

11 Air Quality

11.1 Introduction

11.1.1 This chapter was prepared by Redmore Environmental and presents an assessment of the likely significant effects of the Development on human health, dust soiling and increases in pollutant concentrations during the construction phase. The assessment also considers the likely significant effects of the Development on increases in pollutant concentrations on existing and proposed sensitive receptors during the completed development stage of the project. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and/or enhance likely beneficial effects. The nature and significance of the likely residual effects are then reported. An assessment of the cumulative effects of the project with other cumulative developments (as identified in Chapter 3 and Appendix 3.4) is also presented.

11.1.2 The chapter is supported by the following appendices:

- Appendix 11.1: Legislation, Policy and Guidance;
- Appendix 11.2: Construction Phase Fugitive Dust Emissions Methodology;
- Appendix 11.3: Detailed Air Quality Assessment Methodology;
- Appendix 11.4: Air Quality Monitoring Report - Development on Land East of Hemel Hempstead; and
- Appendix 11.5: Dispersion Modelling Input Data - Ecological Receptors

Competence

11.1.3 This Chapter has been prepared by Natasha Jones BSc (Hons) MSc; Associate Member of the Institute of Environmental Science (AMIEEnvSc). Natasha has been responsible for conducting air quality studies for a range of projects, including residential, commercial, employment and industrial schemes. She has over two years of experience completing a range of air quality impact assessments for standalone planning applications and EIA.

11.1.4 The assessment has been overseen by Claire Meddings BSc (Hons) MSc CSci MIAQM MIENVSc who is a Director at Redmore Environmental Ltd. Claire has over 17 years' of experience within the air quality consultancy sector and has produced or project managed over 1,000 Air Quality Assessments across the residential, retail, commercial and industrial sectors throughout the UK and internationally. She has experience in a range of air quality impact assessments for standalone planning applications and EIA and is well versed in air quality legislation along with national and local planning policies.

11.2 Legislation, Planning Policy and Guidance

11.2.1 Appendix 11.1 provides a detailed overview of the legislation, planning policy and guidance that is of relevance to this assessment and the Development. A summary of the documents is provided below.

Legislation Context

11.2.2 The following legislation is relevant to the Development:

- Air Quality Standards Regulations (Amendments) 2016¹;
- Air Quality Strategy 2023²;
- The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020³;
- The Environment Act 1995⁴;
- Environmental Improvement Plan 2023⁵;
- Environmental Targets (Fine Particulate Matter) (England) Regulations 2023⁶; and
- The Environment Protection Act 1990⁷.

Planning Policy Context

National

11.2.3 The following national planning policy is relevant to the Development:

- National Planning Policy Framework (NPPF): Chapter 15⁸; and
- Clean Air Strategy 2019⁹.

Local

11.2.4 The following local planning policy is relevant to the Development:

- Draft SADC Local Plan – Draft Local Plan (2041) ('Emerging Local Plan')¹⁰.

Guidance

11.2.5 The following guidance is relevant to the Development:

- National Planning Practice Guidance (NPPG) (Live Document);
- Department for Environment, Food and Rural Affairs (DEFRA) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2011¹¹;
- DEFRA Local Air Quality Management Technical Guidance 2022¹²;
- Institute of Air Quality Management (IAQM) Land-use Planning & Development Control: Planning for Air Quality 2017¹³;
- IAQM Guidance on the Assessment of Dust from Demolition and Construction 2024¹⁴;
- Design Manual for Roads and Bridges (DMRB) 2024¹⁵;
- IAQM A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites¹⁶;
- Natural England's Approach to Advising Competent Authorities on the Assessment of Road Traffic Emissions Under the Habitats Regulations¹⁷; and,
- Natural England Air pollution and development: advice for local authorities¹⁸

11.3 Assessment Methodology

Consultation

EIA Scoping Opinion

- 11.3.1 A request for a Scoping Opinion was submitted by the Applicant to SADC on 27th March 2025. The Scoping Report accompanied the request (Appendix 3.2). The Scoping Opinion (Appendix 3.3) was issued by SADC on 23rd May which included comments from statutory consultees. Table 11.1 summarises key comments raised by consultees of relevance to this assessment during the EIA Scoping study and how the assessment responded to them.

Table 11.1: EIA Scoping Response Summary

Consultee and Comment	Response
<i>SADC Scoping Opinion – 23 May 2025</i>	
With regards specifically to the air quality chapter of the EIA Scoping Report, the scope of the proposed air quality assessment appears proportionate to the nature and scale of development, as does the overview of the proposed assessment methodologies. Reference to the relevant three IAQM Guidance documents is welcomed. The scope is broadly acceptable subject to the detailed comments on the Dispersion Modelling Methodology, which must be fully taken into account. A detailed air quality methodology must be agreed with the Council before the assessment is carried out. The comments from [...] Environmental Health Manager must be taken into consideration.	The scope of the chapter is in line with that stated in the Scoping Report. A detailed air quality assessment methodology report was submitted to SADC for review and comment on 24 October 2025.
<i>Environmental Health SADC (30 April 2025)</i>	
A more detailed air quality assessment methodology report is required to be submitted and agreed in advance with SADC to ensure clarity of process and the specific assessment methodologies and criteria to be adopted. The report should cover baseline studies, assessment of impact magnitude including dispersion modelling methodology, classification of receptor sensitivity and effect levels and subsequent overall assessment of significance. A matrix representation of each of the effect levels should be derived, along with discussion of other contextual factors that may be considered in assessing the overall significance of effects (e.g. magnitude and number of receptors affected).	A detailed air quality assessment methodology report was issued to SADC for review and comment on 24 October 2025.
Potential significant air quality effects on sensitive receptors (both human and ecological) associated with development have been identified, including	The assessment has considered the potential effects on both existing human receptors and future

Consultee and Comment	Response
temporary construction effects and permanent effects from the completed development, as below: ▪ The effects of construction of the Development on dust soiling and concentrations of PM₁₀; ▪ The effects of construction traffic on concentrations NO₂, PM₁₀ and PM_{2.5}, ▪ The effects of operation of the Development on concentration of NO₂, PM₁₀ and PM_{2.5} from road traffic emissions in the opening year. The Scoping Report states, ‘Receptors for the assessment will be sensitive [Human] receptors surrounding the Site boundary, and additional receptors located nearby road links where a potentially significant change in traffic is predicted.’ These ‘additional receptors’ should explicitly include both existing human receptors and future (initial) occupants of the development.	occupants of the Development, as well as relevant ecological receptors.
The absence of a project specific local baseline monitoring exercise is noted. Ideally a monitoring exercise, at least 1 year’s duration given the scale of development as part of the Hemel Growth Area would’ve been implemented. The Scoping Report states, “baseline conditions at the Site will be determined using local authority monitoring data and mapped background concentrations provided by Defra”. This data will also be used for dispersion model verification. The use of monitoring data from both SADC and DBC is stated on Page 49, albeit suitable (roadside) sites may be some distance away. For model verification a combination of continuous monitoring and diffusion tubes is recommended (LAQM, TG22). For information, a short-term diffusion tube study during 2024 was undertaken to inform the East Hemel Hempstead EIA Air Quality Assessment, currently underway. Albeit only a 6 month survey it may supplement the local authority monitoring data to be used and check that background Defra maps are representative of the study area, if the results can be obtained from the respective applicant.	Review of the Air Quality Monitoring Report produced by The Crown Estate¹⁹ for the development on Land East of Hemel Hempstead indicated suitable monitoring data for inclusion within this assessment. This can be found within Appendix 11.4. The use of this data instead of undertaking a project specific local baseline monitoring exercise was discussed and agreed with SADC on 14th May 2025. Monitors used within the assessment were included within the detailed air quality assessment methodology report issued to SADC on 24th October 2025.
The proposed construction dust assessment methodology using the IAQM Guidance, 2024 ‘Guidance on the Assessment of Dust from Demolition & Construction’, is considered appropriate. It is noted in Section 4.20 of the Scoping Report that ‘the assessment of construction effects will rely on cautious ‘worst-case’ assumptions”. This precautionary approach to the	The IAQM ‘Guidance on the Assessment of Dust from Demolition & Construction’ has been used throughout the construction phase assessment. The risks outlined in the Table 11.8 have been predicted based on a conservative scenario of works being undertaken at the Site

Consultee and Comment	Response
assessment is welcomed and should be applied when considering cumulative construction effects, (see additional comments below).	boundary closest to each sensitive area. This has also been considered within the cumulative assessment
The stated 'non-significant effects' are noted and agreed.	The assessment has been undertaken in accordance with the scoping methodology submitted and agreed with SADC
It is noted embedded mitigation for construction of the scheme includes a Construction Environmental Management Plan (CEMP), with related construction traffic impacts considered in the Framework CTMP. This is welcomed and the CEMP should include adoption of industry good practice. In addition, considering the proposed construction programme could potentially extend to approximately 12 years at scale the CEMP should also challenge current industry practice, explicitly targeting adoption of new technologies and innovative practices, for example, minimum plant emission standard (Stage V) and transitioning to alternative / zero emission plant or latest monitoring technologies when required.	Following the results of the construction phase assessment, suitable mitigation measures have been recommended for inclusion within the CEMP. These have been reviewed in accordance with the IAQM guidance ²⁰ and based on best practice.
The air quality cumulative assessment approach outlined on Page 50 and the overall EIA outline methodology and approach detailed in section 4 of the Scoping Report is noted. Attention to the air quality cumulative effects should be given appropriate and proportionate consideration especially given the proximity, timing and scale of the neighbouring proposed developments, i.e. Land to the East of Hemel Hempstead (SADC Site Allocations H2, H3, H4); and the site allocation in the Dacorum Borough Council North Hemel Hempstead Growth Area (if information is available). Despite the separate studies being undertaken for the respective development areas they are inextricably linked, their impacts will overlap and cooperation on topic studies such as air quality would be welcomed, if not expected.	The assessment has considered the potential for cumulative impacts associated with the Development and nearby schemes, including the adjacent East Hemel Hempstead development.
<i>Development Management SADC (7th November 2025)</i>	
Request for further details on the dispersion model verification methodology within the detailed air quality assessment methodology report	The detailed air quality assessment methodology report was updated and re-issued on 12 th November 2025 for comment.
Request for detailed air quality assessment methodology report to include methodology in relation to ecological receptors for the completed development. There's no mention of it in the first or	The detailed air quality assessment methodology report was updated and re-issued with inclusion of the completed development ecological

Consultee and Comment	Response
subsequent version submitted. I would've expected to see an assessment methodology referenced in line with the IAQM 'Guide to the Assessment of Air Quality Impact on Designated Nature Conservation Sites' (2020). The previously submitted Air Quality Chapter of the Scoping Report identified Local Wildlife Sites and Ancient Woodlands as sensitive ecological receptors within the study area. I would expect to see the assessment methodology reference these, even if to justify screening them out, and done so with input from the project ecologist.	methodology on 21st November 2025 for comment. Justification for scoping Ancient Woodlands and Local Wildlife Sites was provided and reflects text in the Non-Significant Effects section within this chapter.

Pre-Application Consultation

- 11.3.2 Consultation with SADC on 14th May 2025 regarding the use of The Crown Estate Air Quality Monitoring Data undertaken in support of the development on Land East of Hemel Hempstead was carried out. This data can be found in Appendix 11.4 It was agreed that a project-specific monitoring survey would not be required.
- 11.3.3 As noted in Table 11.1, a detailed air quality assessment methodology report was submitted to SADC for review and comment on 24th October 2025. No formal comments have been received.

Summary of Assessment Scope

- 11.3.4 The scope of the construction and completed development assessment within this chapter is limited to the following potential impacts and assessment of effects:

Construction

- 11.3.5 The Development has the potential to result in the following impacts during the construction stage which could lead to significant effects:
- The effects of construction of the Development on dust soiling and concentrations of particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀); and
 - The effects of construction traffic on concentrations of nitrogen dioxide (NO₂), PM₁₀ and particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}).

Completed Development

- 11.3.6 The Development has the potential to result in the following impacts during the completed Development stage which could lead to significant effects:
- The effects of operation of the Development on concentrations of NO₂, PM₁₀ and PM_{2.5} from road traffic in the proposed year of completion; and
 - The effects of road traffic emissions on future users of the Development.

Cumulative Assessment:

- 11.3.7 The cumulative assessment will consider the same potential likely significant effects (where possible and where the necessary information is available) as identified for the Development (outlined above).

Non-Significant Effects

- 11.3.8 The following impacts are not considered to lead to significant effects and were therefore scoped out of the assessment:

- Construction plant emissions would not be modelled, in accordance with the IAQM guidance. Standard mitigation measures for construction plant will be included in the Outline CEMP, based on the advice included in the IAQM guidance, to ensure that effects are 'not significant';
- The Development does not propose to include the use of on-site combustion plant to provide heat, hot water or electricity. As such, there are no centralised combustion plant included within the design that require assessment;
- It is not anticipated that any odorous materials will be excavated or used during the construction phase. No odorous uses are proposed within the completed Development and no odorous uses are close to the Site. Odour effects are therefore scoped out of the ES; and,
- Following correspondence with the Project Ecologist, it was highlighted that Ancient Woodlands have been scoped out of the Ecology Chapter due to the intervening distances from the Site. It was also determined that Local Wildlife Sites are not required to be assessed from an air quality perspective. As such, Ancient Woodlands and Local Wildlife Sites have not been considered within the construction and completed development assessments.

- 11.3.9 In addition to the above, cumulative developments located more than 500m from the Site boundary were scoped out of the assessment as receptors can only be defined as sensitive if they are located within 250m of multiple developments, in accordance with IAQM guidance²¹. Developments beyond 500m of the Site are therefore not anticipated to result in any significant impacts. The developments scoped out on this basis are identified below:

- ID No. 2 - Land At Gaddesden Lane, Redbourn, Hertfordshire;
- ID No. 4 - Land Between Redbourn Bypass Dunstable Road and Harpenden Lane, Redbourn, Hertfordshire;
- ID No. 5 - Land off Green Lane, Hemel Hempstead, Hertfordshire;
- ID No. 6 - Land At Eastman Way, Atlas Copco, Hemel Hempstead Industrial Estate, Swallowdale Lane, Hemel Hempstead;
- ID No. 7 - LA3, Land At West Hemel Hempstead;
- ID No. 8 - Plots 1 & 2 Maylands Avenue, Hemel Hempstead;
- ID No. 9 - Land At Marchmont Farm, Piccotts End Lane, Hemel Hempstead;
- ID No. 10 - Land West Of Leighton Buzzard Road And North Of Galley Hill Leighton Buzzard Road Hemel Hempstead;

- ID No. 11 - Land North of Polehanger Lane, Berkhamstead Road, Hemel Hempstead, Hertfordshire;
- ID No. 12 - London Luton Airport Expansion DCO;
- ID No. B3 - West Redbourn;
- ID No. M6 - South of Harpenden Lane, Redbourn;
- ID No. Hm03 - Hemel Hempstead Hospital;
- ID No. Hm04 - Paradise;
- ID No. Hm06 - Paradise; and
- ID No. Hm13 - Polehanger Lane.

11.3.10 Given No 4: Land Between Redbourn Bypass Dunstable Road and Harpenden Lane is not allocated in the existing or emerging SADC Local Plan, nor has a planning application been submitted, it has been scoped out of this assessment.

11.3.11 The study area for the assessment of fugitive dust and PM₁₀ emissions during the construction phase of the Development has been defined using the IAQM guidance²². The assessment considered sensitive receptors within 250m from the Site for earthworks and construction activities, and within 50m of the Site access route up to 250m from the Site entrance for trackout.

11.3.12 The study area for the assessment of road vehicle exhaust emissions during the construction and completed development phases was within 200m of roads with associated sensitive receptor locations where there was a predicted change in traffic flow as a result of the Development. The IAQM guidance²³ was utilised to identify road links where the change in traffic flow had the potential to result in significant effects. The relevant roads considered as part of the assessment are shown in Figures 11.1 and 11.2.

Baseline Characterisation Approach

Existing Baseline

11.3.13 The approach to defining the baseline conditions within the study area for the assessment involved desk based research, as set out below.

Desk Study

11.3.14 The baseline data for the study area was obtained by a review of the following information sources:

- A review of predicted background concentrations within the vicinity of the Development produced by DEFRA;
- A desk study of satellite imagery to confirm the location of existing sensitive receptors that may be sensitive to changes in air quality as a result of the Development;
- A review of the SADC 2024 Air Quality Annual Status Report (ASR)²⁴, the Dacorum Borough Council (DBC) 2025 Air Quality ASR²⁵ and the East Hemel Air Quality Monitoring Report²⁶ to determine monitoring data within the vicinity of the Development and Air Quality Management Areas (AQMAs); and

- A review of baseline and future completion year (without and with the Development) traffic data, as provided by the Project Transport Consultants. Traffic data used within this assessment is outlined in Appendix 11.3.

Field Study

- 11.3.15 For the purpose of this assessment, no site visits were required as sufficient information was available from the previously identified sources to describe the baseline environment.
- 11.3.16 Appendix 11.4 contains the monitoring survey data undertaken by The Crown Estate in support of the development on Land East of Hemel Hempstead. The data was reviewed, and suitable monitoring locations were used within the assessment.

Future Baseline

- 11.3.17 The future baseline conditions have been determined by a review of predicted future background pollutant concentrations and modelling of future year concentrations without the Development. Reference should be made to Section 11.4 for the baseline conditions and Section 11.6 and 11.7 for the assessment results.
- 11.3.18 During the construction phase, climate change could result in persistent meteorological conditions that either act to increase risk from dust deposition (prolonged drought) or to decrease risk (prolonged unsettled weather). During the completed development phase, climate change has the potential to affect dispersion patterns due to increased temperatures and changes to wind speeds. However, it is unlikely to significantly change ground level concentrations between the baseline and the Development scenarios for all modelled traffic.

Assessment Method

- 11.3.19 The Development has the potential to cause air quality impacts during the construction and completed development phases, as well as expose future occupants to elevated pollution levels. These factors were assessed in accordance with the following methodology.

Construction

Fugitive Dust and PM₁₀ Emissions

- 11.3.20 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 IAQM document 'Guidance on the Assessment of Dust from Demolition and Construction V2.2'²⁷.
- 11.3.21 The first step was to screen the need for a 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.
- 11.3.22 Step 2 assessed the risk of potential dust impacts. The Site was 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; and

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

11.3.23 The two factors were combined in order to determine the risk of dust impacts without mitigation applied.

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

11.3.25 Appendix 11.2 provides a detailed overview of the construction phase fugitive dust emission methodology.

Road Vehicle Exhaust Emissions

11.3.26 There is the potential for road traffic exhaust emissions associated with vehicles travelling to and from the Site during the construction phase to impact on existing air quality at sensitive receptor locations. An assessment was therefore undertaken in accordance with the IAQM guidance 'Land-use Planning & Development Control: Planning for Air Quality'²⁸. This involved comparing the predicted change in vehicle flows on the local road network as a result of the Development with the following thresholds:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere; and
- A change of Heavy Duty (HDV) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.

11.3.27 The predicted AADT vehicle flows associated with the Development are outlined in Section 11.6 and are compared against the criteria outlined above.

Completed Development

Road Vehicle Exhaust Emissions - Human Receptors

11.3.28 The Development has the potential to impact on existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the Site during the completed development phase. Potential effects were defined by predicting pollutant levels at sensitive human receptor locations using dispersion modelling for the following scenarios:

- 2024 - Model Verification (comparison of predicted and measured pollutant concentrations allowing a verification factor to be calculated to adjust results accordingly);
- Completion year Do-Minimum (DM) - total predicted flows in 2041 should the Development not proceed, inclusive of committed developments and developments within the local plan; and
- Completion Do-Something (DS) - total predicted flows in 2041 should the Development be completed, inclusive of committed developments and developments within the local plan.

11.3.29 The DM scenario (i.e. without the Development) included baseline traffic data, inclusive of anticipated growth, committed developments and developments within the local plan for 2041. The DS scenario (i.e. with the Development) included baseline traffic data, inclusive of anticipated growth, committed developments and developments within the local plan for 2041, in addition to the total predicted vehicle trips associated with the Development. Further information on the schemes included within the future year baseline can be found in Table 11.2.

11.3.30 Reference should be made to the relevant Appendix 11.3 for a description of the dispersion modelling inputs. This includes the traffic flows in AADT format used within the assessment.

Road Vehicle Exhaust Emissions - Ecological Receptors

11.3.31 The Development has the potential to impact on existing air quality at ecological receptors as a result of road traffic exhaust emissions associated with vehicles travelling to and from the Site during the completed development phase. These were assessed in accordance with 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations'²⁹ and Natural England's air pollution and development: advice for local authorities³⁰. This provides a staged assessment methodology for consideration of potential air quality impacts from a development both alone and cumulatively with other developments.

11.3.32 It should be noted that although the guidance only relates to potential air quality impacts on European designations, it has also been utilised to consider effects on other ecological sites in lieu of alternative methods. This is in accordance with the general requirements of the IAQM 'A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites'³¹. It should be noted that the only receptor identified for consideration in the assessment is a Local Nature Reserve (LNR).

11.3.33 Review of the staged assessment indicated that detailed dispersion modelling was required in order to quantify changes in pollutant concentrations as a result of vehicles travelling to and from the Site. This was completed for the following scenarios:

- Baseline - Conditions without the Development or any other potential cumulative developments. This is the background pollutant level in addition to modelled contribution from road vehicle exhaust emissions based on base year 2024 traffic flows;
- Development Alone (DA) - This is the background pollutant level in addition to modelled contribution from road vehicle exhaust emissions based on base year 2024 traffic flows, as well as trips generated as a result of the Development; and,
- In-Combination (IC) - Conditions with the Development and other potential cumulative developments. This is the background pollutant level in addition to the modelled contribution from road vehicle exhaust emissions from the Development and other potential cumulative developments completed by 2041.

11.3.34 The predicted Process Contribution (PC), the difference between the DA or IC and Baseline scenario, as a proportion of the relevant critical load or level was calculated from the modelling results. PCs below 100% of the relevant critical level or load were classified as **not significant** in accordance with the Environment Agency (EA) 'Air emissions risk assessment for your environmental permit'³².

Potential Future Exposure

- 11.3.35 The Development has the potential to expose future occupants to poor air quality. Pollutant concentrations were therefore quantified across the Site using dispersion modelling. The results were subsequently compared with the relevant Air Quality Objectives (AQOs) and Concentration Target to determine the potential for exceedence. Reference should be made to Appendix 11.3 for a full description of the assessment input data.
- 11.3.36 To ensure a conservative assessment of potential air quality impacts on future occupants of the Development, pollutant concentrations at the Site were predicted for the completion year. 2024 background pollutant concentrations and emission factors have also been used in the dispersion model. The combination of these conservative assumptions is likely to overestimate pollutant concentrations, ensuring the assessment provides a robust analysis of future air quality conditions at the Site.

Cumulative Effects

- 11.3.37 The cumulative schemes that have been agreed with SADC for assessment have been reviewed to determine their potential to interact cumulatively with the Development during the construction and completed development phases. Table 11.2 presents a summary of this screening exercise and identifies those that have been taken forward within this assessment for cumulative assessment.

Table 11.2: List of Cumulative Schemes

No.	Planning Ref.	Location
<i>St Albans City and District Council</i>		
1	5/2016/2845	Land Between Three Cherry Trees Lane and Cherry Tree Lane, Hemel Hempstead Phase 2 - Spencers Park Phase 2 West Outline planning application to include up to 600 dwellings (C3), land for primary school (D1), land for local centre uses (A1, A3, A4, A5, D1, D2), land for up to 7,500 square metres of employment uses (B1, B2, B8), landscaping, open space and play area.
2	5/2021/3631	Land At Gaddesden Lane, Redbourn Construction of up to 300 new homes including 35% affordable new homes, new landscaping, public open space and associated infrastructure works.
3	5/2024//2171	Land to East of Hemel Hempstead, Hemel Hempstead Road, Redbourn (SADC Site Allocations H2, H3, H4) Construction of up to 4,000 new dwellings (to include 40% affordable housing, 5 extra-care facilities each comprising 70-80 self-contained units, 3 nursing homes (each of 70-80 beds) and 16 supporting living units); up to 53ha of employment.
<i>Dacorum Borough Council</i>		
5	21/03793/M OA	Land off Green Lane, Hemel Hempstead Hybrid application for redevelopment of the site in 4 plots to provide up to 26,640 sqm of new commercial floorspace.

No.	Planning Ref.	Location
6	22/03812/MF A	Land at Eastman Way, Atlas Copco, Hemel Hempstead Industrial Estate, Swallowdale Lane, Hemel Hempstead Demolition of existing building and redevelopment of the site to provide a commercial building (Flexible uses within Class E (g)(iii), B2 and/or B8 of the Use Class Order (including ancillary office provision)), with associated enabling works, access, parking, landscaping, and infrastructure.
7	4/03266/18/MF	LA3, Land at West Hemel Hempstead Hybrid planning application for mixed use proposed development at west Hemel Hempstead, pursuant to Policy LA3 of the adopted site allocations development plan document (2017) to provide for up to 1,100 dwellings (with up to 40% affordable housing).
8	21/04556/MF A	Plots 1 & 2 Maylands Avenue, Hemel Hempstead Construction of 234 apartments and 1,486 sqm of commercial floor space, provided in three main buildings ranging from 5 to 9 storeys on two podiums, with associated car parking, landscaping, amenity space and service areas.
9	19/02749/M OA	Land at Marchmont Farm, Piccotts End Lane, Hemel Hempstead Outline planning for up to 350 dwellings, land for 5 gypsy & traveller pitches. Vehicular access from A4147, public open space including extension to Margaret Lloyd Park and associated landscaping, infrastructure and drainage. Detailed approval for access arrangements
10	21/04508/M OA	Land West of Leighton Buzzard Road and North of Galley Hill Leighton Buzzard Road, Hemel Hempstead Construction of up to 390 dwellings (C3 Use), including up to 40% affordable housing and 5% self build, a residential care home for up to 70-beds (C2 use), along with associated landscaping and open space with access from Leighton Buzzard Road.
11	25/01742/M OA 25/02145/SC E	Land North Of Polehanger Lane Berkhamsted Road Hemel Hempstead Hertfordshire Outline Planning Application for up to 750 dwellings, a neighbourhood centre comprising up to 1000 sqm Class E/ F2 floorspace, two form entry primary school, Public Open Space, Suitable Alternative Natural Greenspace, associated infrastructure and engineering works with all matters reserved except for access to the site from Berkhamsted Road
Development Consent Order		
12	DCO	London Luton Airport Expansion The Application would grant development consent for the expansion of London Luton Airport to enable an increase in overall passenger capacity to 32 million passengers per annum. The

No.	Planning Ref.	Location
		Application would involve the construction of a new passenger terminal and additional aircraft stands among further associated infrastructure works.
<i>SADC Site Allocations (Draft SADC Local Plan)</i>		
B3	West Redbourn	Residential-led scheme of approximately 545 units and a new 2FE Primary school.
M6	South of Harpenden Lane, Redbourn	Residential-led scheme of approximately 68 units.
<i>Dacorum Borough Council Site Allocations (Draft DBC Local Plan)</i>		
Hm0 1	North Hemel Hempstead Growth Area	Around 1,500 dwellings by 2041, with up to 3,500 additional homes (to include provision for older people) to be delivered beyond the plan period subject to masterplanning; three 3FE and one 2FE primary schools (including nursery provision on three); and one 8FE secondary school. Gypsy and Traveller site for 8 pitches
Hm0 3	Hemel Hempstead Hospital	Around 450 dwellings (to include provision for older people), subject to master planning and a 3FE primary school (including nursery provision).
Hm0 4	Paradise	Around 350 dwellings, subject to masterplanning with Class E and F1 uses at ground floor level where viable.
Hm0 6	Riverside	Around 500 Homes subject to masterplanning with main town centre uses appropriate at ground floor level and expansion of the car park.
Hm1 3	Polehanger Lane	Around 750 homes including provision for older people, subject to master planning. A neighbourhood centre to include a community building. A 2FE Primary school (including nursery provision). Suitable Alternative Natural Greenspace (16ha).

11.3.38 As noted previously, a number of sites have been scoped out of the construction phase fugitive dust assessment as the applications are not located within 500m of the Site boundary.

11.3.39 Vehicle movements associated with sites outlined in Table 11.2 have been included in the completed development assessment.

Assessment Criteria

Construction

Fugitive Dust and PM₁₀ Emissions

11.3.40 Appendix 11.2 details the magnitude of emission for construction phase activities and the sensitivity of nearby receptors.

Road Traffic Exhaust Emissions

- 11.3.41 The criteria for the assessment of construction phase road vehicle exhaust emissions are outlined above.

Completed Development

Road Vehicle Exhaust Emissions - Human Receptors

Sensitivity of Receptor

- 11.3.42 Receptors sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided by National Highways³³ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance³⁴ on where the AQOs apply 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.
- 11.3.43 The magnitude of predicted air quality impacts was calculated based on the predicted concentration change between the DM and DS scenarios as a proportion of the AQO or Concentration Target. It should be noted that these are based on the values provided within the IAQM guidance³⁵ with additional descriptors to ensure consistency throughout the ES.
- 11.3.44 The receptor sensitivity is set out in Table 11.3.

Table 11.3: Completed Development - Receptor Sensitivity Descriptors

Receptor Sensitivity	Descriptor - Pollutant Concentration at Receptor in Assessment Year
Very High	110% or more of AQO/Concentration Target
High	103 - 109% of AQO/Concentration Target
Medium	95 - 102% of AQO/Concentration Target
Low	76 - 94% of AQO/Concentration Target
Negligible	75% or less of AQO/Concentration Target

Magnitude of Impact

- 11.3.45 The magnitude of predicted air quality impacts was calculated based on the concentration change between the DM and DS scenarios as a proportion of the AQO and Concentration Target.
- 11.3.46 Table 11.4 sets out the magnitude of impact descriptors used in the assessment of road vehicle exhaust emission impacts on human receptors. These are based on the values provided within IAQM guidance³⁶.

Table 11.4: Completed Development - Magnitude of Impact Descriptors

Impact Magnitude	Descriptor - Predicted Concentration Change as a Proportion of the AQO/Concentration Target (%)
Negligible	0
Low	1

Impact Magnitude	Descriptor - Predicted Concentration Change as a Proportion of the AQO/Concentration Target (%)
Medium	2 - 5
High	6 - 10
Very High	More than 10

11.3.47 It should be noted that the categories in Table 11.4 are intended to be used by rounding the change in percentage pollutant concentration to whole numbers.

11.3.48 The significance of effects was then determined through the interaction between the magnitude of impact and sensitivity of the receptor, as outlined under the 'Assessing Significance' section below.

Road Vehicle Exhaust Emissions - Ecological Receptors

11.3.49 The sensitivity of ecological receptors was determined within Chapter 13: Biodiversity.

Assessing Significance

11.3.50 The significance of potential effects was determined by integrating the assessments of sensitivity and impact magnitude in a reasoned way. This is described separately for the construction and completed development impacts in the following Sections.

Construction

Fugitive Dust and PM₁₀ Emissions

11.3.51 The approach to determining the magnitude of emission and receptor sensitivity is outlined in Appendix 11.2. These two factors are combined to determine the significance of the unmitigated effects.

11.3.52 Table 11.5 outlines the unmitigated effect significance from earthworks, construction and trackout.

Table 11.5: Construction Dust - Effect Significance from Earthworks, Construction and Trackout Activities

Receptor Sensitivity	Dust Impact Magnitude		
	High	Medium	Low
High	Major	Moderate	Minor
Medium	Moderate	Moderate	Minor
Low	Minor	Minor	Negligible

11.3.53 Once the effect significance has been determined, site specific mitigation measures were identified from the IAQM guidance³⁷ in order to reduce potential dust impacts. For sites with negligible effects, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

11.3.54 The significance of residual impacts was then determined based on the dust effect significance and appropriate mitigation measures. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be negligible. This is regarded as not significant.

Road Vehicle Exhaust Emissions

11.3.55 If the predicted change in traffic flow on the road network as a result of the Development is less than the thresholds outlined previously, the IAQM guidance indicates effects associated with road traffic exhaust emission effects can be classified as **negligible** and no further assessment is required. These effects would be considered to be **not significant**.

Completed Development

Road Vehicle Exhaust Emissions - Human Receptors

11.3.56 The significance of the completed Development road vehicle exhaust emissions effects was determined through the interaction between the magnitude of impact and sensitivity of the receptor, as outlined in Table 11.6.

Table 11.6: Completed Development - Significance of Effect Matrix

Sensitivity / Value of Receptor	Magnitude of Impact				
	Very High	High	Medium	Low	Negligible
Very High	Major	Major	Major	Moderate	Negligible
High	Major	Major	Moderate	Moderate	Negligible
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Moderate	Minor	Negligible	Negligible	Negligible

11.3.57 Following the prediction of impacts at discrete receptor locations, the IAQM document³⁸ provides guidance on determining the overall air quality effect 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.

11.3.58 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 **major**, the effect is considered **significant**, whilst if the impact is **minor** or **negligible**, the impact is considered to be **not significant**.

Ecological Receptors

11.3.59 As outlined above, the EA guidance states that a predicted PC of less than 100% of the critical load or level at a LNR is classified as **not significant**. Should a predicted PC exceed 100% of the relevant critical load or level, the effect is not necessarily considered

significant. In these cases, the results are considered further through detailed ecological interpretation. Appendix 11.3 outlines the critical loads and levels used within this assessment.

Potential Future Exposure

- 11.3.60 In relation to potential exposure of future occupants to poor air quality, should the AQOs or Concentration Target be exceeded at locations of relevant exposure, then the IAQM guidance³⁹ considers air quality to be **significant** and mitigation is required. Should compliance with the AQOs and Concentration Target be indicated then effects would be considered **not significant**.

Assumptions and Limitations

- 11.3.61 The following assumptions and limitations have informed this assessment:

- The annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations are representative of baseline levels in the study area. These were obtained from the DEFRA background mapping study, an industry standard database produced on behalf of the UK Government, to ensure the most accurate representation of background pollutant concentrations available;
- Background pollutant concentrations are predicted to decrease in future years as a result of Government policies and legislation to reduce pollutant emissions. However, there is current uncertainty over the level of likely decrease. As such, a conservative assumption that air quality conditions do not improve in the future was adopted to ensure robust results;
- Road traffic emissions of oxides of nitrogen (NO_x) are predicted to decrease in future years with changes to the UK's fleet in line with Government legislation. An assumption that emission factors remain at base year levels was therefore adopted in order to provide a robust assessment;
- The meteorological data used for the assessment is representative of the conditions at the Site. Records were obtained based on a review of available observation locations to ensure the most representative record station was selected;
- The traffic data obtained for the purpose of the assessment is accurate. These values were provided by iTransport, the Transport Consultants for the project. Reference should be made to Chapter 9: Transport and Access for further details of the traffic data; and
- The monitoring data used in the assessment is accurate. The results were obtained from the latest SADC and DBC Air Quality ASR, which have been ratified by DEFRA and are therefore considered valid. Monitoring results were also taken from the East Hemel Monitoring Report. These results were annualised and bias adjusted based on the methodology outlined in the DEFRA guidance⁴⁰ and are therefore considered robust.

11.4 Baseline Conditions

Existing Baseline

- 11.4.1 Appendix 11.3 provides a detailed review of the existing baseline conditions within the vicinity of the site. An overview of local air quality management, monitoring and background pollutant concentrations can be found below.

Local Air Quality Management

- 11.4.2 A review of the latest Local Air Quality Management (LAQM) review and assessment report published by SADC⁴¹ confirmed that one AQMA has been declared by SADC due to exceedances of the annual mean AQO for NO₂ and 24-hour mean AQO for PM₁₀. This is described as follows:

"AQMA 1 - The area comprising of odd numbers 1-7 London Road, 1-11c Holywell Hill and even numbers London Road, St Albans."

- 11.4.3 As the Site borders the DBC administrative extents, a review of their latest LAQM review and assessment report was also undertaken. This indicated that two AQMA's have been declared by DBC due to exceedances of the annual mean AQO for NO₂. The closest AQMA to the Site is described as follows:

"AQMA Lawn Lane - An area encompassing a number of properties overlooking to Lawn Lane, and the boundary declared between Belswains Lane and Seaton Road."

- 11.4.4 The Site is located approximately 6.9km north-west of the SADC AQMA and 4.8km north-east of the closest DBC AQMA which is located on the south west side of Hemel Hempstead. It is considered unlikely the proposals would cause air quality impacts over distances of this magnitude. This has been confirmed following review of the AADT flows provided by the Project Transport Consultants which show that the Development does not increase traffic above the stage 2 screening criteria outlined in the IAQM guidance⁴².

Local Air Quality Monitoring

- 11.4.5 SADC and DBC have undertaken monitoring of NO₂ concentrations throughout their areas of jurisdiction. Data has also been taken from the East Hemel Monitoring Report⁴³ (Appendix 11.4). An overview of the results and trends of the data are detailed below.
- 11.4.6 SADC undertake monitoring at three locations within the vicinity of the Site. Annual mean NO₂ levels were below the AQO during 2022 and 2023 at all three positions. 2024 monitoring data has not yet been published by SADC. Concentrations have also decreased between the years, likely due to improvements in vehicle emission standards and the increase in low-emission vehicles.
- 11.4.7 Recent annual mean NO₂ concentrations recorded closest to the Site within DBC extents were above the AQO of 40µg/m³ at one monitor (DB1 - Queensway 1) during 2022 and 2023. It is noted in the relevant Air Quality Status Report⁴⁴ that these exceedances were due to cooking practices from nearby businesses. Following DBC's consultation with the relevant premises, exceedances have been resolved and the NO₂ concentration was below the AQO during 2024. Annual mean NO₂ concentrations were below at all other monitors over 2022, 2023 and 2024, with a decreasing trend in concentrations over the years.

- 11.4.8 Annual mean NO₂ concentrations were recorded as part of the East Hemel Monitoring Survey. The results show that NO₂ levels were below the AQO during 2022 at all monitoring positions. Not further monitoring has been undertaken.
- 11.4.9 Reference should be made to Figure 11.3 for a map of the survey positions.
- 11.4.10 SADC and DBC do not undertake monitoring of PM₁₀ or PM_{2.5} concentrations within the vicinity of the Site. Monitoring undertaken by The Crown Estate in support of the development on Land East of Hemel Hempstead did not undertake monitoring of any other pollutant concentrations.

Background Pollutant Concentrations

- 11.4.11 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 local authorities in their Review and Assessment of air quality. The Development Site is located across five grid squares as outlined below:
- NGR 507500, 210500;
 - NGR 508500, 209500;
 - NGR 508500, 210500;
 - NGR 508500, 211500; and,
 - NGR 509500, 210500.
- 11.4.12 Predicted background concentrations for these locations are below the relevant AQOs and Concentration Target during 2024 (baseline year), 2025 (current year) and 2040 (completed development year used in absence of 2041 data). Reference should be made to Appendix 11.3 for the background pollutant concentrations.

Other Pollutant Sources

- 11.4.13 As noted previously, no odorous uses are proposed within the completed Development and no odorous uses are close to the Site. Odour effects are therefore scoped out of the ES. There are also no known industrial point sources near the Site that would cause significant effects.

Future Baseline

- 11.4.14 It is currently predicted that air quality will improve in future years. The DEFRA 'Air Pollution in the UK 2020'⁴⁵ report published in September 2021 indicates that ambient concentrations of NO₂, as measured by the Automatic Urban and Rural Network (AURN), have demonstrated a downward trend since the AURNs inception in 1992. In addition, in January 2019 the UK Government launched the Clean Air Strategy⁴⁶ which included a commitment to end the sale of new diesel and petrol cars and vans by the end of 2030. This will continue to aid the reduction of road vehicle exhaust emissions from combustion engines, including NO_x and PM₁₀.
- 11.4.15 In order to provide a future baseline for assessment of operational stage air quality effects at human receptors, predicted 2041 annual mean NO₂, PM₁₀ and PM_{2.5} background concentrations were taken from the DEFRA mapping study for the grid squares containing

the Site. It should be noted that DEFRA have only released background data up to 2040. These have therefore been reviewed and considered for the completion year of 2041.

11.4.16 The background concentrations are summarised in Table 11.3.5 in Appendix 11.3.

11.4.17 As shown in Table A11.3.5, the predicted background NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and Concentration Target at the Site in 2040.

11.4.18 It should be noted that the future air quality effects were predicted using 2024 baseline data to ensure a conservative assessment. This approach is likely to result in an overestimation of pollutant concentrations during the operation of the Development.

Summary of Receptors and Sensitivity

Construction

Human Receptors

11.4.19 Receptors sensitive to construction phase air quality affects were classified as **high** as they included Brockswood Primary School and existing residential properties and future users of the Development. Reference should be made to Appendix 11.3 for the approximate number of receptors assessed in the construction phase.

Completed Development

Human Receptors

11.4.20 Sensitive receptors for the completed development phase were chosen based on locations sensitive to potential changes in off-Site pollutant concentrations within 200m of the highway network in accordance with National Highways guidance⁴⁷ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance on where the AQOs apply, as summarised in Table A11.1.2 in Appendix 11.1, 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.

11.4.21 In order to assess pollutant concentrations across the entire Development, a cartesian grid was run over the Site. Future receptors at the Site were also were position closest to the boundary where emissions are expected to be higher.

11.4.22 Table 11.7 provides a summary of the existing and future sensitive receptors assessed in the completed Development phase. Reference should be made to Figure 11.4 for a map showing the receptor locations and Table 11.3.8 in Appendix 11.3 for further details on the sensitive receptors.

Table 11.7: Completed Development - Summary of Receptor Sensitivity

Receptor	Sensitivity (Value)
<i>Existing</i>	
R1 Residential - Hemel Hempstead Road	High
R2 Residential - Hemel Hempstead Road	High
R3 Hemel Hempstead Road Caravan Park	High
R16 East Hemel Primary School	High

Receptor	Sensitivity (Value)
R17 Residential - Holtsmere End Lane	High
R18 Residential - Redbourn Road	High
R19 Residential - Redbourn Road	High
R20 Residential - Redbourn Road	High
R21 Residential - Redbourn Road	High
R22 Residential - St Agnells Lane	High
R23 Mapel Grove Primary School	High
R24 The Astley Cooper School	High
R25 Aspire Academys Trust	High
R26 Residential - A4147 Redbourn Road	High
R27 Residential - A4147 Redbourn Road	High
R28 Residential - Pittcotts End Road	High
R29 Residential - Pittcotts End Road	High
R30 Residential - Leighton Buzzard Road	High
R31 Residential - Leighton Buzzard Road	High
R32 Residential - Warners End Road	High
R33 The Collett School	High
R34 Gade Valley Primary School	High
R35 Laureate Academy	High
R36 West Herts College	High
R37 Residential - Leighton Buzzard Road	High
R38 Residential - Leighton Buzzard Road	High
R39 Residential - Leighton Buzzard Road	High
R40 Residential - Leighton Buzzard Road	High
R41 Residential - Leighton Buzzard Road	High
R42 Residential - Station Road	High
R43 Residential - St Albans Road	High
R44 Residential - St Albans Road	High
R45 Residential - St Albans Road	High
R46 Assisted Living Mountbatten Lodge	High
R46 Assisted Living Mountbatten Lodge	High
R47 Residential - St Albans Road	High
R48 Residential - St Albans Road	High
R49 Residential - St Albans Road	High

Receptor	Sensitivity (Value)
R50 Residential - Leverstock Green Way	High
R51 Residential East Hemel Development 8	High
R52 Residential East Hemel Development 9	High
R53 Residential East Hemel Development 10	High
R54 Residential East Hemel Development 11	High
R55 Residential East Hemel Development 12	High
R56 Residential East Hemel Development 13	High
R57 Residential East Hemel Development 14	High
R58 Residential East Hemel Development 15	High
R59 East Hemel Primary School	High
R60 Residential - Adjacent to M1	High
R61 Residential - Punch Bowl Lane	High
R62 Residential - Cherry Tree Lane	High
R63 Residential - Karina Court	High
R64 Residential - Swallowdale Lane	High
R65 Residential - Maylands Avenue	High
R66 Residential - Hawk Court	High
R67 Residential - Queensway	High
R68 Residential - Queensway	High
R69 Squirrels Nurseries	High
R70 Residential - Queensway	High
R71 Residential - Queensway	High
R72 George Street Primary School	High
R73 Residential - Queensway	High
R74 West Herts College	
<i>Future</i>	
R4 Residential - Proposed Development 1	High
R5 Residential - Proposed Development 2	High
R6 Residential - Proposed Development 3	High
R7 Residential - Proposed Development 4	High
R8 Residential - Proposed Development 5	High
R9 Residential East Hemel Development 1	High
R10 Residential East Hemel Development 2	High
R11 Residential East Hemel Development 3	High
R12 Residential East Hemel Development 4	High

Receptor	Sensitivity (Value)
R13 Residential East Hemel Development 5	High
R14 Residential East Hemel Development 6	High
R15 Residential East Hemel Development 7	High

Ecological Receptors

- 11.4.23 One ecological receptor sensitive to potential operational phase road vehicle exhaust emission impacts was identified from a desk-top study following review of the 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations'⁴⁸. This is the Howe Grove Wood LNR, which is located within 200m of a road link that is subject to potential changes in traffic flow as a result of the Development. Reference should be made to Figure 11.4 for a map showing the receptor location and (Appendix 11.3) for details on the relevant habitats.

11.5 Embedded Mitigation (Scheme Design and Management)

Construction

- 11.5.1 Site-specific mitigation measures, in line with the IAQM guidance⁴⁹, are included within an Outline CEMP (Appendix 6.1). These measures are informed by the construction dust risk assessment which was undertaken and reported in Section 11.7. The indicative measures outlined in Table 11.8 below will be included to mitigate fugitive dust emissions during construction where appropriate.

Table 11.8: Summary of Embedded Mitigation – Construction Phase Fugitive Dust and PM₁₀ Emissions

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 - 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 SADC
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 SADC when requested - Record any exceptional incidents that cause dust and / or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book - Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised

Issue	Control Measure
Monitoring	▪ Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to SADC when asked ▪ Carry out regular site inspections, record inspection results, and inspect log available to the local authority 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
Preparing and Maintaining the Site	▪ Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible ▪ 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 ▪ Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas ▪ Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials ▪ Implement a Travel Plan that supports and encourages sustainable travel
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
Earthworks	▪ Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable ▪ Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable

Issue	Control Measure
	Only remove the cover in small areas during work and not all at once
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 - For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust
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 - Inspect on-site haul routes for integrity and instigate necessary repairs - Record all inspections of haul routes and any subsequent action in a site log book - Install hard surfaced haul routes which are regularly dampened down - Implement a wheel washing system, if required - Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exist, wherever size and layout permits - Access gates to be located at least 10m from receptors where possible

Completed Development

- 11.5.2 A zero emissions energy strategy will be provided as part of the submission to help reduce emissions associated with the Development and work towards net zero.
- 11.5.3 The proposed primary school is centred to the Development and set back from the B487 - Hemel Hempstead. As pollutant concentrations decrease with distance, future students are less likely to be exposed to high concentrations from the B487.

11.6 Assessment of Effects - Construction

Fugitive Dust and PM₁₀ Emissions

Step 1 - Screen the Need for an Assessment

- 11.6.1 Activities such as excavation, ground works including cut and fill earthworks, construction, concrete batching and storage of materials have 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.
- 11.6.2 The potential for effects 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.

- 11.6.3 The desk-top 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 effects has been undertaken.

Step 2a - Define the Potential Dust Emission Magnitude

Earthworks

- 11.6.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling to create development platforms and landscaping. The area of the Site is greater than 110,000m². In accordance with the criteria outlined in Table A11.2.5 (Appendix 11.2), the magnitude of potential dust emissions from earthworks is therefore **high**.

Construction

- 11.6.5 Due to the size of the Development, the total building volume is likely to be greater than 75,000m³. In accordance with the criteria outlined in Table A11.2.5 (Appendix 11.2), the magnitude of potential dust emissions from construction is therefore **high**.

Trackout

- 11.6.6 Based on the Site area, it is anticipated that the unpaved road length may be greater than 100m during certain stages of construction. In accordance with the criteria outlined in Table A11.2.5 (Appendix 11.2), the magnitude of potential dust emissions from trackout is therefore **high**.

Step 2b - Define the Sensitivity of the Area

Dust soiling

- 11.6.7 Table A11.3.6 (Appendix 11.3) shows that there are more than 100 **high** sensitivity receptors within 20m of the Site boundary. The sensitivity of the area with respect to dust soiling from earthworks and construction, as defined using the criteria summarised in Table A11.2.2 in (Appendix 11.2) is therefore considered to be **high**.
- 11.6.8 Table A11.3.7 (Appendix 11.3) shows that there are more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the Site accesses. The sensitivity of the area with respect to dust soiling from trackout, as defined using the criteria summarised in Table A11.2.2 in (Appendix 11.2) is therefore considered to be **high**.

Human Health

- 11.6.9 As shown in Table A11.3.5 (Appendix 11.3), the highest annual mean PM₁₀ background concentration at the Site is 15.50µg/m³. As shown in Table A11.2.3 (Appendix 11.2), where the background annual mean PM₁₀ concentration is below 24µg/m³ and there are anticipated to be more than 100 **high** sensitivity receptors within 20m of the Site boundary, the sensitivity of the area to potential human health impacts from earthworks and construction is **medium**.
- 11.6.10 There are anticipated to be more than 100 **high** sensitivity receptors within 20m of the road network within 250m of the Site accesses. The sensitivity of the area with respect to human health from trackout, as defined using the criteria in Table A11.2.3, is therefore considered to be **medium**.

Step 2c - Define the Risk of Dust Impacts

- 11.6.11 The derived dust emission magnitude for each activity has been combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 11.5. A summary of the risk from each dust generating activity is provided in Table 11.9.

Table 11.9: Construction Dust - Summary of Potential Unmitigated Construction Dust Risk

	Activity	Dust Emission Magnitude	Sensitivity of the Area	Risk
<i>Dust Soiling</i>	Earthworks	High	High	Major
	Construction	High	High	Major
	Trackout	High	High	Major
<i>Human Health</i>	Earthworks	High	Medium	Moderate
	Construction	High	Medium	Moderate
	Trackout	High	Medium	Moderate

- 11.6.12 As indicated in Table 11.9, the potential risk of dust soiling in the absence of mitigation is **major** from all activities. The potential risk of human health impacts in the absence of mitigation is **moderate** adverse from all activities.
- 11.6.13 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 conservative 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.

Road Vehicle Exhaust Emissions

- 11.6.14 Vehicle movements associated with the construction phase will generate exhaust emissions on the local and regional road networks. Information provided by iTransport, the Transport Consultants for the project, indicated the Development is predicted to generate an AADT flow of 150 LDVs and 69 HDVs during construction.
- 11.6.15 Based on the information above, construction of the Development is not predicted to result in an increase of LDV flows of more than 500 AADT or HDV flows of more than 100 AADT. In accordance with the IAQM guidance⁵⁰, potential air quality impacts associated with road vehicle exhaust emissions during construction are not predicted to be significant. As such, there is predicted to be a direct, temporary, negligible impact at the local level which is considered to be **not significant**.

Additional Mitigation, Monitoring and Residual Effects

Fugitive Dust and PM₁₀ Emissions

- 11.6.16 Mitigation during construction is embedded in the Outline CEMP as set out in section 11.5 of this ES. Following implementation of the embedded measures, air quality effects are predicted to be direct and temporary at the local level which is considered to be **not significant** and therefore no further mitigation measures are required or proposed.

Road Vehicle Exhaust Emissions

11.6.17 No significant adverse effects were identified and therefore no additional mitigation is required, and the residual effects remain as presented above.

11.7 Assessment of Effects - Completed Development

Road Vehicle Exhaust Emissions - Human Receptors

11.7.1 Vehicle movements associated with the operation of the Development will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the Site.

11.7.2 Reference should be made to Appendix 11.3 for details of the air quality modelling and assessment inputs.

Predicted Concentrations

11.7.3 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. The results are summarised in Table 11.10.

Table 11.10: Completed Development Road Vehicle Exhaust Emissions - Predicted Annual Mean NO₂ Concentrations

Receptor		Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Hemel Hempstead Road	17.60	17.77	0.17
R2	Residential - Hemel Hempstead Road	16.52	16.66	0.14
R3	Hemel Hempstead Road Caravan Park	15.82	15.99	0.17
R4	Residential - Proposed Development 1	15.72	15.88	0.16
R5	Residential - Proposed Development 2	16.33	16.53	0.20
R6	Residential - Proposed Development 3	15.79	15.97	0.18
R7	Residential - Proposed Development 4	15.60	15.78	0.18
R8	Residential - Proposed Development 5	14.98	15.10	0.12
R9	Residential East Hemel Development 1	16.61	16.86	0.25
R10	Residential East Hemel Development 2	15.05	15.19	0.14
R11	Residential East Hemel Development 3	14.89	15.01	0.12
R12	Residential East Hemel Development 4	13.44	13.61	0.17
R13	Residential East Hemel Development 5	13.41	13.49	0.08
R14	Residential East Hemel Development 6	13.63	13.68	0.05
R15	Residential East Hemel Development 7	13.47	13.56	0.09
R16	East Hemel Primary School	13.35	13.40	0.05
R17	Residential - Holtsmere End Lane	15.62	15.76	0.14

Receptor		Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R18	Residential - Redbourn Road	15.88	16.02	0.14
R19	Residential - Redbourn Road	16.56	16.69	0.13
R20	Residential - Redbourn Road	15.76	15.86	0.10
R21	Residential - Redbourn Road	19.13	19.29	0.16
R22	Residential - St Agnells Lane	20.15	20.29	0.14
R23	Mapel Grove Primary School	13.10	13.11	0.01
R24	The Astley Cooper School	13.24	13.25	0.01
R25	Aspire Academys Trust	13.86	13.87	0.01
R26	Residential - A4147 Redbourn Road	16.91	16.94	0.03
R27	Residential - A4147 Redbourn Road	15.33	15.35	0.02
R28	Residential - Pittcotts End Road	13.29	13.31	0.02
R29	Residential - Pittcotts End Road	14.51	14.51	0.00
R30	Residential - Leighton Buzzard Road	14.47	14.47	0.00
R31	Residential - Leighton Buzzard Road	14.76	14.76	0.00
R32	Residential - Warners End Road	18.70	18.72	0.02
R33	The Collett School	14.63	14.64	0.01
R34	Gade Valley Primary School	14.44	14.45	0.01
R35	Laureate Academy	15.21	15.22	0.01
R36	West Herts College	16.81	16.82	0.01
R37	Residential - Leighton Buzzard Road	17.58	17.60	0.02
R38	Residential - Leighton Buzzard Road	14.75	14.77	0.02
R39	Residential - Leighton Buzzard Road	14.64	14.65	0.01
R40	Residential - Leighton Buzzard Road	16.01	16.03	0.02
R41	Residential - Leighton Buzzard Road	18.94	18.95	0.01
R42	Residential - Station Road	15.67	15.68	0.01
R43	Residential - St Albans Road	19.83	19.83	0.00
R44	Residential - St Albans Road	16.91	16.90	-0.01
R45	Residential - St Albans Road	16.68	16.68	0.00
R46	Assisted Living Mountbatten Lodge	14.01	14.01	0.00
R47	Residential - St Albans Road	18.02	18.00	-0.02
R48	Residential - St Albans Road	16.76	16.74	-0.02
R49	Residential - St Albans Road	17.39	17.40	0.01
R50	Residential - Leverstock Green Way	15.95	15.97	0.02

Receptor		Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R51	Residential East Hemel Development 8	16.06	16.08	0.02
R52	Residential East Hemel Development 9	18.03	18.11	0.08
R53	Residential East Hemel Development 10	15.57	15.62	0.05
R54	Residential East Hemel Development 11	16.32	16.35	0.03
R55	Residential East Hemel Development 12	13.72	13.74	0.02
R56	Residential East Hemel Development 13	15.58	15.61	0.03
R57	Residential East Hemel Development 14	13.36	13.37	0.01
R58	Residential East Hemel Development 15	13.65	13.66	0.01
R59	East Hemel Primary School	13.19	13.20	0.01
R60	Residential - Adjacent to M1	19.37	19.43	0.06
R61	Residential - Punch Bowl Lane	13.31	13.36	0.05
R62	Residential - Cherry Tree Lane	12.90	12.91	0.01
R63	Residential - Karina Court	13.12	13.12	0.00
R64	Residential - Swallowdale Lane	16.57	16.65	0.08
R65	Residential - Maylands Avenue	19.79	19.95	0.16
R66	Residential - Hawk Court	18.06	18.19	0.13
R67	Residential - Queensway	15.90	15.96	0.06
R68	Residential - Queensway	15.53	15.58	0.05
R69	Squirrels Nurseries	13.08	13.09	0.01
R70	Residential - Queensway	14.66	14.70	0.04
R71	Residential - Queensway	14.76	14.80	0.04
R72	George Street Primary School	13.39	13.40	0.01
R73	Residential - Queensway	15.42	15.45	0.03
R74	West Herts College	14.67	14.69	0.02

11.7.4 As shown in Table 11.10, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.

11.7.5 It should be noted that a small number of receptors experience a decrease in pollutant concentrations between the DM and DS scenarios. This is due to a reduction in HDV traffic on existing roads between scenarios. This is as a result of the introduction of new road links associated with the Development and other committed schemes. These changes will lead to the redistribution of traffic across the local road network.

11.7.6 Reference should be made to Figures 11.5 and 11.6 for graphical representation of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios, respectively.

11.7.7 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. The results are summarised in Table 11.11.

Table 11.11: Completed Development Road Vehicle Exhaust Emissions - Predicted Annual Mean PM₁₀ Concentrations

Receptor		Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Hemel Hempstead Road	16.65	16.68	0.03
R2	Residential - Hemel Hempstead Road	16.45	16.47	0.02
R3	Hemel Hempstead Road Caravan Park	16.29	16.32	0.03
R4	Residential - Proposed Development 1	16.27	16.30	0.03
R5	Residential - Proposed Development 2	16.38	16.42	0.04
R6	Residential - Proposed Development 3	16.31	16.35	0.03
R7	Residential - Proposed Development 4	16.34	16.38	0.04
R8	Residential - Proposed Development 5	16.25	16.28	0.03
R9	Residential East Hemel Development 1	16.75	16.82	0.07
R10	Residential East Hemel Development 2	16.19	16.21	0.03
R11	Residential East Hemel Development 3	16.20	16.22	0.03
R12	Residential East Hemel Development 4	15.94	15.99	0.05
R13	Residential East Hemel Development 5	15.91	15.93	0.02
R14	Residential East Hemel Development 6	15.95	15.97	0.02
R15	Residential East Hemel Development 7	15.93	15.96	0.03
R16	East Hemel Primary School	15.90	15.91	0.02
R17	Residential - Holtsmere End Lane	16.63	16.67	0.04
R18	Residential - Redbourn Road	16.71	16.76	0.05
R19	Residential - Redbourn Road	16.89	16.94	0.04
R20	Residential - Redbourn Road	16.59	16.62	0.03
R21	Residential - Redbourn Road	17.51	17.56	0.05
R22	Residential - St Agnells Lane	17.90	17.95	0.05
R23	Mapel Grove Primary School	15.90	15.91	0.00
R24	The Astley Cooper School	15.95	15.96	0.00
R25	Aspire Academys Trust	16.13	16.13	0.00
R26	Residential - A4147 Redbourn Road	16.91	16.92	0.01
R27	Residential - A4147 Redbourn Road	16.41	16.42	0.01
R28	Residential - Pittcotts End Road	15.92	15.92	0.00
R29	Residential - Pittcotts End Road	16.05	16.05	0.00

Receptor		Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R30	Residential - Leighton Buzzard Road	16.05	16.05	0.00
R31	Residential - Leighton Buzzard Road	16.23	16.23	0.00
R32	Residential - Warners End Road	17.57	17.58	0.01
R33	The Collett School	16.47	16.47	0.00
R34	Gade Valley Primary School	16.35	16.36	0.00
R35	Laureate Academy	16.71	16.71	0.00
R36	West Herts College	17.15	17.15	0.01
R37	Residential - Leighton Buzzard Road	17.29	17.31	0.01
R38	Residential - Leighton Buzzard Road	16.52	16.52	0.01
R39	Residential - Leighton Buzzard Road	16.45	16.45	0.01
R40	Residential - Leighton Buzzard Road	16.82	16.83	0.01
R41	Residential - Leighton Buzzard Road	17.60	17.61	0.01
R42	Residential - Station Road	16.72	16.73	0.01
R43	Residential - St Albans Road	18.00	18.00	0.00
R44	Residential - St Albans Road	17.18	17.18	0.00
R45	Residential - St Albans Road	17.10	17.10	0.00
R46	Assisted Living Mountbatten Lodge	16.21	16.21	0.00
R47	Residential - St Albans Road	17.47	17.47	0.00
R48	Residential - St Albans Road	17.00	16.99	0.00
R49	Residential - St Albans Road	17.29	17.29	0.00
R50	Residential - Leverstock Green Way	16.74	16.75	0.01
R51	Residential East Hemel Development 8	16.97	16.98	0.00
R52	Residential East Hemel Development 9	17.07	17.09	0.02
R53	Residential East Hemel Development 10	16.45	16.47	0.01
R54	Residential East Hemel Development 11	16.49	16.50	0.01
R55	Residential East Hemel Development 12	16.00	16.00	0.01
R56	Residential East Hemel Development 13	16.33	16.33	0.00
R57	Residential East Hemel Development 14	15.90	15.90	0.00
R58	Residential East Hemel Development 15	15.94	15.94	0.00
R59	East Hemel Primary School	15.88	15.88	0.00
R60	Residential - Adjacent to M1	17.24	17.25	0.01
R61	Residential - Punch Bowl Lane	15.89	15.90	0.01
R62	Residential - Cherry Tree Lane	15.80	15.80	0.00

Receptor		Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R63	Residential - Karina Court	15.89	15.89	0.00
R64	Residential - Swallowdale Lane	16.95	16.98	0.03
R65	Residential - Maylands Avenue	17.70	17.75	0.05
R66	Residential - Hawk Court	17.37	17.41	0.05
R67	Residential - Queensway	16.76	16.78	0.02
R68	Residential - Queensway	16.70	16.72	0.02
R69	Squirrels Nurseries	15.90	15.90	0.00
R70	Residential - Queensway	16.42	16.43	0.01
R71	Residential - Queensway	16.45	16.47	0.01
R72	George Street Primary School	16.01	16.01	0.00
R73	Residential - Queensway	16.54	16.56	0.01
R74	West Herts College	16.42	16.43	0.01

11.7.8 As shown in Table 11.11, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios.

11.7.9 Reference should be made to Figures 11.7 and 11.8 for graphical representation of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios, respectively.

11.7.10 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. The results are summarised in Table 11.12.

Table 11.12: Completed Development Road Vehicle Exhaust Emissions - Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Hemel Hempstead Road	8.39	8.41	0.02
R2	Residential - Hemel Hempstead Road	8.26	8.28	0.01
R3	Hemel Hempstead Road Caravan Park	8.16	8.18	0.02
R4	Residential - Proposed Development 1	8.15	8.17	0.02
R5	Residential - Proposed Development 2	8.22	8.24	0.02
R6	Residential - Proposed Development 3	8.17	8.19	0.02
R7	Residential - Proposed Development 4	8.17	8.20	0.02
R8	Residential - Proposed Development 5	8.12	8.13	0.02
R9	Residential East Hemel Development 1	8.37	8.41	0.04

Receptor		Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R10	Residential East Hemel Development 2	8.09	8.10	0.02
R11	Residential East Hemel Development 3	8.09	8.10	0.02
R12	Residential East Hemel Development 4	7.93	7.96	0.03
R13	Residential East Hemel Development 5	7.92	7.93	0.01
R14	Residential East Hemel Development 6	7.94	7.95	0.01
R15	Residential East Hemel Development 7	7.93	7.94	0.02
R16	East Hemel Primary School	7.91	7.92	0.01
R17	Residential - Holtsmere End Lane	8.31	8.33	0.02
R18	Residential - Redbourn Road	8.34	8.37	0.02
R19	Residential - Redbourn Road	8.44	8.46	0.02
R20	Residential - Redbourn Road	8.29	8.30	0.01
R21	Residential - Redbourn Road	8.80	8.83	0.03
R22	Residential - St Agnells Lane	8.98	9.00	0.03
R23	Mapel Grove Primary School	7.90	7.90	0.00
R24	The Astley Cooper School	7.93	7.93	0.00
R25	Aspire Academys Trust	8.02	8.03	0.00
R26	Residential - A4147 Redbourn Road	8.46	8.46	0.00
R27	Residential - A4147 Redbourn Road	8.20	8.21	0.00
R28	Residential - Pittcotts End Road	7.91	7.92	0.00
R29	Residential - Pittcotts End Road	8.01	8.01	0.00
R30	Residential - Leighton Buzzard Road	8.01	8.01	0.00
R31	Residential - Leighton Buzzard Road	8.10	8.10	0.00
R32	Residential - Warners End Road	8.80	8.80	0.00
R33	The Collett School	8.20	8.20	0.00
R34	Gade Valley Primary School	8.14	8.14	0.00
R35	Laureate Academy	8.32	8.32	0.00
R36	West Herts College	8.57	8.57	0.00
R37	Residential - Leighton Buzzard Road	8.64	8.65	0.01
R38	Residential - Leighton Buzzard Road	8.23	8.23	0.00
R39	Residential - Leighton Buzzard Road	8.19	8.19	0.00
R40	Residential - Leighton Buzzard Road	8.39	8.39	0.00
R41	Residential - Leighton Buzzard Road	8.81	8.82	0.00
R42	Residential - Station Road	8.34	8.34	0.00

Receptor		Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R43	Residential - St Albans Road	9.03	9.04	0.00
R44	Residential - St Albans Road	8.60	8.60	0.00
R45	Residential - St Albans Road	8.56	8.56	0.00
R46	Assisted Living Mountbatten Lodge	8.07	8.07	0.00
R47	Residential - St Albans Road	8.75	8.75	0.00
R48	Residential - St Albans Road	8.49	8.49	0.00
R49	Residential - St Albans Road	8.66	8.66	0.00
R50	Residential - Leverstock Green Way	8.36	8.37	0.00
R51	Residential East Hemel Development 8	8.47	8.47	0.00
R52	Residential East Hemel Development 9	8.60	8.61	0.01
R53	Residential East Hemel Development 10	8.23	8.23	0.01
R54	Residential East Hemel Development 11	8.28	8.29	0.00
R55	Residential East Hemel Development 12	7.97	7.97	0.00
R56	Residential East Hemel Development 13	8.18	8.19	0.00
R57	Residential East Hemel Development 14	7.91	7.91	0.00
R58	Residential East Hemel Development 15	7.94	7.94	0.00
R59	East Hemel Primary School	7.90	7.90	0.00
R60	Residential - Adjacent to M1	8.73	8.74	0.01
R61	Residential - Punch Bowl Lane	7.90	7.91	0.01
R62	Residential - Cherry Tree Lane	7.85	7.85	0.00
R63	Residential - Karina Court	7.90	7.90	0.00
R64	Residential - Swallowdale Lane	8.47	8.49	0.02
R65	Residential - Maylands Avenue	8.88	8.91	0.03
R66	Residential - Hawk Court	8.69	8.72	0.02
R67	Residential - Queensway	8.37	8.38	0.01
R68	Residential - Queensway	8.34	8.35	0.01
R69	Squirrels Nurseries	7.90	7.90	0.00
R70	Residential - Queensway	8.18	8.19	0.01
R71	Residential - Queensway	8.20	8.21	0.01
R72	George Street Primary School	7.96	7.96	0.00
R73	Residential - Queensway	8.24	8.25	0.01
R74	West Herts College	8.17	8.18	0.00

11.7.11 As shown in Table 11.12, predicted annual mean PM_{2.5} concentrations were below the Concentration Target at all sensitive receptors in both the DM and DS scenarios.

11.7.12 Reference should be made to Figures 11.9 and 11.10 for graphical representation of annual mean PM_{2.5} concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Effects

11.7.13 Predicted effects on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 11.13.

Table 11.13: Completed Development Road Vehicle Exhaust Emissions - Predicted NO₂ Impacts

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R1	Residential - Hemel Hempstead Road	Negligible	Negligible	Negligible
R2	Residential - Hemel Hempstead Road	Negligible	Negligible	Negligible
R3	Hemel Hempstead Road Caravan Park	Negligible	Negligible	Negligible
R4	Residential - Proposed Development 1	Negligible	Negligible	Negligible
R5	Residential - Proposed Development 2	Negligible	Low	Negligible
R6	Residential - Proposed Development 3	Negligible	Negligible	Negligible
R7	Residential - Proposed Development 4	Negligible	Negligible	Negligible
R8	Residential - Proposed Development 5	Negligible	Negligible	Negligible
R9	Residential East Hemel Development 1	Negligible	Low	Negligible
R10	Residential East Hemel Development 2	Negligible	Negligible	Negligible
R11	Residential East Hemel Development 3	Negligible	Negligible	Negligible
R12	Residential East Hemel Development 4	Negligible	Negligible	Negligible
R13	Residential East Hemel Development 5	Negligible	Negligible	Negligible
R14	Residential East Hemel Development 6	Negligible	Negligible	Negligible
R15	Residential East Hemel Development 7	Negligible	Negligible	Negligible
R16	East Hemel Primary School	Negligible	Negligible	Negligible
R17	Residential - Holtsmere End Lane	Negligible	Negligible	Negligible
R18	Residential - Redbourn Road	Negligible	Negligible	Negligible
R19	Residential - Redbourn Road	Negligible	Negligible	Negligible
R20	Residential - Redbourn Road	Negligible	Negligible	Negligible
R21	Residential - Redbourn Road	Negligible	Negligible	Negligible
R22	Residential - St Agnells Lane	Negligible	Negligible	Negligible
R23	Mapel Grove Primary School	Negligible	Negligible	Negligible
R24	The Astley Cooper School	Negligible	Negligible	Negligible
R25	Aspire Academys Trust	Negligible	Negligible	Negligible
R26	Residential - A4147 Redbourn Road	Negligible	Negligible	Negligible

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R27	Residential - A4147 Redbourn Road	Negligible	Negligible	Negligible
R28	Residential - Pittcotts End Road	Negligible	Negligible	Negligible
R29	Residential - Pittcotts End Road	Negligible	Negligible	Negligible
R30	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R31	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R32	Residential - Warners End Road	Negligible	Negligible	Negligible
R33	The Collett School	Negligible	Negligible	Negligible
R34	Gade Valley Primary School	Negligible	Negligible	Negligible
R35	Laureate Academy	Negligible	Negligible	Negligible
R36	West Herts College	Negligible	Negligible	Negligible
R37	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R38	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R39	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R40	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R41	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R42	Residential - Station Road	Negligible	Negligible	Negligible
R43	Residential - St Albans Road	Negligible	Negligible	Negligible
R44	Residential - St Albans Road	Negligible	Negligible	Negligible
R45	Residential - St Albans Road	Negligible	Negligible	Negligible
R46	Assisted Living Mountbatten Lodge	Negligible	Negligible	Negligible
R47	Residential - St Albans Road	Negligible	Negligible	Negligible
R48	Residential - St Albans Road	Negligible	Negligible	Negligible
R49	Residential - St Albans Road	Negligible	Negligible	Negligible
R50	Residential - Leverstock Green Way	Negligible	Negligible	Negligible
R51	Residential East Hemel Development 8	Negligible	Negligible	Negligible
R52	Residential East Hemel Development 9	Negligible	Negligible	Negligible
R53	Residential East Hemel Development 10	Negligible	Negligible	Negligible
R54	Residential East Hemel Development 11	Negligible	Negligible	Negligible
R55	Residential East Hemel Development 12	Negligible	Negligible	Negligible
R56	Residential East Hemel Development 13	Negligible	Negligible	Negligible
R57	Residential East Hemel Development 14	Negligible	Negligible	Negligible
R58	Residential East Hemel Development 15	Negligible	Negligible	Negligible
R59	East Hemel Primary School	Negligible	Negligible	Negligible

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R60	Residential - Adjacent to M1	Negligible	Negligible	Negligible
R61	Residential - Punch Bowl Lane	Negligible	Negligible	Negligible
R62	Residential - Cherry Tree Lane	Negligible	Negligible	Negligible
R63	Residential - Karina Court	Negligible	Negligible	Negligible
R64	Residential - Swallowdale Lane	Negligible	Negligible	Negligible
R65	Residential - Maylands Avenue	Negligible	Negligible	Negligible
R66	Residential - Hawk Court	Negligible	Negligible	Negligible
R67	Residential - Queensway	Negligible	Negligible	Negligible
R68	Residential - Queensway	Negligible	Negligible	Negligible
R69	Squirrels Nurseries	Negligible	Negligible	Negligible
R70	Residential - Queensway	Negligible	Negligible	Negligible
R71	Residential - Queensway	Negligible	Negligible	Negligible
R72	George Street Primary School	Negligible	Negligible	Negligible
R73	Residential - Queensway	Negligible	Negligible	Negligible
R74	West Herts College	Negligible	Negligible	Negligible

11.7.14 As shown in Table 11.13, effects on annual mean NO₂ concentrations as a result of the completed development phase road vehicle exhaust emissions were predicted to be **negligible** at all receptor locations.

11.7.15 Predicted effects on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 11.14.

Table 11.14: Completed Development Road Vehicle Exhaust Emissions - Predicted PM₁₀ Impacts

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R1	Residential - Hemel Hempstead Road	Negligible	Negligible	Negligible
R2	Residential - Hemel Hempstead Road	Negligible	Negligible	Negligible
R3	Hemel Hempstead Road Caravan Park	Negligible	Negligible	Negligible
R4	Residential - Proposed Development 1	Negligible	Negligible	Negligible
R5	Residential - Proposed Development 2	Negligible	Negligible	Negligible
R6	Residential - Proposed Development 3	Negligible	Negligible	Negligible
R7	Residential - Proposed Development 4	Negligible	Negligible	Negligible
R8	Residential - Proposed Development 5	Negligible	Negligible	Negligible
R9	Residential East Hemel Development 1	Negligible	Negligible	Negligible
R10	Residential East Hemel Development 2	Negligible	Negligible	Negligible
R11	Residential East Hemel Development 3	Negligible	Negligible	Negligible
R12	Residential East Hemel Development 4	Negligible	Negligible	Negligible
R13	Residential East Hemel Development 5	Negligible	Negligible	Negligible
R14	Residential East Hemel Development 6	Negligible	Negligible	Negligible
R15	Residential East Hemel Development 7	Negligible	Negligible	Negligible
R16	East Hemel Primary School	Negligible	Negligible	Negligible
R17	Residential - Holtsmere End Lane	Negligible	Negligible	Negligible
R18	Residential - Redbourn Road	Negligible	Negligible	Negligible
R19	Residential - Redbourn Road	Negligible	Negligible	Negligible
R20	Residential - Redbourn Road	Negligible	Negligible	Negligible
R21	Residential - Redbourn Road	Negligible	Negligible	Negligible
R22	Residential - St Agnells Lane	Negligible	Negligible	Negligible
R23	Mapel Grove Primary School	Negligible	Negligible	Negligible
R24	The Astley Cooper School	Negligible	Negligible	Negligible
R25	Aspire Academys Trust	Negligible	Negligible	Negligible
R26	Residential - A4147 Redbourn Road	Negligible	Negligible	Negligible
R27	Residential - A4147 Redbourn Road	Negligible	Negligible	Negligible
R28	Residential - Pittcotts End Road	Negligible	Negligible	Negligible
R29	Residential - Pittcotts End Road	Negligible	Negligible	Negligible
R30	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R31	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R32	Residential - Warners End Road	Negligible	Negligible	Negligible

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R33	The Collett School	Negligible	Negligible	Negligible
R34	Gade Valley Primary School	Negligible	Negligible	Negligible
R35	Laureate Academy	Negligible	Negligible	Negligible
R36	West Herts College	Negligible	Negligible	Negligible
R37	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R38	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R39	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R40	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R41	Residential - Leighton Buzzard Road	Negligible	Negligible	Negligible
R42	Residential - Station Road	Negligible	Negligible	Negligible
R43	Residential - St Albans Road	Negligible	Negligible	Negligible
R44	Residential - St Albans Road	Negligible	Negligible	Negligible
R45	Residential - St Albans Road	Negligible	Negligible	Negligible
R46	Assisted Living Mountbatten Lodge	Negligible	Negligible	Negligible
R47	Residential - St Albans Road	Negligible	Negligible	Negligible
R48	Residential - St Albans Road	Negligible	Negligible	Negligible
R49	Residential - St Albans Road	Negligible	Negligible	Negligible
R50	Residential - Leverstock Green Way	Negligible	Negligible	Negligible
R51	Residential East Hemel Development 8	Negligible	Negligible	Negligible
R52	Residential East Hemel Development 9	Negligible	Negligible	Negligible
R53	Residential East Hemel Development 10	Negligible	Negligible	Negligible
R54	Residential East Hemel Development 11	Negligible	Negligible	Negligible
R55	Residential East Hemel Development 12	Negligible	Negligible	Negligible
R56	Residential East Hemel Development 13	Negligible	Negligible	Negligible
R57	Residential East Hemel Development 14	Negligible	Negligible	Negligible
R58	Residential East Hemel Development 15	Negligible	Negligible	Negligible
R59	East Hemel Primary School	Negligible	Negligible	Negligible
R60	Residential - Adjacent to M1	Negligible	Negligible	Negligible
R61	Residential - Punch Bowl Lane	Negligible	Negligible	Negligible
R62	Residential - Cherry Tree Lane	Negligible	Negligible	Negligible
R63	Residential - Karina Court	Negligible	Negligible	Negligible
R64	Residential - Swallowdale Lane	Negligible	Negligible	Negligible
R65	Residential - Maylands Avenue	Negligible	Negligible	Negligible

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R66	Residential - Hawk Court	Negligible	Negligible	Negligible
R67	Residential - Queensway	Negligible	Negligible	Negligible
R68	Residential - Queensway	Negligible	Negligible	Negligible
R69	Squirrels Nurseries	Negligible	Negligible	Negligible
R70	Residential - Queensway	Negligible	Negligible	Negligible
R71	Residential - Queensway	Negligible	Negligible	Negligible
R72	George Street Primary School	Negligible	Negligible	Negligible
R73	Residential - Queensway	Negligible	Negligible	Negligible
R74	West Herts College	Negligible	Negligible	Negligible

11.7.16 As shown in Table 11.14, effects on annual mean PM₁₀ concentrations as a result of the completed development phase road vehicle exhaust emissions were predicted to be **negligible** at all receptor locations.

11.7.17 Predicted effects on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 11.15.

Table 11.15: Completed Development Road Vehicle Exhaust Emissions - Predicted PM_{2.5} Impacts

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R1	Residential - Hemel Hempstead Road	Low	Negligible	Negligible
R2	Residential - Hemel Hempstead Road	Low	Negligible	Negligible
R3	Hemel Hempstead Road Caravan Park	Low	Negligible	Negligible
R4	Residential - Proposed Development 1	Low	Negligible	Negligible
R5	Residential - Proposed Development 2	Low	Negligible	Negligible
R6	Residential - Proposed Development 3	Low	Negligible	Negligible
R7	Residential - Proposed Development 4	Low	Negligible	Negligible
R8	Residential - Proposed Development 5	Low	Negligible	Negligible
R9	Residential East Hemel Development 1	Low	Negligible	Negligible
R10	Residential East Hemel Development 2	Low	Negligible	Negligible
R11	Residential East Hemel Development 3	Low	Negligible	Negligible
R12	Residential East Hemel Development 4	Low	Negligible	Negligible
R13	Residential East Hemel Development 5	Low	Negligible	Negligible
R14	Residential East Hemel Development 6	Low	Negligible	Negligible
R15	Residential East Hemel Development 7	Low	Negligible	Negligible
R16	East Hemel Primary School	Low	Negligible	Negligible
R17	Residential - Holtsmere End Lane	Low	Negligible	Negligible
R18	Residential - Redbourn Road	Low	Negligible	Negligible
R19	Residential - Redbourn Road	Low	Negligible	Negligible
R20	Residential - Redbourn Road	Low	Negligible	Negligible
R21	Residential - Redbourn Road	Low	Negligible	Negligible
R22	Residential - St Agnells Lane	Low	Negligible	Negligible
R23	Mapel Grove Primary School	Low	Negligible	Negligible
R24	The Astley Cooper School	Low	Negligible	Negligible
R25	Aspire Academys Trust	Low	Negligible	Negligible
R26	Residential - A4147 Redbourn Road	Low	Negligible	Negligible
R27	Residential - A4147 Redbourn Road	Low	Negligible	Negligible
R28	Residential - Pittcotts End Road	Low	Negligible	Negligible
R29	Residential - Pittcotts End Road	Low	Negligible	Negligible
R30	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R31	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R32	Residential - Warners End Road	Low	Negligible	Negligible

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R33	The Collett School	Low	Negligible	Negligible
R34	Gade Valley Primary School	Low	Negligible	Negligible
R35	Laureate Academy	Low	Negligible	Negligible
R36	West Herts College	Low	Negligible	Negligible
R37	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R38	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R39	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R40	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R41	Residential - Leighton Buzzard Road	Low	Negligible	Negligible
R42	Residential - Station Road	Low	Negligible	Negligible
R43	Residential - St Albans Road	Low	Negligible	Negligible
R44	Residential - St Albans Road	Low	Negligible	Negligible
R45	Residential - St Albans Road	Low	Negligible	Negligible
R46	Assisted Living Mountbatten Lodge	Low	Negligible	Negligible
R47	Residential - St Albans Road	Low	Negligible	Negligible
R48	Residential - St Albans Road	Low	Negligible	Negligible
R49	Residential - St Albans Road	Low	Negligible	Negligible
R50	Residential - Leverstock Green Way	Low	Negligible	Negligible
R51	Residential East Hemel Development 8	Low	Negligible	Negligible
R52	Residential East Hemel Development 9	Low	Negligible	Negligible
R53	Residential East Hemel Development 10	Low	Negligible	Negligible
R54	Residential East Hemel Development 11	Low	Negligible	Negligible
R55	Residential East Hemel Development 12	Low	Negligible	Negligible
R56	Residential East Hemel Development 13	Low	Negligible	Negligible
R57	Residential East Hemel Development 14	Low	Negligible	Negligible
R58	Residential East Hemel Development 15	Low	Negligible	Negligible
R59	East Hemel Primary School	Low	Negligible	Negligible
R60	Residential - Adjacent to M1	Low	Negligible	Negligible
R61	Residential - Punch Bowl Lane	Low	Negligible	Negligible
R62	Residential - Cherry Tree Lane	Low	Negligible	Negligible
R63	Residential - Karina Court	Low	Negligible	Negligible
R64	Residential - Swallowdale Lane	Low	Negligible	Negligible
R65	Residential - Maylands Avenue	Low	Negligible	Negligible

Receptor		Sensitivity	Magnitude of Impact	Effect Significance
R66	Residential - Hawk Court	Low	Negligible	Negligible
R67	Residential - Queensway	Low	Negligible	Negligible
R68	Residential - Queensway	Low	Negligible	Negligible
R69	Squirrels Nurseries	Low	Negligible	Negligible
R70	Residential - Queensway	Low	Negligible	Negligible
R71	Residential - Queensway	Low	Negligible	Negligible
R72	George Street Primary School	Low	Negligible	Negligible
R73	Residential - Queensway	Low	Negligible	Negligible
R74	West Herts College	Low	Negligible	Negligible

11.7.18 As shown in Table 11.15, effects on annual mean PM_{2.5} concentrations as a result of the completed development phase road vehicle exhaust emissions were predicted to be **negligible** at all receptor locations.

11.7.19 Overall, there is predicted to be a direct, permanent, negligible impact at the local level as a result of vehicle exhaust emissions during the completed development phase are direct. This is considered to be **not significant**.

Road Vehicle Exhaust Emissions - Ecological Receptors

Assessment of Potential Effects

11.7.20 Dispersion modelling was undertaken in order to quantify potential changes in pollutant levels at Howe Grove Wood LNR as a result of road vehicle exhaust emissions associated with the Development. Reference should be made to (Appendix 11.3) for details of the assessment inputs.

11.7.21 Predicted annual mean NO_x concentrations are summarised in Table 11.16.

Table 11.16: Predicted Annual Mean NO_x Concentrations at Ecological Receptors

Receptor		Predicted Annual Mean NO _x Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	DA		
E1	Howe Grove Wood LNR	11.63	11.64	0.01	0.05
E2	Howe Grove Wood LNR	11.98	12.00	0.02	0.05
E3	Howe Grove Wood LNR	11.96	11.98	0.02	0.05
E4	Howe Grove Wood LNR	11.93	11.94	0.02	0.05

Receptor		Predicted Annual Mean NO _x Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	DA		
E5	Howe Grove Wood LNR	17.20	17.25	0.05	0.17
E6	Howe Grove Wood LNR	15.98	16.03	0.04	0.14
E7	Howe Grove Wood LNR	16.53	16.58	0.05	0.15
E8	Howe Grove Wood LNR	16.43	16.48	0.05	0.17
E9	Howe Grove Wood LNR	16.81	16.87	0.05	0.17
E10	Howe Grove Wood LNR	16.36	16.41	0.05	0.16
E11	Howe Grove Wood LNR	16.09	16.13	0.05	0.15
E12	Howe Grove Wood LNR	11.48	11.49	0.01	0.05
E13	Howe Grove Wood LNR	11.71	11.73	0.02	0.05

11.7.22 As shown in Table 11.16, the predicted PC was below 100% of the critical level at all receptors. As such, impacts are predicted to be **not significant**.

11.7.23 Predicted annual mean NH₃ concentrations are summarised in Table 11.17.

Table 11.17: Predicted Annual Mean NH₃ Concentrations at Ecological Receptors

Receptor		Predicted Annual Mean NH ₃ Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	DA		
E1	Howe Grove Wood LNR	1.35	1.35	0.00	0.12
E2	Howe Grove Wood LNR	1.38	1.38	0.00	0.14
E3	Howe Grove Wood LNR	1.38	1.38	0.00	0.14
E4	Howe Grove Wood LNR	1.37	1.37	0.00	0.13
E5	Howe Grove Wood LNR	1.79	1.80	0.00	0.42

Receptor		Predicted Annual Mean NH ₃ Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	DA		
E6	Howe Grove Wood LNR	1.70	1.70	0.00	0.35
E7	Howe Grove Wood LNR	1.74	1.74	0.00	0.38
E8	Howe Grove Wood LNR	1.77	1.77	0.00	0.40
E9	Howe Grove Wood LNR	1.80	1.81	0.00	0.42
E10	Howe Grove Wood LNR	1.77	1.77	0.00	0.39
E11	Howe Grove Wood LNR	1.74	1.75	0.00	0.38
E12	Howe Grove Wood LNR	1.38	1.38	0.00	0.12
E13	Howe Grove Wood LNR	1.39	1.40	0.00	0.13

11.7.1 As shown in Table 11.17, the predicted PC was below 100% of the critical level at all receptors. As such, impacts are predicted to be **not significant**.

11.7.2 Predicted annual nitrogen deposition is summarised in Table 11.18.

Table 11.18: Predicted Annual Nitrogen Deposition at Ecological Receptors

Receptor		Predicted Annual Nitrogen Deposition (kgN/ha/yr)		PC (kgN/ha/yr)	PC as Prop. of Critical Load (%)
		Baseline	DA		
E1	Howe Grove Wood LNR	16.65	16.66	0.01	0.12
E2	Howe Grove Wood LNR	16.92	16.93	0.01	0.14
E3	Howe Grove Wood LNR	16.90	16.91	0.01	0.13
E4	Howe Grove Wood LNR	16.87	16.89	0.01	0.13
E5	Howe Grove Wood LNR	20.87	20.91	0.04	0.41
E6	Howe Grove Wood LNR	19.95	19.99	0.03	0.33
E7	Howe Grove Wood LNR	20.37	20.40	0.04	0.35
E8	Howe Grove Wood LNR	20.88	20.92	0.04	0.37
E9	Howe Grove Wood LNR	21.17	21.21	0.04	0.42
E10	Howe Grove Wood LNR	20.83	20.86	0.04	0.37
E11	Howe Grove Wood LNR	20.62	20.66	0.04	0.35
E12	Howe Grove Wood LNR	17.13	17.14	0.01	0.10
E13	Howe Grove Wood LNR	17.31	17.32	0.01	0.13

11.7.3 As shown in Table 11.18, the predicted PC was below 100% of the critical load at all receptors. As such, impacts are predicted to be **not significant**.

Potential Future Exposure

11.7.4 The Development has the potential to cause the exposure of occupants to elevated pollution levels associated with local road vehicle exhaust emissions. Dispersion modelling was undertaken with the inputs described in Appendix 11.3 to quantify air quality conditions at the Site. Reference should be made to Figures 11.6, 11.8 and 11.10 for graphical representations of the results.

11.7.5 As shown in Figure 11.6, annual mean NO₂ concentrations were below the AQO of 40µg/m³ across the Development. The maximum level at the Site was 24.82µg/m³.

- 11.7.6 As shown in Figure 11.8, annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ across the Development. The maximum level at the was 19.00µg/m³.
- 11.7.7 As shown in Figure 11.10, annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ across the Development. The maximum level at the Site was 9.75µg/m³.
- 11.7.8 Based on the results of the assessment, exposure of future occupants to exceedences of the relevant AQOs and Concentration Target has not been predicted. As such, the predicted effect is **not significant**.
- 11.7.9 As concentrations at the Site boundary were below the relevant AQOs and Concentration Target, it is predicted that pollutant concentrations would be even lower across the remaining areas of the Site as pollutant concentrations decrease with distance from the road. As such, the proposed school location and other residential properties set back from the road network and Site boundary are not anticipated to exposed to elevated concentrations.

Interim Planning Guidance for PM_{2.5}

- 11.7.10 Interim Planning Guidance on the consideration of the PM_{2.5} targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise PM_{2.5} and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 11.19 below, along with the development response.

Table 11.19 Interim Planning Guidance for PM_{2.5}

Question	Response
How has exposure to PM_{2.5} been considered when selecting the development site? Factors to consider include: - Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these - Site proximity to pollution sources and the impact of these on users of the development - Exposure and emissions during both construction and in-use	The Development is located within the Hemel Gardens Community. The assessment has not predicted any significant impacts on local air quality as a result of the Development. The Site is located adjacent to the B487 Hemel Hempstead Road and within the vicinity of the M1. Therefore, the Development has the potential to expose occupants to poor air quality. However, the assessment indicated that concentrations of PM_{2.5} are below the Concentration Target across the Development. As outlined in Table 11.8, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations.

Question	Response
What actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of PM_{2.5} and its precursors? Factors to consider include: ▪ Site layout ▪ The development's design ▪ Technology used in the construction or installed for use in the development ▪ Construction and future use of the development	In order to reduce emissions of PM_{2.5} with associated impacts at nearby receptors, the following measures have been included: ▪ The Development will include Electric Vehicle (EV) charging. ▪ Provision of secure cycle storage to encourage sustainable modes of transport to and from the Site. ▪ Provision of a Travel Plan to encourage sustainable transport modes. ▪ Proposed residential properties and school are distanced from the B487. As pollutant concentrations decrease with distance, sensitive receptors at the Site will be less exposed to emissions of PM_{2.5} from the local road network. Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities.

- 11.7.11 Based on the responses provided in Table 11.19 and the results of the assessment, as outlined previously, it is considered that the proposal has identified key sources of air pollution and taken appropriate action to minimise emissions of PM_{2.5}.

Additional Mitigation, Monitoring and Residual Effects

Road Vehicle Exhaust Emissions - Human Receptors

- 11.7.12 No significant adverse effects were identified and therefore no additional mitigation is required and the residual effects remain as presented above. However, a number of measures will be included within the Development to encourage the use of sustainable transport modes, manage vehicle flow and reduce pollution around the Site. These measures are referred to in Table 11.19 above.

Road Vehicle Exhaust Emissions - Ecological Receptors

- 11.7.13 No significant adverse effects were identified and therefore no additional mitigation is required, and the residual effects remain as presented above.

Potential Future Exposure

- 11.7.14 No significant adverse effects were identified and therefore no additional mitigation is required, and the residual effects remain as presented above.

11.8 Cumulative Effects

Construction

Assessment

Fugitive Dust and PM₁₀ Emissions

- 11.8.1 Should permission be granted for other committed developments identified in Table 11.2 within 500m of the Site, it is possible that cumulative dust effects may occur during construction. However, the committed developments will be required to consider construction phase dust emissions as part of the planning applications for the sites utilising the same approach adopted within this chapter. Measures will be recommended for each site to minimise dust emissions during the construction phase and assuming the effective implementation of these measures, cumulative effects will be **not significant**.

Road Vehicle Exhaust Emissions

- 11.8.2 Cumulative vehicle exhaust emission effects may occur during construction as a result of additional traffic movements associated with committed developments in the vicinity of the Site. However, the number of vehicle trips associated with the Development is lower than the relevant screening criteria, below which **negligible** impacts would be expected. A similar or lower level of vehicle trip generation would be expected for any other committed development.
- 11.8.3 The predicted number of vehicle trips generated during construction of the Development is also considerably lower than those generated from the completed development. As noted in paragraph 11.8.7 below, no significant adverse effects were identified as a result of cumulative road vehicle exhaust emissions from the completed development. Residual cumulative effects are therefore predicted to have a direct, temporary, negligible impact at the local level which is considered to be **not significant**.

Mitigation, Monitoring and Residual Effects

Fugitive Dust and PM₁₀ Emissions

- 11.8.4 A CEMP will be produced for the Development to control potential air quality effects during the construction phase. It is assumed that other committed developments would also produce a CEMP to control potential effects. With effective implementation of such measures, there is predicted to be a direct, temporary, cumulative impact at the local level which is considered to be **not significant**.

Road Vehicle Exhaust Emissions

- 11.8.5 No significant adverse effects were identified and therefore no additional mitigation is required and the residual effects remain as presented above.

Completed Development

Assessment

Road Vehicle Exhaust Emissions - Human Receptors

- 11.8.6 During the completed development phase, there is potential for cumulative effects associated with vehicle exhaust emissions generated by the cumulative developments identified in Table 11.2. However, additional vehicle movements associated with the operation of the cumulative schemes scoped into the assessment have been included within

the future baseline scenario considered in this assessment. Therefore, cumulative vehicle movements have been assessed in the completed development assessment presented in Table 11.13 to Table 11.15. The results of the assessment indicated that cumulative air quality impacts were predicted to be **negligible** at all receptor locations. As such there is predicted to be a direct, permanent, negligible impact at the local level which is considered to be **not significant**.

Road Vehicle Exhaust Emissions - Ecological Receptors

11.8.7 Dispersion modelling was undertaken in order to quantify potential changes in pollutant levels at Howe Grove Wood LNR as a result of road vehicle exhaust emissions associated with the Development and other potential cumulative developments. Reference should be made to Appendix 11.5 for details of the assessment inputs.

11.8.8 Predicted annual mean NO_x concentrations are summarised in Table 11.20.

Table 11.20: Predicted Cumulative Annual Mean NO_x Concentrations at Ecological Receptors

Receptor		Predicted Annual Mean NO _x Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	IC		
E1	Howe Grove Wood LNR	11.63	11.80	0.17	0.58
E2	Howe Grove Wood LNR	11.98	12.17	0.19	0.62
E3	Howe Grove Wood LNR	11.96	12.15	0.18	0.61
E4	Howe Grove Wood LNR	11.93	12.11	0.18	0.61
E5	Howe Grove Wood LNR	17.20	17.62	0.42	1.40
E6	Howe Grove Wood LNR	15.98	16.35	0.36	1.21
E7	Howe Grove Wood LNR	16.53	16.92	0.39	1.29
E8	Howe Grove Wood LNR	16.43	16.84	0.41	1.37
E9	Howe Grove Wood LNR	16.81	17.24	0.43	1.43
E10	Howe Grove Wood LNR	16.36	16.76	0.41	1.36
E11	Howe Grove Wood LNR	16.09	16.48	0.40	1.32
E12	Howe Grove Wood LNR	11.48	11.67	0.19	0.62

Receptor		Predicted Annual Mean NO _x Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	IC		
E13	Howe Grove Wood LNR	11.71	11.91	0.20	0.66

11.8.9 As shown in Table 11.20, the predicted PC was below 100% of the critical load at all receptors. As such, impacts are predicted to be **not significant**.

11.8.10 Predicted annual mean NH₃ concentrations are summarised in Table 11.21.

Table 11.21: Predicted Cumulative Annual Mean NH₃ Concentrations at Ecological Receptors

Receptor		Predicted Annual Mean NH ₃ Concentration (µg/m ³)		PC (µg/m ³)	PC as Prop. of Critical Level (%)
		Baseline	IC		
E1	Howe Grove Wood LNR	1.35	1.36	0.01	1.44
E2	Howe Grove Wood LNR	1.38	1.39	0.02	1.55
E3	Howe Grove Wood LNR	1.38	1.39	0.02	1.52
E4	Howe Grove Wood LNR	1.37	1.39	0.02	1.50
E5	Howe Grove Wood LNR	1.79	1.83	0.04	3.51
E6	Howe Grove Wood LNR	1.70	1.73	0.03	3.04
E7	Howe Grove Wood LNR	1.74	1.77	0.03	3.23
E8	Howe Grove Wood LNR	1.77	1.81	0.03	3.44
E9	Howe Grove Wood LNR	1.80	1.84	0.04	3.59
E10	Howe Grove Wood LNR	1.77	1.80	0.03	3.40
E11	Howe Grove Wood LNR	1.74	1.78	0.03	3.30
E12	Howe Grove Wood LNR	1.38	1.39	0.02	1.54
E13	Howe Grove Wood LNR	1.39	1.41	0.02	1.63

11.8.11 As shown in Table 11.21, the predicted PC was below 100% of the critical load at all receptors. As such, impacts are predicted to be **not significant**.

11.8.12 Predicted annual nitrogen deposition is summarised in Table 11.22.

Table 11.222: Predicted Cumulative Annual Nitrogen Deposition at Ecological Receptors

Receptor		Predicted Annual Nitrogen Deposition (kgN/ha/yr)		PC (kgN/ha/yr)	PC as Prop. of Critical Load (%)
		Baseline	IC		
E1	Howe Grove Wood LNR	16.65	16.78	0.13	1.35
E2	Howe Grove Wood LNR	16.92	17.06	0.15	1.47
E3	Howe Grove Wood LNR	16.90	17.04	0.14	1.45
E4	Howe Grove Wood LNR	16.87	17.01	0.14	1.43
E5	Howe Grove Wood LNR	20.87	21.20	0.33	3.31
E6	Howe Grove Wood LNR	19.95	20.24	0.29	2.86
E7	Howe Grove Wood LNR	20.37	20.67	0.30	3.04
E8	Howe Grove Wood LNR	20.88	21.21	0.32	3.23
E9	Howe Grove Wood LNR	21.17	21.51	0.34	3.37
E10	Howe Grove Wood LNR	20.83	21.15	0.32	3.20
E11	Howe Grove Wood LNR	20.62	20.93	0.31	3.09
E12	Howe Grove Wood LNR	17.13	17.28	0.15	1.46
E13	Howe Grove Wood LNR	17.31	17.46	0.15	1.53

11.8.13 As shown in Table 11.22, the predicted PC was below 100% of the critical load at all receptors. As such, impacts are predicted to be **not significant**.

Potential Future Exposure

11.8.14 Additional vehicle movements associated with the operation of the cumulative schemes scoped into the assessment have been included within the future baseline scenario considered in this assessment. Therefore, cumulative vehicle movements have been assessed in the completed development assessment. The results of the exposure assessment indicated that annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted to be below the relevant AQOs and Concentration Target across the Development. As such, the predicted effect is **not significant**.

Mitigation, Monitoring and Residual Effects

Road Vehicle Exhaust Emissions - Human Receptors

- 11.8.15 No significant adverse effects were identified and therefore no additional mitigation is required and the residual effects remain as presented above.

Road Vehicle Exhaust Emissions - Ecological Receptors

- 11.8.16 No significant adverse effects were identified and therefore no additional mitigation is required, and the residual effects remain as presented above.

Potential Future Exposure

- 11.8.17 No significant adverse effects were identified and therefore no additional mitigation is required and the residual effects remain as presented above.

11.9 Summary

- 11.9.1 A summary of the residual effects is provided in Table 11..

Table 11.23: Summary of Residual Effects

Effect	Receptor (Sensitivity)	Magnitude of Impact	Scale of Effect	Additional Mitigation and Monitoring	Residual Effect
Development Scenarios					
<i>Construction Phase - Fugitive Dust and PM₁₀ Emissions</i>					
Dust soiling as a result of fugitive dust emissions and human health effects as a result of increases in PM ₁₀ concentrations	Existing residential properties, Brockwood Primary School and future users of the Development (high)	Major risk of dust soiling for earthworks, construction and trackout Moderate risk of human health impacts from earthworks, construction and trackout	N/A - not determined in accordance with IAQM guidance ^{li}	None - appropriate measures included within Outline CEMP	Direct, temporary effect at the local level which is considered to be not significant
<i>Construction Phase - Road Vehicle Exhaust Emissions</i>					
Increases in NO ₂ , PM ₁₀ and PM _{2.5} concentrations associated with vehicle exhaust emissions	Existing residential properties, nearby schools and future users of the Development (high)	Not significant	Negligible	No additional mitigation is required	Direct, temporary negligible impact at the local level which is considered to be not significant
<i>Completed Development Road Vehicle Exhaust Emissions - Human Receptors</i>					
Increases in NO ₂ , PM ₁₀ and PM _{2.5} concentrations associated with vehicle exhaust emissions	Existing residential properties, schools and future users of the Development (high)	Negligible	Negligible	No additional mitigation is required	Direct, permanent, negligible impact at the local level which is considered to be not significant

Effect	Receptor (Sensitivity)	Magnitude of Impact	Scale of Effect	Additional Mitigation and Monitoring	Residual Effect
<i>Completed Development Road Vehicle Exhaust Emissions - Ecological Receptors</i>					
Changes in pollutant levels as a result of vehicle exhaust emissions	Howe Grove Wood LNR	Not significant	Not significant	No additional mitigation is required	Not significant
<i>Cumulative Scenarios</i>					
<i>Construction Phase- Fugitive Dust and PM₁₀ Emissions</i>					
Dust soiling as a result of fugitive dust emissions and human health effects as a result of increases in PM ₁₀ concentrations	Existing residential properties, Brockwood Primary School and future users of the Development (high)	Anticipated to be the same as the construction phase scenario	N/A - not determined in accordance with IAQM guidance	CEMP for individual schemes	Not significant
<i>Construction Phase - Road Vehicle Exhaust Emissions</i>					
Increases in NO ₂ , PM ₁₀ and PM _{2.5} concentrations associated with vehicle exhaust emissions	Existing residential properties, nearby schools and future users of the Development (high)	Not significant	Negligible	No additional mitigation is required	Direct, temporary negligible impact at the local level which is considered to be not significant
<i>Completed Development Road Vehicle Exhaust Emissions - Human Receptors</i>					
Increases in NO ₂ , PM ₁₀ and PM _{2.5} concentrations associated with vehicle exhaust emissions	Existing residential properties, schools and future users of the Development (high)	Negligible	Negligible	No additional mitigation is required	Direct, permanent, negligible impact at the local level which is considered to be not significant

Effect	Receptor (Sensitivity)	Magnitude of Impact	Scale of Effect	Additional Mitigation and Monitoring	Residual Effect
<i>Completed Development Road Vehicle Exhaust Emissions - Ecological Receptors</i>					
Changes in pollutant levels as a result of vehicle exhaust emissions	Howe Grove Wood LNR	Negligible	Not significant	No additional mitigation is required	Not significant

Abbreviations

Abbreviation	Description
AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ASR	Annual Status Report
AURN	Automatic Urban and Rural Network
CEMP	Construction Environmental Management Plan
DA	Development Alone
DBC	Dacorum Borough Council
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EV	Electric Vehicle
HDV	Heavy Duty Vehicles
IAQM	Institute of Air Quality Management
IC	In-Combination
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
NO _x	Nitrogen oxide
NO ₂	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PC	Process Contribution
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
SADC	St Albans City and District Council

Figures

Figure 11.1: ADMS-Roads Inputs Do-Minimum and Do-Something

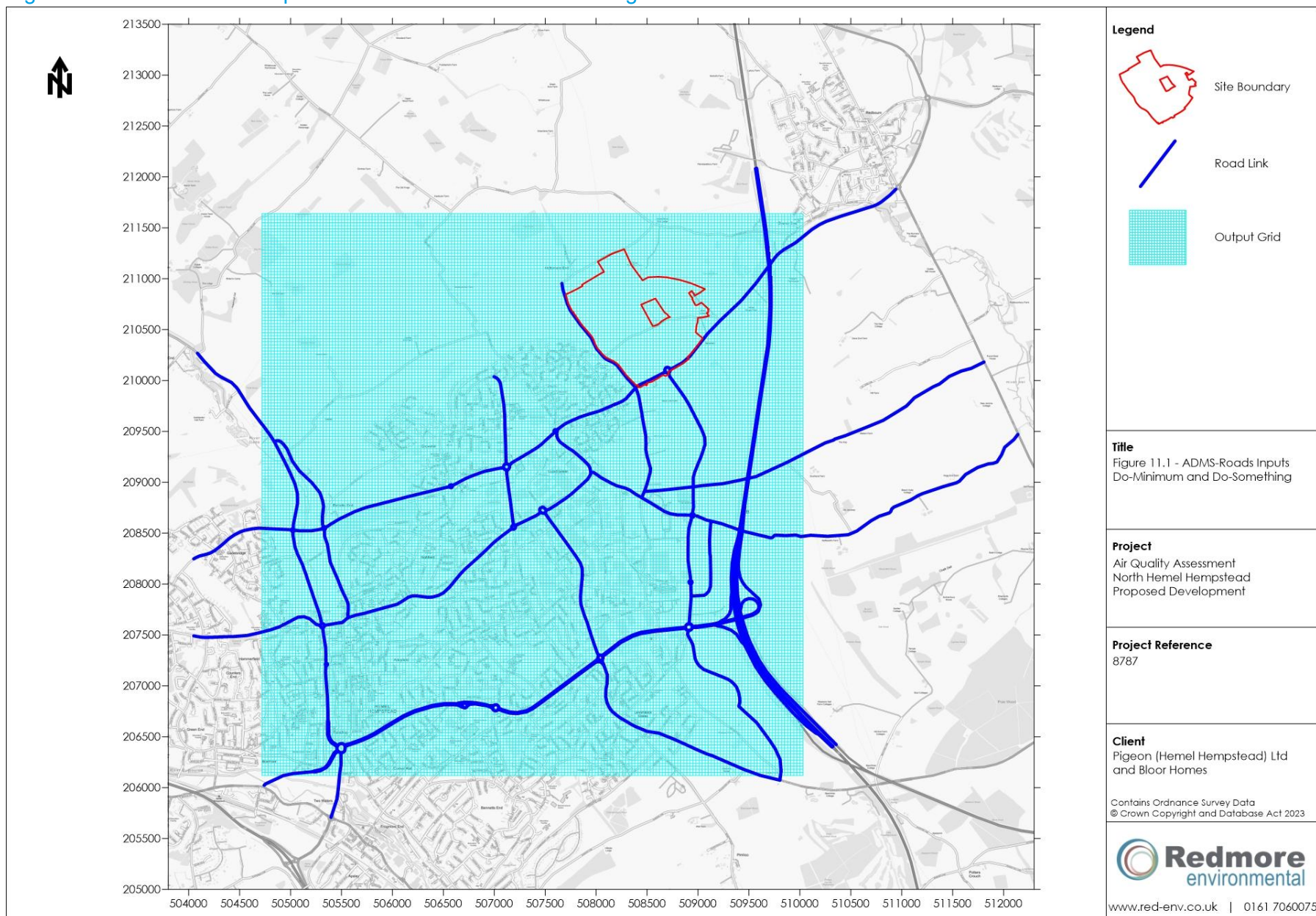


Figure 11.2: ADMS-Roads Inputs Verification

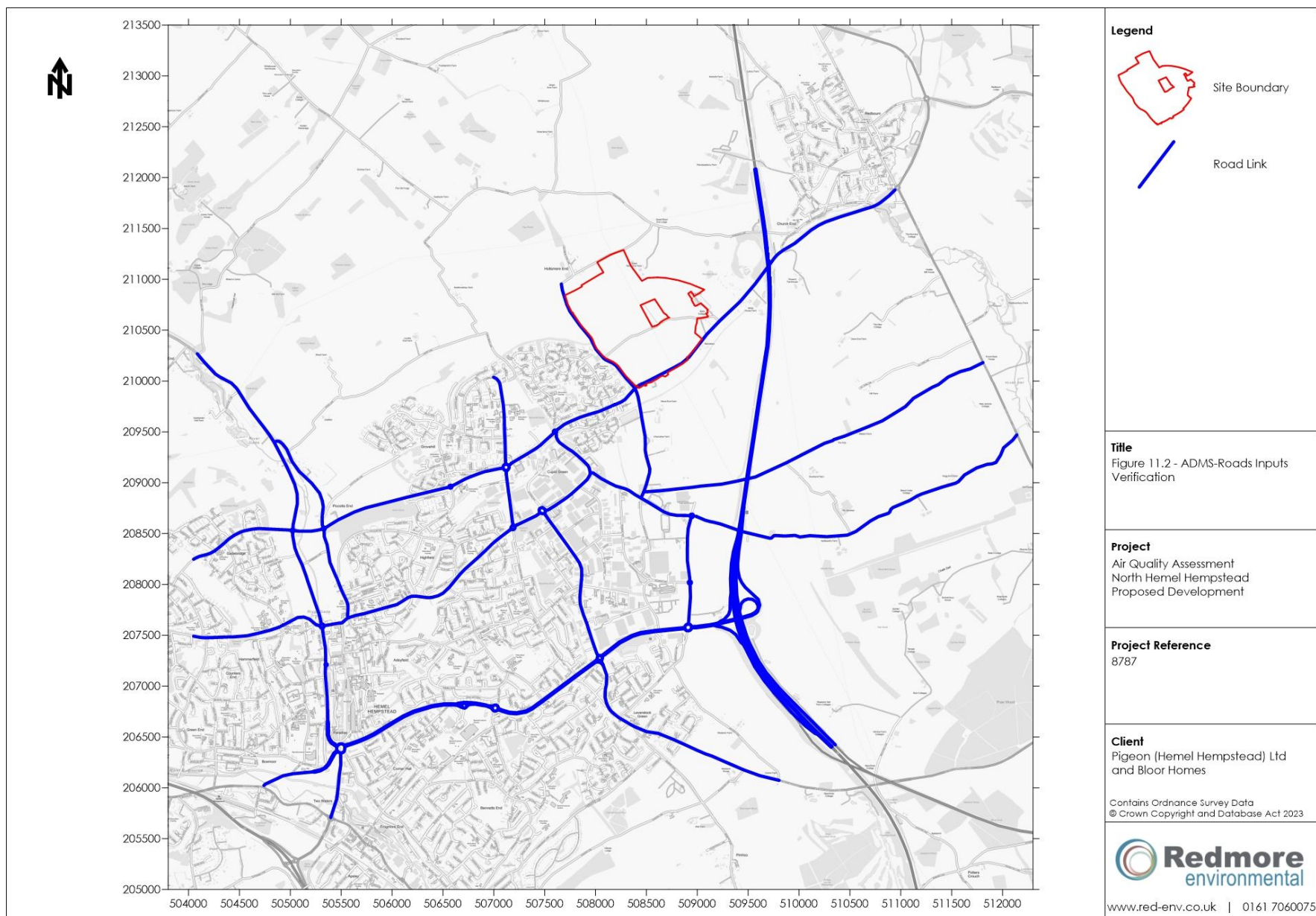


Figure 11.3: Air Quality Assessment North Hemel Hempstead Development

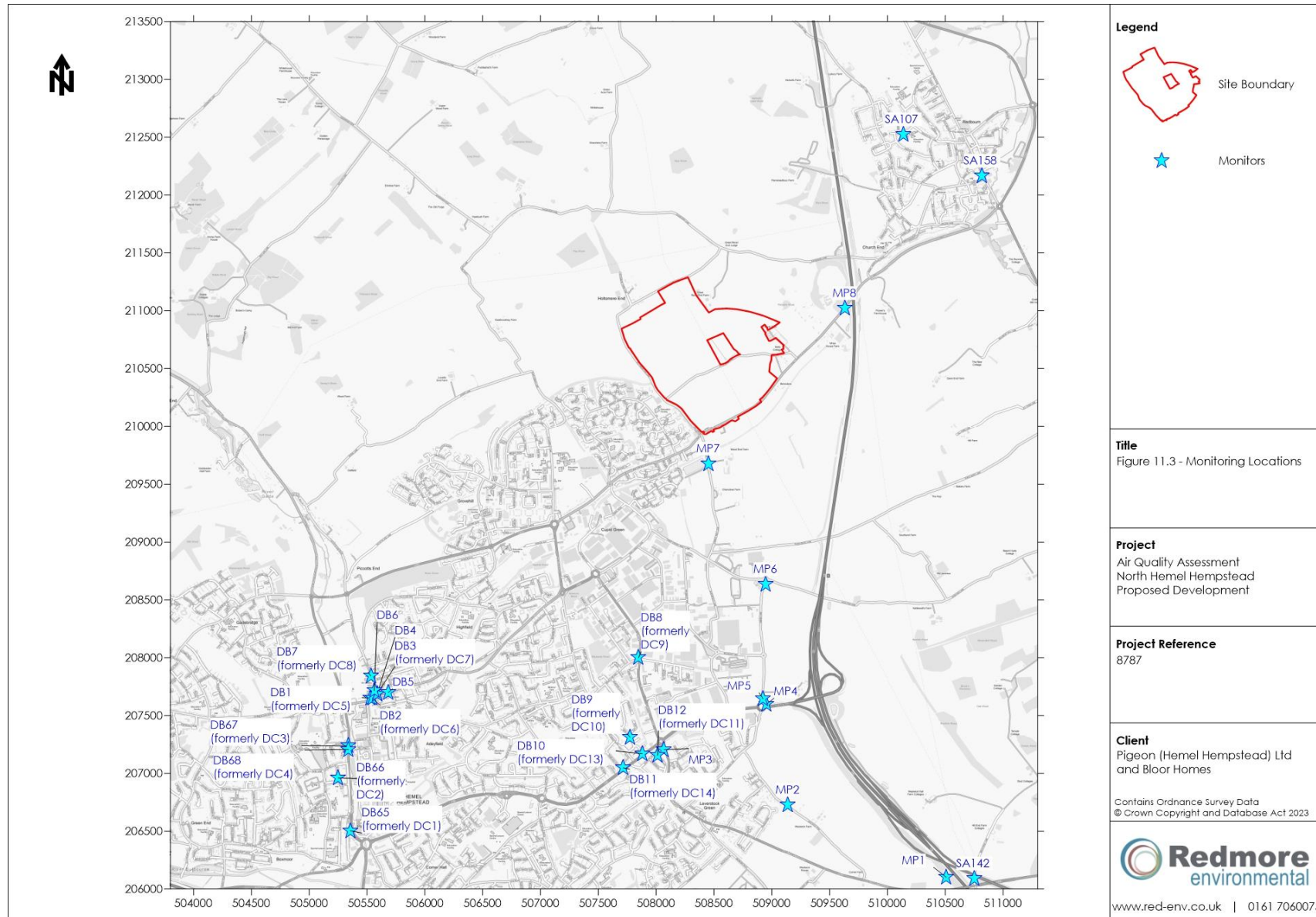


Figure 11.4: Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

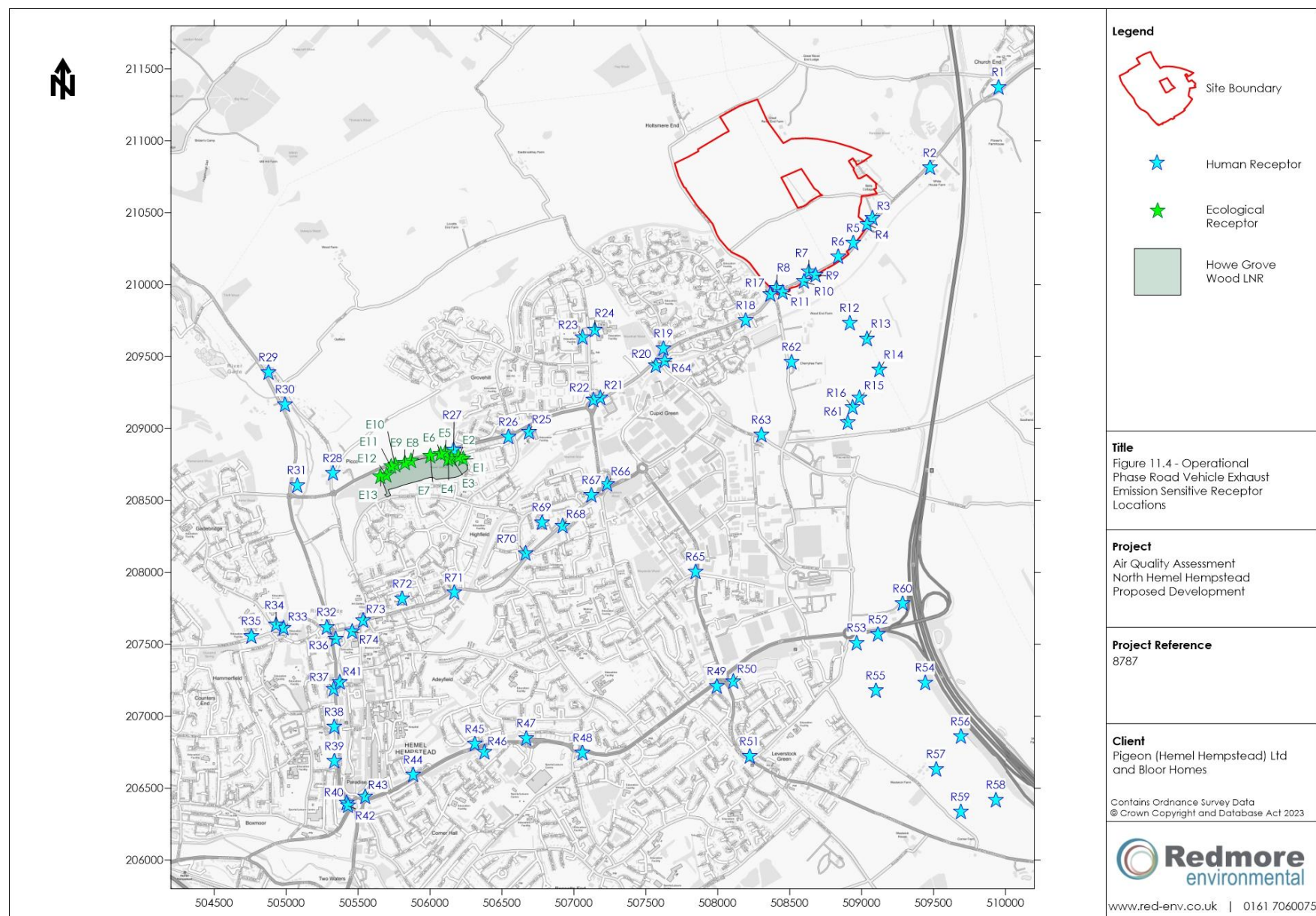


Figure 11.5: Predicted Annual Mean NO₂ Concentrations (µg/m³) Do-Minimum

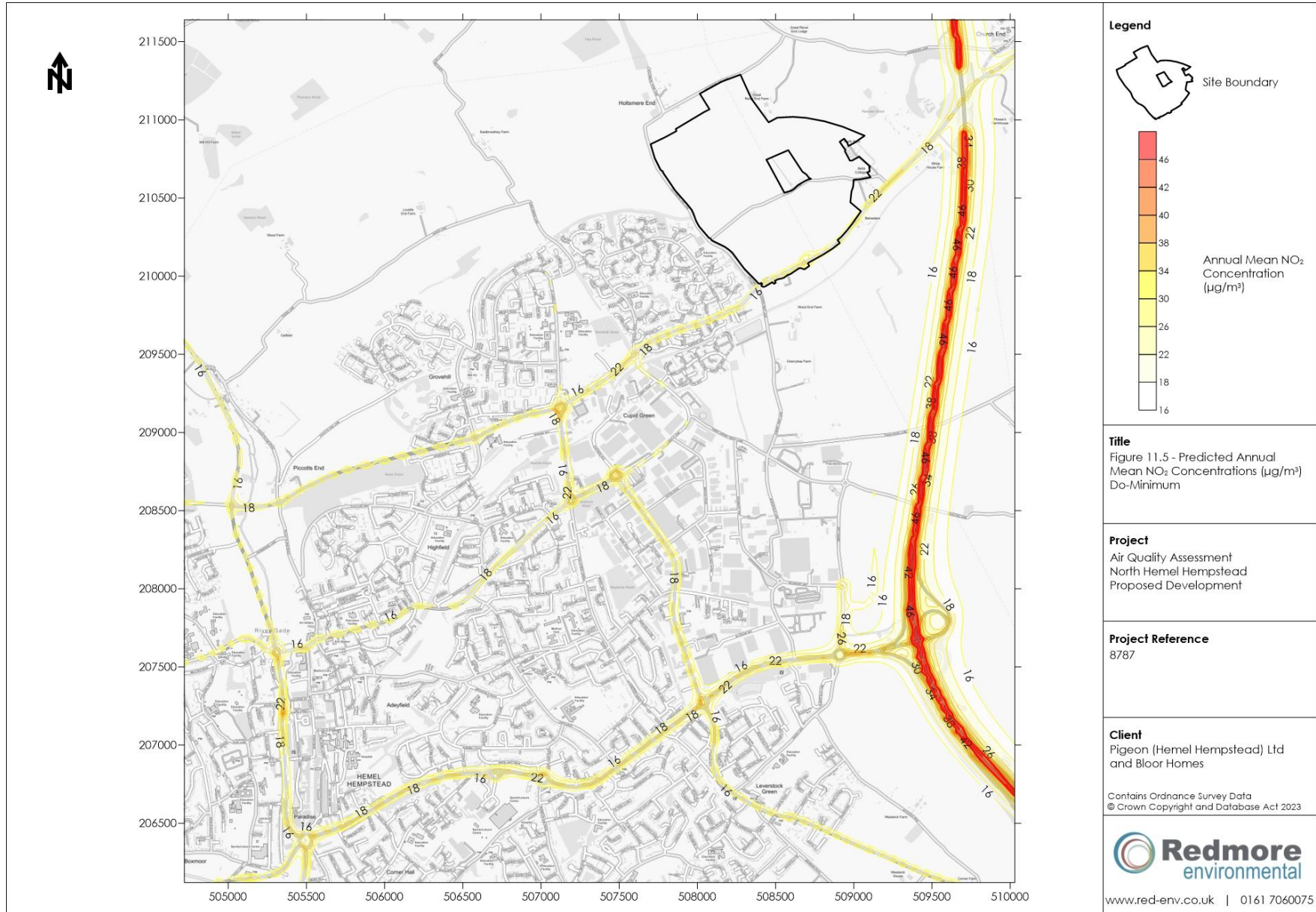


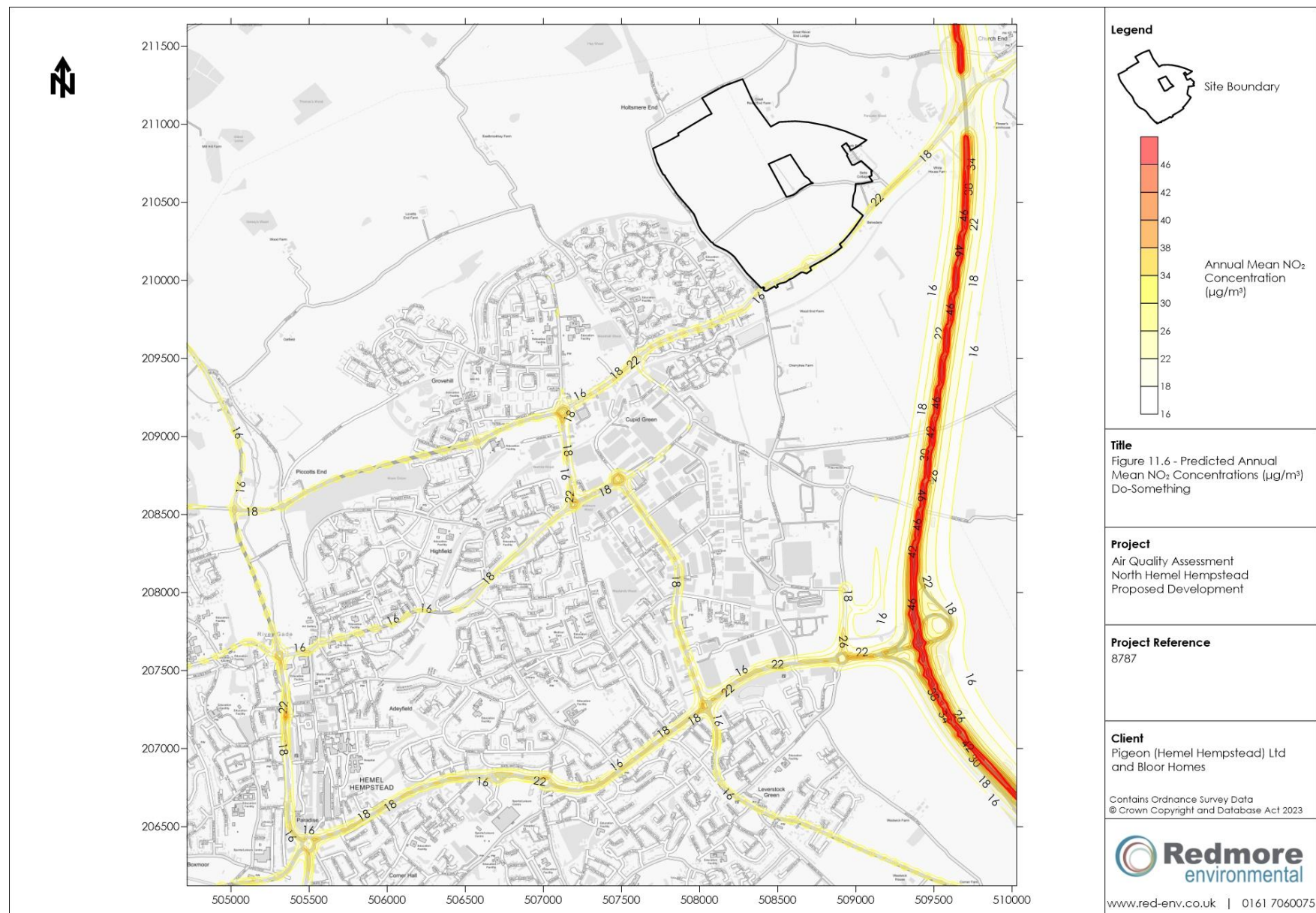
Figure 11.6: Predicted Annual Mean NO₂ Concentrations (µg/m³) Do-Something

Figure 11.7: Predicted Annual Mean PM₁₀ Concentrations (µg/m³) Do-Minimum

Figure 11.8: Predicted Annual Mean PM₁₀ Concentrations (µg/m³) Do-Something



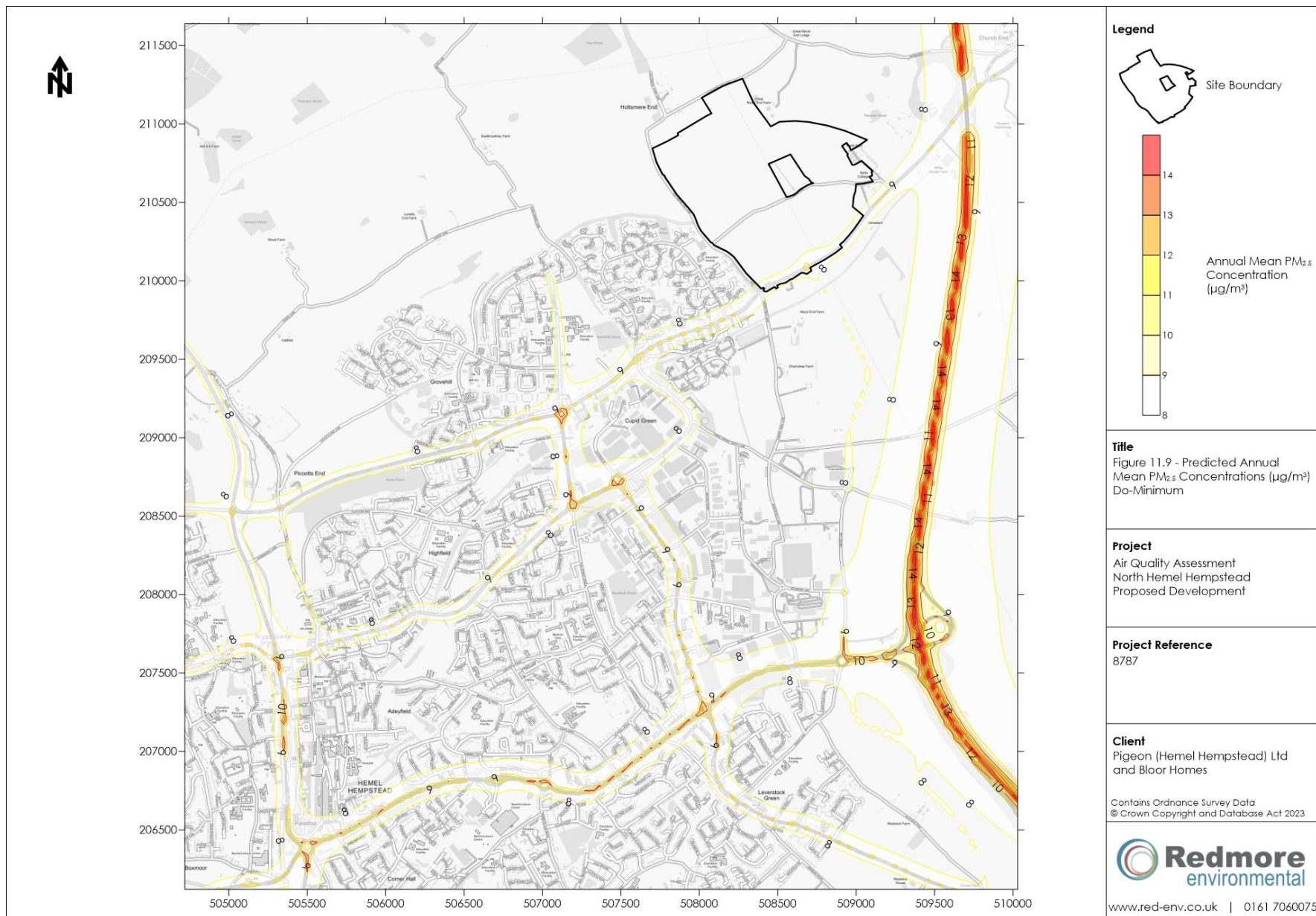
Figure 11.9: Predicted Annual Mean PM_{2.5} Concentration (µg/m³) Do-Minimum

Figure 11.10: Predicted Annual Mean PM_{2.5} Concentrations (µg/m³) Do-Something

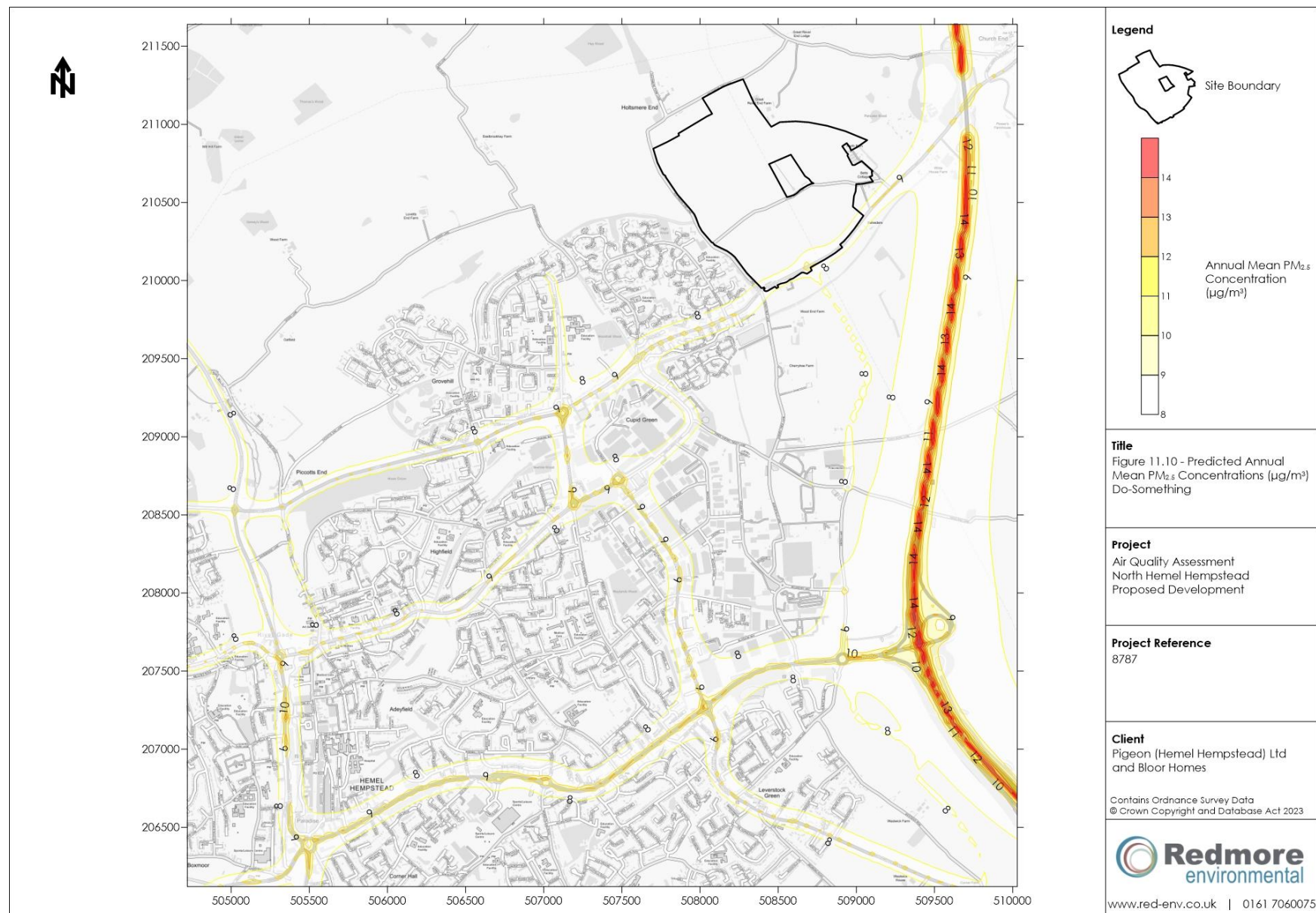
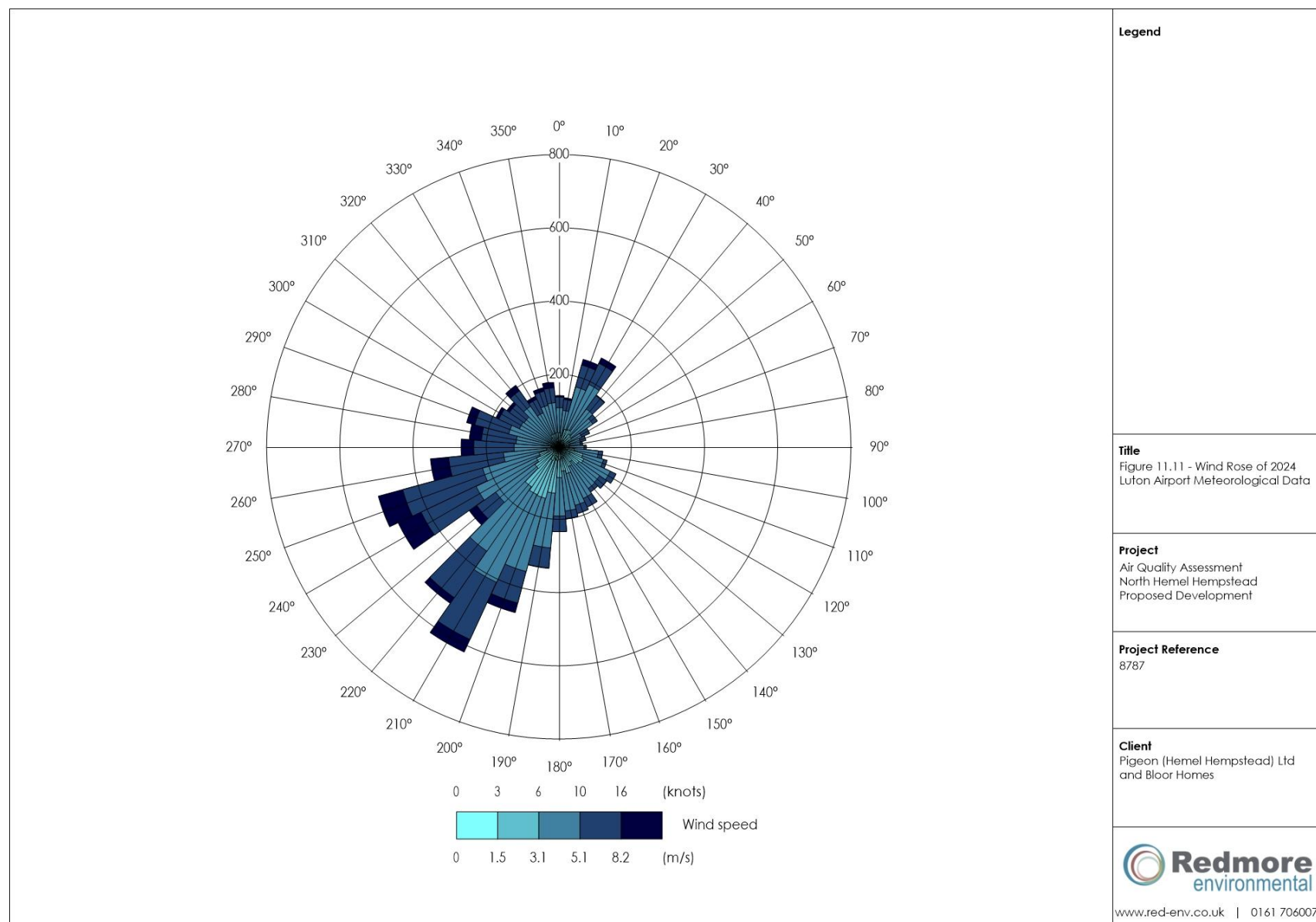


Figure 11.11: Air Quality Assessment North Hemel Hempstead Development



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