

Air Quality Assessment
Bakers Road, Uxbridge

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Executive Summary

Redmore Environmental Ltd was commissioned by HSBC Bank Pension Trust (UK) Ltd to undertake an Air Quality Assessment in support of a planning application for a hotel development on land off Bakers Road, Uxbridge.

The proposals have the potential to cause air quality 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 elevated pollution levels. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider its suitability for the proposed end-use 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 demolition, earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential operational phase air quality impacts from vehicle exhaust emissions were assessed by predicting air quality conditions at sensitive locations both with and without the development in place. Results were subsequently verified using local monitoring data. Further to this, dispersion modelling was undertaken in order to predict pollutant concentrations across the proposed site as a result of emissions from the highway network.

Review of the dispersion modelling results indicated that predicted air quality impacts as a result of traffic generated by the development were not significant at any sensitive location in the vicinity of the site.

The results of the assessment also demonstrated that predicted pollution levels were below the relevant air quality standards across the development. The site is therefore considered suitable for the proposed use from an air quality perspective.

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 HSBC Bank Pension Trust (UK) Ltd to undertake an Air Quality Assessment in support of a planning application for a hotel development on land off Bakers Road, Uxbridge.
- 1.1.2 The proposed development has the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future occupants to elevated pollution levels. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential effects associated with the scheme.

1.2 Site Location and Context

- 1.2.1 The proposed development is located on land off Bakers Road, Uxbridge, at approximate National Grid Reference (NGR): 505554, 184216. Reference should be made to Figure 1 for a map of the site and surrounding area.
- 1.2.2 The proposals comprise demolition of the existing building and subsequent erection of an 8-storey hotel and associated infrastructure.
- 1.2.3 The development has the potential to cause impacts at sensitive locations during the construction and operational phases. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. Further to this, there are concerns that the proposals may introduce future users to exceedences of the relevant Air Quality Objectives (AQOs). An Air Quality Assessment was therefore undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and consider potential effects as a result of the proposals. This is detailed in the following report.

1.3 Energy Emissions

- 1.3.1 The development may include gas boilers and/or a gas fired Combined Heat and Power (CHP) unit to provide heat and hot water to the site. At the time of assessment full details of the energy strategy were not available as they will be confirmed during the detailed design phase. As such, potential air quality impacts associated with emissions of combustion products could not be assessed within this report. To provide assurance to London Borough of Hillingdon (LBoH) that effects will not be significant, it is suggested that a suitably worded condition be attached to the planning consent for the site. This would ensure that the scheme could not proceed without appropriate assessment of potential air quality impacts associated with the energy strategy.
- 1.3.2 It is considered that the production of a suitable planning condition should ensure that air quality impacts associated with the energy strategy are not significant and allow the project to proceed to the detailed design stage.

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 nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- 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 2007¹. 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/m ³)	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) guidance² 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 sites (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 sites (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 sites (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 sites 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 Air Quality Management Area (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 revised National Planning Policy Framework³ (NPPF) was published in July 2018 and sets out the Government's planning policies for England and how these are expected to be applied.

2.5.2 A core principle relating to air quality effects from development is that planning should:

"contribute to conserving and enhancing the natural environment and reduce pollution"

2.5.3 In achieving this, it states that:

"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 [...]"

2.5.4 With regard to assessing cumulative effects the NPPF states:

³ NPPF, Ministry of Housing, Communities and Local Government, 2018.

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development"

2.5.5 The NPPF recognises air quality as part of delivering sustainable development and states that:

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

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

2.6 National Planning Practice Guidance

2.6.1 The National Planning Practice Guidance⁴ (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?

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

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 2016⁵ 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:

"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

⁵ The London Plan March 2016, GLA, 2016.

- 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 [...]"

2.7.3 The requirements of these policies have been considered throughout this Air Quality Assessment.

Local Plan

2.7.4 The LBoH Local Plan⁶ comprises a spatial vision, strategic objectives, a spatial strategy, core policies and a monitoring and implementations framework with clear objectives for achieving delivery. It was adopted in November 2012 and sets out the overall level and broad locations of growth up to 2026.

2.7.5 A review of the Local Plan⁷ indicated the following policies in relation to air quality that are relevant to this assessment:

⁶ LBoH Local Plan: Part 1 Strategic Policies, LBoH, 2012.

⁷ LBoH Local Plan: Part 1 Strategic Policies, LBoH, 2012.

"BE1 - Built Environment

All new developments should:

[...]

10. Maximise the opportunities for all new homes to contribute to tackling and adapting to climate change and reducing emissions of local air quality pollutants."

"EM8: Land, Water, Air and Noise

[...]

All developments should not cause deterioration in the local air quality levels and should ensure the protection of both existing and new sensitive receptors.

All major development within the AQMA should demonstrate air quality neutrality (no worsening impacts) where appropriate; actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels; deliver increased planting through soft landscaping and living walls and roofs; and provide a management plan for ensuring air quality impacts can be kept to a minimum.

The council seeks to reduce the levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy.

London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Actions plans, in particular where AQMAs have been designated.

The Council has a network of Air Quality Monitoring stations but recognises that this can be widened to improve understanding of air quality impacts. The Council may therefore require new major development in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements."

2.7.6 These policies have been considered throughout this report by assessing potential air quality impacts as a result of the proposed development.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future occupants to elevated pollution levels. These issues have been assessed in accordance with the following methodology which was agreed with Val Beale, Air Quality Officer at LBoH, on 8th May 2018.

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'⁸.

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

- Demolition;
- Earthworks;
- Construction; and,
- Trackout.

3.2.3 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 PM₁₀.

3.2.4 The assessment steps are detailed below.

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

Step 1

- 3.2.5 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.
- 3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

- 3.2.7 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).
- 3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.
- 3.2.9 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	Demolition	• Total building volume greater than 50,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level

Magnitude	Activity	Criteria
	Earthworks	- Total site area greater than 10,000m² - Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) - More than 10 heavy earth moving vehicles active at any one time - Formation of bunds greater than 8m in height - More than 100,000 tonnes of material moved
	Construction	- Total building volume greater than 100,000m³ - 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
Medium	Demolition	- Total building volume 20,000m³ to 50,000m³ - Potentially dusty construction material - Demolition activities 10m to 20m above ground level
	Earthworks	- Total site area 2,500m² to 10,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 4m to 8m in height - Total material moved 20,000 tonnes to 100,000 tonnes
	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	Demolition	- Total building volume under 20,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber) - Demolition activities less than 10m above ground level

Magnitude	Activity	Criteria
	Earthworks	- Total site area less than 2,500m² - Soil type with large grain size (e.g. sand) - Less than 5 heavy earth moving vehicles active at any one time - Formation of bunds less than 4m in height - Total material moved less than 20,000 tonnes - Earthworks during wetter months
	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

3.2.10 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 PM₁₀. 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. Sites 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

3.2.11 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.

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

3.2.13 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

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

3.2.14 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/m ³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m ³	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/m ³	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

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
	-	1- 10	Medium	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.15 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

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

3.2.17 Table 8 outlines the risk category from demolition activities.

Table 8 Construction Dust - Dust Risk Category from Demolition

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

3.2.18 Table 9 outlines the risk category from earthworks and construction activities.

Table 9 Construction Dust - Dust Risk Category from Earthworks and 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 10 outlines the risk category from trackout activities.

Table 10 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 guidance⁹ 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

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

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 guidance¹⁰ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

3.3.1 The development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future occupants to poor air quality. Potential impacts have been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2015 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2020 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2020 should the proposals be completed).

3.3.2 Reference should be made to Appendix 1 for assessment input data and details of the verification process.

Potential Development Impacts

3.3.3 Locations sensitive to potential changes in pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)¹¹ on the likely limits of pollutant dispersion from road sources. The criteria provided within GLA guidance¹² on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in

¹⁰ The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

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

¹² London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

- 3.3.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹³. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 11.

Table 11 Significance of Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

- 3.3.5 The matrix shown in Table 11 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

- 3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹⁴ provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and,

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

¹⁴ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

3.3.8 It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM guidance¹⁵ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

Future Exposure

3.3.9 The proposed development has the potential to expose future occupants to poor air quality. Pollutant concentrations were therefore quantified across the site using dispersion modelling. The results were subsequently compared with the relevant AQOs to determine the potential for any exceedence. Reference should be made to Appendix 1 for details of the relevant modelling inputs.

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

4.0 BASELINE

4.1 Introduction

- 4.1.1 Existing air quality conditions in the vicinity of the proposed development site 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), LBoH has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the relevant AQO within the borough. As such, one AQMA has been declared which is described as:

"The area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line."

- 4.2.2 The development is located within the AQMA. As such, there is the potential for exposure of future occupants to elevated pollution levels and any emissions associated with the proposals to cause air quality effects within this sensitive area. This has been considered throughout the assessment.
- 4.2.3 LBoH has concluded that concentrations of all other pollutant 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 LBoH throughout their area of jurisdiction. Recent results recorded in the vicinity of the development are shown in Table 12. Exceedences of the AQO are shown in **bold**.

Table 12 Monitoring Results - NO₂

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)		
		2014	2015	2016
HD43	Uxbridge Day Nursery Park Road Uxbridge (on wire Fence)	47.6	46.3	42.8
HD52	Lamp post near 101 Cowley Mill Road Uxbridge	38.5	37.6	32.3
HD53	Warren Road Ickenham Uxbridge (1st lamp post on left)	40.7	46.8	42.3
HD211	198 Harefield Road, Uxbridge Lamp Post (2)	35.9	38.8	34.0
HD212	59 Hillingdon Road, Uxbridge Lamp Post (56)	42.3	45.4	38.5

4.3.2 As shown in Table 12, annual mean NO₂ concentrations were above the AQO at the HD43, HD53 and HD212 monitors in recent years. As these diffusion tubes are located adjacent to roads within an AQMA, elevated concentrations would be expected.

4.3.3 LBoH do not undertake PM₁₀ monitoring within the vicinity of the site.

4.3.4 Reference should be made to Figure 2 for a map of the survey locations.

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: 505500, 184500. Data for this location was downloaded from the DEFRA website¹⁶ for the purpose of the assessment and is summarised in Table 13.

Table 13 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2015	2018	2020
NO ₂	26.00	23.42	21.39
PM ₁₀	15.65	15.10	14.74

¹⁶ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>.

- 4.4.2 As shown in Table 13, predicted background NO₂ and PM₁₀ concentrations are below the relevant AQOs at the development site.

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. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase Sensitive Receptors

- 4.5.2 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 14.

Table 14 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	1 - 10	0
Up to 50	10 - 100	0
Up to 100	10 - 100	-
Up to 350	10 - 100	-

- 4.5.3 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. These are summarised in Table 15. For the purpose of the assessment it was assumed construction phase traffic would access the site from Bakers Road.

Table 15 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

4.5.4 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.

4.5.5 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 16.

Table 16 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	A number of developments in the vicinity of the site have been granted planning consent in recent years. As such, it is likely that there has been a history of dust generation in the area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	There is no significant screening around the site boundary
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 3, the predominant wind bearing at the site is from the south-west. As such, receptors to the north-east of the site are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
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 likely 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

4.5.6 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 users would expect to enjoy a reasonable level of amenity, aesthetics or value of their property could be diminished by soiling and people would be expected to be present for extended periods of time e.g. residential properties.

4.5.7 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 17.

Table 17 Sensitivity of the Surrounding Area

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

Operational Phase Sensitive Receptors

4.5.8 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 18. Receptor heights were selected to take account of less sensitive land uses, such as ground floor retail units.

Table 18 Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - First Floor Belmont Road	505511.9	184267.2	4.5
R2	Residential - Flats Belmont Road	505447.4	184236.9	12.0
R3	Residential - Belmont Road	505419.5	184338.0	4.5
R4	Residential - Belmont Road	505377.5	184389.1	1.5
R5	Residential - Uxbridge Road	505342.4	184333.5	1.5
R6	Residential - Oxford Road	505322.5	184019.8	1.5
R7	Residential - Oxford Road	505263.6	184178.1	1.5
R8	Fountain Mills Young Peoples Centre	505278.6	184469.2	1.5
R9	Residential - First Floor Windsor Street	505449.3	183985.2	4.5
R10	Residential - Roundabout	505489.7	183918.4	1.5
R11	Coat of Many Colours Nursery	505336.9	183943.2	1.5
R12	Residential - Rockingham Road	505303.6	183975.3	1.5
R13	Residential - Rockingham Road	505221.8	183946.1	1.5
R14	School - Rockingham Road	505062.9	183896.7	1.5
R15	Residential - Cowley Road	505373.2	183807.8	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R16	Residential - Cowley Road	505408.2	183716.8	1.5
R17	School - Cowley Road	505399.6	183547.5	1.5
R18	School - Hillingdon Road	505874.1	183751.9	1.5
R19	Residential - Hillingdon Road South	505997.8	183743.0	1.5
R20	Residential - Hillingdon Road South	505970.3	183371.3	1.5
R21	Residential - Hillingdon Road South	506081.9	183521.9	1.5
R22	Residential - Park Road	505965.6	183954.9	1.5
R23	Residential - Park Road	505986.2	184102.2	1.5
R24	Residential - Park Road	506038.8	184205.2	1.5
R25	Residential - Honeycroft Hill	506129.9	184275.7	1.5
R26	Residential - Park Road	506144.2	184568.7	1.5
R27	Residential - Belmont Road	506051.2	184589.0	1.5
R28	Residential - Belmont Road	505937.1	184560.1	1.5
R29	Residential - Belmont Road	505908.9	184515.6	1.5
R30	School - Belmont Road	505850.8	184144.6	1.5
R31	Residential - Chippendale Waye	505959.7	184019.6	1.5
R32	Residential - Belmont Road	505695.6	184404.5	1.5
R33	Residential - Belmont Road	505797.8	184478.9	1.5
R34	Residential - Bakers Road	505580.1	184232.3	4.5

4.5.9 Reference should be made to Figure 4 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

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 proposed development. These are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

- 5.2.1 The undertaking of activities such as demolition, excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and 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

Demolition

- 5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of existing buildings on site.
- 5.2.5 It is estimated that the total building volume to be demolished is less than 20,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **small**.

5.2.6 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for dust soiling as a result of demolition activities.

5.2.7 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for human health impacts as a result of demolition activities.

Earthworks

5.2.8 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site is estimated to cover an area of less than 2,500m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.2.9 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of earthworks activities.

5.2.10 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of earthworks activities.

Construction

5.2.11 Due to the size of the development the total building volume is likely to be less than 25,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **small**.

5.2.12 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.13 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.14 Based on the site area, it is anticipated that the unpaved road length is likely to be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.15 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for dust soiling as a result of trackout activities.

5.2.16 Table 17 indicates the sensitivity of the area to human health impacts is **medium**. In accordance within the criteria outlined in Table 10, the development 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

5.2.17 A summary of the risk from each dust generating activity is provided in Table 19.

Table 19 Summary of Potential Unmitigated Dust Risks

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

5.2.18 As indicated in Table 19, the potential risk of dust soiling is **low** from demolition, earthworks, construction and trackout. The potential risk of human health effects is **negligible** from demolition, construction, earthworks and trackout.

5.2.19 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

5.2.20 The Mayor of London's guidance¹⁷ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 20. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

Table 20 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Site management	• Develop a Dust Management Plan (DMP) which may be incorporated into an overarching Construction Environmental Management Plan • Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary • Display the head or regional office contact information • Record and respond to all dust and air quality pollutant emissions complaints • Make a complaints log available to the local authority when asked • Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked • Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions • Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors • Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials from site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping

¹⁷ The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Issue	Control Measure
Operating vehicle/machinery and sustainable travel	• Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone • Ensure all non-road mobile machinery (NRMM) comply with the relevant standards • 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 • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
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/particulate matter mitigation • Use enclosed chutes and conveyors and covered skips • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
Waste management	• Reuse and recycle waste to reduce dust from waste materials • Avoid bonfires and burning of waste materials
Demolition	• Ensure effective water suppression is used during demolition operations • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	• Regularly use a water-assisted dust sweeper on access and local roads, as necessary, to remove any material tracked out of the site • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials

Step 4

5.2.21 Assuming the relevant mitigation measures outlined in Table 20 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the Mayor of London's Guidance¹⁸.

5.3 Operational Phase Assessment

5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site, as well as consider potential exposure of future occupants to AQO exceedences.

5.3.2 The assessment considered the following scenarios:

- 2015 - Verification;
- 2020 - DM; and,
- 2020 - DS.

5.3.3 The DM scenario (i.e. without development) included anticipated baseline traffic data, inclusive of anticipated growth, for the relevant assessment year. The DS scenario (i.e. with development) included anticipated baseline traffic data, inclusive of anticipated growth for the relevant assessment year, in addition to predicted traffic associated with the operation of the proposals.

5.3.4 For the purpose of the assessment traffic data for 2020 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors and background concentrations for 2016 were utilised within the dispersion model. The use of 2020 traffic data and 2015 emission factors and background concentrations is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution levels.

¹⁸ The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

5.3.5 Reference should be made to Appendix 1 for full assessment input details.

Potential Development Impacts

Predicted Concentrations

5.3.6 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21.

Table 21 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - First Floor Belmont Road	42.54	42.68	0.14
R2	Residential - Flats Belmont Road	29.52	29.54	0.02
R3	Residential - Belmont Road	41.29	41.43	0.14
R4	Residential - Belmont Road	51.20	51.40	0.20
R5	Residential - Uxbridge Road	37.49	37.55	0.06
R6	Residential - Oxford Road	36.06	36.08	0.02
R7	Residential - Oxford Road	34.21	34.23	0.02
R8	Fountain Mills Young Peoples Centre	35.60	35.62	0.02
R9	Residential - First Floor Windsor Street	35.85	35.88	0.03
R10	Residential - Roundabout	39.35	39.38	0.03
R11	Coat of Many Colours Nursery	38.03	38.07	0.04
R12	Residential - Rockingham Road	36.84	36.86	0.02
R13	Residential - Rockingham Road	33.22	33.23	0.01
R14	School - Rockingham Road	30.24	30.24	0.00
R15	Residential - Cowley Road	31.42	31.43	0.01
R16	Residential - Cowley Road	35.04	35.05	0.01
R17	School - Cowley Road	32.27	32.28	0.01
R18	School - Hillingdon Road	31.62	31.62	0.00

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R19	Residential - Hillingdon Road South	35.85	35.87	0.02
R20	Residential - Hillingdon Road South	30.48	30.49	0.01
R21	Residential - Hillingdon Road South	32.30	32.31	0.01
R22	Residential - Park Road	30.63	30.65	0.02
R23	Residential - Park Road	30.30	30.32	0.02
R24	Residential - Park Road	30.51	30.52	0.01
R25	Residential - Honeycroft Hill	30.48	30.48	0.00
R26	Residential - Park Road	30.89	30.90	0.01
R27	Residential - Belmont Road	30.98	31.01	0.03
R28	Residential - Belmont Road	30.07	30.10	0.03
R29	Residential - Belmont Road	30.20	30.23	0.03
R30	School - Belmont Road	31.14	31.19	0.05
R31	Residential - Chippendale Waye	32.35	32.40	0.05
R32	Residential - Belmont Road	33.10	33.13	0.03
R33	Residential - Belmont Road	30.93	30.96	0.03
R34	Residential - Bakers Road	36.43	36.94	0.51

5.3.7 As indicated in Table 21, predicted annual mean NO₂ concentrations were above the relevant AQO at three locations and below at 31 receptor positions. It should be noted that there were no new exceedences in the DS scenario when compared with the DM.

5.3.8 Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.9 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - First Floor Belmont Road	17.61	17.63	0.02
R2	Residential - Flats Belmont Road	16.08	16.09	0.00
R3	Residential - Belmont Road	17.46	17.47	0.02
R4	Residential - Belmont Road	18.40	18.42	0.03
R5	Residential - Uxbridge Road	16.92	16.92	0.01
R6	Residential - Oxford Road	16.97	16.97	0.00
R7	Residential - Oxford Road	16.83	16.83	0.00
R8	Fountain Mills Young Peoples Centre	17.29	17.29	0.00
R9	Residential - First Floor Windsor Street	16.76	16.77	0.00
R10	Residential - Roundabout	17.78	17.78	0.00
R11	Coat of Many Colours Nursery	17.01	17.01	0.00
R12	Residential - Rockingham Road	17.12	17.13	0.00
R13	Residential - Rockingham Road	16.69	16.69	0.00
R14	School - Rockingham Road	16.26	16.26	0.00
R15	Residential - Cowley Road	16.45	16.45	0.00
R16	Residential - Cowley Road	17.11	17.11	0.00
R17	School - Cowley Road	16.65	16.65	0.00
R18	School - Hillingdon Road	16.74	16.74	0.00
R19	Residential - Hillingdon Road South	17.57	17.57	0.00
R20	Residential - Hillingdon Road South	16.50	16.50	0.00
R21	Residential - Hillingdon Road South	16.86	16.87	0.00
R22	Residential - Park Road	16.32	16.33	0.00
R23	Residential - Park Road	16.24	16.24	0.00
R24	Residential - Park Road	16.33	16.34	0.00
R25	Residential - Honeycroft Hill	16.32	16.32	0.00

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R26	Residential - Park Road	16.40	16.41	0.00
R27	Residential - Belmont Road	16.39	16.40	0.00
R28	Residential - Belmont Road	16.25	16.25	0.00
R29	Residential - Belmont Road	16.26	16.26	0.00
R30	School - Belmont Road	16.35	16.36	0.01
R31	Residential - Chippendale Waye	16.36	16.37	0.00
R32	Residential - Belmont Road	16.43	16.44	0.00
R33	Residential - Belmont Road	16.35	16.35	0.00
R34	Residential - Bakers Road	16.78	16.84	0.06

5.3.10 As indicated in Table 22, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

5.3.11 Reference should be made to Figures 7 and 8 for graphical representations of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

5.3.12 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - First Floor Belmont Road	103 - 109% of AQO	0	Negligible
R2	Residential - Flats Belmont Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R3	Residential - Belmont Road	103 - 109% of AQO	0	Negligible
R4	Residential - Belmont Road	110% or more of AQO	0	Negligible
R5	Residential - Uxbridge Road	76 - 94% of AQO	0	Negligible
R6	Residential - Oxford Road	76 - 94% of AQO	0	Negligible
R7	Residential - Oxford Road	76 - 94% of AQO	0	Negligible
R8	Fountain Mills Young Peoples Centre	76 - 94% of AQO	0	Negligible
R9	Residential - First Floor Windsor Street	76 - 94% of AQO	0	Negligible
R10	Residential - Roundabout	95 - 102% of AQO	0	Negligible
R11	Coat of Many Colours Nursery	95 - 102% of AQO	0	Negligible
R12	Residential - Rockingham Road	76 - 94% of AQO	0	Negligible
R13	Residential - Rockingham Road	76 - 94% of AQO	0	Negligible
R14	School - Rockingham Road	76 - 94% of AQO	0	Negligible
R15	Residential - Cowley Road	76 - 94% of AQO	0	Negligible
R16	Residential - Cowley Road	76 - 94% of AQO	0	Negligible
R17	School - Cowley Road	76 - 94% of AQO	0	Negligible
R18	School - Hillingdon Road	76 - 94% of AQO	0	Negligible
R19	Residential - Hillingdon Road South	76 - 94% of AQO	0	Negligible
R20	Residential - Hillingdon Road South	76 - 94% of AQO	0	Negligible
R21	Residential - Hillingdon Road South	76 - 94% of AQO	0	Negligible
R22	Residential - Park Road	76 - 94% of AQO	0	Negligible
R23	Residential - Park Road	76 - 94% of AQO	0	Negligible
R24	Residential - Park Road	76 - 94% of AQO	0	Negligible
R25	Residential - Honeycroft Hill	76 - 94% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R26	Residential - Park Road	76 - 94% of AQO	0	Negligible
R27	Residential - Belmont Road	76 - 94% of AQO	0	Negligible
R28	Residential - Belmont Road	76 - 94% of AQO	0	Negligible
R29	Residential - Belmont Road	76 - 94% of AQO	0	Negligible
R30	School - Belmont Road	76 - 94% of AQO	0	Negligible
R31	Residential - Chippendale Way	76 - 94% of AQO	0	Negligible
R32	Residential - Belmont Road	76 - 94% of AQO	0	Negligible
R33	Residential - Belmont Road	76 - 94% of AQO	0	Negligible
R34	Residential - Bakers Road	76 - 94% of AQO	1	Negligible

5.3.13 As indicated in Table 23, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

5.3.14 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - First Floor Belmont Road	Below 75% of AQO	0	Negligible
R2	Residential - Flats Belmont Road	Below 75% of AQO	0	Negligible
R3	Residential - Belmont Road	Below 75% of AQO	0	Negligible
R4	Residential - Belmont Road	Below 75% of AQO	0	Negligible
R5	Residential - Uxbridge Road	Below 75% of AQO	0	Negligible
R6	Residential - Oxford Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R7	Residential - Oxford Road	Below 75% of AQO	0	Negligible
R8	Fountain Mills Young Peoples Centre	Below 75% of AQO	0	Negligible
R9	Residential - First Floor Windsor Street	Below 75% of AQO	0	Negligible
R10	Residential - Roundabout	Below 75% of AQO	0	Negligible
R11	Coat of Many Colours Nursery	Below 75% of AQO	0	Negligible
R12	Residential - Rockingham Road	Below 75% of AQO	0	Negligible
R13	Residential - Rockingham Road	Below 75% of AQO	0	Negligible
R14	School - Rockingham Road	Below 75% of AQO	0	Negligible
R15	Residential - Cowley Road	Below 75% of AQO	0	Negligible
R16	Residential - Cowley Road	Below 75% of AQO	0	Negligible
R17	School - Cowley Road	Below 75% of AQO	0	Negligible
R18	School - Hillingdon Road	Below 75% of AQO	0	Negligible
R19	Residential - Hillingdon Road South	Below 75% of AQO	0	Negligible
R20	Residential - Hillingdon Road South	Below 75% of AQO	0	Negligible
R21	Residential - Hillingdon Road South	Below 75% of AQO	0	Negligible
R22	Residential - Park Road	Below 75% of AQO	0	Negligible
R23	Residential - Park Road	Below 75% of AQO	0	Negligible
R24	Residential - Park Road	Below 75% of AQO	0	Negligible
R25	Residential - Honeycroft Hill	Below 75% of AQO	0	Negligible
R26	Residential - Park Road	Below 75% of AQO	0	Negligible
R27	Residential - Belmont Road	Below 75% of AQO	0	Negligible
R28	Residential - Belmont Road	Below 75% of AQO	0	Negligible
R29	Residential - Belmont Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R30	School - Belmont Road	Below 75% of AQO	0	Negligible
R31	Residential - Chippendale Waye	Below 75% of AQO	0	Negligible
R32	Residential - Belmont Road	Below 75% of AQO	0	Negligible
R33	Residential - Belmont Road	Below 75% of AQO	0	Negligible
R34	Residential - Bakers Road	Below 75% of AQO	0	Negligible

5.3.15 As indicated in Table 24, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

Potential Future Exposure

5.3.16 The proposed development 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. Reference should be made to Figures 6 and 9 for graphical representations of the results.

5.3.17 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 guidance¹⁹. However as shown in Table 2, hotels are considered locations of relevant exposure for short-term AQOs, including 1-hour mean NO₂ and 24-hour mean PM₁₀ concentrations. This has therefore been considered during the assessment of potential impacts at the site.

5.3.18 Dispersion models are inherently less accurate at calculating exceedences of short-term AQOs. As such, predictions of 1-hour NO₂ concentrations were not produced as part of the assessment. However, as stated in GLA guidance²⁰, if annual mean NO₂ concentrations are below 60µg/m³, then it is unlikely that the 1-hour AQO will be exceeded.

¹⁹ London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

²⁰ London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

- 5.3.19 As shown in Figure 6, annual mean NO₂ concentrations were predicted to be below 60µg/m³ at all locations across the ground floor. The maximum level at the site boundary was 38.72µg/m³. As such, compliance with the 1-hour mean AQO is considered likely at the development location.
- 5.3.20 As shown in Figure 9, the number of days with PM₁₀ concentrations above 50µg/m³ was predicted to be below the permitted number of 35 at all locations across the development at ground floor. The maximum number of days with PM₁₀ concentrations above 50µg/m³ at the site boundary was 1. As such, compliance with the 24-hour mean AQO is considered likely at the development location.
- 5.3.21 It should be noted that pollutant levels decrease with distance from pollutant sources. As pollutant concentrations were below the relevant AQOs at the development site at ground floor, further assessment above this level was not considered necessary.
- 5.3.22 Based on the assessment results, exposure of future site users to exceedences of the relevant AQOs for NO₂ and PM₁₀ is considered unlikely as a result of the proposed development.

Overall Impact Significance

- 5.3.23 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined in Section 3.3. Further justification is provided in Table 25.

Table 25 Overall Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted NO ₂ concentrations were above the annual mean AQO at three locations and below at 31 positions in the DM scenario. Predicted PM ₁₀ concentrations were below the relevant AQOs at all sensitive receptors. As the assessment takes account of anticipated future changes in traffic flows and emissions in the local area, results are considered to be a reasonably accurate representation of future conditions in the absence of the development

Guidance	Comment
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed that vehicle exhaust emission rates and background pollutant levels will not reduce in future years. This provides worst-case results when compared with GLA and Highways England methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.24 The IAQM guidance²¹ states that only if the impact is greater than **slight**, the effect is considered significant. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

²¹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.0 CONCLUSION

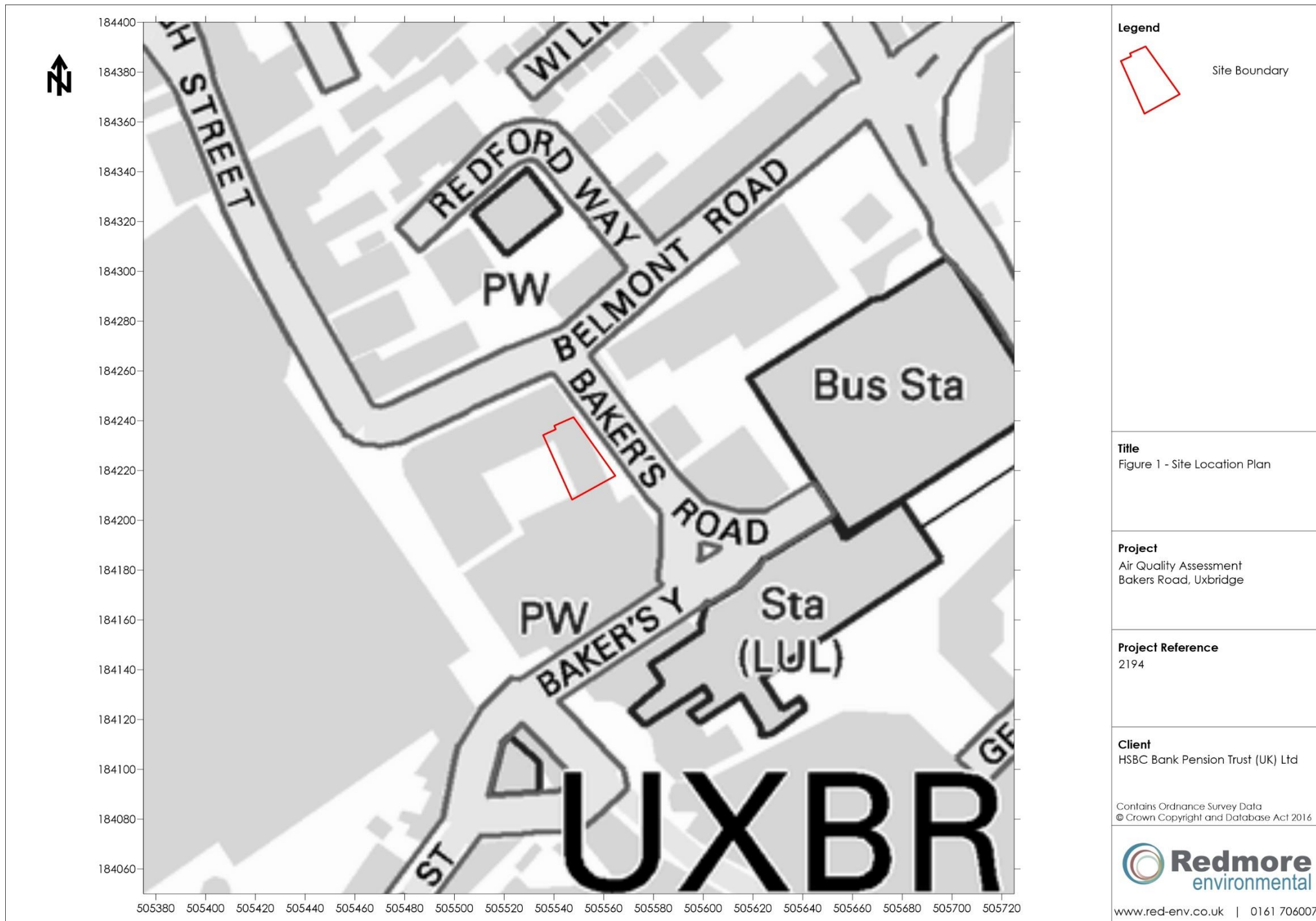
- 6.1.1 Redmore Environmental Ltd was commissioned by HSBC Bank Pension Trust (UK) Ltd to undertake an Air Quality Assessment in support of a planning application for a hotel development on land off Bakers Road, Uxbridge.
- 6.1.2 The proposals have the potential to cause air quality impacts as a result 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 development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. 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 demolition, earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 The proposed development has the potential to expose future users to elevated pollution levels and impact existing air quality in the vicinity of the site during operation. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict pollutant concentrations as a result of emissions from the local highway network. Results were subsequently verified using local monitoring data.
- 6.1.5 Impacts on NO₂ and PM₁₀ concentrations as a result of operational phase road vehicle exhaust emissions were predicted to be **negligible** at all sensitive receptor locations.
- 6.1.6 The results of the dispersion modelling assessment indicated that predicted 1-hour mean NO₂ concentrations, and 24-hour mean PM₁₀ concentrations were below the relevant AQOs at all locations across the development. As such, the location is considered suitable for the proposed use from an air quality perspective.
- 6.1.7 Following consideration of the relevant issues, air quality impacts as a result of the operation of the proposals were considered to be **not significant**, in accordance with the IAQM guidance.
-

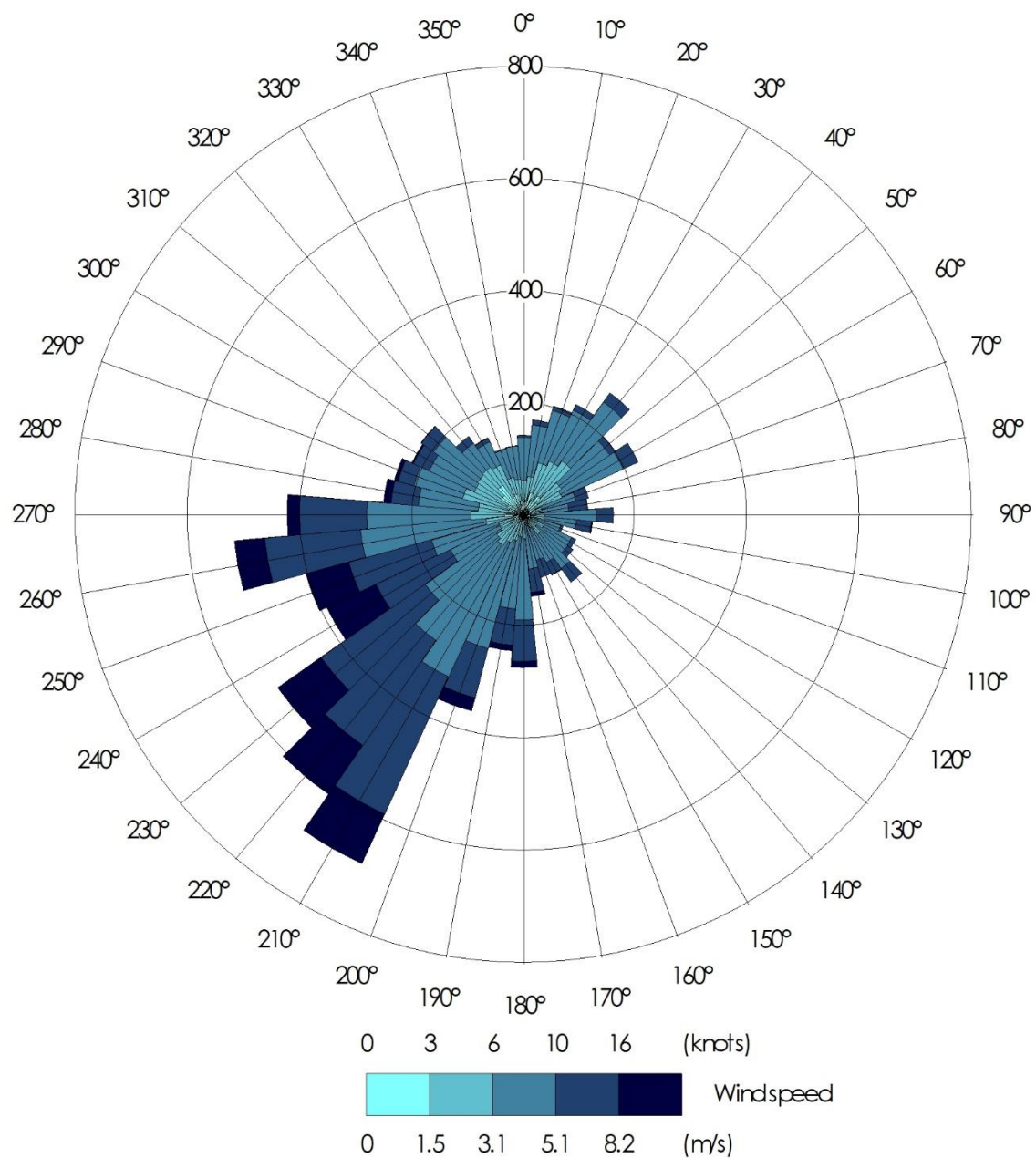
6.1.8 Based on the assessment results the proposals are considered to comply with the relevant planning policies in relation to air quality. As such, these are not considered a constraint to planning consent for the development.

7.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
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
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DPD	Development Plan Document
DS	Do-Something
EU	European Union
GLA	Greater London Authority
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicles
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LAEI	London Atmospheric Emissions Inventory
LBoH	London Borough of Hillingdon
LGV	Light Goods Vehicles
NGR	National Grid Reference
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PM ₁₀	Particulate Matter with an aerodynamic diameter of less than 10µm
Z ₀	Roughness length

Figures





Legend

Title
Figure 3 - Wind Rose of 2015
Heathrow Airport Meteorological
Data

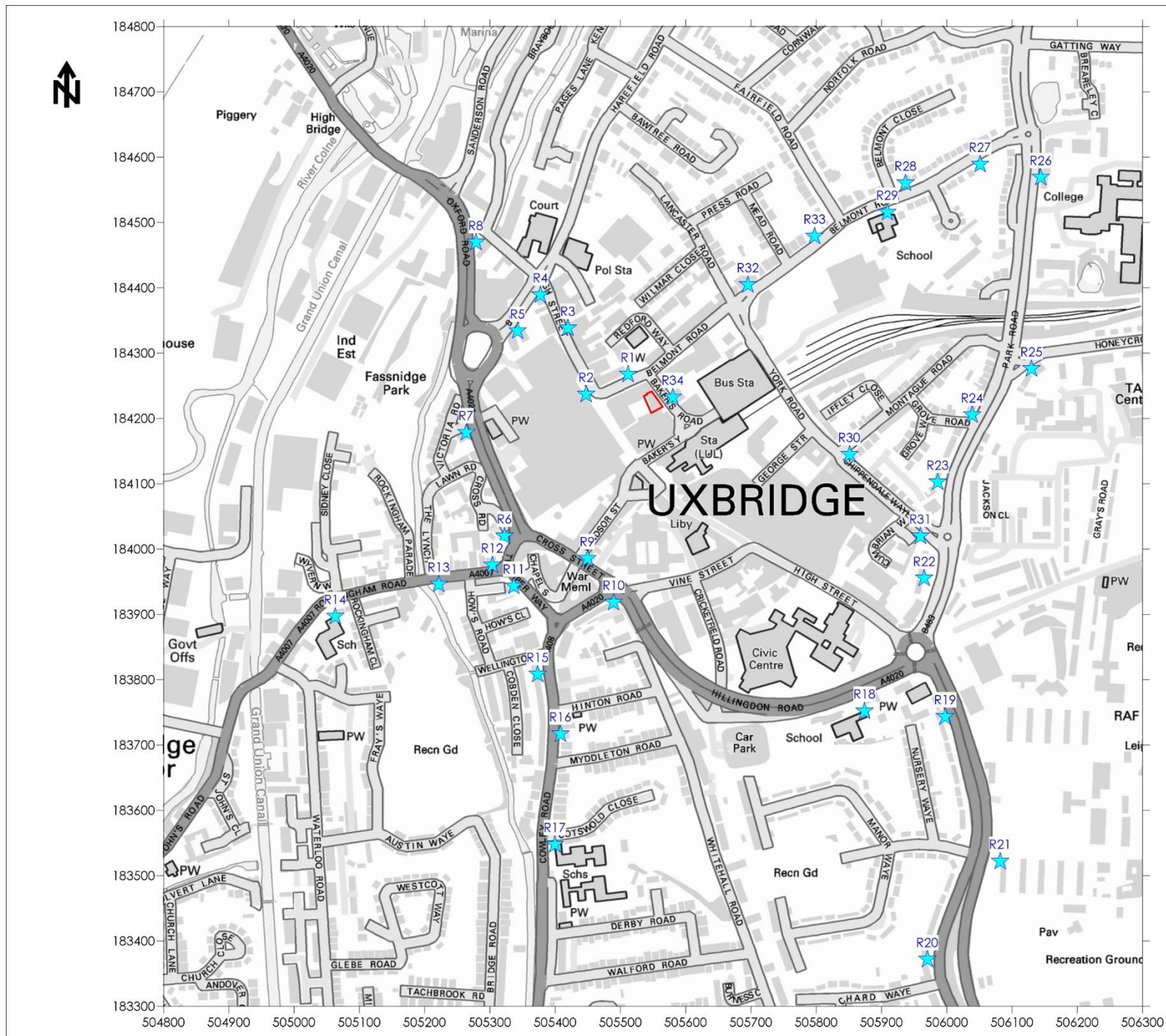
Project
Air Quality Assessment
Bakers Road, Uxbridge

Project Reference
2194

Client
HSBC Bank Pension Trust (UK) Ltd



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Legend

-  Site Boundary
-  Sensitive Receptor

Title

Figure 4 - Road Vehicle Exhaust
Emission Sensitive Receptor
Locations

Project

Air Quality Assessment
Bakers Road, Uxbridge

Project Reference

2194

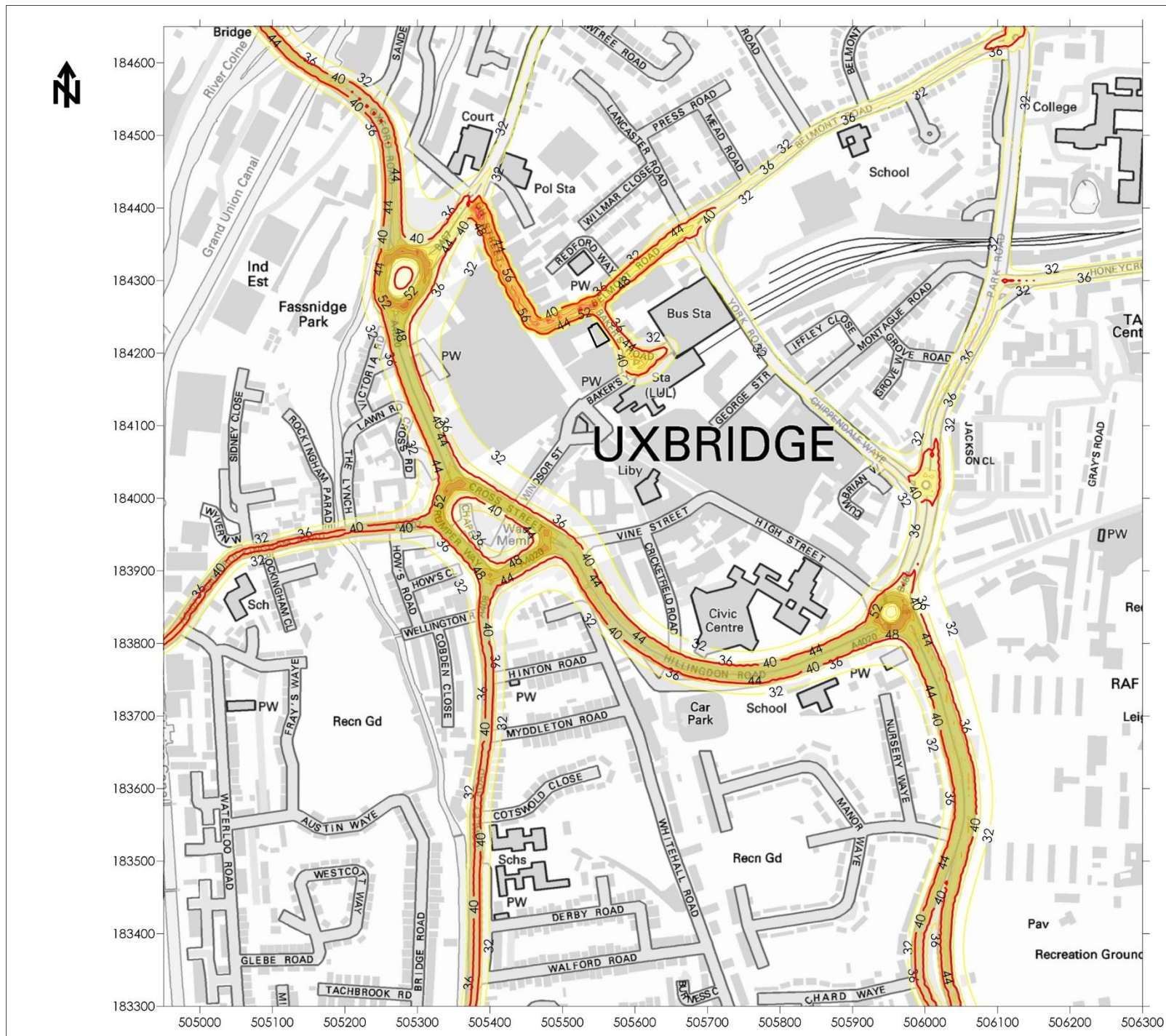
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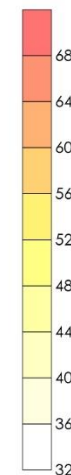
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Legend



Site Boundary



Annual Mean
NO₂ Concentration
(µg/m³)

Title

Figure 5 - Predicted Annual Mean
NO₂ Concentrations (µg/m³)
Do-Minimum

Project

Air Quality Assessment
Bakers Road, Uxbridge

Project Reference

2194

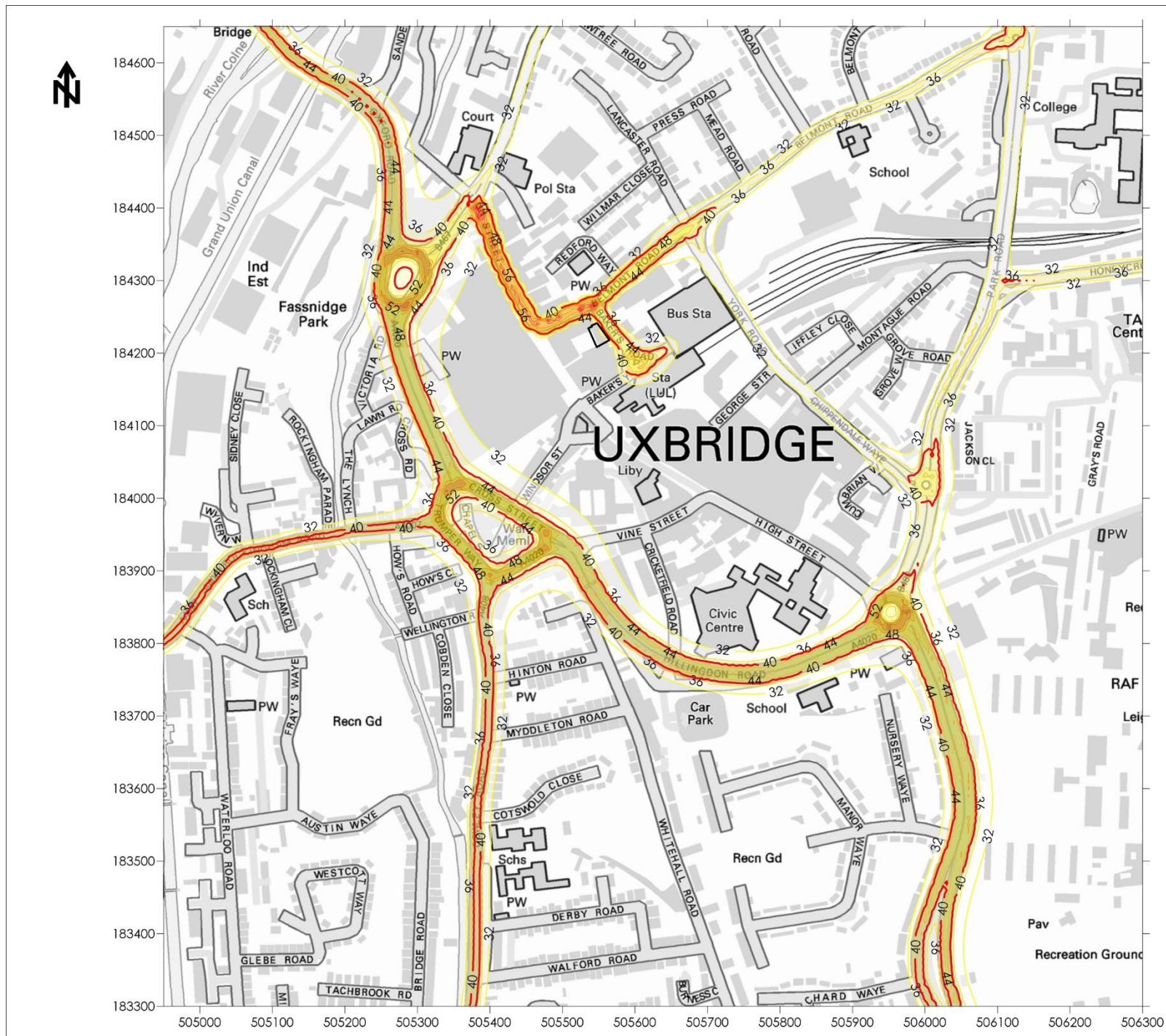
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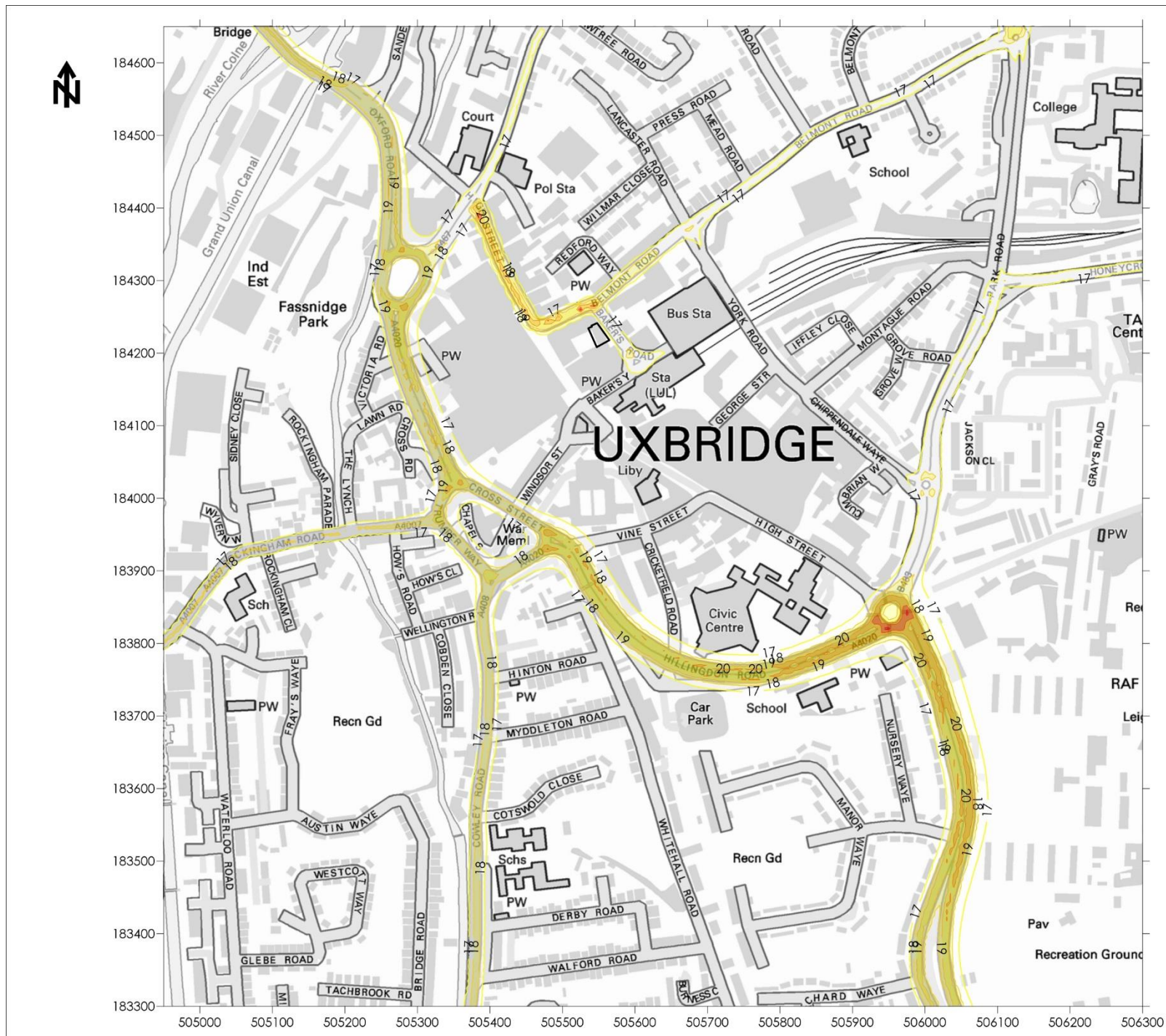
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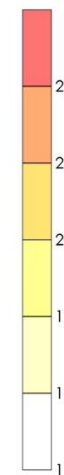




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Site Boundary



Title

Figure 7 - Predicted Annual Mean PM₁₀ Concentrations (µg/m³) Do-Minimum

Project

Air Quality Assessment
Bakers Road, Uxbridge

Project Reference

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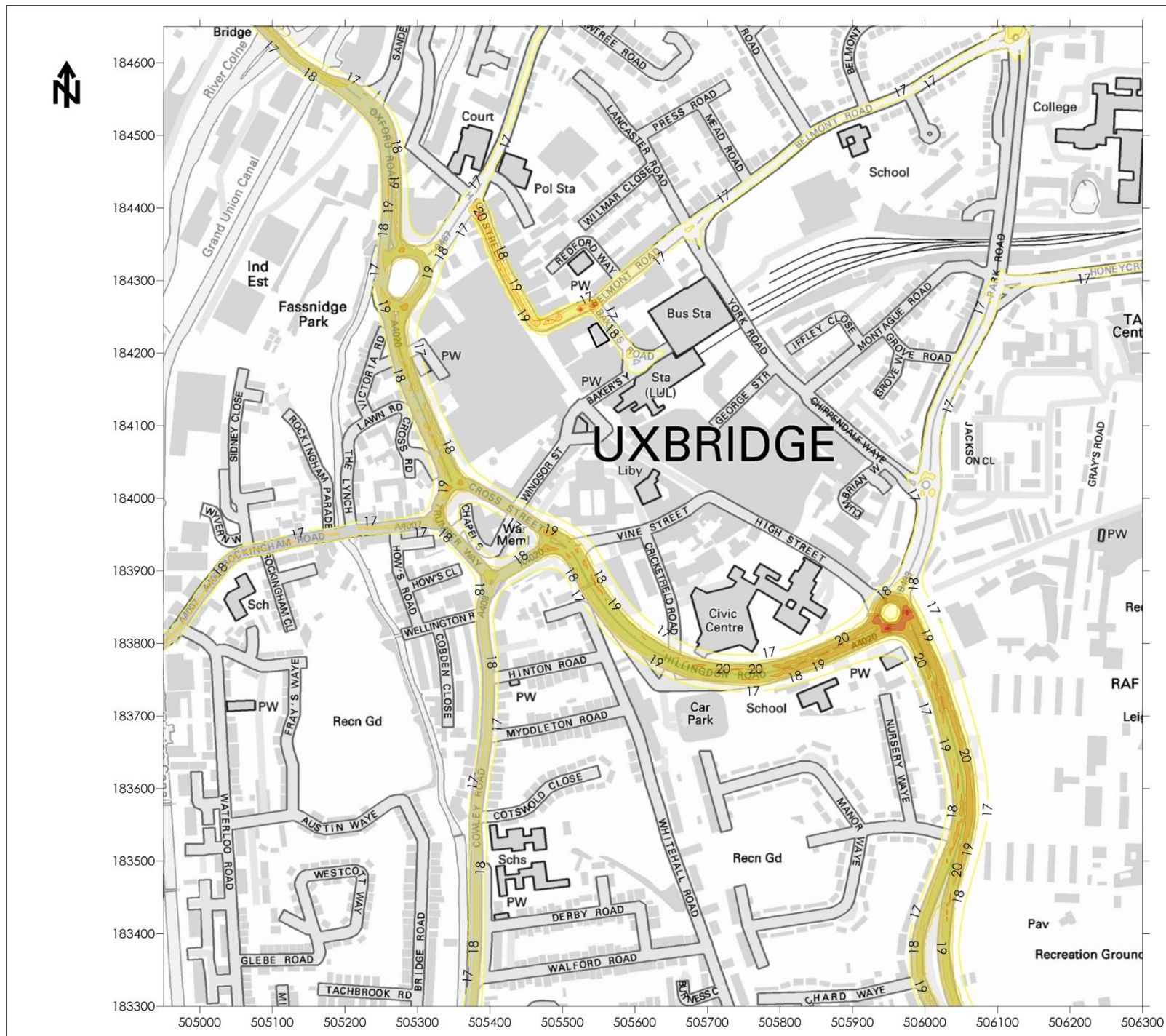
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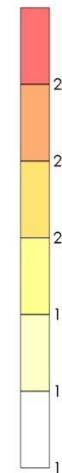
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Site Boundary



Annual Mean
PM₁₀ Concentration
(µg/m³)

Title

Figure 8 - Predicted Annual Mean
PM₁₀ Concentrations (µg/m³)
Do-Something

Project

Air Quality Assessment
Bakers Road, Uxbridge

Project Reference

2194

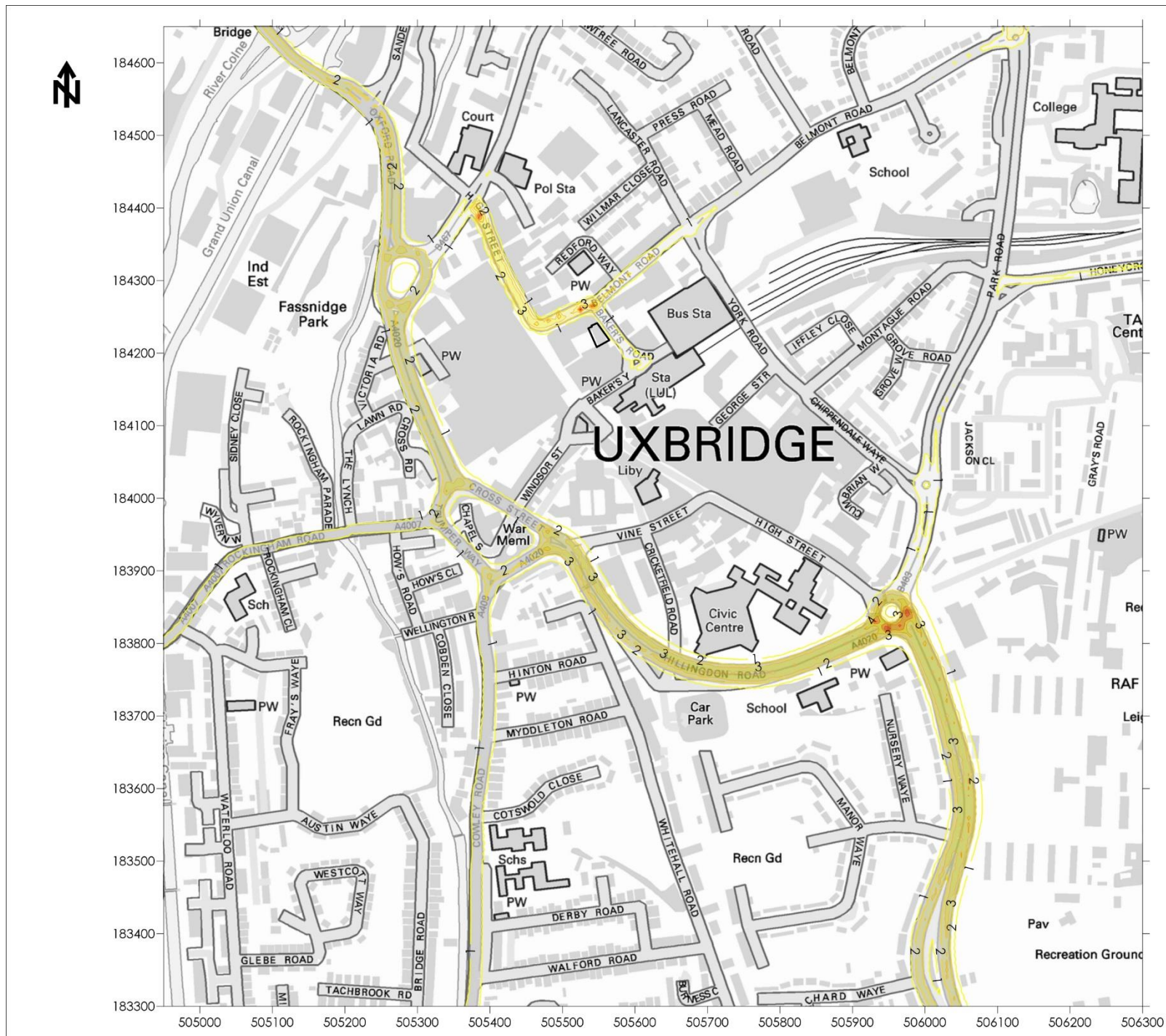
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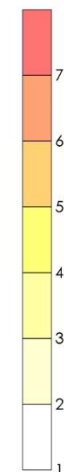
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Legend



Site Boundary



Title

Figure 9 - Predicted Number of Days with PM₁₀ Concentrations Greater than 50µg/m³

Project

Air Quality Assessment
Bakers Road, Uxbridge

Project Reference

2194

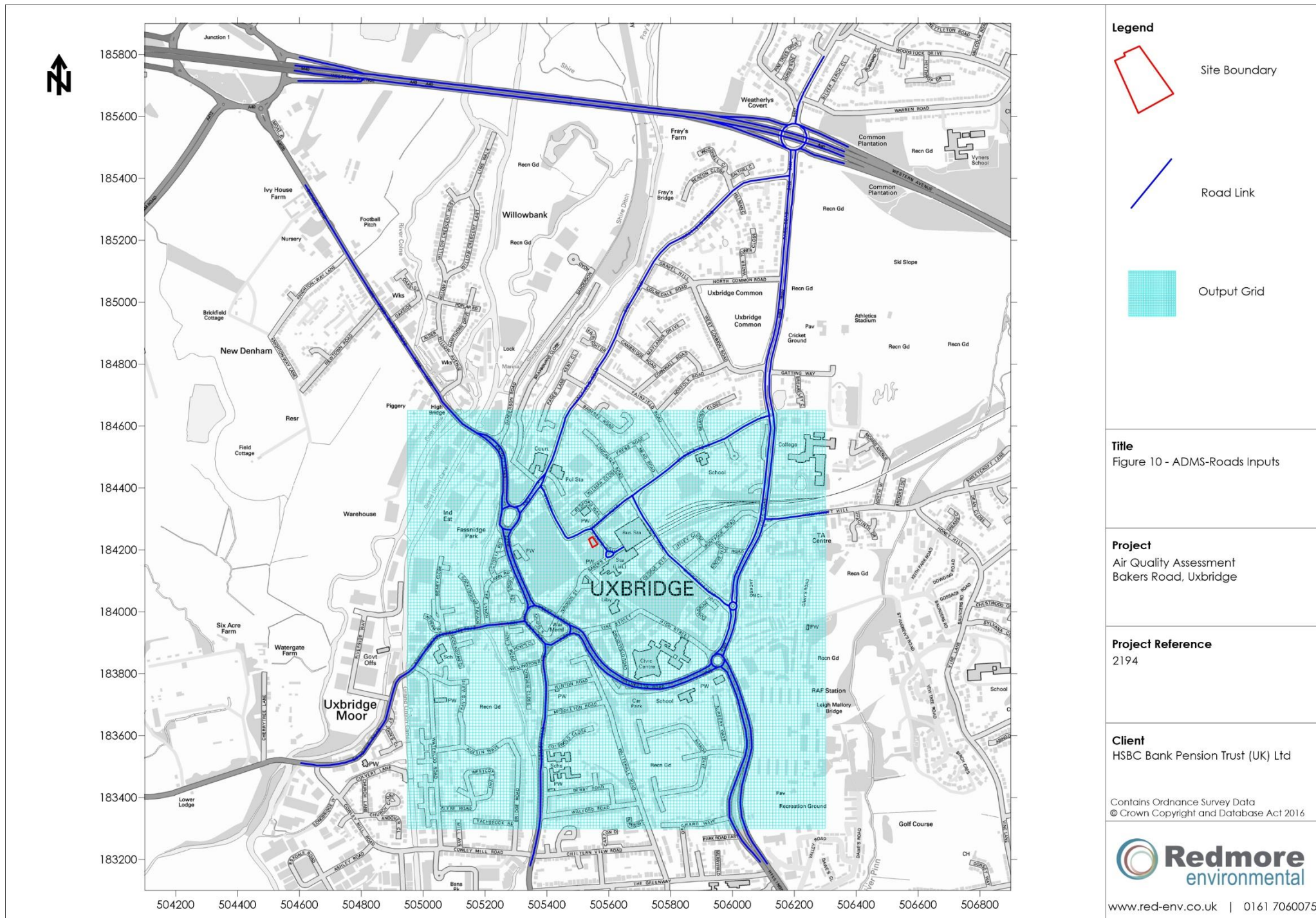
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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site, as well as expose future occupants to elevated pollution levels. In order to assess NO₂ and PM₁₀ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

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.

The following Sections detail the relevant inputs utilised in the assessment.

Assessment Area

The assessment area was defined based on the development location, the anticipated access routes and the positioning of residential properties. Ambient concentrations were predicted over

the area NGR: 504950, 183300 to 506300, 1844650. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 10 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 guidance²² 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.

Traffic data for Bakers Road was not available from the LAEI. Data was therefore supplemented with information from an Air Quality Assessment produced by WSP Environment & Energy²³ for the 1 - 3 Bakers Road site directly opposite the development. As planning permission was granted for this scheme, the report was considered to provide suitable data in lieu of other sources.

Baseline traffic data was projected forward to represent the opening year utilising a factor obtained from TEMPro (version 7.2). This software package has been developed by the Department for Transport (DfT) to calculate traffic growth throughout the UK.

Traffic generation associated with the proposals was provided by TTP Consulting Limited, the Transport Consultants for the scheme. This was applied to the relevant road links to establish the DS scenario, based on the anticipated traffic distribution patterns from the site.

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.

²² London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

²³ 1 - 3 Bakers Road, Uxbridge, Air Quality Assessment Report, WSP Environment and Energy, 2011.

Table A1.1 Traffic Flows

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Average Vehicle Speed (km/h)	Road Width (m)
		Verif.	2020 DM	2020 DS			
L1	Harefield Road North	7,477	7,917	7,980	2.52	40	6.8
L2	Harefield Road South to Junction High Street	7,477	7,917	7,980	2.52	40	6.8
L3	Harefield Road Southbound Slow to High Street	3,739	3,958	3,990	2.52	25	5.2
L4	Harefield Road Southbound to Roundabout	4,470	4,733	4,765	18.48	25	5.2
L5	Harefield Road Northbound from Roundabout	4,473	4,736	4,768	18.53	25	6.2
L6	Harefield Road Northbound from High Street Slow	3,739	3,958	3,990	2.52	25	5.9
L7	Roundabout	13,890	14,706	14,769	8.64	15	9.1
L8	Oxford Road	22,369	23,683	23,715	5.08	40	8.3
L9	Oxford Road Southbound	13,151	13,924	13,940	3.51	40	5.6
L10	Oxford Road Northbound	13,151	13,924	13,940	3.51	40	5.6
L11	High Street Slow	9,872	10,452	10,578	22.36	25	9.5
L12	Belmont Road West of Bakers Road	9,872	10,452	10,578	22.36	35	9.3
L13	Belmont Road	7,452	7,890	7,953	9.73	40	8.1
L14	Oxford Road Southbound South of Roundabout	13,792	14,603	14,619	8.00	40	9.2
L15	Oxford Road Northbound South of Roundabout	13,889	14,705	14,721	8.64	40	8.9
L16	St John's Road	12,150	12,864	12,880	9.26	40	8.3
L17	Cowley Road Slow	16,845	17,835	17,851	6.00	15	13.2
L18	Cowley Road	16,845	17,835	17,851	6.00	40	11.6
L19	Harefield Road North slow to Hillingdon Road	7,477	7,917	7,980	2.52	15	6.4
L20	Park Road Northbound to A40 Roundabout	18,714	19,814	19,877	1.79	25	8.0

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Average Vehicle Speed (km/h)	Road Width (m)
		Verif.	2020 DM	2020 DS			
L21	York Road/Chippendale Way	4,955	5,246	5,309	13.37	40	11.8
L22	Chippendale Way Slow	4,955	5,246	5,309	13.37	15	18.8
L23	Hillingdon Road Northbound South	21,294	22,545	22,577	4.89	60	9.0
L24	Hillingdon Road Southbound South	21,287	22,538	22,570	4.86	60	7.7
L25	Hillingdon Road Roundabout	20,654	21,868	21,931	1.95	15	9.6
L26	Hillingdon Road Westbound	20,654	21,868	21,868	1.95	60	7.0
L27	Hillingdon Road Eastbound	20,654	21,868	21,868	1.95	60	7.0
L28	B403 Northbound to Chippendale Way	5,834	6,177	6,208	9.03	40	6.8
L29	B403 Southbound from Chippendale Way	5,834	6,177	6,208	9.03	40	6.8
L30	B403 Roundabout	5,832	6,175	6,238	9.00	15	8.4
L31	Park Road Northbound Slow	5,669	6,002	6,002	6.39	15	7.6
L32	Park Road Northbound	5,669	6,002	6,002	6.39	40	6.7
L33	Park Road Northbound North of Honeycroft Hill	3,671	3,887	3,887	7.40	40	8.3
L34	Park Road Southbound to Honeycroft Hill	3,670	3,885	3,885	7.36	40	6.7
L35	Park Road Southbound South of Honeycroft Hill	5,669	6,002	6,002	6.39	40	6.3
L36	Park Road Southbound Slow	5,669	6,002	6,002	6.39	15	8.2
L37	Honeycroft Hill	9,786	10,361	10,361	9.22	40	8.2
L38	Trumper Way/ Cross Street Roundabout	13,793	14,604	14,636	8.01	15	12.0
L39	Park Road Southbound from A40 Roundabout	18,715	19,815	19,878	1.80	25	9.1
L40	Swakeleys Roundabout	21,026	22,262	22,388	6.72	25	8.1
L41	Western Avenue Westbound Overpass	44,916	47,556	47,556	4.85	90	10.8
L42	Western Avenue Westbound to M40	51,333	54,349	54,381	4.85	90	11.4

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Average Vehicle Speed (km/h)	Road Width (m)
		Verif.	2020 DM	2020 DS			
L43	Western Avenue Westbound to M40	43,499	46,055	46,087	6.29	90	11.4
L44	M40 Eastbound Western Avenue	43,499	46,055	46,087	6.29	90	7.3
L45	Western Avenue Eastbound	51,333	54,349	54,381	4.85	90	11.4
L46	Western Avenue Eastbound Overpass	44,916	47,556	47,556	4.85	90	10.8
L47	Western Avenue Slipway to Roundabout Westbound	6,417	6,794	6,826	4.85	70	8.5
L48	B483 Slipway Westbound to A40	6,417	6,794	6,826	4.85	70	8.2
L49	Western Avenue Eastbound to Roundabout	6,417	6,794	6,826	4.85	70	7.6
L50	B467 Slipway to Western Avenue Eastbound	6,417	6,794	6,826	4.85	70	8.8
L51	B467 Slow	42,053	44,525	44,525	6.72	15	16.2
L52	Western Avenue Slipway Westbound	6,214	6,579	6,579	6.29	70	6.0
L53	Western Avenue Slipway Eastbound	6,214	6,579	6,579	6.29	70	6.1
L54	B467	42,053	44,525	44,525	6.72	40	9.1
L55	Park Road Northbound North of Belmont Road	18,715	19,815	19,846	1.80	40	7.2
L56	Park Road Southbound to Belmont Road	18,715	19,815	19,846	1.80	40	7.2
L57	Belmont Road East of Bakers Road Canyon	8,944	9,469	9,595	14.30	30	8.4
L58	Belmont Road East of Bakers Road	8,944	9,469	9,595	14.30	15	11.1
L59	Bakers Road Canyon 1	3,630	3,843	4,095	38.20	40	12.9
L60	Bakers Road Canyon 2	3,630	3,843	3,843	38.20	40	12.9
L61	Bakers Road Turning point	3,630	3,843	3,843	38.20	15	7.7
L62	Bus Station	3,630	3,843	3,843	38.20	25	11.3
L63	Belmont Road, Slow Phase	7,452	7,890	7,953	9.73	15	9.2
L64	Belmont Road Slow Phase	7,452	7,890	7,953	9.73	15	10.7

Reference should be made to Figure 10 for a graphical representation of the road link locations.

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 A1.2.

Table A1.2 Canyon Parameters

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
L11	11.4	10.0	15.2	15.2	9.8	10.0	17.9	17.9
L12	9.3	9.0	253.6	230.5	10.4	15.0	253.6	220.8

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
L57	11.7	7.0	107.1	92.3	13.1	15.0	107.1	89.7
L59	10.1	16.8	61.9	52.0	10.9	10.5/ 21.05 ^(a)	61.9	61.9
L60	10.2	27.5	25.9	25.9	12.2	10.5	25.9	25.9

NOTE: (a) Height altered in DS scenario to represent introduction of proposals into building topography

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 selected for use in the model.

Emission Factors

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 COPERT5 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2015 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2015 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 observation station over the period 1st January 2015 to 31st December 2015 (inclusive). Heathrow Airport is located at NGR: 506947, 176515, which is approximately 8.1km south of the proposed development. 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 values 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 3 for a wind rose of the utilised meteorological records.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1m 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 'cities and woodlands'.

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, including runways and 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 site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'large conurbations greater than 1 million'.

Background Concentrations

Background NO₂ and PM₁₀ concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 13.

Similarly to emission factors, the background concentrations from 2015 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

It is noted that the GLA have released background concentration maps with a spatial resolution of 20m for 2013, 2020, 2025 and 2030. However, as the modelling area is considerably greater than 20m, and values were not available for the verification year, this data was not considered appropriate for use in the assessment.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 6.1) provided by DEFRA, which is the method detailed within GLA guidance²⁴.

Short Term PM₁₀ Concentrations

The number of days with PM₁₀ concentrations greater than 50µg/m³ was calculated based on predicted annual mean concentrations and the methodology outlined within GLA guidance²⁵.

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.

Monitoring was undertaken during 2016 within the modelled extents. However, due to poor data quality, 2015 survey data was utilised for verification in preference to the 2016 results.

Monitoring of NO₂ concentrations was undertaken at five locations within the modelling extents during 2015. Review of the survey positions identified that the HD52 - 101 Cowley Mill Road, Uxbridge, diffusion tube was positioned a considerable distance from roads included within the model. As such, it was removed from the verification process in order to prevent an

²⁴ London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

²⁵ London Local Air Quality Management (TG16), Technical Guidance 2016 (LLAQM.TG (2016)), GLA, 2016.

underestimation of pollutant emissions. Results were obtained from the remaining monitors and the road contributions to total NO_x concentrations calculated following the methodology contained within GLA guidance²⁶. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

Table A1.3 Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
HD43	Uxbridge Day Nursery Park Road, Uxbridge	42.8	39.34
HD53	Warren Road Ickenham, Uxbridge	42.3	38.03
HD211	198 Harefield Road, Uxbridge	34.0	17.62
HD212	59 Hillingdon Road, Uxbridge	38.5	28.39

The annual mean road NO_x concentrations predicted from the dispersion model and the 2015 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.4.

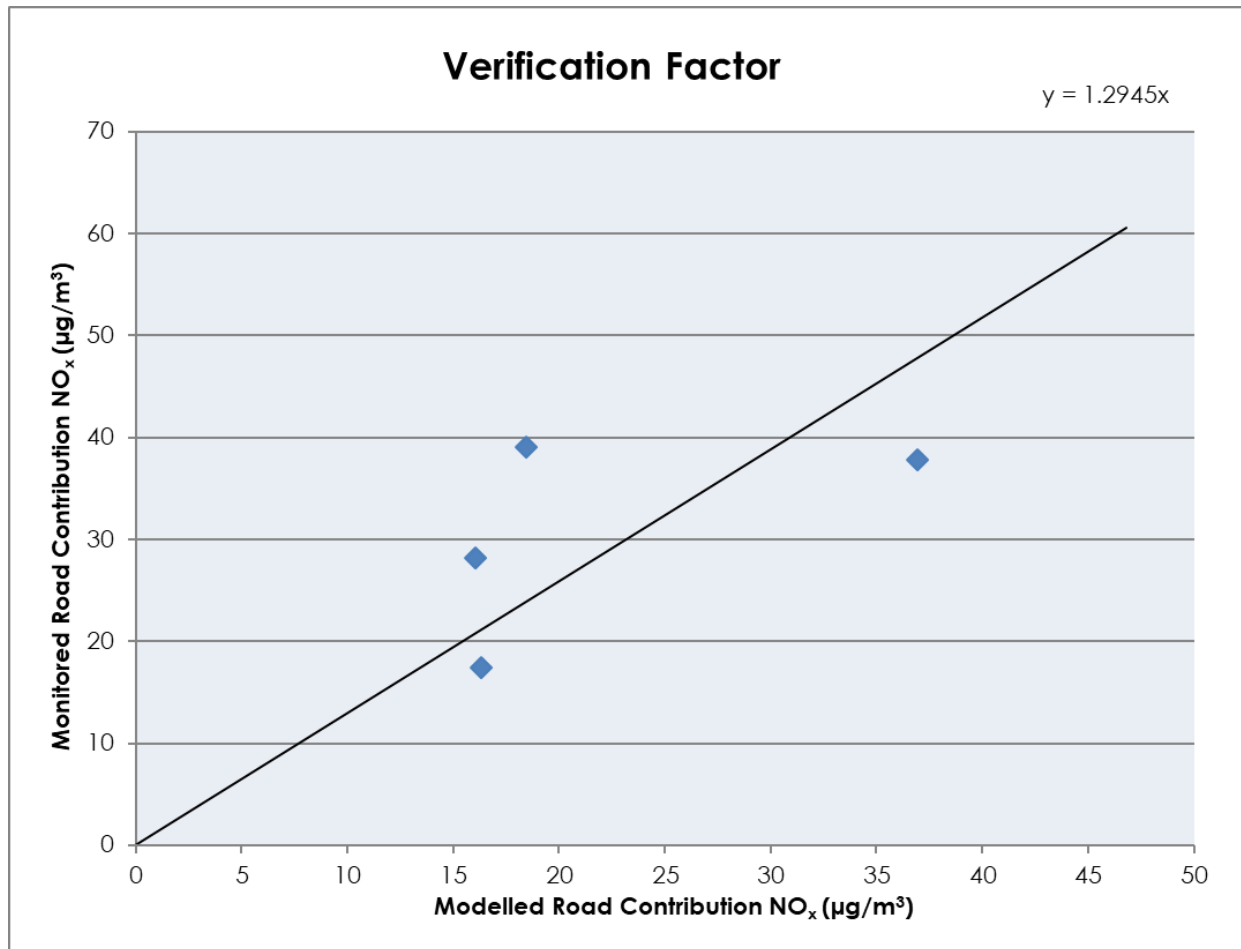
Table A1.4 Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
HD43	Uxbridge Day Nursery Park Road, Uxbridge	42.8	18.32
HD53	Warren Road Ickenham, Uxbridge	42.3	36.83
HD211	198 Harefield Road, Uxbridge	34.0	16.20
HD212	59 Hillingdon Road, Uxbridge	38.5	15.97

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.2945 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

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

Graph 1 - NO_x Verification Factor



Monitoring of PM₁₀ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM₁₀ model predictions in lieu of more accurate data in accordance with GLA guidance²⁷.

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

Date: 31st August 2018

Ref: 2194

Appendix 2 - Curricula Vitae

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 sites 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.

KEY EXPERIENCE:

Elen 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.
- Advanced Canyon Modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Assessment of construction dust impacts from a range of development sizes.
- 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.
- ADMS-5 modelling of industrial sources including Anaerobic Digestion (AD) plants to determine impacts of stack emissions on local air quality.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Potion Redevelopment, Erith

Air Quality Assessment of a residential development in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM₁₀ and NO₂ concentrations across the site. Results revealed that pollution levels were below the air quality standards across the development.

Magdalen Street, Colchester

Air Quality Assessment in support of a planning application for a cluster of student accommodation buildings. The site was located in a built up area of Colchester and was already occupied by a bus depot. The assessment included a comparison of concentrations at sensitive receptors in areas where the urban topography would be altered as a result of the development. Review of the results revealed that canyon effects would be reduced in the presence of the student accommodation, when compared to the existing land use. A detailed report was produced and the local authority accepted the air quality findings.

Greenbridge Road, Swindon

Air Quality Assessment for a mixed-use development in Swindon. The proposals involved demolition of a large building prior to construction. An assessment of fugitive dust emissions was undertaken and revealed that the use of good practice control measures would provide suitable mitigation for the impacts of the scheme.

Gonerby Moor Anaerobic Digestion Plant

Air Quality and Odour Assessments in support of an AD plant in Grantham. Combustion products from the combined heat and power unit have the potential to result in air quality impacts. Further to this, storage and transfer of biomass materials can lead to odour emissions from the site. ADMS-5 was used to model both odour and air quality impacts. Results revealed that emissions would not lead to exceedences of the relevant air quality standards across the site, and odour emissions remained below benchmark levels at all identified sensitive locations.

Coral Mill, Rochdale

Air Quality Assessment for a residential scheme partially located in an AQMA. Due to the size of the development, it was possible that traffic generation by future occupants travelling to and from the site may cause negative impacts on sensitive receptors nearby. NO₂ and PM₁₀ concentrations were quantified at specific receptor points to ensure there would be no significant increases in pollutant levels. Results revealed negligible impacts at all locations.

Stone Street, Kent

Air Quality Assessment for redevelopment of existing buildings in Gravesend, Kent. Road layout changes had been proposed in the vicinity of the site, which would alter the routes used by road traffic and thereby influence the location of vehicle emissions. Modelling took account of the impact of the new road layout on concentrations at the development. Results revealed pollutant concentrations were below the relevant standards across the site.