



AIR QUALITY ASSESSMENT HAMPTON BY HILTON, HEATHROW

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Prepared by	Charlotte Smith	Conal Kearney	Lewis Ellison	Lewis Ellison
Signature				
Position	Senior Air Quality Consultant	Principal Air Quality Consultant	Air Quality Consultant	Air Quality Consultant
Checked by	Conal Kearney	Josh Davies	Josh Davies	Josh Davies
Signature				
Position	Principal Air Quality Consultant	Air Quality Consultant	Air Quality Consultant	Air Quality Consultant
Verified by	Conal Kearney	Conal Kearney	Conal Kearney	Conal Kearney
Signature				
Position	Principal Air Quality Consultant	Principal Air Quality Consultant	Associate Director	Associate Director
Project number	AQ103490r1	AQ103490r2	AQ103490r3	AQ103490r4

Osprey House, Pacific Quay, Broadway, Manchester, M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk





EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd was commissioned by Acre Hotels Ltd to undertake an Air Quality Assessment in support of a proposed Hilton Hotel development at land off Bath Road, Harlington.

The proposals comprise the development of six storey hotel to provide 157 rooms. This is an increase from the original 128 room development. The resultant increase in trip generation has resulted in an increase in pollution concentrations at sensitive receptor locations, however the pollutant change from 128 rooms to 157 rooms is extremely small and has not changed the findings of the assessment.

The site is located within an area identified by the London Borough of Hillingdon as experiencing elevated pollutant concentrations and as such, the proposals have the potential to introduce future site users to poor air quality. Additionally, the development has the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions from construction works and operational emissions associated with vehicles travelling to and from the site. As such, an Air Quality Assessment was required to quantify pollutant levels across the site, consider its suitability for the proposed end-use and assess potential impacts as a result of the development.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of 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.

Dispersion modelling was undertaken in order to quantify existing pollutant concentrations at the site and predict air quality impacts as a result of road vehicle exhaust emissions associated with the traffic generated from by the development. The dispersion modelling indicated high pollutant levels at existing residential receptors both without and with the development in place however, the assessment concluded that impacts on pollutant levels as a result of operational phase vehicle exhaust emissions were not predicted to be significant at any sensitive receptor in the vicinity of the site. Furthermore, the assessment also concluded that the relevant Air Quality Objective was not exceeded across the proposed development and as such, the proposals are considered acceptable without the requirement for mitigation measures.

The London Plan states that new developments must be considered Air Quality Neutral. Pollutant emissions associated with transport emissions from the development were compared to relevant benchmarks. This indicated that transport emissions from the proposals were below the combined benchmark and as such, mitigation measures to reduce emissions are not required.

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





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1. INTRODUCTION

1.1 Background

Resource and Environmental Consultants Ltd (REC) was commissioned by Acre Hotels Ltd to undertake an Air Quality Assessment in support of a proposed Hilton Hotel development at land off Bath Road, Harlington.

1.2 Site Location and Context

The site is located at land off Bath Road, Harlington at National Grid Reference (NGR): 507895, 176995. Reference should be made to Figure 1 for a location plan.

The proposals comprise the development of a six storey hotel to provide 157 rooms.

The development is located within an Air Quality Management Area (AQMA), declared by London Borough of Hillingdon (LBoH) due to exceedances of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO₂) and the 24-hour AQO for particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀). As such, there are concerns that the proposals could expose future site users to elevated pollution concentrations. Additionally, the development has the potential to cause air quality impacts at sensitive receptor locations as a result of emissions associated with the construction and operational phases. This may include fugitive dust emissions associated with construction works and operational emissions associated with vehicles travelling to and from the site.

An Air Quality Assessment was therefore required to determine baseline conditions, consider location suitability for the proposed end-use and provide consideration of potential effects as a result of the proposals. This is detailed in the following report.

1.3 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.





2. LEGISLATION AND POLICY

2.1 European Legislation

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 objectives for particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}). The consolidated Directives include:

- ▶ Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) for NO₂, oxides of nitrogen (NO_x), sulphur dioxide, lead and 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.

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

The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose the 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.

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 exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

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 more than 18 times a year

¹ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.





Pollutant	Air Quality Objective	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
PM ₁₀	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year

Table 2 summarises the advice provided in Greater London Authority (GLA) guidance LLAQM.TG (16)² on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives 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
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-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

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 administration under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering

² London Local Air Quality Management Technical Guidance 2016 LLAQM.TG (16), GLA, 2016.





present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2010) 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."

Enforcement of the Act, in regard to nuisance, is currently under the administration 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 National Planning Policy Framework

The National Planning Policy Framework^[1] (NPPF) was published on 24th July 2018 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

"Planning policies and decisions 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality

"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

^[1] National Planning Policy Framework, Department for Communities and Local Government, 2018.





local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

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

2.5.2 National Planning Practice Guidance

The National Planning Practice Guidance³ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

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

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

2.6 Local Planning Policy

2.6.1 The London Plan

The Minor Alterations to The London Plan⁴ was published in March 2016 and sets out a fully integrated economic, environmental, transport and social framework for the development of the capital until 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.

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

"Policy 3.2 Improving health and addressing health inequalities

Strategic

- ▶ The Mayor will take account of the potential impact of development proposals on health and health inequalities within London. The Mayor will work in partnership with the NHS in London, boroughs and the voluntary and community sector as appropriate to reduce

³ <http://planningguidance.planningportal.gov.uk/>.

⁴ The London Plan, Minor Alterations to the London Plan, Greater London Authority, March 2016.





health inequalities and improve the health of all Londoners, supporting the spatial implications of the Mayor's Health Inequalities Strategy.

- ▶ The Mayor will promote London as a healthy place for all – from homes to neighbourhoods and across the city as a whole – by:
 - Coordinating planning and action on the environment, climate change and public health to maximise benefits and engage a wider range of partners in action

[...]

- ▶ The impacts of major development proposals on the health and wellbeing of communities should be considered, for example through the use of Health Impact Assessments (HIA).

Planning decisions

- ▶ New developments should be designed, constructed and managed in ways that improve health and promote healthy lifestyles to help to reduce health inequalities.

Policy 5.3 - Sustainable design and construction

Strategic

- ▶ 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

- ▶ 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.
- ▶ 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:

[...]

- ▶ Minimising pollution (including noise, air and urban run-off)

[...]

Policy 7.14 - Improving air quality

Strategic





- ▶ 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

Development proposals should:

- ▶ Minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3).
- ▶ 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 Council's 'The control of dust and emissions from construction and demolition'.
- ▶ Be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)).
- ▶ 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."

These policies have been considered throughout the completion of this Air Quality Assessment.

2.6.2 London Borough of Hillingdon Local Planning Policy

London Borough of Hillingdon's Local Development Framework (LDF) consists of a portfolio of documents, of which the Local Plan is the principal overarching section. The Hillingdon Local Plan consists of two parts; Part 1: Strategic Policies, which was adopted in November 2012 and Part 2, which is due to replace the existing Unitary Development Plan. The Hillingdon Local Plan - Part 1: Strategic Policies⁵ sets out the spatial vision, objectives, development strategy and a series of key policies that will guide the scale, location and type of development in the borough until 2026. As such, the policies contained within the Local Plan - Part 1 provide the current basis for the determination of planning applications within LBoH's area of administration.

A review of the Local Plan-Part 1 indicated the following policies in relation to air quality that are

⁵ Hillingdon Local Plan: Part 1 Strategic Policies, London Borough of Hillingdon, 2012.





relevant to this assessment:

"Policy E2 - Location of Employment Growth

The council will accommodate 9,000 jobs during the plan period. [...] The council will promote development in highly accessible locations that delivers sustainable travel patterns and contributes to the improvements of existing networks to reduce emissions and impacts of air quality. [...]."

and

"Policy EM1 - Climate Change and Adaption and Mitigation

The council will ensure that climate change mitigation is addressed at every stage of the development process by:

[...]

6. targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact the local air quality. Targeting areas of poor air quality for additional emission reductions.

[...]."

and

"Policy EM8 - Land, Water, Air and Noise

[...]

Air Quality

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

All major development within the Air Quality Management Area (AQMA) should demonstrate air quality neutrality (no worsening of 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 Action 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 developments in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements.

[...]."

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





3. METHODOLOGY

The proposed development has the potential to cause air quality impacts during the construction and operational phases in addition to exposing future site users to elevated pollution levels. These issues have been assessed in accordance with the following methodology.

3.1 Construction Phase Assessment

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 Greater London Authority (GLA) document 'Guidance on the Assessment of Dust from Demolition and Construction'⁶.

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

- ▶ Earthworks;
- ▶ Construction; and
- ▶ Trackout.

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.

The assessment steps are detailed below.

3.1.1 Step 1

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

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

3.1.2 Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated to 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

⁶ Guidance on the Assessment of Dust from Demolition and Construction, Greater London Authority, 2014.





- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

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

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	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	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





Magnitude	Activity	Criteria
Small	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

Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table 4.

Table 4 Examples of Factors Defining Sensitivity of an Area

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	- Users expect of 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





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, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads	• Locally designated site e.g. Local Nature Reserve

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

- ▶ 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 the 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.

These factors were considered in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table 5.

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

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

Table 6 outlines the sensitivity of the area to human health impacts.





Table 6 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
	-	1 - 10	Medium	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low	Low

Table 7 outlines the sensitivity of the area to ecological impacts.

Table 7 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

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table 8 outlines the risk category from earthworks and construction activities.





Table 8 Dust Risk Category from Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 9 outlines the risk category from trackout.

Table 9 Dust Risk Category from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

3.1.3 Step 3

Step 3 requires the identification of site specific mitigation measures within the IAQM guidance 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.

3.1.4 Step 4

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

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 GLA⁶ guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix IV.

3.2 Operational Phase Assessment

3.2.1 Road Traffic Exhaust Emissions

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO₂ and PM₁₀, associated with vehicles travelling to and from the site, as well as





expose future users to elevated pollutant levels. 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).

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

Receptors potentially sensitive to changes in NO₂ and PM₁₀ concentrations were identified within 200m of the affected highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)⁷ on the likely limits of pollutant dispersion from road sources. LLAQM.TG (16)² provides the following examples of where annual mean AQOs should apply:

- ▶ Residential properties;
- ▶ Schools;
- ▶ Hospitals; and
- ▶ Care homes.

The sensitivity impact significance of each receptor was defined in accordance with the criteria shown in Table 10. These are based upon the guidance provided within the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance 'Land-Use Planning and Development Control: Planning for Air Quality'⁸.

Table 10 Operational Traffic Exhaust Emissions - Significance of Impact

Long Term Average Concentration	% Change in Concentration Relative to 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

The criteria shown in Table 10 is adapted from the EPUK and IAQM guidance 'Land-Use Planning and Development Control: Planning for Air Quality'⁸ with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.

⁷ Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

⁸ Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2017.





Following the prediction of impacts at discrete receptor locations utilising the criteria in Table 10, the EPUK and IAQM⁸ document states that this framework is to be used as a starting point to make a judgement on significance of effect but other influences might need to be accounted for. Whilst impacts might be determined as 'slight', 'moderate' or 'substantial' at individual receptors, overall effect might not necessarily be deemed as significant in some circumstances. The following factors may provide some assistance in determining the overall significance of a development:

- ▶ Number of properties affected by significant air quality impacts and a judgement on the overall balance;
- ▶ Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
- ▶ The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
- ▶ Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and
- ▶ The extent to which an objective is exceeded e.g. an annual mean NO₂ concentration of 41µg/m³ should attract less significance than an annual mean of 51µg/m³.

These factors were considered and an overall significance determined for the impact of operational road vehicle exhaust emissions. 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.

3.3 Future Exposure

The proposed development includes sensitive land use and as such has the potential to introduce new receptors into an area of existing poor air quality. Detailed dispersion modelling was therefore undertaken to quantify NO₂ and PM₁₀ concentrations across the site and determine suitability for the proposed end-use. Reference should be made to Appendix II for details of the assessment inputs.

The results of the dispersion modelling assessment were compared against the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance⁹ from the London Air Pollution Planning and the Local Environment (APPLE) working group. These are outlined in Table 11.

Table 11 Air Pollution Exposure Criteria

Category	Applicable Range	Recommendation
APEC - A	Below 5% of the annual mean AQO	No air quality grounds for refusal; however mitigation of any emissions should be considered
APEC - B	Between 5% below or above the annual mean AQO	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g. maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised

⁹ London Councils Air Quality and Planning Guidance, London Councils, 2007.





Category	Applicable Range	Recommendation
APEC - C	Above 5% of the annual mean AQO	Refusal on air quality grounds should be anticipated, unless the LA has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures

It should be noted that a significant area of London would fall under APEC - C due to high NO₂ concentrations throughout the city. As such, a presumption against planning consent in these locations may result in large areas of land becoming undevelopable and prevent urban regeneration. The inclusion of suitable mitigation measures to protect future users is therefore considered a suitable way to progress sustainable schemes in these locations and has been considered within this assessment.

3.4 Air Quality Neutral

For hotel developments, the methodology outlined in the GLA 'Air Quality Neutral Planning Support GLA 80371'¹⁰ states that as there is no data available on trip lengths, a Transport Emission benchmark (TEB) cannot be derived. As such, the methodology defined for retail developments has been utilised in this assessment as it is the most comparable category in terms of trip rate generation. The methodology is summarised in the following sections.

3.4.1 Air Quality Neutral Assessment

The following potential scenarios have been considered within the assessment:

- ▶ Benchmark; and
- ▶ Development.

The benchmark scenario is representative of annual NO_x and PM₁₀ benchmark emissions, which are target emissions as defined by the GLA Guidance¹⁰. The development scenario is representative of the annual NO_x and PM₁₀ emissions from the operation of the proposed development only.

The following emission sources were considered during the assessment:

- ▶ Road vehicles travelling to and from the site.

3.4.2 Road Vehicle Exhaust Emissions

The proposed development has the potential to cause variations in exhaust emissions associated with vehicles travelling to and from the site. These were assessed by calculating annual emissions based on the anticipated traffic generated by the site and standard emission factors provided in the Air Quality Neutral Planning Support GLA 80371¹⁰, as shown in Table 12.

¹⁰ Air Quality Neutral Planning Support: GLA 80371, Air Quality Consultants Ltd in association with ENVIRON UK Ltd, 2014.





Table 12 Air Quality Neutral Road Transport Emission Factors

Pollutant	g/vehicle-km in Outer London
NO _x	0.353
PM ₁₀	0.0606





4. BASELINE

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.

4.1 Local Air Quality Management

As required by the Environment Act (1995), LBoH has undertaken Review and Assessment of air quality within their area of administration. This process has indicated that annual mean NO₂ concentrations and 24-hour mean PM₁₀ concentrations are above the AQO across the entire borough. As such, an AQMA has been declared, described as:

"Hillingdon AQMA - 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".

The proposed site is located within the Hillingdon AQMA and as such, there is the potential for the development to introduce future site users to elevated pollutant concentrations as well as cause adverse impacts to air quality within this area. This has been considered within this report.

LBoH has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have been designated.

4.2 Air Quality Monitoring

LBoH monitors pollutant concentrations using continuous methods throughout their area of administration. A review of the most recent Air Quality Progress Report¹¹ indicated that there are four automatic analysers located in the vicinity of the site. Monitoring results for NO₂ and PM₁₀ from recent years are shown in Table 13. Exceedances are highlighted in **bold**.

Table 13 Automatic Monitoring Results

Site Name	Type	NGR(m)		Annual Mean NO ₂ Concentration (µg/m ³)			
		X	Y	2014		2015	
				NO ₂	PM ₁₀	NO ₂	PM ₁₀
Hillingdon Sipson	Background	507325	177282	36.6	-	33.7	-
London Heathrow LHR2	Airport	508600	176700	46.4	18.6	44.2	13.0
Hillingdon 3 – Oxford Avenue	Roadside	509557	176994	36.7	21.5	34.5	21.0
London Harlington	Airport	508295	177800	36.5	19.6	32.0	16.0

¹¹ Air Quality Progress Report, London Borough of Hillingdon, 2016.





As indicated in Table 13, the annual mean AQO for NO₂ was exceeded at the London Heathrow monitoring site in recent years. This is to be expected due to its location adjacent to an airport and within the AQMA. The annual mean AQO for PM₁₀ was not exceeded at any monitoring sites in recent years. Reference should be made to Figure 2 for a graphical representation of the monitoring location.

LBoH also utilises passive diffusion tubes to monitor NO₂ concentrations throughout the borough. There are four diffusion tubes located in the vicinity of the proposed development. Monitoring results are summarised in Table 14. Exceedances of the AQO are shown in **bold**.

Table 14 Diffusion Tube Monitoring Results

Site Name	Type	NGR (m)		Annual Mean NO ₂ Concentration (µg/m ³)	
		X	Y	2014	2015
HD57	Background	508756	177717	39.5	35.6
HD58	Background	508412	177124	41.7	37.2
HD59	Background	507294	177322	33.3	29.1
HD213	Background	508773	177352	39.4	37.0

As indicated in Table 14 the annual mean AQO for NO₂ was exceeded at one monitoring location in recent years. Reference should be made to Figure 2 for a graphical representation of the diffusion tube and automatic analyser monitoring locations.

4.3 Background Pollutant Concentrations

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: 507500, 176500. Data for this location was downloaded from the DEFRA website¹² for the purpose of this assessment and is summarised in Table 15; for the base year (2015) and the predicted development opening year (2020).

Table 15 Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m ³)	
	2015	2020
NO _x	93.23	79.02
NO ₂	45.47	40.45
PM ₁₀	18.54	16.81

¹² <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.





As shown in Table 15, background concentrations of NO₂ exceeded the relevant AQO in 2015. Comparison with the monitoring results indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations.

4.4 Sensitive Receptors

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.

4.4.1 Construction Phase Sensitive Receptors

Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 16.

Table 16 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	1 - 10	0
20 - 50	10 - 100	0
50 - 100	10 - 100	-
100 - 350	More than 100	-

Reference should be made to Figure 3 for a graphical representation of earthworks and construction dust buffer zones.

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 100m from the road network within 500m of the site access. These are summarised in Table 17. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on the sourcing of materials. This is likely to be decided by the contractor. However, it was assumed traffic would access the site from Bath Road to ensure the maximum potential trackout distance was considered.

Table 17 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	1 -10	0
20 - 50	1 -10	0

Reference should be made to Figure 4 for a graphical representation of trackout dust buffer zones.





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.

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

Table 18 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The site is located in close proximity to the wider Heathrow Airport site and as such, dust generating activities in the area are likely to have occurred as a result of development
The likelihood of concurrent dust generating activity on nearby sites	A review of the LBoH planning portal indicated that there are currently no planning applications for additional major developments in the vicinity of the site. As such, the risk of concurrent dust generating activity is minimal
Pre-existing screening between the source and the receptors	The site is bound by vegetation along the southern boundary however the residential properties to the north of the site are bordered by a tree line which should provide screening from any dust associated with the development
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south-west of the development, as shown in Figure 5. As such, properties to the north-east would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no 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 not 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

Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was considered to be **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.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.1.2, is shown in Table 19.





Table 19 Sensitivity of the Surrounding Area

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

4.4.2 Existing Sensitive Receptors

Receptors sensitive to potential operational phase emission impacts were identified from a desk-top study and are summarised in Table 20.

Table 20 Existing Sensitive Receptors

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Three Magpies Public House	507669	176940	4.5
R2	Sipson Road	507801	177086	1.5
R3	IBIS Styles Hotel	507836	176968	1.5
R4	The Renaissance Hotel	508100	176911	1.5
R5	Radisson Blu Edwardian Hotel	508343	176955	4..5
R6	High Street Harlington	508835	177043	1.5
R7	High Street Harlington	508803	177051	1.5
R8	High Street Harlington	508815	177120	1.5
R9	Bath Road	509493	176950	1.5

The sensitive receptors identified in Table 20 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the proposed development that have not been individually identified above. Reference should be made to Figure 6 for a graphical representation of operational phase emission sensitive receptor locations.





5. ASSESSMENT

There is the potential for air quality impacts as a result of the construction and operation of the proposed development in addition to the exposure of future site users to elevated pollution levels. These are assessed in the following Sections.

5.1 Construction Phase Assessment

5.1.1 Step 1

The undertaking of activities such as 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 road and highway surfaces.

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.

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.

5.1.2 Step 2

Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. Information on soil type was not available for the purpose of this assessment. As such, the soil type was considered to be potentially dusty in order to provide a worst-case scenario.

The proposed development site is estimated to cover an area between 2,500m² and 10,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

Table 19 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 **medium** risk site for dust soiling as a result of earthworks activities.

Table 19 indicates the sensitivity of the area to human health is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health as a result of earthworks activities.





Construction

Due to the size of the development site the total building volume is likely to be greater than 100,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

Table 19 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 **medium** risk site for dust soiling as a result of construction activities.

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

Trackout

Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project.

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**.

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

Table 19 indicates the sensitivity of the area to human health is **low**. In accordance within the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health as a result of trackout activities.

Summary of the Risk of Dust Effects

A summary of the risk from each dust generating activity is provided in Table 21.

Table 21 Summary of Potential Unmitigated Dust Risks

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

As indicated in Table 21, the potential risk of dust soiling impacts are **negligible** from trackout activities and **medium** from earthworks and construction activities. The potential risk of human health impacts is **negligible** from trackout activities and **low** from earthworks and construction activities.





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.

5.1.3 Step 3

The GLA Supplementary Planning Guidance⁶ provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the development site as summarised in Table 22. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the Local Planning Authority.

Table 22 Fugitive Dust Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a Stakeholder Communications Plan that includes community engagement • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dust and air quality complaints • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation • Make complaints log available to LA when asked
Monitoring	• Carry out regular site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Fully enclose site or specific operations where there is a high potential for dust production and the site as active for an extensive period • Avoid site runoff of water or mud • Use water as dust suppressant where applicable • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping





Issue	Control Measure
Operating Vehicle/ Machinery and Sustainable Travel	• All vehicles to switch off engines - no idling vehicles • Ensure all vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards • Avoid the use of diesel or petrol powered generators where practicable • Produce a Construction Logistics Plan to manage sustainable deliveries
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation • Use enclosed chutes and covered skips • Minimise drop heights • Ensure equipment is readily available on site to clean any spillages
Waste Management	• No bonfires
Earthworks and Construction	• Re-vegetate earthworks and exposed areas • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate • Only remove the cover in small areas during work and not all at once • Avoid scabbling • Ensure sand and other aggregates are stored and not able to dry out, unless it is required for a specific process • Ensure bulk cement and other fine powder materials are delivered and stored to prevent escape

5.1.4 Step 4

Assuming the relevant mitigation measures outlined in Table 22 are implemented, the residual effect from all dust generating activities is predicted to be **negligible**, in accordance with the GLA Supplementary Planning Guidance.

5.2 Operational Phase Assessment - Sensitive Receptors

Additional vehicle movements associated with the operation of the proposed development will generate exhaust emissions, such as NO₂ and PM₁₀, 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.

The assessment considered the following scenarios:

- ▶ 2015 Verification;
- ▶ 2020 Do-Minimum (DM); and
- ▶ 2020 Do-Something (DS).





The DM (i.e. without development) scenario is representative of anticipated traffic data for 2020. The DS (i.e. with development) scenario is representative of anticipated traffic data for 2020 in addition to vehicle trips associated with the proposal.

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

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

5.2.1 Nitrogen Dioxide

Predicted Nitrogen Dioxide Impacts at Sensitive Receptors

The sensitive receptors identified as part of this assessment are considered to be both residential and hotel use and as such, different AQOs apply to different receptors as detailed in Table 2. Therefore both annual mean NO₂ concentrations and 1-hour mean NO₂ concentrations were predicted for all receptors for the 2020 DM and DS scenarios in order to identify potential impacts relative to the correct AQOs. These are summarised in Table 23 and exceedances of the relevant AQOs are highlighted in **bold**.

Table 23 Predicted NO₂ Concentrations

Sensitive Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)			Predicted 1-hour Mean NO ₂ concentration (µg/m ³)		
		DM	DS	Change	DM	DS	Change
R1	Three Magpies Public House	41.63	41.65	0.02	81.50	81.57	0.06
R2	Sipson Road	39.26	39.29	0.03	76.54	76.59	0.05
R3	IBIS Styles Hotel	42.70	42.74	0.04	83.20	83.27	0.07
R4	The Renaissance Hotel	40.32	40.35	0.03	78.29	78.34	0.05
R5	Radisson Blu Edwardian Hotel	38.56	38.58	0.02	75.97	76.01	0.03
R6	High Street Harlington	40.16	40.17	0.01	77.93	77.94	0.01
R7	High Street Harlington	37.94	37.94	0.00	76.08	76.08	0.00
R8	High Street Harlington	39.07	39.07	0.00	77.77	77.77	0.00
R9	Bath Road	40.25	40.25	0.00	78.87	78.87	0.00

As indicated in Table 23, predicted annual mean NO₂ concentrations exceeded the annual mean AQO at five of the nine sensitive receptor locations in the DM and DS scenario. This is expected due to their locations within an AQMA. It should be noted that no new exceedances were predicted as a result of the proposed development. Furthermore, R3 and R4 are located at hotels therefore the annual mean





objective does not apply to these locations. For the 1-hour mean, there were no exceedances of the AQO at any of the sensitive receptor locations.

Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 24 and predicted impacts on 1-hour mean NO₂ concentrations are summarised in Table 24.

Table 24 Predicted NO₂ Impacts - Annual Mean

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R1	Three Magpies Public House	0.05	103-109%	Negligible
R2	Sipson Road	0.08	95-102%	Negligible
R3	IBIS Styles Hotel	0.10	103-109%	Negligible
R4	The Renaissance Hotel	0.08	95-102%	Negligible
R5	Radisson Blu Edwardian Hotel	0.05	95-102%	Negligible
R6	High Street Harlington	0.03	95-10%	Negligible
R7	High Street Harlington	0.00	95-102%	Negligible
R8	High Street Harlington	0.00	95-102%	Negligible
R9	Bath Road	0.00	95-10%	Negligible

As indicated in Table 24, the significance of impacts on annual mean NO₂ concentrations as a result of the development was predicted to be **negligible** at all locations.

Table 25 Predicted NO₂ Impacts - 1-Hour Mean

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R1	Three Magpies Public House	0.03	75% or Less	Negligible
R2	Sipson Road	0.02	75% or Less	Negligible
R3	IBIS Styles Hotel	0.03	75% or Less	Negligible
R4	The Renaissance Hotel	0.02	75% or Less	Negligible
R5	Radisson Blu Edwardian Hotel	0.02	75% or Less	Negligible
R6	High Street Harlington	0.01	75% or Less	Negligible
R7	High Street Harlington	0.00	75% or Less	Negligible
R8	High Street Harlington	0.00	75% or Less	Negligible





Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R9	Bath Road	0.00	75% or Less	Negligible

As indicated in Table 25, the significance of impacts on 1-hour mean NO₂ concentrations as a result of the development was predicted to be **negligible** at all locations.

5.2.2 Particulate Matter

Predicted Concentrations at Sensitive Receptors

Similarly to NO₂, as there are sensitive receptor locations with varying land uses, different AQOs for PM₁₀ apply depending on whether the receptor is residential or hotel use. Annual mean concentrations and number of days where PM₁₀ exceeds the 24-hour mean AQO were therefore both predicted for the 2020 DM and DS scenarios and are summarised in Table 26 to 28.

Table 26 Predicted Annual Mean PM₁₀ Concentrations

Sensitive Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Three Magpies Public House	19.87	19.88	0.00
R2	Sipson Road	19.41	19.42	0.00
R3	IBIS Styles Hotel	20.15	20.16	0.01
R4	The Renaissance Hotel	19.82	19.82	0.01
R5	Radisson Blu Edwardian Hotel	19.47	19.48	0.00
R6	High Street Harlington	19.59	19.59	0.00
R7	High Street Harlington	19.22	19.22	0.00
R8	High Street Harlington	19.43	19.43	0.00
R9	Bath Road	19.50	19.50	0.00

As indicated in Table 26, annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptor locations for both scenarios considered.

Predicted impacts on annual mean PM₁₀ concentrations are summarised in Table 27.





Table 27 Predicted Annual Mean PM₁₀ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R1	Three Magpies Public House	0.01	75% or Less	Negligible
R2	Sipson Road	0.01	75% or Less	Negligible
R3	IBIS Styles Hotel	0.02	75% or Less	Negligible
R4	The Renaissance Hotel	0.01	75% or Less	Negligible
R5	Radisson Blu Edwardian Hotel	0.01	75% or Less	Negligible
R6	High Street Harlington	0.00	75% or Less	Negligible
R7	High Street Harlington	0.00	75% or Less	Negligible
R8	High Street Harlington	0.00	75% or Less	Negligible
R9	Bath Road	0.00	75% or Less	Negligible

As indicated in Table 27, impacts on annual mean PM₁₀ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations.

For 24-hour mean concentrations, the number of days with PM₁₀ concentrations greater than the AQO were predicted and are summarised in Table 28.

Table 28 Predicted 24-Hour Mean PM₁₀ Impacts

Sensitive Receptor		Predicted Number of Days with PM ₁₀ Concentrations Greater than 50µg/m ³		
		DM	DS	Change
R1	Three Magpies Public House	3.25	3.25	0.00
R2	Sipson Road	2.72	2.72	0.00
R3	IBIS Styles Hotel	3.59	3.60	0.01
R4	The Renaissance Hotel	3.18	3.19	0.01
R5	Radisson Blu Edwardian Hotel	2.79	2.79	0.00
R6	High Street Harlington	2.92	2.92	0.00
R7	High Street Harlington	2.52	2.52	0.00
R8	High Street Harlington	2.74	2.74	0.00
R9	Bath Road	2.81	2.81	0.00





As indicated in Table 28, 24-hour mean concentrations were below the relevant AQO (35 days with PM₁₀ concentrations greater than 50µg/m³) at all sensitive receptor locations for both scenarios considered. As such, impacts on 24-hour mean PM₁₀ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at all receptor locations. The overall significance of operational phase road traffic emission impacts was therefore determined to be **not significant**.

5.3 Operational Phase Assessment - Future Exposure

During the operational phase of the proposed development there is the potential for future users to be exposed to elevated pollutant concentrations as a result of road traffic exhaust emissions. Concentrations across the site were assessed through dispersion modelling, with the results presented in the following Sections. Reference should be made to Figures 7 to 14 for graphical representations of predicted concentrations during 2020.

5.3.1 Nitrogen Dioxide

As the proposals are for a hotel development, both the annual mean and 1-hour mean concentrations across the site have been presented for the DS scenario. Figures 7 to 10 display the contour plots for the predicted annual mean NO₂ concentrations and Figure 11 displays the contour plots for the predicted 1-hour annual mean NO₂ concentrations, at heights representative of the proposed development for the DS scenario.

Predicted annual mean NO₂ concentrations across the development site are summarised in Table 29.

Table 29 Predicted Annual Mean NO₂ Concentrations at the Development Site

Floor	Predicted 2020 Annual Mean NO ₂ Concentration Range (µg/m ³)	APEC Category
Ground (1.5m)	38.24 – 42.68	B - C
First (4.5m)	38.00 – 41.09	B
Second (7.5m)	37.59 – 39.10	A - B
Third (10.5m)	37.09 - 37.69	A

Table 29 indicates predicted concentrations are categorised as APEC - C to APEC - A across the site, in accordance with the London Councils Air Quality and Planning Guidance⁹. Exceedances of the annual mean AQO were predicted at locations of the proposed development adjacent to Bath Road however it should be noted that the annual mean objective does not apply to hotels and as such, 1-hour mean NO₂ concentrations across the development were predicted and are summarised in Table 30.

Table 30 Predicted 1-Hour Mean NO₂ Concentrations at the Development Site

Floor	Predicted 2020 1-Hour Mean NO ₂ Concentration Range (µg/m ³)
Ground (1.5m)	76.09 - 82.87





Table 30 indicates exceedances of the 1-hour mean AQO were not predicted at any location across the ground floor of the proposed development site therefore the site is considered suitable for the proposed end use without the inclusion of mitigation measures to protect future users from elevated NO₂ concentrations.

It should be noted that NO₂ levels are likely to be lower at elevated heights due to increased distance from emission sources, such as roads. This has been directly represented within the results and therefore predicted 1-hour mean concentrations above ground floor level have not been considered further in this assessment as they are likely to be lower.

5.3.2 Particulate Matter - Annual Mean

Annual mean PM₁₀ concentrations were predicted across the development at a height of 1.5m to represent exposure across the ground floor level for the DS scenario, as shown in Figure 12. Concentrations were predicted to be below the AQO across the entirety of the site both with and without the proposals in place, with levels ranging from 19.32µg/m³ to 20.22µg/m³ in the DS scenario. These are categorised as APEC - A, in accordance with the London Councils' criteria.

It should be noted that similar to NO₂, the annual mean AQO does not apply to hotel developments and therefore the PM₁₀ 24-hour mean has also been predicted.

5.3.3 Particulate Matter - 24 Hour Mean

The predicted number of days with 24-hour mean PM₁₀ concentrations greater than 50µg/m³ was predicted across the development at a height of 1.5m to represent the ground floor level, as shown in Figure 13. This does not indicate any exceedances of the AQO at any location across the site, with the number of days exceeding 50µg/m³ ranging from 2.6 to 3.7 in the DS scenario. This indicated the predicted number of days is below the permitted number of 35 at all locations on the development site.

It should be noted that figures showing predicted annual mean and 24-hour mean PM₁₀ concentrations at heights above the ground floor were not included as concentrations from road sources reduce at increased heights and therefore the relevant AQO will not be exceeded at other levels of the proposed development.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation measure to protect future users from elevated PM₁₀ concentrations.

5.4 Overall Impact Significance

The overall significance of operational phase road traffic impacts was determined as **not significant**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in Section 3. Further justification is provided in Table 31.





Table 31 Overall Operational Emission Impact Significance

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on NO ₂ and PM ₁₀ concentrations were predicted to be negligible at all sensitive receptors. These represent worst-case locations and therefore it is unlikely that any other receptors would be significantly affected by the proposed development
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The proposed development will not result in any new exposure to pollutant concentrations above the AQOs at sensitive locations
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The maximum change in annual mean NO ₂ and PM ₁₀ concentrations at all receptor locations were predicted to be 0.10% and 0.01% respectively, relative to the AQO. The maximum change in 1-hour mean NO ₂ concentrations at all receptor locations was predicted to be 4.51% relative to the AQO. NO ₂ and PM ₁₀ impacts were predicted to be negligible at all receptor locations
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were no exceedances of the annual mean, 1-hour mean or 24-hour mean AQO for NO ₂ and PM ₁₀ at sensitive locations within the modelling extents
The extent to which an objective is exceeded e.g. an annual mean NO ₂ concentration of 41µg/m ³ should attract less significance than an annual mean of 51µg/m ³	There were exceedances of the annual mean AQO for NO ₂ and PM ₁₀ at sensitive receptor locations within the modelling extents however the proposed development did not lead to any exceedances by significant margins

5.5 Air Quality Neutral Assessment

The proposals comprise the development of the site to provide a 157 room hotel. The change of use will impact on the total emissions of the site. These are assessed in the following Sections.

5.5.1 Road Transport

5.5.1.1 Benchmarks

As previously mentioned, there is currently no Transport Emissions Benchmark (TEB) for hotel developments. Therefore, the TEB has been calculated using the GLA Air Quality Neutral Planning Support¹⁰ guidance document based on retail land-use class as this was considered as the most similar to hotel use of the available land use types.

The gross internal area was provided by Architects Network Ltd, the appointed architects for the scheme. The TEBs are those provided in the GLA Air Quality Neutral Planning Support document and are detailed in Table 32.





Table 32 Transport Emission Benchmarks

Land Use	Quantity (m ²)	NO _x		PM ₁₀	
		TEB ((NO _x (g/m ² /year) / (g/dwelling/ year))	NO _x per Land Use (kg/year)	TEB ((PM ₁₀ (g/m ² /year) / (g/dwelling/ year))	PM ₁₀ per Land Use (kg/year)
Hotel	7445	249	1853.8	42.9	319.4
Total	-	-	1853.8	-	319.4

As indicated in Table 32, the total annual NO_x emission TEB is 1853.8kg/year and the total annual PM₁₀ emission TEB is 319.4g/year.

5.5.1.2 Development Emissions

Development road transport emissions were calculated using traffic data provided by Monson Engineering Ltd, the appointed Transport Consultants for the scheme. The number of daily trips was used to calculate annual NO_x and PM₁₀ based on emission factors provided in the GLA Air Quality Neutral Planning Support document, as shown in Table 12. A summary of the traffic data used in the assessment is provided in Table 33.

Table 33 Development Emissions - Traffic Data

Land use	24-hour AADT Flow	HDV Proportion (%)	Road Type	Average Distance (km/m ² /annum) or (km/dwelling/annum)
Hotel	299	0	London - Outer	5.4

The inputs outlined in Table 33 and Table 12 were utilised to calculate development road vehicle exhaust emissions. This is summarised in Table 34.

Table 34 Development Emissions - Road Vehicle Exhaust Emissions

Land Use	NO _x Emission (kg/year)	PM ₁₀ Emission (kg/year)
Hotel	208.03	35.71
Total	208.03	35.71

The TEB and development road traffic exhaust emissions were calculated using the inputs and methodology outlined in Section 3.4.2. These are summarised in Table 35.





Table 35 Development Road Vehicle Exhaust Emissions

Scenario	NO _x Emission (kg/year)	PM ₁₀ Emission (kg/year)
TEB	1853.81	319.39
Development Emissions	208.03	35.71
Difference	-1645.77	-283.68

As indicated in Table 35, annual NO_x road vehicle exhaust emissions are below the TEB. As such, no further action is required to tackle the excess NO_x and PM₁₀ emissions.





6. CONCLUSION

REC Ltd was commissioned by Acre Hotels Ltd to undertake an Air Quality Assessment in support of a proposed Hilton Hotel development at land off Bath Road, Harlington.

The proposals comprise the development of six storey hotel to provide 157 rooms. This is an increase from the original 128 room development. The resultant increase in trip generation has resulted in an increase in pollution concentrations at sensitive receptor locations, however the pollutant change from 128 rooms to 157 rooms is extremely small and has not changed the findings of the assessment.

The site is located within an AQMA and subsequently, there are concerns that the proposals will introduce future site users to poor air quality. Additionally, the development has the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was required to quantify baseline conditions, assess suitability for the proposed end-use and consider potential effects in the vicinity of the site.

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 GLA Supplementary Planning Guidance methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **negligible**.

During the operational phase of the development there is the potential for air quality impacts as a result of additional traffic generated as a result of the proposals. These were assessed using detailed dispersion modelling. This indicated predicted impacts on annual mean NO₂ and PM₁₀ levels were predicted to be **negligible** at all receptor locations with relevant exposure such as residential properties. Where the annual mean Air Quality Objective did not apply, 1-hour mean NO₂ and 24-hour mean PM₁₀ concentrations were also predicted. This indicated that predicted impacts were also considered to be **negligible**. The overall significance of potential impacts was therefore determined to be **not significant**, in accordance with the EPUK and IAQM guidance.

Dispersion modelling was also undertaken in order to quantify pollutant concentrations at the site. As the proposals are for hotel development, the annual mean Air Quality Objective does not apply at this location. Concentrations of NO₂ and PM₁₀ were predicted at various floor heights across the development. This indicated no predicted exceedances of relevant exposure of NO₂ and PM₁₀ concentrations across the development.

The GLA states that new developments must be considered Air Quality Neutral. Pollutant emissions associated with anticipated traffic flow as a result of the development were compared to relevant benchmarks. This indicated that NO_x and PM₁₀ emissions from the proposals were below the benchmarks and as such, further action is not required to tackle the excess NO_x and PM₁₀ emissions.

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





7. ABBREVIATIONS

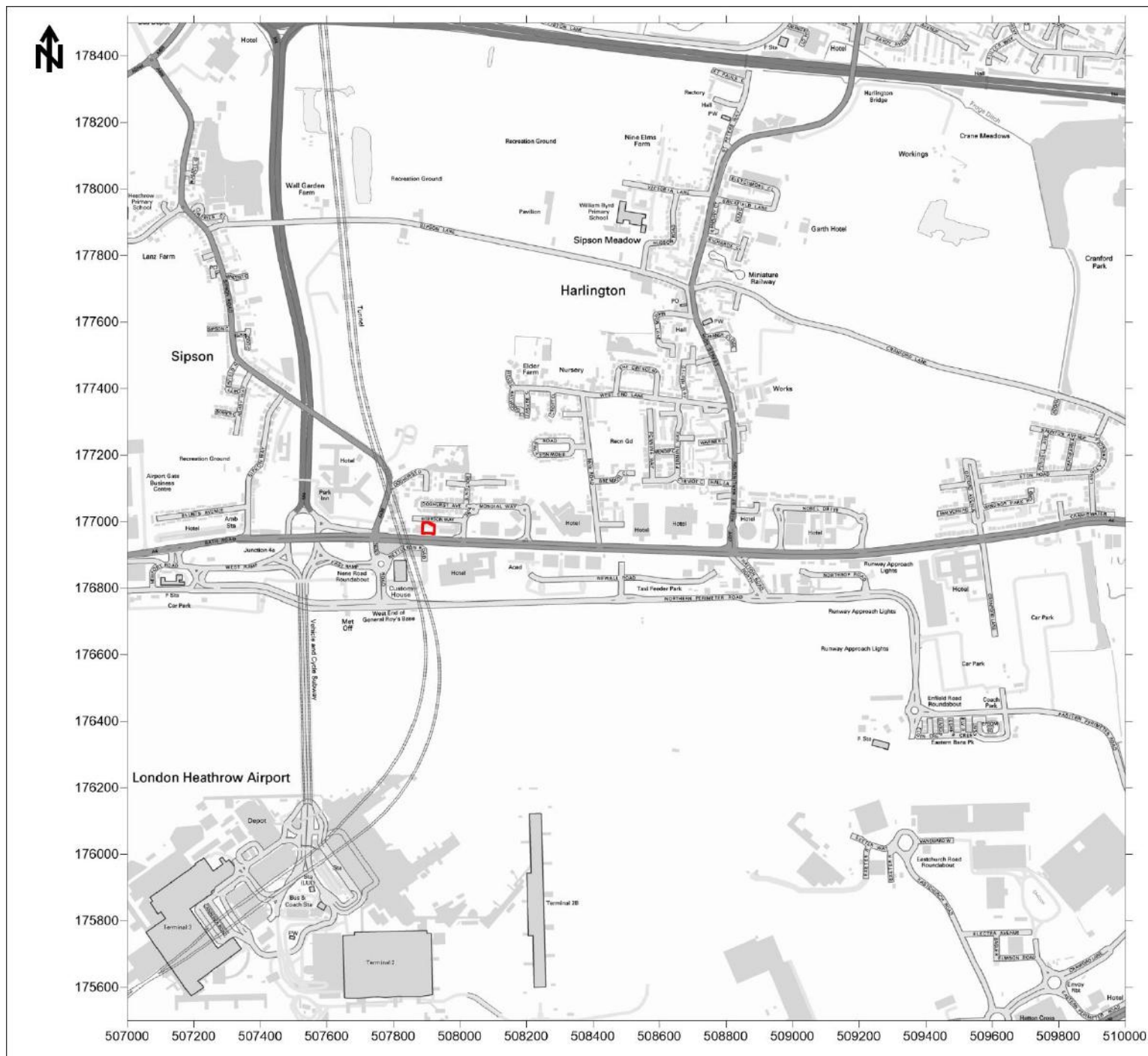
AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EPUK	Environmental Protection UK
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAEI	London Atmospheric Emissions Inventory
LBoH	London Borough of Hillingdon
LLAQM	London Local Air Quality Management
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
REC	Resource and Environmental Consultants
TEMPRO	Trip End Model Presentation Program
Z ₀	Roughness Length





APPENDIX I FIGURES





Legend



Site Boundary

Title

Figure 1
Site Location

Project

Air Quality Assessment
Hampton by Hilton, Heathrow

Project Number

AQ103490

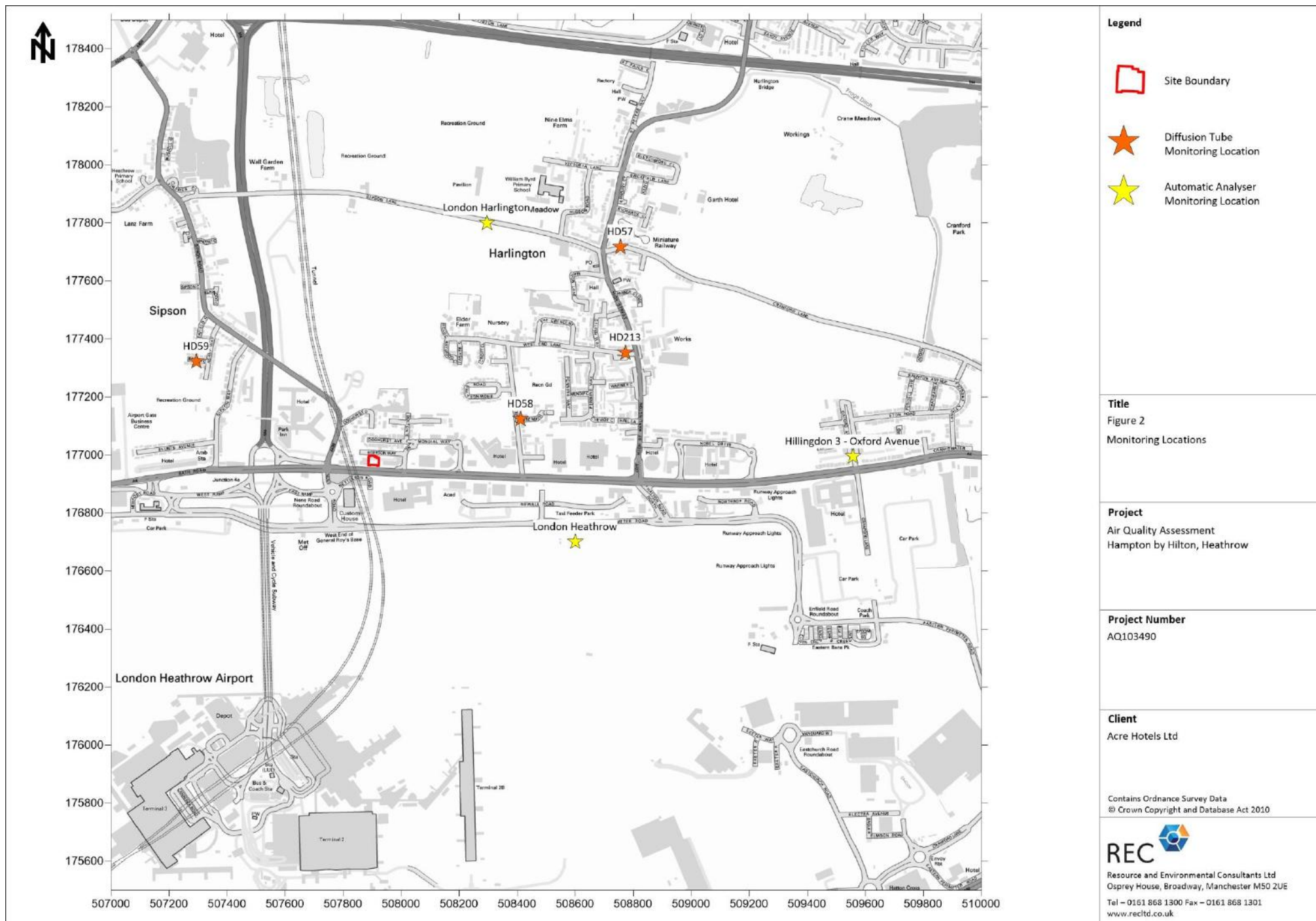
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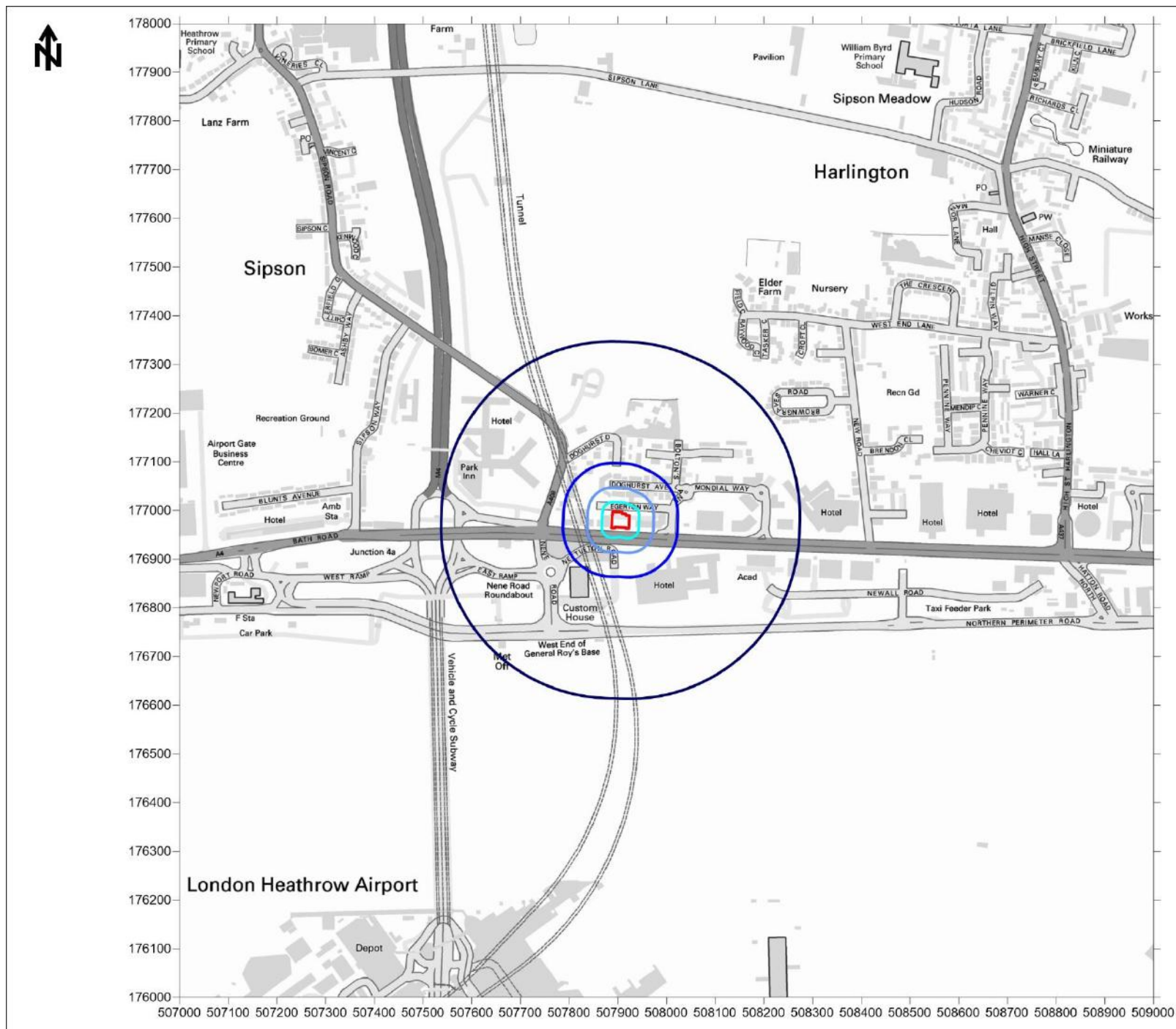
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Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M20 2UE
Tel - 0161 868 1300 Fax - 0161 868 1301
www.recltd.co.uk





Legend

-  Site Boundary
-  20m from Site Boundary
-  50m from Site Boundary
-  100m from Site Boundary
-  350m from Site Boundary

Title

Figure 3

Earthworks and Construction Dust
Buffer Zones

Project

Air Quality Assessment
Hampton by Hilton, Heathrow

Project Number

AQ103490

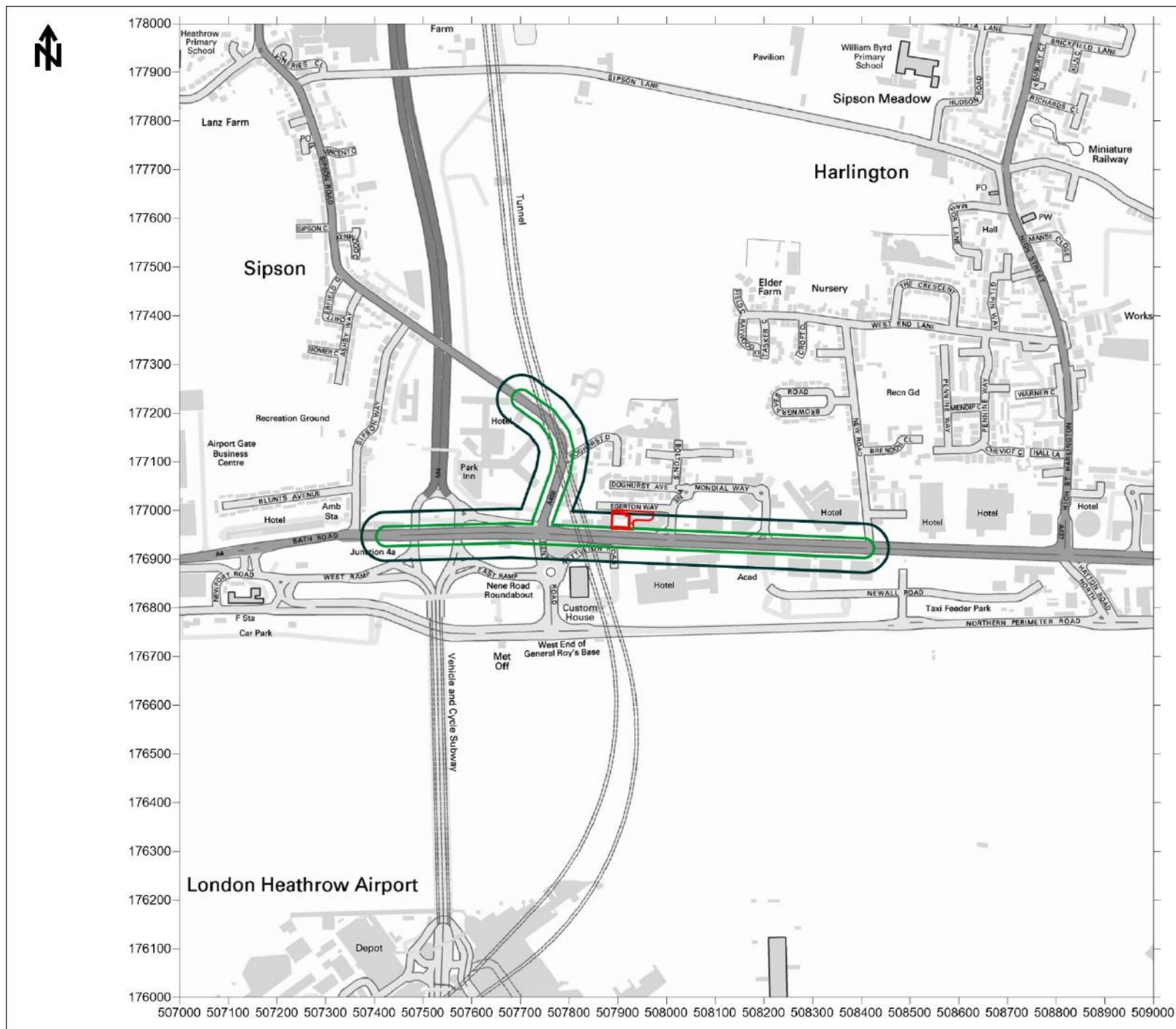
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Legend

- Site Boundary
- 20m from Site Access Route
- 50m from Site Access Route

Title

Figure 4
Trackout Dust Buffer Zones

Project

Air Quality Assessment
Hampton by Hilton, Heathrow

Project Number

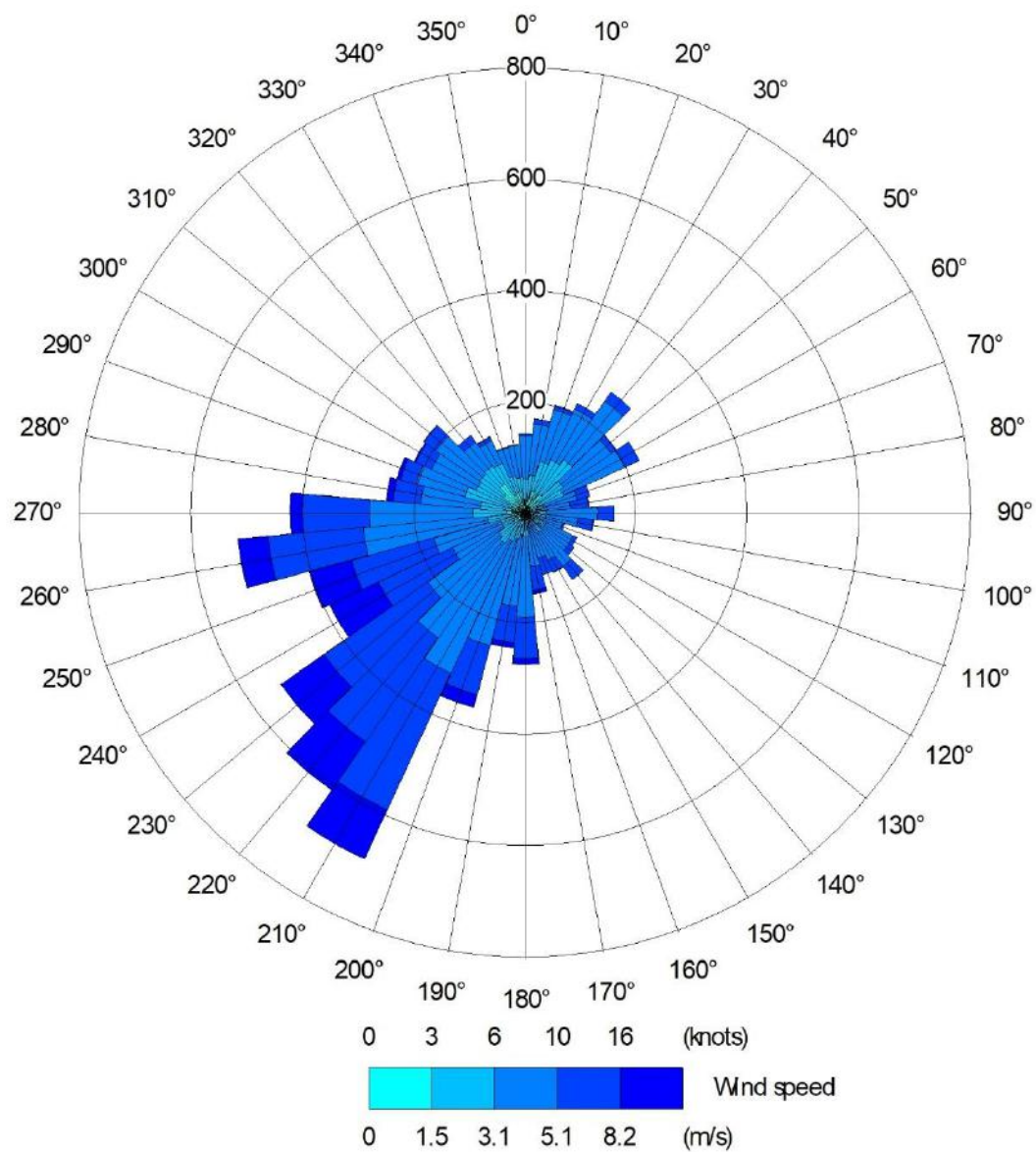
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Osprey House, Broadway, Manchester M20 2UE
Tel - 0161 868 1300 Fax - 0161 868 1301
www.rec ltd.co.uk



Legend

Title

Figure 5
2015 Wind Rose for Heathrow Airport
Meteorological Station

Project

Air Quality Assessment
Hampton by Hilton, Heathrow

Project Number

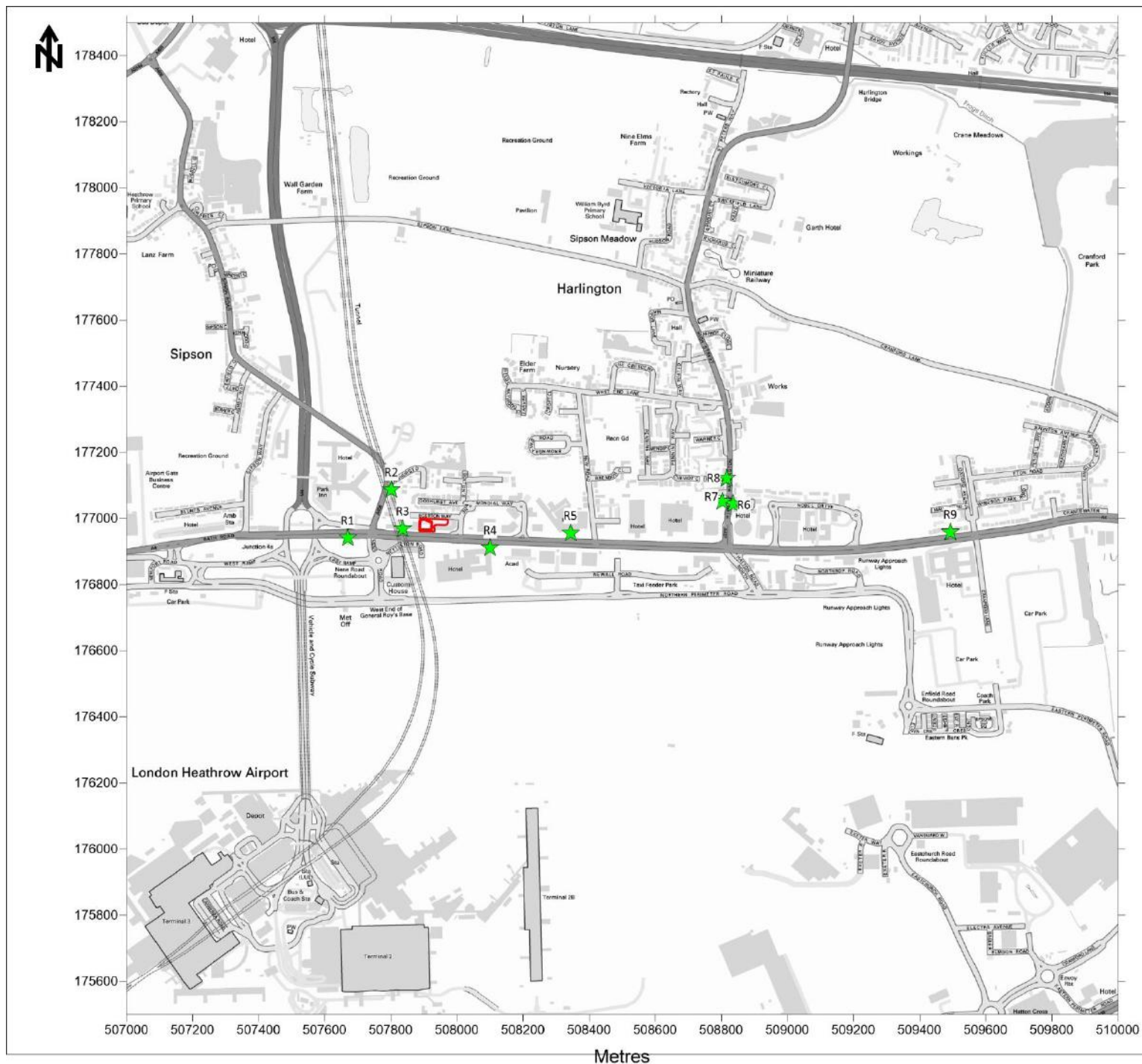
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Acre Hotels Ltd



Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
www.recld.co.uk



Legend

-  Site Boundary
-  Sensitive Receptor Location

Title

Figure 6
Traffic Exhaust Emissions
Sensitive Receptor Locations

Project

Air Quality Assessment
Hampton by Hilton, Heathrow

Project Number

AQ103490

Client

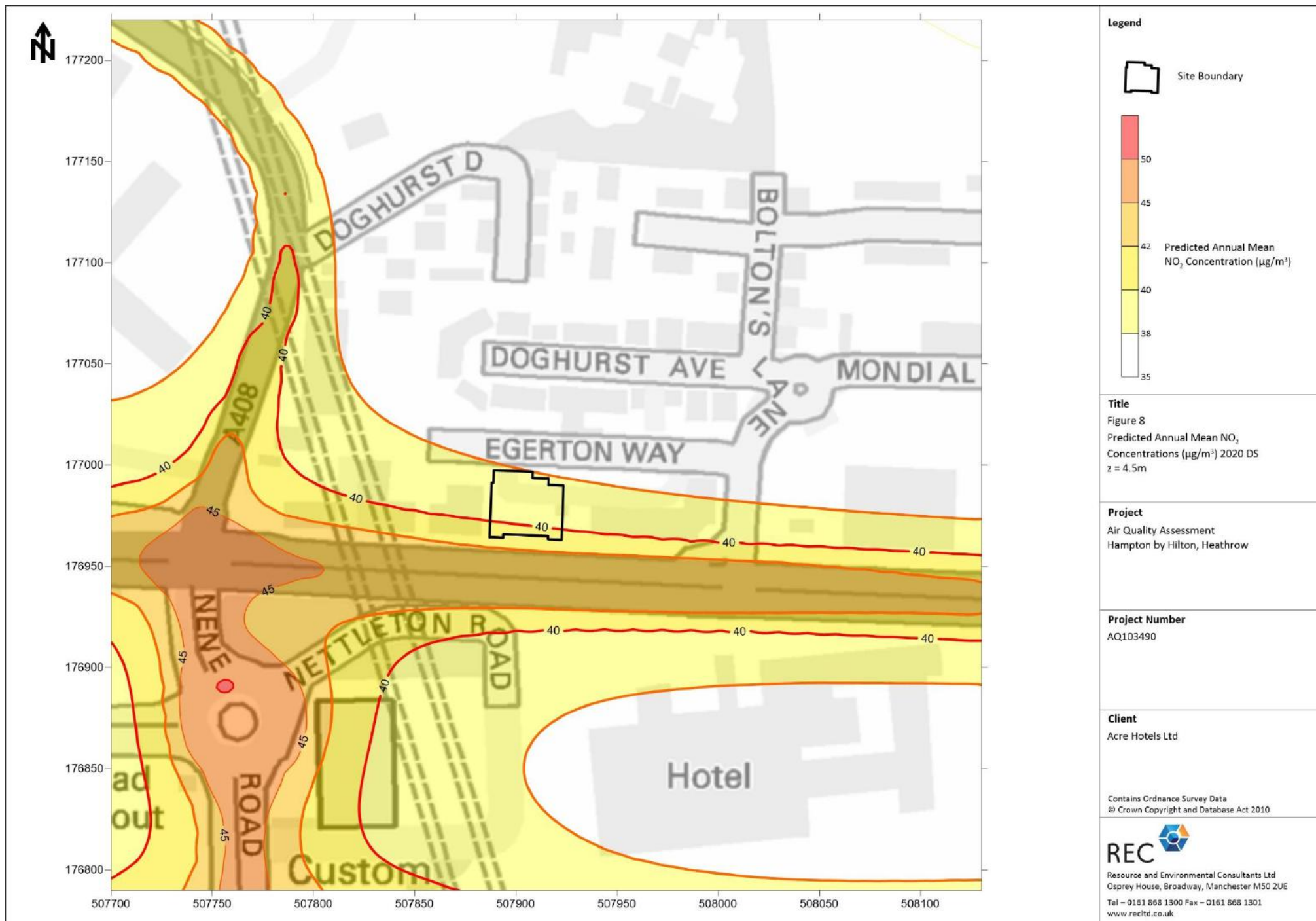
Acre Hotels Ltd

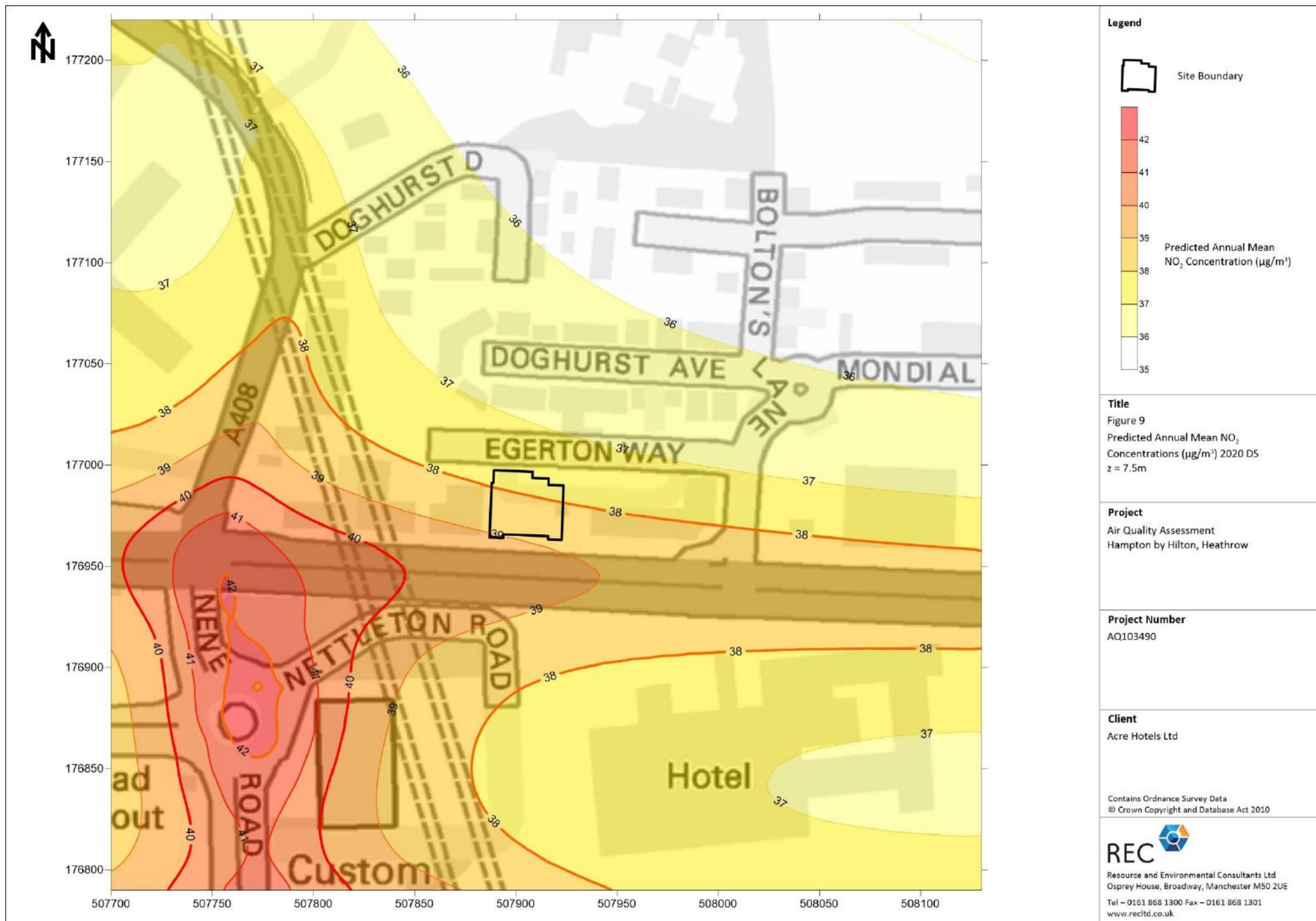
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Osprey House, Broadway, Manchester M50 2UE
Tel - 0161 868 1300 Fax - 0161 868 1301
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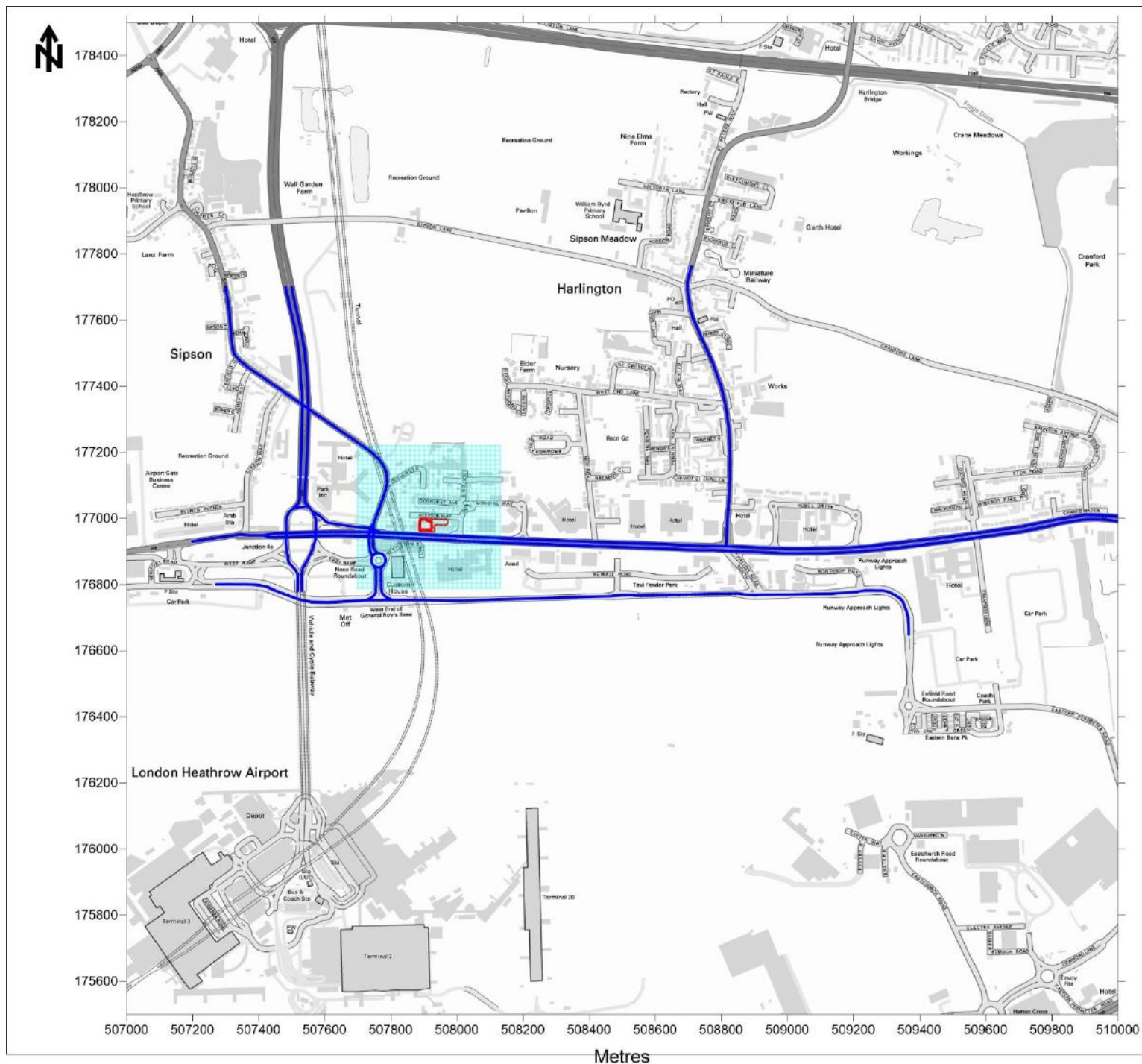












Legend

-  Site Boundary
-  Modelled Road Link
-  Cartesian Grid

Title

Figure 14
ADMS-Roads Input

Project

Air Quality Assessment
Hampton by Hilton, Heathrow

Project Number

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Osprey House, Broadway, Manchester M50 2UE
Tel - 0161 868 1300 Fax - 0161 868 1301
www.recltd.co.uk



APPENDIX II ASSESSMENT INPUT DATA





ASSESSMENT INPUTS

Vehicle trips associated with the development have the potential to result in air quality impacts as a result of increased traffic exhaust emissions. Additionally, the site is located within an AQMA which has the potential to expose future users to elevated pollution levels. Dispersion modelling using ADMS-Roads was therefore undertaken to predict NO₂ and PM₁₀ concentrations at sensitive locations both with and without the development in order to consider potential changes as a result of the proposals.

The dispersion 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; and
- ▶ Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.0.1.0). 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.

Assessment Area

Ambient concentrations were predicted over the area NGR: 507700, 176790 to 508130, 177220. One Cartesian grid at heights of 1.5 to 10.5 metres was used within the model to represent concentrations at ground floor to third floor level to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 14 for a graphical representation of the assessment grid extents.

Traffic Flow Data

24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from the London Atmospheric Emissions Inventory (LAEI). The updated version of the LAEI (2013) was released by the Greater London Authority (GLA) in and provides information on emissions from all sources of air pollutants in the Greater London area.





Growth factors provided by the Trip End Model Presentation Program (TEMPO) software package were utilised to allow for conversion from the obtained 2013 traffic flow year to 2015, which was used for model verification and from 2015 to 2020, which was used to represent the development opening year.

Road widths were estimated from aerial photography and UK highway design standards. Reference should be made to Figure 14 for a graphical representation of the road link locations. A summary of the traffic data used in the verification scenarios is provided in Table AII.1.

Table AII.1 2014 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L1	M4 Southbound	12.5	36,072	3.0	90
L1a	M4 South Roundabout	12.2	36,072	3.0	30
L2	M4 Northbound	10.9	36,072	3.0	90
L2a	M4 Northbound Roundabout	12.2	36,072	3.0	30
L3	Tunnel Road West	12.0	18,036	3.0	50
L3a	Tunnel Road West to Tunnel Road East	4.2	4,509	3.0	30
L4	Tunnel Road East	12.2	18,036	3.0	40
L5	M4 to A4	7.5	3,012	11.3	40
L5a	Junction to Bath Road	9.0	3,012	11.3	25
L6	Bath Road	12.0	27,531	7.6	55
L6a	Bath Road (West of Sipson Rd travelling East)	6.5	10,819	12.3	65
L6b	Bath Road (West of Sipson Rd travelling West)	6.5	10,819	12.3	65
L7	Sipson Road Junction Eastbound	9.5	10,236	5.1	25
L7a	Sipson Road Junction Westbound	9.0	10,236	5.1	25
L8	Bath Road (East of Sipson Road travelling East)	6.5	18,585	6.6	65
L8a	Bath Road (East of Sipson Road travelling West)	6.5	18,585	6.6	65
L9	Sipson Road in Sipson	5.5	11,834	5.7	25
L9a	Sipson Road	7.3	11,834	5.7	40
L9b	Sipson Road towards Junction	7.7	11,834	5.7	30
L9c	Sipson Rd Junction Southbound	5.0	5,917	5.7	20





Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L9d	Sipson Road Junction North	5.0	5,917	5.7	20
L10	Nene Road Southbound	5.8	9,584	9.0	25
L10a	Nene Road Northbound	7.3	9,584	9.0	25
L11	Nene Road Roundabout	9.0	19,169	9.0	25
L12	Nene Road Southbound	8.7	9,584	9.0	30
L12a	Nene Road Northbound	9.0	9,584	9.0	30
L13	Northern Perimeter Road West	9.5	24,541	14.1	60
L13a	Nene Road Junction	18.5	24,541	14.1	30
L13b	Northern Perimeter Road West	18.5	24,541	14.1	60
L14	Bath Road/High Street Harlington Junction East	8.8	9,329	11.9	25
L14a	Bath Road	6.8	10,435	11.0	50
L14b	Bath Road/Oxford Avenue Junction	7.2	10,436	11.0	30
L14c	Bath Road	6.8	13,071	7.8	50
L14d	Bath Road/High Street Harlington Junction West	8.5	9,329	11.9	30
L14e	Bath Road	6.8	10,438	11.0	50
L14f	Bath Road/Oxford Avenue Junction	7.2	10,436	11.0	30
L14g	Bath Road	6.8	13,071	7.8	50
L15a	High Street/Bath Road Junction	12.7	15,491	6.6	20
L15b	High Street Harrington	8.1	15,491	6.6	40
L15c	High Street Junction Approach	6.8	15,475	6.8	20

The road width and mean vehicle speed shown in Table All.1 remained the same for the 2020 DM and DS scenarios. A summary of the 2020 traffic data is shown in Table All.2.





Table AII.2 2020 Traffic Data

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L1	M4 Southbound	37,835	3.0	37,854	3.0
L1a	M4 South Roundabout	37,835	3.0	37,854	3.0
L2	M4 Northbound	37,835	3.0	37,854	3.0
L2a	M4 Northbound Roundabout	37,385	3.0	37,854	3.0
L3	Tunnel Road West	18,918	3.0	18,955	3.0
L3a	Tunnel Road West to Tunnel Road East	4,729	3.0	4,767	3.0
L4	Tunnel Road East	18,918	3.0	18,955	3.0
L5	M4 to A4	3,160	11.3	3,197	11.3
L5a	Junction to Bath Road	3,160	11.3	3,197	11.3
L6	Bath Road	28,877	7.6	28,914	7.6
L6a	Bath Road (West of Sipson Rd travelling East)	11,348	12.3	11,367	12.3
L6b	Bath Road (West of Sipson Rd travelling West)	11,348	12.3	11,367	12.3
L7	Sipson Road Junction Eastbound	10,737	5.1	10,812	5.1
L7a	Sipson Road Junction Westbound	10,737	5.1	10,812	5.1
L8	Bath Road (East of Sipson Road travelling East)	19,494	6.6	19,568	6.6
L8a	Bath Road (East of Sipson Road travelling West)	19,494	6.6	19,568	6.6
L9	Sipson Road in Sipson	12,412	5.7	12,487	5.7
L9a	Sipson Road	12,412	5.7	12,487	5.7
L9b	Sipson Road towards Junction	12,412	5.7	12,487	5.7
L9c	Sipson Rd Junction Southbound	6,206	5.7	6,244	5.7
L9d	Sipson Road Junction North	6,206	5.7	6,244	5.7
L10	Nene Road Southbound	10,053	9.0	10,090	9.0
L10a	Nene Road Northbound	10,053	9.0	10,090	9.0
L11	Nene Road Roundabout	20,106	9.0	20,181	9.0
L12	Nene Road Southbound	10,053	9.0	10,090	9.0
L12a	Nene Road Northbound	10,053	9.0	10,090	9.0





Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L13	Northern Perimeter Road West	25,741	14.1	25,759	14.1
L13a	Nene Road Junction	24,741	14.1	25,759	14.1
L13b	Northern Perimeter Road West	25,741	14.1	25,759	14.1
L14	Bath Road/High Street Harlington Junction East	9,785	11.9	9,785	11.9
L14a	Bath Road	10,946	11.0	10,946	11.0
L14b	Bath Road/Oxford Avenue Junction	10,947	11.0	10,947	11.0
L14c	Bath Road	13,710	7.8	13,710	7.8
L14d	Bath Road/High Street Harlington Junction West	9,785	11.9	9,785	11.9
L14e	Bath Road	10,948	11.0	10,948	11.0
L14f	Bath Road/Oxford Avenue Junction	10,947	11.0	10,947	11.0
L14g	Bath Road	13,710	7.8	13,710	7.8
L15a	High Street/Bath Road Junction	16,249	6.6	16,249	6.6
L15b	High Street Harrington	16,249	6.6	16,249	6.6
L15c	High Street Junction Approach	16,232	6.8	16,232	6.8

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 7.0) released in 2016, which incorporates updated COPERT4v11 vehicle emissions factors for NO_x and vehicle fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2015 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to the development opening year in order to provide a robust assessment.

Meteorological Data

Meteorological data used in this assessment was taken from Heathrow Airport meteorological station over the period 1st January 2015 to 31st December 2015 (inclusive). Heathrow Airport meteorological station is located at approximate NGR: 507061, 176504, which is approximately 1km south-west of the proposed development.





All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 for a wind rose of utilised meteorological data.

Roughness Length

A roughness length (z_0) of 1.5m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'large urban areas'.

A z_0 of 0.2m was utilised to represent the morphology of the meteorological station location and is suggested as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used in this dispersion modelling study. This value is considered appropriate for the nature of the assessment area and meteorological station location and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

An annual mean NO_2 concentration of $33.7\mu\text{g}/\text{m}^3$ was measured at the Hillingdon Sipson automatic monitoring site and PM_{10} concentration of $18.54\mu\text{g}/\text{m}^3$, as predicted by DEFRA, was used in the dispersion modelling assessment to represent annual mean pollutant levels in the vicinity of the site.

Similarly to emission factors, background concentrations for 2015 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate actual pollutant concentrations during the operation of the proposals.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO_2 concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LLAQM. TG (16)².

RMSE Calculation

There are a number of automatic monitoring locations in the vicinity of the proposed development, the closest of which are summarised in Table AII.3 which compares the difference between the modelled and monitored road NO_x for the automatic monitoring sites.





Table AII.3 Automatic Monitoring Modelling Results

Monitoring Location	Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)	Difference in Values
Hillingdon 3 - Oxford Avenue	1.73	5.73	-4.00
London Heathrow	24.15	1.10	23.05
London Harlington	-3.63	0.41	-4.04

The RMSE value for the NO₂ monitoring locations in the vicinity of the site was calculated at 13.70. It should be noted that the RMSE value alone does not necessarily mean that the model could have under predicted results by this error margin; it is also possible that the model over-predicted the results.

In this case, the RMSE process indicated that a review of the model performance at each of the automatic monitoring locations was required. This process indicated that the NO₂ concentrations at the London Harlington site were below the monitored background levels used in the assessment and as such, this location was omitted from the verification process. This is likely to have occurred as a result of aviation sources being included within the background concentrations due to the close proximity of Heathrow Airport. Furthermore, the London Harlington monitoring location is identified as a roadside location however it is not located adjacent to a major road. The low traffic levels on Sipson Road suggest that road vehicle exhaust emissions do not have a significant impact in that area.

Table AII.3 which suggests that the model was under predicting NO_x levels at the London Heathrow site. This is likely due to the complex nature of the air quality emissions in the Heathrow Airport area which the model does not have the capabilities to assess. However, by keeping this monitoring location within the verification process, it allows for a worst case scenario as the results are adjusted to this margin of error.

Verification

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

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

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

For the purpose of this assessment model verification was undertaken for 2015, using traffic data, meteorological data and monitoring results from this year.





LBoH undertakes monitoring of NO₂ concentrations at two roadside locations within the assessment extents. The road contribution to total NO_x concentration was calculated from the monitored NO₂ results for use in the verification process. This was undertaken following the methodology contained within GLA guidance LLAQM.TG (16)². The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table AII.4.

Table AII.4 2015 Monitoring Results

Monitoring Location	Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
Hillingdon 3 - Oxford Road	34.50	1.73
London Heathrow	44.20	24.15

The dispersion model was run with the traffic input data previously detailed for 2015 to predict the NO_x concentration at the monitoring locations. The results are shown in Table AII.5.

Table AII.5 Verification Results

Monitoring Location	Modelled Road NO _x Concentration (µg/m ³)
Hillingdon 3 - Oxford Road	5.73
London Heathrow	1.10

The monitored and modelled NO_x road contribution concentrations were graphed and the equation of the trendline based on the linear progression through zero calculated. This indicated a verification factor of **1.0754** was to be applied to all results.





Air Quality Assessment
Hampton by Hilton, Heathrow
July 2018
AQ103490r4

APPENDIX III ASSESSOR'S CURRICULUM VITAE





CONAL KEARNEY

Principal Air Quality Consultant

BEng(Hons), MSc, MIAQM, MEnvSc

KEY EXPERIENCE:

Conal is a Principal Consultant with specialist experience in the air quality and odour sector. His key capabilities include:

- ▶ Advanced atmospheric air dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS and AIRVIRO.
- ▶ Preparation of factual and interpretative Air Quality Assessment reports and Air Quality Environmental Statement chapters in the vicinity of proposed schemes and developments in accordance with DEFRA, Environment Agency and Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) methodologies.
- ▶ Management and delivery of project work on key, land development and urban regeneration projects.
- ▶ Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- ▶ Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- ▶ Dust and Odour impact assessments from minerals and waste sites
- ▶ Representing clients at public enquiries and planning hearings.

QUALIFICATIONS:

- ▶ Bachelor of Engineering
- ▶ Master of Science
- ▶ Member of Institute of Air Quality Management
- ▶ Member of the Institute of Environmental Science (IES)

SELECT PROJECTS SUMMARY:

Industrial Developments

Buck Park, Denholme - AQA and dust assessment for proposed mineral extraction and site restoration project.

Messingham Quarry, North Lincolnshire - AQA and dust impacts for proposed new sand extraction site.

Arden Quarry, Derbyshire - AQA for proposed mineral extraction and site restoration

Calder Brick Works, Yorkshire - AQA for proposed site restoration plan

Coopers Moss, St Helens AQA and dust assessment for materials import and site restoration.

Clayton Hall Landfill, Chorley - AQA and odour assessment for proposed landfill extension and mineral extraction.

Highways Developments

Alderley Edge Bypass, Cheshire - AQA for major new road scheme.

South Heywood – EIA for new link road and mixed use joint development

Residential Developments

Beck's Mill, Silsden – AQA and emissions calculation for proposed residential development

Bredbury Curve, Stockport - AQA assessment for proposed residential development in AQMA.

Hollin Lane, Middlesbrough – AQA for large scale residential development.

Friars School, Southwark, London. School development for mixed use education and residential building in AQMA.

Abbotsford House, Bearsden, Scotland – AQA and dust assessment for residential development

Kelvedon Street, Newport, South Wales – AQA for new housing development

Westcraig, Edinburgh - EIA for residential development

Public Sector

Technical advisor on Manchester Airport Consultative Committee - advise members on environmental technical matters in relation to the airport's operations.

Cheshire County Council - compile AQ chapters for Local Transport Plan

Cheshire East Council - specialist AQ advice on highways, minerals and waste projects

Local Air Quality Management

Broughton Gyratory, Chester - dispersion model for City Centre detailed assessment report

Congleton town centre - dispersion modelling assessment for detailed and further assessment reports.

Disley - dispersion modelling assessment for detailed and further assessments

Holmes Chapel - dispersion modelling assessment for detailed and further assessment reports for road and rail sources.

Crewe - town centre dispersion modelling for detailed and further assessment reports.

Commercial Developments

Granta Park Daycare Centre, Oxfordshire. AQA for new build daycare centre adjacent to major road.

Curzon Cinema, Colchester. Air quality assessment for town centre new build cinema.

Newfoundland Circus, Bristol - AQA for hotel development in city centre

Salesians School, Chertsey - AQA for school extension near M25





LEWIS ELLISON

Air Quality Consultant

MOcean.Geo (Hons)

KEY EXPERIENCE:

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

- ▶ Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail and commercial sectors.
- ▶ Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use.
- ▶ Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- ▶ Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- ▶ Production of air quality mitigation strategies for developments throughout the UK.
- ▶ Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- ▶ Master of Science

SELECT PROJECTS SUMMARY:

Residential Development:

AGFA Works, Seagate – Air Quality Assessment using ADMS-Roads in support of an 83 residential unit development with the potential to cause air quality impacts at sensitive locations.

Andrew Avenue, Breahead – Air Quality Assessment using ADMS-Roads in support of a 77 residential unit development in close proximity to the M8.

Clothorn Road, Didsbury – Air Quality assessment for a residential development consisting of 12 units in close proximity to an AQMA declared by Manchester city council.

Downend Road, Portchester – Air Quality Assessment in support of a 350 residential unit development in close proximity to the M27.

Great Leighs, Chelmsford- Baseline scoping report in support of several proposed large scale residential developments totalling 1300 residential units, with the potential to impact on nearby sensitive locations.

Parkview, Lofthouse Gate – Air Quality Assessment in support of a proposed 160 residential unit development in close proximity to two AQMA declared by Wakefield Metropolitan District Council.

Shields Road, Walkergate - Air Quality Assessment using ADMS-Roads in support of a 40 residential unit development in close proximity to the Shields Road.

Environmental impact assessment:

Bower Farm, Bridgewater – Production of an Air Quality Assessment with relevant mitigation measures for inclusion in an EIA report for part of the east Sedgemoor development.

Commercial Development:

ALDI, Hertford – Air Quality Assessment for the Proposed Aldi Superstore at Hertfordshire using ADMS-Roads.

Hortonwood West, Telford – Construction Environmental Management Plan (CEMP) for the expansion of the current factory on site.

Inverness Airport Business Park – Air Quality Scoping Report for a proposed hotel and commercial office space.

Odour assessment:

Wren Park Care Home, Shefford – Qualitative Odour Assessment of industrial units in the vicinity of a proposed extension to the current care home.

Marsh Farm, Basildon – Qualitative Odour Assessment of an anaerobic digesting unit in support of a follow up assessment for the unit.

Mixed-Use Development:

Coldharbour Land, Lambeth – Air Quality Assessment for a proposed mixed use development with the implementation of mitigation measures.

Old Fire Station, Newham, London- Air Quality Assessment using ADMS-Roads for a proposed mixed use development with the implementation of mitigation measures, in support of a redevelopment of the previous fire station.

Ordsall Lane, Salford – Air Quality Assessment in support of a mixed use development using ADMS-Roads.

