

24 ENDELL STREET, COVENT GARDEN

Proposed Redevelopment

Air Quality Assessment
Prepared for: Patrizia UK Limited

SLR Ref: 410.12357.00001
Version No: v3.0
October 2021



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1.0 INTRODUCTION

SLR Consulting Ltd (SLR) has been commissioned by Patrizia UK Limited to undertake an air quality assessment in support of a planning application for the proposed redevelopment ('Proposed Development'), of 24 Endell Street, Covent Garden, London (the 'Site'). The Proposed Development comprises provision of best in class office space whilst retaining the function of the Studio recording space within the building.

The Site is located within Camden London Borough Council's (CLBC – the Council) jurisdiction, at the approximate National Grid Reference (NGR): x530235, y181220. The administrative boundary of Westminster City Council (WCC) lies approximately 45m to the southeast of the Site. The surrounding area comprises:

- Short's Gardens Road bordering the Site to the north with Covent Garden Medical Centre and residential properties on the opposite side;
- mixed commercial and residential properties adjacent to the Site along Betterton Street to the east;
- mixed commercial and residential properties directly adjacent to the south along Betterton Street and Endell Street; and
- Endell Street with commercial and residential properties to the west.

1.1 Scope of Assessment

It is understood that an air quality assessment is required to assess potential air quality effects and design constraints associated with the construction and operation of the Proposed Development.

This assessment has been undertaken in accordance with national guidance, as well as established best practice. The scope of the assessment is as follows:

- Baseline Evaluation;
- Construction Phase Assessment;
- Operational Phase Assessment;
- Air Quality Neutral Calculation; and
- Mitigation Measures.

The Proposed Development does not include the provision of any gas-fired appliances (including boilers) for space heating and domestic hot water generation. Therefore, as there will be no associated direct / site-specific combustion emission to atmosphere from the operation of the Site, assessment of building emissions is not required.

2.0 RELEVANT AIR QUALITY LEGISLATION AND GUIDANCE

2.1 Legislative Context

2.1.1 Air Quality Standards

The Air Quality Standards Regulations 2010¹ (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC)², and the Fourth Daughter Directive (2004/107/EC)³ within UK legislation, in order to align and bring together in one statutory instrument the Government's obligations. The AQSR includes Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment. Limit values are legally binding and are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites). Compliance is regulated at a national level (based upon a series of zones/agglomerations).

In the interim period the UK has formally left the EU, however, despite this EU law and regulations referred to above have subsequently been ratified into UK law and these are still of relevance.

2.1.2 Air Quality Strategy

Irrespective of the above, the UK Government and the devolved administrations are required under the Environment Act 1995 to produce a national air quality strategy to improve air quality. The latest Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland was published in 2007⁴. The AQS provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations for the protection of public health and the environment. There is no legal requirement to meet these objectives except where they mirror an equivalent legally binding Limit Value as prescribed within EU legislation, however compliance is regulated at a local level by local planning authorities.

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period – herein referred to as relevant exposure. Table 2-2 provides an indication of those locations.

The ambient air quality standards of relevance to human receptors in this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table 2-1.

Table 2-1
Relevant Ambient AQALs

Pollutant	AQAL ($\mu\text{g}/\text{m}^3$)	Averaging Period
Nitrogen Dioxide (NO_2)	40	Annual mean
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)
Particles (PM_{10})	40	Annual mean
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)
Particles ($\text{PM}_{2.5}$)	25	Annual mean

¹ The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

² Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

³ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004.

⁴ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra. July 2007.

Table 2-2
Human Health Relevant Exposure

AQAL Averaging Period	Relevant Locations	AQALs should apply at	AQALs should not apply at
Annual Mean	Where individuals are exposed for a cumulative period of 6-months in a year	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	Where individuals might reasonably be expected to spend one hour or longer	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

2.2 Local Air Quality Management

As reinforced within the AQS, Part IV of the Environment Act 1995 induces a statutory duty for local authorities to undergo a process of Local Air Quality Management (LAQM). This requires local authorities to Review and Assess air quality within their boundaries to determine the likeliness of compliance, regularly and systematically.

Where any of the prescribed AQS objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective. AQMAs can give rise to potential constraints to development, or at least a higher degree of scrutiny to air quality assessment work. Local authorities therefore have formal powers to control air quality through a combination of LAQM and through application of wider planning policies.

2.3 Clean Air Strategy

The Clean Air Strategy (CAS)⁵, published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

2.4 London Environment Strategy

The London Environment Strategy⁶ is a strategic planning policy document developed by the Mayor of London. The strategy aims to tackle the environmental pressures associated with an ever-growing London populace. With particular regard to air quality, the policies that are set out in the London Environmental Strategy aim to achieve the best air quality of any major world city by 2050.

2.5 London Air Quality Strategy

The London Air Quality Strategy⁷ (2010) is the Mayor of London's air quality strategy for the 32 Boroughs forming the Greater London Authority (GLA) and the greater London area. The Greater London Authority Act (1999) requires the Strategy to contain information about the following matters: Greater London's current air quality and its likely future air quality; the measures which are to be taken by the Mayor, Transport for London and the London

⁵ The Clean Air Strategy, Defra. January 2019.

⁶ Mayor of London, London Environment Strategy, 31 May 2018.

⁷ Mayor of London, London Air Quality Strategy, 14 December 2010.

Development Agency for the purpose of implementing the Strategy; and the measures which other persons or bodies are to be encouraged by the Mayor to take for the purpose of its implementation.

The London Air Quality Strategy sets out actions to improve London's air quality and includes measures aimed at reducing emissions from transport, homes, workplaces and new developments. It also sets out how Londoners can reduce their own emissions, and, especially for vulnerable people, reduce their risk of exposure. Policies will be implemented through a series of green transport and non-transport related policies in order to bring about emission reduction.

2.6 General Nuisance Legislation

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows LA and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10µm (i.e. greater than PM₁₀) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.7 Planning Policy

The following policies have been considered within this assessment.

2.7.1 National Policy

The 2021 update to the National Planning Policy Framework⁸ (NPPF) sets out planning policy for England. The NPPF states that the planning system should contribute to and enhance the natural and local environment, by preventing new development from contributing or being adversely affected by unacceptable concentrations of air pollution and development should, wherever possible, help to improve local environmental conditions such as air quality.

In specific relation to air quality policy, the document states:

Chapter 15 - Conserving and Enhancing the Natural Environment

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”

The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values [...] It is important that the potential impact of new development on air

⁸ National Planning Policy Framework (2021). Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

quality is taken into account [...] where the national assessment indicates that relevant limits have been exceeded or are near the limit.”

“Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).”

The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *“assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality [...] Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact”*.

2.7.2 Local Policy

London Plan 2021

The London Plan⁹ was formally adopted by the GLA on 2nd March 2021. The London Plan is the overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years (to the period 2041) and contains policies which are harmonious to those of Development Plan Documents to the 32 London boroughs.

The following policy relating to air quality is contained within the London Plan:

“Policy SI 1 Improving air quality

A Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor’s or boroughs’ activities to improve air quality.

B To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1 Development proposals should not:

- a) lead to further deterioration of existing poor air quality*
- b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits*
- c) create unacceptable risk of high levels of exposure to poor air quality.*

2 In order to meet the requirements in Part 1, as a minimum:

- a) development proposals must be at least Air Quality Neutral*
- b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures*
- c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1*
- d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.*

⁹ Mayor of London, The London Plan, March 2021.

C Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

- a) how proposals have considered ways to maximise benefits to local air quality, and*
- b) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.*

D In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

E Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development.”

Borough of Camden Local Plan

CLBC adopted their Local Plan¹⁰ in July 2017. The Camden Local Plan sets out the vision, strategic objectives and policies for development in Camden to 2031.

The following policies within the Local Plan relate to air quality:

“Policy CC4 Air Quality

The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council’s Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

Policy CC1 Climate change mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

- a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;*

¹⁰ Camden London Borough Council, Camden Local Plan. July 2017.

- b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;*
- c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;*
- d. support and encourage sensitive energy efficiency improvements to existing buildings;*
- e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and*
- f. expect all developments to optimise resource efficiency....”*

2.8 Assessment Guidance

The air quality assessment has been carried out in accordance with the principles contained within the following guidance documents:

- CLBC: Air Quality, Camden Planning Guidance, Supplementary Planning Document (2021)¹¹;
- Mayor of London: London Local Air Quality Management Technical Guidance LLAQM.TG(19)¹²;
- Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM): Land-Use Planning & Development Control: Planning for Air Quality¹³;
- Mayor of London: Supplementary Planning Guidance (SPG) The Control of Dust and Emissions During Construction and Demolition¹⁴;
- IAQM: Construction and Demolition Dust Guidance¹⁵; and
- GLA: The Air Quality Neutral Planning Support¹⁶.

¹¹ Camden London Borough Council, Camden Planning Guidance, Air Quality, January 2021.

¹² Mayor of London, London Local Air Quality Management Technical Guidance LLAQM.TG(19);

¹³ Environmental Protection UK and Institute of Air Quality Management, 'Land-Use Planning and Development Control: Planning for Air Quality', v1.2 2017.

¹⁴ Mayor of London, The control of dust and emissions during construction and demolition, Supplementary Planning Guidance, July 2014.

¹⁵ Institute of Air Quality Management (IAQM), Guidance on the assessment dust from demolition and construction (2016).

¹⁶ Air Quality Neutral Planning Support Update: GLA 80371, Air Quality Consultants, April 2014.

3.0 ASSESSMENT METHODOLOGY

3.1 Construction Phase

The assessment has been undertaken in accordance with Mayor of London and IAQM guidance. The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:

- demolition;
- earthworks;
- construction; and
- track-out.

The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM₁₀; and
- harm to ecological receptors.

The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the scheme. A detailed assessment is required where a:

- human receptor is located within 350m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the site entrance(s); and/or
- ecological receptor is located within 50m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the site entrance(s).

The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds, and professional judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the appropriate mitigation requirements, whereby through effective application, residual effects are considered to be 'not significant'.

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise (when compared to the operational phase, for which a full assessment has been undertaken), there is not considered to be any potential for significant air quality effects from development related road traffic emissions during the construction phase. Such potential effects have therefore been scoped out from requiring detailed assessment based on their assumed insignificant impact.

3.2 Operational Phase

3.2.1 Road Traffic Screening Assessment

The assessment of road traffic trips generated by the Proposed Development's operational phase has been undertaken qualitatively, in accordance with EPUK/IAQM Guidance.

The EPUK/IAQM guidance provides a series of indicative screening criteria where if exceeded, should consequently require a detailed assessment. If the Proposed Development is found not to exceed any of the relevant indicative criteria presented, then a detailed impact assessment is consequently not required. Road-traffic related impacts can therefore be considered as having an insignificant effect.

The indicative screening criteria relevant for this assessment is as follows (specific to developments located within an AQMA):

- a change of Light-Duty Vehicle (LDV) flows of more than 100 AADT (within an AQMA); and/or
- a change of Heavy-Duty Vehicle (HDV) flows of more than 25 AADT (within an AQMA).

3.3 Air Quality Neutral Calculation

The GLA Air Quality Neutral (AQN) guidance document requires all proposed non-residential developments of greater than 1,000m² to undertake an air quality neutral calculation. This is also reinforced within CLBC's AQ SPD. The proposals are considered to be in excess of this criterion (6,061 m²), therefore an AQN calculation has been undertaken.

The purpose of developments to be AQN within London is to prevent the incremental deterioration of air quality. The outcomes of the AQN calculation will determine whether mitigation is required to offset any development-generated emissions to demonstrate air quality neutrality. The outcomes do not directly indicate the potential of the Proposed Development to have significant impacts on human health.

As per the GLA guidance, Option 1 has been considered. This requires a Building Emissions Benchmark (BEB) and Transport Emissions Benchmark (TEB) to be calculated and compared against Site-specific emissions, respectively (based on the gross floor area (GFA)). Should a benchmark be exceeded, mitigation will subsequently be required, to be implemented on-site or off-site. As discussed, there are no associated direct / site-specific combustion emission to atmosphere from the operation of the Site. As such, only an assessment of transport emissions is presented. Site-specific emissions for the purpose of transport assessment are termed Total Transport Emissions (TTE).

The development does not provide provision for car parking however the number of LDV's on the local network is predicted to increase as a direct result of the Proposed Development. As per the GLA guidance, TTE cannot be calculated for 'car-free' developments, however, given the absence of evidence that users of the Proposed Development will not use offsite parking, all LDVs were assumed to be cars to provide a conservative assessment. It is acknowledged that not all LDVs would represent development trips to the scheme by new car movements (as intended by the guidance) and some of these would theoretically still occur on the local road network without the development in place (i.e. taxi trips).

Details of the proposed GFA and corresponding uses provided by Buckley Gray Yeoman, the appointed architects, for the purposes of the AQN calculation are presented in Table 3-1. It is noted the AQN guide utilises land classes before the 2020 amends and therefore the equivalent pre-2020 land use class has also been presented.

No TEB is available for pre-2020 class D2 use and therefore in accordance with the GLA guidance the TEB from the nearest comparable category should be selected, considered to be pre-2020 B1.

Table 3-1
GFA and Corresponding Uses

Floor	GFA (m ²)	Land Use Class	Land Use Class (Pre-2020)
Lower Basement	960	Sui Generis	D2
Upper Basement	661	Sui Generis	D2
Ground	946	E	B1
1 st Floor	858	E	B1
2 nd Floor	882	E	B1
3 rd Floor	868	E	B1

Floor	GFA (m ²)	Land Use Class	Land Use Class (Pre-2020)
4 th Floor	766	E	B1
5 th Floor	165	E	B1

4.0 BASELINE ENVIRONMENT

4.1 Baseline Air Quality

Monitoring data collected prior to the COVID-19 pandemic (i.e. pre-2020) has been used to characterise the baseline environment, as pollutant concentrations monitored during 2020 and 2021 are expected to be atypical, and not representative of the local environment and have therefore not been considered.

4.1.1 LAQM Review and Assessment

The latest publicly available Annual Status Report (ASR) for CLBC and WCC prior to COVID-19 are the 2020 Annual ASRs^{17,18} respectively. The ASRs for both councils have been consulted to determine existing baseline air quality conditions, relative to the preceding five years' monitoring (i.e. 2020 ASR includes monitoring data for the period 2015 - 2019), where available.

At present, CLBC has a borough-wide AQMA declared in 2002 due to the exceedance of NO₂ annual mean and PM₁₀ 24-hour mean AQALs at locations of relevant exposure. The adjacent WCC borough also has a similarly declared borough-wide AQMA. The Site is located within the Camden AQMA and in close proximity to the City of Westminster AQMA.

4.1.2 Review of Air Quality Monitoring

Automatic Air Quality Monitoring

The UK Automatic Urban and Rural Network (AURN) is a countrywide network of air quality monitoring stations operated on behalf of Defra. The closest AURN monitor to the Site is the London Bloomsbury AURN (NGR: x530119, y182039) an 'urban background' site located approximately 0.8km north of the Site within CLBC.

In addition to the AURN site discussed above, CLBC and WCC undertake continuous air quality monitoring at various locations as part of their commitment to LAQM.

Details and relevant 2015 – 2019 concentrations monitored at continuous monitors within the development locale are presented in Table 4-1 to Table 4-4, whilst the location relative to the Site is illustrated in Figure 4-1.

Table 4-1
Automatic Monitoring Locations: Details

Site ID	Local Authority	Site Type	NGR (m)		Within AQMA	Distance to Site (km)
			X	Y		
Covent Garden	WCC	Urban Background	530444	180903	Yes	0.3
Strand	WCC	Roadside	530785	180911	Yes	0.6
Oxford Street East	WCC	Roadside	529493	181331	Yes	0.7
BL0: London Bloomsbury (Russel Square Gardens)	CLBC	Urban Background	530123	182014	Yes	0.8

¹⁷ Camden London Borough Council, 2020 Annual Status Report (July 2020).

¹⁸ Westminster City Council, 2020 Annual Status Report (July 2020).

Table 4-2
Automatic Monitors: 2015-2019 Annual Mean NO₂ Results

Site ID	2019 Data Capture %	Annual Mean NO ₂ Concentration (µg/m ³)				
		2015	2016	2017	2018	2019
Covent Garden	84.0	-	-	37	39	39
Strand	98.0	122	101	92	88	76
Oxford Street East	97.0	-	-	-	76	51
BL0: London Bloomsbury (Russel Square Gardens)	97.7	48	42	38	36	32

Table 4-3
Automatic Monitors: 2015-2019 Number of NO₂ Hourly Mean Exceedances

Site ID	2019 Data Capture %	Hourly NO ₂ Means in Excess of 200µg/m ³				
		2015	2016	2017	2018	2019
Covent Garden	84.0	-	-	0	0	0
Strand	98.0	284	235	26	34	21
Oxford Street East	97.0	-	-	-	11	5
BL0: London Bloomsbury (Russel Square Gardens)	97.7	0	0	0	0	0

Table 4-4
Automatic Monitors: 2015-2019 Annual Mean PM₁₀ Results

Site ID	2019 Data Capture %	Annual Mean PM ₁₀ Concentration (µg/m ³)				
		2015	2016	2017	2018	2019
Oxford Street East	39.0	-	-	-	28	24
BL0: London Bloomsbury (Russel Square Gardens)	91.6	22	20	19	17	18

Table 4-5
Automatic Monitors: 2015-2019 Number of PM₁₀ 24 hourly Exceedances

Site ID	2019 Data Capture %	Annual Mean PM ₁₀ Concentration (µg/m ³)				
		2015	2016	2017	2018	2019
Oxford Street East	39.0	-	-	-	1	0
BL0: London Bloomsbury (Russel Square Gardens)	91.6	6	9	6	1	9

All automatic monitoring locations (apart from Covent Garden) reported annual mean NO₂ concentrations above 40µg/m³ for at least one year, relative to the period assessed. Covent Garden is an urban background site located 0.3km south of the Site and therefore it is expected to report lower concentrations. Annual mean concentrations at Covent Garden have however been within 10% of the AQAL since it was established. Covent Garden is the nearest automatic monitor relative to the Site.

In regard to the number of 1-hour means $>200\mu\text{g}/\text{m}^3$ reported at all monitoring locations considered, all 1-hour mean AQAL exceedances are limited to roadside locations, with the number of hourly means $>200\mu\text{g}/\text{m}^3$ reducing at all sites for the period assessed. This demonstrates that roadside sites witness elevated concentrations, relative to background sites (which is expected), however improvements in air quality are occurring at key locations.

Both annual mean and 24-hour mean PM_{10} concentrations reported at the automatic monitors of relevance to the Site were below the respective AQALs. PM_{10} concentrations have shown to some degree an improvement relative to the period assessed but appear to be already stabilised.

Passive Diffusion Tube Monitoring

Passive NO_2 diffusion tube monitoring is currently undertaken by CLBC at numerous locations – in fulfilment of their statutory LAQM obligations. WCC was due to implement a borough wide diffusion tube programme; however, due to the outbreak of COVID-19 tubes were unable to be deployed as planned.

The details and results of the monitoring locations of relevance to the Site are presented in Table 4-6 and Table 4-7 respectively, whilst their locations are illustrated in Figure 4-1. All monitoring results presented have been ratified and adjusted (where necessary) by CLBC. WCC did not operate a diffusion tube programme in 2019.

Table 4-6
Local LAQM NO_2 Passive Diffusion Tube Monitoring Sites: Details

Site ID	Site Location	Site Type	NGR (m)		Height (m)	Within AQMA	Distance to Site (km)
			X	Y			
CA21	Bloomsbury Street	Kerbside	529962	181620	2.2	Yes	0.5
CA11	Tottenham Court Road	Kerbside	529568	181728	3.5	Yes	0.8

Table 4-7
Local LAQM NO_2 Passive Diffusion Tube Monitoring Sites: 2015-2019 Results

Site ID	2019 Data Capture %	Annual Mean NO_2 Concentration ($\mu\text{g}/\text{m}^3$)				
		2015	2016	2017	2018	2019
CA21	91.7	71.4	72.2	71.2	59.4	48.5
CA11	83.3	85.6	83.6	74.0	65.8	61.2

For the non-automatic locations of relevance to the Site, all locations consistently reported NO_2 annual mean concentrations above the AQAL limit ($40\mu\text{g}/\text{m}^3$) over the period 2015 to 2019.

The maximum concentration recorded in 2019 was $61.2\mu\text{g}/\text{m}^3$ at CA11, located roadside of Tottenham Court Road which is expected to experience greater volumes of traffic relative to Endell Street and Short's Gardens.

CA21 is the closest monitoring location to the Site, located roadside of Bloomsbury Street approximately 0.5km north of the Site. The 2019 annual mean concentration recorded here was $61.2\mu\text{g}/\text{m}^3$.

Since 2015, both diffusion tube sites have largely demonstrated a reduction in annual mean NO_2 concentrations, demonstrating local improvements at key locations, correlating to national projections – however, they remain in excess of the AQAL.

The empirical relationship given in LLAQM.TG(19) states that exceedances of the 1-hour mean objective for NO_2 is only likely to occur where annual mean concentrations are $60\mu\text{g}/\text{m}^3$ or above at a location of relevant exposure (Table 2-2). This indicates that an exceedance of the 1-hour mean objective is likely to have occurred at the CA21 monitoring location between 2015-2017 and at the CA11 monitoring site between 2015 and 2019.

4.1.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include semi-empirical annual average concentration estimates for NO_x, NO₂, PM₁₀ and PM_{2.5} using a base year of 2018 (the year in which comparisons between modelled and monitoring are made).

Annual mean background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} have been obtained from the Defra published background maps (2018 base year), based on the 1km grid squares which cover the modelled domain. The Defra mapped background concentrations for a baseline year of 2019 and the predicted opening year of the development 2023 are presented in Table 4-8.

Table 4-8
Defra Background Pollutant Concentrations

Grid Square (X, Y)	Year	Annual Mean Background Concentration (µg/m ³)		
		NO ₂	PM ₁₀	PM _{2.5}
530500, 181500	2019	44.2	19.9	12.9
	2023	39.9	18.7	12.1
AQAL		40	40	25

The mapped NO₂ background concentration is estimated to be just above the AQAL in 2019 (44.2µg/m³) but is projected to decline to 39.9µg/m³ - below the AQAL by 2023. This is largely attributed to the introduction of policy and the uptake of cleaner vehicles into the London vehicle fleet. The mapped background concentrations of PM₁₀ and PM_{2.5} are 'well below' the AQAL for all years considered.

4.1.4 London Atmospheric Emissions Inventory Concentrations

The London Atmospheric Emissions Inventory (LAEI), provides 2016 ground level annual mean concentrations for NO₂, PM₁₀ and PM_{2.5} modelled at a 20m grid square resolution across London. The reported NO₂, PM₁₀ and PM_{2.5} concentrations which are centred upon the Site are provided in Table 4-9.

As per Table 4-8, the minimum reported 2016 annual mean NO₂ concentration covering the Site is above the AQAL (49.3µg/m³). However, the maximum reported concentration is below the LLAQM.TG(19) indicative threshold for exceedance of the 1-hour mean objective. Therefore, this indicates that exceedance of the 1-hour mean objective is unlikely to have occurred at the Site as per the 2016 LAEI modelled values.

2016 modelled PM₁₀ and PM_{2.5} concentrations are below the relevant long-term and short-term AQALs.

Table 4-9
2016 LAEI Pollutant Concentrations Relevant to the Site

Statistic	Annual Mean Concentration (µg/m ³)			Daily PM ₁₀ Means in Excess of 50µg/m ³
	NO ₂	PM ₁₀	PM _{2.5}	
Minimum	49.3	26.7	16.4	17.1
Maximum	58.7	28.7	17.3	23.7
AQAL	40	40	25	>35

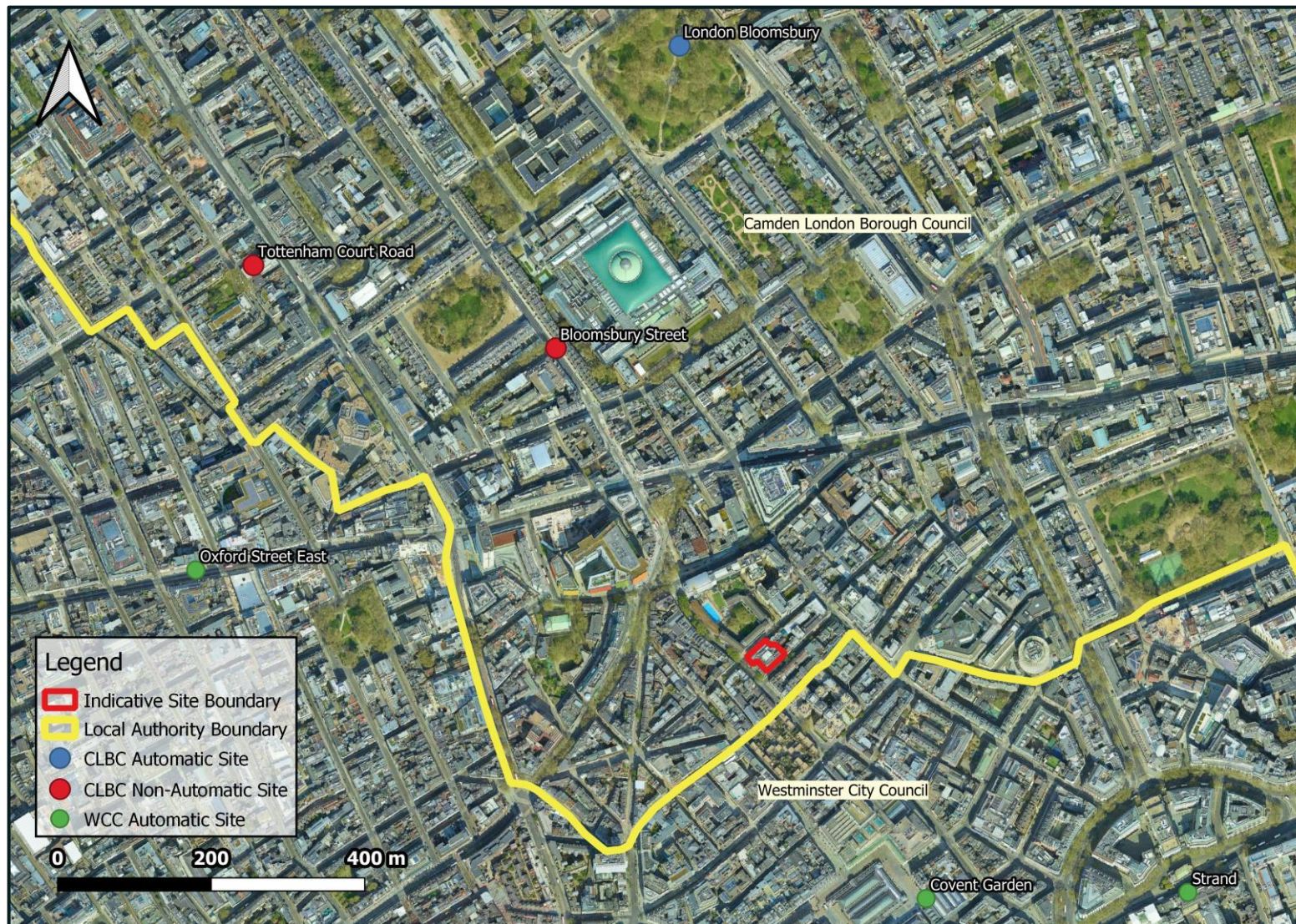


Figure 4-1
Local Monitoring Locations

5.0 CONSTRUCTION PHASE ASSESSMENT

This section presents the potential air quality impacts and effects associated with the construction of the Proposed Development.

5.1 Construction Dust Assessment

Where figures relating to area of the site, volume of the site, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the Mayor of London guidance to guide the assessor to define the dust emissions magnitude and sensitivity of the area (as detailed in Section 3.1).

5.1.1 Assessment Screening

There are 'human receptors' within 350m of the Site but no designated habitat sites within 50m of the Site boundary or up to 500m of the Site entrance(s) / 50m of the roads anticipated to witness construction traffic movements. Therefore, an assessment of construction dust on human receptors only is required.

5.1.2 Potential Dust Emissions Magnitude

Demolition

The existing building will remain intact. Potential demolition activities are proposed to occur within the building itself, within an enclosed environment. Impacts associated with demolition have therefore been screened out of this assessment.

Earthworks

The proposals comprise redevelopment of the existing structure, however the building footprint is set to be retained. As such, no significant earthwork activities are proposed. Given the Central London location it is highly unlikely that external stockpiling will be undertaken. Therefore, the dust emission magnitude in relation to Earthwork activities are initially considered to be 'Small'. This designation is likely to be conservative, as minimal earthwork activities, prior to mitigation, are assumed to be undertaken.

Construction

A roof pavilion, along with fire stair access, is to be constructed in addition to the remodelling of all floorspaces within the building and the creation of new entrances. The total building volume is anticipated to be <100,000m³, however new additions to the building are expected to be from glass, metal and timber (materials with low potential for dust release) and therefore, the dust emission magnitude for construction is therefore initially considered to be 'Small'.

Trackout

Trackout potential is limited by the Site location (i.e. Central London) and the nature of the redevelopment. It is anticipated that HDV movements in any one day will be less than 10. As the existing building structure is being retained the surface material is likely to be paved with low potential for dust release and any unpaved road length will be less than 50m. Therefore, dust emission magnitude for trackout is initially considered to be 'Small'.

Table 5-1
Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Earthworks	Small
Construction	Small
Trackout	Small

5.1.3 Sensitivity of the Area

Dust Soiling Impacts

The Site is located within a predominantly commercial district. Commercial properties surround the Site along with apartments and Turtles Nursery situated <50m from the Site boundary. There are anticipated to be <100 highly sensitive receptors located within 20m of the Site.

There are also believed to be <100 highly sensitive receptors (residential apartments) within 20m of the access routes up to 50m from the Site entrance - commensurate of a small site¹⁹, assuming construction traffic travels west and south following the one-way system along Shorts Gardens and Endell Street.

The sensitivity of the area with respect to dust soiling effects on people and property in relation to demolition, earthworks, construction and trackout activities is therefore considered to be 'high'.

Human Health Impacts

The maximum 2019 mapped background PM₁₀ concentration (2018 base year) for the 1km² grid squares centred on the Site (centroid NGR: x530500, 181500) is estimated to be 19.9µg/m³ (i.e. falls into the <24µg/m³ class).

Given the above information regarding the number and associated sensitivities of receptors within 20m from the Site, and within 50m of the Site entrance on access roads, the sensitivity of the area with respect to human health impacts in relation to demolition, earthworks, construction and trackout is therefore considered to be 'low'.

Table 5-2
Sensitivity of the Area

Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling Impacts	High	High	High
Human Health Impacts	Low	Low	Low

5.1.4 Risk of Impacts (Unmitigated)

The outcome of the assessment of the potential 'magnitude of dust emissions', and the 'sensitivity of the area' are combined in Table 5-3 below to determine the risk of impact which is used to inform the selection of appropriate mitigation.

Table 5-3
Risk of Dust Impacts

Potential Impact	Earthworks	Construction	Trackout
Dust Soiling Impacts	Low Risk	Low Risk	Low Risk
Human Health Impacts	Negligible	Negligible	Negligible

5.1.5 Mitigation

Following the construction dust assessment, the Site is found to be at worst 'Low Risk' in relation to dust soiling effects on people and property and 'Negligible' in relation to human health impacts (Table 5-3). However, potential dust effects during the construction phase are considered to be temporary in nature and may only arise at particular times (i.e. certain activities and/or meteorological conditions).

¹⁹ As per the IAQM's 'Guidance on the Assessment of Dust from Demolition and Construction', without site-specific mitigation, trackout may occur along the public highway up to 500m from large sites, 200m from medium sites and 50m from small sites (determined by the calculated trackout dust emission magnitude), as measured from the site exit.

Nonetheless, commensurate with the above designation of dust risk, mitigation measures, as identified by the Mayor of London guidance are required to ensure that any potential impacts arising from the construction phase of the Proposed Development are reduced and, where possible, completely removed. In accordance with the Mayor of London guidance, providing effective mitigation measures are implemented, such as those outlined in Section 8.1, construction dust effects are considered to be 'not significant'.

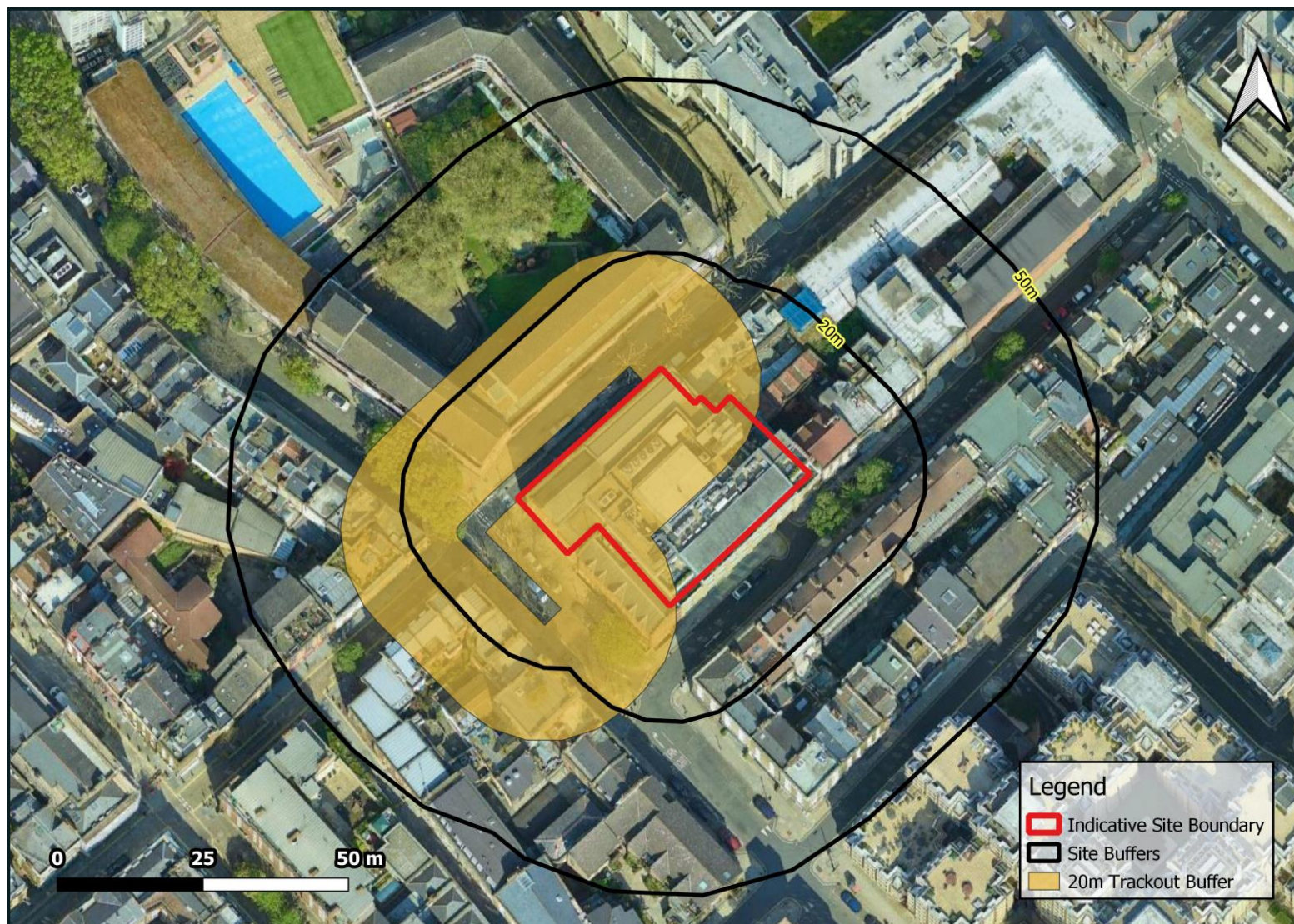


Figure 5-1
Construction Dust Assessment Buffers

6.0 OPERATIONAL PHASE ASSESSMENT

This section presents the potential air quality impacts and effects associated with the operation of the Proposed Development.

6.1 Road Traffic Screening Assessment

Traffic data used for screening purposes was provided by Velocity Transport Planning - the appointed transport consultant (Table 6-1). The data relates to the maximum predicted trip rates the Proposed Development is expected to generate, for comparison against the EPUK/IAQM indicative criterion for assessment (as outlined in Section 0). This is believed to be conservative, as does not reflect anticipated trips on the public road network (expected to be lower in comparison, achieved via distribution).

Table 6-1
Maximum Development Trip Generation Rates

Scenario	AADT		
	All	LDVs	HDVs
Proposed Development	9	7	2
Net Change	3	2	1
EPUK/IAQM Screening Criteria		100	25

As shown in Table 6-1, maximum generated trips are not predicted to exceed the relevant criteria, with the AADT values further reducing once distributed onto the local road network. Effects associated with the operation of the Proposed Development can therefore be considered as insignificant and require no further consideration.

7.0 Air Quality Neutral Calculation

As discussed in Section 3.3, an assessment of Site-generated transport emissions is solely required, given the absence of any specified building combustion processes in day-to-day operation.

As per Table 3-1, the Proposed Development comprises of 6 floors of office use (pre-2020 land use class B1) and 2 floors of recording studio use (pre-2020 land use class D2). No TEB is available for pre-2020 class D2 use and therefore in accordance with the GLA guidance the TEB from the nearest comparable category should be selected. Given the studio use, it is considered that pre-2020 office (B1) use is most appropriate and therefore all floors are considered to be of pre-2020 B1 use for the purpose of the TEB calculation. It is noted that this approach is undertaken in A2.12 of the GLA guidance.

The GLA AQN guidance provides figures for the average distance travelled (km) for each land-use class. Emissions of NO_x and PM₁₀ per kilometre and the TEB factors for NO_x and PM₁₀ specific to the Site location within the Ultra-Low Emission Zone (ULEZ).

7.1 Total Transport Emissions

The TTE is based on the annual number of car movements believed to be generated by the development, together with the associated trip lengths and vehicle emission rates.

Reference should be made to Table 7-1 and Table 7-2 for presentation of the AQN TTE inputs and outputs for the proposed Site, respectively.

Table 7-1
Air Quality Neutral – Total Transport Emissions Inputs: Proposed Site Use

Input Parameter	Proposed Office (pre-2020 B1) Use
AADT (LDV)	7
No. Trips per Annum	2,555
Average trip distance (km)	3.0
NO _x emission factor (g/vehicle-km)	0.4224
PM ₁₀ emission factor (g/vehicle-km)	0.0733

Table 7-2
Air Quality Neutral – Total Transport Emissions Outputs: Proposed Site Use

Pollutant	Proposed Office (B1) Use Annual Emissions (kg/annum)
NO _x	3.2
PM ₁₀	0.6

7.2 Transport Emission Benchmarks

The TEB for the Site is calculated using the TEB benchmark rate for pre-2020 Class B1 land use provided in the GLA guidance and factored by the GFA area for both NO_x and PM₁₀.

Reference should be made to Table 7-3 and Table 7-4 for a presentation of the air quality neutral TEB inputs and outputs for the proposed Site, respectively.

Table 7-3
Air Quality Neutral – Transport Emission Benchmarks Inputs

Input Parameter	Proposed Office (pre-2020 B1) Use
GFA	6,106m ²
NO _x TEB (g/m ² /annum)	1.27
PM ₁₀ TEB (g/m ² /annum)	0.22

Table 7-4
Air Quality Neutral – Transport Emission Benchmarks Outputs

Pollutant	Proposed Office (pre-2020 B1) Use Total Transport Emissions (kg/annum)
NO _x	7.8
PM ₁₀	1.3

7.3 Net Emissions

The overall outcome is determined by subtracting the TTE of the proposed Site use from the TEB, as presented in Table 7-5.

Table 7-5
Air Quality Neutral – Transport Emissions Overall Outcome

Pollutant	Proposed Office (pre-2020 B1) Use Net Emissions (kg/annum)
NO _x	-4.5
PM ₁₀	-0.8

As shown in Table 7-5, the outcome of the transport related emissions assessment (Option 1) illustrates that the TTE for NO_x and PM₁₀ are both less than the corresponding TEBs. The development is considered to be at a minimum AQN. As such, no additional mitigation is considered necessary in accordance with Option 1.

It is reiterated that the AQN assessment undertaken is considered to be overly conservative, given LDV's have been assessed in the absence of 'car' only trips, and are considered to reflect existing transport movements which are already on the network in reality.

8.0 MITIGATION MEASURES

This section presents any proportionate mitigation measures required during the construction and operational phases of the Proposed Development.

8.1 Construction Phase

8.1.1 Construction Dust

As discussed in Section 5.0, construction impacts associated to the Proposed Development would result in the generation of dust and PM₁₀.

The Mayor of London guidance outlines a number of site-specific mitigation measures based on the assessed Site risk. The measures are grouped into those which are highly recommended and those which are desirable. With the effective application of the dust mitigation measures, as detailed in Table 8-1, residual effects are considered 'not significant'.

Table 8-1
Construction Dust Mitigation Measures

Site Application	Mitigation Measures
Highly Recommended	
Communications	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.
	Display the head or regional office contact information.
Monitoring	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.
	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.
Operating Vehicle/Machinery and Sustainable Travel	Ensure all vehicles switch off engines when stationary - no idling vehicles.
	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
	Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.
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.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
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.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

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.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
Waste Management	Avoid bonfires and burning of waste materials.
Desirable	
Communications	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, real time PM ₁₀ continuous monitoring and/or visual inspections.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	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.
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 windowsills within 100m of site boundary, with cleaning to be provided if necessary.
Operating Vehicle/Machinery and Sustainable Travel	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).
Operations	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.
Preparing and Maintaining the Site	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	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.
	Cover, seed or fence stockpiles to prevent wind whipping.
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.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
	Record all inspections of haul routes and any subsequent action in a site logbook.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

8.1.2 Plant Emissions

Is it noted that the Site is located within the non-road mobile machinery (NRMM) Low Emission Zone (LEZ), therefore the following controls apply:

- all NRMM should comply with the NRMM LEZ;
- all NRMM should use fuel equivalent to ultralow sulphur diesel;
- all NRMM should comply with either the current or previous EU Directive Staged Emission Standards;
- all NRMM should be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting);
- the on-going conformity of plant retrofitted with DPF, to a defined performance standard; and
- implementation of fuel conservation measures including instructions to throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded, ensure equipment is properly maintained to ensure efficient fuel consumption.

8.2 Operational Phase

In accordance with EPUK/IAQM guidance, road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality. As such, long-term scheme-specific mitigation measures in relation to operational effects arising from road traffic emissions are therefore not considered to be necessary.

8.3 Air Quality Neutral Calculation

As identified in Section 7.0, the outcome of the AQN calculation illustrated that Proposed Development is found to be AQN (as a minimum). As such, no additional mitigation is considered necessary.

9.0 CONCLUSIONS

SLR Consulting Ltd has been commissioned by Patrizia UK Limited to undertake an air quality assessment to support a planning application for a proposed redevelopment on the existing structure at 24 Endell Street, Covent Garden, London.

9.1 Construction Phase

A qualitative assessment of the potential dust impacts during the construction of the development has been undertaken following the Mayor of London guidance.

Following the construction dust assessment, the Site is found to have at worst 'Low Risk' in relation to dust soiling effects on people and property, and 'Negligible' in relation to human health impacts. Providing mitigation measures are implemented, such as those outlined in Section 8.1 of this report, residual effects from dust emissions arising during the construction phase are considered to be 'not significant'.

It should be acknowledged that the Site is located within the NRMM LEZ, as such on-site NRMM will need to comply with the associated emission standards.

9.2 Operational Phase

The Proposed Development is expected to generate road traffic volumes below the relevant EPUK/IAQM screening criteria for both Site access scenarios contemplated. As such, road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality.

Following the GLA's AQN guidance, the development has demonstrated to be AQN (at a minimum) - based on a series of conservative assumptions.

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