



GA2, Land north of Great Ashby Environmental Statement

Chapter 6: Air Quality

Waterman on behalf of Picture
Estates Limited

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6. AIR QUALITY

Introduction

- 6.1 This chapter of the ES has been prepared by Waterman and presents an assessment of the likely significant effects of the Proposed Development with respect to Air Quality. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and/or enhance likely beneficial effects. Taking into account the mitigation measures, the nature and significance of the likely residual effects are reported.
- 6.2 This chapter is supported by the following technical appendices:
- **Appendix 6.1:** Summary of Relevant Legislation, Planning Policy and Guidance;
 - **Appendix 6.2:** Air Quality Modelling Study;
 - **Appendix 6.3:** Consultation with North Hertfordshire District Council;
 - **Appendix 6.4:** Damage Cost Calculation; and
 - **Appendix 6.5:** Ancient Woodland Assessment.

Competence

- 6.3 For a summary of the competence of the authors of this chapter, please see **Appendix 1.6**.

Legislation and Policy Context

- 6.4 The following legislation, planning policy and guidance are considered relevant to this air quality assessment. A summary of these documents is provided in **Appendix 6.1**.

Legislation Context

- 6.5 The following legislation is relevant to the Proposed Development:
- EU Framework Directive 2008/50/EC, 2008ⁱ;
 - Air Quality Standards Regulations, 2010ⁱⁱ;
 - The UK Air Quality Strategy, 2007ⁱⁱⁱ; and
 - The Environment Act 1995^{iv};

National Planning Policy

- 6.6 The following national planning policy is relevant to the Proposed Development:

- National Planning Policy Framework (2024)^v.

Local Planning Policy

6.7 The following local planning policies are relevant to the Proposed Development

- North Hertfordshire Local Plan 2011-2031, November 2022^{vi}.

Guidance

6.8 The following guidance is relevant to the Proposed Development:

- Department for Environment, Food and Rural Affairs, Clean Air Strategy, 2019^{vii};
- Improving Air Quality in the UK: Tackling Nitrogen Dioxide in our Towns and Cities. UK Air Quality Plan for Tackling Nitrogen Dioxide, 2017^{viii};
- Environmental Protection UK & Institute of Air Quality Management Guidance; Land-Use Planning & Development Control: Planning for Air Quality, 2017^{ix};
- Planning Practice Guidance: Air Quality. 2019^x;
- Institute of Air Quality Management: Guidance on the Assessment of Dust from Demolition and Construction, Version 2.2 January 2024^{xi};
- Local Air Quality Management Policy Guidance, 2022^{xii}; and
- North Hertfordshire Air Quality Planning Guidance, October 2018^{xiii}.

Assessment Methodology and Significance Criteria

6.9 This section presents the methodology used to assess the potential effects of the Proposed Development in relation to air quality.

Consultation

6.10 A request for an EIA Scoping Opinion was issued to North Hertfordshire District Council (NHDC). The Scoping Opinion was received from NHDC and other statutory and non-statutory organisations in June 2023.

6.11 In addition, consultation was undertaken with NHDC's Air Quality Environmental Protection Officer in October 2023.

6.12 **Table 6.1** presents a summary of the comments raised in the Council's EIA Scoping Opinion and other discussions with relevant consultees with respect to air quality.

Table 6.1: Summary of Comments Raised in the Scoping Opinion

Consultee	Comment	Response
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North Hertfordshire District Council Service Director	It is agreed that Air Quality should be scoped into the Environmental Statement. Given the distances involved, it is generally agreed that the proposed development would not be likely to have any significant impacts on the nearest Air Quality Management Areas. As such, whilst the Environmental Statement would need to include a chapter on Air Quality impacts (both during construction and operational phases), this would not need to include any in depth analysis with regard to the AQMA. The methodology as outlined in section 6.16 of the Scoping Report is noted. However, I refer you to the comments of the Council's Environmental Protection Officer (Air Quality), who raises some specific requirements. You may wish to contact the Environmental Protection Officer for their input and advice in terms of finalising methodology and/or identifying receptors etc. The outline proposals meet the criteria for a MAJOR development. A transport assessment and air quality assessment will be required, and a Construction Management plan. The development will also require mitigation measures, including installation of an agreed number of EV charge points, and a Travel Plan as detailed under section 2.4.2 of the NHDC Air Quality Planning Guidance document. The requirements for major scale developments are detailed within section 2.4.3 of the Guidance document.	An air quality assessment has been carried out and the Council's Environmental Protection Officer has been contacted to agree upon the assessment methodology. Mitigation measures are considered within the ES Air Quality Chapter
Natural England	The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality.	The potential impacts of construction vehicles are assessed within this chapter and will be managed within a Construction Logistics Plan (CLP), Construction Traffic Management Plan (CTMP) or similar. Mitigation measures are considered within the ES Air Quality Chapter

North Hertfordshire Environmental Protection Officer (Air Quality)	You need to contact the County Council for Traffic data if it's not available on the national database. As for background year, I suggest you go for 2019 as the monitoring was less reliable in 2022, but up to you, you can access it via the Herts & Beds AQ Webpage hosted by airqualityengland.co.uk	The 2019 monitoring data has been used for the baseline assessment to verify the model. The Air Quality Damage Calculation has been completed and included in Appendix 6.4.
Full details of the consultation are included in Appendix 6.3	Additionally, we'd like to see the Air quality damage calculation as referenced in the attached Air Quality Planning Guidance issued by North Herts Council (as attached), as issued by DEFRA. Please reference the Planning Guidance Document.	

Study Area and Scope

Study Area

- 6.13 The study area assessed for the construction phase covers an area up to 250m from the Site boundary, and up to 50m of construction routes up to 250m from the Site entrance.
- 6.14 The study area for the complete and operational phase covers receptors along roads surrounding the Proposed Development or along roads with an increase in annual average daily traffic of over 500 light duty vehicles (LDV's) or 100 heavy duty vehicles (HDV's) in accordance with the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance^{xiv}.
- 6.15 The baseline year of 2019 was assessed to compare against monitored concentrations at four of Stevenage Borough Council's (SBC) diffusion tubes. The year 2019 was used to assess the baseline as this is the latest full year of representative monitoring data due to the COVID-19 pandemic. The 2022 monitoring was considered less reliable by the NHDC Environmental Health Officer.
- 6.16 The year 2030 was used for the 'with Proposed Development' and 'without Proposed Development' scenarios as 2030 is the anticipated year of the completion and opening of the Proposed Development.

Scope

- 6.17 This chapter provides a description of the methods used in the assessment. This is followed by a description of the relevant baseline conditions of the Site and surrounding area. The likely potential effects during construction and once the Proposed Development is completed and operational have been considered within the assessment. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified, or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

Assessment Methodology

- 6.18 This section outlines the methodology used to assess the likely air quality effects arising from the construction and the completed and operational Proposed Development.

Impact Areas

- 6.19 This air quality assessment has been undertaken using the following information and procedures, together with professional judgement:

- Review of NHDC's Air Quality Annual Status reports published as part of the Local Air Quality Management (LAQM) regime to determine baseline conditions around the Site;
- Determination of the likely effects of construction activities, and consideration of the environmental management controls likely to be employed during the construction phase at the Site;
- Review of the local area to identify potentially sensitive receptor locations that could be affected by changes in air quality arising from the construction works and the operation of the Proposed Development;
- Review and use of relevant traffic flow from the Applicant's transport consultant (Woods Hardwick);
- Dispersion modelling of pollutant emissions using the ADMS-Roads model^{xv} to predict the likely pollutant concentrations at the Site and surrounding area from road traffic emissions, and the likely effect of the Development on local air quality from additional traffic emissions. The latest NO_x to NO₂ Calculator available from the LAQM Support website^{xvi} has been applied to derive the road-related NO₂ concentrations from the modelled NO_x concentrations;
- Comparison of the predicted air pollutant concentrations with monitored concentrations from four SBC diffusion tubes, located on the local road network. Adjustment of the model results was then undertaken, details of which are provided in **Appendix 6.2**;
- Comparison of the predicted air pollutant concentrations with the UK Air Quality Strategy (AQS)^{xvii} objectives;
- Determination of the likely effects of the complete and operational Proposed Development on air quality, based on the application of the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) significance criteria to modelled results;
- Identification of mitigation measures, where appropriate; and
- Conclusion on the likely significant air quality effects from the Proposed Development.

- 6.20 The AQS identifies the pollutants associated with road traffic emissions and local air quality as:

- Nitrogen Oxides (NO_x);

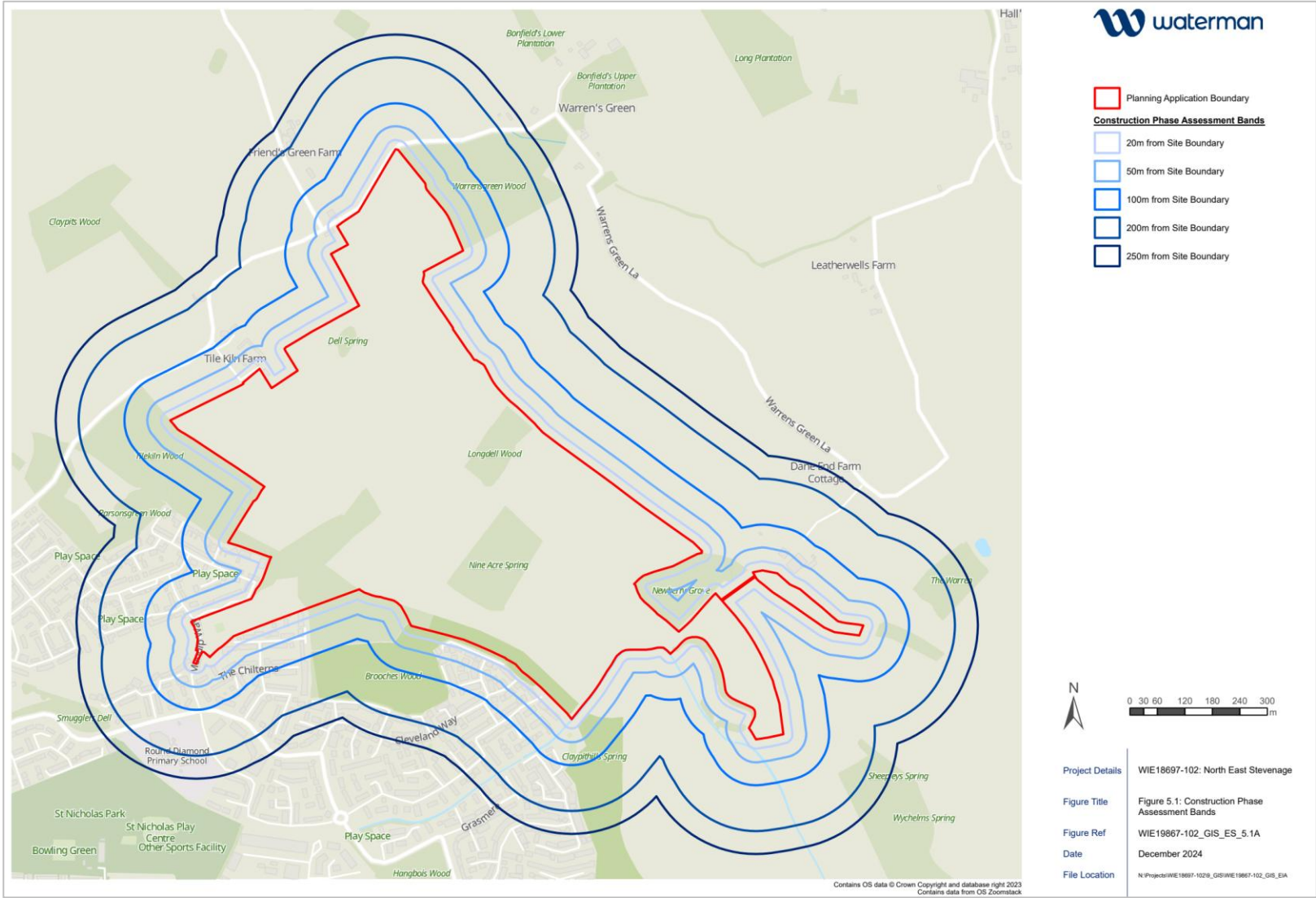
- Particulate Matter (as PM₁₀ (particles with a diameter up to 10µm) and PM_{2.5} (particles with a diameter up to 2.5µm));
 - Carbon Monoxide (CO);
 - 1, 3-Butadiene (C₄H₆); and
 - Benzene (C₆H₆).
- 6.21 Emissions of total NO_x from motor vehicle exhausts comprise Nitric Oxide (NO) and Nitrogen Dioxide (NO₂). NO oxidises in the atmosphere to form NO₂. The most significant pollutants associated with road traffic emissions, in relation to human health, are NO₂ and particulate matter (PM₁₀ and PM_{2.5}). This assessment therefore focuses on NO₂ and particulate matter (PM₁₀ and PM_{2.5}).

Construction

Dust Emissions

- 6.22 The assessment of the effects from construction activities in relation to dust emissions has been based on the IAQM's Guidance on the Assessment of Dust from Demolition and Construction (IAQM Construction guidance)^{xviii} and the following:
- Consideration of planned construction activities and their phasing; and
 - A review of the sensitive uses in the area immediately surrounding the Site.
- 6.23 The IAQM Construction guidance identifies receptors sensitive to emissions and nuisance dust from construction activities could be within 250m of the Site boundary, or within 50m of construction routes used by construction vehicles on the public highway up to 250m from the Site entrance. Professional judgment has been used to determine the number of sensitive receptors within each distance band. **Figure 6.1** shows the area surrounding the Site where sensitive receptors could potentially be affected.

Figure 6.1 Construction Phase Assessment Bands



6.24 The IAQM Construction guidance identifies the following four construction activity categories:

- Demolition – any activity involved in the removal of an existing building, including any deconstruction;
- Earthworks – the excavation, haulage, tipping and stockpiling of material. May also involve levelling the site and landscaping;
- Construction – any activity involved with the provision of a new structure; and
- Trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

6.25 The IAQM Construction guidance considers three separate dust impacts, with account being taken of the sensitivity of the area that may experience these impacts:

- Annoyance due to dust soiling;
- Potential effects on human health due to significant increase in exposure to PM10; and
- Harm to ecological receptors.

6.26 A summary of the four-step process undertaken for the construction dust assessment, as set out in the IAQM Construction guidance, is presented in **Table 6.2**.

Table 6.2: Summary of the Guidance for Undertaking a Construction Dust Assessment

Step		Description
1.	Screen the Need for a Detailed Assessment	Simple distance-based criteria are used to determine the requirement for a detailed dust assessment. An assessment will normally be required where there is: • A ‘human receptor’ within: - 250m of the boundary of the site; or - 50 m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s). • An ‘ecological receptor’ within: - 50m of the boundary of the site; or - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s) Figure 6.1: Construction Phase Assessment Bands, shows the area surrounding the Site, where sensitive receptors could be affected during the construction phase.

Step		Description
2.	Assess the Risk of Dust Impacts	The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based on two factors: - the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (STEP 2A); and - the sensitivity of the area to dust impacts (STEP 2B), which is defined as low, medium or high sensitivity. To determine the risk of impacts with no mitigation applied (STEP 2C), the dust emission magnitude (STEP 2A) is combined with the sensitivity of the area determined (STEP 2B)
3.	Site Specific Mitigation	The dust risk categories for each of the four activities determined in STEP 2C are used to define the appropriate, site-specific, mitigation measures to be adopted. Local authorities may have a Code for Construction Practice or equivalent document, that should be taken into account during the development of the mitigation measures. For the cases where the risk is 'negligible' no mitigation measures beyond those required by legislation are required
4.	Determine Significant Effects	Once the risk of dust impacts has been determined in STEP 2C and the appropriate dust mitigation measures identified in STEP 3 the final step is to determine whether there are significant effects arising from the construction phase of a proposed development. For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

6.27 Following the above, where necessary, appropriate dust and pollution measures would be provided to ensure the air quality impacts of construction are minimised and any mitigation measures employed are effective. The IAQM Construction guidance on which the approach outlined above is based, assumes that mitigation will ensure that a potential significant adverse effect will not occur, so the residual effect will normally be 'not significant'.

6.28 The potential impacts and effects of construction activities on local air quality were based on professional judgement and reference to the criteria set out in the IAQM. This includes an assessment of the risk of dust emissions and effects arising from the likely construction activities, based on the magnitude of potential dust emissions and the sensitivity of the area.

Construction Vehicle Exhaust Emissions

6.29 The IAQM Construction guidance on assessing construction effects states that:

“Experience of assessing the exhaust emissions from onsite plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant effect on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For Site plant and onsite traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur. For Site traffic on the public highway, if it cannot be scoped out (for example by using the EPUK’s criteria),, then it should be assessed using the same methodology and significance criteria as operational traffic impacts”.

- 6.30 The IAQM Construction guidance states that a detailed air quality assessment should be undertaken where there is a change in HDV movements greater than 100 AADT. The predicted number of construction vehicles is currently unknown; however, the change is not likely to exceed 100 HDV movements AADT. Additionally, the potential impacts of construction vehicles would be set out and managed within a CLP, or similar. Construction vehicle emissions would be assessed if required when the construction vehicle traffic data is known. In the absence of available traffic data, a qualitative assessment has been undertaken.
- 6.31 The qualitative assessment used the professional judgement of a technically competent assessor (refer to Assessor Experience within **Appendix 6.2**). Existing traffic flows on the surrounding road network and air quality conditions were considered when assessing the effects of construction vehicle exhaust emissions on air quality.

Construction Plant Emissions

- 6.32 Given the small contribution of emissions to local air quality, in accordance with the IAQM Construction guidance, it is considered that a quantitative assessment of the emissions from construction plant is not required, and a qualitative assessment is appropriate.

Complete and Operational Development

ADMS Model

- 6.33 The likely effect on local air quality from the traffic from the completed and operational Development has been assessed using the atmospheric dispersion model ADMS-Roads.
- 6.34 Traffic data has been provided by the Applicant’s Transport team, Woods Hardwick, and obtained from the Department for Transport (DfT) website^{xix} for use in the air quality model verification. The year 2019 has been used to assess the baseline, as this was recommended over 2022 by NHDC’s Air Quality Environmental Protection Officer.

- 6.35 The year 2030 was used for the ‘without Proposed Development’ and ‘with Proposed Development’ scenarios as 2030 is the anticipated year of the completion and opening of the Proposed Development.
- 6.36 The ADMS-Roads dispersion model predicts how emissions from roads combine with local background pollution levels, taking account of meteorological conditions, to affect local air quality. The model has been run for the completion year, using background data and vehicle emission rates for 2030 as inputs. For the verification assessment (referred to later in this Chapter), background data and vehicle emission rates for 2019 have been used. Pollutant concentrations have been modelled at locations representative of nearby sensitive receptors.
- 6.37 Full details of the dispersion modelling study, including the road traffic data used in the assessment, are presented in **Appendix 6.2**.

Model Uncertainty

- 6.38 Analyses of historical monitoring data by Defra^{xx} identified a disparity between actual measured NO_x and NO₂ concentrations and the expected decline associated with emission forecasts, which form the basis of air quality modelling as described above. In February 2020, Air Quality Consultants published a report on Performance of Defra’s Emission Factor Toolkit 2013-2019^{xi}. The report concluded that recent analysis of recent NO_x measurements provides evidence that vehicle controls are working, and as a result, the Emission Factor Toolkit (EFT) is now reflecting the rate of observed reductions. This air quality assessment has been undertaken using EFT Version 12 published by Defra, which was the latest emission factors available when the assessment was undertaken.

Background Pollutant Concentrations

- 6.39 To estimate the total concentrations due to the contribution of any other nearby sources of pollution, background pollutant concentrations need to be added to the modelled concentrations. Full details of the background pollution data used within the air quality assessment are included in **Appendix 6.2**.

Model Verification

- 6.40 Model Verification is the process of comparing monitored and modelled pollutant concentrations and, if necessary, adjusting the modelled results to reflect actual measured concentrations, to improve the accuracy of the modelling results. The model has been verified by comparing the predicted annual mean NO₂ concentrations for the baseline year of 2019, with the 2019 results from four SBC diffusion tubes located in proximity to the Site. Modelled concentrations have then been adjusted accordingly. The verification and adjustment process are described in detail in **Appendix 6.2**.

UK Air Quality Strategy Objectives

- 6.41 The Government has established a set of air quality standards and objectives to protect human health. The current AQS was published in July 2007^{xxii} and sets out the objectives for Local Planning Authorities (LPA) in undertaking their LAQM duties. The AQS objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Box 1.1 of Defra's Local Air Quality Management Technical Guidance (LAQM.TG22)^{xxiii} explains the locations where these objectives apply.
- 6.42 The European Union (EU) also sets Limit Values^{xxiv} for NO₂, PM₁₀ and PM_{2.5}, which have been adopted by the UK^{xxv}. The Limit Value concentrations for NO₂, PM₁₀ and PM_{2.5} are the same numerical levels as the AQS Objectives, but the target dates differ. Achievement of the Limit Values is a national obligation rather than a local obligation. In the UK, only monitoring and modelling carried out by Defra and Central Government meets the specification required to assess compliance with the Limit Values. Further, Defra and Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the Limit Values being exceeded. As such the Limit Values have not been considered further in this chapter.
- 6.43 The AQS objectives in relation to air pollutants relevant to this assessment are summarised in **Table 6.3**.

Table 6.3: National Air Quality Strategy Objectives

Pollutant	Objective		Date by Which Objective is to be Met
	Concentration	Measured As	
Nitrogen Dioxide (NO ₂)	200µg/m ³	1 hour mean not to be exceeded more than 18 times per year	31/12/2005
	40µg/m ³	Annual Mean	31/12/2005
Particulate Matter (PM ₁₀) (a)	50µg/m ³	24 hour mean not to be exceeded more than 35 times per year	31/12/2004
	40µg/m ³	Annual Mean	31/12/2004
Particulate Matter (PM _{2.5}) (b)	Target of 15% reduction in concentrations at urban background locations	Annual Mean	Between 2010 and 2020
	25µg/m ³	Annual Mean	01/01/2020

Notes: (a) Particulate matter with a mean aerodynamic diameter less than 10 microns (or micrometres – µm)

(b) Particulate matter with a mean aerodynamic diameter less than 2.5 microns

Significance Criteria

- 6.44 The scale attributed to each effect has been determined based on the sensitivity of the receptor and magnitude of impact arising as a result of the Proposed Development. Professional judgement and experience have been drawn upon to assess the scale and significance.

Receptors and Receptor Sensitivity

- 6.45 For the air quality assessment, the sensitivity of all receptors were evaluated as being high. The receptors and the definition of sensitivity of a receptor is based on a scale set out in **Table 6.4**.

Table 6.4: Receptor Sensitivity Description

Value (Sensitivity)	Description
High	Residential, Schools, Hospitals, Care Homes
Medium	Office, Shop, Site of Special Scientific Interest (SSSI)
Low	Local Nature Reserves, Ancient Woodlands
No Impact	N/A

Construction

- 6.46 The construction assessment does not consider individual selected receptors. All sensitive receptors within 250m of the Site boundary or within 50m of the routes used by construction vehicles on the public highway up to 250m from Site entrances have been considered.

Complete and Operational Development

- 6.47 For the complete and operational Proposed Development assessments, a selection of existing high sensitivity receptors have been identified. The existing receptors were selected due to their proximity to the local road network and considered to be exposed to the current worst-case air quality conditions.
- 6.48 The Proposed Development would introduce new high sensitivity residential and school receptors. The future receptors were also identified due to their proximity to the road network and considered to be the receptors most likely to be exposed to poor air quality.

Magnitude of Impact

Construction

Dust Emissions

- 6.49 The potential effects of the construction on local air quality were based on professional judgement and with reference to the criteria set out in the IAQM Construction guidance. Appropriate mitigation that would be implemented to minimise any adverse effects on air quality was also considered.
- 6.50 The assessment of the risk of dust effects arising from the likely construction activities, as identified by the IAQM's Construction guidance, is based on the magnitude of potential dust emissions and the sensitivity of the area. The risk category matrix for construction activity types, taken from the IAQM Construction guidance, are presented in **Table 6.5** to **Table 6.8**.

Table 6.5: Risk Category from Demolition Activities

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

Table 6.6: Risk Category from Earthworks Activities

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

Table 6.7: Risk Category from Construction Activities

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

Table 6.8: Risk Category from Trackout Activities

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

- 6.51 The risk category determined for each construction activity type is used to define the appropriate mitigation measures that should be applied. The IAQM recommends significance is only assigned to the effect after considering mitigation and assumes all actions to avoid or reduce the effects are inherent within the design of the Proposed Development. In the case of construction mitigation, this would be secured through planning conditions, legal requirements or required by regulations. Therefore, in this assessment no significance is identified for the pre-mitigation effects of the construction activities.

- 6.52 **Figure 6.1:** Construction Phase Assessment Bands shows the area surrounding the Site, where existing sensitive receptors could be affected during construction.

Complete and Operational Development

- 6.53 The EPUK/IAQM guidance provides an approach to assigning the magnitude of changes because of a development as a proportion of a relevant assessment level, followed by an examination of this change in the context of the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations.
- 6.54 **Table 6.9** presents the IAQM framework for describing the impacts (the change in concentration of an air pollutant) at individual receptors. The term Air Quality Assessment Level (AQAL) is used to include air quality objectives or limit values, where these exist.

Table 6.9: Impact Descriptors for Individual Receptors for Annual Mean Objective

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Minor	Moderate	Moderate	Major
103-109% of AQAL	Moderate	Moderate	Major	Major
110% or more of AQAL	Moderate	Major	Major	Major

Note: AQAL may be an air quality objective, EU limit value, or an Environment Agency 'Environmental Assessment Level (EAL)'

The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers. Changes of 0% (i.e. less than 0.5%) are described as negligible.

The table is only to be used with annual mean concentrations

- 6.55 The approach set out in the EPUK / IAQM guidance provides a method for describing the impact magnitude at individual receptors only. The guidance outlines that this change may have an effect on the receptor depending on the severity of the impact and other factors that may need to be considered. The assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect. However, whilst there may be 'minor', 'moderate' or 'major' impacts described at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

Assessing Significance

- 6.56 Effects classified as major or moderate are considered 'significant'. Effects classified as minor or negligible in scale are considered 'not significant'.

Construction

Dust Emissions

- 6.57 The potential effects of dust emissions arising from construction activities on local air quality are based on professional judgement and with reference to the criteria set out in the IAQM Construction guidance. Appropriate mitigation that would be implemented to minimise any adverse effects on air quality were also considered. Details of the assessors' experience and competence to undertake the dust assessment is provided in **Appendix 6.2**. The IAQM outlines that experience of implementing mitigation measures for construction activities demonstrates that total mitigation is normally possible, such that residual effects would not be 'significant'. As noted above, such mitigation would be secured through planning conditions, legal requirements or required by regulations. Therefore, it follows that, within this assessment, no post-mitigation matrix of scale/nature of effect and thus significance criteria is provided for the likely residual effects from the construction phase.
- 6.58 The geographic extent of effects of dust emissions arising from the construction phase of the Proposed Development are expected to be limited to within 250m of the Site boundary. Beyond this threshold, the IAQM Construction guidance advises effects will be 'not significant'. When considering trackout movements, effects are possible where there are receptors within 50m of a road edge or 250m from the Site entrance. The spatial extent is therefore classified as 'local' since the effects may extend beyond the vicinity of the Site and its immediate neighbours.

Construction vehicle Emissions

- 6.59 A change of less than 100 HDV AADT movements is not considered significant in the IAQM Construction guidance and does not require a detailed assessment. The IAQM Construction guidance also states that is not possible to be prescriptive on how to assess the impacts for individual sites. Professional judgment, by a technically competent assessor is therefore required. The significance of the effects of construction vehicle exhaust emissions is based on professional judgement.

Construction Plant Emissions

- 6.60 The significance of the effects of construction plant emissions on air quality is also based on professional judgement.
- 6.61 Effects generated as a result of the construction phase are classed as 'temporary'.

Completed Development

- 6.62 Following the approach to assessing significance outlined in the EPUK/IAQM guidance, the significance of likely effects of the complete and operational Proposed Development on air quality has been established through professional judgement and the consideration of the following factors:

- The geographical extent (local, city-wide or regional) or effects;
- Their duration (effects resulting from the completed Proposed Development are classed as 'long-term' effects);
- Their reversibility (reversible or permanent);
- The magnitude of changes in pollution concentrations;
- The exceedance of standards (e.g. AQS objectives); and
- Changes in pollutant exposure

Limitations and Assumptions

- 6.63 Due to the COVID-19 pandemic, 2020 and 2021 monitoring data was not considered representative of baseline air quality conditions at and surrounding the Site. Baseline data from 2019 has been used in the assessment as it was considered more representative than 2022 and was recommended by NHDC.
- 6.64 For the purposes of the dust emissions assessment during construction, it was assumed activities would be carried out at the Site boundary to provide a worst-case assessment.
- 6.65 The predicted number of construction vehicles is currently unknown; however, the potential impacts of construction vehicles would be set out and managed within a CLP, or similar. Construction vehicle emissions would be assessed if required when the construction vehicle traffic data is known. In the absence of available traffic data, a qualitative assessment has been undertaken.
- 6.66 For the purposes of modelling, traffic data for the relevant local road network was provided by the Applicant's transport consultant, Woods Hardwick, and the DfT website for use in the air quality model verification. The year 2019 has been used to assess the baseline as it was considered more representative than 2022 and was recommended by NHDC.
- 6.67 There is no standard or recognised methodology to predict the reduction in pollutant concentrations from all air quality mitigation measures or measures likely to have a positive impact on local air quality (such as cycle spaces, electric charging points, sustainable transport options, green infrastructure, etc.) as these measures are either based on holistic behavioural changes and/or there is a lack of real-world quantifiable data (in $\mu\text{g}/\text{m}^3$). To demonstrate ways in which the Proposed Development has a positive influence on air quality, a summary of measures which are likely to lead to a benefit to air quality have been outlined in the '*Mitigation Measures*' section below.

Baseline Conditions

Establishing Baseline Conditions

- 6.68 To establish baseline conditions at and around the Site, information has been taken from a review of NHDC's Air Quality Annual Status Reports^{xxvi}, published as part of the LAQM regime. This includes a review of NHDC's monitoring data.

Baseline Conditions

North Hertfordshire District Council Review and Assessment Process

- 6.69 NHDC has declared two Air Quality Management Areas (AQMAs) for annual mean nitrogen dioxide (NO₂). The two AQMA's are:
- NHDC Air Quality Management Order No.1 2012: an area encompassing located approximately 6.6km north-west of the Site; and
 - NHDC Air Quality Management Order No.2 2016 – Paynes Park Roundabout, located approximately 7.5km north-west of the Site.

North Hertfordshire District Council Local Monitoring

- 6.70 Monitoring data for 2020 and 2021 were not considered representative of normal baseline conditions due to the COVID-19 pandemic. 2023 data was not publicly available at the time of writing. NHDC 2020, 2021 and 2023 monitoring data has therefore not been considered within this chapter.
- 6.71 In 2022, NHDC undertook monitoring of NO₂, PM₁₀ and PM_{2.5} at two automatic monitors. Details of the automatic monitors are presented below:
- Stevenage Road NO_x (NH1) roadside monitor, located approximately 7.1km west of the Site, measuring NO₂; and
 - Stevenage Road PM (NH2) roadside monitor located approximately 7.1km west of the Site, measuring PM₁₀ and PM_{2.5}.

- 6.72 The latest results for the two NHDC automatic monitors are presented in **Table 6.10**.

Table 6.10: Measured Concentrations at NHDC Automatic Monitors

ID	Pollutant	Averaging Period	AQS Objective	2018	2019	2022
NH1	NO ₂	Annual Mean (µg/m ³)	40µg/m ³	44.0	45.0	31
		1-Hour Mean (No. of Hours)	200µg/m ³ not to be exceeded more than 18 times a year	0	0	0

NH2	PM ₁₀	Annual Mean (µg/m ³)	40µg/m ³	21.5	20.4	18.5
		24-Hour Mean (No. of Days)	50µg/m ³ not to be exceeded more than 35 times a year	1	5	4
	PM _{2.5}	Annual Mean	25µg/m ³	10.0	8.4	8.1

Notes: Data obtained from the 2021 AND 2023 North Hertfordshire District Council Air Quality Annual Status Reports
Exceedances of the AQS Objectives are shown in bold text

6.73 The monitoring results in **Table 6.10** show all AQS objectives were met in 2022. The annual mean NO₂ objective was exceeded at the NH1 monitor from 2018 to 2019. All other AQS objectives were met at both monitors from 2018 to 2022.

6.74 In 2022, NHDC also measured annual mean NO₂ concentrations at 45 locations using diffusion tubes. **Table 6.11** presents the results from the ten diffusion tubes within 6.5km of the Site.

Table 6.11: Annual Mean NO₂ Monitored Concentrations at the NHDC Diffusion Tubes within 6.5km

Site ID	Address	Classification	Approximate Distance to Site Centre (km)	Annual Mean NO ₂ Concentrations (µg/m ³)		
				2018	2019	2022
NH133	George & Dragon, High Street, Graveley	Roadside	3.1	-	18.2	14.5
NH134	6 Bucks Head Cottages, Stevenage Rd, L. Wymondley	Roadside	4.7	-	18.6	14.5
NH121	1 Hadrians Way, Baldock	Roadside	6.2	23.8	20.9	16.9
NH61	(NH53a) Whitehorse Street, Baldock (nr town hall)	Roadside	6.3	27.2	26.8	26.5
NH88	Church St, Baldock (Opp. Town Hall)	Kerbside	6.3	34.7	35.7	25.6

NH72	Opp Rose Crown, Whitehorse Street, Baldock	Roadside	6.4	27.5	26.8	21.5
NH59	(NH04a) Clothall Road, Baldock	Roadside	6.5	26.2	23.4	19.7
NH123	Dunkerley Ct, LGC	Roadside	6.5	19.0	19.0	19.7
NH130	Opp Old White Horse, Station Rd, Baldock	Roadside	6.5	-	30.7	No data
NH122	29 Hopewell Rd, Baldock	Roadside	6.5	21.0	19.6	No data

Notes: Data obtained from the North Hertfordshire District Council's 2021 and 2023 Air Quality Annual Status Reports
Exceedances of the AQS objectives shown in **bold**

- 6.75 **Table 6.11** indicates the annual mean NO₂ objective of 40µg/m³ was not exceeded at any diffusion tube within 6.5km of the Site from 2018 to 2022. Annual mean NO₂ concentrations decreased from 2018 to 2022 at all NHDC diffusion tubes, where monitoring data was available.

Stevenage Borough Council Local Monitoring

- 6.76 At its nearest point, the Site is located within approximately 20m of SBC's administrative boundary. Monitoring data for 2020 and 2021 were not considered representative of normal baseline conditions due to the COVID-19 pandemic. 2023 data was not publicly available at the time of writing. SBC 2020, 2021 and 2023 monitoring data has therefore not been considered within this chapter
- 6.77 In 2022 SBC undertook NO₂ and PM_{2.5} monitoring at the St Georges Way (AQMS 2) roadside automatic monitor, located approximately 4.2km southwest of the Site. The results for the St Georges Way (AQMS 2) automatic monitor are presented in **Table 6.12**.

Table 6.12: Measured Concentrations at SBC's St George's Way Automatic Monitor

Pollutant	Averaging Period	AQS Objective	2018	2019	2022
NO ₂	Annual Mean (µg/m ³)	40µg/m ³	28.0	25.0	19.5
	1-Hour Mean (No. of Hours)	200µg/m ³ not to be exceeded more than 18 times a year	0	1	0
PM _{2.5}	Annual Mean (µg/m ³)	25µg/m ³	9.0	9.0	8.8

Source: Data obtained from Stevenage Borough Council's 2021 Air Quality Annual Status Report^{xxvii}

- 6.78 The monitoring results in **Table 5.12** indicate no exceedances of the AQS objectives were recorded from 2018 to 2022.

- 6.79 Additionally, SBC undertook NO₂ diffusion tube monitoring at 27 locations in 2022. The results for the 15 NO₂ diffusion tubes within 4km from the centre of the Site are presented in **Table 6.13**.

Table 6.13: Measured Concentrations at SBC diffusion tubes within 4km of Site

Site ID	Address	Classification	Approximate Distance to Site Centre (km)	Annual Mean NO ₂ Concentrations (µg/m ³)		
				2018	2019	2022
4	Bedwell Crescent	Kerbside	1.2	19.8	19.5	16.0
24	Martins Way	Kerbside	1.4	31.4	30.3	22.9
26	Vardon Road	Roadside	2.7	21	21.2	17.6
28	Chells Way	Roadside	3.0	22.4	22.2	17.4
34	A602/A1(M)Junction 7	Kerbside	3.1	49.5	50.7	36.8
13	Whitney Drive	Suburban	3.6	21.2	21.1	16.8
23	Hitchin Road – Longfield	Roadside	3.6	33.5	33.1	24.2
18	Fairlands Valley Park	Background	3.7	14.5	14.3	11.1
19	7 Tates Way	Roadside	3.7	35.1	31.9	27.1
17	Hitchin Road	Roadside	3.7	42.2	42.7	32.9
7	High Street	Roadside	3.7	30.5	29.5	22.8
21	13 Hitchin Road	Roadside	3.7	24.3	23.2	18.4
3	Monks View	Suburban	3.8	18.7	20.9	16.7
38	High Street – Costa	Roadside	3.9	-	26.6	20.4
39	High Street – Bike Stop	Roadside	4.0	-	27.2	22.5

Notes: Data obtained from the SBC Annual Status Report for 2021
Exceedances of the AQS Objectives shown in bold text

- 6.80 **Table 6.11** indicates the annual mean NO₂ objective of 40µg/m³ was not exceeded at any diffusion tube within 4km of the Site in 2022. The annual mean NO₂ objective of 40µg/m³ was exceeded at diffusion tubes 34 and 17 in 2018 and to 2019 where data is available. The annual mean NO₂ AQS objective of 40µg/m³ was met at all other SBC diffusion tubes between 2018 and 2022 where data is available.

Receptors

- 6.81 A list of existing and future high sensitivity receptors for the operational phase of the Proposed Development is included in **Table 6.14** and presented in **Figure 6.2**.

Table 6.14: Existing and Future Sensitive Receptors

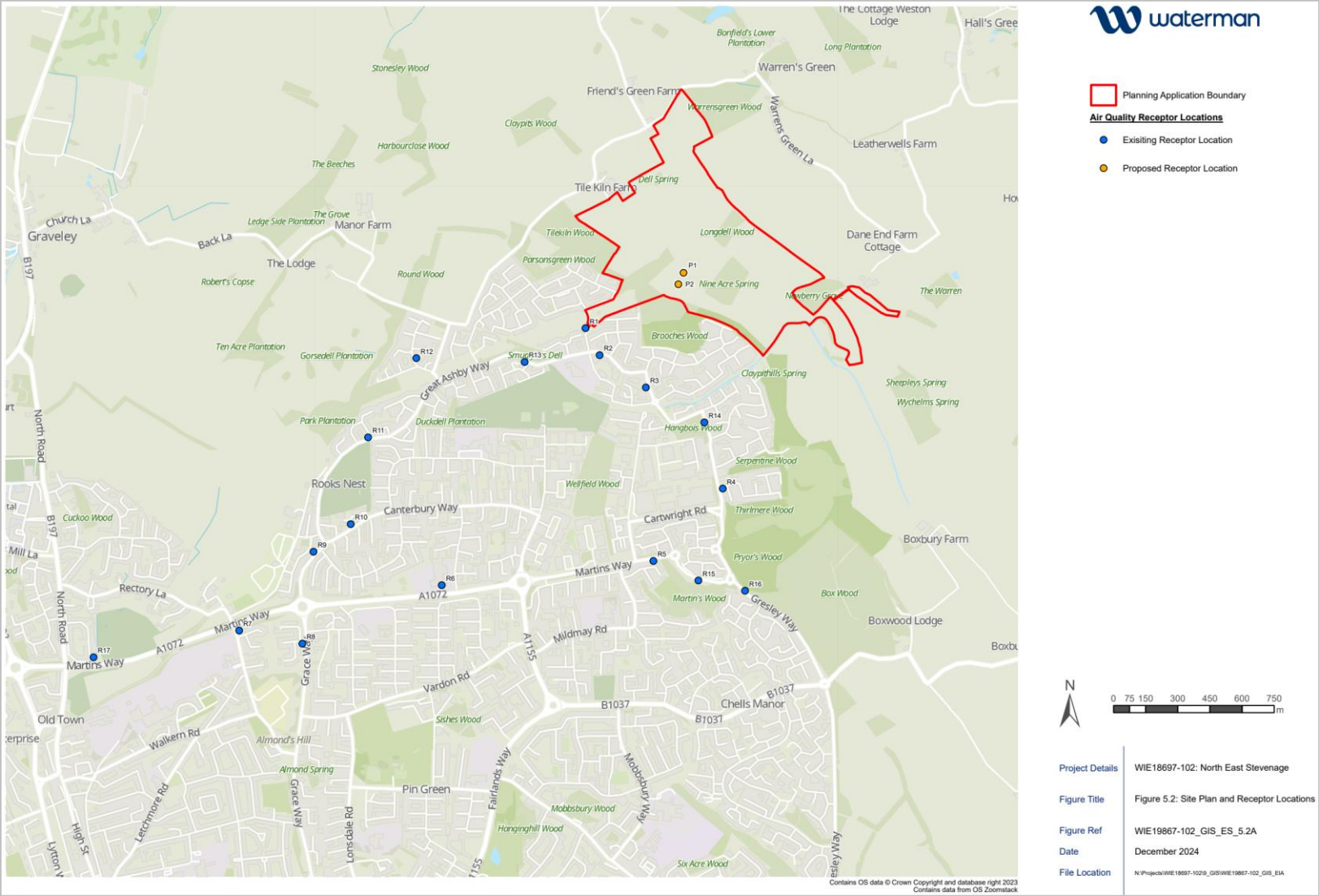
Receptor	Location (X, Y)	Height
Existing Receptors		

Receptor		Location (X, Y)		Height
R1	42 The Beacons	525739	227461	0
R2	Busy Bees Nursery	525805	227335	0
R3	95 Great Ashby Way	526021	227184	0
R4	30 Ullswater Close	526380	226712	0
R5	39 Ascot Crescent	526056	226374	0
R6	Giles Junior School	525068	226261	0
R7	1 Trafford Close	524122	226049	0
R8	25 Trent Close	524417	225988	0
R9	5 St Albans Drive	524469	226417	0
R10	3 Iona Close	524643	226546	0
R11	28 St Davids Close	524724	226951	0
R12	6 Orwell Avenue	524949	227321	0
R13	90 Cherwell Drive	525455	227303	0
R14	Hangbois Wood	526294	227021	0
R15	Martins Wood	526266	226283	0
R16	Box Wood	526484	226235	0
R17	69 Burymead	523442	225924	0
Future Receptors				
P1	Northwest of the Site	526196.68	227719.5	0
P2	Southwest of the Site	526172.54	227665.9	0

Future Baseline

- 6.82 It is predicted baseline NO₂ concentrations will decrease in the future after the UK Government's announcement (in September 2023) that new diesel or petrol vehicles will not be sold in the UK from 2035. A general reduction in NO₂ concentrations is already evident in recent years as shown by the monitoring results in **Tables 6.10 to 6.13**.

Figure 6.2 Site Plan and Receptor Locations



Assessment of Effects (Construction and Operational)

Environmental Design and Management

- 6.83 Embedded mitigation measures included within the design of the Proposed Development include:
- Location of sensitive residential and school receptors away from heavily trafficked roads and localised sources of air pollution;
 - Provision of cycle spaces in line with NHDC's parking standards
 - Provision of parking spaces with electric charging infrastructure in line with NHDC's parking standards;
 - Provision of new pedestrian and cycle paths aimed to promote walking, cycling and the use of public transport; and
 - Public and private landscaping including public and private amenity space provided throughout the Proposed Development with an integration of a mix of trees, mass planting and lawn areas.

Effects During Construction

Dust Emissions

- 6.84 The following dust assessment follows the methodology set out in **Table 6.2** and **Table 6.5** to **Table 6.8**.

Site Evaluation/ Screen the Need

- 6.85 The Proposed Development is in a predominantly residential and agricultural area, with the nearest high sensitivity residential receptors located along Merrick Close adjacent to the northwestern boundary of the Site and along Cleveland Way located approximately 50m from the Site. There are additional existing residential receptors within 250m of the boundary of the Site and within 50m of the routes that would be used by construction vehicles on the public highway up to 250m from the Site entrances. Additionally, Brooches Wood Ancient and Semi-Natural Woodland is adjacent to the western boundary of the Site.
- 6.86 It is acknowledged future residential and school users would be present whilst the phased construction of the Proposed Development is undertaken. These highly sensitive receptors have been considered when undertaking the construction assessment.
- 6.87 Therefore, in accordance with **Table 6.2** the dust emissions assessment would proceed to a detailed assessment.

Potential Dust Emission Magnitude

6.88 The risk of dust impacts from the construction phase has been considered based upon the magnitude of works as detailed in the IAQM guidance on construction dust. This includes:

- Demolition – the Site is currently in agricultural use and there are no structures present on site. As a result, demolition is not due to take place and has not been considered further.
- Earthworks – the Site area is 62.9ha (629,000m²). Based on the size and considering the other criteria in Step 2A of the IAQM guidance, the potential dust emissions during earthworks activities would be of large magnitude;
- Construction - the total volume of buildings to be constructed would exceed 75,000m³. Based on the total volume and considering the other criteria in Step 2A of the IAQM guidance, the potential dust emissions during construction activities would be of large magnitude; and
- Trackout - the number of HDV's could peak above 50 movements a day during the peak construction period. Therefore, considering the criteria in Step 2 of the IAQM guidance the potential for dust emissions due to trackout activities would be of large magnitude.

6.89 A summary of the potential dust emission magnitude is presented in **Table 6.15**.

Table 6.15: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Earthworks	Large
Construction	Large
Trackout	Large

Sensitivity of the Area

6.90 The sensitivity of the area to each main activity set out above has been assessed based on the number and distance of the nearest sensitive receptors to the activity, and the sensitivity of these receptors to dust soiling and human health.

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

6.91 There are estimated to be 10-100 high sensitivity residential receptors within 20m of the Site boundary. On this basis (as set out in Table 2 of the IAQM guidance), given there are estimated to be 10-100 high sensitivity receptors within 20m of the Site boundary, it is considered the area would be of **high sensitivity** to dust soiling effects on people and property.

Sensitivity of the Area to Human Health Impacts

6.92 The Defra background annual mean PM₁₀ concentration for the grid squares covering the Site (525500, 227500, 526500, 227500 and 527500, 227500) was 15.4µg/m³, 15.1 µg/m³ and 14.8 µg/m³ respectively in 2019. This is below the annual mean AQS objective for PM₁₀ of 40ug/m³. Based on

Table 3 of the IAQM guidance and as there are estimated to be 10-100 high sensitivity receptors within 20m of the Proposed Development, it is considered the area is of **low sensitivity** to human health impacts.

Sensitivity of the Area to Ecological Impacts

- 6.93 The Brooches Wood Ancient and Semi-Natural Woodland is adjacent to the western boundary of the Site and is considered to have a **low sensitivity** to ecological impacts (please refer to **Appendix 6.5**).

Risk of Impacts

- 6.94 Based on the dust emissions magnitude as set out in **Table 6.2** and taking into account the sensitivity of the area, the overall risk impacts during the construction of the Proposed Development have been identified and presented in **Table 6.16**. This is based on the matrices set out in **Table 6.5** to **Table 6.8**. The predicted risks are prior to, and do not take account of, mitigation applied.

Table 6.16: Summary of Risk

Potential Effect	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Low Risk	Low Risk

- 6.95 As outlined in **Table 6.16** the Site is high-risk due to dust soiling and Low risk for human health effects. In accordance with the IAQM guidance, the Site would overall be considered high risk for dust impacts. Therefore, site specific mitigation measures are required to ensure that adverse impacts on existing receptors would be minimised, reduced and, where possible, eliminated.

Construction Vehicle Emissions

- 6.96 The number of HDV's could peak above 50 outward movements a day during the peak construction period. Considering the sensitivity of the surrounding residential area and increased traffic, it is considered the potential impact of construction vehicles on air quality could result in a direct, temporary, adverse, short term, local effect of **minor significance** during the construction phase.

Construction Plant Emissions

- 6.97 Emissions from plant operating on the Site during construction, would be small in comparison to existing background concentrations. It is therefore considered the likely effect on local air quality would be **Negligible (Not Significant)**.

Effects Once the Proposed Development is Operational

- 6.98 Potential effects on local air quality associated with the Proposed Development would likely result from changes to road traffic flows or vehicle emissions associated with the operational Proposed Development. **Table 6.17** and **Table 6.18** present the predicted worst-case concentrations at relevant existing and future receptors with the complete and operational Proposed Development.

Nitrogen Dioxide Concentrations

- 6.99 **Table 6.17** presents the predicted NO₂ concentrations, assuming a progressive reduction in forecast emission rates and background concentrations from 2019 to 2030.

Table 6.17: NO₂ Results of ADMS Modelling at Sensitive Receptors

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			
	2019 Baseline	2030 Without Development	2030 With Development	2030 Change
Existing Receptors				
R1	16.6	11.1	13.2	2.1
R2	17.3	11.2	11.8	0.6
R3	17.0	11.3	11.6	0.3
R4	17.3	11.7	11.9	0.2
R5	17.8	11.8	11.8	0.0
R6	16.5	11.0	11.1	0.1
R7	18.6	11.2	11.4	0.2
R8	20.2	11.9	12.1	0.2
R9	25.5	13.4	14.5	1.1
R10	22.2	12.4	13.2	0.8
R11	21.5	12.1	14.1	2.0
R12	16.8	11.1	11.5	0.4
R13	17.4	11.2	12.1	0.9
R14	17.9	11.6	11.9	0.3
R15	18.3	12.0	12.0	0.0
R16	30.9	15.9	16.4	0.5
R17	22.4	11.9	12.2	0.3
Future Receptors				
P1	-	-	11.9	-
P2	-	-	12.8	-

- 6.100 The results in **Table 6.17** indicate the annual mean NO₂ AQS objective is predicted to be met at all the existing and proposed sensitive receptors in all years. The highest concentration of 30.9µg/m³ is predicted at Receptor 16 in 2019.
- 6.101 The 1-hour mean AQS objective for NO₂ is unlikely to be exceeded at a roadside location where the annual mean NO₂ concentration is less than 60µg/m³. As shown in **Table 6.17**, the predicted annual mean NO₂ concentrations in 2019, and in 2030 both 'without Proposed Development' and 'with Proposed Development' scenarios were below 60µg/m³ at all receptors modelled. It is therefore likely the 1-hour mean objective would be met at all sensitive receptors.
- 6.102 Using the impact descriptors outlined in **Table 6.9**, the Proposed Development is predicted to result in a 'negligible' impact at all 17 existing receptors. Using professional judgement, based on the severity of the impact and the concentrations predicted at the sensitive receptors, it is considered the effect of the Proposed Development on NO₂ concentrations would be **Negligible (Not Significant)** at all existing sensitive receptors.

Particulate Matter (PM₁₀ and PM_{2.5}) Concentrations

- 6.103 **Table 6.18** presents the predicted PM₁₀ and PM_{2.5} concentrations.

Table 6.18: PM₁₀ and PM_{2.5} Results of ADMS Modelling at Sensitive Receptors

Receptor ID	PM ₁₀ Annual Mean (µg/m ³)				PM ₁₀ Number of Days >50 µg/m ³				PM _{2.5} Annual Mean (µg/m ³)			
	2019 Baseline	2030 Without Development	2030 With Development	2030 Change	2019 Baseline	2030 Without Development	2030 With Development	2030 Change	2019 Baseline	2030 Without Development	2030 With Development	2030 Change
Existing Receptors												
R1	15.8	14.7	16.1	1.4	0	0	0	0	10.1	9.2	9.9	0.7
R2	15.9	14.7	15.1	0.4	0	0	0	0	10.2	9.2	9.4	0.2
R3	15.7	14.4	14.6	0.2	0	0	0	0	10.0	9.1	9.1	0.0
R4	15.1	13.9	14.0	0.1	0	0	0	0	10.1	9.1	9.2	0.1
R5	15.2	13.9	13.9	0.0	0	0	0	0	10.1	9.1	9.1	0.0
R6	15.2	14.0	14.0	0.0	0	0	0	0	10.2	9.3	9.3	0.0
R7	15.9	14.6	14.7	0.1	0	0	0	0	10.4	9.4	9.4	0.0
R8	16.0	14.7	14.8	0.1	0	0	0	0	10.7	9.6	9.7	0.1

R9	17.5	16.1	16.9	0.8	0	0	0	0	11.2	10.1	10.5	0.4
R10	16.8	15.5	16.0	0.5	0	0	0	0	10.9	9.8	10.1	0.3
R11	16.6	15.3	16.7	1.4	0	0	0	0	10.8	9.7	10.5	0.8
R12	15.9	14.8	15.1	0.3	0	0	0	0	10.0	9.1	9.3	0.2
R13	16.0	14.8	15.4	0.6	0	0	0	0	10.2	9.2	9.5	0.3
R14	15.9	14.6	14.8	0.2	0	0	0	0	10.1	9.1	9.2	0.1
R15	15.3	14.0	14.0	0.0	0	0	0	0	10.2	9.1	9.2	0.1
R16	17.9	16.4	16.7	0.3	1	0	0	0	11.7	10.4	10.6	0.2
R17	16.8	15.2	15.4	0.2	0	0	0	0	11.1	9.9	10.0	0.1
Future Receptors												
P1	-	-	14.8	-	-	-	-	-	-	-	9.2	-
P2	-	-	15.4	-	-	-	-	-	-	-	9.5	-

- 6.104 As shown in **Table 6.18**, the annual mean concentrations of PM₁₀ are predicted to be below the objective of 40µg/m³ in 2019 and in 2030, for both 'without Proposed Development' and 'with Proposed Development' scenarios, at all sensitive receptors modelled. The maximum predicted concentration is 17.9µg/m³ at Receptor 16 in 2019.
- 6.105 Using the impact descriptors outlined in **Table 6.9**, the Proposed Development is predicted to result in a 'negligible' impact on annual mean PM₁₀ concentrations at all existing sensitive receptors.
- 6.106 The results in **Table 6.18** indicate that in 2019 and in 2030, both 'without Proposed Development' and 'with Proposed Development' scenarios, all sensitive receptors are predicted to be below the 24-hour mean PM₁₀ objective value of 35 days exceeding 50µg/m³.
- 6.107 The results in **Table 6.18** indicate that in 2019 and 2030, both 'without Proposed Development' and 'with Proposed Development' scenarios, all sensitive receptors are predicted to be below the annual mean PM_{2.5} objective value of 25µg/m³. The maximum predicted concentration is 11.8µg/m³ at Receptor 16 in 2019.
- 6.108 Using the impact descriptors outlined in **Table 6.9**, the Proposed Development is predicted to result in a 'negligible' impact on annual mean PM_{2.5} concentrations at all existing sensitive receptors.
- 6.109 From the results in **Table 6.9** and based on the reduction in the annual mean PM_{2.5} concentration at the NHDC NH2 automatic monitor of 1.9µg/m³ from 2018 to 2022, it is predicted that all receptors would have annual mean PM_{2.5} concentrations less than 10 µg/m³ by the end of 31st December 2040. The Development would therefore be compliant with the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023.

- 6.110 Using professional judgement, based on the severity of the impact and the concentrations predicted at the sensitive receptors, it is considered the effect of the Proposed Development on PM₁₀ and PM_{2.5} concentrations would be **Negligible (Not Significant)** at all sensitive receptors.

Conditions within the Proposed Development

- 6.111 As shown by the results in **Tables 6.17** and **6.18**, the predicted NO₂, PM₁₀ and PM_{2.5} concentrations for locations within the Proposed Development (receptors P1 and P2) are below the relevant objectives in 2030. As such it is considered that the effect of introducing residential and school uses to the Proposed Development would be **Negligible (Not Significant)**.

Mitigation Measures

Mitigation During Construction

Nuisance Dust

- 6.112 The Site is a high-risk site in relation to nuisance dust emissions (referred to earlier in this ES chapter). Consequently, a range of environmental management controls would be developed with reference to the IAQM guidance for high-risk sites. The mitigation measures will be included within a Construction Environment Management Plan (CEMP), accompanying the planning application / secured by condition, and implemented to prevent the release of dust entering the atmosphere and/or being deposited on nearby receptors.
- 6.113 Mitigation measures for high-risk sites detailed within the IAQM Construction guidance are categorised into categories. Control measures include:
- Site management – stakeholder engagement and site inspections;
 - Preparing and maintaining the site – installation of green infrastructure and measures to deal with spillages;
 - Operating vehicle/machinery and sustainable travel – reducing vehicle idling and construction logistics plans;
 - Operations – measures to reduce effects of cutting, grinding and sawing, and mobile crushing plant; and
 - Waste Management – prevent burning of materials on site and provision of a waste or recycling plan.
- 6.114 The Site is a high-risk site, due to dust soiling. Monitoring of PM₁₀ using real-time automatic monitors may be required. The monitoring requirements would be set out in the CEMP and agreed with NHDC.

- 6.115 Mitigation measures are routinely and successfully applied to construction projects throughout the UK and are proven to significantly reduce the potential for adverse nuisance dust effects associated with the various stages of the construction work.

Construction Vehicle Exhaust Emissions

- 6.116 All construction traffic logistics would be agreed with NHDC within a CLP or similar. Consideration would also be given to the avoidance, or limited use, of traffic routes in proximity to sensitive uses (i.e., residential roads etc.) and the avoidance, or limited use, of roads during peak hours, where practicable.

Construction Plant Emissions

- 6.117 None Required.

Mitigation Once the Proposed Development is Operational

- 6.118 It has been demonstrated the likely effect of the completed and operational Proposed Development on local air quality at all existing and future receptors would be Negligible (Not Significant). Accordingly, no mitigation would be required.
- 6.119 Sensitive receptors within the Proposed Development are not predicted to exceed NO₂, PM₁₀ and PM_{2.5} AQS objectives as a result of traffic emissions associated with the complete and operation of the Proposed Development. The Site is therefore considered suitable for residential and school use.

Residual Effects and Monitoring

- 6.120 The residual effects arising from the Proposed Development are summarised in **Table 6.19** below.

Table 6.19: Summary of Residual Effects

Effect	Receptor (Sensitivity)	Nature of Effect and Geographic Scale	Magnitude of Impact*	Classification of Effect (Statement of Significance BEFORE mitigation)	Mitigation and Monitoring	Residual Effect
Construction Effects						
Dust Emissions	All existing and future receptors (High)	Local	High Adverse - Negligible	Short-term, local effects of major adverse significance at receptors within 20m from the Proposed Development; Short-term, local effects of moderate adverse significance at receptors between 20m and 100m of the Proposed Development; Short-term, local effects of minor adverse significance at receptors between 100m and 250m of the Proposed Development; and Negligible effects at receptors over 250m from the Proposed Development.	Refer to IAQM for high-risk sites. A CEMP would be implemented. Mitigation measures are routinely and successfully applied to construction projects throughout the UK and are proven to significantly reduce the potential for adverse nuisance dust effects associated with the various stages of the construction work.	Negligible (Not Significant)

Effect	Receptor (Sensitivity)	Nature of Effect and Geographic Scale	Magnitude of Impact*	Classification of Effect (Statement of Significance BEFORE mitigation)	Mitigation and Monitoring	Residual Effect
Construction Vehicle Emissions	All existing and future receptors (High)	Local	Minor	Not Significant	Construction traffic logistics would be agreed with NHDC and set out in a CLP. Where practicable – avoidance, or limited use of roads during peak hours.	Negligible (Not Significant)
Construction Plant Emissions	All existing and future receptors (High)	Local	Negligible	Not Significant	None Required	Negligible (Not Significant)
Operational Effects						
Nitrogen Dioxide	All existing and future receptors (High)	Local	Negligible	Not Significant	None Required	Negligible (Not Significant)
Particulate Matter	All existing and future receptors (High)	Local	Negligible	Not Significant	None Required	Negligible (Not Significant)

Notes: * incorporating environmental design and management, ** incorporating mitigation and monitoring measures

Likely Significant Environmental Effects

Effects During Construction

Nuisance Dust

- 6.121 Residual effects due to fugitive dust emissions would be **Negligible (Not Significant)**.

Construction Vehicle Emissions

- 6.122 The likely residual effect of construction vehicles entering and egressing the Site on local air quality would be **Negligible (Not Significant)**.

Construction Plant Emissions

- 6.123 The likely residual effect of construction plant on local air quality would be **Negligible (Not Significant)**.

Effects Once the Proposed Development is Operational

- 6.124 It has been demonstrated the likely effect of the completed and operational Proposed Development on local air quality at all existing receptors would be negligible. Accordingly, no mitigation would be required and the likely residual effects on local air quality at existing receptors would be Negligible (Not Significant).

Summary and Conclusions

- 6.125 The main likely effects on local air quality during demolition and construction relate to nuisance dust and exhaust emissions from construction vehicles and plant.
- 6.126 A range of measures to minimise or prevent dust and reduce exhaust emissions generated from construction activities would be set out in the CEMP and implemented throughout the demolition and construction phase. Therefore, it is considered effects due to dust emissions would be **negligible**.
- 6.127 Construction plant emissions would not have a significant effect on local air quality during the construction of the Proposed Development.
- 6.128 Construction traffic movements would be agreed with NHDC and consideration given to the avoidance, or limited use of roads during peak hours. Considering these measures, the effect of construction vehicles on local air quality would be **negligible**.
- 6.129 A detailed modelling exercise has been undertaken to assess likely effects on local air quality associated with changes to road traffic from the Proposed Development. The modelling indicates levels of nitrogen dioxide and particulate matter would not exceed nationally accepted limits at any

of the nearby residential properties or within the Development in 2030. It is concluded that the effect of the Development on levels of nitrogen dioxide and particulates would be **negligible**.

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