REC
Resource & Environmental Consultants Ltd

Air Quality Assessment
Finchley Bell, Finchley Road, London

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Prepared for:

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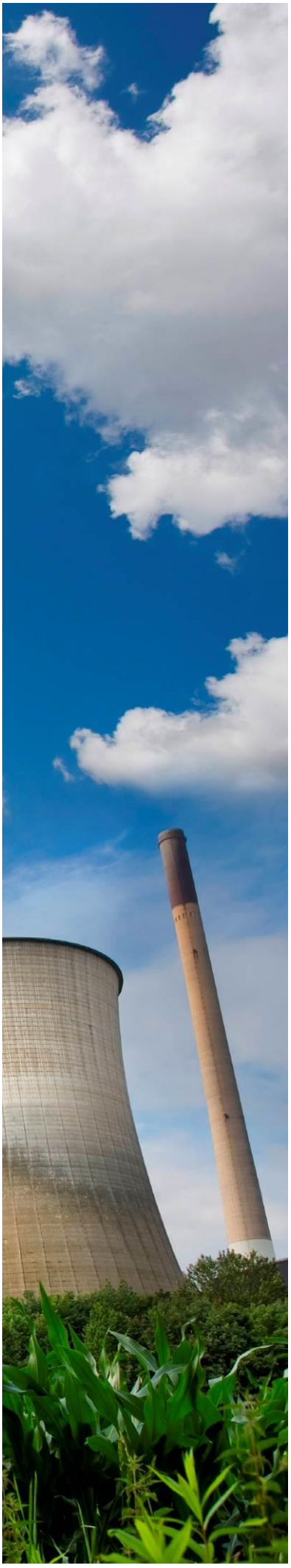

Osprey House, Pacific Quay, Broadway, Manchester, M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk

REC Air Quality

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Prepared by	Andrea Cordon	Lauren Haynes	
Signature			
Position	Graduate Air Quality Consultant	Graduate Air Quality Consultant	
Authorised by	Jethro Redmore	Jethro Redmore	
Signature			
Position	Air Quality Impact Group Manager	Air Quality Impact Group Manager	
Verified by	Paul Furmston	Paul Furmston	
Signature			
Position	Director	Director	
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EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd was commissioned by Caldecotte Consultants to undertake an Air Quality Assessment in support of the proposed redevelopment of the former Finchley Bell public house in Camden, London, for residential and commercial uses.

The proposals involve the demolition of the existing building on site to provide a commercial unit at ground floor level and 10 flats at first to fifth floor levels.

The development site is located within an area identified by the London Borough of Camden as experiencing elevated pollutant concentrations. As such, an Air Quality Assessment was required in order to determine baseline conditions, assess site suitability for the proposed end-use and consider potential impacts as a result of the proposals.

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. A risk assessment was therefore undertaken to consider the likelihood of effects at sensitive receptors in the vicinity of the site. Suitable mitigation measures were subsequently identified to control impacts to an acceptable level.

Dispersion modelling was undertaken in order to quantify existing pollutant concentrations across the site as a result of emissions from the local highway network. This indicated mechanical ventilation should be included within the proposed residential units on first floor level to reduce potential exposure of future residents to elevated pollutant concentrations. This type of mitigation is suggested within best practice guidance and is therefore considered suitable for a development of this size and nature.

Potential impacts during the operational phase of the development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. A screening assessment was therefore undertaken to consider changes in pollutant concentrations as a result of the proposals. This indicated air quality impacts associated with the development were not anticipated to be significant at any sensitive location in the vicinity of the site.

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APPENDICES

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd was commissioned by Caldecotte Consultants to undertake an Air Quality Assessment in support of the proposed redevelopment of the former Finchley Bell public house for residential and commercial uses.

The proposed development may cause air quality impacts during the construction and operational phases. Furthermore, the site is located within an area identified by the London Borough of Camden (LBoC) as having elevated pollutant concentrations. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential impacts as a result of the proposals.

1.2 Site Location and Context

The site is located on land off Finchley Road, Camden, London, at National Grid Reference (NGR): 526080, 185035. Reference should be made to Figure 1 for a location plan.

The proposals involve the demolition of the existing building on site to provide a commercial unit at ground floor level and 10 flats at first to fifth floor levels. It should be noted that there is no parking provision associated with the scheme. Reference should be made to Figure 2 and Figure 3 for site layout plans.

The scheme has the potential to cause air quality impacts at sensitive locations during the construction and operational phases. This may include dust emissions associated with construction works and road vehicle exhaust emissions from traffic generated by the development during the operational phase. Additionally, the proposed site is located within an Air Quality Management Area (AQMA), which has been declared due to exceedences of the annual mean Air Quality Limit Value (AQLV) for nitrogen dioxide (NO_2) and the 24-hour mean AQLV for particulate matter with an aerodynamic diameter of less than 10µm (PM_{10}). The development is also adjacent to the A41 - Finchley Road, a significant source of vehicle exhaust emissions. As such, pollutant levels at the site have been quantified to provide consideration of exposure of new residents to elevated concentrations and potential air quality impacts assessed within this 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.

2.0 AIR QUALITY LEGISLATION AND POLICY

2.1 European Legislation

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

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. Table 1 presents the AQLVs for pollutants considered within this assessment.

Table 1 Air Quality Limit Values

Pollutant	Air Quality Limit Value	
	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
PM_{10}	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year

Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out Air Quality

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

Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale.

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

2.5 National Planning Policy

The National Planning Policy Framework (NPPF)[2] was published on 27th March 2012 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

> "The planning system should contribute to and enhance the natural and local environment by: […]
>
> Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"
>
> "Planning policies should sustain compliance with and contribute towards EU limit

[2] National Planning Policy Framework, Department for Communities and Local Government, 2012.

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

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

2.6 Local Planning Policy

2.6.1 London Plan

The London Plan[3] was published in 2011 by the Greater London Authority (GLA) and sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

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

"Policy 5.3 - Sustainable design and construction

Strategic

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

Planning decisions

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

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

a. […]
d. minimising pollution (including noise, air and urban run-off)
e. […]"

"Policy 7.14 - Improving air quality

Strategic

A. The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport

[3] The London Plan, Greater London Authority, 2011.

and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

Planning decisions

B. Development proposals should:

a. minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)
b. promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'
c. be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs).
d. ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches
e. where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified […]"

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

2.6.2 Camden Core Strategy

Camden's Local Development Framework (LDF) consists of a portfolio of documents, of which the Core Strategy[4] is the principal overarching part. The Camden Core Strategy was formally adopted in 2010 and 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 2025. As such, the policies contained within the Core Strategy provide the current basis for the determination of planning applications within LBoC's area of jurisdiction.

A review of the Core Strategy indicated the following policy in relation to air quality that is relevant to this assessment:

[4] Camden Core Strategy, London Borough of Camden, 2010.

"CS16 - Improving Camden's health and well-being

The Council will seek to improve health and well-being in Camden. We will:

a. […];
e) recognise the impact of poor air quality on health and implement Camden's Air Quality Action Plan which aims to reduce air pollution levels."

Reference has been made to this policy during the undertaking of this Air Quality Assessment.

3.0 METHODOLOGY

The proposed development has the potential to expose new residents to elevated pollutant concentrations and cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology.

3.1 Construction Phase Assessment

During the construction phase of the proposed development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. In order to assess the likelihood of effects at sensitive receptors and identify suitable mitigation measures for the control of construction dust emissions, a risk assessment was undertaken in accordance with the GLA 'Best Practice Guidance: The Control of Dust and Emissions from Construction and Demolition'[5]. This document provides an assessment of potential risk associated with specific construction sites and activities, as summarised in Table 2, and provides suitable mitigation options to reduce potential impacts based on the rating of the particular site.

Table 2 Construction Dust - Site Risk Rating

Risk Rating	Criteria
High	• Development of over 15,000m^2 of land • Development of over 150 properties • Potential for emissions and dust to have significant effect on sensitive receptors
Medium	• Development of between 1,000m^2 and 15,000m^2 of land • Development of between ten and 150 properties • Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors
Low	• Development of up to 1,000m^2 of land • Development of one property and up to a maximum of ten • Potential for emissions and dust to have an infrequent impact on sensitive receptors

3.2 Operational Phase Assessment

3.2.1 Predicted Concentrations at the Development Site

The proposed scheme has the potential to expose new residents to elevated pollutant levels. Detailed dispersion modelling was therefore undertaken using ADMS-Roads in order to quantify NO_2 and PM_{10} concentrations across the site and consider the requirement for mitigation.

Reference should be made to Appendix II for assessment input data.

[5] Best Practice Guidance: Control of Dust and Emissions from Construction and Demolition, Greater London Authority, 2006.

3.2.2 Potential Development Impacts

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO_2 and PM_{10}, associated with vehicles travelling to and from the site. A screening assessment was therefore undertaken using the criteria contained within the Design Manual for Roads and Bridges (DMRB)[6] and Environmental Protection UK (EPUK) Development Control: Planning for Air Quality (2010 update)[7] guidance documents to determine the potential for trips generated by the development to affect local air quality.

The DMRB[8] provides the following criteria for determination of road links potentially affected by changes in traffic flow:

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

The EPUK Development Control: Planning for Air Quality (2010 update)[9] guidance document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will generate or increase traffic congestion, where 'congestion' manifests itself as an increase in periods with stop start driving;
- Proposals that will give rise to a significant change in either traffic volumes, typically a change in AADT or peak traffic flows of greater than ±5% or ±10%, depending on local circumstances (a change of ±5% will be appropriate for traffic flows within an AQMA), or in vehicle speed (typically of more than ±10km/hr), or both, usually on a road with more than 10,000 AADT (5,000 if 'narrow and congested');
- Proposals that would significantly alter the traffic composition on local roads, for instance, increase the number of HDVs by 200 movements or more per day; or,
- Proposals that include significant new car parking, which may be taken to be more than 100 spaces outside and AQMA or 50 spaces inside an AQMA.

Should these criteria not be met, then the DMRB[10] and EPUK guidance[11] documents consider air quality impacts associated with a scheme to be **negligible** and no further assessment is required.

Should screening of the traffic data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in NO_2 and PM_{10} concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the EPUK guidance[12].

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6 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
7 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.
8 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
9 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.
10 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
11 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.
12 Development Control: Planning for Air Quality (2010 update), Environmental Protection UK, 2010.

4.0 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), LBoC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 and 24-hour concentrations of PM_{10} are above the AQLVs within the borough. As such, an AQMA has been declared, which is described as:

"Camden AQMA - The whole borough"

The development is located within the Camden AQMA. As such, there is the potential for exposure to elevated pollutant concentrations for future residents and adverse impacts to existing air quality as a result of road vehicle exhaust emissions associated with the scheme. These factors have been considered within this assessment.

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

4.2 Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by LBoC using continuous and periodic methods throughout their area of jurisdiction. A review of the most recent LAQM report[13] indicated the closest monitoring location to the proposed development is Swiss Cottage at NGR: 526629, 184391. This is approximately 850m south east of the development boundary at a kerbside location. The site is operated as part of the London Air Quality Network[14] and monitors NO_2 and PM_{10}. Recent NO_2 monitoring results are shown in Table 3 and Table 4. Exceedences of the AQLV are shown in **bold** text.

Table 3 Swiss Cottage - Annual Mean NO_2 Monitoring Results

Site	Annual Mean Concentration (µg/m^3)		
	2010	2011	2012
Swiss Cottage	**82**	**71**	**70**

Table 4 Swiss Cottage - 1-hour Mean NO_2 Monitoring Results

Site	Number of Exceedences of 200µg/m^3 (hours)		
	2010	2011	2012
Swiss Cottage	**128**	**77**	**37**

[13] 2010 Air Quality Progress Report, London Borough of Camden, 2010.
[14] http://londonair.org.uk/LondonAir/Default.aspx.

As indicated in Table 3 and Table 4, the annual mean and 1-hour mean AQLVs for NO_2 were exceeded at Swiss Cottage during recent years. This is to be expected due to its kerbside location at a busy junction.

Recent PM_{10} monitoring results from Swiss Cottage are shown in Table 5 and Table 6.

Table 5 Swiss Cottage - Annual Mean PM_{10} Monitoring Results

Site	Annual Mean Concentration (µg/m^3)		
	2010	2011	2012
Swiss Cottage	26	27	23

Table 6 Swiss Cottage - 24-hour Mean PM_{10} Monitoring Results

Site	Number of Exceedences of 50µg/m^3 (days)		
	2010	2011	2012
Swiss Cottage	11	31	21

As indicated in Table 5 and Table 6, there were no exceedences of the annual mean or 24-hour mean AQLVs for PM_{10} at Swiss Cottage during recent years.

Reference should be made to Figure 4 for a map of the automatic monitoring site location in the context of the site.

LBoC also undertake periodic monitoring of NO_2 concentrations within their area of jurisdiction using passive diffusion tubes. There are three sites located in the vicinity of the proposed development and recent monitoring results are shown in Table 7. Exceedences of the AQLV are shown in **bold** text.

Table 7 NO_2 Diffusion Tube Monitoring Results

Site		Type	Annual Mean Concentration (µg/m^3)		
			2010	2011	2012
CA7	Frognal Way	Background	29.00	31.46	28.89
CA15	Swiss Cottage, Finchley Rd (triplicate)	Kerbside	**71.00**	**73.17**	**72.66**
CA17	47 Fitzjohn's Ave	Roadside	**73.00**	**58.39**	**61.20**

As indicated in Table 7, the annual mean AQLV for NO_2 was exceeded at diffusion tubes CA15 and CA17 during recent years. This is to be expected due to their location within the Camden AQMA.

Reference should be made to Figure 5 for a map of the diffusion tube locations in the vicinity of the site.

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: 526500, 185500. The most recent dataset, released in August 2012, for this location was downloaded from the DEFRA website[15] for the purpose of this assessment and is summarised in Table 8.

Table 8 Predicted Background Pollutant Concentrations

Pollutant	Predicted 2013 Background Concentration ($\mu g/m^3$)
NO_2	32.03
PM_{10}	19.32

As shown in Table 8, background pollutant concentrations are below the relevant AQLVs. Comparison with the roadside diffusion tube monitoring results shows the significant influence of emissions from the surrounding highway network on ambient concentrations.

[15] http://laqm.defra.gov.uk/maps/maps2010.html.

5.0 ASSESSMENT

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

5.1 Construction Phase Assessment

The proposals include the development of up to 1,000m^2 of land and therefore there is a **low** risk of potential dust impacts during the construction phase, in accordance with the criteria shown in Table 2. The GLA 'Best Practice Guidance: The Control of Dust and Emissions from Construction and Demolition' provides a number of potential mitigation measures to reduce potential impacts. These have been adapted for the proposed site as summarised in Table 9. These can 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 9 Fugitive Dust Mitigation Measures

Issue	Control Measure
Site planning	• Erect solid barriers around dusty activities or the site boundary • No bonfires • Plan site layout - machinery and dust causing activities should be located away from sensitive receptors
Construction traffic	• All vehicles to switch off engines - no idling vehicles • Wash or clean all vehicles effectively before leaving the site if close to sensitive receptors • All loads entering and leaving site to be covered • No site runoff of water or mud • All non road mobile machinery (NRMM) to use ultra low sulphur tax-exempt diesel (ULSD) where available • On-road vehicles to comply with the requirements of the Low Emission Zone (LEZ) as a minium
Earth moving works	• Minimise dust generating activities • Use water as dust suppressant where applicable • Keep stockpiles for the shortest possible time
Demolition	• Use water as dust suppressant • Cutting equipment to use water as suppressant or suitable local exhaust ventilation systems • Securely cover skips and minimise drop heights

It is considered the use of the mitigation measures outlined in Table 9 should control potential dust impacts to an acceptable level throughout the construction phase.

5.2 Operational Phase Assessment

5.2.1 Predicted Concentrations at the Development Site

The proposed development has the potential to expose new residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix II to quantify NO_2 and PM_{10} concentrations across the site and consider the requirement for mitigation.

Reference should be made to Figure 6 to Figure 11 for graphical representations of predicted annual mean NO_2 and PM_{10} concentrations and the predicted number of days with PM_{10} concentrations greater than 50µg/m^3 across the proposed development.

Nitrogen Dioxide

Figure 6 to Figure 9 display the contour plots for predicted annual mean NO_2 concentrations at different floor levels on the proposed development site.

The results indicate elevated NO_2 concentrations across the assessment area, with exceedences of the annual mean AQLV predicted at ground and first floor levels. This is to be expected due to the existing background NO_2 concentration in the vicinity of the site and results are consistent with the AQMA declaration. Predicted concentrations at second floor level were below the AQLV at all locations on the development site.

As seen in Figure 9, the area of exceedence at first floor level covers all proposed residential units.

Modelling was not undertaken for third, fourth and fifth floor levels as concentrations would be lower than those predicted for the second floor.

It should be noted that background pollutant levels area likely to be lower at elevated heights due to increased distance from emission sources, such as roads. This has not been directly represented within the results and therefore predicted levels at heights above ground level are considered to represent worst-case concentrations.

Proposed mitigation to reduce the potential for exposure of future residents to elevated NO_2 levels is discussed in Section 6.0.

Measurements across the UK have shown that the 1-hour AQLV for NO_2 is unlikely to be exceeded unless the annual mean NO_2 concentration is greater than 60µg/m^3. Therefore, this is used as an indicator of potential exceedences of the 1-hour mean AQLV for NO_2, in accordance with the methodology outlined in DEFRA guidance LAQM.TG(09)[16].

As shown in Figure 6 to Figure 9, annual mean NO_2 concentrations were predicted to be below 60µg/m^3 across the development site and, as such, exceedences of the 1-hour mean AQLV are unlikely.

[16] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

Particulate Matter

As shown in Figure 10 and Figure 11, there were no predicted exceedences of the annual mean or 24-hour mean AQLVs for PM_{10} at any location within the assessment extents.

5.2.2 Potential Development Impacts

Any additional vehicle movements associated with the proposed development will generate exhaust emissions, such as NO_2 and PM_{10} on the local and regional road networks. Information on anticipated trip generation associated with the development was not available at the time of the assessment. However, due to the small number of proposed units, zero parking nature of the proposals and the high public transport accessibility of the site, it is not anticipated that a significant number of vehicle trips will be generated by the proposals during the operational phase.

Based on the above information, the proposed development is not anticipated to result in a change in AADT flows of more than 1,000, produce over 200 HDV movements per day or significantly affect average speeds on the local road network. Additionally, it is unlikely that the proposed development will generate or increase traffic congestion, give rise to a significant change in AADT or peak traffic flows or in vehicle speed, significantly alter the traffic composition on local roads or include significant new car parking. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **negligible**, in accordance with the DMRB and EPUK screening criteria shown in Section 3.2.2.

6.0 MITIGATION

6.1 Construction Phase

Reference should be made to Table 9 for suggested fugitive dust mitigation measures for the proposed development.

6.2 Operational Phase

There are a number of air quality mitigation options available to reduce potential exposure of future residents to elevated pollutant concentrations or off-set impacts associated with a development. However, all techniques have financial implications and may therefore affect scheme viability. As such, they should only be included if necessary.

Detailed dispersion modelling undertaken at heights equivalent to the proposed floors indicated that exceedences of the annual mean AQLV for NO_2 were predicted throughout the development site at ground and first floor levels. It is proposed to include a mechanical ventilation system for all residential units at first floor height to provide a supply of clean air from a location where pollutant concentrations are below the relevant AQLV. The inlet should be positioned at a height of 7.5m or above on the western façade of the building, away from the A41 - Finchley Road, preferably at roof level. This should reduce the potential for exposure of future residents to elevated NO_2 concentrations. Mechanical ventilation is suggested within the EPUK guidance document 'Development Control: Planning for Air Quality (2010 Update)' and as such is considered a suitable solution for a development of this size and nature.

It should be noted that pollutant concentrations have not been considered at the proposed commercial units at ground floor level. This was because they are not considered a location of relevant exposure in accordance with the Air Quality Standards Regulations (2010) and AQS.

The development is not predicted to cause significant air quality impacts at any location and may result in an overall reduction in emissions when compared with existing residential properties due to the car-free proposals and improved energy efficiency associated with new builds. Although high NO_2 concentrations were predicted across the site, this was due to the existing elevated background levels. As such, it is considered planning consent should not be refused on air quality grounds subject to the inclusion of mechanical ventilation, as proposed.

7.0 CONCLUSION

REC Ltd was commissioned by Caldecotte Consultants to undertake an Air Quality Assessment in support of the proposed redevelopment of the former Finchley Bell public house in Camden, London, for residential and commercial uses.

The development site is located within an area identified by LBoC as experiencing elevated pollutant concentrations. As such, an Air Quality Assessment was required in order to determine baseline conditions, assess site suitability for the proposed end-use and consider potential impacts as a result of the development.

During the construction phase of the proposed development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. A risk assessment was therefore undertaken in accordance with the GLA 'Best Practice Guidance: The Control of Dust and Emissions from Construction and Demolition' to consider the likelihood of effects at sensitive receptors in the vicinity of the site and identify suitable mitigation measures. Subject to the implementation of the identified control measures, construction dust impacts are not considered to be significant.

Dispersion modelling was undertaken using ADMS-Roads in order to predict NO_2 and PM_{10} concentrations across the site as a result of emissions from the local highway network. The results were utilised to provide consideration of potential exposure of future residents to elevated pollution levels.

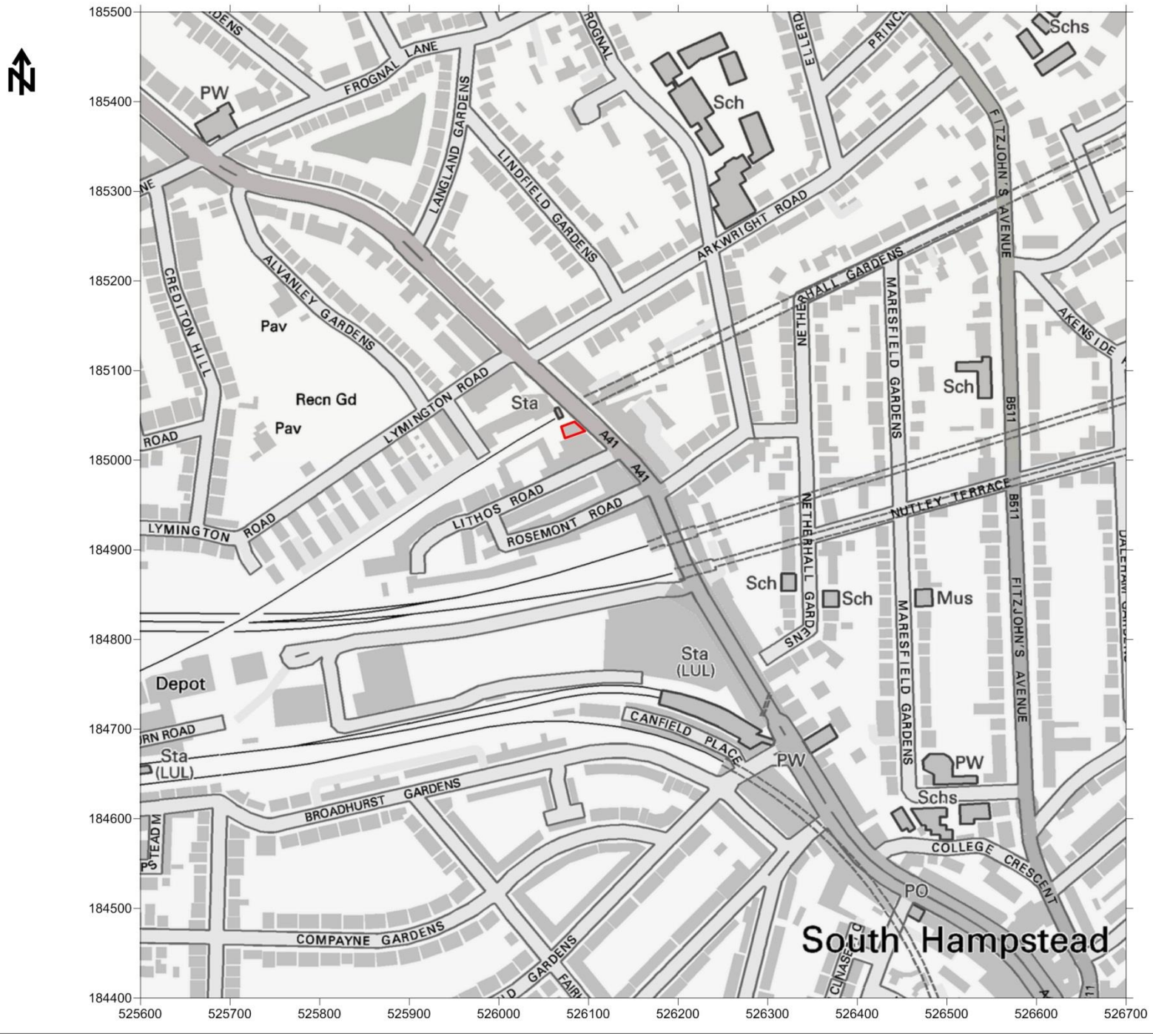
The results of the dispersion modelling assessment indicated that predicted annual mean concentrations of NO_2 exceeded the relevant AQLV at ground and first floor levels. As such, mechanical ventilation should be included on the specified units within the development in order to reduce the potential for exposure of future residents to elevated NO_2 concentrations. Mechanical ventilation is suggested within EPUK guidance and is therefore considered a suitable solution for a development of this size and nature.

Potential impacts during the operational phase of the proposed development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. An assessment was therefore undertaken using the DMRB and EPUK screening criteria to determine the potential for trips generated by the development to affect local air quality. This indicated that impacts are likely to be **negligible** throughout the operational phase. As such, air quality impacts are not considered to be a constraint to planning consent.

8.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EPUK	Environmental Protection UK
EU	European Union
GLA	Greater London Authority
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
LA	Local Authority
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LBoC	London Borough of Camden
LDF	Local Development Framework
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NRMM	Non-Road Mobile Machinery
$PM_{2.5}$	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
ULSD	Ultra Low Sulphur Diesel
z_0	Roughness length

APPENDIX I FIGURES



Legend

Site Boundary

Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

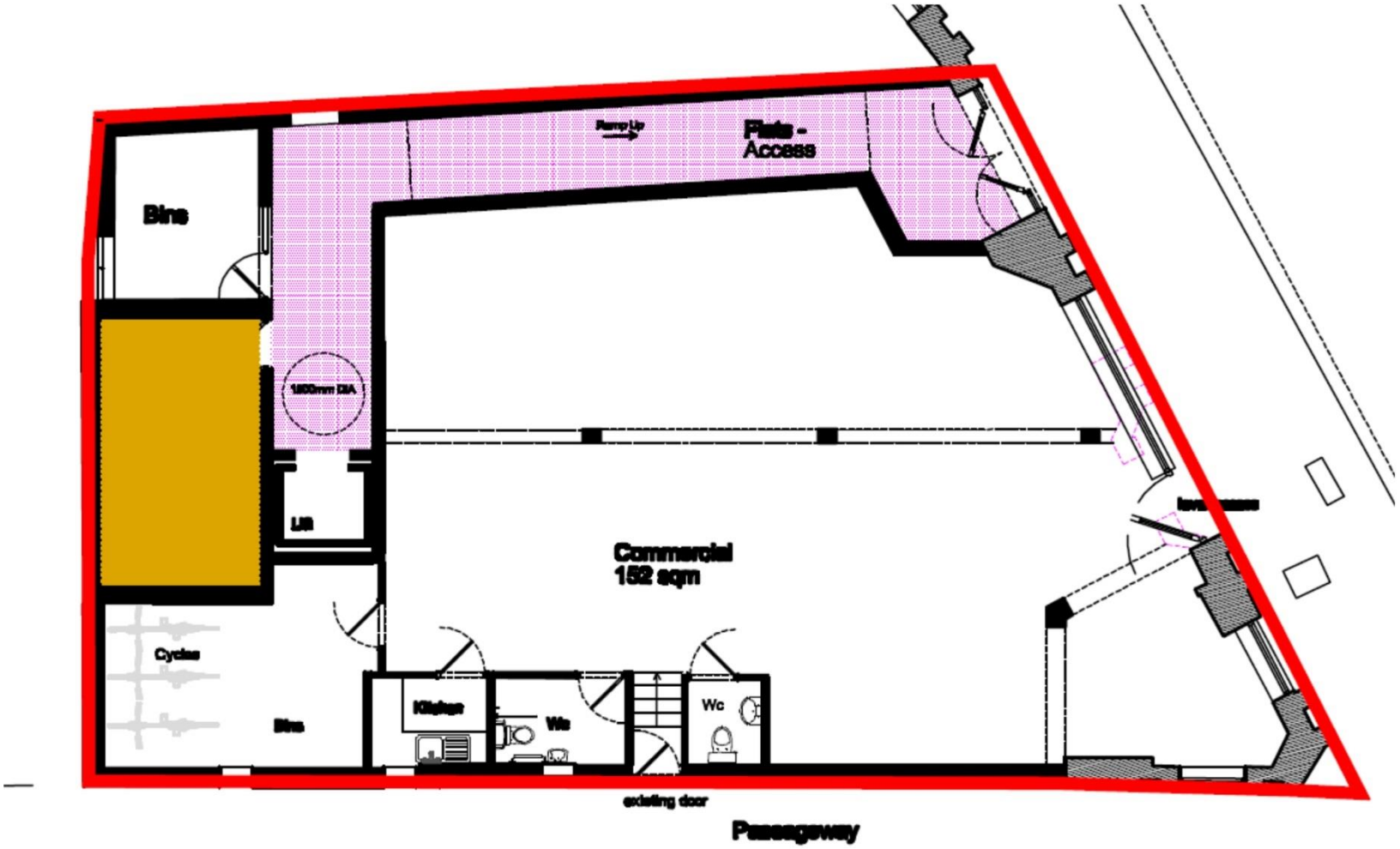
33433

Client

caldecotte consultants

Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Title
Figure 2 - Ground Floor Plan

Project
Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number
33433

Client
caldecotte CC consultants

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Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
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First and Second Floor

Third to Fifth Floor

Legend

Title

Figure 3 - First to Fifth Floor Plans

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

33433

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Tel – 0161 868 1300 Fax – 0161 868 1301
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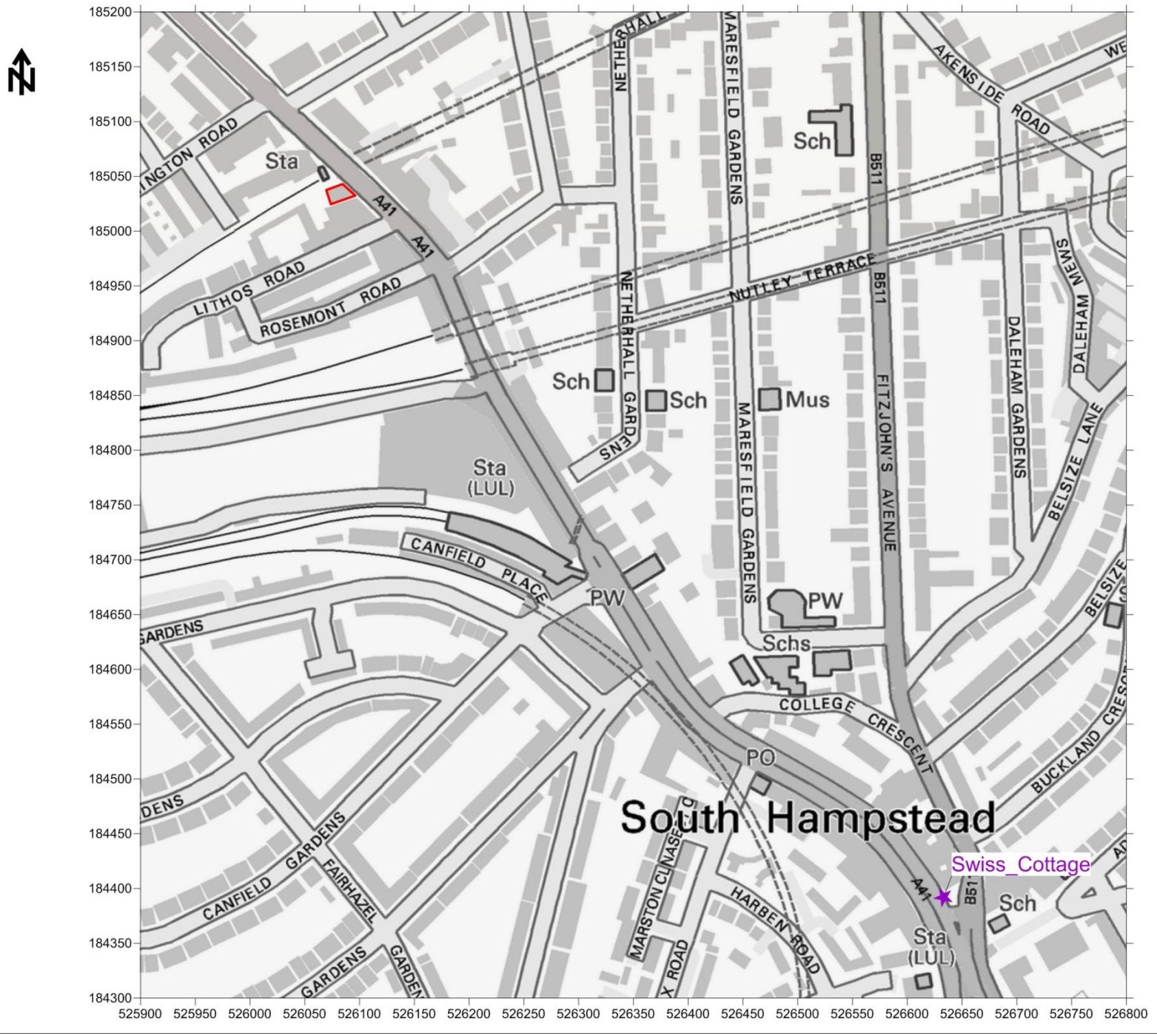

Legend

Site Boundary

Automatic Monitoring Site

Title

Figure 4 - Automatic Monitoring Sites

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

33433

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Resource and Environmental Consultants Ltd
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Tel – 0161 868 1300 Fax – 0161 868 1301
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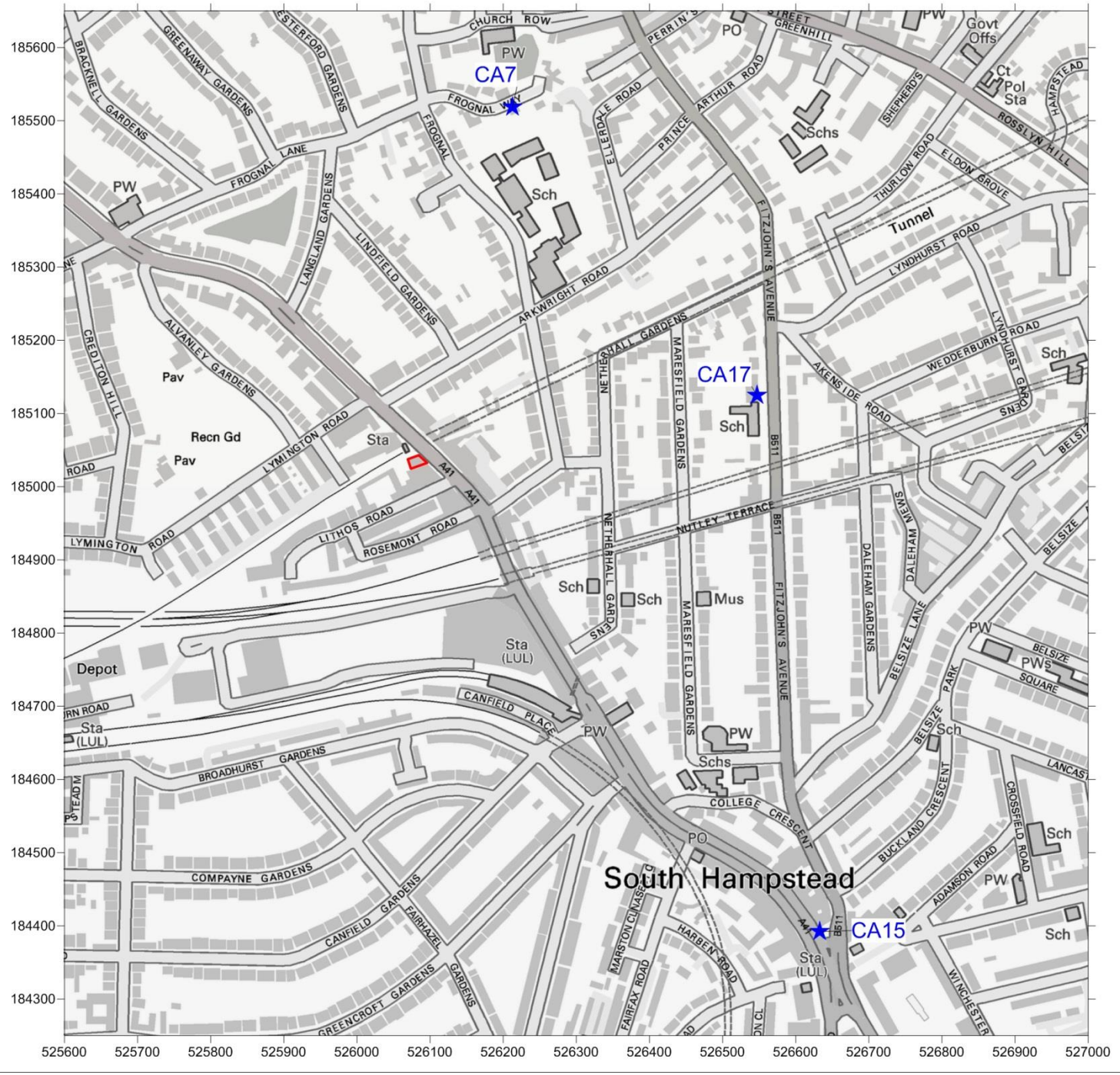

Legend

Site Boundary

Diffusion Tube Location

Title

Figure 5 - NO2 Diffusion Tube Locations

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

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caldecotte consultants

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Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
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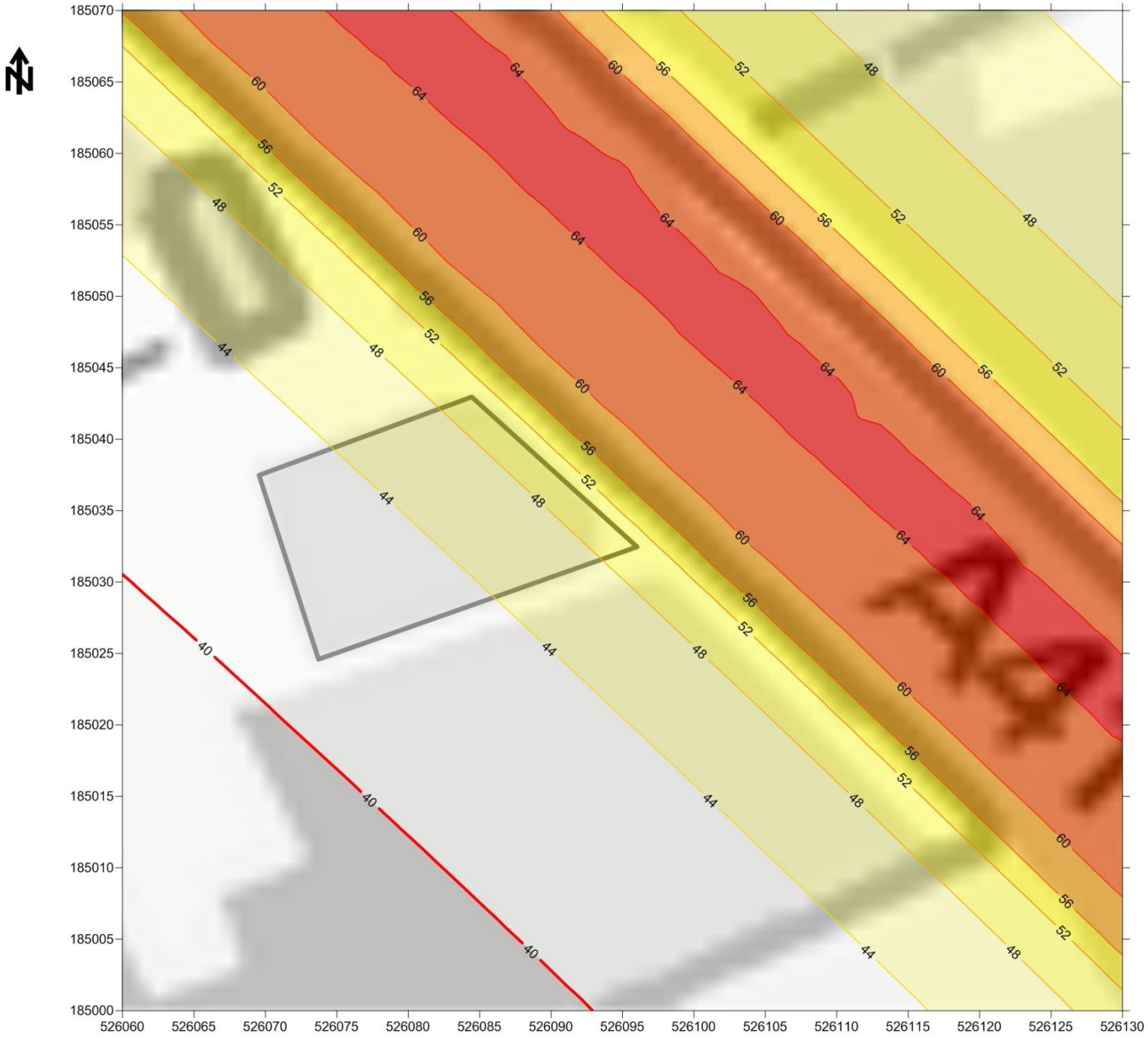

Legend

Site Boundary

64
60
56
52
48
44
40

Predicted Annual Mean NO2 Concentration (µg/m3)

Title

Figure 6 - Predicted 2012 Annual Mean NO2 Concentrations (µg/m3)
z = 1.5m

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

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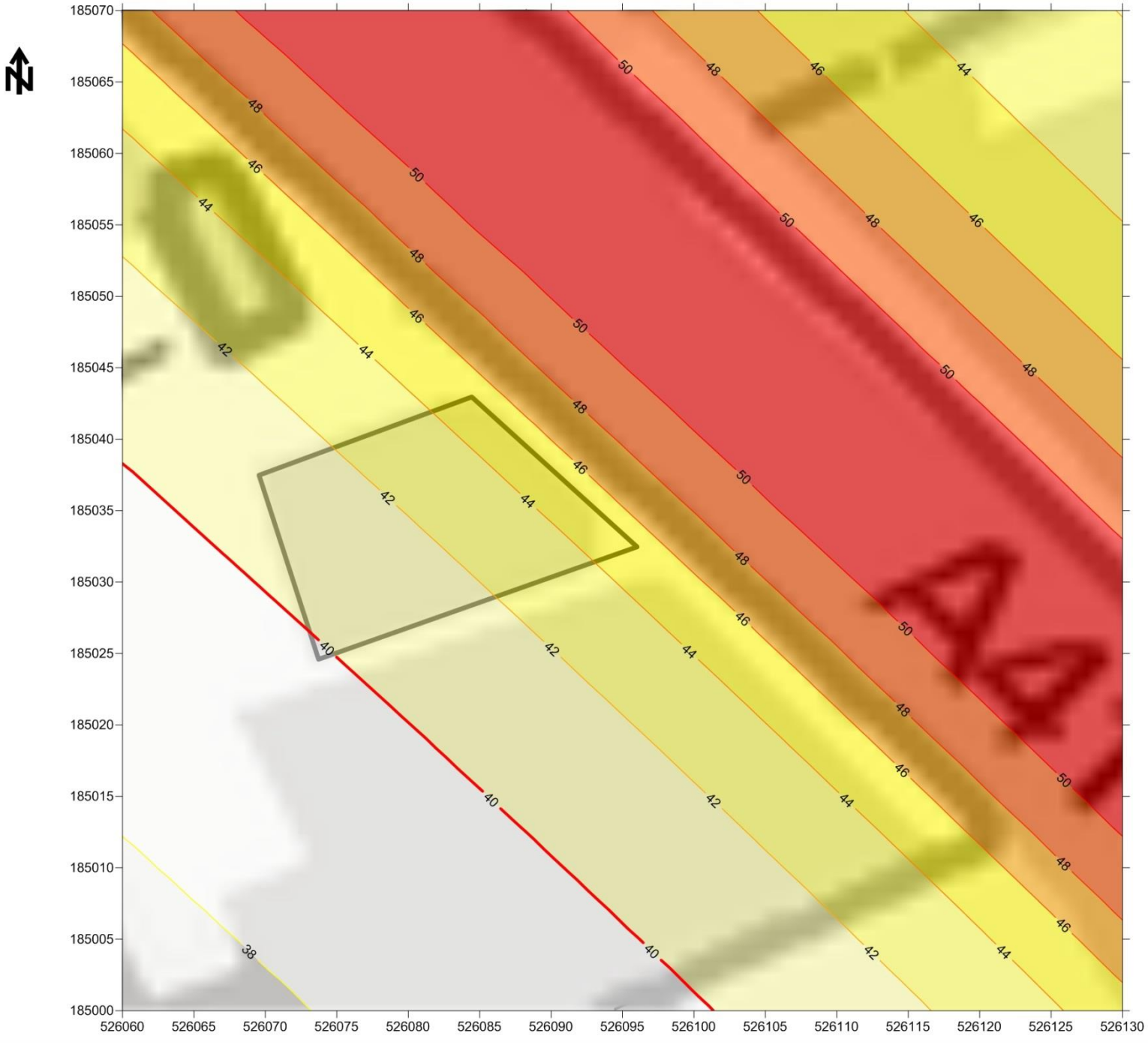
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Site Boundary

50
48
46
44
42
40
38

Predicted Annual Mean NO2 Concentration (µg/m3)

Title

Figure 7 - Predicted 2012 Annual Mean NO2 Concentrations (µg/m3)
z = 4.5m

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

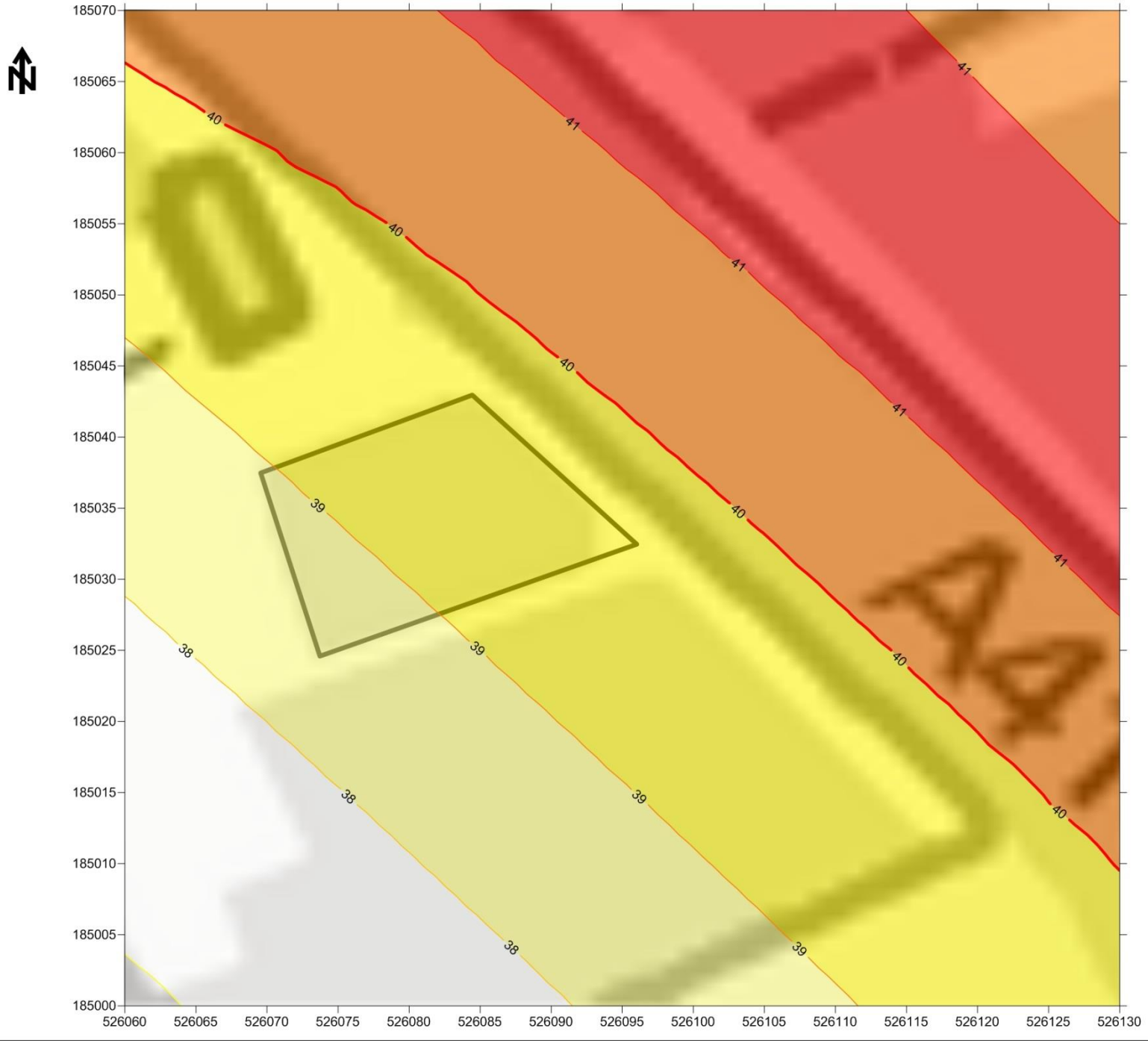
33433

Client

caldecotte CC consultants

REC Resource & Environmental Consultants Ltd
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Site Boundary

41
40
39
38
37

Predicted Annual Mean NO2 Concentration (µg/m3)

Title

Figure 8 - Predicted 2012 Annual Mean NO2 Concentrations (µg/m3)
z = 7.5m

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

33433

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REC Resource & Environmental Consultants Ltd
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
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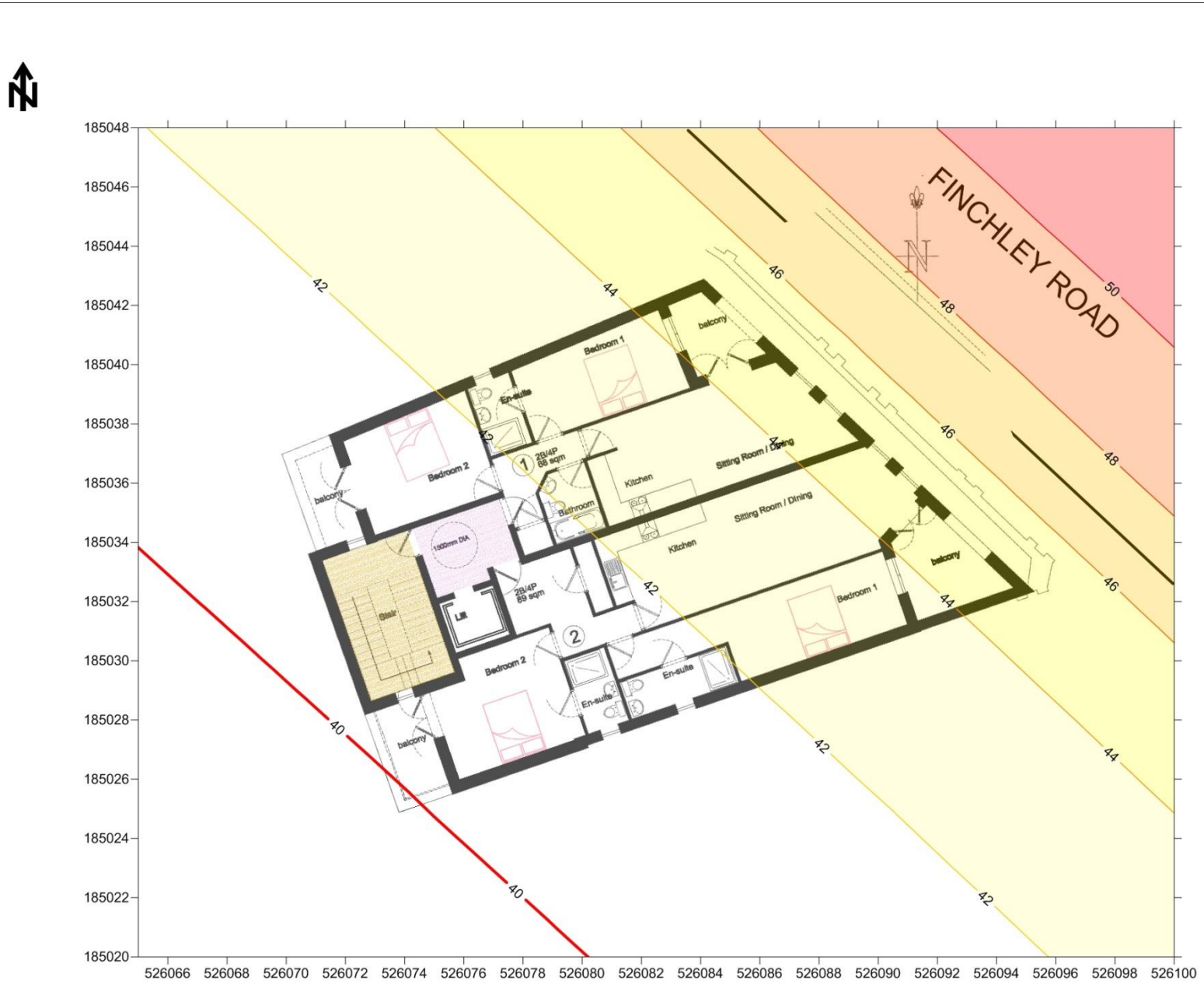

Legend

Site Boundary

50
48
46
44
42
40

Predicted Annual Mean NO2 Concentration (µg/m3)

Title

Figure 9 - Predicted 2012 Annual Mean NO2 Concentrations (µg/m3)
First Floor Level

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

33433

Client

caldecotte CC consultants

REC Resource & Environmental Consultants Ltd
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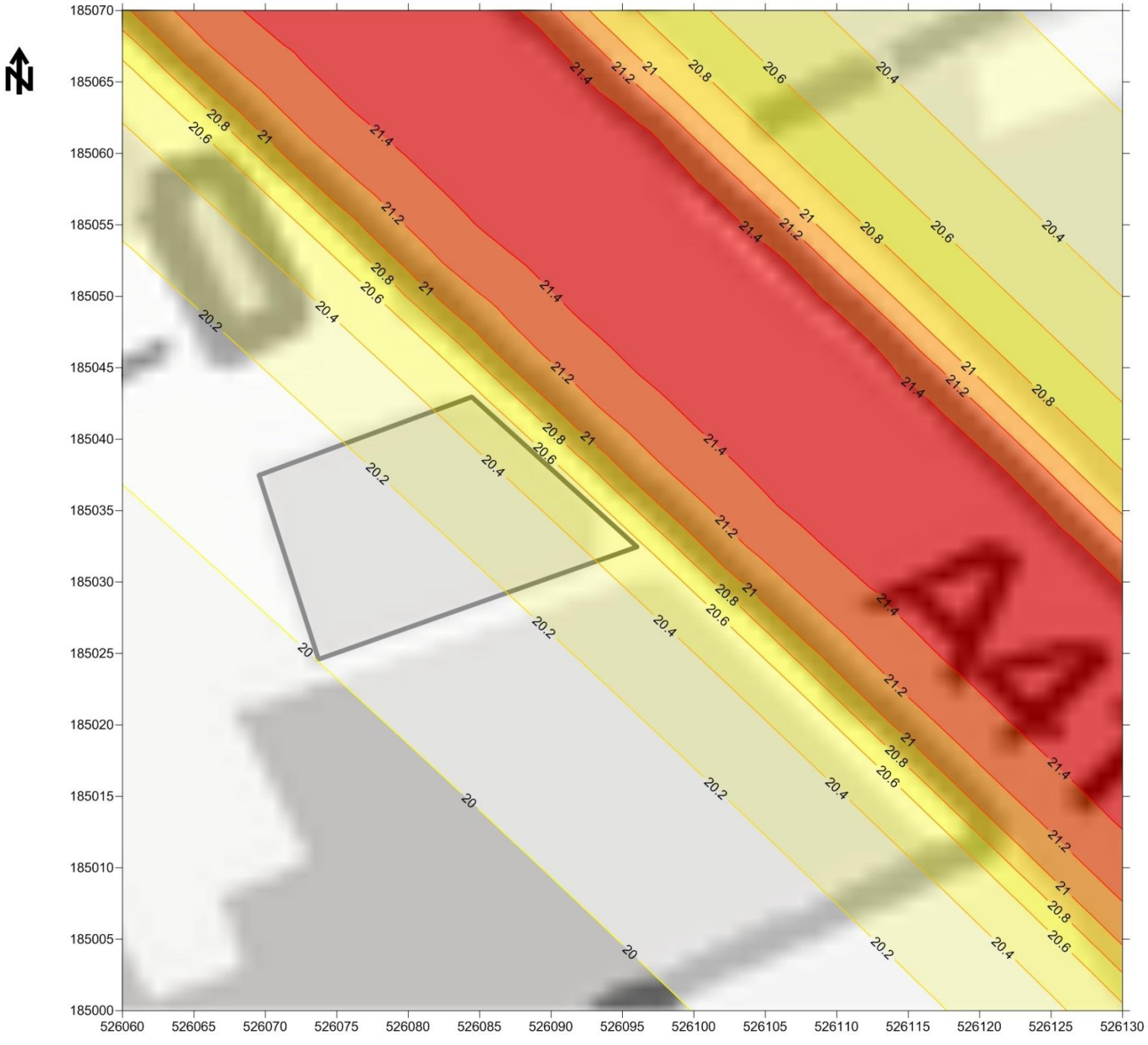

Legend

Site Boundary

21.4
21.2
21.0
20.8
20.6
20.4
20.2
20.0

Predicted Annual Mean PM10 Concentration (µg/m3)

Title

Figure 10 - Predicted 2012 Annual Mean PM10 Concentrations (µg/m3)
z = 1.5m

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

33433

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REC Resource & Environmental Consultants Ltd
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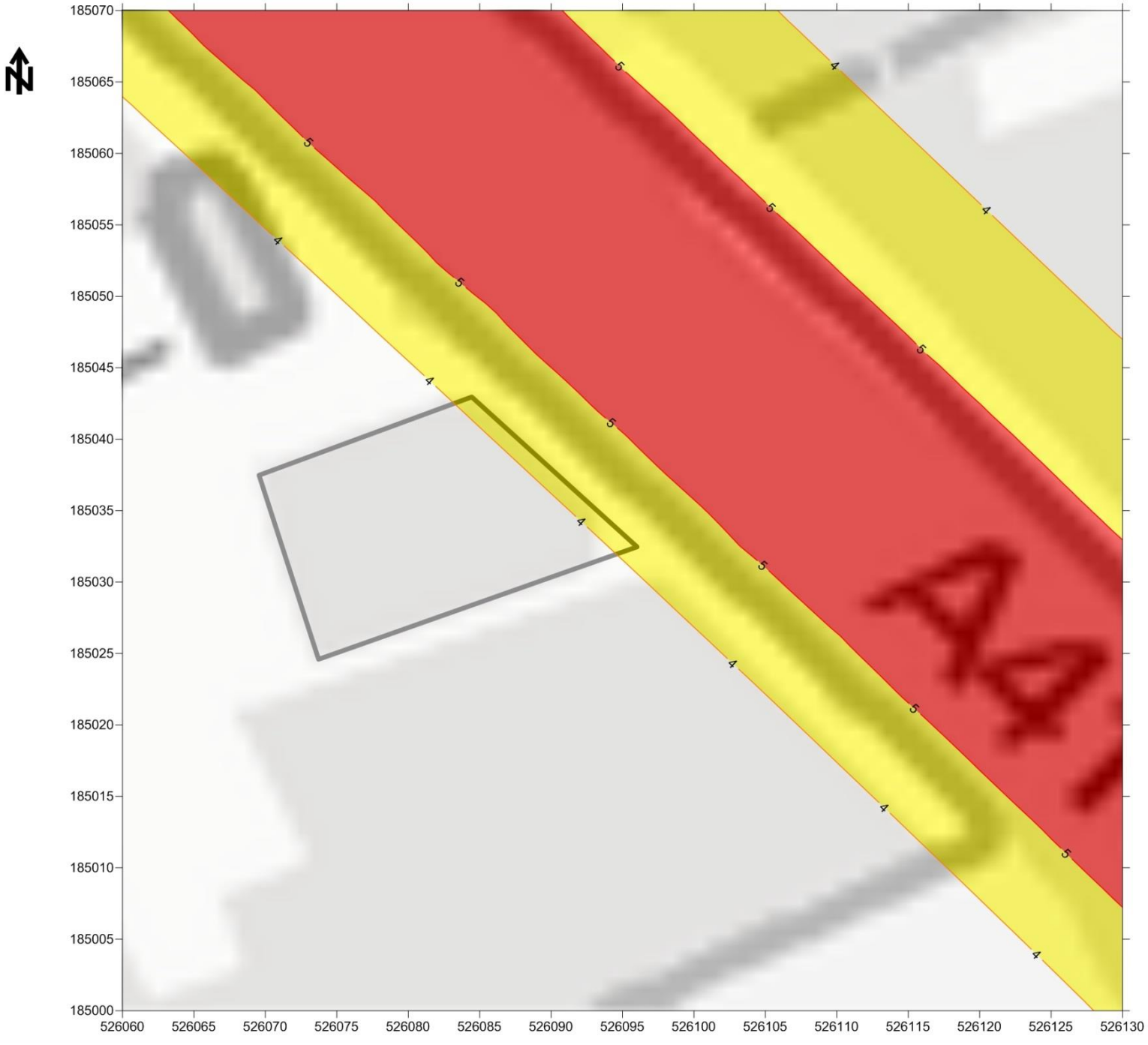
www.recltd.co.uk



Legend

Site Boundary

5

4

3

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

Title

Figure 11 - Predicted Number of Days with PM10 Concentrations Greater than 50µg/m3
z = 1.5m

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

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caldecotte CC consultants

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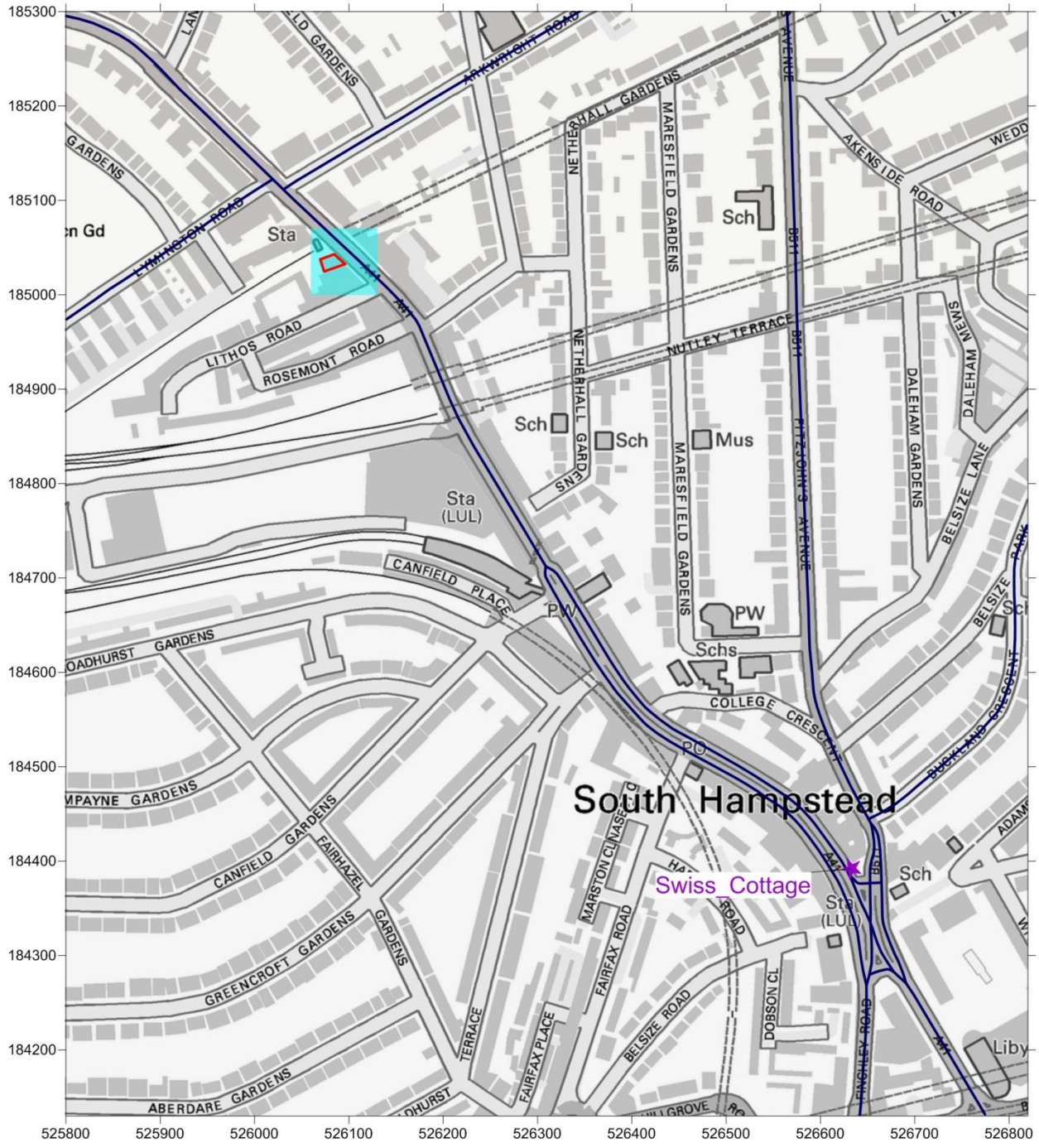
www.recltd.co.uk



Legend

- Site Boundary
- Road Link Location
- Output Grid
- Automatic Monitoring Site

Title

Figure 12 - ADMS-Roads Inputs

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

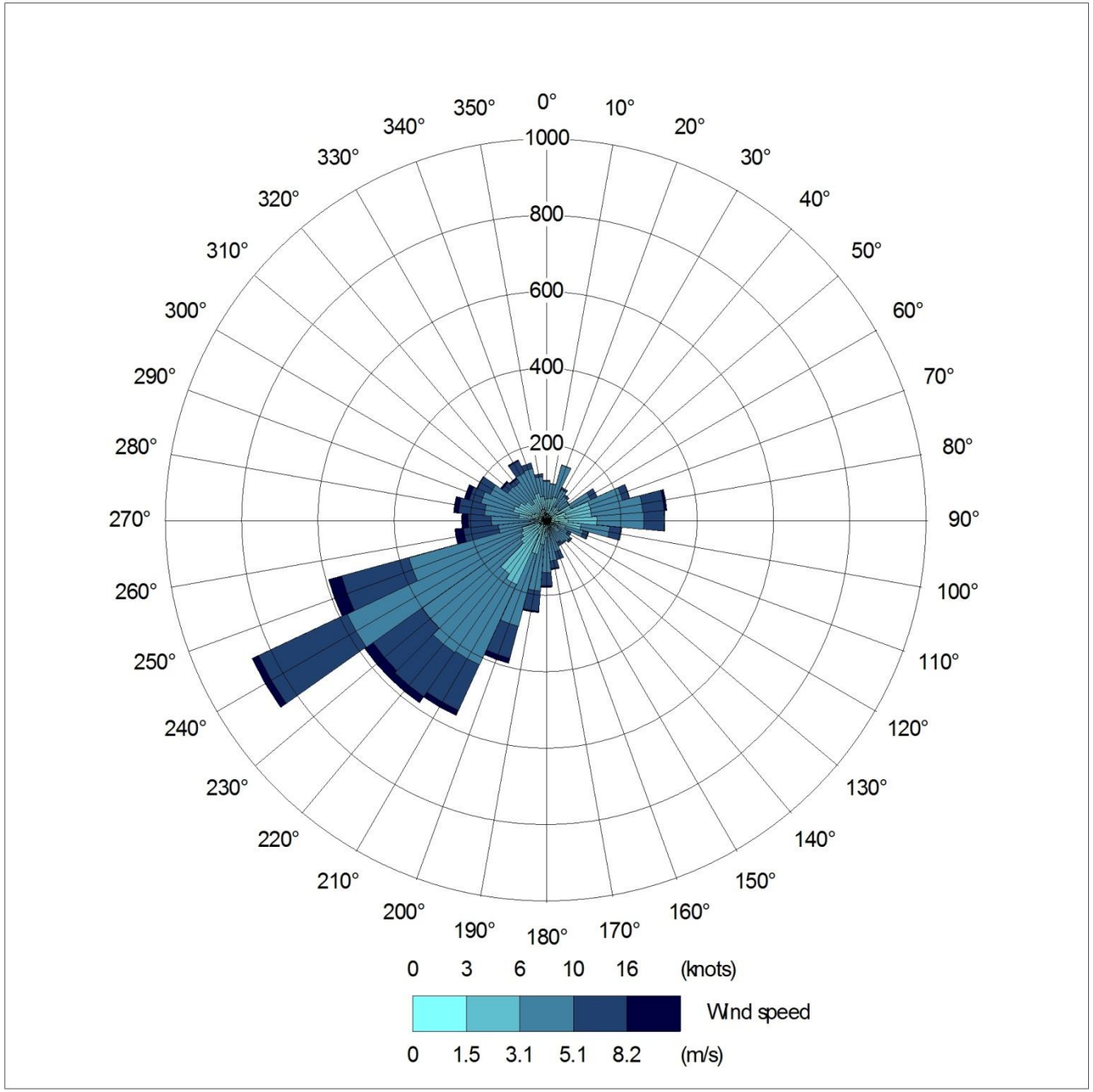
33433

Client

caldecotte CC consultants

REC Resource & Environmental Consultants Ltd
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Title

Figure 13 - Wind Rose of 2012 London City Airport Meteorological Data

Project

Air Quality Assessment
Finchley Bell, Finchley Road, London

Project Number

33433

Client

caldecotte CC consultants

REC Resource & Environmental Consultants Ltd
Resource and Environmental Consultants Ltd
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

The proposed development has the potential to expose new residents to elevated pollutant levels. In order to assess NO_2 and PM_{10} concentrations across the site, detailed dispersion modelling was undertaken in accordance with the following methodology.

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 3.1.4). 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

Concentrations were predicted over the area NGR: 526060, 185000 to 526130, 185070 in order to consider pollutant levels on the development site. One Cartesian grid with a resolution of 1m was used within the model to produce data suitable for contour plotting using the Surfer software package. It should be noted that although the grid only covered the proposed site, road links were extended in order to ensure the impact of all relevant vehicle emissions in the vicinity of the development were considered.

Heights of 1.5m, 4.5m and 7.5m were included in the model to provide detailed consideration of pollutant concentrations at different floor levels on the proposed development site.

Reference should be made to Figure 12 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour AADT flows and fleet composition, was obtained from the London Atmospheric Emissions Inventory (LAEI). The LAEI (2008) was released by the GLA in 2010 and provides information on emissions from all sources of air pollutants in the Greater London area for the base year of 2011.

In the absence of data for 2012, 24-hour AADT flows for 2011 were utilised as traffic levels

in London have remained relatively constant or shown a downward trend in recent years[17]. This was considered to provide a suitable representation of baseline flows in lieu of more accurate information.

Vehicle speeds were estimated based on the free flow potential of each link and local speed limits. Road widths were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table AII.1.

Table AII.1 2012 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	Mean Vehicle Speed (km/h)
L1a	A41 Finchley Rd - north of Canfield Gdns	22.0	47,347	25
L1b	A41 Finchley Rd - south of Canfield Gdns northbound	11.0	23,674	20
L1c	A41 Finchley Rd - south of Canfield Gdns southbound	11.0	23,674	20
L1d	A41 Finchley Rd - south of Canfield Gdns southbound - junction	11.0	19,870	10
L1e	A41 Finchley Rd - south of Canfield Gdns southbound - left turn	6.3	3,804	10
L2	B511 Fitzjohn's Ave	11.0	18,110	30
L3	Arkwright Rd	7.3	11,364	35
L4	Lymington Rd	6.8	6,770	25
L5	Buckland Crescent	9.1	11,991	25
L6a	B511 College Crescent - north of Buckland Crescent	7.3	23,809	25
L6b	B511 College Crescent - south of Buckland Crescent southbound	7.3	23,674	15
L6c	B511 College Crescent - south of Buckland Crescent northbound	7.3	10,971	10
L7	A41 Finchley Rd - south of junction	18.3	21,941	25
L8	A41 Avenue Rd	18.3	47,347	25
L9	A41 Finchley Rd - south of junction - right turn	6.3	3,804	10

Reference should be made to Figure 12 for a graphical representation of the road link locations.

Fleet composition as car, taxi, light goods vehicle (LGV), rigid heavy goods vehicle (HGV), articulate HGV, bus and coach and motorcycle proportion for each link is summarised in Table AII.2.

[17] Travel in London: Report 4, Transport for London, 2011.

Table AII.2 Fleet Composition

Road Link	Proportion of Fleet (%)						
	Car	Taxi	LGV	Rigid HGV	Articulate HGV	Bus and Coach	Motorcycle
L1a	73.13	4.02	12.20	3.02	0.37	3.78	3.48
L1b	73.13	4.02	12.20	3.02	0.37	3.78	3.48
L1c	73.13	4.02	12.20	3.02	0.37	3.78	3.48
L1d	73.13	4.02	12.20	3.02	0.37	3.78	3.48
L1e	73.13	4.02	12.20	3.02	0.37	3.78	3.48
L2	78.95	3.14	8.89	5.27	1.21	0.87	1.68
L3	79.09	3.13	8.89	5.87	1.34	0.00	1.68
L4	80.15	3.18	9.01	4.93	1.03	0.00	1.70
L5	78.53	3.12	8.82	5.10	1.16	1.63	1.65
L6a	78.06	3.10	8.78	5.63	1.29	1.49	1.66
L6b	78.06	3.10	8.78	5.63	1.29	1.49	1.66
L6c	78.06	3.10	8.78	5.63	1.29	1.49	1.66
L7	69.42	3.76	13.16	3.36	0.54	6.37	3.39
L8	73.13	4.02	12.20	3.02	0.37	3.78	3.48
L9	81.83	3.23	9.15	3.39	0.68	0.00	1.71

Emission Factors

There is current uncertainty over NO_2 concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2012 emission factors from the Emissions Factor Toolkit (version 5.2c), released in January 2013, have been utilised for the prediction of pollution levels in preference to the development opening year in order to provide a robust assessment. The data base incorporates updated COPERT4v8.1 vehicle emission factors for NO_x and vehicle fleet information, resulting in a significantly more accurate data source than previous versions.

Meteorological Data

Meteorological data used in the assessment was taken from London City Airport weather station over the period 1st January 2012 to 31st December 2012 (inclusive). London City Airport observation station is located at NGR: 542999, 180432, which is approximately 17.5km south-east of the proposed development. DEFRA guidance LAQM.TG(09)[18] recommends meteorological stations within 30km of an assessment area as being suitable

[18] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

for detailed modelling.

All meteorological data used in the assessment was provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of meteorological data within the UK. Reference should be made to Figure 13 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 dispersion modelling assessment area and is suggested within ADMS-Roads as being suitable for 'large urban areas'. A z_0 value of 0.5m was used for the meteorological station, which is stated within ADMS-Roads as being suitable for 'parkland, open suburbia'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 100m was used in this dispersion modelling study. This value is considered appropriate for the nature of the assessment area and is suggested within ADMS-Roads as being suitable for 'large conurbations > 1 million'.

Background Concentrations

The background concentrations provided by DEFRA were used in the assessment to represent annual mean NO_2 and PM_{10} levels in the vicinity of the site during 2012.

The modelling area extended over a number of grid squares with varying predicted background concentrations. Due to the distance between the development site and the monitoring station used for verification purposes, data from different grid squares was used to represent pollutant levels, as follows:

- Verification: NGR: 526500, 184500; and,
- Development site: NGR: 526500, 185500.

In order to avoid 'double-counting' of road vehicle exhaust emissions, the 'A-road in' proportion of the relevant background concentrations was removed from the predicted background at the monitoring station in accordance with the methodology outlined in DEFRA guidance LAQM.TG(09). This sector was considered to be the most representative of that being modelled within ADMS-Roads.

The total predicted background concentration was used for the development site as only a small proportion of the roads in the corresponding grid square were modelled. As such, it was considered that the removal of the road contribution would result in an overall underestimate of total pollutant concentrations. This also provided a worst-case assessment scenario.

Background concentrations before and after adjustment are shown in Table AII.3 and Table AII.4.

Table AII.3 Background Pollutant Concentrations - Verification

Pollutant	Predicted 2012 Annual Mean Background Concentration (µg/m^3)	
	Total Predicted Background	Predicted Background without Road Contribution
NO_2	38.95	35.69
PM_{10}	21.19	21.02

Table AII.4 Background Pollutant Concentrations - Development Site

Pollutant	Predicted 2012 Annual Mean Background Concentration (µg/m^3)	
	Total Predicted Background	Predicted Background without Road Contribution
NO_2	32.96	-
PM_{10}	19.59	-

Similarly to emission factors, background concentrations for 2012 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 proposal.

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 LAQM.TG(09)[19].

Calculation of 24-hour Mean PM_{10} Statistics

The number of days with PM_{10} concentrations greater than 50µg/m^3 was calculated based on the methodology outlined within LAQM.TG(09)[20].

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

[19] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.
[20] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2012, using traffic data, meteorological data and monitoring results from this year.

LBoC undertakes automatic monitoring of roadside NO_2 and PM_{10} concentrations at one location in the vicinity of the development. Monitoring results for this site were obtained from the London Air website[21] and the road contribution to total NO_x concentration calculated from the monitored NO_2 result for use in the verification process. This was undertaken following the methodology contained within DEFRA guidance LAQM.TG(09)[22]. The road contribution to total PM_{10} concentration was calculated from the monitored PM_{10} result by subtracting the background from the total measured concentration.

The monitored annual mean concentrations and calculated roadside concentrations are summarised in Table AII.5 and Table AII.6.

Table AII.5 2012 NO_2 Monitoring Results

Pollutant		Monitored NO_2 Concentration ($\mu g/m^3$)	Background NO_2 Concentration ($\mu g/m^3$)	Calculated Roadside NO_x Concentration ($\mu g/m^3$)
CA15	Swiss Cottage	70.00	35.69	97.38

Table AII.6 2012 PM_{10} Monitoring Results

Monitoring Location		Monitored PM_{10} Concentration ($\mu g/m^3$)	Background PM_{10} Concentration ($\mu g/m^3$)	Calculated Roadside PM_{10} Concentration ($\mu g/m^3$)
CA15	Swiss Cottage	23.00	21.02	1.98

The dispersion model was run with the traffic input data previously detailed for 2012 to predict NO_x and PM_{10} concentrations at the automatic monitoring site location. The results are shown in Table AII.7 and Table AII.8.

Table AII.7 NO_x Verification Results

Monitoring Location		Monitored Roadside NO_x Concentration ($\mu g/m^3$)	Modelled Roadside NO_x Concentration ($\mu g/m^3$)
CA15	Swiss Cottage	97.38	79.16

Table AII.8 PM_{10} Verification Results

Monitoring Location		Monitored Roadside PM_{10} Concentration ($\mu g/m^3$)	Modelled Roadside PM_{10} Concentration ($\mu g/m^3$)
CA15	Swiss Cottage	1.98	3.88

[21] http://londonair.org.uk/LondonAir/Default.aspx.
[22] Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA, 2009.

The monitored and modelled roadside concentrations were compared to calculate the associated ratio. This indicated the following verification factors were required to be applied to the modelling results:

- NO_x: 1.2302; and,
- PM_{10}: 0.5098.

APPENDIX III ASSESSOR'S CURRICULUM VITAE

ANDREA CORDON

Graduate Air Quality Consultant

BSc, MSc

KEY EXPERIENCE:

Andrea is a Graduate Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments (AQAs) to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail, infrastructure and commercial sectors.
- Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of ground level pollutant concentrations 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.
- Execution of field odour surveys and assessments in accordance with the Environment Agency methodology.
- Production of air quality mitigation strategies for developments throughout the UK.
- Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- Bachelor of Science
- Master of Science
- Graduate IEMA

PROJECTS SUMMARY:

Residential and Mixed Use Developments

Cranage, Cheshire - relocation of two residential properties situated within an AQMA, to a new site further away from the M6 motorway.

Shoppenhangers Manor, Maidenhead - residential development adjacent to the A404(M).

Former Roadside Restaurant, Ermine Street, Alconbury - baseline AQA in support of a gypsy and traveller site in close proximity to the A14/A1(M).

Bective Road, Northampton - construction phase assessment of fugitive dust emissions in accordance with IAQM methodology and dispersion modelling in support of a residential development in close proximity of an AQMA.

Wheatstone House, Brentford - residential scheme in AQMA and in close proximity to the A4 and the M4.

Former Beeston Castle Hotel - odour risk assessment in support of a residential development adjacent to a livestock market.

Ackton Pastures Extension - residential development within the M62 AQMA.

Dystelegh Court, Disley - residential scheme adjacent to AQMA and in close proximity to the A6.

Oxford Road, Reading - baseline AQA for mixed use development in an AQMA.

Belbroughton Road, Blakedown - residential development located in the proximity of two AQMAs.

Bradgate Quarry 2, Rotherham - AQA including DMRB for residential scheme in close proximity to AQMA.

29 Crescent, Salford - baseline AQA for a change of use from offices to a house in multiple occupation.

Springfield Lane, Salford - mixed use scheme in AQMA.

Sillavan Way, Salford - residential development in an AQMA.

Wycke Hill, Spital Road, Maldon - construction phase assessment of fugitive dust emissions in accordance with IAQM methodology and dispersion modelling using ADMS-Roads in support of residential development.

Church Road, Litherland - residential scheme adjacent to major road and in close proximity to a proposed AQMA.

Commercial and Retail Developments

Lion Garage, Gravesend - AQA in support of commercial development with associated car parking.

Commissioners Road, Strood - commercial development with B1 and B8 floor space in close proximity to AQMA.

Hugh Baird College, Bootle - baseline AQA for new college building adjacent to a major junction.

Solent Retail Park, Havant - AQA in support of commercial and industrial development in close proximity to a proposed AQMA.

Industrial Developments

Leacon Lane, Charing - AQA including DMRB in support of the planning application appeal for a renewable energy unit facility.

Spring Farm, Taverham - AQA including DMRB in support of a planning condition variation for a biomass renewable energy unit.

Infrastructure Developments

Hazel Grove, Stockport - construction phase assessment of fugitive dust emissions in accordance with IAQM methodology and AQA including DMRB for park and ride scheme in AQMA.

JETHRO REDMORE

Manager - Air Quality Impact Group

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

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist with specialist experience in the air quality and odour sector. His key capabilities include:

- Production and management of Air Quality and Odour Assessments to DEFRA, Environment Agency and EPUK methodologies for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Significant proportion of assessments produced as part of over-arching Environmental Statements (ES) for large developments throughout the UK.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS, ADMS-4, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of EIAs and scoping reports for developments throughout the UK.
- Design and project management of pollutant monitoring campaigns to define baseline conditions and inform future assessment in accordance with DEFRA and Environment Agency guidance.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies.

PROJECTS SUMMARY:

Residential Developments

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

Church Way Doncaster - mixed use scheme adjacent to AQMA.

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

Mill Street, Crewe - residential development in proximity of 2-AQMAs.

Wheatstone House, London - mixed use scheme in AQMA.

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Poplar Business Park, Tower Hamlets – AQA for residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre for EIA.

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

Temple Point Leeds - residential development adjacent to M1.

Bury Road, Bury - residential development in proximity of AQMA.

Commercial and Retail Developments

Pleasington Lakes, Blackburn - EIA for holiday village adjacent to M65.

Wakefield College - redevelopment of city centre campus in AQMA.

Pleckgate School, Blackburn - biomass boiler and odour assessment.

Deptford Terrace, Sunderland - AQA for mixed use development.

Pakeezah Gourmet, Bradford - AQA including DMRB for new food store.

Lidl, Honiton - Food store development close to AQMA.

Witton Park School, Blackburn - biomass boiler feasibility assessment.

Manchester Airport Cargo Shed - commercial development.

New Crown Wood School, Greenwich - biomass boiler emission assessment.

Basford West, Crewe - AQA of industrial and business park.

Farnworth Superstore - AQA in support of new food superstore.

Basford West, Crewe - mixed use development in proximity of AQMA.

Wild Rose Holiday Park, Cumbria - EIA for holiday park extension.

Coolmore Estates, Seaham - EIA in support of creative centre of excellence.

Morton District Shopping Centre, Carlisle - air quality EIA for commercial development.

Westwood Park, Wigan - air quality EIA for new business park.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

Preston East - EIA for employment park.

Industrial Developments

Blue Star Fibres, Grimsby - fibre manufacturing plant adjacent to SPA.

Maesgwyn Biomass Plant - AQA including ecological assessment.

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

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

Countrystyle Biomass Plant, Kent - EIA for biomass facility.

Beddington Heat and Power, London - biomass energy recovery plant.

Brook Bridge Poultry Farm - Ammonia dispersion modelling of quail farm.