Arthur Stanley House
Air Quality Assessment

Westbrook Partners / 1921 Mortimer Investments Limited

December 2017

Arthur Stanley House

Air Quality Assessment

December 2017

Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London, SE1 9DG
www.watermangroup.com

Client Name: 1921 Mortimer Investments
Document Reference: WIE13024-R-5-4-1-CB Air Quality
Project Number: WIE13024

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

Draft	June 2017	Guido Pellizzaro Associate Director	Chris Brownlie Principal Consultant	Guido Pellizzaro Associate Director
Final	July 2017			
Submission	December 2017			

Comments

Comments

Disclaimer

This report has been prepared by Waterman Infrastructure & Environment Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

Contents

1. Introduction 1
2. Air Quality Legislation and Planning Policy 2
3. Baseline Conditions 13
4. Demolition and Construction Phase Qualitative Assessment 16
5. Operational Phase Qualitative Assessment 22
6. Summary and Conclusions 25

Appendices 1

Tables

Table 1: Summary of Relevant UK AQS Objectives 3

Table 2: Monitored Annual Mean Concentrations (µg/m^3) and Number of Short Term Exceedences at Bloomsbury and Shaftesbury Avenue Automatic Monitors 14

Table 3: Monitored Annual Mean NO_2 Concentrations (µg/m^3) at the nearest diffusion tube monitoring sites operated by LBC 15

Table 4: Defra Background Map in 2016 for the Grid Square at the Location of the Site 15

Table 5: Summary of the SPG for Undertaking a Construction Dust Assessment 16

Table 6: Dust Emission Magnitude 18

Table 7: Sensitivity of the Area to Dust and Soiling Effects on People and Property 19

Table 8: Sensitivity of the Area to Human Health Impacts 19

Table 9: Summary of Dust Risk 20

Table 10: Summary of Mitigation Measures included as part of the Development 24

Appendices

Appendix A: Air Quality Neutral Assessment

Executive Summary

Waterman Infrastructure & Environment Limited (hereafter referred to as 'Waterman') was commissioned by 1921 Mortimer Investments to undertake an air quality assessment for the redevelopment of Arthur Stanley House.

The purpose of the air quality assessment is to:

- provide a review of the existing air quality at and surrounding the Site;
- to qualitatively assess the potential effect of the Development on local air quality during the demolition and construction works;
- to qualitatively assess the potential effect of the Development on local air quality during operation; and
- to qualitatively consider the potential air quality concentrations office and residential users at the Site would be exposed to.

The implementation of a range of appropriate site management practices to control dust emissions would significantly reduce the potential for adverse nuisance dust effects associated with the various stages of the works. It is considered that likely residual impacts and effects due to fugitive emissions would be insignificant.

Any emissions from demolition and construction traffic would be small and would not significantly affect air quality. It is anticipated that the effect of construction vehicles entering and egressing the Site during the construction period would be temporary, local and of minor adverse significance, in the context of local background pollutant concentrations and existing local road traffic emissions.

In accordance with the London Plan, all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM and therefore the effect would be insignificant.

The Development would not include any car parking spaces for office or residential users and would not alter the number of trips from those associated with the current use. As such it is considered that the Development would result in insignificant effects in relation to traffic emissions.

The Development would include the use of a small-scale gas-fired Combined Heat and Power (CHP) for use in the supply of hot water to the residential units. The CHP has improved efficiencies and low emissions from tightened legislation compared to the existing heating plant at the Site, and is calculated to be Air Quality Neutral. The detailed specification and installation of this plant would be in line with best practice guidance and submitted to LBC prior to installation. It is considered the effect of the CHP is insignificant.

In accordance with LLAQM.TG(16) only the short-term AQS objectives apply for office users. The nearest automatic monitor shows the short-term objectives for NO_2 and PM_{10} are below the respective AQS objectives. In addition, mechanical ventilation would be provided for office users. Based on this the future concentrations for the office users of the Development is considered insignificant.

In relation to future residential and healthcare users the results from the closest air quality monitors to the Site show the annual mean NO_2 AQS objective is exceeded in all years, at all monitoring sites. Given there are exceedences of the AQS objective, the Development includes a mechanical ventilation strategy with filtration to ensure future residential and healthcare users of the Development are provided with suitable air. Taking account of the mechanical ventilation strategy, the introduction of residential and healthcare users to the Site is therefore considered insignificant.

1. Introduction

1.1. Waterman Infrastructure & Environment Ltd (hereafter referred to as 'Waterman') was instructed by 1921 Mortimer Investments (the Applicant) to undertake an air quality assessment for the redevelopment of Arthur Stanley House, London, W1T 4RN (hereafter referred to as the 'Site').

1.2. The redevelopment would provide nine residential units (Use Class C3) (providing 944m^2 Gross Internal Area (GIA)) and 6,459m^2 GIA of office use (Use Class B1), including a healthcare use (doctor's surgery) (hereafter referred to as the 'Development'). The total area of development to be provided is 7,403m^2.

1.3. The Site area is approximately 1150m^2 and is located on the corner of Tottenham Street and Tottenham Mews; approximately 20m from Cleveland Street to the north; 80m from Charlotte Street to the south; and directly opposite Goodge Place.

1.4. LBC has designated an Air Quality Management Area (AQMA) for annual mean nitrogen dioxide (NO_2) and 24-hour mean particulate matter (PM_{10}) across the entire Borough. The Site is therefore located within this AQMA.

1.5. The purpose of this air quality assessment is to:

- provide a review of the existing air quality at and surrounding the Site;
- to qualitatively assess the potential effect of the Development on local air quality during the demolition and construction works; and
- to qualitatively assess the potential effect of the Development on local air quality during operation and consider the potential air quality concentrations office users at the Site would be exposed to..

1.6. Section 2 of this report gives a summary of legislation and planning policy relevant to air quality. Section 3 sets out the baseline conditions at and around the Site; Section 4 sets out the assessment during the Demolition and Construction Phase and Section 5 sets out the qualitative review of the Operational Phase, including the inherent mitigation measures. A summary of the main findings and conclusions of the assessment is given in Section 6.

2. Air Quality Legislation and Planning Policy

Legislation

EU Framework Directive 2008/50/EC, 2008

2.1. Air pollutants at high concentrations can have adverse effects on the health of humans and ecosystems. European Union (EU) legislation on air quality forms the basis for UK legislation and policy on air quality.

2.2. The EU Framework Directive 2008/50/EC[1] on ambient air quality assessment and management came into force in May 2008 and was implemented by Member States, including the UK, by June 2010. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.

Air Quality Standards Regulations, 2010

2.3. The Air Quality Standards Regulations[2] implement Limit Values prescribed by the EU Framework Directive 2008/50/EC. The Limit Values are legally binding and the Secretary of State, on behalf of the UK Government, is responsible for their implementation.

The UK Air Quality Strategy, 2007

2.4. The current UK Air Quality Strategy (UK AQS) was published in July 2007[3] and sets out new objectives for local planning authorities (LPA) in undertaking their Local Air Quality Management (LAQM) duties. The 2007 UK AQS introduced a national level policy framework for exposure reduction for fine particulate matter. Objectives in the UK AQS are in some cases more onerous than the Limit Values set out within the relevant EU Directives and the Air Quality Standards Regulations 2010. In addition, objectives have been established for a wider range of pollutants.

2.5. The UK AQS objectives of air pollutants relevant to this assessment are summarised in **Table 1**.

2.6. There are currently no statutory UK standards in relation to deposited dust and its propensity to cause nuisance. However, a deposition rate of 200mg/m^2/day (averaged over a month) is sometimes used as a threshold value for potentially significant nuisance effects[4].

1 Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.
2 Defra, (2010) The Air Quality Standards (England) Regulations.
3 Department of the Environment, Food and Rural Affairs (Defra), (2007). 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'.
4 Bate, K.J. and Coppin, N.J. 1991, 'Dust impacts from mineral workings', Mine and Quarry, 20 (3), 1991, pp31 – 35.

Table 1: Summary of Relevant UK AQS Objectives

Pollutant	Objective / Limit Value		Date by which Objective to be Met
	Concentration	Measured as	
Nitrogen Dioxide (NO_2)	200µg/m^3	1 hour mean not to be exceeded more than 18 times per year	31/12/2005
	40µg/m^3	Annual Mean	31/12/2005
Particulate Matter (PM_{10}) (a)	50µg/m^3	24 hour mean not to be exceeded more than 35 times per year	31/12/2004
	40µg/m^3	Annual Mean	31/12/2004
Particulate Matter ($PM_{2.5}$) (b)	Target of 15% reduction in concentrations at urban background locations	Annual Mean	Between 2010 and 2020
	25µg/m^3	Annual Mean	01/01/2020

Note: (a) Particulate matter with a mean aerodynamic diameter less than 10 microns (or micrometres – µm)
(b) Particulate matter with a mean aerodynamic diameter less than 2.5 microns

The Environment Act, 1995

2.7. Under Part IV of the Environment Act 1995[5], local authorities are required to review and assess air quality in their area by way of a staged process. Should this process suggest that any of the AQS objectives (as defined in **Table 1**) will not be met by the target dates, the local authority must consider the declaration of an AQMA and the subsequent preparation of an Air Quality Action Plan (AQAP) to improve the air quality in that area in pursuit of the objectives.

2.8. LBC has designated the entire Borough as an AQMA for annual mean NO_2 and 24-hour mean PM_{10}. Details of LBC's Air Quality Action Plan and a summary of the LBC review and assessment of air quality are provided later in this Report.

National Planning Policy

National Planning Policy Framework, 2012

2.9. Paragraph 109 of the National Planning Policy Framework (NPPF)[6] identifies that the planning system should aim to conserve and enhance the natural and local environment by:

"…*preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of land, air, water or noise pollution or land instability.*"

2.10. Furthermore, paragraph 124 states:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative effects on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

5 Office of the Deputy Prime Minister (ODPM), 1995, 'The Environment Act' 1995.
6 Department for Communities and Local Government (DCLG) (2012), 'National Planning Policy Framework', Department for Communities and Local Government, London.

Regional Planning Policy

The London Plan - The Spatial Development Strategy for Greater London; consolidated with alterations since 2011, 2016

2.11. Policy 7.14 'Improving air quality' of the London Plan[7] states that development proposals should:

"A.minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3);

B.promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition';

C.be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs);

D.ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approach; and

E.where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality effects from the biomass boiler are identified."

Draft New London Plan, 2017

2.12. The Mayor of London's Draft New London Plan[8] is open for consultation until March 2018. This document set outs the current strategic vision for London between 2019 to 2041.

2.13. Policy SI1 Improving air quality states that:

'*London's air quality should be significantly improved and exposure to poor air quality, especially for vulnerable people, should be reduced.*

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) reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality; and

d) create unacceptable risk of high levels of exposure to poor air quality.

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. Particular care should

7 Greater London Authority (2016): The 2015 London Plan with Minor Alterations 2016, Spatial Development Strategy for Greater London, GLA, London.
8 Mayor of London (2017) Draft New London Plan, Draft for Public Consultation, 2017 London

be taken with developments that are 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.

The development of large-scale redevelopment areas, such as Opportunity Areas and those subject to an Environmental Impact Assessment should propose methods of achieving an Air Quality Positive approach through the new development. All other developments should be at least Air Quality Neutral.

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.

Air Quality Assessments (AQAs) should be submitted with all major developments, unless they can demonstrate that transport and building emissions will be less than the previous or existing use.

Development proposals should ensure that where emissions need to be reduced, this is done on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated'.

A City for all Londoners, 2016

2.14. The Mayor of London's A City for All Londoners[9] document outlines the challenges and opportunities across priority policy areas in London, as well as the changes that City Hall wants to deliver over the next four years to improve air quality. The Mayor is committed to improving air quality through the design of 'Healthy Streets'. Such measures detailed include:

- Introducing an emissions surcharge (or 'Toxicity Charge') in 2017 for high-polluting older vehicles in central London;
- Introducing a Central-London Ultra-Low Emission Zone (ULEZ) in 2019 and potentially enlarging the area it covers, up to the North and South Circular Roads for all vehicles and London wide for the most polluting heavy vehicles. The new ULEZ would incorporate the J1/M1;
- Replace diesel buses with green buses (hybrid or zero emission) this includes a retrofit scheme of 3000 buses outside central London by 2020;
- All buses in central London to be 'Euro 6' hybrid by 2019;
- All new buildings in London to be air quality positive to include reducing emissions and associated exposure;
- Planting trees on a busy road to provide a buffer between pedestrians and traffic, as well as absorbing pollutants to improve air quality; and
- Increase the use of cycling and walking.

Local Planning Policy

London Borough of Camden's Site Allocations Proposed Submission Document, 2012

2.15. The LBC Site Allocations Document[10] states that:

"As set out in the Core Strategy, the Council will support and promote the Central London area of Camden as a successful and vibrant part of the capital to live in, work in and visit. We will:

9 Mayor of London (2016) A City for All Londoners, London
10 LBC, March 2012, 'Camden Site Allocations Proposed Submission Document'

…continue to designate Central London as a Clear Zone Region to reduce congestion, promote walking and cycling and improve air quality."

London Borough of Camden Local Plan, 2017

2.16. The Local Plan[11] was adopted by LBC on the 3rd July 2017 and sets out the Council's vision for the borough between 2016-2031.

2.17. Policy CC4 Air quality of the Local Plan states:

"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."

Guidance

Improving Air Quality in the UK: Tackling Nitrogen Dioxide in our Towns and Cities. UK Air Quality Plan for Tackling Nitrogen Dioxide (Consultation Document).

2.18. The UK Government was required by the High Court to release an Air Quality Plan to meet the NO_2 Limit Value in the shortest timescale as possible. This document was adopted on the 26th July 2017[14] and is currently under consultation.

2.19. The revised plan focuses on reducing concentrations of NO_x and NO_2 around road vehicle emissions within the shortest possible time. With the principal aims to:

a. reduce emissions of NOx from the current road vehicle fleet in problem locations now; and

b. accelerate road vehicle fleet turnover to cleaner vehicles to ensure that the problem remains addressed and does not move to other locations.

2.20. The other aims include reducing background concentrations of NO_x from:

- Other forms of transport such as rail, aviation and shipping;
- Industry and non-road mobile machinery; and
- Buildings, both commercial and domestic, and other stationary sources.

11 LBC, 2017, Camden Local Plan
14 Defra (2017) Improving Air Quality in the UK: Tackling nitrogen dioxide in our towns and cities. UK Air Quality Plan for Tackling Nitrogen Dioxide

2.21. The Consultation Document, provided additional measures to reduce NO_x and NO_2 concentrations in the UK, further than the measures detailed in the adopted 2016 Plan. Such measures include:

- Mandate local authorities to implement Clean Air Zones within the shortest possible time;
- Consultation on proposal for a Clean Air Zone Framework for Wales;
- Consultation on a draft National Low Emission Framework for Scotland;
- Commitment to establishing a Low Emission Zone for Scotland by 2018;
- Tackling air pollution on the English Road network;
- New real driving emissions requirement to address real world NOx emissions;
- Additional funding to accelerate uptake of hydrogen vehicles and infrastructure;
- Additional funding to accelerate the uptake of electric taxis;
- Further investment in retrofitting alongside additional support of low emission buses and taxis;
- Regulatory changes to support the take up of alternatively fuelled light commercial vehicles;
- Exploring the appropriate tax treatment for diesel vehicles;
- Call for evidence on updating the existing HGV Road User Levy;
- Call for evidence on use of red diesel;
- Ensure wider environmental performance is apparent to consumers when purchasing cars;
- Updating Government procurement policy;
- New emissions standards for non-road mobile machinery;
- New measures to tackle NO_x emissions from Medium Combustion Plants; and
- New measures to tackle NO_x emissions from generators.

2.22. The above draft measures do not provide any actions which are relevant to the operation or design of the Development.

Planning Practice Guidance, 2014

2.23. The Government's online Planning Practice Guidance[15] (PPG) states that air quality concerns are more likely to arise where development is proposed within an area of existing poor air quality, or where it would adversely impact upon the implementation of air quality strategies and / or action plans.

2.24. The PPG notes that when deciding whether air quality is relevant to a planning application, considerations would include whether the development would lead to:

- significant effects on traffic, such as volume, congestion, vehicle speed, or composition;
- the introduction of new point sources of air pollution, such as furnaces, centralised boilers and Combined Heat and Power (CHP) plant; and
- exposing occupants of any new developments to existing sources of air pollutants and areas with poor air quality.

15 DCLG (2014), 'Planning Practice Guidance: Air Quality (ID 32)' (06 March 2014).

Environmental Protection UK & Institute of Air Quality Management Guidance; Land-Use Planning & Development Control: Planning for Air Quality, 2017

2.25. Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) Guidance[16] provide guidance for air quality considerations within local development control processes; promoting a consistent approach to the treatment of air quality issues.

2.26. The EPUK and IAQM guidance explains how development proposals could adopt good design principals to reduce emissions and contribute to better air quality. The guidance also provides a method for screening the need for an air quality assessment and a consistent approach for describing the effects at individual receptors.

2.27. The EPUK and IAQM Guidance advises that:

"*In arriving at a decision about a specific proposed development the local planning authority is required to achieve a balance between economic, social and environmental considerations. For this reason, appropriate consideration of issues such as air quality, noise and visual amenity is necessary. In terms of air quality, particular attention should be paid to:*

- *Compliance with national air quality objectives and of EU Limit Values;*
- *Whether the development will materially affect any air quality action plan or strategy;*
- *The overall degradation (or improvement) in local air quality; or*
- *Whether the development will introduce new public exposure into an area of existing poor air quality.*"

The Mayor's Air Quality Strategy 'Clearing the Air', 2010

2.28. The Greater London Authority (GLA) Act 1999[17] required the GLA to produce an Air Quality Strategy (AQS) for Greater London that sets out air quality objectives (to be no less than national objectives) and present measures that the Mayor, GLA and London Boroughs will take towards meeting these objectives. The Mayor's AQS[18] aims to improve air quality within London by targeting the reduction of emissions related to transport and construction. Some of the initiatives proposed include:

- targeted measures for areas with poor air quality; and
- use of the planning system to reduce air pollutant emissions from new developments.

Mayor of London's Supplementary Planning Guides: Sustainable Design and Construction, 2014

2.29. The 'Sustainable Design and Construction' Supplementary Planning Guidance[19] (SPG) provides guidance to support the implementation of the London Plan.

2.30. Section 4.3 of the SPG focusses on air pollution and the effects from the construction and operation of new developments to ensure that they are 'air quality neutral'. Emission benchmarks are provided within the SPG for:

- emissions from buildings; and

16 Environmental Protection UK & Institute of Air Quality Management (IAQM) (2017), 'Land-use Planning & Development Control: Planning for Air Quality.' January 2017. IAQM, London
17 Greater London Authority (GLA) (1999) 'Greater London Authority Act 1999' London, 1999.
18 Greater London Authority (2010), 'Clearing the air – The Mayor's Air Quality Strategy', GLA, London.
19 Greater London Authority (2014), 'Sustainable Design and Construction - Supplementary Planning Guidance', Greater London Authority, London.

- transport emissions.

2.31. Section 4.3.17 and Appendix 5 of the SPG note that two sets of Building Emission Benchmarks (BEBs) have been defined for a series of land-use classes, one for NO_X (nitrogen oxides) and one for PM_{10}. Section 4.3.18 and Appendix 6 of the SPG note that the design of a development should encourage and facilitate walking, cycling and the use of public transport, thereby minimising the generation of air pollutants.

2.32. The Development would be 'car free' and does not contain any car parking spaces and as such is considered Air Quality Neutral with regards to transport emissions.

2.33. The Development includes a small-scale gas-fired Combined Heat and Power (CHP) for use in the supply of hot water to the residential units. A such an Air Quality Neutral Assessment has been completed for the energy centre which compares the Development against the relevant BEBs to determine whether the Development is Air Quality Neutral. This concludes the Development would be Air Quality Neutral and that no further mitigation measures are required.

2.34. Details of the Air Quality Neutral Assessment are provided in **Appendix A: Air Quality Neutral Assessment**.

Mayor of London: 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance', 2014

2.35. The 'Control of Dust and Emissions during Construction and Demolition' SPG[20] seeks to reduce emissions of dust, PM_{10} and $PM_{2.5}$ from construction and demolition activities in London. It also aims to manage emissions of NO_X from construction and demolition machinery by means of a new non-road mobile machinery Ultra-Low Emissions Zone (ULEZ). The SPG provides guidance on the implementation of London Plan Policy 7.14 – 'Improving Air Quality', as well as a range of policies that deal with environmental sustainability, health and quality of life.

London Local Air Quality Management Policy Guidance (LLAQM.PG (16)), 2016

2.36. The Local Air Quality Management Policy Guidance LLAQM.PG (16)[21] provides additional guidance on the links between transport and air quality. LLAQM.PG (16) describes how road transport contributes to local air pollution and how transport measures may bring improvements in air quality. Key transport-related Government initiatives are set out, including regulatory measures and standards to reduce vehicle emissions and improve fuels, tax-based measures and the development of an integrated transport strategy.

2.37. LLAQM.PG (16) also provides guidance on the links between air quality and the land use planning system. The guidance advises that air quality considerations should be integrated within the planning process at the earliest stage, and is intended to aid local authorities in developing action plans to deal with specific air quality issues and create strategies to improve air quality. LLAQM.PG (16) summarises the means in which the land use planning system can help deliver compliance with the air quality objectives.

20 Mayor of London (2014) 'The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance'
21 Defra (2016), 'London Local Air Quality Management (LLAQM) Policy guidance 2016 (LLAQM.PG (16))', DEFRA, London.

Institute of Air Quality Management: Guidance on the Assessment of Dust from Demolition and Construction, 2014

2.38. The IAQM Construction Dust Guidance[22] provides guidance to consultants and Environmental Health Officers (EHOs) on how to assess air quality effects from construction related activities. The guidance provides a risk based approach based on the potential dust emission magnitude of the site (small, medium or large) and the sensitivity of the area to dust effects. The importance of professional judgement is noted throughout the guidance. The guidance recommends that once the risk class of the site has been identified, the appropriate level of mitigation measures is implemented to ensure that the construction activities have no significant effects.

London Borough of Camden Air Quality Action Plan, 2016-2018

2.39. The LBC Air Quality Action Plan (AQAP), Camden's Clean Air Action Plan 2016-2018[23] aims to continue to reduce concentrations of PM_{10} and $PM_{2.5}$, and to meet the EU Objective for NO_2. The key objectives of the plan are to:

- *"Encourage reductions in fossil fuel use, the adoption of clean fuels and low emission technology and promote energy efficiency;*
- *Raise awareness about air quality in Camden and promote lifestyle changes which can help reduce levels of air pollution and minimise exposure to air pollution;*
- *Improve the health and well-being of the local population, including those that work and visit Camden;*
- *Work in partnership with national and regional bodies, and with local public and private organisations, to foster and drive improvements in air quality;*
- *Lead by example and reduce NO2 and PM10 emissions associated with the Council's own buildings and transport services; and*
- *Ensure actions which serve to reduce NO2 and PM10 emissions complement actions to mitigate CO2 emissions."*

London Borough of Camden Guide for Contractors Working in Camden, 2008

2.40. LBC have produced a guide[24] to reduce disturbances due to dust and smoke arising from demolition and construction work on all building sites within the Borough. The document sets out Best Practicable Means (BPM) to mitigate dust emissions from construction sites these include:

"a. Carry out demolition and construction work in accordance with the Best Practise Guidance Note 'The control of dust and emissions from construction and demolition' (2006). This outlines BPM to effectively manage construction work in order to mitigate air pollution emissions.

b. When carrying out demolition or construction work during periods of dry or windy weather, there can often be dust problems on sites bordered by homes. You must take measures to reduce the formation and spread of dust. You must control dust at source by using a continuous fine-water spray. You must provide a suitable water supply, and make sure there are enough hoses to reach all parts of the site and a way of getting rid of wastewater.

c. There must be adequate screening and damping down during all demolition activities, sandblasting, clearance work, breaking up of existing ground services and other site preparations and activities. You must use existing features of the site, such as boundary walls to provide screening where practicable.

22 Institute of Air Quality Management (2014) 'Guidance on the Assessment of dust from demolition and construction.'
23 LBC, 2013, 'Camden's Clean Air Action Plan 2016-2018'
24 LBC, 2008, 'Guide for Contractors Working in Camden'

d. You must enclose scaffolding with appropriate sheeting material.

e. You must provide easy-to-clean hard-standings for vehicles.

f. You must keep heavily used areas clean by brushing vehicles and spraying them with water regularly.

g. You must control the cutting or grinding of materials on the site.

i. Buildings or structures that are being demolished, or small areas of land that are being prepared for development must be damped down using high-pressure hoses.

k. On sites where a large amount of dust has been produced and is laying on the ground, you must use a specialist vehicle to remove dust (by vacuuming) before you damp down the site.

l. Major haul routes on the site must be watered as necessary to reduce dust. Where practical, you must compact the route to reduce the amount of soil and other material that is moved around the site. This applies especially near to exits. If machinery movements produce dust, you must set effective speed limits and reschedule work if necessary. If the development involves machinery moving across open land, you must create a suitable track to reduce the amount of dust produced.

m. You must enclose materials at all times, and damp down dusty materials using water sprays during dry weather.

n. All materials that create dust, including soil, must be stored away from the site boundary, screened to prevent wind spreading the dust and damped down where practical. You will need to consider the size and shape of stockpiles to reduce dust.

o. Paved roads near to exits must be kept clean. Vehicles transporting materials onto or off the site must be suitably covered where necessary to prevent dust.

p. You must use rubble chutes and skips where appropriate. There must be an effective close-fitting cover over the skip to contain all the dust and other rubbish. The chutes must be continuous until they reach the skip, with no gaps, and maintained in good condition.

q. You must not allow rubbish and waste materials to build up on the site.

r. You must plant, turf or securely cover completed earthworks to stabilise the surface.

s. Reducing dust, fumes or other nuisance or environmental effects, which may cause offence to the local community or environment.

t. Reduce environmental effects which may cause offence to the local community by promoting proactive community relations."

Central London Air Quality Cluster Group: Cost Effective Actions to Cut Central London Air Pollution, 2012

2.41. The Central London Air Quality Cluster Group consists of the amalgamation of eight central London Boroughs, including LBC, to improve air quality within central London. The 'Cost Effective Actions to Cut Central London Air' guidance[25] provides action measures which London Boroughs can implement to improve air quality. Such measures range from business engagement, car clubs, encouraging cycling, to energy efficiency in buildings and ultra-low NO_X boilers. The following measures are applicable to the proposed Development:

- New buildings to be air quality neutral;
- New buildings to include a Level 4 BREEAM assessment; and

25 Central London Air Quality Cluster Group, 2012, 'Cost Effective Actions to Cut Central London Air Pollution'

- Boilers are replaced by ultra-low NO_X models instead of Class 4 or 5.

3. Baseline Conditions

London Borough of Camden Review and Assessment Process

3.1. Between 1998 and 2001 LBC undertook the first round of Review and Assessment of air quality[26] which concluded that it was necessary to declare the whole Borough as an AQMA for the annual mean objective for NO_2 and the 24-hour mean objective for PM_{10}.

3.2. The Updating and Screening Assessments (USAs) completed in August 2003[27], 2006[28] and 2009[29] concluded that the LBC AQMA designation should remain and no further Detailed Assessment for air quality were required.

3.3. The fourth round of Review and Assessment[30] identified that the LBC no longer exceeded the 24-hour mean objective for PM_{10} at three of their automatic monitoring sites. However, LBC attributed this to the change in the methodology used to measure PM_{10} concentrations rather than improvements in emissions, and therefore, the AQMA order remained unchanged.

3.4. The fourth round of Review and Assessment additionally indicated that a number of diffusion tube sites and one automatic site at roadside locations exceeded the 1-hour mean NO_2 AQS objective. LBC undertook further modelling work to understand the spatial distribution of PM_{10} and NO_2 exceedances across the Borough. The modelling revealed that a number of roads in Camden which experience high volumes of traffic and a large proportion of HGV vehicles, such as St Pancras Way adjacent to the Site, exceeded both short and long term NO_2 and PM_{10} AQS objectives.

3.5. The report published by LBC as part of the fifth round of Review and Assessment[31] confirmed that the NO_2 annual mean AQS objective was still being exceeded at all the Council's automatic monitoring sites and the vast majority of the NO_2 diffusion tube sites. Although the report confirmed that PM_{10} concentrations now meet the AQS objectives at all monitoring sites, no amendment to the AQMA order has been suggested.

3.6. The latest report[32] published by LBC and available on their website confirmed the findings of the previous rounds of review and assessment and while there has been a declining trend in NO_2 levels across the borough, the majority of locations exceeded the annual mean objective and therefore the AQMA should be retained.

Local Monitoring

3.7. LBC currently undertakes air quality monitoring at four automatic monitors within the Borough. The details of the nearest automatic monitors include:

- Bloomsbury – approximately 0.8km east of the Site and classified as an urban background monitoring site;
- Shaftesbury Avenue – approximately 0.9km south east of the Site and classified as a roadside monitoring site;
- Euston Road – approximately 1km north east of the Site and classified as a roadside monitoring site; and

26 LBC, June 1998, 'Statutory Review and Assessment of Air Quality in the London Borough of Camden Stages 1 and 2'
27 LBC, August 2003, 'Second Round of Review and Assessment of Air Quality: Updating and Screening Assessment'
28 LBC, August 2006, 'Third Round of Review and Assessment of Air Quality: Updating and Screening Assessment'
29 LBC, August 2009, '2009 Air Quality Updating and Screening Assessment for London Borough of Camden'
30 LBC, June 2010, '2009 Progress Report for London Borough of Camden'
31 LBC, July 2013, '2013 Air Quality Progress Report for the London Borough of Camden'
32 LBC, April 2015, '2015 Updating and Screening Assessment for London Borough of Camden'

- Marylebone Road – approximately 1.2km west of the Site and classified as a roadside monitoring site.

3.8. The monitoring results for NO_2 and PM_{10} at the Bloomsbury and Shaftesbury Avenue automatic monitors are presented in **Table 2** for the latest years of available data.

Table 2: Monitored Annual Mean Concentrations (µg/m^3) and Number of Short Term Exceedences at Bloomsbury and Shaftesbury Avenue Automatic Monitors

Monitor	Pollutant	Averaging Period	AQS Objective	Year		
				2014	2015	2016
Bloomsbury	NO_2	Annual Mean	40µg/m^3	**45**	**48**	**42**
		Hourly Mean	200µg/m^3 not to be exceeded mor than 18 times per year	0	0	0
	PM_{10}	Annual Mean	40µg/m^3	22	20	20
		No. of Days	50µg/m^3 not to be exceeded more than 35 times per year	11	6	9
Shaftesbury Avenue	NO_2	Annual Mean	40µg/m^3	**69**	No Data*	No Data**
		Hourly Mean	200µg/m^3 not to be exceeded mor than 18 times per year	1		
	PM_{10}	Annual Mean	40µg/m^3	25	22	
		No. of Days	50µg/m^3 not to be exceeded more than 35 times per year	16	4	

Notes: Data obtained from London Air (www.londonair.org.uk)
Exceedences of the AQS Objectives shown in bold text
*No data due to poor data capture
**Monitoring stopped

3.9. The monitoring results in **Table 2** indicate that the annual mean NO_2 objectives were exceeded at the Bloomsbury automatic monitor in all years and at the Shaftesbury Avenue automatic monitor in 2014. The short-term NO_2 and all PM_{10} objectives were met in all years at both monitoring locations.

3.10. Based on the results presented in **Table 2**, the main contribution to air quality in the area is from road traffic emissions, with higher monitored concentrations at the Shaftesbury Avenue roadside monitor compared to the Bloomsbury urban background monitor. On review of the Site and the local area (particularly given that the Site is not located on a major road) it is considered the Bloomsbury automatic monitor is representative of the site characteristics rather than the Shaftesbury Avenue monitor.

3.11. In addition to the above automatic monitors, NO_2 is measured at 14 locations using diffusion tubes within LBC. The nearest diffusion tubes within 1km are:

- CA11: Tottenham Court Road located approximately 230m south east from the Site boundary and classified as a kerbside monitoring site;
- CA21: Bloomsbury Street located approximately 650m east from the Site boundary and classified as a roadside monitoring site; and
- CA10: Tavistock Gardens located approximately 750m north east from the Site boundary and classified as an urban background monitoring site.

3.12. The most recent results from this location are presented in **Table 3**.

Table 3: Monitored Annual Mean NO_2 Concentrations (µg/m^3) at the nearest diffusion tube monitoring sites operated by LBC

Site ID	AQS Objective	2014	2015	2016
CA11: Tottenham Court Road (kerbside site)	40µg/m^3	**86.7**	**85.6**	**83.6**
CA21: Bloomsbury Street (roadside site)		**71.4**	**80.8**	**72.2**
CA10: Tavistock Gardens (urban background site)		**46.5**	**44.6**	39.7

Notes: 2014 and 2015 Data obtained from LBC Air Quality Annual Status Report for 2015 and 2016 Data from:
https://opendata.camden.gov.uk/Environment/Air-Quality-Monitoring-Diffusion-Tube/gy6e-_i4w6/data#SaveAs
Exceedances of the AQS Objectives shown in **bold text**

3.13. The monitoring results in **Table 3** indicate that the annual mean NO_2 objective of 40µg/m^3 was exceeded at the nearest diffusion tubes sites in all years, apart for Tavistock Garden in 2016, which was marginally below the AQS objective.

3.14. The results from the diffusion tubes show a year on year decline at all the monitoring sites from 2014, except for Bloomsbury Street.

3.15. As with the automatic monitoring data, the results in **Table 3** also shows the main contribution to air quality is from road traffic emissions. As the distance of the monitoring locations from main roads increases so the air quality concentrations measured reduce.

Defra Air Quality Background Maps

3.16. In addition to the urban background monitoring undertaken by LBC, background concentrations of NOx, NO_2, PM_{10} and $PM_{2.5}$ are available from the Defra Air Quality Archive for 1 x 1km grid squares for assessment years between 2013 and 2030. **Table 4** presents the Defra background concentrations for the year 2016 for the grid square the Site is located within (529500,181500).

Table 4: Defra Background Map in 2016 for the Grid Square at the Location of the Site

Pollutant	Annual Mean Concentration (µg/m^3)	AQS Objective
NO_x	88.5	-
NO_2	**47.0**	40µg/m^3
PM_{10}	22.6	40µg/m^3
$PM_{2.5}$	16.2	25µg/m^3

Exceedances of the AQS Objectives shown in **bold text**

3.17. The data in **Table 4** shows that the NO_2 objective of 40µg/m^3 from the 2016 Defra Background Maps is exceeded. All other pollutants are below the respective AQS objectives. The Defra background map annual mean NO_2 concentration (of 47.0µg/m^3) is similar to the monitored concentrations at the Bloomsbury automatic monitor (ranging between 42µg/m^3 to 48µg/m^3).

4. Demolition and Construction Phase Qualitative Assessment

Assessment Methodology

Construction Phase Assessment Methodology

Dust Emissions

4.1. The effects of dust emissions from the construction phase has been based on the SPG[19], which takes account of the guidance published by the IAQM.

4.2. The approach to the assessment includes:

- consideration of planned construction activities and their phasing; and
- a review of the sensitive uses in the area immediately surrounding the Site in relation to their distance from the Site.

4.3. Following the SPG, construction activities can be divided into the following four distinct activities:

- Demolition – any activity involved in the removal of an existing building;
- Earthworks – the excavation, haulage, tipping and stockpiling of material, but may also involve levelling the site and landscaping;
- Construction – any activity involved with the provision of a new structure; and
- Trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

4.4. The SPG considers three separate dust effects, with the proximity of sensitive receptors being taken into consideration for:

- annoyance due to dust soiling;
- potential effects on human health due to significant increase in exposure to PM_{10}; and
- harm to ecological receptors.

4.5. To determine the risk of the construction phase, the following four step process, as set out in **Table 5**, has been undertaken.

Table 5: Summary of the SPG for Undertaking a Construction Dust Assessment

Step		Description
1	Screen the Need for a Detailed Assessment	Simple distance based criteria are used to determine the requirement for a detailed dust assessment. An assessment will normally be required where there are 'human receptors' within 50m of the boundary of the site and / or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance or 'ecological receptors' within 50m of the boundary of the site and/or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance.
2	Assess the Risk of Dust Impacts	The risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological effects should be determined using four risk categories: negligible, low, medium and high based on the following factors: • the scale and nature of the works, which determines the risk of dust arising (i.e. the magnitude of potential dust emissions) classed as small, medium or large; and

Step		Description
		• the sensitivity of the area to dust effects, considered separately for ecological and human receptors (i.e. the potential for effects) defined as low, medium or high. Provide a map of nearest receptors.
2a	Define the potential Dust Emission Magnitude	Classify the magnitude of the likely risk as small, medium or large for the four activities.
2b	Define the Sensitivity of the Areas	Define the sensitivity of receptors as High, Medium or Low. Define sensitivity of people to Dust Soiling Effects and define the sensitivities of people to the health effects of PM_{10}.
2c	Define the Risk of Impacts	Combine the magnitude (as detailed in 2a) and the sensitivity (in 2b) to determine the risk of impacts with no mitigation applied. Summaries the risk of dusts impacts for the four activities in a table

4.6. Following the above air quality dust risk assessment appropriate dust and pollution measures are provided to ensure the air quality impacts of construction are minimised and any mitigation measures employed are effective.

4.7. The potential impacts and effects of construction activities on local air quality were based on professional judgement and reference to the criteria set out in the SPG. This includes an assessment of the risk of dust effects arising from the likely construction activities, based on the magnitude of potential dust emissions and the sensitivity of the area.

Construction Vehicle Exhaust Emissions

4.8. The IAQM guidance on assessing demolition and construction effects states that:

"*Experience of assessing the exhaust emissions from on-site plant and site traffic suggests that they are unlikely to make a significant effect on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed.*"

4.9. Given the area of development (1,062m^2) (0.1 hectare), in accordance with the IAQM guidance, a quantitative assessment of the exhaust emissions from construction traffic is not required, and a qualitative assessment is appropriate.

Construction Plant Emissions

4.10. All construction plant now need to comply with the London Low Emission Standards set out for Non-Road Mobile Machinery (NRMM), as such it is considered that no significant effects are predicted for construction plant and no quantitative assessment is required.

Determining Significance of Effects

Demolition and Construction

Dust Emissions

4.11. The potential effects of construction activities on local air quality were based on professional judgement and with reference to the criteria set out in the SPG.

Construction Vehicle Exhaust Emissions

4.12. The significance of the effects of construction vehicle exhaust emissions on air quality is based on professional judgement.

Construction Plant Emissions

4.13. The significance of the effects from construction plant emissions on air quality is also based on professional judgement, because all construction plant is required to meet the NRMM emissions standards for NO_2 and PM_{10} in the London Plan.

Construction Phase Effects

Nuisance Dust

Site Evaluation / Screen the Need

4.14. The nearest residential properties are located within 20m of the Site, located on the opposite side of Tottenham Mews, Tottenham Street and Cleveland Street. In accordance with **Table 5**, the assessment will proceed to detailed assessment.

Potential Dust Emission Magnitude

4.15. The risk of dust impacts from the demolition and construction phase has been considered based upon the magnitude of works as detailed in the SPG. This includes:

- Demolition - The estimate for the total volume of buildings to be demolished is 1260m^3. Based on this, and considering the criteria in paragraph 4.27 of the SPG, the potential dust emissions during demolition activities would be of **small** magnitude.
- Earthworks - Given the area surrounding the Site and the size of the development area 1062m^2 Site it is estimated that there would be a maximum of 2 heavy earth moving vehicles active at any one time. Based on this, and considering the criteria in paragraph 4.29 of the SPG, the potential dust emissions during earthworks activities would be of **small** magnitude.
- Construction - It is estimated the total volume of building to be constructed is 1,965m^3, which would result in a small magnitude. However, given the construction work would involve piling, based on the criteria in paragraph 4.31 of the SPG, the potential dust emissions during construction activities would be of **large** magnitude.
- Trackout – Given the surrounding site location and the size of the Site it is estimated that the number of HDV trips leaving the Site would be less than 10 HDV outward movements in any one day. Based on this, and considering and considering the criteria in paragraph 4.33 of the SPG, the potential for dust emissions due to trackout activities would be of **small** magnitude.

4.16. A summary of the potential Dust Emission Magnitude is presented in **Table 6.**

Table 6: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Large
Trackout	Small

Sensitivity of the Area

4.17. As detailed in the SPG the sensitivity of the area has taken account of the following factors:

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

Sensitivity of the Area to Dust and Soiling Effects on People and Property

4.18. As discussed above, the nearest residential properties are located within 20m of the Site, located on the opposite side of Tottenham Mews, Tottenham Street and Cleveland Street.

4.19. Based on Table 4.2 of the SPG, given that there are 10-100 high sensitivity receptors within 20m, it is considered the area is highly sensitive to dust and soiling effects on people and property.

4.20. The summary of the sensitivity of people to dust and soiling effects is detailed in **Table 7**.

Table 7: Sensitivity of the Area to Dust and Soiling Effects on People and Property

Activity	Sensitivity of Area to Dust and Soiling Effects
Demolition	High
Earthworks	High
Construction	High
Trackout	High

Sensitivity of the Area to Human Health Impacts

4.21. As shown in **Table 2** and **Table 4**, the annual mean background PM_{10} concentration at the Site ranges between 20.0 - 22.6µg/m^3 in 2016. This is below the annual mean AQS objective for PM_{10} of 40ug/m^3.

4.22. Based on Table 4.3 of the SPG, given that there are estimated to be 10-100 receptors within 20m and that PM_{10} concentrations are below 24ug/m^3, it is considered the area is of medium sensitivity to human health impacts.

4.23. The summary of the sensitivity of people to the health effects of particulate matter is detailed in **Table 8** below.

Table 8: Sensitivity of the Area to Human Health Impacts

Activity	Sensitivity of Area to Human Health Impacts
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

Risk of Impacts

4.24. Based on the dust emissions magnitude as set out in **Table 9** and taking account of the sensitivity of the area as detailed in **Tables 6, 7** and **8**, the overall risk impacts have been identified and presented in **Table 9**. This is based on the matrices set out in Tables 4.6 to 4.9 of the SPG. The predicted impacts are prior to, and do not take account of, mitigation applied.

Table 9: Summary of Dust Risk

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Low Risk	High Risk	Negligible
Human Health	Low Risk	Low Risk	Medium Risk	Negligible

4.25. The Site is considered **high risk** with regards to dust soiling impacts during construction consequently, mitigation would be required to ensure that adverse impacts are minimised, reduced and, where possible, eliminated.

Construction Vehicle Exhaust Emissions

4.26. Plant operating on the Site and construction related vehicles entering and egressing the Site from / to the local road network would have the potential to increase local air pollutant concentrations, particularly in respect of NO_2 and particulate matter (both PM_{10} and $PM_{2.5}$).

4.27. At this stage, the number of HDVs associated with the development is not known. However, based on the size of the Site, it is estimated that number of HDVs would be less than 10 HDV outward movements in any one day. However, emissions from construction traffic would be relatively small compared to existing road traffic emissions, which include 6,180 daily vehicles (including 183 HDVs) on Goodge Street and 21,693 (including 758 HDVs) daily flows on Tottenham Court Road in 2016[33].

4.28. Considering the current traffic movements and background pollutant concentrations around the Site, the likely effect of construction vehicles entering and egressing the Site on air quality would in the worst-case, give rise to a **temporary**, **local**, **adverse effect** of **minor significance** during the construction period.

Construction Plant Emissions

4.29. In accordance with the London Plan all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effect of construction plant on local air quality would be **insignificant**.

Demolition and Construction Mitigation Measures and Residual Effects

Construction

Nuisance Dust

4.30. A range of environmental management controls would be developed and set out in the Construction Management Plan, with reference to the Mayor's SPG and IAQM guidance relating to High Risk sites and would include:

- enclosure of material stockpiles at all times and damping down of dusty materials during dry weather;

[33] http://www.dft.gov.uk/traffic-counts/index.php

- provision of appropriate hoarding and / or fencing to reduce dust dispersion and restrict public access;
- maintenance of Site fencing, barriers and scaffolding clean using wet methods;
- control of cutting or grinding of materials on the Site and avoidance of scabbling;
- dust generating machinery e.g. disk cutters to be fitted with vacuums;
- appropriate handling and storage of materials, especially stockpiled materials;
- restricting drop heights onto lorries and other equipment;
- fitting equipment with dust control measures such as water sprays, wherever possible;
- using a wheel wash, avoiding of unnecessary idling of engines and routing of Site vehicles as far from sensitive properties as possible;
- ensuring bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- using gas powered generators rather than diesel if possible and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
- switching off all plant when not in use;
- no fires would be allowed on the Site;
- ensuring that a road sweeper is available to clean mud and other debris from hard-standing, roads and footpath; and
- Real-time monitoring undertaken in the construction phase, to be agreed with LBC.

4.31. Such measures are routinely and successfully applied to major construction projects throughout the UK, and are proven to reduce significantly the potential for adverse nuisance dust effects associated with the various stages of construction work. It is considered that with these measures the residual effects would be **insignificant**.

Construction Vehicle Exhaust Emissions

4.32. All construction traffic logistics would be agreed with LBC. Consideration would also be given to the avoidance, or limited use of, traffic routes in proximity to sensitive routes (i.e. residential roads etc.) and the avoidance (or limited) use of roads during peak hours, where practicable. However, it is anticipated that the likely residual effect of construction vehicles entering and egressing the Site to air quality would remain as per the likely effect. That is, during the construction period the likely worst-case residual effect would be **temporary**, **local** and of **minor adverse** significance.

Construction Plant Emissions

4.33. In accordance with the London Plan all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely residual effects of construction plant on local air quality would be **insignificant**.

5. Operational Phase Qualitative Assessment

Assessment Methodology and Significance

5.1. The Development has a potential to generate additional traffic on the surrounding road network and would introduce a small-scale gas-fired CHP for use in the supply of hot water to the residential units. This, in turn, has the potential to affect local air quality. A qualitative review of the operational Development has been undertaken against relevant air quality guidance to determine the impact of the Development. The significance is based on professional judgement.

Operational Effects

Traffic Emissions

5.2. As detailed within the Transport Statement (TS) the Development does not contain any car parking spaces for office or residential users and the Site is also well served by public transport. Therefore, it is considered that the Development is not anticipated to cause an increase in traffic above the existing levels for its current use. Therefore, no assessment of the operational phase of the Development has been undertaken and it is considered that the Development would result in **insignificant** effects in relation to traffic emissions.

Energy Plant Emissions

5.3. Potential operational air quality impacts can relate to emissions from heating and other building plant that is provided. Most modern space heating is achieved either through burning gas, which results in only low gaseous or particulate emissions, or by using electricity which gives rise to indirect emissions at the power generation facility only.

5.4. In line with measure 13 of the 'Improving Air Quality in the UK' document, the Development would include the use of a modern heating and energy plant which has improved efficiencies and low emissions as a result of tightened legislation compared to the existing heating plant at the Site.

5.5. An Air Quality Neutral Assessment has been undertaken for the proposed small-scale gas-fired CHP and is found to be Air Quality Neutral and no further mitigation is considered necessary.

5.6. The final technical specifications for the gas-fired CHP would be submitted to LBC during the detailed design stage. The detailed specification and installation of this plant would be in line with requirements of current Building Regulations, and would be designed to comply with Her Majesty's Inspectorate of Pollution, HMIP Technical Guidance Note (Dispersion) D1 (often referred to as a D1 Calculation)[34]. This document and calculation complements the Third Edition of the 1956 Clean Air Act Memorandum on Chimney Heights[35] and is intended to ensure that flue systems comply with the Clean Air Act 1993[36] and Environmental Protection Act 1990[37]. In addition, and in line with the London Plan, the energy plant would be required to meet the emission standards and velocity as set out within the SPG. Consequently, no unacceptable effects on air quality at local existing and proposed receptors would occur as a result of this plant.

34 Her Majesty's Inspectorate of Pollution (HIMP), 'Guidelines on Discharge Stack Heights of Polluting Emissions'. Technical Guidance Note (Dispersion) D1, 1993.
35 HMSO, Third Edition of the 1956 Clean Air Act Memorandum on Chimney Heights, 1981.
36 HMSO, Clean Air Act, 1993.
37 HMSO. Environmental Protection Act, 1990.

5.7. Therefore, it is not anticipated that the operation of the proposed heating plant would result in a significant increase in emissions to air. It is considered the effect of the operational Development would be **insignificant**.

Future Occupants

Office Use

5.8. LLAQM.TG(16)[38] states the annual mean AQS objectives should not apply at '*Building façades of offices or other places of work where members of the public do not have regular access*' and in these locations only the short-term AQS objectives are applicable.

5.9. As shown in **Table 2** of Section 2: Baseline Conditions, monitored NO_2 and PM_{10} concentrations at the Bloomsbury urban background automatic monitor (located approximately 800m east of the Site) are below the 1-hour NO_2 and the 24-hour PM_{10} AQS objectives in all years. Based on the results from this monitor it is considered that the short term AQS objective for NO_2 and PM_{10} is likely to be met at the Development.

5.10. Whilst the AQS objectives are likely to be met, the office (as well as the healthcare centre) will have mixed mode ventilation such that at certain times the occupants can have direct control of the ventilation via openable windows. The air intake will be from the roof level (at level 8) and on the north side of the building away from the road. The filtration provided will be designed in accordance with BS EN 13779. At predetermined external ambient temperatures, internal temperatures and CO_2 level the mechanical ventilation shall take over and the office and healthcare centre occupants will be advised to close the windows.

5.11. Based on the above, the introduction of office users to the Site is therefore considered **insignificant**.

Residential and Healthcare Use

5.12. LLAQM.TG(16) states the annual mean AQS objectives should apply at *'All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc*'. As such the annual mean AQS objectives as well as the short-term AQS objectives have been considered for the residential and healthcare users.

5.13. As shown in **Tables 2** to **4** the results from the closest air quality monitors to the Site show the annual mean NO_2 AQS objective is exceeded in all years, at all monitoring sites. Given there are exceedences of the AQS objective, the Development includes a mechanical ventilation strategy to ensure future residential users of the Development are provided with suitable air. The mechanical ventilation would include whole house ventilation system with heat recovery. The air intakes and discharge shall be at the façade in each apartment and the ventilation units shall be complete with pre-filters to filter out PM_{10} and a carbon filter to remove 99.5% of NO_2.

5.14. Taking account of the mechanical ventilation strategy the introduction of residential and healthcare users to the Site is therefore considered **insignificant.**

Mitigation Measures

5.15. **Table 10** presents the measures inherent to the Development and those to be included during the construction and operational phases of the Development which are likely to have a benefit to air quality.

38 Defra, 2016, London Local Air Quality Management Technical Guidance, April 2016

Table 10: Summary of Mitigation Measures included as part of the Development

Phase	Mitigation Measures
Inherent – Measures included in the design of the Development	Mechanical ventilation strategy for office, residential and healthcare users
	No car parking spaces provided and scheme designed to be 'car free'
	Provision of 72 long stay cycle spaces and 12 short stay cycle spaces for office users with changing facilities and 14 residential cycle spaces.
	Use of a small-scale gas-fired CHP, which has improved efficiencies and low emissions from tightened legislation compared to the existing heating plant at the Site, and is calculated to be Air Quality Neutral.
Operational Development	Provision and monitoring of Residential and Employee Travel Plans

6. Summary and Conclusions

6.1. The main likely effects on local air quality during construction relates to dust. A range of measures to minimise or prevent dust would be implemented and it is considered that following mitigation, the effects from nuisance dust emissions would be **insignificant**.

6.2. Emissions from construction vehicles would be small in comparison to the emissions from the large volume of vehicles travelling on roads in the surrounding area of the Site and would not significantly affect air quality. In the worst-case, it is anticipated that the effect of construction vehicles entering and egressing the Site during the construction period would have a **temporary, local** and of **minor adverse** significance, in the context of local background pollutant concentrations and existing local road traffic emissions.

6.3. In accordance with the London Plan all construction plant would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effect of construction plant on local air quality would be **insignificant**.

6.4. The Development would not include any car parking spaces for office or residential users and would not alter the number of trips from those associated with the current use. As such it is considered that the Development would result in **insignificant** effects in relation to traffic emissions.

6.5. The Development would include the use of a small-scale gas-fired Combined Heat and Power (CHP) for use in the supply of hot water to the residential units. The CHP has improved efficiencies and low emissions from tightened legislation compared to the existing heating plant at the Site, and is calculated to be Air Quality Neutral. The detailed specification and installation of this plant would be in line with best practice guidance and submitted to LBC prior to installation. It is considered the effect of the CHP is **insignificant**.

6.6. In accordance with LLAQM.TG(16) only the short-term AQS objectives apply for office users. The nearest automatic monitor shows the short-term objectives for NO_2 and PM_{10} are below the respective AQS objectives. In addition, mechanical ventilation would be provided for office users. Based on this the future concentrations for the office users of the Development is considered **insignificant**.

6.7. In relation to future residential and healthcare users the results from the closest air quality monitors to the Site show the annual mean NO_2 AQS objective is exceeded in all years, at all monitoring sites. Given there are exceedences of the AQS objective, the Development includes a mechanical ventilation strategy with filtration to ensure future residential and healthcare users of the Development are provided with suitable air. Taking account of the mechanical ventilation strategy, the introduction of residential and healthcare users to the Site is therefore considered **insignificant**.

APPENDICES

Appendix A: Air Quality Neutral Assessment

Appendix A: Air Quality Neutral Calculations

1.1 Calculations have been undertaken by Waterman Infrastructure & Environment (Waterman IE) to accompany the planning application for the redevelopment of Arthur Stanley House for residential and office use (hereafter referred to as the 'Development').

1.2 The Development is located on the corner of Tottenham Street and Tottenham Mews, approximately 20m from Cleveland Street to the north, 80m from Charlotte Street to the south and directly opposite Goodge Place.

1.3 The purpose of the calculations is to demonstrate how the Development performs against relevant 'air quality neutral' benchmarks (discussed further below).

Description of the Development

1.4 The Development is located in Inner London and would provide nine residential units (Use Class C3) and office use (Use Class B1), including a medical centre. The total amount of floorspace proposed by the Development is set out below in **Table A1**.

Table A1: Proposed Land Uses

Land Use (Use Class)	Proposed Floor space Areas (GIA) (m^2)
Residential (C3)*	944
Office (B1)**	6,459
Total	**7,403**

Note: *Proposal of nine residential units
** It is noted that 600m^2 could be D1 use. For the purpose of this air quality neutral assessment only B1 is considered.

Planning Policy

The London Plan – Spatial Development Strategy for Greater London, 2016

1.5 Policy 7.14 'Improving air quality' of the London Plan[1] states that development proposals should: *"…be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs)…"*

The Mayor's Air Quality Strategy 'Clearing the Air' 2010

1.6 Policy 7 – Using the planning process to improve air quality of the Mayor's Air Quality Strategy[2] states that: *"The Mayor will ensure that new developments in London shall as a minimum be 'air quality neutral' through the adoption of best practice in the management and mitigation of emissions".*

The Mayor's Supplementary Planning Guidance - Sustainable Design and Construction, 2014

1.7 The Sustainable Design and Guidance – Supplementary Planning Guidance (SPG)[3] provides updated guidance to support the implementation of the London Plan.

[1] Greater London Authority (2016): The London Plan –– The Spatial Development Strategy for London consolidated with alterations since 2011, GLA, London.
[2] Greater London Authority (2010), 'Clearing the air – The Mayor's Air Quality Strategy', GLA, London.
[3] Greater London Authority (2014), 'Sustainable Design and Construction, Supplementary Planning Guidance', GLA, London

1.8 Further to Policy 7.14 of the London Plan, Section 4.3 of the SPG focusses on air pollution and the effects from the operation of new developments within Greater London. The SPG requires all new developments to be at least 'air quality neutral'.

1.9 Paragraph 4.3.15 of the SPG states:

"This policy applies to all major developments in Greater London. Developers will have to calculate the NO_x and / or PM_{10} emissions from the buildings and transport elements of their developments and compare them to the benchmarks set out in Appendix 5 and 6."

1.10 The SPG presents emission benchmarks for buildings (associated with emissions from combustion plant introduced as part of a development to provide heating and power) and transport (associated with vehicle trips related to the operation of the development). It is considered that where a development does not exceed these benchmarks, then it is considered 'air quality neutral' and would not increase NO_x (oxides of nitrogen) and PM_{10} (particulate matter of 10µm diameter or less) emissions across London. A discussion on the Building Emission Benchmarks (BEBs) and the Transport Emission Benchmarks (TEBs) as set out within the SPG is presented below.

1.11 In addition to the BEBs and TEBs, the SPG provides emissions standards for any proposed combustion plant (individual / communal gas boilers, solid biomass or Combined Heat and Power (CHP) plant) to be introduced as part of a development. These emissions standards must be complied with.

Building Emissions Benchmarks (BEBs)

1.12 Paragraph 4.3.17 and Appendix 5 of the SPG note that BEBs have been defined for a series of land-use classes for both NO_x and PM_{10}. The BEBs are presented in **Table A2**.

Table A2: 'Air Quality Neutral' Emissions Benchmarks for Buildings

Land Use Class	NO_x (g/m^2)	PM_{10} (g/m^2)
Class A1	22.6	1.29
Class A3 – A5	75.2	4.32
Class A2 and Class B1	30.8	1.77
Class B8	23.6	1.90
Class C1	70.9	4.07
Class C3	26.2	2.28

1.13 It is noted that whilst the BEBs have been provided for PM_{10}, these only apply for developments which would introduce heating plants likely to produce significant PM_{10} emissions. This would typically include heating plant operated by oil or solid fuel (including all biomass appliances). All other plant would not result in an increase in PM_{10}; therefore, an assessment against the PM_{10} BEBs would not be required.

Transport Emissions Benchmarks (TEBs)

1.14 Paragraph 4.3.18 and Appendix 6 of the SPG sets out the TEBs defined by a series of land-use class for both NO_x and PM_{10}. The TEBs are presented in **Table A3**.

Table A3: 'Air Quality Neutral' Emissions Benchmarks for Transport

Land Use	London Central Activity Zone	Inner	Outer
NO_x (g/m^2/annum)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NO_x (g/dwelling/annum)			
Residential (C3)	234	558	1553
PM_{10} (g/m^2/annum)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM_{10} (g/dwelling/annum)			
Residential (C3, C4)	40.7	100	267

1.15 Section 4.3.18 of the SPG notes that the design of a development should encourage and facilitate walking, cycling and the use of public transport, thereby minimising the generation of air pollutants.

1.16 As well as providing benchmarks the SPG also recommends emission standards for combustion plant to comply with, in addition to meeting the overall 'air quality neutral' benchmark.

Air Quality Neutral Planning Support: GLA 80371, April 2014

1.17 In April 2014[4] the GLA published a report to provide support to the development of the Mayor's policy related to 'air quality neutral' developments. The report provides a method to enable a development to be assessed against the air quality neutral benchmarks set out in the Sustainable Design and Construction SPG.

1.18 The report provides a methodology required to apply the air quality neutral policy. It requires the transport and building emissions for the development to be identified and then compared to the benchmark emissions. The report notes that the building and transport emissions should be calculated separately and not combined.

Air Quality Neutral Calculation

1.19 The Air Quality Neutral Assessment of the Development has been based on the approach and methodology detailed within the Air Quality Neutral Planning Support Document. The calculations are presented below.

Building Emissions

1.20 The energy centre for the Development comprises a small-scale gas-fired Combined Heat and Power (CHP) for use in the supply of hot water to the residential units. The details of the CHP unit are presented in **Table A4**.

[4] Air Quality Consultants and Environ, April 2014, 'Air Quality Neutral Planning Support Update: GLA 80371'

Table A4: Calculation of the Total Building Emission

Unit	Release Rate (m/s)	NO_x Emissions (g/s)	Hours of Operation (hrs./annum)	Total NO_x (kg/annum)
Residential CHP	10	0.000657	4,500	10.6
Total Building NO_x Emission				**10.6**

Note: Data provided by project M&E Consultant (G Build) including the likely hours of operation.
As discussed, for gas-fired plants PM_{10} emission factors are not provided because gas-fired plants do not emit any significant level of particulates
Assumes a release rate in accordance with the requirements set out in the Sustainable Design and Construction SPG.

1.21 The Building Emission Benchmarks (BEB) for each land use category are presented in **Table A5** these are calculated by multiplying the floor area for each land use category with the Building Emission Benchmark presented in **Table A2**.

Table A5: Calculation of the Benchmarked NO_x Building Emissions for each Land-Use Category

Land Use	GIA (m^2)	Building Emissions Benchmark (gNO_x/m^2/annum)	Benchmarked Emissions ($kgNO_x$/annum)
Residential (C3)	944	26.2	24.7
Office (B1)	6,459	30.8	198.9
Total Benchmarked Building Emissions			**223.6**

1.22 The Total Building NO_x Emission of 10.6kg/annum is below the benchmark of 223.6kg/annum and the Development is therefore considered to be 'Air Quality Neutral', with respect to building emissions and no further abatement would be required.

Transport Emissions

1.23 The benchmarked transport emissions for the Development have been calculated by multiplying the relevant floorspace (m^2) with the TEBs for the Inner London Zone (as presented in **Table A3**).

1.24 The total benchmarked transport emissions for the Development are presented in Table A6.

Table A6: Calculation of the Benchmarked Transport Emissions for each Land-Use Category

Land Use	Number of units	GIA (m^2)	Transport Emissions Benchmark (g/m^2/annum)		Benchmarked Emissions (kg/annum)	
			NO_x	PM_{10}	NO_x	PM_{10}
Residential (C3)	9	-	558	100	5.0	0.9
Office (B1)	-	6,459	11.4	2.05	73.6	13.2
Total Transport Emissions					**78.6**	**14.1**

1.25 The Development is considered to be 'car free' and does not contain any car parking spaces and is therefore considered to be 'air quality neutral' and no further mitigation measures are considered necessary.

UK and Ireland Office Locations