Air Quality Assessment

Southampton Row, London

Client: Mercure Hotel Bloomsbury

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Executive Summary

Redmore Environmental Ltd was commissioned by Mercure Hotel Bloomsbury to undertake an Air Quality Assessment in support of a planning application for the extension of the existing Mercure Hotel, Southampton Row, London.

The proposal has the potential to cause impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future occupants to any existing air quality issues. As such, an Air Quality Assessment was required in order to determine baseline conditions and assess potential effects as a result of the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a proposal of this size and nature and reduce potential impacts to an acceptable level.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the relevant screening criteria. Due to the limited number of anticipated vehicle trips associated with the proposals, road vehicle exhaust emission impacts were not predicted to be significant.

There is the potential for the exposure of future site users to elevated pollution levels. Dispersion modelling was therefore undertaken in order to predict concentrations across the proposed development site as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.

The results of the dispersion modelling assessment indicated that predicted pollution levels were below the relevant air quality criteria at all proposed hotel rooms across the site. As such, exposure of future occupants to poor air quality is considered unlikely as a result of the proposals.

Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Mercure Hotel Bloomsbury to undertake an Air Quality Assessment in support of a planning application for the extension of the existing Mercure Hotel, Southampton Row, London.

1.1.2 The development may lead to the exposure of future occupants to poor air quality, as well as adverse impacts at sensitive locations. As such, an Air Quality Assessment was required in order to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential impacts associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located at the existing Mercure Hotel off Southampton Row, Camden at approximate National Grid Reference (NGR): 530301, 181905. This area is included within both the Central Activities Zone (CAZ) and the Low Emission Zone (LEZ) of Greater London. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the extension of the existing hotel to provide 18 new rooms from first floor level, accommodated through a side, rear and roof extension. Reference should be made to Figure 2 for a layout plan at first floor level.

1.2.3 The London Borough of Camden (LBoC) has declared an Air Quality Management Area (AQMA) due to exceedences of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO_2) and 24-hour mean AQO for particulate matter with an aerodynamic diameter of less than 10µg/m^3 (PM_{10}). The development is located within the AQMA. Subsequently, there are concerns that the proposals will introduce future occupants to poor air quality. As such, concentrations at the site have been assessed in the following report in order to consider location suitability for the proposed end-use and define any requirement for mitigation. Potential impacts associated with the construction and operational phases of the scheme have also been considered as necessary.

2.0 LEGISLATION AND POLICY

2.1 European Directives

2.1.1 European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new Air Quality Limit Values (AQLVs) for particulate matter with an aerodynamic diameter of less than 2.5µm. The consolidated Directives include:

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient AQLVs for NO_2, oxides of nitrogen (NO_x), sulphur dioxide, lead and PM_{10};
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and,
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

2.1.2 The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

2.2 UK Legislation

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 5 pollutants.

2.2.2 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for

Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.2.3 Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (μg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

2.2.4 Table 2 summarises the advice provided in the Greater London Authority (GLA) guidance[2] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside site (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

1 The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

2 London Local Air Quality Management (TG16), Technical Guidance (LLAQM.TG(2016)), GLA, 2016.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside site (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside site (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside site where the public would not be expected to have regular access

2.3 Local Air Quality Management

2.3.1 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

2.4.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> "any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.4.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

2.5 National Planning Policy

2.5.1 The National Planning Policy Framework[3] (NPPF) was published on 27th March 2012 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to the proposed development:

> "The planning system should contribute to 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 soil, air, water or noise pollution or land instability"
>
> "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 impacts on air quality from individual site 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."

2.5.2 The implications of the NPPF have been considered throughout this assessment.

3 NPPF, Department for Communities and Local Government, 2012.

2.6 National Planning Practice Guidance

2.6.1 The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. Why should planning be concerned about air quality?
2. What is the role of Local Plans with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality be relevant to a planning decision?
6. Where to start if bringing forward a proposal where air quality could be a concern?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?
9. How do considerations about air quality fit into the development management process?

2.6.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.7 Local Planning Policy

The London Plan

2.7.1 The London Plan March 2016[5] was published by the GLA and along with the adopted alterations, sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

2.7.2 The London Plan policies relating to air quality are outlined below:

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4 http://planningguidance.planningportal.gov.uk.

5 The London Plan March 2016, GLA, 2016.

"**Policy 5.3 - Sustainable design and construction**

Strategic

A. The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

Planning decisions

B. Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

C. Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

[…]

d) minimising pollution (including noise, air and urban run-off)

[…]"

"**Policy 7.14 - Improving air quality**

Strategic

A. The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

Planning decisions

B. Development proposals should:

a) minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within 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 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 approaches
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 impacts from the biomass boiler are identified […]"

Local Plan

2.7.3 LBoC adopted the Local Plan[6] on 3rd July 2017. This document provides the basis for planning decisions and future development in the borough, covering the period from

6 Local Plan, LBoC, 2017.

2016 - 2031. A review of the Local Plan revealed the following policy of relevance to this report:

> "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."

2.7.4 The implications of the above policy was taken into consideration throughout the undertaking of the assessment.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposal has the potential to cause air quality impacts during the construction and operational phases, as well as expose future occupantsto elevated pollution levels. These issues have been assessed in accordance with the following methodology.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Mayor of London's 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance'[7].

3.2.2 Activities on the proposed construction site have been divided into two types to reflect their different potential impacts. These are:

- Construction; and,
- Trackout.

3.2.3 It should be noted that demolition and earthwork activities will not be undertaken on site. As such, they were not considered within the assessment.

3.2.4 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM_{10}.

3.2.5 The assessment steps are detailed below.

7 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Step 1

3.2.6 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to Step 2.

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

Step 2

3.2.8 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

3.2.9 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.10 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m

Magnitude	Activity	Criteria
Medium	Construction	• Total building volume 25,000m³ to 100,000m³ • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Construction	• Total building volume less than 25,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.11 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10}. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Site of Special Scientific Interest

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, shopping streets, playing fields, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.12 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.13 These factors were considered in the undertaking of this assessment.

3.2.14 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.15 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	-	More than 10	High	Medium	Low	Low	Low
	-	1- 10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.16 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 7 Construction Dust - Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

3.2.17 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

3.2.18 Table 8 outlines the risk category from earthworks and construction activities.

Table 8 Construction Dust - Dust Risk Category from Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.19 Table 9 outlines the risk category from trackout activities.

Table 9 Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

3.2.20 Step 3 requires the identification of site specific mitigation measures within the Mayor of London's guidance[8] to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

3.2.21 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.2.22 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The Mayor of London's guidance[9] suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

8 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

9 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

3.3 Operational Phase Assessment

Potential Development Impacts

3.3.1 The proposal has the potential to impact on existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the Highways Agency 'Design Manual for Roads and Bridges' (DMRB)[10] and IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'[11] guidance documents to determine the potential for trips generated by the scheme to affect local air quality.

3.3.2 The DMRB[12] provides the following criteria for determination of road links potentially affected by changes in traffic flow:

- Annual Average Daily Traffic (AADT) flows change by 1,000 or more;
- Daily HDV AADT flows change by 200 or more;
- Daily average speed changes by 10km/hr or more; or,
- Peak hour speed changes by 20km/hr or more.

3.3.3 The IAQM 'Land-Use Planning & Development Control: Planning for Air Quality' guidance[13] document provides the following criteria to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,

10 DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

11 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

12 DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

13 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

- Introduction of a new junction or removal of an existing junction near to relevant receptors.

3.3.4 Should these criteria not be met, then the DMRB[14] and IAQM guidance[15] documents consider air quality impacts associated with a scheme to be **negligible** and no further assessment is required.

3.3.5 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance[16].

Potential Future Exposure

3.3.6 The proposal has the potential to expose future site users to poor air quality. In order to assess pollutant concentrations across the development site detailed dispersion modelling was undertaken. Reference should be made to Appendix 1 for a full description of the assessment input data.

3.3.7 The results of the assessment were compared against the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance[17]. These are outlined in Table 10 and allow determination of the significance of predicted pollution levels and associated exposure.

[14] DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

[15] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

[16] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

[17] London Councils Air Quality and Planning Guidance, London Councils, 2007.

Table 10 Assessment Criteria

Category	Applicable Range		Recommendation
	Annual Mean NO_2 or PM_{10}	24-hour PM_{10}	
APEC - A	Below 5% of the annual mean AQO	> 1-day less than AQO	No air quality grounds for refusal; however, mitigation of any emissions should be considered
APEC - B	Between 5% below or above the annual mean AQO	Between 1-day above or below AQO	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g., Maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised
APEC - C	Above 5% of the annual mean AQO	> 1-day more than AQO	Refusal on air quality grounds should be anticipated, unless the LA has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures

3.3.8 It should be noted that a significant area of London would fall under APEC - C due to high NO_2 concentrations throughout the city. As such, a presumption against planning consent in these locations may result in large areas of land becoming undevelopable and prevent urban regeneration. The inclusion of suitable mitigation measures to protect future site users is therefore considered a suitable way to progress sustainable schemes in these locations and has been considered within this assessment.

4.0 BASELINE

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the proposal were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), LBoC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean NO_2 and 24-hour mean PM_{10} concentrations are above the relevant AQOs within the borough. As such, one AQMA has been declared and is described as follows:

"The whole borough."

4.2.2 The development is located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area, as well as the exposure of future site users to poor air quality. These issues have been considered throughout the assessment.

4.2.3 LBoC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant concentrations is undertaken by LBoC using continuous and periodic methods throughout their area of jurisdiction. Recent NO_2 results recorded in the vicinity of the site are shown in Table 11. Exceedences of the AQO are shown in **bold**.

Table 11 Monitoring Results - Annual Mean NO_2

Monitoring Site	Monitored NO_2 Concentration (μg/m^3)		
	2015	2016	2017
Camden - Holborn (Bee Midtown)	**83**	**84**	**74**

Monitoring Site	Monitored NO_2 Concentration ($\mu g/m^3$)		
	2015	2016	2017
Camden Bloomsbury	**48**	**42**	38
Bloomsbury Street	**74.86**	**72.19**	**68.98**

4.3.2 As shown in Table 11, annual mean NO_2 concentrations were above the AQO at all monitors between 2015 and 2016. Levels have since dropped at the Camden Bloomsbury automatic site. Due to the location of the survey positions adjacent to roads within an AQMA, elevated concentrations would be expected.

4.3.3 Short term NO_2 monitoring results are summarised in Table 12

Table 12 Monitoring Results - Number of Hours with 1-Hour Mean NO_2 Concentrations above 200µg/m³

Monitoring Site	Monitored NO_2 Concentration ($\mu g/m^3$)		
	2015	2016	2017
Camden - Holborn (Bee Midtown)	**75**	**46**	10
Camden Bloomsbury	0	0	0

4.3.4 As shown in Table 12, the number of hours with NO_2 concentrations above 200µg/m³ was above the permitted number of 18 between 2015 and 2016 at the Camden - Holborn automatic monitor.

4.3.5 Recent annual mean PM_{10} results are shown in Table 13.

Table 13 Monitoring Results - Annual Mean PM_{10}

Monitoring Site	Monitored NO_2 Concentration ($\mu g/m^3$)		
	2015	2016	2017
Camden Bloomsbury	19	20	19

4.3.6 As shown in Table 13, annual mean PM_{10} concentrations were below the AQO between 2015 and 2017.

4.3.7 Short term PM_{10} monitoring results are summarised in Table 14.

Table 14 Monitoring Results - Number of Days with 24-hour Mean PM_{10} Concentrations above 50µg/m³

Monitoring Site	Monitored NO_2 Concentration (µg/m³)		
	2015	2016	2017
Camden Bloomsbury	6	9	6

4.3.8 As shown in Table 14, the number of days with PM_{10} concentrations above 50µg/m³ was below the permitted number of 35 at the Camden Bloomsbury monitor in recent years.

4.3.9 Reference should be made to Figure 3 for a map of the survey positions.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 530500, 181500. Data for this location was downloaded from the DEFRA website[18] for the purpose of the assessment and is summarised in Table 15.

Table 15 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2017	2018	2020
NO_2	47.97	44.97	37.61
PM_{10}	21.00	20.68	20.04

4.4.2 As shown in Table 15, predicted background NO_2 concentrations are above the relevant AQO at the development site during 2017 and 2018. Background PM_{10} concentrations are below the annual mean AQO for all years.

18 http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015.

4.5 Sensitive Receptors

4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundaries. These are summarised in Table 16.

Table 16 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	More than 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

4.5.2 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access routes. These are summarised in Table 17. For the purpose of the assessment it was assumed construction phase traffic would access the development site from Southampton Row.

Table 17 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	0
Up to 50	More than 100	0

4.5.3 There are no ecological receptors within 50m of the site or trackout boundary. As such, ecological impacts have not been assessed further within this report.

4.5.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 18.

Table 18 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby site	The development has the potential to result in cumulative dust impacts if other sites within 700m of the boundary are developed concurrently
Pre-existing screening between the source and the receptors	The site is located in a built-up area. Adjacent buildings may act as a constraint to dust dispersion during the construction phase of the development
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 4, the predominant wind bearing is from the south-west. As such, receptors to the north-east of the boundary are most likely to be affected by dust releases
Conclusions drawn from local topography	The site is located within a street canyon. As such, buildings surrounding the site may act as a topographical constraint to dust dispersion during the construction phase
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.5 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties. As such, users would expect to enjoy a reasonable level of amenity, aesthetics or the value of their property could be diminished by soiling and people would be expected to be present for extended periods of time.

4.5.6 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 19.

Table 19 Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area	
	Construction	Trackout
Dust Soiling	High	High
Human Health	Low	Medium

5.0 ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposal. These are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

5.2.1 The undertaking of activities such as construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Construction

5.2.4 Due to the size and nature of the proposal, the total building volume is likely to be less than 25,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **small.**

5.2.5 Table 19 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8 the scheme is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.6 Table 19 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the scheme is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.7 Based on the site area and the access route comprising all tarmacked surfaces, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.8 Table 19 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the scheme is considered to be a **low** risk site for dust soiling as a result of trackout activities.

5.2.9 Table 19 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 9, the scheme is considered to be a **negligible** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.10 A summary of the risk from each dust generating activity is provided in Table 20.

Table 20 Summary of Potential Unmitigated Dust Risks

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

5.2.11 As indicated in Table 20, the potential risk of dust soiling is **low** from construction and trackout activities. The potential risk of human health impacts is **negligible** from construction and trackout.

5.2.12 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

5.2.13 The Mayor of London's guidance[19] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the proposal as summarised in Table 21.

Table 21 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
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
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 LA upon request • 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 log book
Monitoring	• Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	• 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 • Avoid site runoff of water or mud
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

19 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Issue	Control Measure
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate
Waste management	• Avoid bonfires or burning of waste materials

Step 4

5.2.14 Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual impacts from all dust generating activities are predicted to be **not significant**, in accordance with the Mayor of London's guidance[20].

5.3 Operational Phase Assessment

Potential Development Impacts

Air Quality Neutral

5.3.1 The London Plan[21] requires that all developments are 'air quality neutral' to ensure proposals do not lead to further deterioration of existing poor air quality. In order to support this policy, guidance[22] has been produced on behalf of the GLA. The document provides a methodology for determining potential emissions from a development and benchmark values for comparison purposes. Where the benchmark is exceeded then action is required, either locally or by way of off-setting.

5.3.2 Review of the Air Quality Neutral guidance[23] document revealed an assessment is only required in the following circumstances:

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20 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

21 Air Quality Neutral Planning Support Update: GLA 80371, Air Quality Consultants and Environ, 2014.

22 Air Quality Neutral Planning Support Update: GLA 80371, Air Quality Consultants and Environ, 2014.

23 Air Quality Neutral Planning Support Update: GLA 80371, Air Quality Consultants and Environ, 2014.

- For 10 or more residential dwellings (or where the number is not given, an area of more than 0.5 ha); or,
- For all other uses, where the floor space is 1,000m^2 or more (or the site area is 1ha or more).

5.3.3 As the proposals are only for 586m^2 of additional floor space, further assessment is not required.

<u>Transport Emissions</u>

5.3.4 Any additional vehicle movements associated with the proposal will generate exhaust emissions on the local and regional road networks. Information on the number of vehicle movements generated from the scheme was provided by Stuart Michael Associates, the Transport Consultants for the project. This indicated that the proposed extension is likely to generate an additional 20 vehicle movements on the local road network.

5.3.5 Based on the provided information, the proposal is not anticipated to result in an increase in AADT flows of more than 1,000, produce over 200 HDV movements per day or significantly affect average speeds on the local road network. Additionally, the scheme is not predicted to result in a change of LDV flows of more than 100 AADT on any individual road link, include significant highway realignment or the introduction of a junction and there will not be a requirement for more than 25 HDV deliveries per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **negligible**, in accordance with the DMRB[24] and IAQM[25] screening criteria shown in Section 4.3.

Potential Future Exposure

5.3.6 The proposal has the potential to cause exposure of future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Modelling was undertaken at first floor level as this is the lowest point of relevant exposure.

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24 DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

25 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

5.3.7 It should be noted that the proposals do not include any residential usage or staff accommodation. As such, it is not considered a location of relevant exposure for annual mean AQOs in accordance with GLA guidance[26]. However as shown in Table 2, hotels are considered locations of relevant exposure for short-term AQOs, including 1-hour mean NO_2 and 24-hour mean PM_{10} concentrations. This has therefore been considered during the assessment of potential impacts at the site. Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO_2 and 24-hour mean PM_{10} concentrations, respectively.

5.3.8 Dispersion models are inherently less accurate at calculating exceedences of short-term AQOs. As such, predictions of 1-hour NO_2 concentrations were not produced as part of the assessment. However, as stated in GLA guidance[27], if annual mean NO_2 concentrations are below 60μg/m^3, then it is unlikely that the 1-hour AQO will be exceeded.

5.3.9 As shown in Figure 5, annual mean NO_2 concentrations were predicted to be below 60μg/m^3 at all proposed hotel rooms at first floor. The maximum level at any façade was 49.53g/m^3 which is classified as APEC-A in accordance with the London Council Air Quality and Planning Guidance[28].

5.3.10 As shown in Figure 6, the number of days with PM_{10} concentrations above 50μg/m^3 was predicted to be below the permitted number of 35 at all locations across the development at first floor. The maximum number of days with PM_{10} concentrations above 50μg/m^3 at the façade of any proposed hotel room was 5, which is classified as APEC-A in accordance with the London Council Air Quality and Planning Guidance[29].

5.3.11 It should be noted that pollutant levels decrease with distance from pollutant sources. As pollutant concentrations were classified as APEC-A at all locations of relevant exposure at first floor, further assessment above this level was not considered necessary.

26 London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

27 London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

28 London Councils Air Quality and Planning Guidance, London Councils, 2007.

29 London Councils Air Quality and Planning Guidance, London Councils, 2007.

5.3.12 Based on the assessment results, exposure of future site users to exceedences of the relevant AQOs for NO_2 and PM_{10} is considered unlikely as a result of the proposed development.

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by Mercure Hotel Bloomsbury to undertake an Air Quality Assessment in support of a planning application for the extension of the existing Mercure Hotel, Southampton Row, London.

6.1.2 The proposal has the potential to cause impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future occupants to any existing air quality issues. As such, an Air Quality Assessment was required in order to determine baseline conditions and assess potential effects as a result of the scheme.

6.1.3 During the construction phase of the proposal there is the potential for air quality impacts as a result of fugitive dust emissions from the scheme. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by construction and trackout activities was predicted to be **not significant**.

6.1.4 Potential impacts during the operational phase of the proposal may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the development site. These were assessed against the screening criteria provided within the DMRB[30] and IAQM[31] guidance documents. Due to the low number of anticipated vehicle trips, road traffic impacts were predicted to be **negligible**.

6.1.5 The proposal has the potential to expose future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict concentrations as a result of emissions from the local highway network. Results were subsequently verified using monitoring data collected by LBoC.

6.1.6 The results of the dispersion modelling assessment indicated that predicted NO_2 and PM_{10} concentrations were below the relevant AQOs at all proposed hotel rooms across the site. Exposure of future occupants to poor air quality is therefore considered unlikely as a result of the proposals.

30 DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

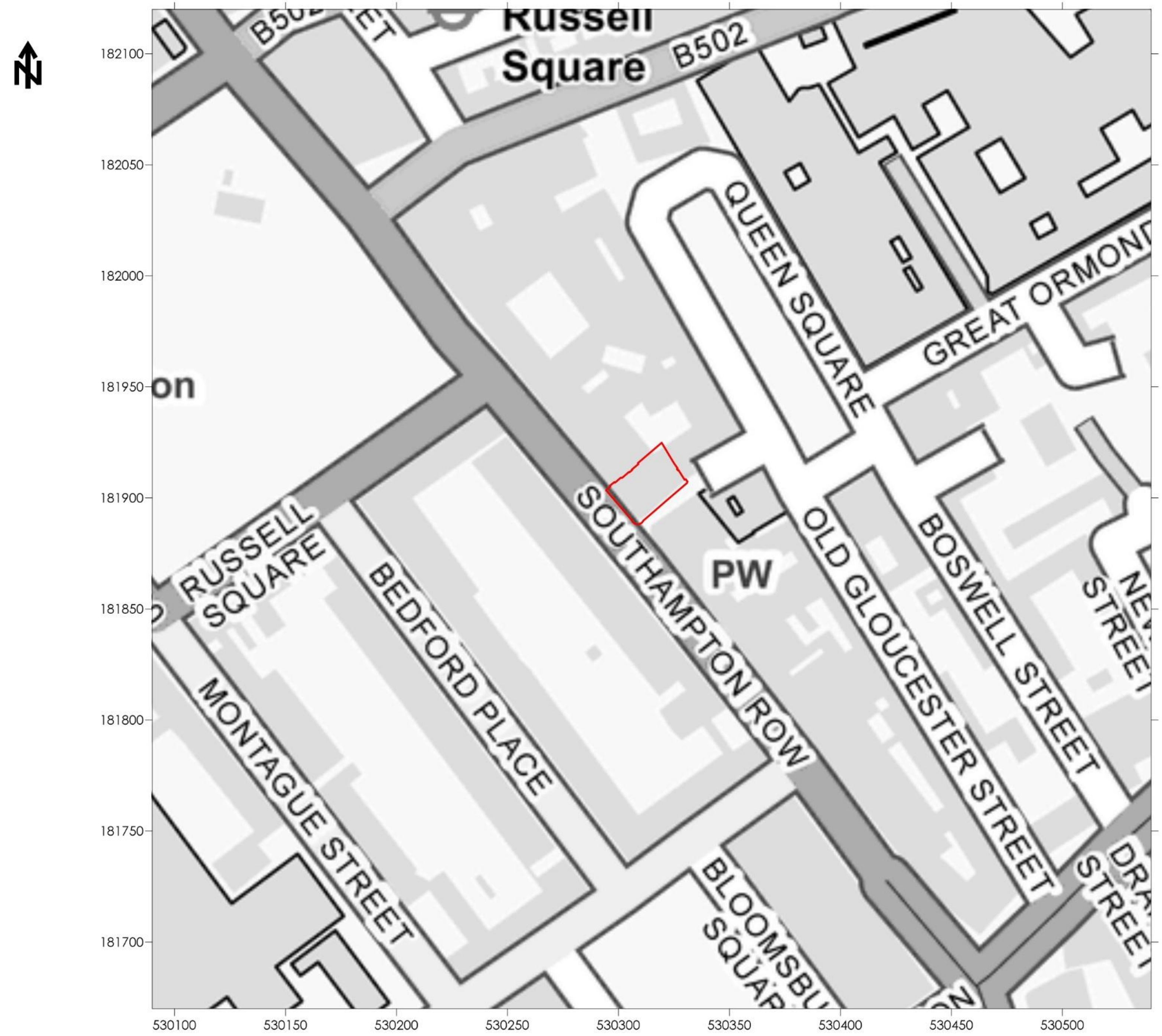
31 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.1.7 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the development.

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
APEC	Air Pollution Exposure Criteria
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EU	European Union
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LBoC	London Borough of Camden
LGV	Light Goods Vehicle
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM_{10}	Particulate Matter with an aerodynamic diameter of less than 10µm
z_0	Roughness length

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location

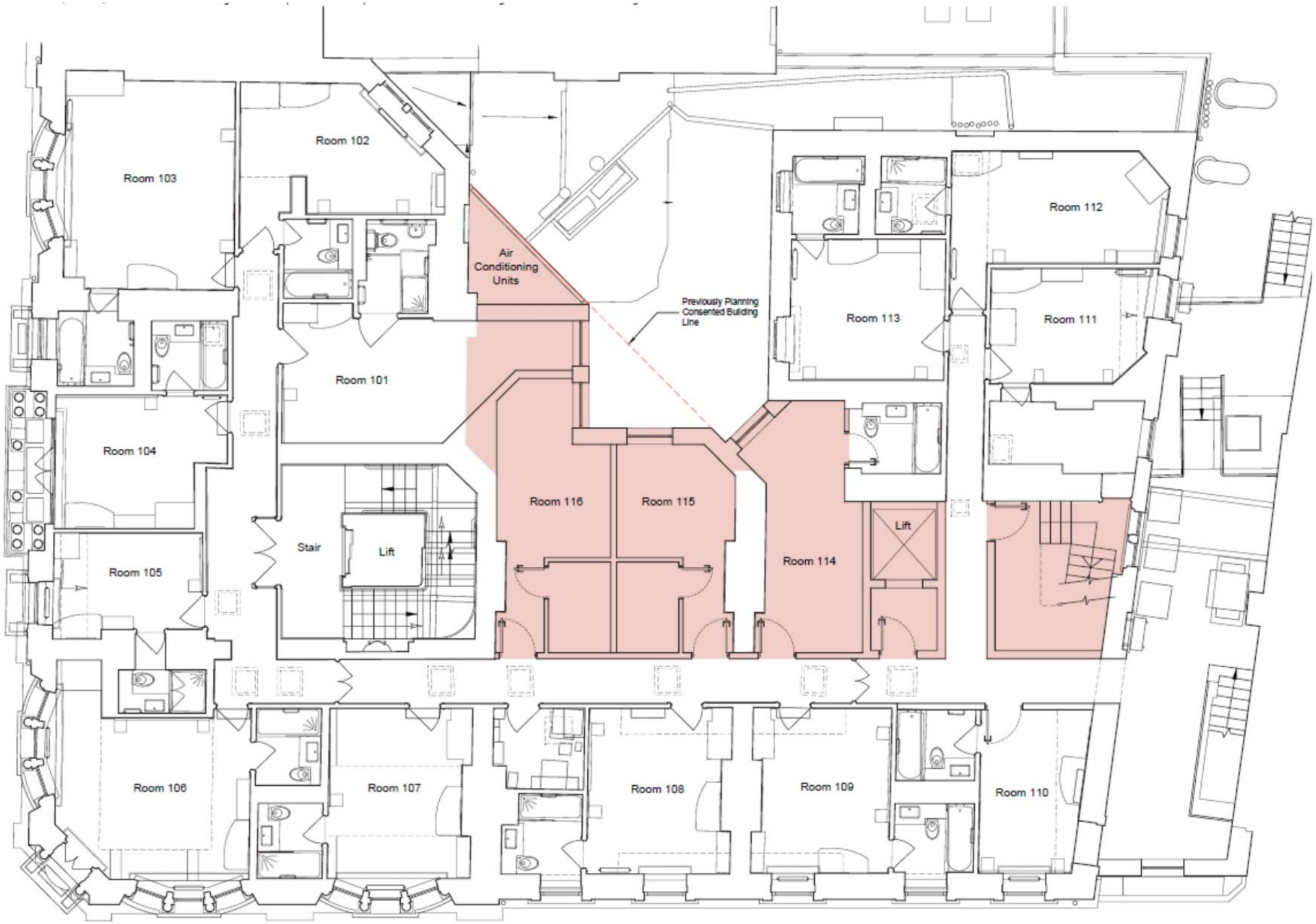
Project
Air Quality Assessment
Southampton Row, London

Project Reference
2286

Client
Mercure Hotel Bloomsbury

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Proposed Hotel Room

Title

Figure 2 - Site Layout
First Floor

Project

Air Quality Assessment
Southampton Row, London

Project Reference

2286

Client

Mercure Hotel Bloomsbury

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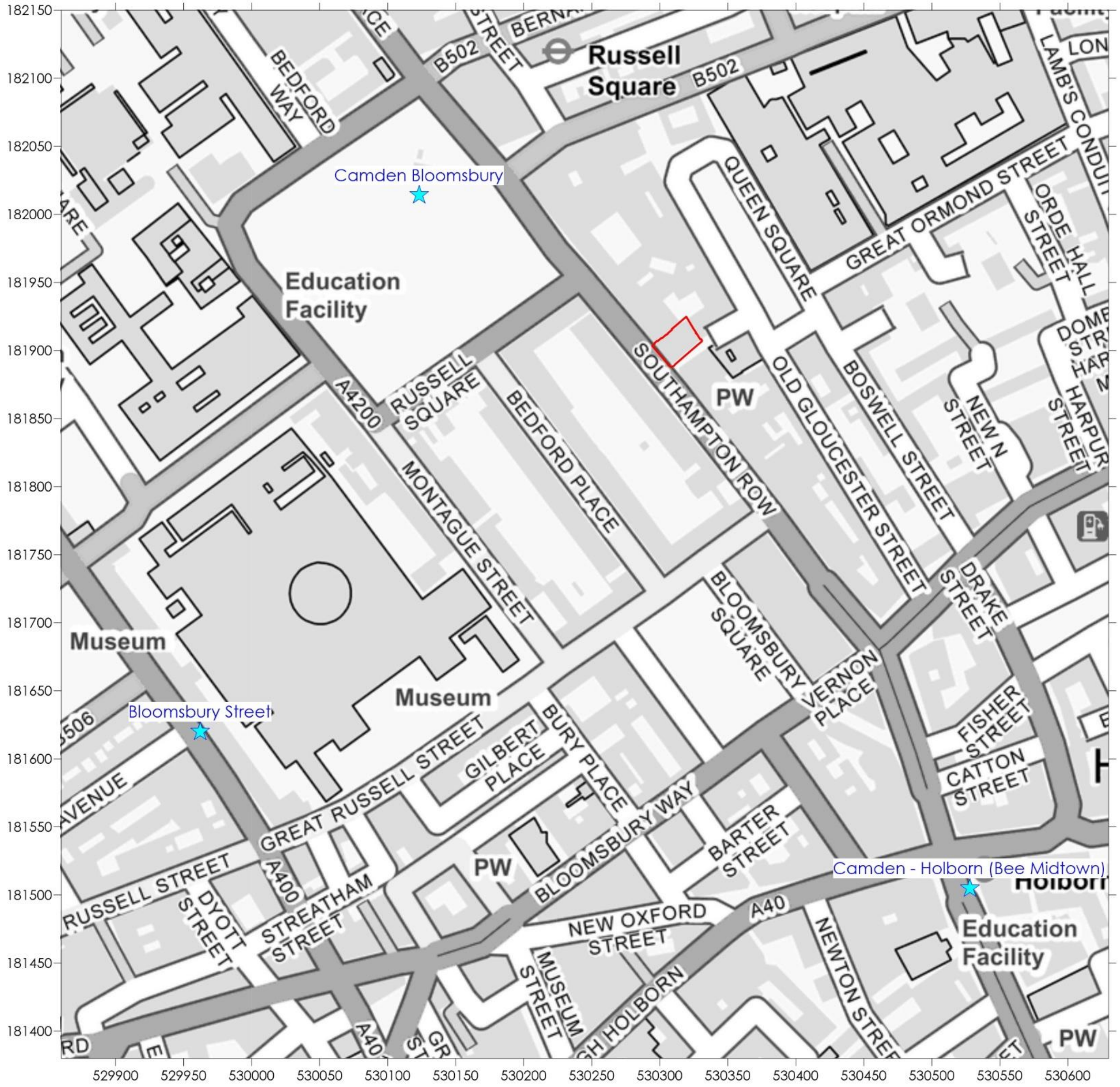

Legend

Site Boundary

Monitor

Title

Figure 3 - Monitoring Locations

Project

Air Quality Assessment
Southampton Row, London

Project Reference

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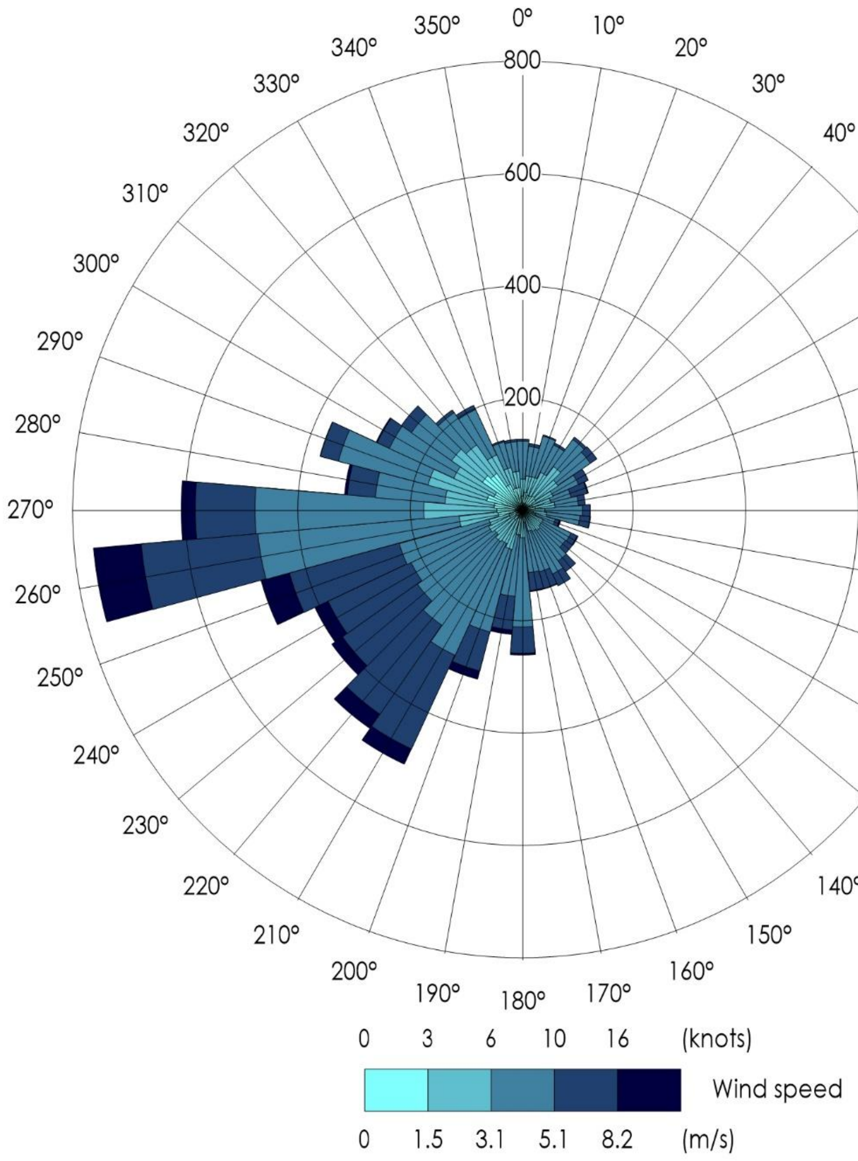

Legend

Title

Figure 4 - Wind Rose of 2017 Heathrow Airport Meteorological Data

Project

Air Quality Assessment
Southampton Row, London

Project Reference

2286

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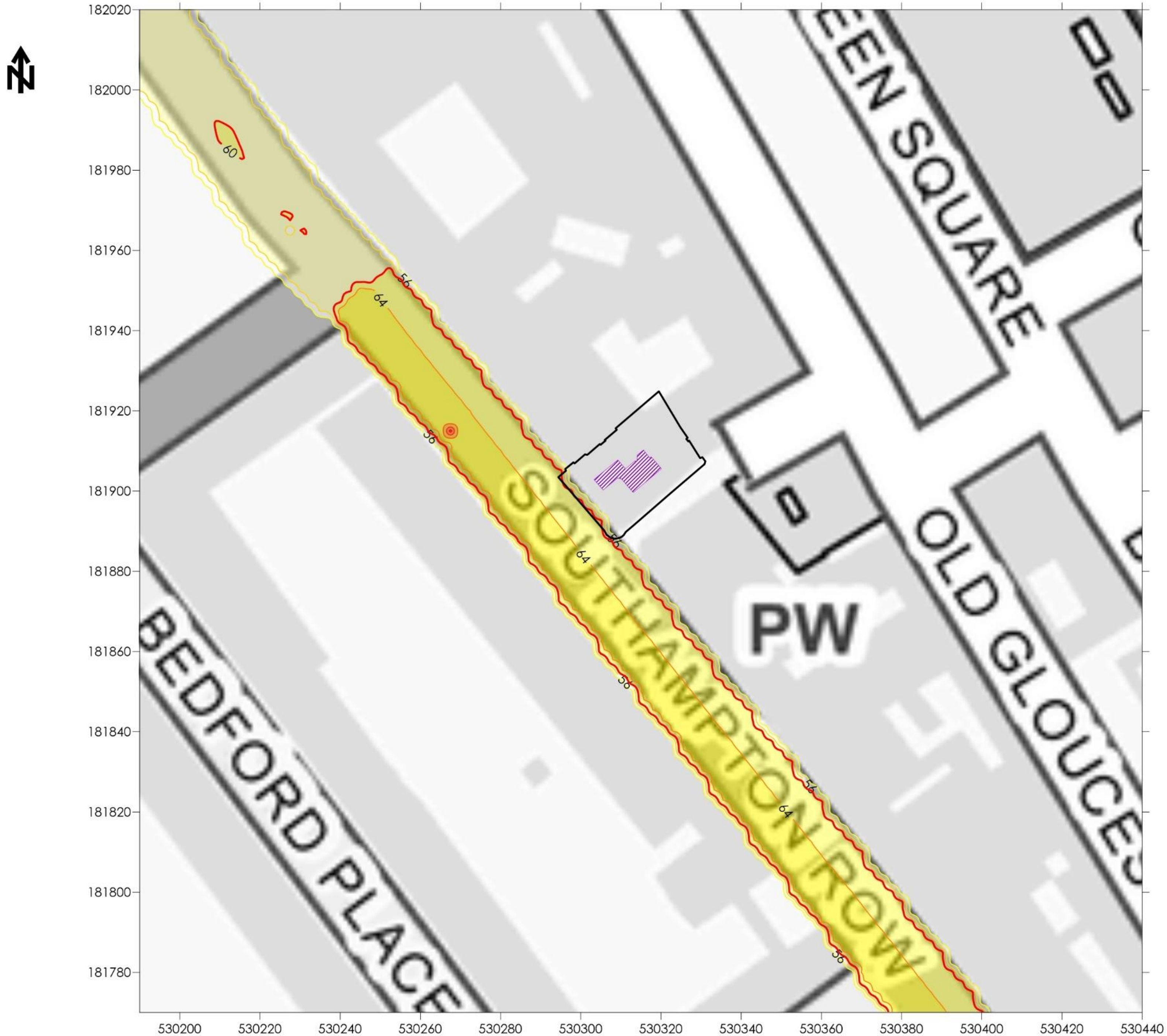

Legend

Site Boundary

Proposed Hotel Room

Annual Mean NO_2 Concentrations ($\mu g/m^3$)

52, 56, 60, 64, 68, 72, 76

Title

Figure 5 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$) First Floor

Project

Air Quality Assessment Southampton Row, London

Project Reference

2286

Client

Mercure Hotel Bloomsbury

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Legend

Site Boundary

Proposed Hotel Room

Predicted Number of Days with PM_{10} Concentrations Greater than 50µg/m³ (Days)

14, 13, 12, 11, 10, 9, 8, 7, 6, 5

Title

Figure 6 - Predicted Number of Days with PM_{10} Concentrations Greater than 50µg/m³ (Days)
First Floor

Project

Air Quality Assessment
Southampton Row, London

Project Reference

2286

Client

Mercure Hotel Bloomsbury

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Legend

Site Boundary

Output Grid

Road Link

Title

Figure 7 - ADMS-Roads Inputs

Project

Air Quality Assessment
Southampton Row, London

Project Reference

2286

Client

Mercure Hotel Bloomsbury

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Appendix 1 - Assessment Input Data

Introduction

The proposal has the potential to expose future occupants to elevated pollution levels. In order to assess NO_2 and PM_{10} concentrations across the development site, dispersion modelling was undertaken in accordance with the following methodology. Modelling was undertaken for 2017 to allow verification against recent monitoring results and 2020 to represent likely conditions in the opening year of the scheme.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

Additional options can also be selected within the ADMS-Roads interface to take account of site specific characteristics that may affect model output, such as canyons.

These are detailed in the following Sections.

Assessment Area

The assessment area was defined based on the development location and roads likely to impact pollutant levels across the site. Ambient concentrations were predicted over NGR: 530190, 181770 to 530440, 182020. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

It should be noted that although the grid only covered the proposed development site, source geometries were extended in order to ensure the impact of all relevant emissions in the vicinity of the scheme were considered.

Reference should be made to Figure 7 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour AADT flows and fleet composition, was obtained from the London Atmospheric Emissions Inventory (LAEI). The LAEI was produced by the GLA and provides traffic flows throughout London for a number of scenarios. It should be noted that the LAEI is referenced in GLA guidance[32] as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

The baseline traffic data was converted to the site opening year utilising factors obtained from TEMPro (version 7.2). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

Road widths were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table A1.1.

Table A1.1 Traffic Data

Link		24-hour AADT Flow		Road Width (m)	Average Vehicle Speed (km/h)
		2017	2020		
L1	Southampton Row north of Russel Square	13,488	14,051	13.3	30
L2	Southampton Row between Russel Square and approach to Vernon Place junction	13,488	14,051	10.9	30

32 London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

Link		24-hour AADT Flow		Road Width (m)	Average Vehicle Speed (km/h)
		2017	2020		
L3	Southampton Row approach to Vernon Place junction from north	13,488	14,051	18.9	20
L4	Southampton Row approach to Vernon Place junction from south	24,450	25,472	14.2	20
L5	Southampton Row approach to High Holborn junction from north	24,450	25,472	14.2	20
L6	Southampton Row approach to High Holborn junction from south	28,664	29,861	18.1	30
L7	High Holborn west of Southampton Row	19,160	19,960	8.4	30
L8	High Holborn between Southampton Row and Drake Street	16,871	17,575	12.9	30
L9	High Holborn east of Drake Street	16,871	17,575	12.5	30

Fleet composition data as a proportion of total flows on each link for cars, taxis, Light Goods Vehicles (LGV), Heavy Goods Vehicles (HGV), buses and coaches and motorcycles are summarised in Table A1.2.

Table A1.2 Fleet Composition Data

Link	Proportion of Fleet (%)						
	Car	Taxi	LGV	Rigid HGV	Artic HGV	Bus and Coach	Motor cycle
L1	50.4	11.1	12.8	6.0	0.2	13.3	6.2
L2	50.4	11.1	12.8	6.0	0.2	13.3	6.2
L3	50.4	11.1	12.8	6.0	0.2	13.3	6.2
L4	42.7	17.5	12.6	4.5	0.3	12.1	10.2
L5	42.7	17.5	12.6	4.5	0.3	12.1	10.2
L6	42.9	17.7	16.9	3.2	0.0	12.1	7.3
L7	46.4	19.0	13.1	1.9	0.1	6.0	13.5
L8	20.1	47.4	12.3	3.9	0.1	7.5	8.7
L9	20.1	47.4	12.3	3.9	0.1	7.5	8.7

Reference should be made to Figure 7 for a graphical representation of the road link locations.

Advanced Street Canyons

Where buildings or walls surround roads, pollutant dispersion patterns are altered which can lead to high pollutant concentrations. These street canyons can significantly influence air quality along a road and therefore it is important to take consideration of their effects when undertaking dispersion modelling.

The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which have been retained in version 4.1.1.0. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

Canyons have five principle effects on dispersion which can influence pollutant concentrations. These are:

- Pollutants are channelled along street canyons;
- Pollutants are dispersed across street canyons by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon through gaps between buildings - as if there was no canyon; and,
- Pollutants leave the canyon from the canyon top.

The combined modelling of these effects will result in concentration patterns unique to each canyon. The parameters used in the assessment are outlined in Table A1.3. It should be noted that where buildings are only present at one side of the road, parameters were purposely included at 0m.

Table A1.3 Canyon Parameters - Verification

Link	Parameter (m)							
	Canyon Width to Left	Average Height of Buildings to Left	Canyon Length Left	Building Length Left	Canyon Width Right	Average Height of Buildings to Right	Canyon Length Right	Building Length Right
L1	10.9	18.5	145.0	120.1	0.0	0.0	0.0	0.0
L2	10.5	21.0	292.0	284.3	9.9	14.0	292.0	275.4
L3	12.7	18.0	53.8	34.0	13.9	17.0	53.8	53.8
L4	17.6	16.0	127.0	106.3	14.7	16.0	127.0	112.6
L5	12.6	16.0	31.7	31.7	12.4	16.0	31.7	31.7
L6	15.9	16.0	163.9	144.4	15.9	17.0	163.9	149.3
L7	9.0	21.5	315.5	247.8	6.5	15.0	315.5	303.7
L8	11.0	13.0	92.1	92.1	10.9	19.5	92.1	92.1
L9	13.5	18.0	71.1	71.1	15.8	18.0	71.1	71.1

A choice of two modes is provided for use in the advanced canyon module. Standard mode assumes that each road is part of a continuous network of roads with similar canyon properties. Network mode analyses the road network to determine transport of pollutants between adjoining street canyons, allows for varying concentrations along the canyon and accounts for transport of pollutants out of the end of a canyon. Network mode is considered best for detailed local analysis and as such was the mode selected for use in the model.

<u>Emission Factors</u>

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 8.0.1). This has been produced by DEFRA and incorporates COPERT 5 vehicle emission factors and fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2017 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2017 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Heathrow Airport meteorological station over the period 1st January 2017 to 31st December 2017 (inclusive). Heathrow Airport meteorological station is located at NGR: 506947, 176515, which is approximately 23.9km south-west of the development site. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 4 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1.5m was used to describe the modelling extents. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'large urban areas'.

A z_0 of 0.3m was used to describe the meteorological site. This value of z_0 is considered appropriate for the morphology of the area due to the large expanse of flat land use, such as surrounding grassland, and is suggested within ADMS-Roads as being suitable for 'agricultural areas (max)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 100m was used to describe the modelling extents and meteorological sites. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'large conurbations >1 million'.

Background Concentrations

Annual mean NO_2 and PM_{10} background concentrations for use in the assessment were obtained from DEFRA mapping study for the grid square containing the development site, as shown in Table 15.

Similarly to emission factors, background concentrations from 2017 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 6.1) provided by DEFRA, which is the method detailed within GLA guidance[33].

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of the assessment, model verification was undertaken for 2017 using traffic data, meteorological data and monitoring results from this year.

33 London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

LBoC undertook monitoring of NO_2 concentrations at one location within the vicinity of roads included within the dispersion model during 2017. The result was obtained and the road contribution to total NO_x concentration calculated following the methodology contained within GLA guidance[34]. The monitored annual mean NO_2 concentration and calculated road NO_x concentration is summarised in Table A1.4.

Table A1.4 NO_x Verification - Monitoring Result

Monitoring Location	Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
Camden - Holborn (Bee Midtown)	74	73.47

The annual mean road NO_x concentration predicted from the dispersion model and the 2017 road NO_x concentration calculated from the monitoring result is summarised in Table A1.5.

Table A1.5 NO_x Verification - Modelling Result

Monitoring Location	Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
Camden - Holborn (Bee Midtown)	73.47	72.44

The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 1.0142 was required to be applied to all modelling results.

Monitoring of PM_{10} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM_{10} model predictions in lieu of more accurate data in accordance with the GLA guidance[35].

34 London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

35 London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

Appendix 2 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development site for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.

EMILY PEARS-RYDING

Air Quality Consultant

BSc (Hons), GradIEMA

Tel: 0161 706 0075 | Email: emily.pears-ryding@red-env.co.uk

KEY EXPERIENCE:

Emily is an Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Assessment of construction dust impacts from a range of development sizes.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Station Road, West Drayton

Air Quality Assessment for a change of use from office units to a hotel in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions and an adjacent petrol station. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{10} and NO_2 concentrations across the site. Results revealed that pollution levels were below the air quality standards across the development. A qualitative assessment of benzene emissions took place to assess the potential effects of the petrol station. A screening process indicated that due to the change of use of the existing building into a hotel, future occupants would not be exposed for periods long enough to affect human health.

Holloway Lane, Harmondsworth

Air Quality Assessment in support of a mineral extraction site located within an AQMA. The proposals involved a processing and concrete plant which had the potential to cause air quality impacts as a result of fugitive dust emissions. An assessment was undertaken and revealed that the use of good practice control measures would provide suitable mitigation for the development.

Dulcote Quarry, Wells

Air Quality Assessment for the redevelopment of Dulcote Quarry to provide a Food Manufacturing Campus. An assessment of road traffic emissions, fugitive dust emissions and odour was undertaken. Impacts of road traffic emissions and fugitive dust on sensitive receptors were negligible at all locations. The risk of potential odour effects was also determined to be negligible.

Queens Road, London

Air Quality and Odour Assessments in support of residential development in an AQMA. Dispersion modelling took place at several different heights reflective of residential units within the development. Predicted concentrations of NO_2 were found to exceed air quality criteria from ground to second floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Anerley Road, Penge

Air Quality Assessment for a residential scheme located in an AQMA. Due to the location of the site at the foot of a hill, detailed calculations took place to take account of the gradient which would increase the amount of emissions produced by road traffic. Results revealed that NO_2 concentrations exceeded air quality criteria across part of the development fronting Anerley Road. Mechanical ventilation was specified in the appropriate units within the development as a form of mitigation.

The Crescent, Salford

Air Quality Assessment for the redevelopment of the former Salford Police Headquarters to residential properties. Using sensitive receptors, located in areas where increased road traffic may affect NO_2 concentrations, a comparison was made between overall concentrations with and without the development in place. Results revealed pollutant concentrations were below the relevant standards across the site and impacts associated with the development were not significant.