	Running 4-weeks

Monitoring Technique	SAL	Averaging Period
Dust Deposition: Sticky Pads	5% Effective Area Coverage (EAC)/day	1-week
Dust Flux: Sticky Pads (Where both EAC and Absolute Area Coverage (AAC) are measured)	High or above in EAC / AAC Dust Matrix	1-week

Table 6-2: EAC / AAC Matric

AAC: Dust Coverage						
EAC: Dust Soiling		Level 0 <80% / interval	Level 1 80-95% / interval	Level 2 95-99% / interval	Level 3 99-100% / interval	Level 4 100% over 45° / interval
Level 0 <0.5%/day		Very Low	Very Low	Very Low	Low	Medium
Level 1 0.5-0.7%/day		Low	Low	Low	Medium	High
Level 2 0.7-2.0%/day		Medium	Medium	Medium	High	High
Level 3 2.0-5.0%/day		High	High	High	High	Very High
Level 4 >5.0%/day		Very High	Very High	Very High	Very High	Very High

As proposed by Datson (2010) and included in AEA (2011)

Air Quality Monitoring Plan

Baseline Monitoring

6.44 The development site is not in an area where there is a large existing body of monitoring data (where these sites are expected to continue to operate throughout

the duration of the construction works). Additionally, an AQDMP has not determined that monitoring need only be carried out during a short-duration activity of the works.

- 6.45 Consequently, it is considered that baseline monitoring is needed, and this will be conducted for a period of up to 3 months until the start of dust-generating activities undertaken during the construction phase.

Monitoring Locations(s)

- 6.46 The principal aim of monitoring is to ensure that the agreed mitigation measures are being effectively applied, and that impacts upon the local community are minimised, where practicable monitoring at, or close to, the site boundary will be undertaken as this will record the highest dust emissions.
- 6.47 Where practicable a minimum of two sampling sites will be set up; it is the aim for these to be located upwind and downwind of the site, however in complex urban areas this may be difficult to determine; in such cases, where practicable, monitors will be sited at opposite ends of the site, selected with regard to sources and receptors.
- 6.48 Potential locations that may be used for monitoring, depending on meeting necessary requirements such as accessibility, safety, and power, would be towards the southwestern corner and northeastern corner of the Site.
- 6.49 Care will be taken with regard to the microenvironment in positioning of equipment. Such as, inlets being in a clear, unobstructed position, and some metres away from any large structures (such as walls of buildings) that might interrupt airflow; immediately above being open to the sky (free in an arc of at least 270°), with no overhanging trees or other structures. Care will also be taken to ensure that where needed, mains power supplies are available on a continual and reliable basis.

6.50 Final locations will be identified in consultation with the Site Contractor and photos of the equipment in-situ will be provided to the Local Authority for comment.

6.51 For construction works that extend over an extended period, the work may be conducted in different phases. In this case, the monitoring locations may remain unchanged throughout the duration of the works or may be moved as the phasing progresses. Where it is necessary to relocate the monitoring equipment, final locations will again be identified in consultation with the Site Contractor and photos of the equipment in-situ will be provided to the Local Authority for comment.

Monitoring Technique

6.52 Surveys of dust flux and/ or dust deposition/soiling rates around the site at nearby receptors should be undertaken, and it is at the developer/contractor's discretion that this technique may be substituted for continuous PM monitoring.

6.53 In this case both the developer/contractor and Local Authority have agreed that continuous PM monitoring will be undertaken; it is proposed that this will use a monitoring device with 'light-scattering' technology or similar.

Main Construction Phase Monitoring

6.54 Air Quality Monitoring will continue throughout the duration of the construction programme.

Site Assessment Levels

6.55 As continuous PM monitoring will be deployed, a Site Assessment Level (SAL) of 190 $\mu\text{g}/\text{m}^3$ as a 1-hour average will be used as a trigger for reporting to the Local Authority.

6.56 The following actions will be taken on reaching the SAL singularly or successively:

- 1 time

- Local authority to be notified of an exceedance of the SAL
 - Local meteorological conditions will be reviewed and recorded
- 2 times or more in successions
 - Local meteorological conditions will again be reviewed and recorded
 - A review of dust generating site activities will also be undertaken and where practical alternative methods or remediation actions will be employed.
- 3 times or more
 - Where practical alternative methods or remediation actions cannot be employed or are unsuccessful in reducing dust generation to below the SAL, all dust generating activity will cease.
 - Local meteorological conditions will again be reviewed and recorded and dust generating activities will only recommence once local meteorological conditions are considered unlikely to significantly contribute to exceedances and where the SAL is no longer being exceeded.

6.57 In addition to the SAL of $190 \mu\text{g}/\text{m}^3$ as a 1-hour average, an Activity Awareness Level (AAL) of $150 \mu\text{g}/\text{m}^3$ as a 1-hour average will be used as an indicator of an increase in local PM concentrations. The AAL will be used as a trigger for consideration of any local meteorological conditions and dust generating activities being undertaken onsite.

6.58 The AAL will be reviewed and revised up or down as necessary to ensure it remains a useful trigger without causing unnecessary interference to site activities

Reporting

6.59 A Dust Monitoring Report will be maintained and updated on a monthly basis detailing the previous months results and made available to the council on request. In addition, any exceedance of relevant SALs will be reported to the Local Authority. In addition, any exceedance of relevant SALs will be reported to the Local Authority within 72-96 hours.

6.60 Reporting will include the following details:

- Level and duration of the exceedance;
- Local meteorological conditions at the time of the exceedance;
- Off-site PM concentrations from local/regional continuous PM monitors prior to, during and immediately after the time of the exceedance;
- Any dust generating activities being undertaken at the time of the exceedance;
- Any alternative methods or remediation actions employed as a result of the exceedance; and
- Any period of cessation of dust generating activities and their recommencement

7 Implementing, Monitoring and Updating

- 7.1 The measures and actions outlined within this AQDMP will be adopted by the appointed contractor. Once appointed the contractor will undertake a review of all measures set out within the AQDMP and ensure they are appropriate for the anticipated methods of working and site activities. Where any changes to the AQDMP are anticipated these will be agreed with LBH, following which the AQDMP will be updated.
- 7.2 As part of the review the contractor will also update the AQDMP and provide additional information/clarification where required/indicated within the current version.
- 7.3 If during progression of the construction activities timescales or working practices are expected to change, then updates to the AQDMP will be made to reflect this and LBH informed accordingly.