

Air Quality Assessment
High Street, Hitchin

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Executive Summary

Redmore Environmental Ltd was commissioned by Bellborough Ltd to undertake an Air Quality Assessment in support of a residential-led development at 9-10 High Street, Hitchin.

An Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the proposed development;
- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development;
- Assess risk of future resident exposure to any existing air quality issues; and,
- Identify any requirement for relevant mitigation measures.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of the identified site-specific control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the development. Additionally, future residents may be exposed to any existing air quality issues at the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

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

The results of the assessment also demonstrated that predicted pollution levels were below the relevant criteria across the development. As such, the site is considered suitable for the proposed use from an air quality perspective and mitigation is not required.

A number of mitigation measures were identified in line with the requirements of the North Hertfordshire Council Air Quality Planning Guidance Document in order to reduce vehicle

exhaust emissions associated with the proposals. It is considered these are appropriate for a development of this scale and nature and will further control impacts during the operational phase.

Based on the assessment results, air quality factors are not considered a constraint to the development.

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1.0 INTRODUCTION

1.1 Instruction

- 1.1.1 Redmore Environmental Ltd was commissioned by Bellborough Ltd to undertake an Air Quality Assessment in support of a residential-led development at 9-10 High Street, Hitchin.

1.2 Site Location and Context

- 1.2.1 The site is located at 9-10 High Street, Hitchin, at approximate National Grid Reference (NGR): 518353, 229178. The relevant Local Authority (LA) is North Hertfordshire Council (NHC). Reference should be made to Figure 1 for a map of the site and surrounding area.
- 1.2.2 The proposals comprise demolition of the existing building and subsequent construction of a part-three, part-four storey building including retail floorspace and car park at lower ground floor and 44 residential dwellings from ground floor level and above.

1.3 Assessment Scope

- 1.2.3 The proposals have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken to:
- Assess potential impacts associated with fugitive dust emissions during the construction phase of the development;
 - Assess potential impacts associated with road transport emissions during the operational phase of the development;
 - Assess risk of future resident exposure to any existing air quality issues; and,
 - Identify the requirement for relevant mitigation measures.
- 1.2.4 This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO₂);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5});
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023¹. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2023² was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to PM_{2.5}. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

¹ AQS: Framework for Local Authority Delivery, DEFRA, 2023.

² Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 1 presents the AQOs and Interim Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/Interim Target

Pollutant	Air Quality Objective/Interim Target	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
PM _{2.5}	12 ^(a)	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance³ on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

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

³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 **Local Air Quality Management**

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

2.3 **Dust**

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

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

- 2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of

the Environmental Protection Act (1990). 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 practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework⁴ (NPPF) was published in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

"c) an environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, 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 [...]."

⁴ NPPF, Ministry of Housing, Communities and Local Government, 2023.

- 2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

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

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

2.5 National Planning Practice Guidance

- 2.5.1 The National Planning Practice Guidance⁵ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making 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 considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

⁵ <https://www.gov.uk/guidance/air-quality--3>.

2.5.2 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 North Hertfordshire Local Plan 2011-2031⁶ was adopted by NHC on 8th November 2022. A review of the document highlighted the following policy of relevance to this assessment:

"Policy D4: Air quality

Planning permission will be granted provided that development proposals:

- a) Give consideration to the potential or actual impact on local air quality, both during the demolition/ construction phase and as a result of its final occupation and use;
- b) Propose appropriate levels of mitigation to minimise emissions to the atmosphere and their potential effects upon health and the local environment; and
- c) Carry out air pollution impact assessments, where required, to determine the impact on local air quality of the development.

Where an air quality impact assessment demonstrates that a development is unacceptable from a local air quality perspective the development will be refused.

Where air pollution impact assessments are not required there will still be a requirement on developers to provide appropriate levels of mitigation to address emissions of pollutants to the atmosphere."

2.6.2 NHC adopted the 'Air Quality Planning Guidance Document'⁷ in October 2018. The purpose of the document is to facilitate sustainable development by helping to achieve the best possible public health protection outcomes, with regards to air quality.

⁶ North Hertfordshire Local Plan 2011-2031, NHC, 2022.

⁷ NHC Air Quality Planning Guidance Document, NHC, 2018.

2.6.3 Consideration was made to the above policy and guidance document throughout the assessment.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future residents to elevated pollution levels. These factors have been assessed in accordance with the following methodology, which was agreed with Roger Pitman, Air Quality & Environmental Consultant at NHC, on 15th May 2024.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V2.2'⁸.

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

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

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

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM₁₀.

3.2.4 The assessment steps are detailed below.

⁸ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Step 1 - Screen the Need for an Assessment

- 3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 250m from the site entrance, then the assessment also proceeds to Step 2.
- 3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2 - Assess the Risk of Dust Impacts

- 3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:
- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
 - The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).
- 3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.
- 3.2.9 Step 2A defines the potential magnitude of dust emission during the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 75,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 12m above ground level

Magnitude	Activity	Criteria
	Earthworks	- Total site area greater than 110,000m² - 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 6m in height
	Construction	- Total building volume greater than 75,000m³ - On site concrete batching - Sandblasting
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day - Potentially dusty surface material (e.g. high clay content) - Unpaved road length greater than 100m
Medium	Demolition	- Total building volume between 12,000m³ and 75,000m³ - Potentially dusty construction material - Demolition activities between 6m and 12m above ground level
	Earthworks	- Total site area 18,000m² to 110,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 3m to 6m in height
	Construction	- Total building volume 12,000m³ to 75,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching
	Trackout	20 to 50 HDV trips per day - Moderately dusty surface material (e.g. high clay content) - Unpaved road length 50m to 100m
Small	Demolition	- Total building volume less than 12,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber) - Demolition activities less than 6m above ground - Demolition during wetter months
	Earthworks	- Total site area less than 18,000m² - 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 3m in height

Magnitude	Activity	Criteria
	Construction	- Total building volume less than 12,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	- Less than 20 HDV trips per day - Surface material with low potential for dust release - Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The sensitivities of specific receptors are shown in Table 4.

Table 4 Construction Dust - Sensitivities of People and Ecological Receptors

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	- Users expect high levels of amenity - High aesthetic or value property - People expected to be present continuously for extended periods of time - Locations where members of the public are exposed over a time period relevant to the AQO for PM₁₀. e.g. residential properties, hospitals, schools and residential care homes	Internationally or nationally designated site e.g. Special Area of Conservation
Medium	- Users would expect to enjoy a reasonable level of amenity - Aesthetics or value of their property could be diminished by soiling - People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	Nationally designated site e.g. Sites of Special Scientific Interest
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, farmland, short term car parks and roads	Locally designated site e.g. Local Nature Reserve

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

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

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
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

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

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

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low

Receptor Sensitivity	Background Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			Less than 20	Less than 50	Less than 100	Less than 250
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low

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

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

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

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

3.2.15 Table 8 outlines the risk category from demolition.

Table 8 Construction Dust - Dust Risk Category from Demolition

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

3.2.16 Table 9 outlines the risk category from earthworks, construction and trackout activities.

Table 9 Construction Dust - Dust Risk Category from Earthworks, Construction and Trackout Activities

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

Step 3 - Site-specific Mitigation

3.2.17 Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance⁹ to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4 - Determine Significance

3.2.18 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of

⁹ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

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

3.3 Operational Phase Assessment

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

- 2022 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2026 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2026 should the proposals be completed).

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

Potential Development Impacts

3.3.3 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)¹⁰ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance¹¹ on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

¹⁰ LA 105: Air Quality, Highways England, 2019.

¹¹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

3.3.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹². Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 10.

Table 10 Significance of Operational Phase Road Vehicle Exhaust Emission Impacts

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

3.3.5 The matrix shown in Table 10 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document¹³ provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and,
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

¹² Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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

- 3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.
- 3.3.8 The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. The IAQM guidance¹⁴ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

Potential Future Exposure

- 3.3.9 The proposals have the potential to expose future residents to any existing air quality issues. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations across the development site, detailed dispersion modelling was undertaken. The results were subsequently compared with the relevant AQOs and Interim Target to determine any potential areas of exceedence and associated constraints to the proposed land use. Reference should be made to Appendix 1 for a full description of the assessment input data.

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

4.0 **BASELINE**

4.1 **Introduction**

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

4.2 **Local Air Quality Management**

- 4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), NHC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean NO₂ concentrations are above the AQO within the LAs administrative extents. As such, two AQMAs have been declared. The closest of these to the site is described as follows:

"AQMA 2 Paynes Park, Hitchin - An area encompassing one residential property fronting & located on the west side of Park Way (A602) at the Payne's Park roundabout."

- 4.2.2 The site is located approximately 80m north-east of the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.
- 4.2.3 NHC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 **Air Quality Monitoring**

- 4.3.1 Monitoring of pollutant concentrations is undertaken by NHC throughout their area of jurisdiction. Recent NO₂ concentrations recorded in the vicinity of the development, as provided in NHC's '2023 Air Quality Annual Status Report (ASR)'¹⁵, are shown in Table 11. Exceedences of the AQO are shown in **bold**.

¹⁵ 2023 Air Quality ASR, NHC, 2023.

Table 11 Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)			
		2019	2020	2021	2022
NH63	(NH02a) Library Hitchin	32.1	27.2	24.1	26.6
NH77	Upper Tilehouse Street, Hitchin (traffic lights)	34.0	24.5	26.9	29.5
NH82	Upper Tilehouse Street, Near Roundabout	32.0	-(a)	21.7	25.9
NH93	Park Way	41.9	-(a)	-(a)	31.1
NH94	Offley Road	27.5	22.1	20.9	24.0
NH95	Pirton Road	28.9	23.0	19.5	22.9
NH108	Hermitage Road	31.8	23.9	24.4	26.4
NH114	Old Park Road	25.5	20.7	18.6	21.8

Note: (a) Data not available.

4.3.2 As shown in Table 11, annual mean NO₂ concentrations were above the AQO of 40µg/m³ at the NH93 - Park Way monitor in 2019. As this site is located at a roadside position within an AQMA, elevated results would be expected. Levels were below the AQO at all remaining monitoring sites in recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 Pollutant concentrations during 2020 and 2021 were lower than previous years due to a reduction in traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution. However, monitoring results for 2022 are now considered representative of post-pandemic conditions. This is supported by the IAQM¹⁶, who have adopted the following position:

"ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline."

4.3.4 NHC do not undertake PM₁₀ or PM_{2.5} monitoring within the vicinity of the site.

¹⁶ Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

4.4 **Background Pollutant Concentrations**

- 4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 518500, 229500. Data for this location was downloaded from the DEFRA website¹⁷ for the purpose of the assessment and is summarised in Table 12.

Table 12 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2022	2024	2026
NO ₂	12.53	11.69	11.03
PM ₁₀	14.40	14.04	13.85
PM _{2.5}	9.60	9.32	9.17

- 4.4.2 As shown in Table 12, predicted background concentrations are below the relevant AQOs and Interim Target at the development site.

4.5 **Sensitive Receptors**

- 4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Construction Phase Sensitive Receptors

- 4.5.2 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 250m from the development boundary. These are summarised in Table 13.

¹⁷ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

Table 13 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	0
Up to 50	More than 100	0
Up to 100	More than 100	-
Up to 250	More than 100	-

- 4.5.3 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 250m of the site access. These are summarised in Table 14.

Table 14 Trackout Dust Sensitive Receptors

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

- 4.5.4 There are no ecological receptors within 50m of the development boundary or the access route within 250m of the site entrance. As such, ecological impacts have not been assessed further within this report.
- 4.5.5 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as a **high**. This was because the identified receptors included residential properties.

Operational Phase Sensitive Receptors

- 4.5.6 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 15.

Table 15 Operational Phase Road Vehicle Exhaust Emissions Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Westbourne Care Home	518014.5	229461.9
R2	Residential - Bedford Road	518140.6	229422.3
R3	Residential - Bedford Road	518082.4	229416.8
R4	Centenary House - NHS	518304.1	229307.9
R5	Residential - Poppys House	518306.5	229214.3
R6	Residential - Paynes Park	518272.1	229187.5
R7	Residential - Paynes Park	518193.5	229092.5
R8	Residential - Tilehouse Street	518160.0	229045.2
R9	Residential - Tilehouse Street	518140.1	228998.1
R10	Residential - Tilehouse Street	518131.3	229052.7
R11	Residential - Upper Tilehouse Street	518094.6	229051.5
R12	Residential - Upper Tilehouse Street	518029.2	229048.1
R13	Residential - Chancy Place	518139.0	229099.8
R14	Residential - Old Park Road	518148.4	229167.7
R15	Residential - Park House	518092.4	229303.8
R16	Residential - Old Park Road	518151.9	229211.9
R17	Residential - Old Park Road	518044.5	229413.1

4.5.7 Reference should be made to Figure 3 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5.0 CONSTRUCTION PHASE ASSESSMENT

5.1 Introduction

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

5.2 Step 1 - Screen the Need for an Assessment

- 5.2.1 The undertaking of activities such as demolition, excavation, groundworks, cutting, construction and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.
- 5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.
- 5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.3 Step 2a - Define the Potential Dust Emission Magnitude

Demolition

- 5.3.1 Demolition will be undertaken at the start of the construction phase and will involve clearance of the existing structure on site. It is estimated that the total building volume to be demolished is between 12,000m³ and 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **medium**.

Earthworks

- 5.3.2 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is less than 18,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

Construction

- 5.3.3 Due to the size of the development, the total building volume is estimated to be between 12,000m³ and 75,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **medium**.

Trackout

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

5.4 Step 2b - Define the Sensitivity of the Area

Dust Soiling

- 5.4.1 Table 13 shows that there are more than 100 **high** sensitivity receptors within 50m of the site boundary. The sensitivity of the area with respect to dust soiling from demolition, earthworks and construction, as defined using the criteria summarised in Table 5, is therefore considered to be **high**.
- 5.4.2 Table 14 shows that there are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to dust soiling from trackout, as defined using the criteria summarised in Table 5, is therefore considered **high**.

Human Health

- 5.4.3 Table 12 shows the annual mean PM₁₀ background concentration at the site is 14.04µg/m³. As shown in Table 6, where the background annual mean PM₁₀ concentration is below 24µg/m³ and there are more than 100 **high** sensitivity receptors within 20m of the site boundary, the sensitivity of the area with respect to human health from demolition, earthworks and construction is considered to be **medium**.
- 5.4.4 There are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to human health from trackout, as defined using the criteria summarised in Table 6, is therefore considered to be **medium**.

5.5 Step 2c - Define the Risk of Dust Impacts

- 5.5.1 The derived dust emission magnitude for each activity was combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 8 and Table 9. A summary of the risk from each dust generating activity is provided in Table 16.

Table 16 Summary of Potential Unmitigated Dust Risks

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

- 5.5.2 As indicated in Table 16, the potential risk of dust soiling is **medium** from demolition and construction and **low** from earthworks and trackout. The potential risk of human health impacts is **medium** from demolition and construction and **low** from earthworks and trackout.
- 5.5.3 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.

5.6 **Step 3 - Site-specific Mitigation**

5.6.1 The IAQM guidance¹⁸ provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 17. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

Table 17 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • 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, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions

¹⁸ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Issue	Control Measure
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site • Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • 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, unless being re-used • Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
Demolition	• Ensure effective water suppression is used during demolition operations • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery

Issue	Control Measure
Trackout	• Use water-assisted dust sweeper on access and local roads, if required • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • Implement a wheel washing system, if required

5.7 **Step 4 - Determine Significance**

- 5.7.1 Assuming the relevant mitigation measures outlined in Table 17 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance¹⁹.

¹⁹ Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

6.0 OPERATIONAL PHASE ASSESSMENT

6.1 Introduction

6.1.1 The development has the potential to increase concentrations of NO₂, PM₁₀ and PM_{2.5} as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site, as well as consider potential exposure of future residents to AQO and Interim Target exceedences.

6.1.2 The assessment considered the following scenarios:

- 2022 - Verification;
- 2026 - DM; and,
- 2026 - DS.

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

6.1.4 For the purpose of the assessment traffic data for 2026 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emissions factors and background concentrations for 2022 were utilised within the dispersion model. The use of 2026 traffic data and 2022 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.

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

6.2 Potential Development Impacts

Predicted Concentrations

6.2.1 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 18.

Table 18 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Westbourne Care Home	16.82	16.83	0.01
R2	Residential - Bedford Road	17.90	17.94	0.04
R3	Residential - Bedford Road	19.21	19.25	0.04
R4	Centenary House - NHS	18.58	18.64	0.06
R5	Residential - Poppys House	16.24	16.27	0.03
R6	Residential - Paynes Park	18.71	18.76	0.05
R7	Residential - Paynes Park	21.14	21.19	0.05
R8	Residential - Tilehouse Street	23.00	23.02	0.02
R9	Residential - Tilehouse Street	21.98	21.99	0.01
R10	Residential - Tilehouse Street	30.03	30.06	0.03
R11	Residential - Upper Tilehouse Street	24.08	24.10	0.02
R12	Residential - Upper Tilehouse Street	24.47	24.49	0.02
R13	Residential - Chancy Place	27.38	27.42	0.04
R14	Residential - Old Park Road	29.81	29.88	0.07
R15	Residential - Park House	18.27	18.30	0.03
R16	Residential - Old Park Road	19.29	19.32	0.03
R17	Residential - Old Park Road	18.96	18.99	0.03

6.2.2 As indicated in Table 18, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

- 6.2.3 Reference should be made to Figures 4 and 5 for graphical representations of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios, respectively.
- 6.2.4 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 19.

Table 19 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Westbourne Care Home	15.31	15.32	0.00
R2	Residential - Bedford Road	15.76	15.77	0.01
R3	Residential - Bedford Road	15.95	15.96	0.01
R4	Centenary House - NHS	15.71	15.72	0.01
R5	Residential - Poppys House	15.29	15.29	0.01
R6	Residential - Paynes Park	15.92	15.94	0.01
R7	Residential - Paynes Park	16.23	16.24	0.01
R8	Residential - Tilehouse Street	16.60	16.60	0.01
R9	Residential - Tilehouse Street	16.31	16.31	0.00
R10	Residential - Tilehouse Street	18.19	18.19	0.01
R11	Residential - Upper Tilehouse Street	16.82	16.83	0.00
R12	Residential - Upper Tilehouse Street	16.90	16.91	0.00
R13	Residential - Chancy Place	17.67	17.68	0.01
R14	Residential - Old Park Road	18.90	18.92	0.02
R15	Residential - Park House	15.80	15.81	0.01
R16	Residential - Old Park Road	16.04	16.05	0.01
R17	Residential - Old Park Road	15.79	15.79	0.01

- 6.2.5 As indicated in Table 19, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

- 6.2.6 Reference should be made to Figures 6 and 7 for graphical representations of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios, respectively.
- 6.2.7 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 20. Exceedences of the Interim Target are shown in **bold**.

Table 20 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Westbourne Care Home	10.10	10.10	0.00
R2	Residential - Bedford Road	10.34	10.34	0.01
R3	Residential - Bedford Road	10.44	10.45	0.01
R4	Centenary House - NHS	10.31	10.32	0.01
R5	Residential - Poppys House	10.08	10.09	0.00
R6	Residential - Paynes Park	10.42	10.43	0.01
R7	Residential - Paynes Park	10.60	10.61	0.01
R8	Residential - Tilehouse Street	10.80	10.81	0.00
R9	Residential - Tilehouse Street	10.68	10.68	0.00
R10	Residential - Tilehouse Street	11.66	11.66	0.00
R11	Residential - Upper Tilehouse Street	10.92	10.92	0.00
R12	Residential - Upper Tilehouse Street	10.96	10.97	0.00
R13	Residential - Chancy Place	11.38	11.38	0.01
R14	Residential - Old Park Road	12.02	12.03	0.01
R15	Residential - Park House	10.36	10.36	0.00
R16	Residential - Old Park Road	10.49	10.49	0.00
R17	Residential - Old Park Road	10.35	10.36	0.00

- 6.2.8 As indicated in Table 20, predicted annual mean PM_{2.5} concentrations were below the Interim Target at 16 receptors and above at one position in both the DM and DS scenarios. It should be noted that there are no new predicted exceedences in the DS scenario when compared with the DM.
- 6.2.9 Reference should be made to Figures 8 and 9 for graphical representations of annual mean PM_{2.5} concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

- 6.2.10 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 21.

Table 21 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Westbourne Care Home	Below 75% of AQO	0	Negligible
R2	Residential - Bedford Road	Below 75% of AQO	0	Negligible
R3	Residential - Bedford Road	Below 75% of AQO	0	Negligible
R4	Centenary House - NHS	Below 75% of AQO	0	Negligible
R5	Residential - Poppys House	Below 75% of AQO	0	Negligible
R6	Residential - Paynes Park	Below 75% of AQO	0	Negligible
R7	Residential - Paynes Park	Below 75% of AQO	0	Negligible
R8	Residential - Tilehouse Street	Below 75% of AQO	0	Negligible
R9	Residential - Tilehouse Street	Below 75% of AQO	0	Negligible
R10	Residential - Tilehouse Street	76 - 94% of AQO	0	Negligible
R11	Residential - Upper Tilehouse Street	Below 75% of AQO	0	Negligible
R12	Residential - Upper Tilehouse Street	Below 75% of AQO	0	Negligible
R13	Residential - Chancy Place	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R14	Residential - Old Park Road	Below 75% of AQO	0	Negligible
R15	Residential - Park House	Below 75% of AQO	0	Negligible
R16	Residential - Old Park Road	Below 75% of AQO	0	Negligible
R17	Residential - Old Park Road	Below 75% of AQO	0	Negligible

6.2.11 As indicated in Table 21, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.2.12 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 22.

Table 22 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Westbourne Care Home	Below 75% of AQO	0	Negligible
R2	Residential - Bedford Road	Below 75% of AQO	0	Negligible
R3	Residential - Bedford Road	Below 75% of AQO	0	Negligible
R4	Centenary House - NHS	Below 75% of AQO	0	Negligible
R5	Residential - Poppys House	Below 75% of AQO	0	Negligible
R6	Residential - Paynes Park	Below 75% of AQO	0	Negligible
R7	Residential - Paynes Park	Below 75% of AQO	0	Negligible
R8	Residential - Tilehouse Street	Below 75% of AQO	0	Negligible
R9	Residential - Tilehouse Street	Below 75% of AQO	0	Negligible
R10	Residential - Tilehouse Street	Below 75% of AQO	0	Negligible
R11	Residential - Upper Tilehouse Street	Below 75% of AQO	0	Negligible
R12	Residential - Upper Tilehouse Street	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R13	Residential - Chancy Place	Below 75% of AQO	0	Negligible
R14	Residential - Old Park Road	Below 75% of AQO	0	Negligible
R15	Residential - Park House	Below 75% of AQO	0	Negligible
R16	Residential - Old Park Road	Below 75% of AQO	0	Negligible
R17	Residential - Old Park Road	Below 75% of AQO	0	Negligible

6.2.13 As indicated in Table 22, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.2.14 Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted Impacts - PM_{2.5}

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Conc. Change as Proportion of Interim Target (%)	Impact Significance
R1	Westbourne Care Home	76 - 94% of Interim Target	0	Negligible
R2	Residential - Bedford Road	76 - 94% of Interim Target	0	Negligible
R3	Residential - Bedford Road	76 - 94% of Interim Target	0	Negligible
R4	Centenary House - NHS	76 - 94% of Interim Target	0	Negligible
R5	Residential - Poppys House	76 - 94% of Interim Target	0	Negligible
R6	Residential - Paynes Park	76 - 94% of Interim Target	0	Negligible
R7	Residential - Paynes Park	76 - 94% of Interim Target	0	Negligible
R8	Residential - Tilehouse Street	76 - 94% of Interim Target	0	Negligible
R9	Residential - Tilehouse Street	76 - 94% of Interim Target	0	Negligible
R10	Residential - Tilehouse Street	95 - 102% of Interim Target	0	Negligible

Receptor		Predicted Annual Mean PM _{2.5} Concentration	Predicted Conc. Change as Proportion of Interim Target (%)	Impact Significance
R11	Residential - Upper Tilehouse Street	76 - 94% of Interim Target	0	Negligible
R12	Residential - Upper Tilehouse Street	76 - 94% of Interim Target	0	Negligible
R13	Residential - Chancy Place	95 - 102% of Interim Target	0	Negligible
R14	Residential - Old Park Road	95 - 102% of Interim Target	0	Negligible
R15	Residential - Park House	76 - 94% of Interim Target	0	Negligible
R16	Residential - Old Park Road	76 - 94% of Interim Target	0	Negligible
R17	Residential - Old Park Road	76 - 94% of Interim Target	0	Negligible

6.2.15 As indicated in Table 23, impacts on annual mean PM_{2.5} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.3 Potential Future Exposure

6.3.1 The proposed development has the potential to cause the exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figures 5, 7 and 9 for graphical representations of annual mean NO₂, PM₁₀ and PM_{2.5} concentrations.

6.3.2 As shown in Figure 5, annual mean NO₂ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level was 22.75µg/m³.

6.3.3 As shown in Figure 7, annual mean PM₁₀ concentrations were predicted to be below the AQO of 40µg/m³ across the development. The maximum level was 16.84µg/m³.

6.3.4 As shown in Figure 9, annual mean PM_{2.5} concentrations were predicted to be below the Interim Target of 12µg/m³ across the development. The maximum level was 10.90µg/m³.

6.3.5 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the AQOs and Interim Target. As such, the site is considered suitable for the proposed use from an air quality perspective.

6.4 **Overall Impact Significance**

6.4.1 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 24.

Table 24 Overall Impact Significance of Road Vehicle Exhaust Emission Impacts

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO₂ and PM₁₀ concentrations were below the relevant AQOs at all locations in the DM scenario Predicted annual mean PM_{2.5} concentrations were above the Interim Target at one location and below at 16 receptors in the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs or Interim Target
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It was assumed that vehicle exhaust emission rates and background concentrations will not reduce in future years. This provides worst-case results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

6.4.2 The IAQM guidance²⁰ states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

²⁰ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

6.5 North Hertfordshire Air Quality Planning Guidance Document

Development Classification

6.5.1 The 'NHC Air Quality Planning Guidance Document'²¹ provides a methodology for determining the scale of a development as minor, medium or major and the required air quality mitigation for the relevant banding. Review of the relevant criteria indicated the proposals were classified as **major** due to the following:

- The proposed development is predicted to cause a change in LDV flows of more than 100 Annual Average Daily Traffic (AADT) within an AQMA.

6.5.2 Based on the development classification, a damage costs assessment is required to determine the appropriate amount of required mitigation. This is provided in the following Section.

Damage Costs Assessment

6.5.3 The guidance sets out a Damage Cost Assessment methodology in order to assess the local emissions from a development and determine the appropriate level of mitigation required to help reduce the potential effect on health and/or the local environment.

6.5.4 The first step of the damage costs assessment is to undertake a calculation to identify the monetary value of predicted emissions from the proposals. This utilises the Emissions Factor Toolkit (EFT) to calculate the amount of transport related pollutant emissions the development is likely to produce. The output is then multiplied by the Interdepartmental Group on Costs and Benefits damage costs for the key pollutants NO_x and PM_{2.5}, and finally multiplied by 5 to provide a five-year exposure cost value. This has been summarised in the following equation:

$$\text{5 Year Exposure Cost Value} = \text{EFT Output} \times \text{Damage Costs} \times 5$$

²¹ NHC Air Quality Planning Guidance Document, NHC, 2018.

6.5.5 It should be noted that the calculation has been undertaken using the most recent damage costs released by DEFRA in 2023²².

6.5.6 The input data values used in the assessment are shown in Table 25.

Table 25 Emissions Assessment - Inputs

Data	Value
Daily Vehicle Movements Produced by Development	116
HDV Proportion (%)	0
Average Speed (km/h)	50
Average Trip Length (km)	10
NO _x Output (kg/year) ^(a)	50,430
PM _{2.5} Output (kg/year) ^(a)	13,997
NO _x Output (tonnes/year)	0.05
PM _{2.5} Output (tonnes/year)	0.01
NO _x Damage Cost (£/tonne)	7,545
PM _{2.5} Damage Cost (£/tonne)	52,114

Note: (a) Cost taken from mid-point year 2028.

6.5.7 The calculation is shown in Table 26.

Table 26 - Emissions Assessment - Calculation

Data	Value
Annual Cost of NO _x Emissions (£)	380
Annual Cost of PM _{2.5} Emissions (£)	729
Total Annual Exposure Cost Value (£)	1,100
Total Cumulative Five Year Exposure Cost Value (£)	5,573

²² Air Quality Appraisal: Damage Cost Guidance, DEFRA, 2023.

Mitigation

6.5.8 As shown in Table 26, the calculation determined the development should include mitigation measures to reduce air quality impacts associated with road traffic emissions equal to £5,573.

6.5.9 The guidance²³ provides a number of mitigation options that should be considered for inclusion within developments. These were reviewed and those to be incorporated within the proposals include the following:

- Provision of Electric Vehicle (EV) charging points for all car parking spaces;
- Provision of secure cycle storage within each property; and,
- Provision of a Travel Plan.

6.5.10 Costs of the above measures were not available at the time of reporting. However, the proposed initiatives are considered sufficient to minimise air quality impacts at development of this scale. Costs associated with the mitigation measures can be requested to NHC through a planning condition, if deemed necessary.

²³ NHC Air Quality Planning Guidance Document, NHC, 2018.

7.0 CONCLUSION

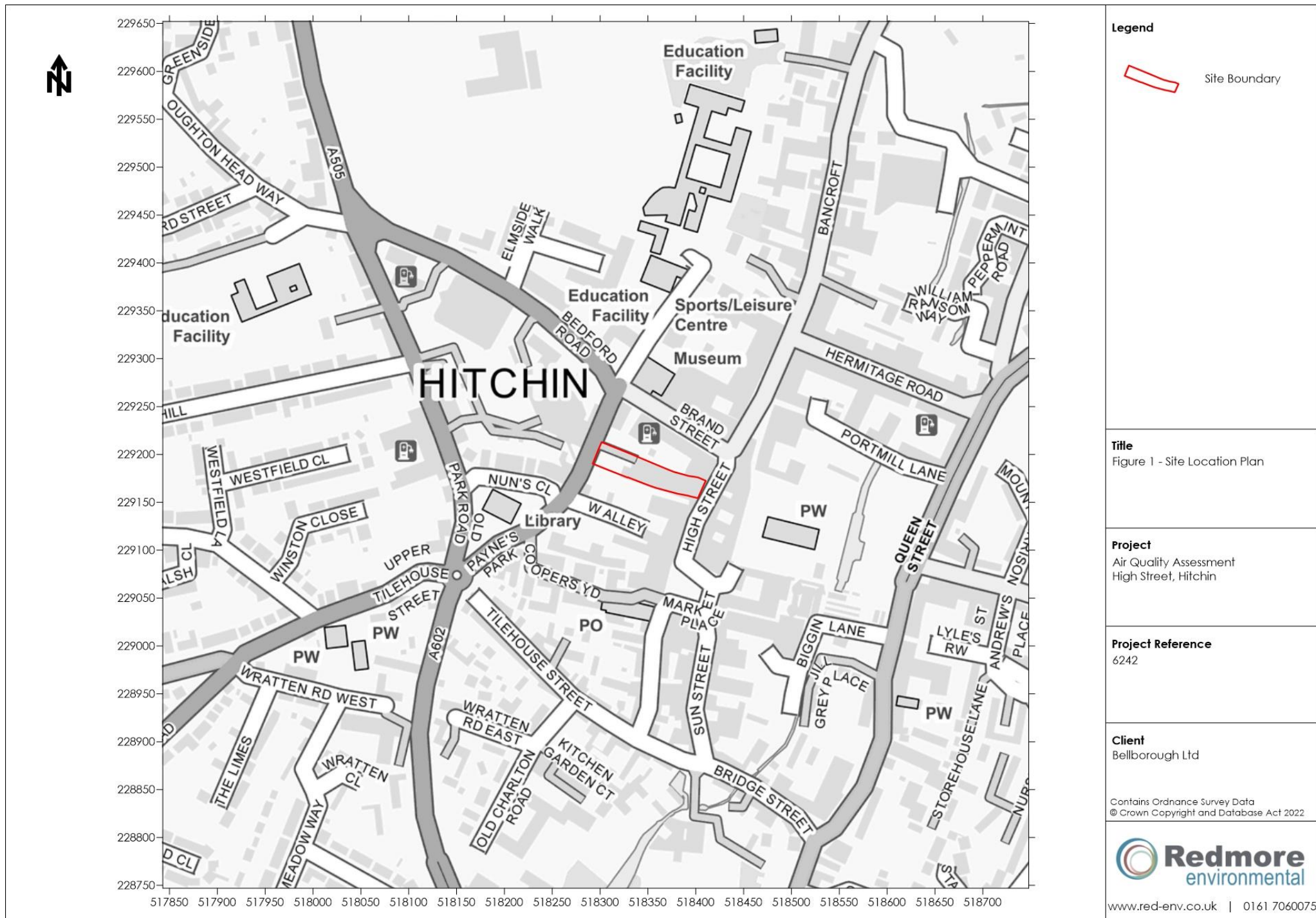
- 7.1.1 Redmore Environmental Ltd was commissioned by Bellborough Ltd to undertake an Air Quality Assessment in support of a residential-led development at 9-10 High Street, Hitchin.
- 7.1.2 The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future residents to any existing air quality issues at the site. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider location suitability for the proposed end-use and assess potential effects as a result of the scheme.
- 7.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Site-specific dust control measures were subsequently determined based on the identified risk ratings. Subject to implementation, potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities are predicted to be **not significant**.
- 7.1.4 The development has the potential to impact on existing air quality in the vicinity of the site and expose future residents to elevated pollution levels during operation. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.
- 7.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations as a result of traffic generated by the development were predicted to be **negligible** at all receptor locations.
- 7.1.6 The results of the dispersion modelling assessment also indicated that predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were below the relevant AQOs and Interim Target across the development. The site is therefore considered suitable for the proposed use from an air quality perspective.

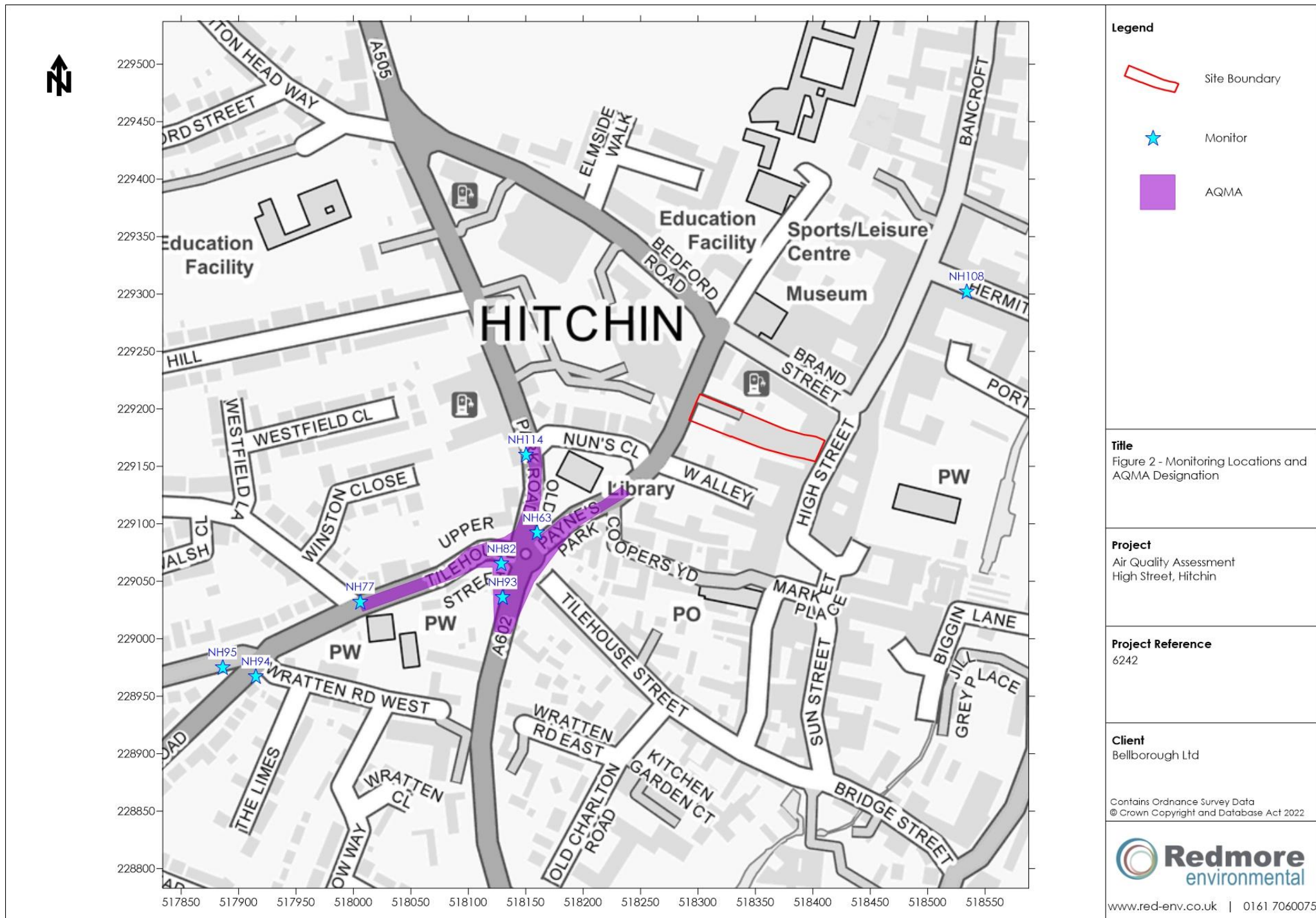
- 7.1.7 Following consideration of the relevant issues, residual impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.
- 7.1.8 A number of mitigation measures were identified in line with the requirements of the NHC Air Quality Planning Guidance Document in order to reduce vehicle exhaust emissions associated with the proposals. It is considered these are appropriate for a development of this scale and nature and will further control impacts during the operational phase.
- 7.1.9 Based on the assessment results, air quality factors are not considered a constraint to the development.

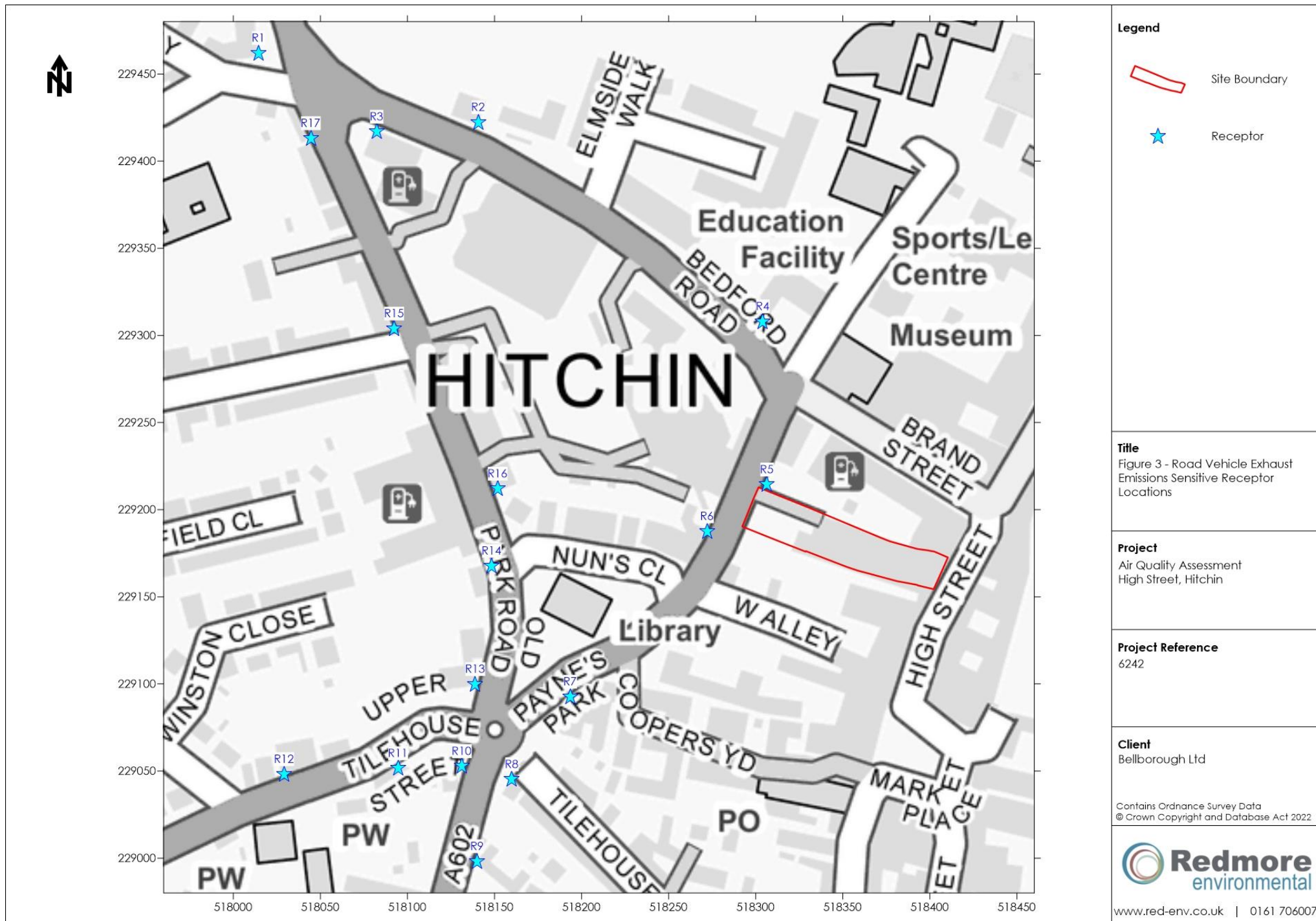
8.0 **ABBREVIATIONS**

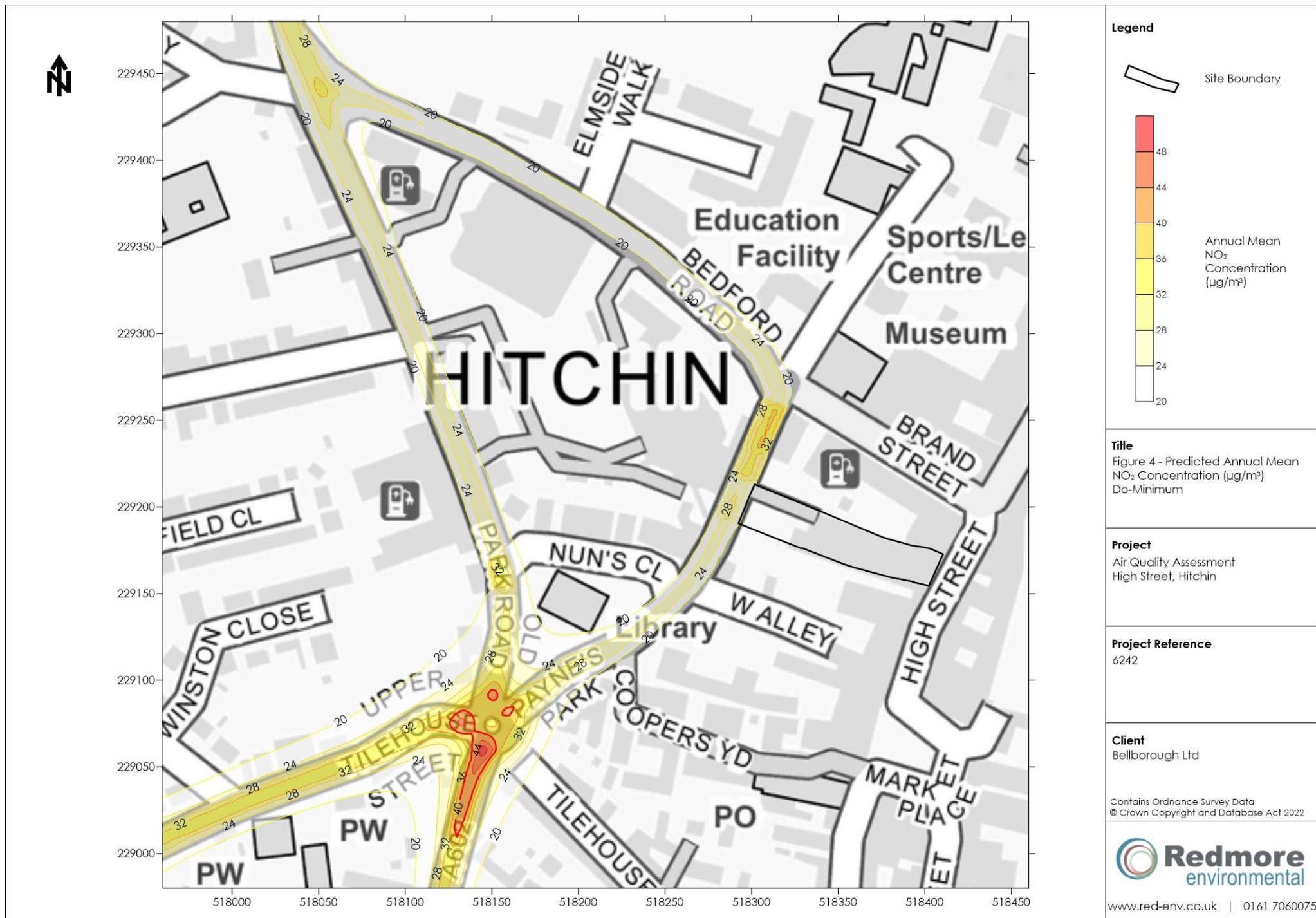
AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASR	Annual Status Report
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EFT	Emissions Factor Toolkit
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NGR	National Grid Reference
NHC	North Hertfordshire Council
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
SP	Slow Phase
Z ₀	Roughness length

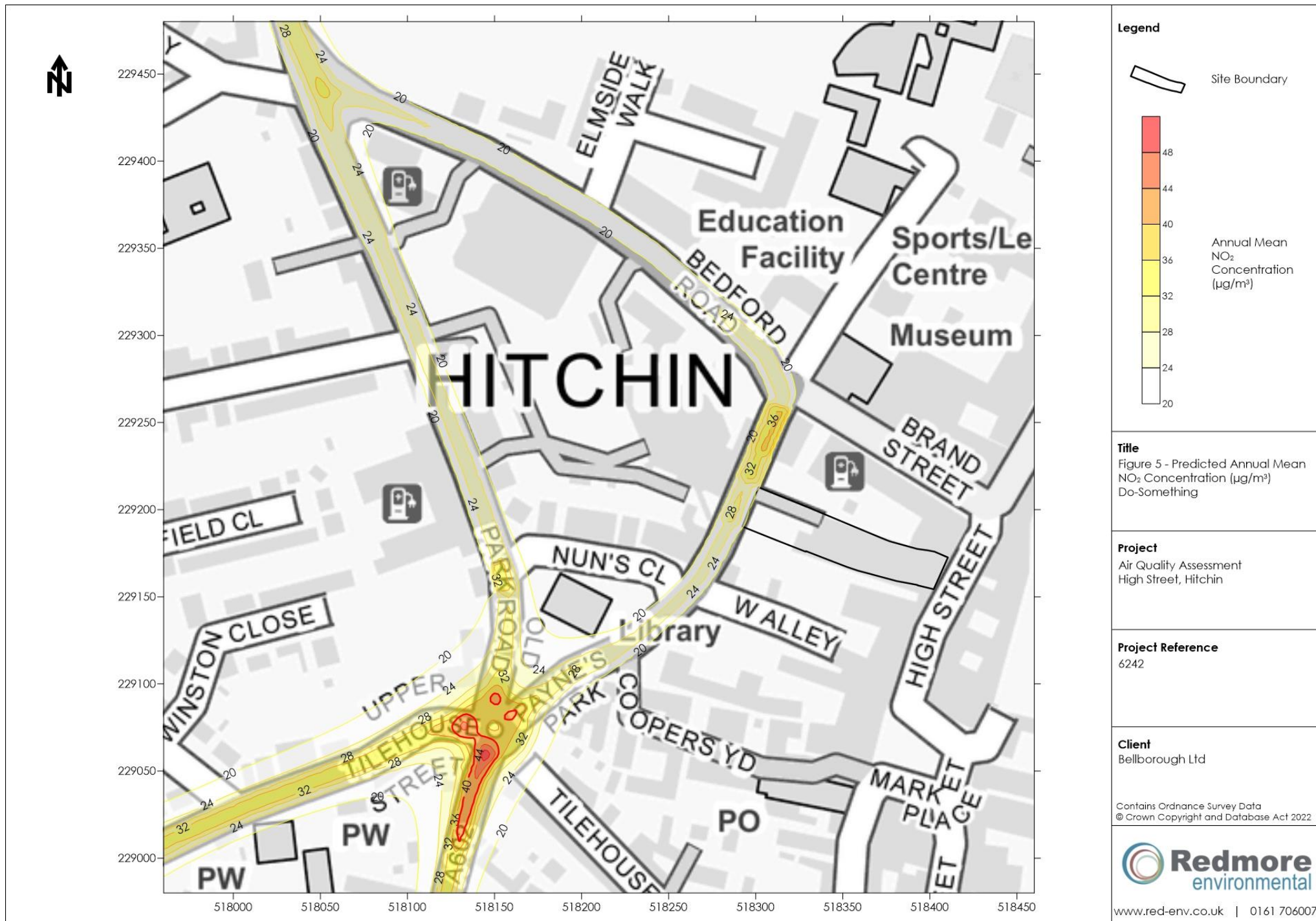
Figures

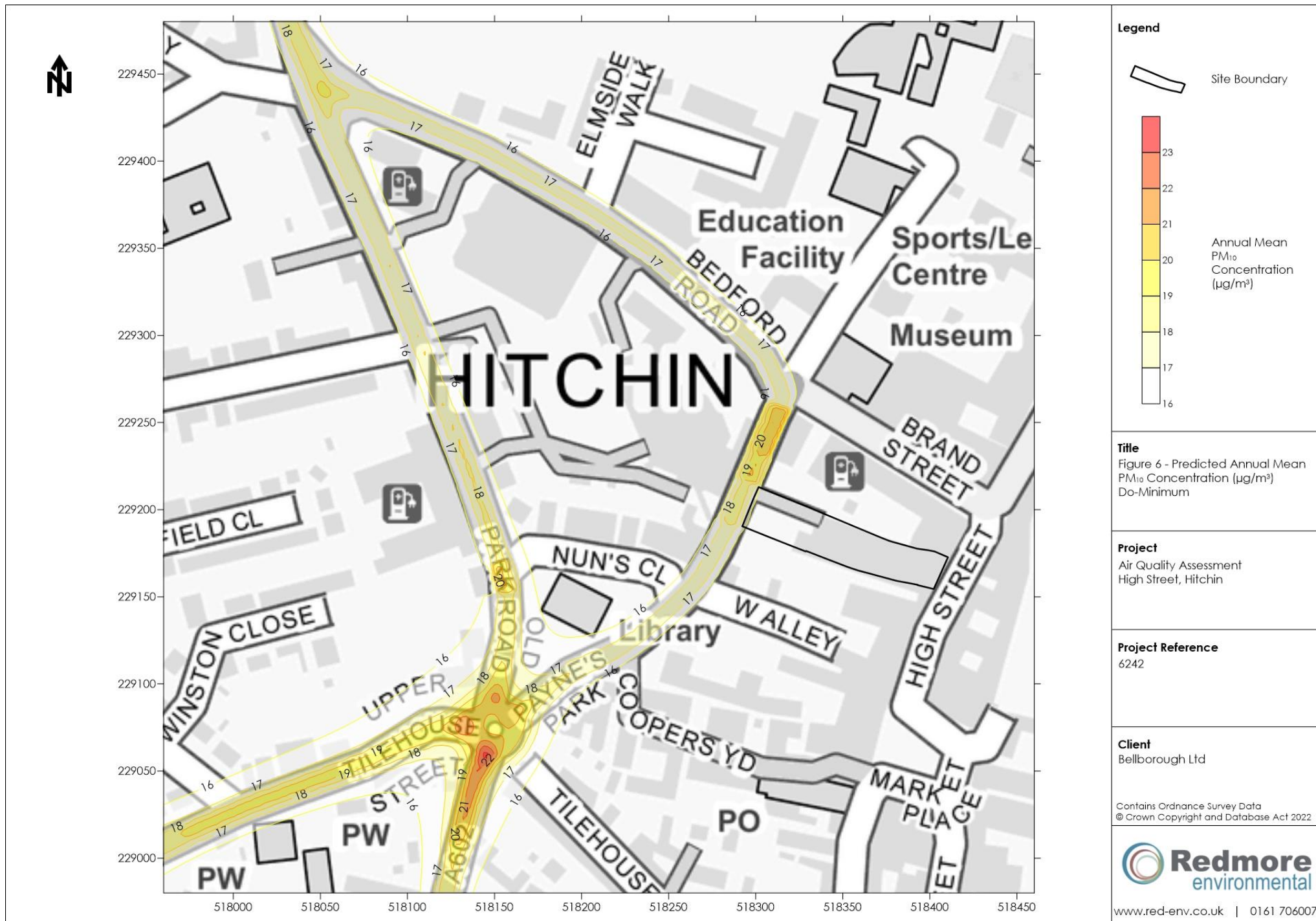


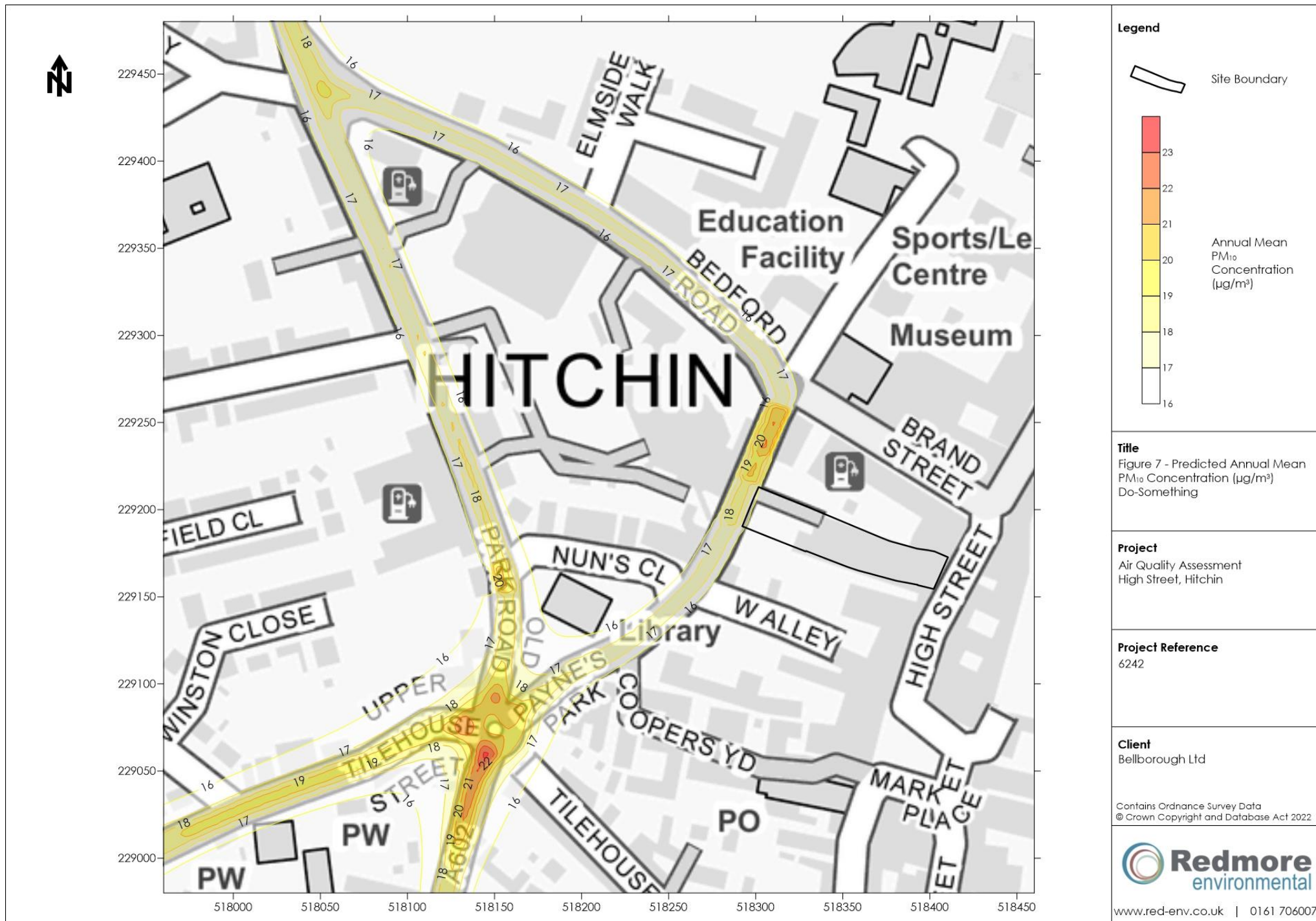


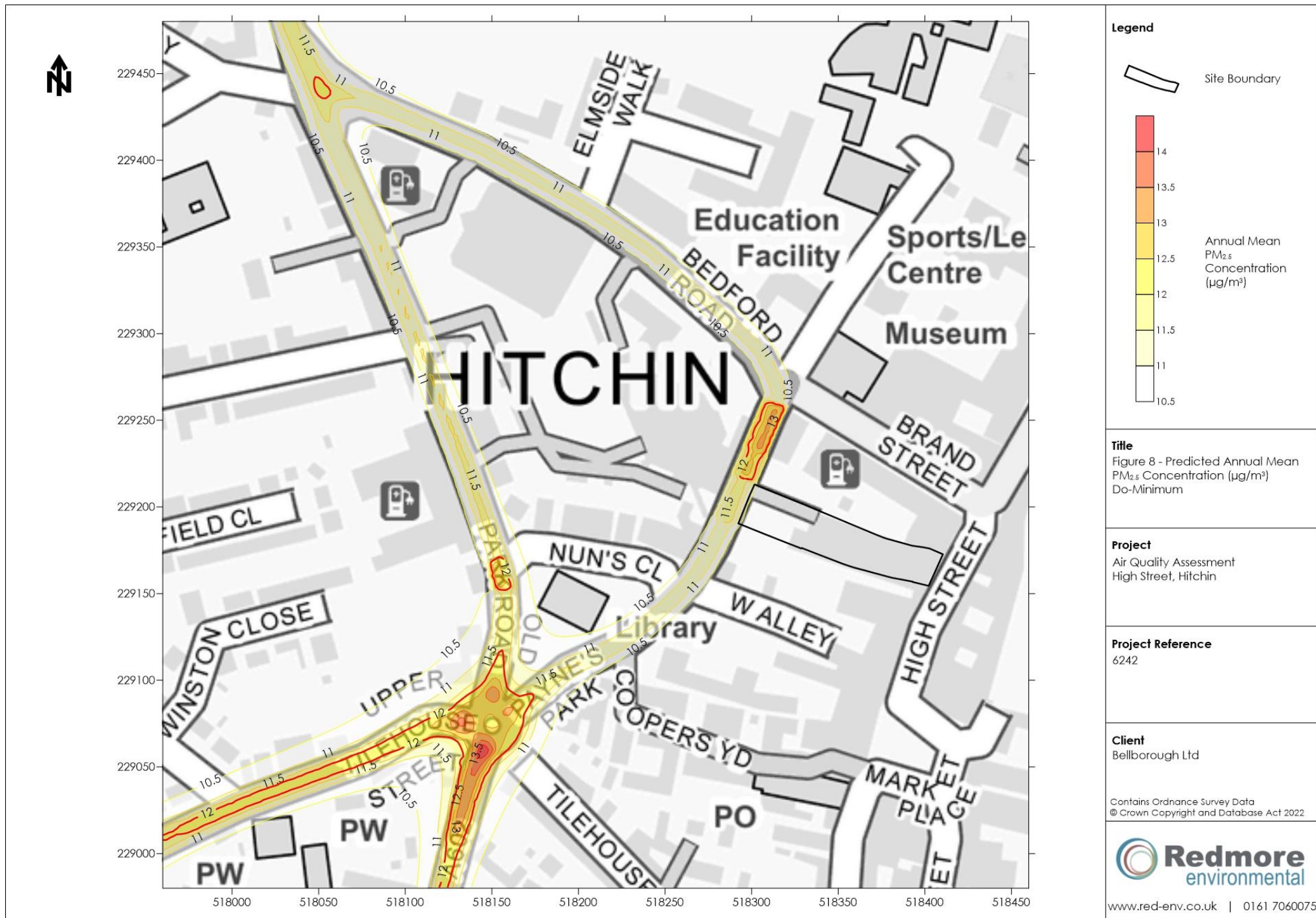


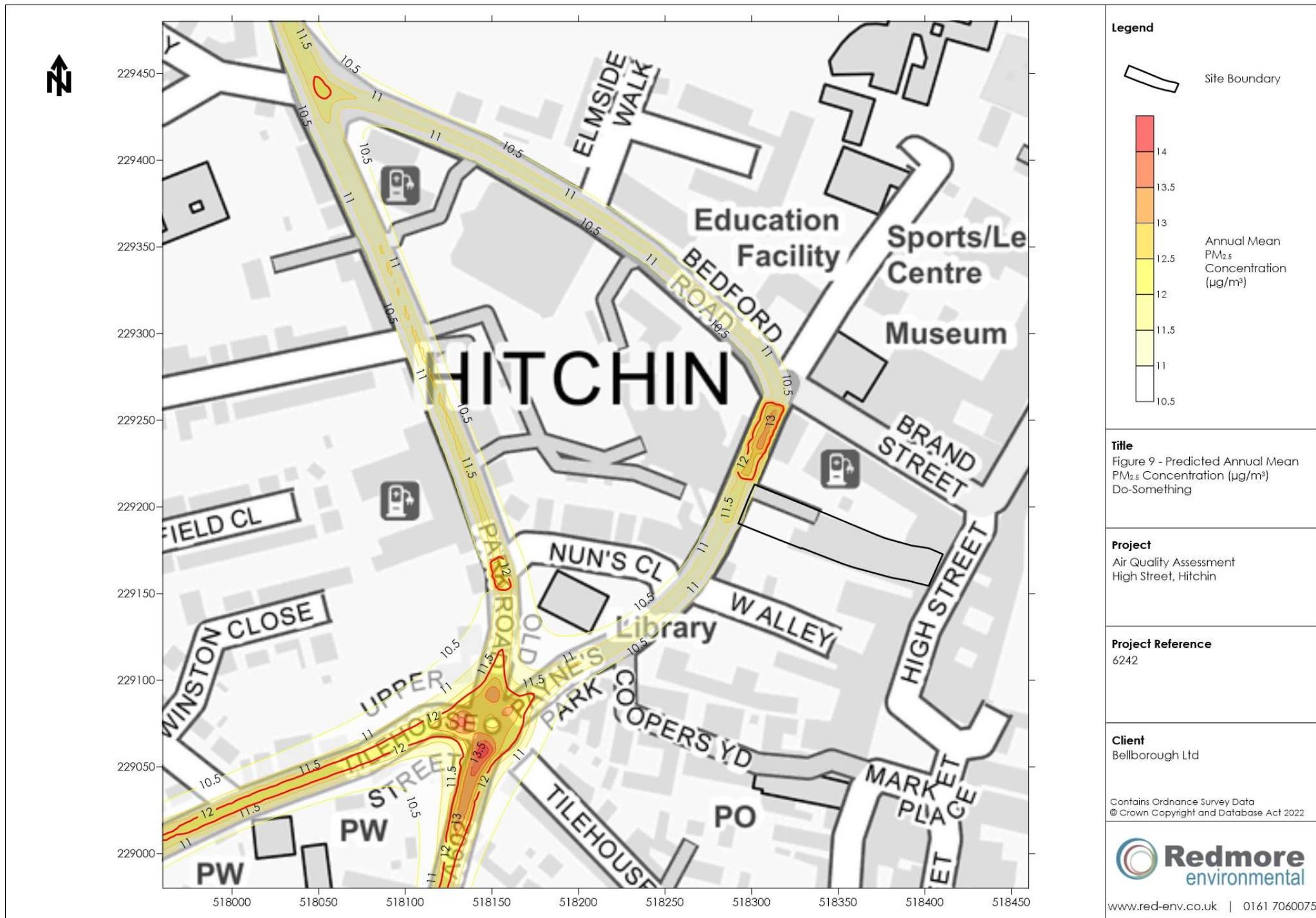


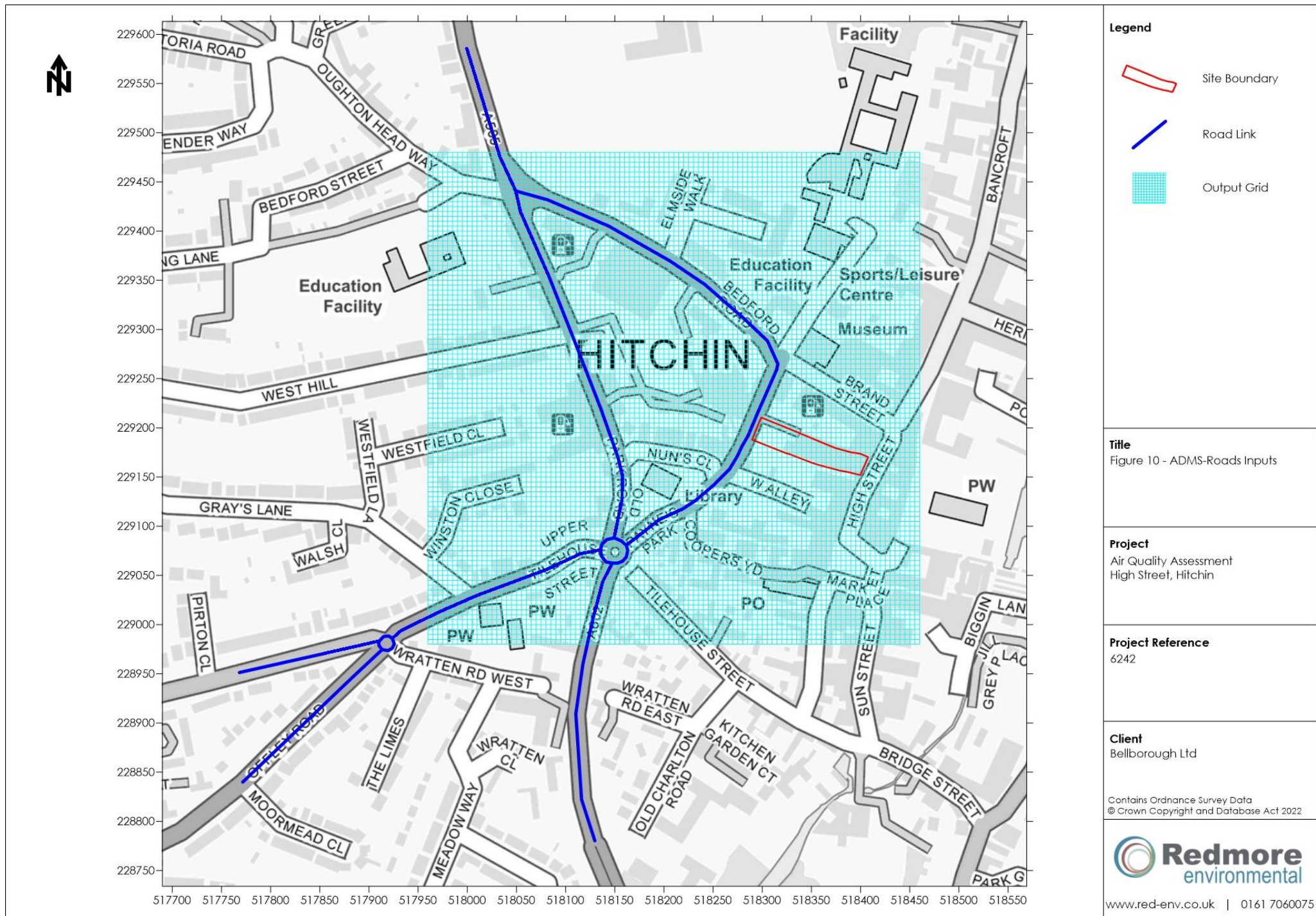


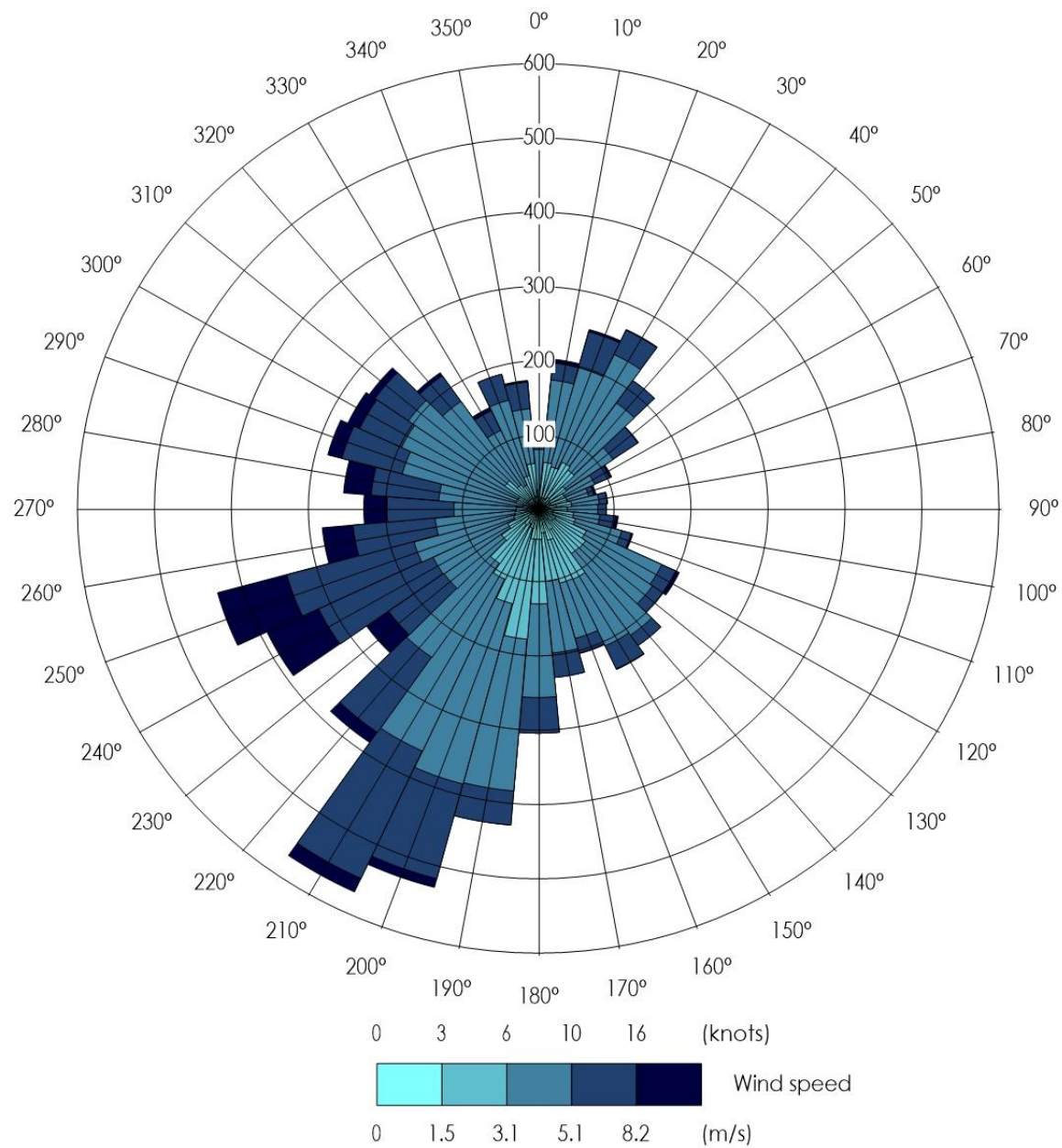












Legend

Title

Figure 11 - Wind Rose of 2022
Luton Airport Meteorological Data

Project

Air Quality Assessment
High Street, Hitchin

Project Reference

6242

Client

Bellborough Ltd

Appendix 1 - Assessment Input Data

Introduction

The proposals have the potential to cause air quality impacts as a result of exhaust emissions associated with vehicles travelling to and from the development, as well as expose future residents to any existing air quality issues at the site. In order to assess NO₂, PM₁₀ and PM_{2.5} concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken in order to predict NO₂, PM₁₀ and PM_{2.5} concentrations across the site using the ADMS-Roads dispersion model (version 5.0.1.3). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

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

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

The relevant inputs are detailed in the following Sections.

Assessment Area

Ambient concentrations were predicted over the area NGR: 517960, 228980 to 518460, 229480. One Cartesian grid was included within the model to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 10 for a graphical representation of the assessment grid extents.

Receptors potentially sensitive to changes in pollutant concentrations were included in the assessment as outlined in the main report text.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour AADT flows and fleet composition, was obtained from the Department for Transport (DfT)²⁴. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2022. It should be noted that the DfT web tool is referenced in DEFRA guidance²⁵ as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

Baseline traffic data was converted to the opening year of the development utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

The predicted number of daily traffic movements generated by the development were provided by Transport Planning Associates, the Transport Consultants for the project. These were added to the relevant links to establish the DS flows.

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

²⁴ <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>.

²⁵ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table A1.1 Traffic Data

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Avg. Vehicle Speed (km/h)
		2022	2026 DM	2026 DS			
L1	A505 Bedford Road, north of Old Park Road, Slow Phase (SP)	17,607	18,104	18,162	2.87	10.0	20
L2	A505 Bedford Road, east of Old Park Road	12,065	12,405	12,521	3.37	7.1	45
L3	A505 Bedford Road, west of Brand Street, SP	12,065	12,405	12,521	3.37	7.1	20
L4	A505 Bedford Road	12,065	12,405	12,521	3.37	6.5	35
L5	A505 Bedford Road, north of site	12,065	12,405	12,521	3.37	6.5	35
L6	A505 Bedford Road, adjacent to site	12,065	12,405	12,521	3.37	6.5	35
L7	A505 Bedford Road, south of site	12,065	12,405	12,521	3.37	7.2	35
L8	A505 Payne's Park, SP	12,065	12,405	12,521	3.37	7.2	20
L9	A602 Park Way, SP	27,160	27,926	27,955	3.11	8.0	20
L10	A602 Park Way	27,160	27,926	27,955	3.11	7.3	80
L11	A505 Upper Tilehouse Street, SP	20,819	21,406	21,435	3.63	10.8	20
L12	A505 Upper Tilehouse Street, Traffic lights	20,819	21,406	21,435	3.63	6.9	20
L13	A505 Upper Tilehouse Street, north of Offley Road, SP	20,819	21,406	21,435	3.63	11.1	20
L14	Pirton Road, SP	6,467	6,649	6,664	7.58	7.1	20
L15	Pirton Road	6,467	6,649	6,664	7.58	7.4	45
L16	A505 Offley Road, SP	17,533	18,027	18,042	5.16	7.9	20
L17	A505 Offley Road	17,533	18,027	18,042	5.16	8.0	45
L18	A505 Park Road, north of roundabout	12,990	13,356	13,414	3.57	8.0	35
L19	A505 Park Road, canyon	12,990	13,356	13,414	3.57	9.1	35
L20	A505 Park Road	12,990	13,356	13,414	3.57	6.3	35
L21	A505 Park Road, SP	12,990	13,356	13,414	3.57	10.4	20
R1	A602/A505 Roundabout	18,259	18,773	18,831	3.63	15.5	20
R2	B655/ A505 Roundabout	14,940	15,361	15,419	7.58	7.5	20

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

Canyons

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

The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which have been retained in version 5.0.1.3. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

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

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

The combined modelling of these effects will result in concentration patterns unique to each canyon. The parameters used in the assessment are outlined in Table A1.2. It should be noted that where buildings are only present on one side of the road, canyon parameters were purposefully included at 0m.

Table A1.2 Canyon Parameters

Link	Parameter (m)					
	Canyon Width to Left	Average Height of Buildings to Left	Building Length Left	Canyon Width to Right	Average Height of Buildings to Right	Building Length Right
L4	5.5	10.0	29.5	8.1	8.0	29.5
L5	7.0	8.0	0.0	7.7	8.0	26.8
L6	0.0	0.0	0.0	7.6	12.0	17.0
L19	5.6	6.0	18.1	0.0	0.0	0.0

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

Emission Factors

The emission factors were calculated using the relevant traffic flows and the EFT (version 12.0.1). This has been produced by DEFRA and incorporates COPERT 5.6 vehicle emission factors.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2022 emission factors were utilised in preference to the scheme opening year in order to provide robust model outputs. As predictions for 2022 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Luton Airport meteorological site over the period 1st January 2022 to 31st December 2022 (inclusive). Luton Airport is located at NGR: 511948, 221574, which is approximately 10.2km south-west of the scheme. It is anticipated

that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 11 for a wind rose of the utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe both the modelling extents and meteorological site. This value is considered appropriate for the morphology of both areas and is suggested 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 10m was used to describe the modelling extents. This is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

A minimum Monin-Obukhov length of 30m was used to describe the meteorological site. This is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

Annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations for use in this assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 12.

Similarly to emission factors, background concentrations from 2022 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance²⁶.

Verification

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

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

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

For the purpose of the assessment, model verification was undertaken for 2022 using traffic data, meteorological data and monitoring results from this year.

NHC undertook monitoring of NO₂ concentrations at seven locations within the vicinity of roads included in the model during 2022. The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance²⁷. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

²⁶ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

²⁷ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table A1.3 NO_x Verification - Monitoring Results

Monitoring Location		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
NH63	(NH02a) Library Hitchin	26.60	27.10
NH77	Upper Tilehouse Street, Hitchin (traffic lights)	29.50	33.11
NH82	Upper Tilehouse Street, Near Roundabout	25.90	25.68
NH93	Park Way	31.10	36.50
NH94	Offley Road	24.00	21.85
NH95	Pirton Road	22.90	19.66
NH114	Old Park Road	21.80	17.49

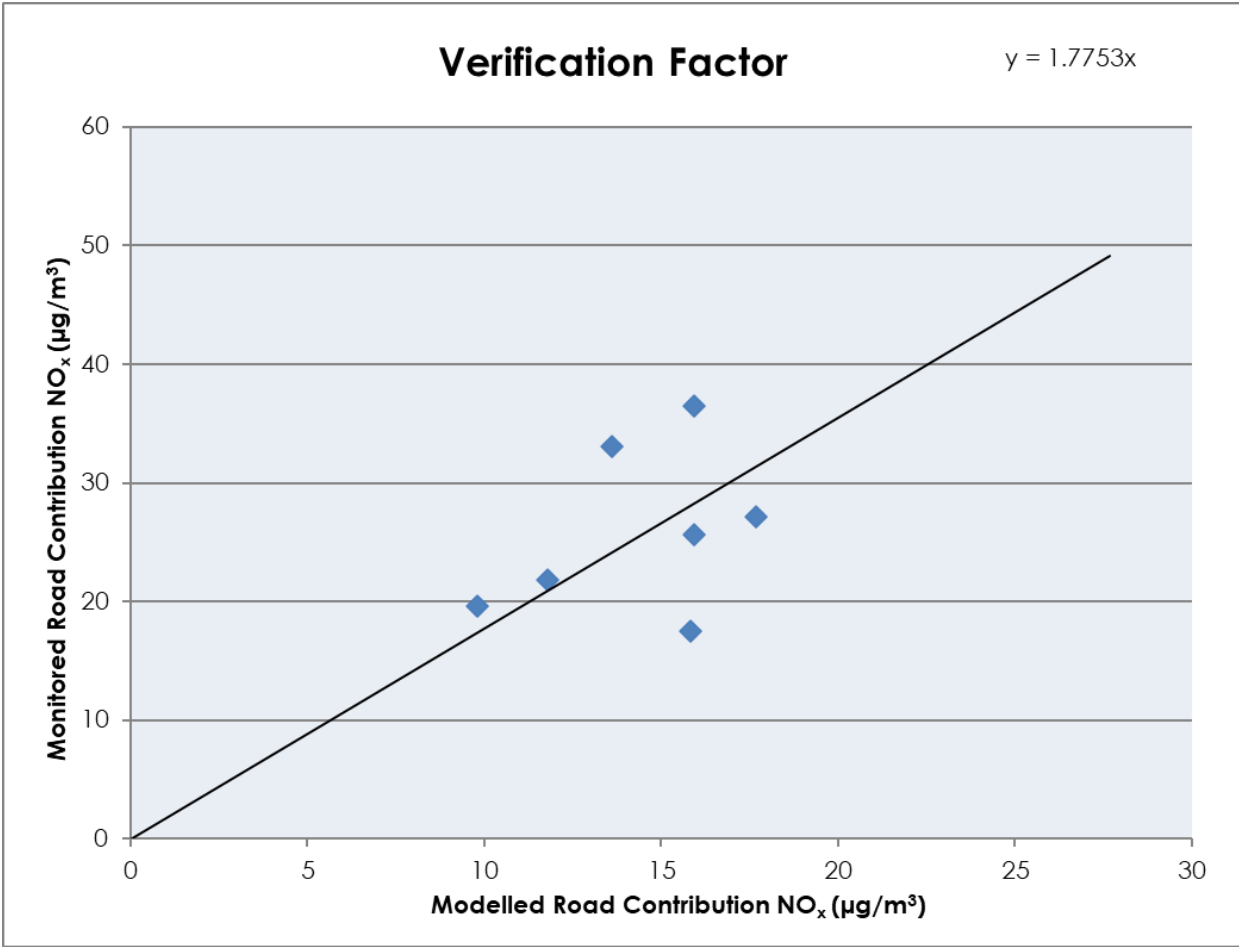
The annual mean road NO_x concentrations predicted from the dispersion model and the road NO_x concentrations calculated from the monitoring results are summarised in Table A1.4.

Table A1.4 NO_x Verification - Modelling Results

Monitoring Location		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
NH63	(NH02a) Library Hitchin	27.10	17.67
NH77	Upper Tilehouse Street, Hitchin (traffic lights)	33.11	13.61
NH82	Upper Tilehouse Street, Near Roundabout	25.68	15.93
NH93	Park Way	36.50	15.94
NH94	Offley Road	21.85	11.78
NH95	Pirton Road	19.66	9.80
NH114	Old Park Road	17.49	15.85

The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 1.7753 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



Monitoring of PM₁₀ and PM_{2.5} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance²⁸.

²⁸ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Appendix 2 - Curricula Vitae

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Industrial

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

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

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

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

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

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

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

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

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

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

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

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

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

Residential

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

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

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

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

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

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

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

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

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

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

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Bowlers Yard, Manchester

Air Quality Assessment in support of an eleven storey residential development to provide circa 65 units on land known as Bowlers Yard, Manchester. The site was located in an Air Quality Management Area (AQMA) and concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{2.5}, PM₁₀ and NO₂ concentrations across the site. Results indicated that pollution levels were below the air quality objectives across the development.

Freemasons Arms Hotel, Heywood

Air Quality Assessment to support a residential-led development in an AQMA. Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography within the locality on the dispersion of traffic related pollutants. Predicted concentrations of NO₂ were found to exceed air quality criteria at the building façade fronting Market Place at first floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Griffin Road, London

Air Quality Assessment in support of a residential development located in an AQMA. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM₁₀ and NO₂ concentrations across the site. Results indicated that pollution levels were classified as APEC - A in accordance with the London Councils Air Quality and Planning Guidance.

High Street, Dudley

Odour Impact Assessment in support of a proposed residential-led development. Due to the location of the site, being above an existing hot food takeaway, odour surveys were required to assess the level of odour across the development. A risk assessment was also undertaken in accordance with the relevant odour guidance. An appropriate ventilation system was identified on the basis of the assessment results.

East Common Lane, Selby

Air Quality Assessment in support of an industrial development on land associated with Access 63 Business Park, East Common Lane Selby. Due to the size of the development it was possible that traffic generated from the scheme may cause negative impacts on sensitive receptors nearby. NO₂ and PM₁₀ concentrations were quantified at specific receptor points to ensure there would be no significant increases in pollution levels. Results revealed negligible impacts.

Wharton Road, Winsford

Air Quality Assessment in support of a residential development of circa 138 units on land off Wharton Road, Winsford. Using sensitive receptors, located in areas where increased road traffic may affect NO₂ concentrations, a comparison was made between overall concentrations with and without the development in place. Results revealed pollutant concentrations were below the relevant standards across the site and impacts were not significant.

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Circle Court Tower, Stretford

Air Quality Assessment for the refurbishment of the existing Circle Court Tower in Stretford, Greater Manchester, to provide improved apartments for occupants. Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions from vehicles using Junction 9 of the M60 motorway, adjacent to the site. Dispersion modelling was undertaken to quantify pollution levels at several different heights reflective of residential units within the development. Predicted concentrations were below the relevant Air Quality Objectives (AQO) at all sensitive locations across the development. Mitigation in the form of mechanical ventilation was therefore not required.

Greenbrow Road, Wythenshawe

Air Quality Assessment in support of a residential development of 56 units and associated infrastructure. The proposals involved demolition of hard standings prior to construction of low rise dwellings. An assessment of fugitive dust emissions was undertaken and the results indicated that the use of good practice control measures would provide suitable mitigation for the impacts of the scheme.

The Grange, Handforth

Co-ordination and management of a 3-month study in order to determine baseline conditions and identify any potential issues at a residential estate. Concerns were raised regarding the exposure of residents to poor air quality due to road traffic emissions from the new Manchester Airport Relief Road. The results of the monitoring identified nitrogen dioxide (NO₂) concentrations to be below the AQO.

Copeley Hill, Birmingham

Air Quality Assessment in support of proposed residential apartments and dwellings within an Air Quality Management Area (AQMA). A two-staged assessment was undertaken involving a three month diffusion tube study and subsequent dispersion modelling using ADMS-Roads. Predicted concentrations indicated elevated pollution levels at residential units along the site boundary. As such, suitable mitigation in the form of mechanical ventilation has been specified for the relevant dwellings in order to protect future residents from poor air quality.

Clinton Place Car Park, Sunderland

Air Quality Assessment in support of a proposed surface car park on land at Clinton Place, Sunderland. The development has potential to cause air quality impacts at sensitive locations during construction and operation. Detailed dispersion modelling was therefore undertaken to consider the potential impact of the development on air quality at sensitive receptor locations within the vicinity of the site. This included emissions for the local road network and vehicles on the car park itself. Results indicated that impacts were predicted to be negligible at all sensitive receptor locations. Suitable mitigation to control potential impacts associated with fugitive dust releases during construction were also identified.