# Chapter 9

## AIR QUALITY

# 9 Air Quality

## Preface

This ES chapter has been revised to reflect the following:

- Update to legislative and policy context;
- Further details on the assessment criteria applied in assessment;
- Update to baseline scenario to 2022 from 2019 given time lapsed from submission of the 2021 ES;
- Updated operational phase and construction traffic air quality modelling – alone and in-combination with cumulative schemes – reflecting changes to the Transport Assessment, and incorporating updated emission factors, background concentrations, air quality monitoring data, and other tools used in the assessment of air quality; and
- Updated assessment of air quality effects on ecological habitats sensitive to air pollution – alone and in-combination with cumulative schemes – incorporating updated emission factors, deposition rates and assessment tools.

There are very few changes in the significance of residual effects stated in the 2021 ES, with slight benefits to human health now seen at existing residential properties from the operational Western Development and Development from road traffic emissions.

The assessment of potential air quality impacts on ecological receptors is now provided in Chapter 12: Biodiversity[i] that draws on Appendix 9.8: Biodiversity Air Quality Modelling Assessment as relevant.

## 9.1 Introduction

9.1.1 This chapter of the ES was prepared by Air Quality Consultants and presents an assessment of the likely significant effects of the Development on air quality. 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 reported.

9.1.2 The chapter is supported by the following appendices:

- Appendix 9.1: Legislation and Policy Context;
- Appendix 9.2: Construction Dust Assessment Methodology;
- Appendix 9.3: Environmental Protection UK (EPUK) / Institute of Air Quality Management (IAQM) Planning for Air Quality Guidance;
- Appendix 9.4: Modelling Methodology;
- Appendix 9.5: Construction Mitigation Measures;

[i] Previously provided within Section 9.7 of ES Chapter 9 in 2021 ES.

- Appendix 9.6: Cumulative Modelling Results;
- Appendix 9.7: Glossary and Appendices References; and
- Appendix 9.8: Biodiversity Air Quality Modelling Assessment.

### Competence

9.1.3 This chapter was authored by Isabel Stanley (Consultant), MSci (Hons) AMIEnvSc AMIAQM. She has undertaken a wide range of air quality assessments, including road traffic and energy plant dispersion modelling, construction dust risk assessments and the assessment of impacts on designated ecological sites.

9.1.4 This chapter was checked by Adam Dawson (Principal Consultant), BSc (Hons) MSc MIEnvSc MIAQM. He has over 10 years of air quality impact assessment experience and undertakes air quality and odour assessments for AQC, covering residential and commercial developments, industrial installations, energy centres and waste facilities. He has experience using a range of dispersion models including ADMS-Roads, ADMS-5 and Breeze AERMOD to complete quantitative modelling assessments, for both planning and permitting purposes. He is a Member of the Institute of Air Quality Management and a Member of the Institution of Environmental Sciences.

9.1.5 Dr Ben Marner (Director), BSc (Hons) PhD CSci MIEnvSc MIAQM has technically approved this document. He has been responsible for air quality and greenhouse gas assessments of road schemes, rail schemes, airports, power stations, waste incinerators, commercial developments and residential developments in the UK and abroad. He is a Member of the Institute of Air Quality Management and a Chartered Scientist. He currently advises the UK Government on air quality as part of its Air Quality Expert Group (AQEG), where his specific area of expertise relates to air quality assessment in the development control process.

## 9.2 Legislation, Planning Policy and Guidance

9.2.1 Legislation, policy and guidance relevant to the air quality assessment is detailed further in Appendix 9.1.

### Legislative Context

9.2.2 The following legislation is relevant to the Development:

- Air Quality (England) Regulations 2000[1];
- Air Quality (England) (Amendment) Regulations 2002[2];
- Air Quality Standards Regulations 2010[3];
- The National Air Quality Strategy (2007)[4];
- The Air Quality Strategy (2023)[5]
- The Clean Air Strategy (2019)[6]
- Reducing Emissions from Road Transport Road to Zero Strategy[7];
- Environmental Improvement Plan 2023[8];
- Environment Act 2021[9]; and
- Environmental Protection Act 1990[10].

### Planning Policy Context

#### National

9.2.3 The National Planning Policy Framework (2023)[11], which sets out the Government's policies to achieve sustainable development, is the key national planning policy relevant to the Development.

#### Local

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

- The Cherwell Local Plan 2011-203112 (Policy ESD10);
- Saved Policies of the Adopted Cherwell Local Plan 199513 (Policies TR10 and ENV1);
- Developer Contributions Supplementary Planning Document[14]; and
- Cherwell Local Plan Review 2040 Consultation Draft (Regulation 18) September 2023 (Core Policy 16)[15].

### Guidance

9.2.5 The following guidance is relevant to the Development:

- Planning Practice Guidance (2019)[16].
- Guidance on the Assessment of Dust from Demolition and Construction v2.2, IAQM[17];
- Land-Use Planning & Development Control: Planning for Air Quality v1.2, EPUK and the IAQM[18]; and
- Local Air Quality Management Technical Guidance (TG22), August 2022 Version, Defra[19].

## 9.3 Assessment Methodology

### Consultation

9.3.1 No topic-specific consultation was carried out for air quality. The EIA Scoping Opinion (see Appendix 3.3) agreed that air quality should be scoped into the ES and raised no concern with the methodology proposed in the Scoping Report (see Appendix 3.2). While this assessment was carried out following the methodology outlined in the Scoping Report, as the submission of the application has been delayed, there are small methodology deviations from the Scoping Opinion. These include using a baseline year of 2022 as opposed to 2019 and an assessment year of 2026 rather than 2025.

### Study Area and Scope

9.3.2 The study area for the assessment was determined using professional judgement, by identifying the sensitive receptors adjacent to roads along which the Development will lead to a potentially significant change in traffic flows, with reference to the road traffic screening criteria outlined in the EPUK / IAQM guidance (see Paragraph 9.3.20 to 9.3.26). The study area includes the A43 north and south of the Baynards Green roundabout, the M40 south of Junction 10, the B4100 east and west of the Baynards Green roundabout and the A421 east of the A43. It also includes the B4100 southeast of the Development towards Bicester, along with locations alongside the A4095. The study area extends 200m from each of the

sensitive receptors shown in Figure 9.1 and also includes the monitoring sites shown in Figure 9.2.

9.3.3 As the Development is for employment use, an assessment of site suitability was not carried out and on-site receptors were not included. Workplaces are not considered relevant receptors to the air quality objectives and are covered under a separate regulatory regime (this is discussed further in Paragraph 9.3.11).

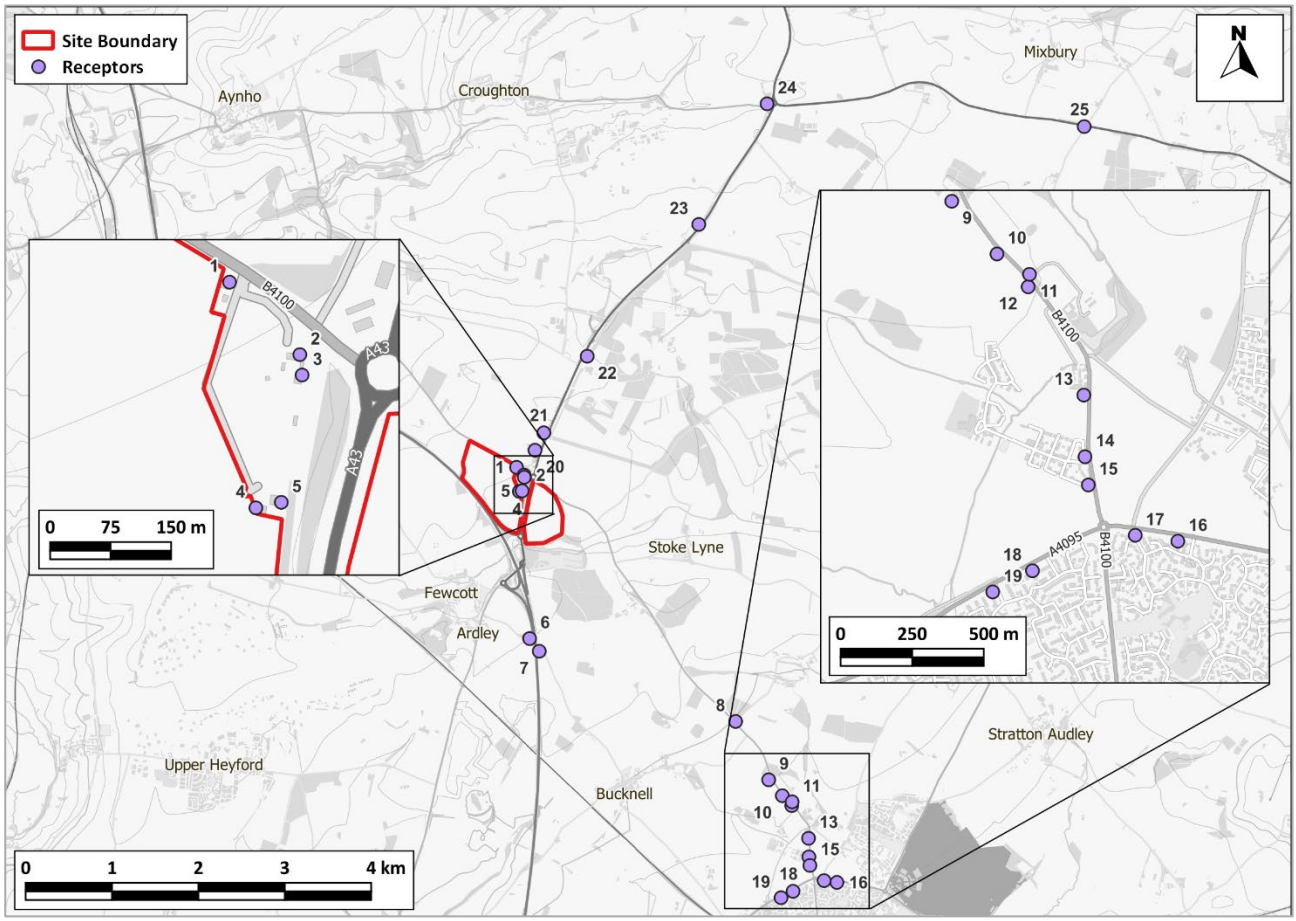
9.3.4 Assessment of the scheme's impacts on nearby ecological sites is not presented within this Chapter and is instead presented in Appendix 9.8. This presents the numerical changes to NOx and ammonia concentrations and nitrogen and acid deposition fluxes from the scheme and other cumulative schemes. The significance of these changes is assessed within Chapter 12: Biodiversity.

### Sensitive Receptors

9.3.5 Receptors for the assessment were identified to represent a range of exposure to air pollution, including worst-case locations (these being at the façades of residential properties closest to roads). Particular attention was paid to assessing impacts close to junctions, where traffic may become congested and where there is a combined effect of several road links, and close to the roads where the traffic increases as a result of the Development will be greatest.

9.3.6 Twenty-five existing residential receptors were identified for the assessment, representing exposure to sources of air pollution. These are described in Table 9.1 and shown in Figure 9.1. Selected receptors may be representative of air quality conditions at a number of nearby properties; consideration was given to how many sensitive locations each receptor represents when considering the impacts of the Development and the overall effect of significance.

## Figure 9.1: Human Health Receptor Locations




## Table 9.1: Description of Receptor Locations

| Receptor | Description | OS X coordinate (easting) | OS Y coordinate (northing) | Height modelled (m) [ii] |
|---|---|---|---|---|
| 1 | Medkre, B4100 | 454716.2 | 229237.1 | 1.5 |
| 2 | Baynard House 1 | 454803.3 | 229147.3 | 1.5 |
| 3 | Baynard House 2 | 454806.1 | 229122.0 | 1.5 |
| 4 | The Cottages | 454748.8 | 228957.5 | 1.5 |
| 5 | The Cottages | 454780.3 | 228964.3 | 1.5 |
| 6 | The Barn House | 454867.4 | 227256.2 | 1.5 |
| 7 | M40 Roadside | 454979.3 | 227109.7 | 1.5 |
| 8 | Watergate Lodge | 457251.9 | 226297.7 | 1.5 |
| 9 | Bicester Eco Town | 457634.5 | 225623.1 | 1.5 |
| 10 | BET Blueberry Dr | 457792.4 | 225439.1 | 1.5 |
| 11 | Northside Lodge | 457906.0 | 225368.2 | 1.5 |
| 12 | BET Haricot Vale Rd | 457901.4 | 225324.6 | 1.5 |
| 13 | Green Acres | 458095.8 | 224946.6 | 1.5 |
| 14 | BET Charlotte Avenue | 458099.9 | 224731.4 | 1.5 |
| 15 | Orchard Walk | 458111.5 | 224632. | 1.5 |

[ii] Representing ground floor exposure.

| Receptor | Description | OS X coordinate (easting) | OS Y coordinate (northing) | Height modelled (m) [ii] |
|---|---|---|---|---|
| 16 | Heather Rd | 458424.4 | 224436.6 | 1.5 |
| 17 | Juniper Gardens | 458275.6 | 224457.3 | 1.5 |
| 18 | Germander Way | 457916.6 | 224333.4 | 1.5 |
| 19 | Saffron Cl | 457777.7 | 224259.6 | 1.5 |
| 20 | Baynards Green Farm | 454929.9 | 229434.7 | 1.5 |
| 21 | Ambury Road | 455031.9 | 229635.9 | 1.5 |
| 22 | Park Farm | 455534.1 | 230521.4 | 1.5 |
| 23 | Lilybird House | 456825.3 | 232045.5 | 1.5 |
| 24 | Barley Mow Farm | 457615.7 | 233440.5 | 1.5 |
| 25 | Mixbury Lodge | 461286.4 | 233177.1 | 1.5 |

### Establishing Baseline Conditions

9.3.7 Existing sources of emissions and baseline air quality conditions within the study area were defined using the following data sources:

- Industrial and waste management sources that may affect the area were identified using Defra's Pollutant Release and Transfer Register[20];
- Local sources were identified through examination of CDC's air quality Review and Assessment reports;
- Information on existing air quality was obtained by collating results of monitoring carried out by CDC;
- Background concentrations were defined using Defra's 2018-based background maps[21], which cover the whole of the UK on a 1x1 km grid;
- Whether or not any exceedances of the annual mean limit value for $NO_2$ in the study area was identified using the maps of roadside concentrations published by Defra[22,23]. These maps are used by the UK Government, together with results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside $PM_{10}$ and $PM_{2.5}$ concentrations, available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

9.3.8 In addition, baseline air quality at existing nearby sensitive receptors was also established using dispersion modelling, the methodology of which is discussed below in Paragraphs 9.3.31 to 9.3.34.

### Identifying Likely Significant Effects

#### Assessment Criteria

##### *Human Health*

9.3.9 The Government has established a set of air quality standards and objectives to protect human health. The ‘standards’ are set as concentrations below which effects are unlikely (even in sensitive population groups) or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The ‘objectives’ set out the extent to which the Government

expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations[1] and the Air Quality (England) (Amendment) Regulations[2].

9.3.10 The UK-wide objectives for $NO_2$, $PM_{10}$ and $PM_{2.5}$ were to have been achieved by 2005, 2004 and 2020, respectively, and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m$^3$ [19]. Measurements have also shown that the 24-hour mean $PM_{10}$ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m$^3$ [19]. The predicted annual mean $PM_{10}$ concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean $PM_{10}$ objective. Where predicted annual mean concentrations are below 32 µg/m$^3$, it is unlikely that the 24-hour mean objective will be exceeded.

9.3.11 The 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. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance[19]. The annual mean objectives for nitrogen dioxide and $PM_{10}$ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for $PM_{10}$ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

9.3.12 For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value (see Paragraph 9.3.18), originally set at 25 µg/m$^3$ and currently set at 20 µg/m$^3$.

9.3.13 Defra has also recently set two new targets, and two new interim targets, for $PM_{2.5}$ concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m$^3$ by the end of 2040, with the interim target being a value of 12 µg/m$^3$ by the start of 2028[iii]. The second set of targets relate to reducing overall population exposure to $PM_{2.5}$. By the end of 2040, overall population exposure to $PM_{2.5}$ should be reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

9.3.14 Defra will assess compliance with the population exposure targets by averaging concentrations measured at its own background monitoring stations. This will not consider small changes over time to precisely where people are exposed (such as would relate to exposure introduced by a new development). Furthermore, all four new targets provide metrics against which central Government can assess its own progress. While local authorities have an important role delivering the required improvements, these are expected

[iii] Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 µg/m$^3$ would not exceed the 10 µg/m$^3$ target.

to relate to controlling emissions and not to directly assessing $PM_{2.5}$ concentrations against the targets.

9.3.15 In March 2023, the Department for Levelling Up, Housing and Communities[24] explained that the new $PM_{2.5}$ targets will:

*"need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of $PM_{2.5}$. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance."*

9.3.16 Defra has also provided advice[25] which explains that there is no current requirement to consider the new $PM_{2.5}$ targets in planning decisions and that guidance to local planning authorities will be forthcoming before this position changes. In the future, when planning decisions do need to consider the new targets, the expectation is that this will focus on reducing emissions from new development rather than there being a direct requirement for planning-related air quality assessments to predict $PM_{2.5}$ concentrations.

9.3.17 For the time being, therefore, no assessment is required, and indeed no robust assessment is possible, in relation to the new $PM_{2.5}$ targets and they are not considered further.

9.3.18 EU Directive 2008/50/EC[26] sets limit values for nitrogen dioxide, $PM_{10}$ and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations[3]. The limit values for nitrogen dioxide and $PM_{10}$ are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national obligation rather than a local one and concentrations are reported to the nearest whole number. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

9.3.19 The relevant air quality criteria for this assessment are provided in Table 9.2.

Table 9.2: Air Quality Objectives and Limit Values

| Pollutant | Objective | Concentration Measured as | Date to be achieved and maintained thereafter | Limit Value | Date to be achieved and maintained thereafter |
|---|---|---|---|---|---|
| $PM_{10}$ | 50 µg/m³ not to be exceeded more than 35 times a year | 24-hour mean | 31st December 2004 | 50 µg/m³ not to be exceeded more than 35 times a year | 1st January 2005 |

| Pollutant | Objective | Concentration Measured as | Date to be achieved and maintained thereafter | Limit Value | Date to be achieved and maintained thereafter |
|---|---|---|---|---|---|
| | 40 µg/m³ | Annual Mean | 31st December 2004 | 40 µg/m³ [iv] | 1st January 2005 |
| $PM_{2.5}$ | N/A | Annual Mean | N/A | 20 µg/m³ [v] | 1st January 2020 |
| $NO_2$ | 200 µg/m³ not to be exceeded more than 18 times a year | 1-Hour Mean | 31st December 2005 | 200 µg/m³ not to be exceeded more than 18 times a year | 1st January 2010 |
| | 40 µg/m³ | Annual Mean | 31st December 2005 | 40 µg/m³ | 1st January 2010 |

*Construction Dust*

9.3.20 Construction activities could give rise to short term elevated dust and / or $PM_{10}$ concentrations within the vicinity of the Site. This may arise from construction activities, vehicle movements, soiling of the public highway, or windblown stockpiles. Assessment of the potential effects of construction was undertaken within 50m of the Site boundary, and 50m of roads within 250m radius of the Site.

9.3.21 There are no official assessment criteria for dust. In the absence of formal criteria, the approach developed by the IAQM was used. Full details of the approach are provided in Appendix 9.2.

*Construction Plant Emissions*

9.3.22 In relation to emissions from on-site plant, the IAQM Guidance[17] states:

*"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site 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."*

9.3.23 On-site plant will typically operate well away from nearby sensitive receptors, such as residential properties, and there is therefore considered to be no risk of significant effects

[iv] A proxy value of 32 µg/m³ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean $PM_{10}$ objective being exceeded. Measurements have shown that, above this concentrations, exceedances of the 24-hour mean objective are possible.
[v] There is no numerical $PM_{2.5}$ objective for local authorities. Convention is to assess against the UK limit value which is currently 20 µg/m³.

at existing receptors as a result of on-site machinery emissions and this is therefore scoped out of further assessment.

*Road Traffic Screening Criteria*

9.3.24 EPUK and the IAQM Guidance recommends a two-stage screening approach to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix 9.3, first considered the size and parking provision of a development; if the development is non-residential and will provide less than 1,000m$^2$ of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

9.3.25 The second stage then compared the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds outside an Air Quality Management Area (AQMA) are a change in flows of more than 100 heavy goods vehicles (HGVs) or 500 light duty vehicles per day; within an AQMA they are a change of more than 25 HGVs or 100 light duty vehicles per day. Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*. A detailed assessment was carried out in this instance, given increases in road traffic exceed the screening criteria; the methodology of the assessment is described below.

9.3.26 While these screening criteria are specifically intended to act as a trigger for a detailed assessment, they can also be used to identify the extent of the road network that requires assessment; where the change in traffic on a given road link is less than the relevant screening threshold, it is unlikely that a significant impact would occur, and these links can be disregarded unless there are additional sources affecting the link (e.g. emissions from a point source).

Assessment Methodology

9.3.27 For the assessment of road traffic emissions, concentrations were predicted for the Eastern and Western sections of the Development, and the Development (i.e. Eastern and Western Developments combined). These are presented separately in the assessment of likely significant effects.

*Construction Dust*

9.3.28 The construction dust assessment considers the dust soiling and human health impacts within 250m of the Site, or within 50m of roads that may be affected by tracked out dirt and dust arising from construction vehicles, up to 250m from the Site exits. It also considers the potential impacts on designated ecological sites within 50m of both the Site and the roads used by construction vehicles; as there are no designated sites within 50m of either the Site boundary or the roads along which material may be tracked by construction vehicles, construction dust impacts on ecological sites was not considered further.

9.3.29 The assessment methodology followed the IAQM Guidance and is described in further detail in Appendix 9.2. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the Site. Step 2b defines the

sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts.

### *Construction Traffic*

9.3.30 The number of construction vehicles associated with the Development is predicted to be below the EPUK/IAQM screening criteria for significant effects on air quality (see Paragraphs 9.3.24 to 9.3.25). Furthermore, the number of construction vehicles is considerably lower than the predicted operational traffic generation (a maximum of 190 HDV AADT during construction vs a maximum of over 900 HDV AADT during operation). As the assessment of the completed Development uses emissions factors from 2026, which is expected to be similar to the peak year of construction (2025), the assessment of the completed Development represents a worst-case compared to expected impacts of the construction phase. A separate assessment of the impact of construction vehicles was thus scoped out.

### *Completed Development*

9.3.31 Pollutant concentrations at the identified human health receptors (shown in Figure 9.1) were predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's Emission Factor Toolkit (EFT) v11.0. Details of the model inputs and the model verification are provided in Appendix 9.4.

9.3.32 Concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$, the pollutants of potential concern, were predicted for the following scenarios:

- Baseline year (2022);
- Future baseline ('Without Development') (2026); and
- Completed Development (2026).

9.3.33 Traffic data for the assessment were provided by David Tucker Associates, who have undertaken the Transport Assessment for the Development (see Appendix 8.1). Further details of the traffic data used in this assessment are provided in Appendix 9.4.

9.3.34 Predictions for future years are based on a return to 'typical' road traffic levels and assume no lasting impact as a result of the Covid-19 pandemic, to ensure a worst-case assessment. This is because the influence of the pandemic has generally been to reduce concentrations of the pollutants considered in this assessment.

9.3.35 Emissions from operational buildings, such as those arising from combustion plant for heating or emergency generators, were not considered in this assessment as exact specifications are yet to be determined. It is expected that emissions from operational plant will be assessed at the reserved matters stage and suitably controlled by planning condition where appropriate. It is expected that air source heat pumps will be installed for the provision of heat to the proposed office space, which have no direct emissions to air (refer to Paragraph 9.5.5).

### Cumulative Effects

9.3.36 Cumulative schemes, as identified in Chapter 3: EIA Methodology, form an inherent part of the future baseline traffic data. The road traffic air quality effect of the Development in combination with cumulative schemes was thus determined in the air quality assessment presented in this chapter.

### Determining Effect Significance

9.3.37 Within this chapter, the air quality assessment used published guidance and criteria to determine the likely air quality impacts at a number of sensitive locations (see Table 9.1). The overall significance of the air quality effects was then determined using professional judgement, giving consideration to various factors including the magnitude of the predicted impacts (see Table 9.3) and the presence of any objective exceedances. Full details of the EPUK / IAQM approach are provided in Appendix 9.3.

### Sensitivity of Receptor

#### *Enabling Works and Construction*

9.3.38 IAQM Guidance on construction dust provides criteria to define receptor sensitivity to dust soiling or health effects of $PM_{10}$ (see Table 9.2.2 in Appendix 9.2). Residential properties are considered 'high' sensitivity receptors to both dust soiling and health effects of $PM_{10}$; places of work are considered 'medium' sensitivity receptors.

9.3.39 The sensitivity of the area to dust soiling and human health effects was determined based on the number of receptors located within certain distances from the Site, and their sensitivity (Step 2b, see Tables 9.2.3 and 9.2.4 in Appendix 9.2). This step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the Site. It also considers additional site-specific factors (such as topography and screening), and in the case of sensitivity to human health effects, baseline $PM_{10}$ concentrations. Area sensitivities are defined for each type of effect (dust soiling or human health) and are described as ‘low’, ‘medium’ or ‘high’.

#### *Completed Development*

9.3.40 The Air Quality Strategy explains that air quality standards and objectives were determined based on expert recommendations, and represent *“levels at which no significant health effects would be expected in the population as a whole”*. The application of these objectives is discussed in Paragraph 9.3.11.

9.3.41 Within this chapter, all human health receptors where the air quality objectives apply were considered to be of 'high' sensitivity. Locations where the objectives do not apply must be considered not to be sensitive, therefore, there are no medium or low sensitivity receptors within the context of this assessment.

### Magnitude of Impact

#### *Enabling Works and Construction*

9.3.42 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the IAQM was used. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required.

9.3.43 Step 2 consists of determining the risk of dust impacts for each activity (i.e. earthworks, construction and the trackout of material from the Site onto the local road network). The 'dust emission magnitude' was determined for each of the activities, and was defined as 'small', 'medium' or 'large' (Step 2a, see Table 9.2.2 in Appendix 9.2).

9.3.44 The dust emission magnitudes determined at Step 2a were combined with the sensitivities of the area to determine the risk of dust soiling and human health impacts for each activity, with no mitigation applied. Impacts were defined as 'negligible', 'low', 'medium' or 'high'. Full details of this approach are provided in Appendix 9.2.

*Completed Development*

9.3.45 There is no official guidance on how to describe air quality impacts and effects for a completed development, nor how to assess their significance. The approach developed by EPUK and the IAQM was therefore used. This includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentration relative to the air quality assessment level (AQAL); in this case the air quality objectives, as provided in Table 9.2, and the absolute concentration relative to the AQAL.

9.3.46 Table 9.3 sets out how the impact descriptors were determined within this assessment. Impacts may be adverse or beneficial, depending on whether the change is positive or negative.

Table 9.3: Magnitude of Impact Descriptors

| Long-term average concentration at receptor in assessment year | Change in concentration relative to AQAL | | | | |
|---|---|---|---|---|---|
| *% of AQAL* | *0%* | *1%* | *2-5%* | *6-10%* | *>10%* |
| 75% of less of AQAL | Negligible | Negligible | Negligible | Minor | Moderate |
| 76-94% of AQAL | Negligible | Negligible | Minor | Moderate | Moderate |
| 95-102% of AQAL | Negligible | Minor | Moderate | Moderate | Major |
| 103-109% of AQAL | Negligible | Moderate | Moderate | Major | Major |
| 110% or more of AQAL | Negligible | Moderate | Major | Major | Major |

## Assessing Significance

*Enabling Works and Construction*

9.3.47 IAQM Guidance states that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. The assessment thus focused on determining the appropriate level of mitigation, by combining the dust emission magnitude with the sensitivity of the area to determine the overall risk of dust impacts (see Table 9.2.6 in Appendix 9.2), so as to ensure that effects will normally be 'not significant'.

*Completed Development*

9.3.48 Once operational, there is no official guidance in the UK in relation to development control on how to assess the significance of effects on existing receptors. The approach developed jointly by EPUK & IAQM was therefore used. This approach takes account of the magnitude

of impact and whether there is a risk of exceedance of the AQAL at each receptor, as well as the geographical extent and scale of the impacts overall. Professional judgement is then used to determine whether the effect is 'significant' or 'not significant'. Full details of the approach to determining significance are provided in Appendix 9.3.

#### Assumptions and Limitations

9.3.49 The study area, as outlined from Paragraph 9.3.2, was defined with reference to the road traffic screening criteria (see Paragraphs 9.3.24 to 9.3.26). Detailed assessment was carried out at receptors where Development-generated changes in road traffic exceed the EPUK / IAQM screening criteria on adjacent roads. However, there are a number of roads which were excluded from study area, despite Development-generated traffic exceeding these criteria. These roads includes the majority of the A43 between Baynards Green and Brackley, to the north of the Development, and the M40 Junction 10. In both cases, the areas surrounding the roads are very rural in nature, with no identified sensitive receptors at the roadside; Development-generated traffic is expected to disperse to a level below the screening criteria before reaching roads alongside which sensitive receptors are located.

9.3.50 The study area excludes roads in Bicester south of the junction of the B4100 and A4095, including roads within the Bicester AQMA. David Tucker Associates, the project transport consultants, confirmed that trip generation from the Development would be below the traffic thresholds described in Paragraphs 9.3.24 to 9.3.26 in these areas.

9.3.51 There are components that contribute to the uncertainty of modelling predictions, which are discussed in greater detail in Appendix 9.4:

- Inherent uncertainties associated with the traffic data which were used to input into the road traffic dispersion model;
- Uncertainties associated with the model itself, which simplifies real-world conditions into a series of algorithms; and
- Uncertainty in pollutant concentrations in the future, which are dependent on predictions in traffic volumes, future background pollutant concentrations and trends in vehicle emissions.

9.3.52 Worst-case assumptions have been incorporated into the assessment, and professional judgement has been employed in interpreting the model results. The conclusions of the assessment are thus considered to be robust

## 9.4 Baseline Conditions

### Existing Baseline Conditions

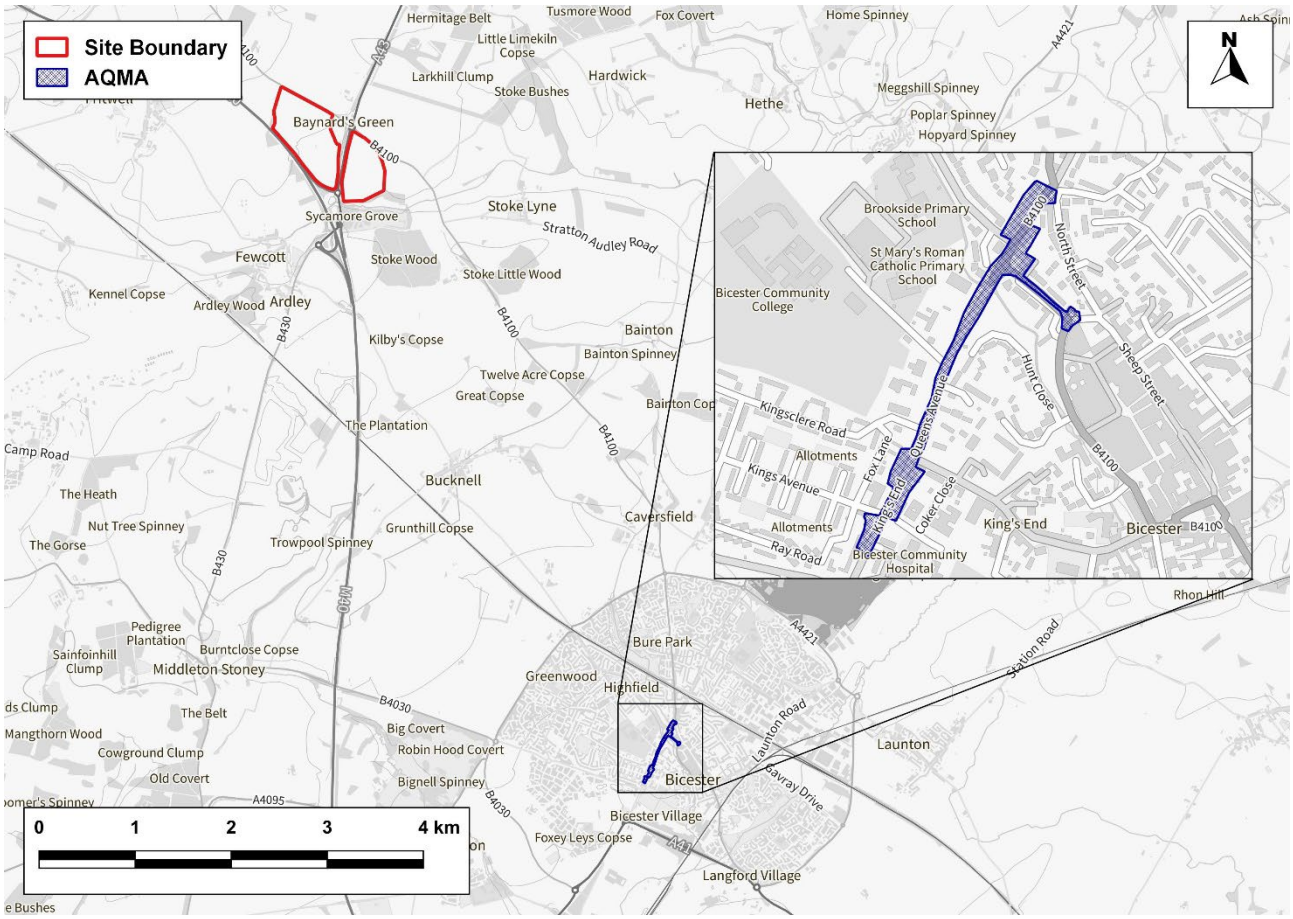
#### Industrial Sources

9.4.1 A search of the UK Pollutant Release and Transfer Register[20] has identified the Ardley Energy from Waste (EfW) Plant and the Ardley Landfill Site approximately 2.2km south of the Site. However, it is unlikely that these facilities will affect the assessment in air quality terms; releases of $NO_x$, ammonia and particulate matter from both sites will be accounted for by predicted background concentrations.

#### Air Quality Management Areas

9.4.2 CDC has investigated air quality under the LAQM regime and has declared four AQMAs within its administrative area. The nearest AQMA to the Site is located approximately 6.5km to the southeast in Bicester, incorporating areas of Kings End, Queens Avenue, Field Street and St Johns Street (known as AQMA No. 4), declared for exceedances of the annual mean $NO_2$ objective. A map of AQMA No. 4 in relation to the Site is provided in Figure 9.2.

Figure 9.2: AQMA No. 4 (Bicester)




## Local Air Quality Monitoring

9.4.3 CDC does not operate any automatic air quality monitoring sites within its area, although it does operate a number of $NO_2$ monitoring sites using passive diffusion tubes. The nearest diffusion tube monitoring site is located in Ardley, approximately 1 km south of the Site. There are also three monitoring sites located on the A4095 road around Bicester.

9.4.4 The monitoring locations are shown in Figure 9.3, with the annual mean results for the years 2017 to 2022 summarised in Table 9.4. Data have been taken from CDC's 2022 and 2023 Air Quality Annual Status Reports (ASRs)[27,28]. It should be noted that the 2023 ASR contains a number of inconsistencies in Site IDs and coordinates. In order to determine the correct 2022 concentrations, a comparison of 2018 to 2021 concentrations was made between the 2022 and 2023 ASRs. 2022 concentrations have been presented for the locations where 2018 to 2021 concentrations from the 2023 ASR match those presented in the 2022 ASR.

9.4.5 Only the 2022 concentration from the Ardley diffusion tube has been used for model verification as there is a high degree of confidence this is the correct measurement.

Therefore, any inaccuracies within the data presented within the 2023 ASR are unlikely to affect the conclusion of the overall assessment.

Figure 9.3: CDC Air Quality Monitoring Locations

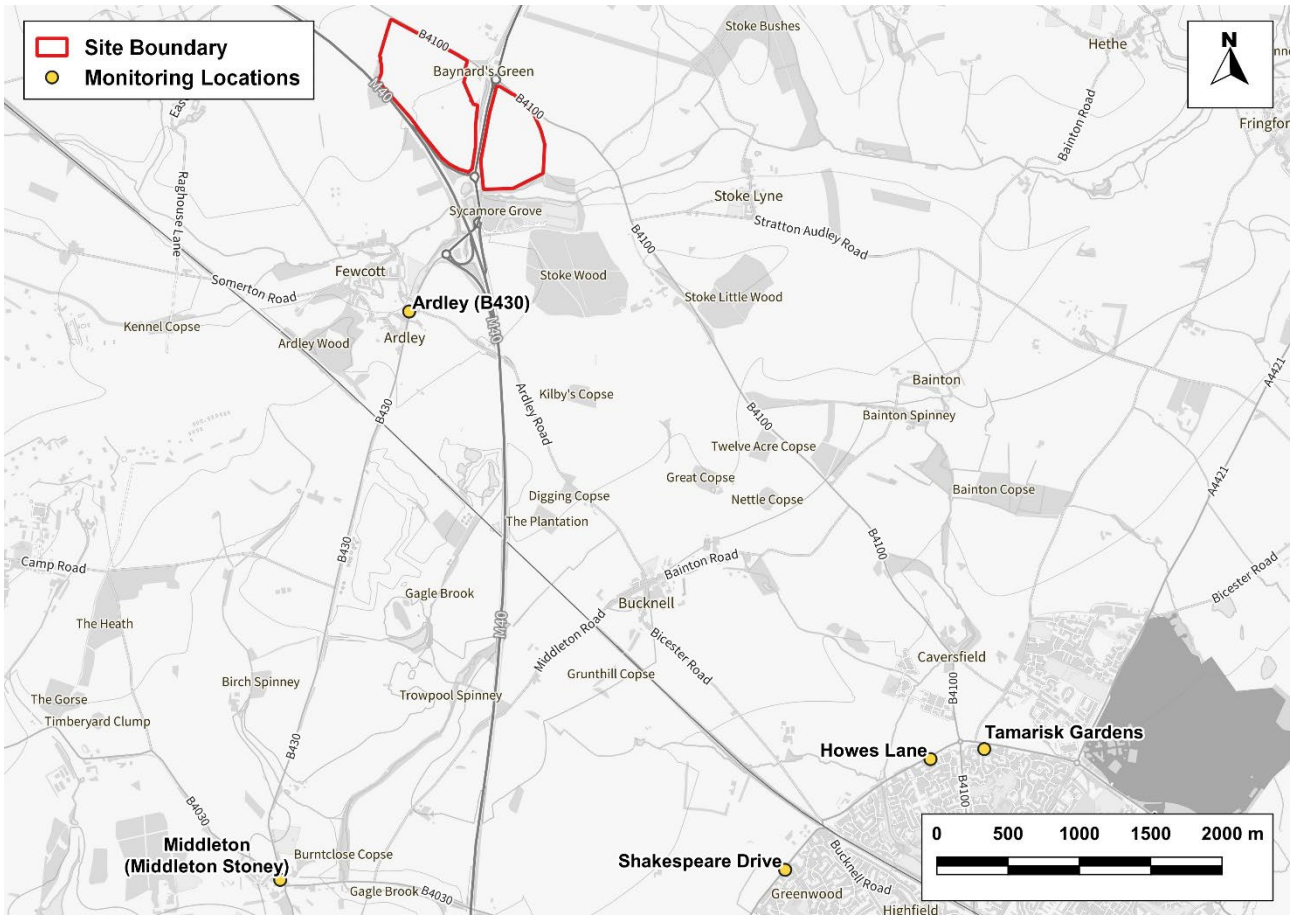



Table 9.4: Summary of Annual Mean $NO_2$ Monitoring (2017-2022) ($\mu g/m^3$)

| Site Name | Site Type | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|
| Ardley (B430) | Roadside | 27.2 | 26.0 | 24.4 | 18.3 | 18.5 | 18.0 |
| Howes Lane | Roadside | 25.6 | 24.5 | 20.7 | 19.3 | 19.6 | - |
| Tamarisk Gardens | Urban Background | 16.3 | 15.9 | 15.0 | 11.6 | 11.8 | 12.1 |
| Shakespeare Drive | Roadside | 24.0 | 23.4 | 23.2 | 19.9 | 20.1 | - |
| Middleton (Middleton Stoney) | Kerbside | 33.6 | 33.1 | 31.3 | 22.2 | 22.4 | 25.2 |
| Objective | | 40 | | | | | |

9.4.6 The results in Table 9.4 show that annual mean $NO_2$ concentrations are well below the objective at all monitoring sites, including roadside and kerbside sites which are closer to vehicle tailpipe emissions.

9.4.7 While 2020 and 2021 results have been presented in this Section for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality

conditions due to the considerable impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.

9.4.8 Outside of the immediate study area, monitoring is undertaken by Buckinghamshire Council[29] and South Oxfordshire District Council[30] adjacent to the M40 at diffusion tube monitor SS20 and automatic monitor CM1. Annual mean nitrogen dioxide concentrations were well below the objective at both sites, being 16.3 µg/m$^3$ and 19.0 µg/m$^3$ in 2022, respectively. The 1-hour mean nitrogen dioxide concentration was not exceeded at automatic monitor CM1 in 2022.

9.4.9 CDC do not undertake the monitoring of $PM_{10}$ or $PM_{2.5}$ within the administrative area.

### Exceedances of the Limit Value

9.4.10 There are no AURN monitoring sites within the study area with which to identify exceedances of the annual mean $NO_2$ limit value. Defra's roadside annual mean $NO_2$ concentrations[23], which are used to identify and report exceedances of the limit value, do not identify any exceedances anywhere in the study area in 2022. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the Development by the time it is operational.

### Background Concentrations

9.4.11 Estimated background concentrations across the study area, derived from the Defra background maps, are set out in Table 9.5. Concentrations are all well below the objectives. A range of values is presented, as the study area covers multiple 1 km x 1 km grid squares.

Table 9.5: Estimated Annual Mean Background Pollutant Concentrations in 2022 and 2026 (µg/m3)

| Year | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|
| 2022 | 7.1 – 14.0 | 13.3 – 16.6 | 8.5 – 10.0 |
| 2026 | 6.2 – 11.3 | 12.8 – 16.0 | 8.1 – 9.6 |
| Objective | 40 | 40 | 20 |

### Baseline Dispersion Model Results

9.4.12 Existing baseline (2022) concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ have been modelled at each of the receptor locations (refer to Figure 9.1 and Table 9.1 for receptor locations), in accordance with the methodology described in Paragraphs 9.3.31 to 9.3.34, and are presented in Table 9.6. Exceedances of the objectives are shown in bold.

9.4.13 The modelled road component of NOx concentrations has been increased from those predicted directly from the model based on a comparison with local monitoring data (see Appendix 9.4 for verification methodology).

Table 9.6: Modelled Annual Mean Existing Baseline (2022) Concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ (µg/m$^3$)

| Receptor | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|
| 1 | 14.4 | 16.4 | 9.8 |
| 2 | 18.5 | 16.7 | 10.0 |
| 3 | 18.9 | 16.7 | 10.0 |
| 4 | 18.2 | 16.1 | 9.9 |

| Receptor | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|
| 5 | 19.5 | 16.3 | 10.0 |
| 6 | 30.8 | 17.8 | 10.8 |
| 7 | **56.4** | 20.0 | 12.2 |
| 8 | 15.9 | 15.0 | 9.2 |
| 9 | 9.8 | 14.4 | 9.0 |
| 10 | 10.9 | 14.6 | 9.0 |
| 11 | 15.4 | 15.2 | 9.4 |
| 12 | 10.6 | 14.5 | 9.0 |
| 13 | 13.1 | 15.1 | 10.1 |
| 14 | 13.1 | 15.1 | 10.1 |
| 15 | 13.1 | 15.1 | 10.0 |
| 16 | 12.7 | 15.1 | 10.0 |
| 17 | 13.3 | 15.1 | 10.0 |
| 18 | 12.3 | 15.3 | 9.6 |
| 19 | 12.2 | 15.3 | 9.6 |
| 20 | 17.7 | 16.9 | 10.1 |
| 21 | 17.4 | 17.4 | 10.1 |
| 22 | 21.0 | 17.5 | 10.4 |
| 23 | 20.6 | 15.2 | 9.5 |
| 24 | 14.6 | 16.3 | 9.6 |
| 25 | 11.2 | 15.1 | 9.1 |
| Objective | 40 | 40 | 20 |

9.4.14 As shown in Table 9.6 the predicted annual mean concentrations of $NO_2$ are well below the objective at all receptors, with the exception of receptor 7 where the objective is exceeded. Receptor 7 is located within 20m of the M40, which experiences a large number of daily vehicle movements and, thus, elevated pollutant emissions. As concentrations are below 60 µg/m$^3$, there is no risk of exceedance of the 1-hour mean objective at any receptor.

9.4.15 Table 9.6 shows predicted annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ are well below their objectives at all receptors. Concentrations of $PM_{10}$ are also well below 32 µg/m$^3$, and so, there is unlikely to be any exceedance of the 24-hour mean $PM_{10}$ objective.

### Future Baseline Conditions

9.4.16 Future baseline (2026) concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ at existing receptor locations are presented in Table 9.7. Predicted exceedances of the objectives are shown in bold.

Table 9.7: Modelled Annual Mean Future Baseline (2026) Concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ (µg/m$^3$)

| Receptor | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|
| 1 | 11.5 | 16.0 | 9.4 |
| 2 | 14.4 | 16.3 | 9.6 |
| 3 | 14.7 | 16.3 | 9.6 |
| 4 | 14.3 | 15.7 | 9.6 |
| 5 | 15.2 | 15.8 | 9.7 |
| 6 | 22.7 | 17.3 | 10.4 |

| Receptor | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|
| 7 | **40.9** | 19.6 | 11.8 |
| 8 | 12.9 | 14.7 | 8.9 |
| 9 | 8.4 | 14.0 | 8.6 |
| 10 | 9.2 | 14.2 | 8.7 |
| 11 | 12.7 | 14.9 | 9.1 |
| 12 | 9.0 | 14.1 | 8.7 |
| 13 | 11.0 | 14.7 | 9.7 |
| 14 | 11.0 | 14.7 | 9.7 |
| 15 | 11.0 | 14.7 | 9.7 |
| 16 | 10.5 | 14.6 | 9.6 |
| 17 | 11.0 | 14.6 | 9.7 |
| 18 | 10.2 | 14.8 | 9.2 |
| 19 | 10.1 | 14.8 | 9.2 |
| 20 | 13.7 | 16.5 | 9.7 |
| 21 | 13.5 | 17.0 | 9.7 |
| 22 | 15.9 | 17.2 | 10.0 |
| 23 | 15.6 | 14.9 | 9.2 |
| 24 | 11.4 | 15.9 | 9.3 |
| 25 | 9.2 | 14.7 | 8.7 |
| Objective | 40 | 40 | 20 |

9.4.17 Table 9.7 shows predicted annual mean concentrations of $NO_2$ are still well below the objective at all receptors, with the exception of receptor 7, where the concentration is just above the objective. As concentrations are also well below 60 µg/m$^3$, there is no risk of exceedance of the 1-hour mean objective at any receptor.

9.4.18 In addition, as shown in Table 9.7, predicted annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ are also well below their objectives. Concentrations of $PM_{10}$ are well below 32 µg/m$^3$, and so, there is unlikely to be any exceedance of the 24-hour mean $PM_{10}$ objective.

## 9.5 Scheme Design and Management

### Construction

9.5.1 Measures will be undertaken during the construction phase in order to minimise disruption and manage the impacts of the Development.

9.5.2 IAQM Guidance describes the measures that should be employed, appropriate to the identified risk of dust impacts, to reduce the impacts. Guidance has also been produced on monitoring of dust and particulate matter during demolition and construction[31]. This reflects best practice and experience and has been used to draw up a set of measures that should be incorporated into the specification of the works.

9.5.3 The measures are described in detail in Appendix 9.5, and should be incorporated into the CEMPs pursuant to the Framework CEMP, to be secured by condition. These will incorporate a Dust Management Plan. Such plans may also include a requirement for monitoring of dust or particulate matter, to be agreed with the local authority, to ensure

implemented mitigation measures remain suitable and effective. Framework CEMPs are provided in Appendices 6.1 and 6.2.

9.5.4 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate watercourses.

### Completed Development

9.5.5 The following design measures represent primary mitigation of relevant to the air quality assessment:

- Use of air source heat pumps to provide heating to the office spaces of the Development, reducing the need for on-site combustion such as gas boilers, as noted in the Development Specification;
- Provision for a scheduled bus service with drop-off area to encourage the use of public transport to access the Development;
- Provision of a comprehensive footway/cycleway on the B4100 between the Development and Bicester, providing a safe and convenient route for staff and visitors, as well as crossings on the A43 and B4100 to access local services on foot pursuant to a section 278 Agreement;
- On-site cycle parking provision in line with CDC standards, to encourage access to the Site using alternatives to private vehicles; and
- Provision of a Framework Travel Plan to encourage uptake of public transport and active travel modes.
- Potential provision of an off road footway/cycleway on B4100 linking the Development to Bicester (A4095) delivered via Section 278 (S278)
- EV charging points, as required by Approved Document S of the Building Regulations 2010.

## 9.6 Construction

### Assessment of Effects

9.6.1 As discussed in Paragraph 9.3.30, traffic volumes generated by the Development during the construction phase will be considerably lower than the operational traffic generation (up to 190 vehicles per day, of which 40 are HGVs). As such, the assessment of construction traffic emissions associated with the Development has been scoped out, as impacts during the operational phase are considered worst-case.

9.6.2 The assessment of effects during the construction phase focuses on determining the risk of significant effects arising from emissions of dust and $PM_{10}$ during construction activities. These will give rise to a risk of dust impacts during earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. There is no requirement for any demolition.

#### Enabling Works

9.6.3 The assessment of construction dust impacts at the Western Development, from Paragraph 9.6.13 to 9.6.18, inherently considers the impact of the Enabling Works. This includes the

construction of the new roundabout, internal access roads, foul drainage station, utility connections, diversion of existing services, diversion of a public right of way and soft landscaping.

### Eastern Development

#### *Dust Emission Magnitude*

9.6.4 Most of the Eastern Site will be subject to earthworks for the Eastern Development. Dust may arise from vehicles travelling over unpaved ground and from the handling of dusty materials, such as dry soil. Based on the example definitions in Table 9.2.1 in Appendix 9.2, the dust emission magnitude for earthworks is considered to be *large*.

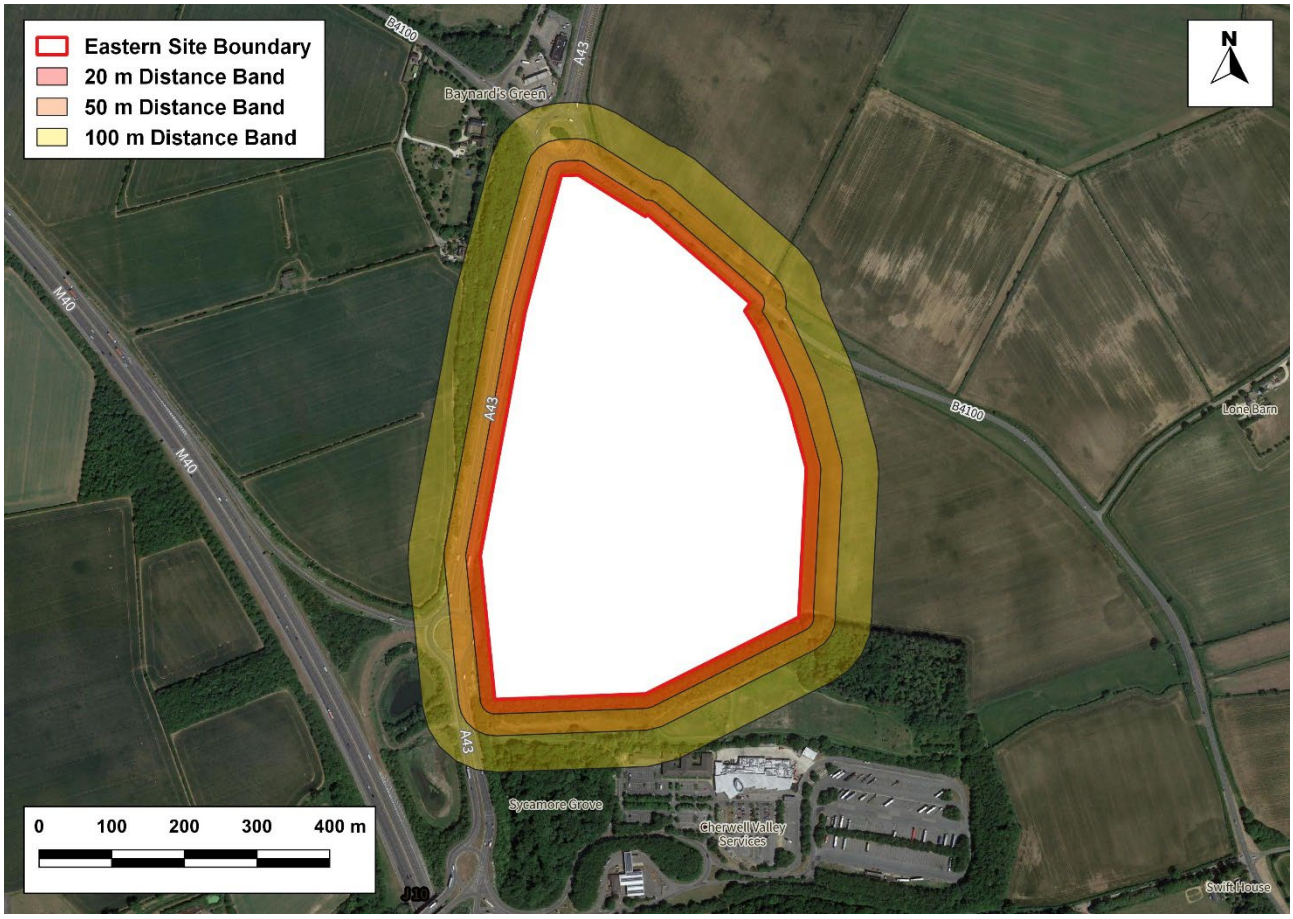
9.6.5 Construction will involve the erection of warehouse buildings with a volume greater than 75,000m$^3$ and the construction of roads and hardstanding. While of large scale, most of the building volume is unlikely to consist of particularly dust-generating material. Based on the example definitions in Table 9.2.1 in Appendix 9.2, the dust emission magnitude for construction is considered to be *large*.

9.6.6 It is likely that the peak number of outward HGV movements will be over 50 per day, and these vehicles may travel over a significant length of unpaved road. As a result and based on the example definitions in Table 9.2.1 in Appendix 9.2, the dust emission magnitude as a result of track out is considered to be *large*.

#### *Sensitivity of the Area*

9.6.7 There are no sensitive receptors within 20m or 50m of the Eastern Site boundary, and two to four residential properties within 100m (see Figure 9.4). Using the matrix in Table 9.2.3 in Appendix 9.2, the area surrounding on-site works is considered to be of low sensitivity to dust soiling.

Figure 9.4: 20m, 50m and 100m Distance Bands around Eastern Site




9.6.8 The matrix in Table 9.2.4 in Appendix 9.2 requires information on baseline $PM_{10}$ concentrations to determine sensitivity to human health effects. Existing baseline $PM_{10}$ concentrations modelled at Receptors 1-5 (see Table 9.6) best represent existing conditions surrounding the Eastern Site, which demonstrate annual mean concentrations below 16.7 µg/m$^3$. Using the matrix in Table 9.2.4 in Appendix 9.2, the area surrounding on-site works is also of low sensitivity to human health impacts.

9.6.9 Paragraph 9.6.6 explains that the dust emissions magnitude as a result of trackout is large, and there is thus a risk of material being tracked out 250m from the Eastern Site exit. As the exact route of construction vehicles is not known, it has been assumed all possible routes could be affected. There are no receptors within 20m or 50m of roads along which material could be tracked, and less than 10 receptors within 100m (see Figure 9.5).

Figure 9.5: 50m Distance Bands around Roads within 250m of Eastern Site


9.6.10 Using the matrix in Table 9.2.3 in Appendix 9.2, the area is considered to be of low sensitivity to dust soiling from track out. Using the matrix in Table 9.2.4 in Appendix 9.2, the area is also of low sensitivity to human health effects from track out.

*Risk and Significance*

9.6.11 The dust emission magnitudes have been combined with the sensitivities of the area using the matrix in Table 9.2.7 in Appendix 9.2, to assign a risk category to each construction activity. The resulting risk categories, without mitigation, are set out in Table 9.8, and have been used to determine the appropriate level of mitigation to be applied during the construction phase.

Table 9.8: Summary of Risk of Impacts (Eastern Development) Without Mitigation

| Source | Dust Soiling | Human Health |
|---|---|---|
| Earthworks | Low Risk | Low Risk |
| Construction | Low Risk | Low Risk |
| Trackout | Low Risk | Low Risk |

9.6.12 Without mitigation, the construction phase of the Eastern Development would result in a low risk of temporary, medium-term, direct adverse effects. The IAQM guidance is clear, however, that with appropriate mitigation in place, the residual effect will be 'not significant'.

Western Development

*Dust Emission Magnitude*

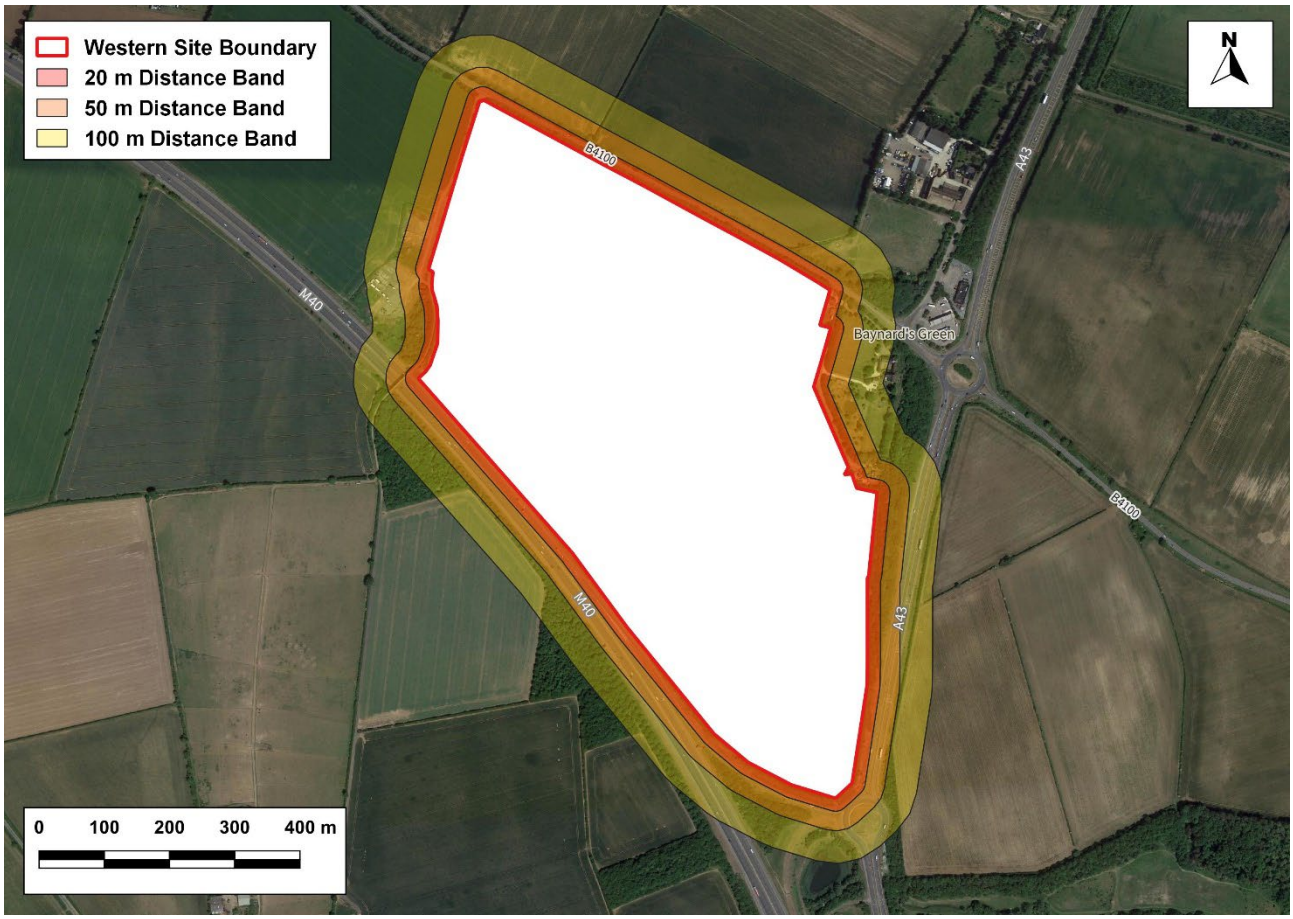
9.6.13 As with the Eastern Development, the dust emission magnitude for earthworks and track out is considered to be *large*.

9.6.14 Construction will involve the erection of warehouse buildings with a volume well in excess of 75,000m$^3$, as well as the construction of paved roads and hardstanding. Based on the example definitions in Table 9.2.1 in Appendix 9.2, the dust emission magnitude for construction is considered to be *large*.

*Sensitivity of the Area*

9.6.15 There are two - four residential properties within 20m of the Western Development boundary, and less than 10 residential properties within 100m (see Figure 9.6). The area surrounding on-site works is considered to be of medium sensitivity to dust soiling and of low sensitivity to human health impacts.

Figure 9.6: 20m, 50m and 100m Distance Bands around Western Site




9.6.16 Paragraph 9.6.13 explains that the dust emissions magnitude for track out is *large*, and there is thus a risk of material being tracked out 250m from the Western Site exit. As the exact route of construction vehicles is not known, it has been assumed all possible routes could be affected. There are three residential properties within 50m of roads along which material could be tracked, and fewer than 10 receptors within 100m (see Figure 9.7). Using the matrix in Table 9.2.3 in Appendix 9.2, the area is considered to be of medium sensitivity to dust soiling from trackout. Using the matrix in Table 9.2.4 in Appendix 9.2, the area is of low sensitivity to human health effects from track out.

Figure 9.7: 20m and 50m Distance Bands around Roads within 250m of Western Site


*Risk and Significance*

9.6.17 Risk categories, without mitigation, are set out in Table 9.9, and have been used to determine the appropriate level of mitigation to be applied during the construction phase.

Table 9.9: Summary of Risk of Impacts (Western Development) Without Mitigation

| Source | Dust Soiling | Human Health |
|---|---|---|
| Earthworks | Medium Risk | Low Risk |
| Construction | Medium Risk | Low Risk |
| Trackout | Medium Risk | Low Risk |

9.6.18 Without mitigation, the construction phase of the Western Development would result in a medium risk of temporary, medium-term, direct adverse effects. The IAQM guidance is clear, however, that with appropriate mitigation in place, the residual effect will be 'not significant'.

Development

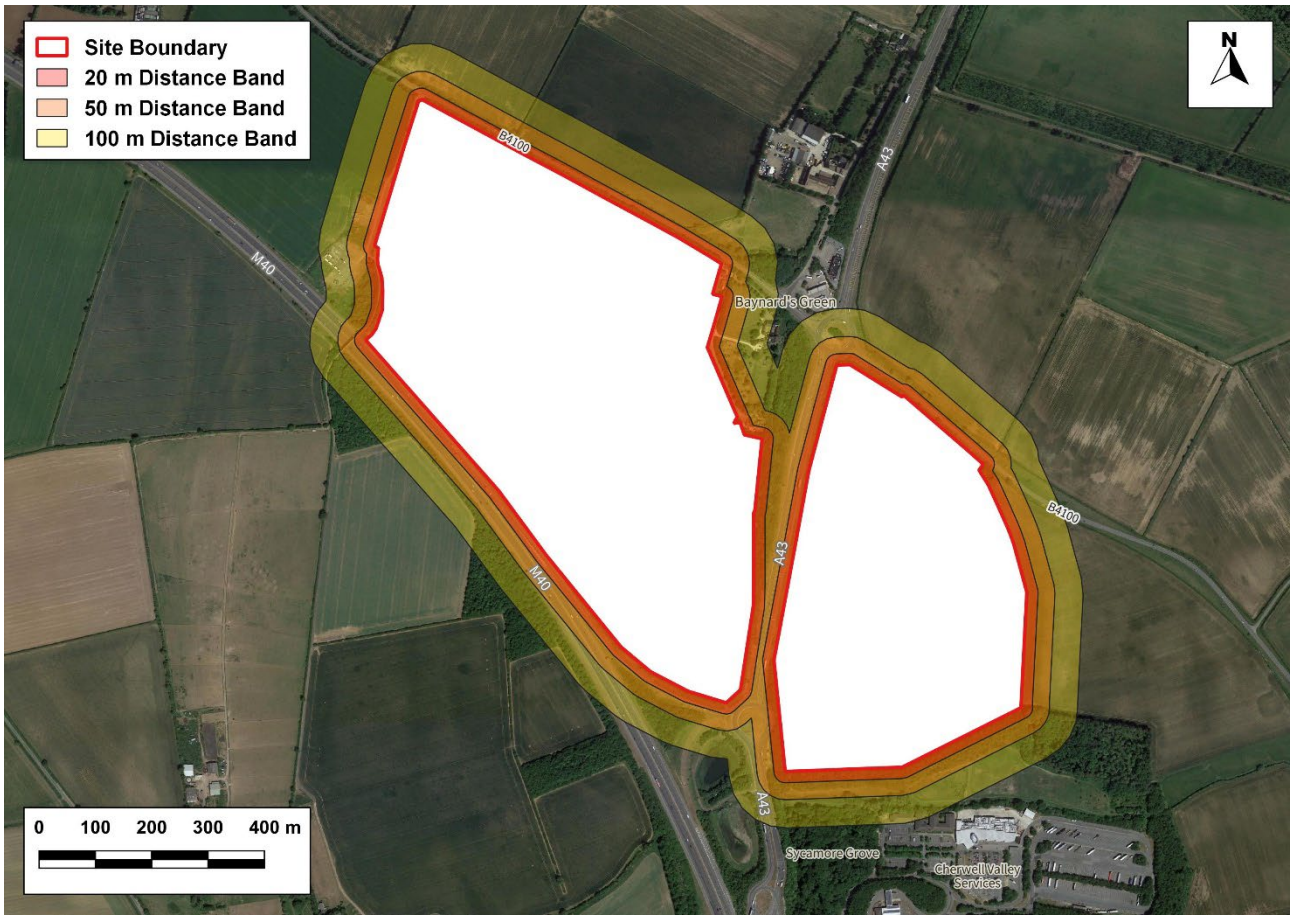
*Dust Emission Magnitude*

9.6.19 For the Development as a whole, the dust emission magnitude for earthworks, construction and track out is considered to be large.

*Sensitivity of the Area*

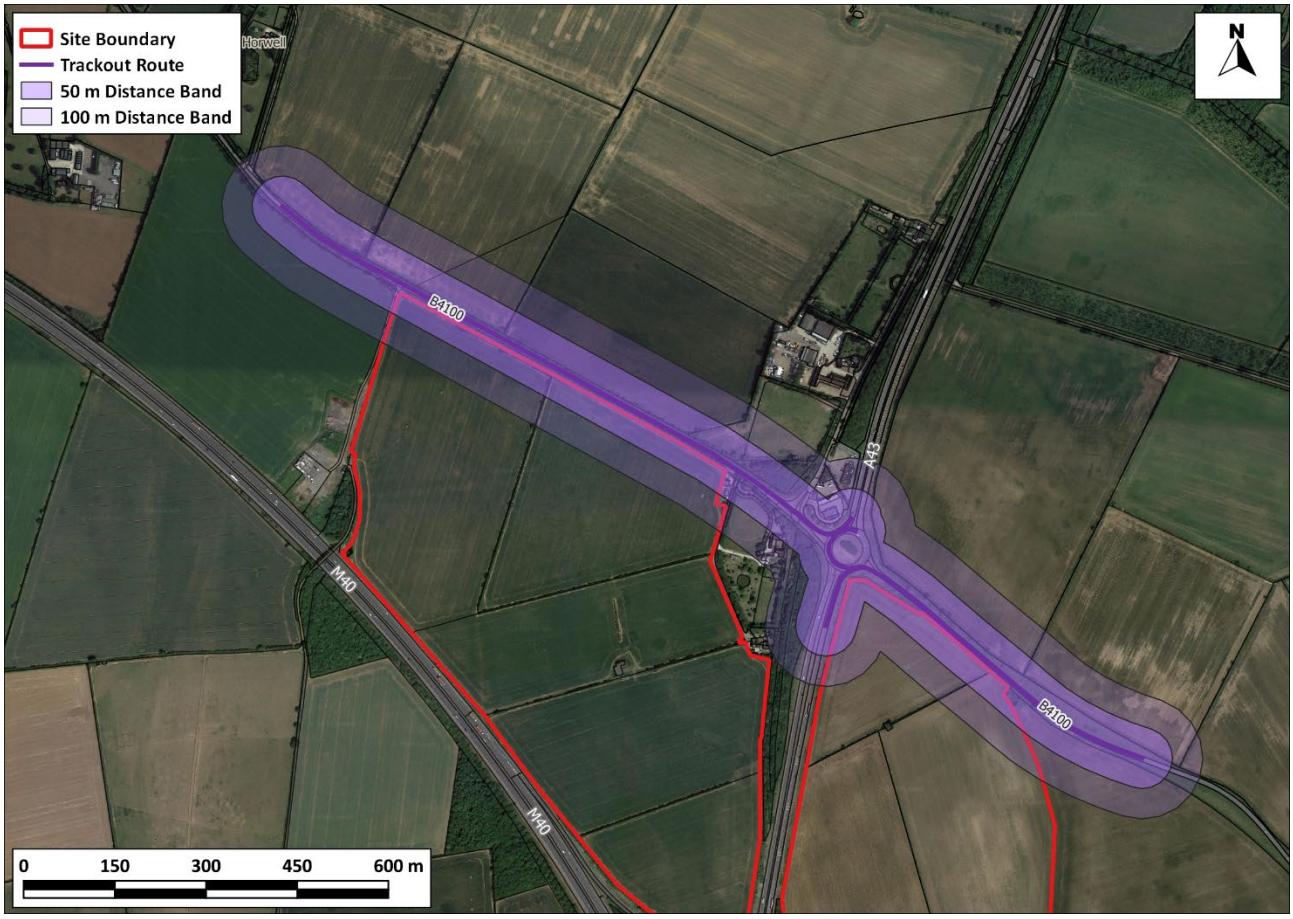
9.6.20 There are three residential properties within 20m of the Site boundary, and less than 10 residential properties within 100m (see Figure 9.8). The area surrounding on-site works is considered to be of medium sensitivity to dust soiling and of low sensitivity to human health impacts.

Figure 9.8: 20m, 50m and 100m Distance Bands around Site




9.6.21 Paragraph 9.6.19 explains that the dust emissions magnitude for trackout is large, and there is thus a risk of material being tracked out 250m from the exit of both the Eastern and Western Developments. As the exact route of construction vehicles is not known, it has been assumed all possible routes could be affected. There are two - four residential properties within 50m of roads along which material could be tracked, and fewer than 10 receptors within 100m (see Figure 9.9).

Figure 9.9: 20m and 50m Distance Bands around Roads within 250m of Site




9.6.22 The area is considered of medium sensitivity to dust soiling and of low sensitivity to human health effects from track out.

*Risk and Significance*

9.6.23 Risk categories, without mitigation, are set out in Table 9.10, and have been used to determine the appropriate level of mitigation to be applied during the construction phase.

Table 9.10: Summary of Risk of Impacts (Development) Without Mitigation

| Source | Dust Soiling | Human Health |
|---|---|---|
| Earthworks | Medium Risk | Low Risk |
| Construction | Medium Risk | Low Risk |
| Trackout | Medium Risk | Low Risk |

9.6.24 Without mitigation, the construction phase of the Development would result in a medium risk of temporary, medium-term, direct adverse effects. The IAQM guidance is clear, however, that with appropriate mitigation in place, the residual effect will be 'not significant'.

**Mitigation, Monitoring and Residual Effects**

9.6.25 Measures to mitigate dust emissions will be required during the construction phase of the Development in order to minimise effects upon nearby sensitive receptors. These are described in Section 9.5 of this chapter. Provided mitigation measures are implemented and maintained, the residual effects will remain as assessed and will be 'not significant'.

## 9.7 Completed Development

### Eastern Development

#### Nitrogen Dioxide

9.7.1 Predicted annual mean concentrations of $NO_2$ in 2026 at existing receptors are set out in Table 9.11 for both the 'Without Development' and 'With Eastern Development' scenario. The impact at each receptor is also described using the impact descriptors in Table 9.3.

Table 9.11: Predicted Impacts of the Eastern Development on $NO_2$ Concentrations in 2026 (µg/m$^3$)

| Receptor | Without Development | With Eastern Development | % Change [vi] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 11.5 | 11.6 | 0 | Negligible |
| 2 | 14.4 | 14.6 | 0 | Negligible |
| 3 | 14.7 | 14.9 | 1 | Negligible |
| 4 | 14.3 | 14.4 | 0 | Negligible |
| 5 | 15.2 | 15.3 | 0 | Negligible |
| 6 | 22.7 | 22.7 | 0 | Negligible |
| 7 | **40.9** | **41.0** | 0 | Negligible |
| 8 | 12.9 | 13.1 | 0 | Negligible |
| 9 | 8.4 | 8.4 | 0 | Negligible |
| 10 | 9.2 | 9.2 | 0 | Negligible |
| 11 | 12.7 | 12.8 | 0 | Negligible |
| 12 | 9.0 | 9.0 | 0 | Negligible |
| 13 | 11.0 | 11.1 | 0 | Negligible |
| 14 | 11.0 | 11.1 | 0 | Negligible |
| 15 | 11.0 | 11.1 | 0 | Negligible |
| 16 | 10.5 | 10.6 | 0 | Negligible |
| 17 | 11.0 | 11.0 | 0 | Negligible |
| 18 | 10.2 | 10.3 | 0 | Negligible |
| 19 | 10.1 | 10.2 | 0 | Negligible |
| 20 | 13.7 | 13.8 | 0 | Negligible |
| 21 | 13.5 | 13.6 | 0 | Negligible |
| 22 | 15.9 | 16.0 | 0 | Negligible |
| 23 | 15.6 | 15.7 | 0 | Negligible |
| 24 | 11.4 | 11.5 | 0 | Negligible |
| 25 | 9.2 | 9.2 | 0 | Negligible |
| Objective | 40 | | - | - |

9.7.2 As shown in Table 9.11, annual mean $NO_2$ concentrations are well below the objective at all modelled receptors, except for receptor 7 where the objective is exceeded both Without the Development and with the Eastern Development. The Eastern Development will cause an increase in concentrations of between 0% and 1% of the objective (when rounded), with the impact being described as negligible at all receptors.

[vi] % changes are relative to the objective and rounded to the nearest whole number.

### Particulate Matter

9.7.3 Predicted annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ in 2026 at existing receptors are set out in Table 9.12 and Table 9.13 respectively, for both the 'Without Development' and 'With Eastern Development' scenario. The impact at each receptor is also described using the impact descriptors in Table 9.3.

Table 9.12: Predicted Impacts of the Eastern Development on $PM_{10}$ Concentrations in 2026 (µg/m$^3$)

| Receptor | Without Development | With Eastern Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 16.0 | 16.0 | 0 | Negligible |
| 2 | 16.3 | 16.3 | 0 | Negligible |
| 3 | 16.3 | 16.4 | 0 | Negligible |
| 4 | 15.7 | 15.7 | 0 | Negligible |
| 5 | 15.8 | 15.9 | 0 | Negligible |
| 6 | 17.3 | 17.3 | 0 | Negligible |
| 7 | 19.6 | 19.6 | 0 | Negligible |
| 8 | 14.7 | 14.7 | 0 | Negligible |
| 9 | 14.0 | 14.0 | 0 | Negligible |
| 10 | 14.2 | 14.2 | 0 | Negligible |
| 11 | 14.9 | 14.9 | 0 | Negligible |
| 12 | 14.1 | 14.1 | 0 | Negligible |
| 13 | 14.7 | 14.7 | 0 | Negligible |
| 14 | 14.7 | 14.7 | 0 | Negligible |
| 15 | 14.7 | 14.7 | 0 | Negligible |
| 16 | 14.6 | 14.6 | 0 | Negligible |
| 17 | 14.6 | 14.6 | 0 | Negligible |
| 18 | 14.8 | 14.8 | 0 | Negligible |
| 19 | 14.8 | 14.8 | 0 | Negligible |
| 20 | 16.5 | 16.5 | 0 | Negligible |
| 21 | 17.0 | 17.0 | 0 | Negligible |
| 22 | 17.2 | 17.2 | 0 | Negligible |
| 23 | 14.9 | 14.9 | 0 | Negligible |
| 24 | 15.9 | 15.9 | 0 | Negligible |
| 25 | 14.7 | 14.7 | 0 | Negligible |
| Criterion [vii] | 32 | | - | - |

[vii] While the annual mean $PM_{10}$ objective is 40 µg/m$^3$, 32 µg/m$^3$ is the annual mean concentration above which an exceedance of the 24-hour mean $PM_{10}$ objective is possible. A value of 32 µg/m$^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean $PM_{10}$ objective, as recommended in EPUK & IAQM guidance.

Table 9.13: Predicted Impacts of the Completed Eastern Development on $PM_{2.5}$ Concentrations in 2026 (µg/m$^3$)

| Receptor | Without Development | With Eastern Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 9.4 | 9.4 | 0 | Negligible |
| 2 | 9.6 | 9.6 | 0 | Negligible |
| 3 | 9.6 | 9.6 | 0 | Negligible |
| 4 | 9.6 | 9.6 | 0 | Negligible |
| 5 | 9.7 | 9.7 | 0 | Negligible |
| 6 | 10.4 | 10.4 | 0 | Negligible |
| 7 | 11.8 | 11.8 | 0 | Negligible |
| 8 | 8.9 | 8.9 | 0 | Negligible |
| 9 | 8.6 | 8.6 | 0 | Negligible |
| 10 | 8.7 | 8.7 | 0 | Negligible |
| 11 | 9.1 | 9.1 | 0 | Negligible |
| 12 | 8.7 | 8.7 | 0 | Negligible |
| 13 | 9.7 | 9.7 | 0 | Negligible |
| 14 | 9.7 | 9.7 | 0 | Negligible |
| 15 | 9.7 | 9.7 | 0 | Negligible |
| 16 | 9.6 | 9.6 | 0 | Negligible |
| 17 | 9.7 | 9.7 | 0 | Negligible |
| 18 | 9.2 | 9.2 | 0 | Negligible |
| 19 | 9.2 | 9.2 | 0 | Negligible |
| 20 | 9.7 | 9.7 | 0 | Negligible |
| 21 | 9.7 | 9.7 | 0 | Negligible |
| 22 | 10.0 | 10.1 | 0 | Negligible |
| 23 | 9.2 | 9.2 | 0 | Negligible |
| 24 | 9.3 | 9.3 | 0 | Negligible |
| 25 | 8.7 | 8.8 | 0 | Negligible |
| Objective | 20 | | - | - |

9.7.4 As shown in Tables 9.12 and 9.13, annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ are well below the objectives at all receptors. The Eastern Development will cause an increase in concentration of 0% of the objective (when rounded) at all receptors, with all the impacts being described as negligible.

9.7.5 Concentrations of $PM_{10}$ are all well below 32 µg/m$^3$, and there is thus unlikely to be a risk of exceedance of the 24-hour mean $PM_{10}$ objective at any receptor.

### Significance of Operational Effects

9.7.6 The Eastern Development will result in permanent, long-term, direct adverse effects on air quality, but these are all described as 'negligible' and thus not significant.

### Western Development

#### Nitrogen Dioxide

9.7.7 Predicted annual mean concentrations of $NO_2$ in 2026 at existing receptors are set out in Table 9.14 for both the 'Without Development' and 'With Western Development' scenario. The impact at each receptor is also described using the impact descriptors in Table 9.3.

Table 9.14: Predicted Impacts of the Completed Western Development on $NO_2$ Concentrations in 2026 (µg/m$^3$)

| Receptor | Without Development | With Western Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 11.5 | 12.5 | 3 | Negligible |
| 2 | 14.4 | 15.4 | 2 | Negligible |
| 3 | 14.7 | 15.5 | 2 | Negligible |
| 4 | 14.3 | 14.5 | 0 | Negligible |
| 5 | 15.2 | 15.4 | 1 | Negligible |
| 6 | 22.7 | 22.7 | 0 | Negligible |
| 7 | **40.9** | **41.1** | 0 | Negligible[viii] |
| 8 | 12.9 | 13.2 | 1 | Negligible |
| 9 | 8.4 | 8.4 | 0 | Negligible |
| 10 | 9.2 | 9.3 | 0 | Negligible |
| 11 | 12.7 | 12.9 | 1 | Negligible |
| 12 | 9.0 | 9.1 | 0 | Negligible |
| 13 | 11.0 | 11.1 | 0 | Negligible |
| 14 | 11.0 | 11.1 | 0 | Negligible |
| 15 | 11.0 | 11.1 | 0 | Negligible |
| 16 | 10.5 | 10.6 | 0 | Negligible |
| 17 | 11.0 | 11.1 | 0 | Negligible |
| 18 | 10.2 | 10.3 | 0 | Negligible |
| 19 | 10.1 | 10.2 | 0 | Negligible |
| 20 | 13.7 | 14.1 | 1 | Negligible |
| 21 | 13.5 | 13.7 | 1 | Negligible |
| 22 | 15.9 | 16.1 | 1 | Negligible |
| 23 | 15.6 | 15.8 | 1 | Negligible |
| 24 | 11.4 | 11.6 | 0 | Negligible |
| 25 | 9.2 | 9.3 | 0 | Negligible |
| Objective | 40 | | - | - |

9.7.8 As shown in Table 9.14, annual mean $NO_2$ concentrations are well below the objective at all receptors, except for receptor 7 where the objective is exceeded both Without the Development and with the Western Development. The Western Development will cause an

[viii] The absolute change in concentration between the 'Without Development' and 'Completed Development' scenarios is 0.13 µg/m$^3$. This is less than a 0.5% increase relative to the AQAL, or a 1% increase when rounded to the nearest whole number.

increase in concentrations of between 0% and 3% of the objective (when rounded). The impact is described as negligible at all receptors.

### Particulate Matter

9.7.9 Predicted annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ in 2026 at existing receptors are set out in Table 9.15 and Table 9.16 respectively, for both the 'Without Development' and 'With Western Development' scenario. The impact at each receptor is also described using the impact descriptors in Table 9.3.

Table 9.15: Predicted Impacts of the Completed Western Development on $PM_{10}$ Concentrations in 2026 (µg/m$^3$)

| Receptor | Without Development | With Western Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 16.0 | 16.1 | 1 | Negligible |
| 2 | 16.3 | 16.4 | 0 | Negligible |
| 3 | 16.3 | 16.4 | 0 | Negligible |
| 4 | 15.7 | 15.7 | 0 | Negligible |
| 5 | 15.8 | 15.9 | 0 | Negligible |
| 6 | 17.3 | 17.3 | 0 | Negligible |
| 7 | 19.6 | 19.6 | 0 | Negligible |
| 8 | 14.7 | 14.7 | 0 | Negligible |
| 9 | 14.0 | 14.0 | 0 | Negligible |
| 10 | 14.2 | 14.2 | 0 | Negligible |
| 11 | 14.9 | 14.9 | 0 | Negligible |
| 12 | 14.1 | 14.1 | 0 | Negligible |
| 13 | 14.7 | 14.7 | 0 | Negligible |
| 14 | 14.7 | 14.7 | 0 | Negligible |
| 15 | 14.7 | 14.7 | 0 | Negligible |
| 16 | 14.6 | 14.6 | 0 | Negligible |
| 17 | 14.6 | 14.6 | 0 | Negligible |
| 18 | 14.8 | 14.8 | 0 | Negligible |
| 19 | 14.8 | 14.8 | 0 | Negligible |
| 20 | 16.5 | 16.6 | 0 | Negligible |
| 21 | 17.0 | 17.0 | 0 | Negligible |
| 22 | 17.2 | 17.2 | 0 | Negligible |
| 23 | 14.9 | 14.9 | 0 | Negligible |
| 24 | 15.9 | 15.9 | 0 | Negligible |
| 25 | 14.7 | 14.7 | 0 | Negligible |
| Criterion [vi] | 32 | | - | - |

Table 9.16: Predicted Impacts of the Completed Western Development on $PM_{2.5}$ Concentrations in 2026 (µg/m$^3$)

| Receptor | Without Development | With Western Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 9.4 | 9.5 | 1 | Negligible |
| 2 | 9.6 | 9.7 | 0 | Negligible |

| Receptor | Without Development | With Western Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 3 | 9.6 | 9.7 | 0 | Negligible |
| 4 | 9.6 | 9.6 | 0 | Negligible |
| 5 | 9.7 | 9.7 | 0 | Negligible |
| 6 | 10.4 | 10.4 | 0 | Negligible |
| 7 | 11.8 | 11.8 | 0 | Negligible |
| 8 | 8.9 | 8.9 | 0 | Negligible |
| 9 | 8.6 | 8.6 | 0 | Negligible |
| 10 | 8.7 | 8.7 | 0 | Negligible |
| 11 | 9.1 | 9.1 | 0 | Negligible |
| 12 | 8.7 | 8.7 | 0 | Negligible |
| 13 | 9.7 | 9.7 | 0 | Negligible |
| 14 | 9.7 | 9.7 | 0 | Negligible |
| 15 | 9.7 | 9.7 | 0 | Negligible |
| 16 | 9.6 | 9.7 | 0 | Negligible |
| 17 | 9.7 | 9.7 | 0 | Negligible |
| 18 | 9.2 | 9.2 | 0 | Negligible |
| 19 | 9.2 | 9.2 | 0 | Negligible |
| 20 | 9.7 | 9.7 | 0 | Negligible |
| 21 | 9.7 | 9.7 | 0 | Negligible |
| 22 | 10.0 | 10.1 | 0 | Negligible |
| 23 | 9.2 | 9.3 | 0 | Negligible |
| 24 | 9.3 | 9.3 | 0 | Negligible |
| 25 | 8.7 | 8.8 | 0 | Negligible |
| Objective | 20 | | - | - |

9.7.10 As shown in Tables 9.15 and 9.16, annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ are well below the objectives at all receptors. The Western Development will cause an increase in concentration of 0% of the objective (when rounded) at all receptors. The exception is Receptor 1, where the increase will be 1% for both $PM_{10}$ and $PM_{2.5}$. All the impacts are described as negligible.

9.7.11 Concentrations of $PM_{10}$ are all well below 32 µg/m$^3$, and there is thus unlikely to be a risk of exceedance of the 24-hour mean $PM_{10}$ objective at any receptor.

### Significance of Operational Effects

9.7.12 The Western Development will result in permanent, long-term, direct adverse effects on air quality, but these are all described as 'negligible' and thus not significant.

## Development

### Nitrogen Dioxide

9.7.13 Predicted annual mean concentrations of $NO_2$ in 2026 at existing receptors are set out in Table 9.17 for both the 'Without Development' and 'Completed Development' scenario. The impact at each receptor is also described using the impact descriptors in Table 9.3.

Table 9.17: Predicted Impacts of the Completed Development on $NO_2$ Concentrations in 2026 ($\mu g/m^3$)

| Receptor | Without Development | Completed Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 11.5 | 12.6 | 3 | Negligible |
| 2 | 14.4 | 15.5 | 3 | Negligible |
| 3 | 14.7 | 15.7 | 2 | Negligible |
| 4 | 14.3 | 14.6 | 1 | Negligible |
| 5 | 15.2 | 15.6 | 1 | Negligible |
| 6 | 22.7 | 22.8 | 0 | Negligible |
| 7 | **40.9** | **41.1** | 1 | Moderate Adverse[ix] |
| 8 | 12.9 | 13.3 | 1 | Negligible |
| 9 | 8.4 | 8.5 | 0 | Negligible |
| 10 | 9.2 | 9.3 | 0 | Negligible |
| 11 | 12.7 | 13.1 | 1 | Negligible |
| 12 | 9.0 | 9.1 | 0 | Negligible |
| 13 | 11.0 | 11.2 | 1 | Negligible |
| 14 | 11.0 | 11.2 | 1 | Negligible |
| 15 | 11.0 | 11.2 | 1 | Negligible |
| 16 | 10.5 | 10.6 | 0 | Negligible |
| 17 | 11.0 | 11.1 | 0 | Negligible |
| 18 | 10.2 | 10.3 | 0 | Negligible |
| 19 | 10.1 | 10.2 | 0 | Negligible |
| 20 | 13.7 | 14.2 | 1 | Negligible |
| 21 | 13.5 | 13.8 | 1 | Negligible |
| 22 | 15.9 | 16.3 | 1 | Negligible |
| 23 | 15.6 | 16.0 | 1 | Negligible |
| 24 | 11.4 | 11.6 | 0 | Negligible |
| 25 | 9.2 | 9.3 | 0 | Negligible |
| Objective | 40 | | - | - |

9.7.14 As shown in Table 9.17, annual mean $NO_2$ concentrations are well below the objective at all receptors except for receptor 7 where the objective is exceeded both Without the Development and with the Development. The Development will cause an increase in concentrations of between 0% and 3% of the objective (when rounded). The impact is described as moderate adverse at receptor 7 and negligible at all remaining receptors. The change in concentration at receptor 7 is only 1%, but the baseline concentration is sufficiently high that even a 1% increase in concentration (when rounded) leads to a moderate adverse impact.

### Particulate Matter

9.7.15 Predicted annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ in 2026 at existing receptors are set out in Table 9.18 and Table 9.19 respectively, for both the 'Without Development' and

[ix] The absolute change in concentration between the 'Without Development' and 'Completed Development' scenarios is 0.2 $\mu g/m^3$ which is a 0.5% increase relative to the AQAL, or a 1% increase when rounded to the nearest whole number.

'Completed Development' scenario. The impact at each receptor is also described using the impact descriptors in Table 9.3.

Table 9.18: Predicted Impacts of the Completed Development on $PM_{10}$ Concentrations in 2026 ($\mu g/m^3$)

| Receptor | Without Development | Completed Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 16.0 | 16.2 | 1 | Negligible |
| 2 | 16.3 | 16.5 | 0 | Negligible |
| 3 | 16.3 | 16.5 | 0 | Negligible |
| 4 | 15.7 | 15.7 | 0 | Negligible |
| 5 | 15.8 | 15.9 | 0 | Negligible |
| 6 | 17.3 | 17.3 | 0 | Negligible |
| 7 | 19.6 | 19.6 | 0 | Negligible |
| 8 | 14.7 | 14.7 | 0 | Negligible |
| 9 | 14.0 | 14.0 | 0 | Negligible |
| 10 | 14.2 | 14.2 | 0 | Negligible |
| 11 | 14.9 | 14.9 | 0 | Negligible |
| 12 | 14.1 | 14.1 | 0 | Negligible |
| 13 | 14.7 | 14.7 | 0 | Negligible |
| 14 | 14.7 | 14.7 | 0 | Negligible |
| 15 | 14.7 | 14.7 | 0 | Negligible |
| 16 | 14.6 | 14.6 | 0 | Negligible |
| 17 | 14.6 | 14.6 | 0 | Negligible |
| 18 | 14.8 | 14.8 | 0 | Negligible |
| 19 | 14.8 | 14.8 | 0 | Negligible |
| 20 | 16.5 | 16.6 | 0 | Negligible |
| 21 | 17.0 | 17.1 | 0 | Negligible |
| 22 | 17.2 | 17.3 | 0 | Negligible |
| 23 | 14.9 | 15.0 | 0 | Negligible |
| 24 | 15.9 | 15.9 | 0 | Negligible |
| 25 | 14.7 | 14.7 | 0 | Negligible |
| Criterion [vi] | 32 | | - | - |

Table 9.19: Predicted Impacts of the Completed Development on $PM_{2.5}$ Concentrations in 2026 ($\mu g/m^3$)

| Receptor | Without Development | Completed Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 1 | 9.4 | 9.5 | 1 | Negligible |
| 2 | 9.6 | 9.7 | 0 | Negligible |
| 3 | 9.6 | 9.7 | 0 | Negligible |
| 4 | 9.6 | 9.6 | 0 | Negligible |
| 5 | 9.7 | 9.7 | 0 | Negligible |
| 6 | 10.4 | 10.4 | 0 | Negligible |
| 7 | 11.8 | 11.8 | 0 | Negligible |
| 8 | 8.9 | 8.9 | 0 | Negligible |

| Receptor | Without Development | Completed Development | % Change [v] | Impact Descriptor |
|---|---|---|---|---|
| 9 | 8.6 | 8.6 | 0 | Negligible |
| 10 | 8.7 | 8.7 | 0 | Negligible |
| 11 | 9.1 | 9.1 | 0 | Negligible |
| 12 | 8.7 | 8.7 | 0 | Negligible |
| 13 | 9.7 | 9.7 | 0 | Negligible |
| 14 | 9.7 | 9.7 | 0 | Negligible |
| 15 | 9.7 | 9.7 | 0 | Negligible |
| 16 | 9.6 | 9.7 | 0 | Negligible |
| 17 | 9.7 | 9.7 | 0 | Negligible |
| 18 | 9.2 | 9.2 | 0 | Negligible |
| 19 | 9.2 | 9.2 | 0 | Negligible |
| 20 | 9.7 | 9.8 | 0 | Negligible |
| 21 | 9.7 | 9.7 | 0 | Negligible |
| 22 | 10.0 | 10.1 | 0 | Negligible |
| 23 | 9.2 | 9.3 | 0 | Negligible |
| 24 | 9.3 | 9.3 | 0 | Negligible |
| 25 | 8.7 | 8.8 | 0 | Negligible |
| Objective | 20 | | - | - |

9.7.16 As shown in Tables 9.18 and 9.19, annual mean concentrations of $PM_{10}$ and $PM_{2.5}$ are well below the objectives at all receptors. The Development will cause an increase in concentration of between 0% and 1% of the objective (when rounded) at all receptors for both $PM_{10}$ and $PM_{2.5}$. All the impacts are described as negligible.

9.7.17 Concentrations of $PM_{10}$ are all well below 32 µg/m$^3$, and there is thus unlikely to be a risk of exceedance of the 24-hour mean $PM_{10}$ objective at any receptor.

### Significance of Operational Effects

9.7.18 For annual mean $NO_2$, the Development will result in permanent, long-term and direct moderate adverse effects on air quality at one receptor (although this has the potential to affect any receptors within 20m downwind of the M40 where traffic levels are as modelled near the Development), with permanent, long-term, direct and negligible adverse effects on air quality at all other receptors. For $PM_{10}$ and $PM_{2.5}$, permanent, direct and negligible adverse effects are predicted at all receptors. Concentrations of all pollutants are well below the relevant air quality objectives at the majority of receptors, with the exception of receptor 7, which is located within 20m of the M40.

9.7.19 Model results represent a number of worst-case assumptions, particularly adjacent to the M40, where there are often densely wooded banks between the road and any adjacent properties, which have not been modelled and will affect dispersion from the M40 to modelled receptors. In reality, concentrations adjacent to the M40 are likely to be significantly lower than those predicted. This is supported by monitored nitrogen dioxide concentrations within 25m of the M40, which were well below the objective in 2022 (see paragraph 9.4.8). If concentrations are as at monitored sites, the predicted 1% increase at receptor 7, in accordance with Table 9.3, would result in a negligible adverse effect.

9.7.20 As the majority of effects are negligible for all pollutants at all receptors, and when considering the potential for significant model overprediction at the receptor where moderate adverse effects are predicted, the operational effects of the Development are judged to be 'not significant'.

### Mitigation, Monitoring and Residual Effects

9.7.21 The assessment has demonstrated that the overall air quality effect of the Development on human health receptors will be 'not significant'; the Development will not cause any exceedances of the air quality objectives, or lead to any impacts that would be described as significant. Therefore, further mitigation measures are not proposed in this regard.

9.7.22 Measures to reduce pollutant emissions from road traffic are also being delivered in the longer term by the introduction of increasingly stringent emissions standards and through the increasing uptake of electric vehicles.

## 9.8 Cumulative Effects

9.8.1 Five cumulative schemes (including the adjacent 'Tritax Scheme') have been identified and form part of the future baseline. As such, the impacts of the Development from both the construction phase and the completed development on the cumulative schemes are inherently considered within the assessment. However, the operational impacts of the Development, in combination with the Tritax Scheme, have been explicitly considered below.

### Construction

9.8.2 The IAQM Guidance is clear that, with appropriate mitigation measures in place, any residual construction dust effects from an individual site will be 'not significant'. The guidance also suggests that cumulative construction dust impacts are only likely where sites are within 250m of each other. Work would also have to be taking place in areas of both sites that are close to a receptor in order for cumulative effects to occur.

9.8.3 In accordance with the mitigation measures set out in Appendix 16.7, if there is concurrent construction work on sites within 250m of each other, the construction contractors should *"hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised".*

9.8.4 The Tritax Scheme is within 250m of the Site. There are five sensitive receptors within 250m of both the Development and the Tritax Scheme. It is anticipated that both construction sites will adopt appropriate mitigation measures to limit emissions of dust, will hold the liaison meetings recommended above and will ensure that plans are co-ordinated to minimise impacts upon the most sensitive receptors. With these measures in place, the cumulative effect of construction activities should be 'not significant'.

### Completed Development

9.8.5 The traffic data used in the operational 'Without Development' and 'Completed Development' scenarios incorporate traffic flows associated with all cumulative schemes (including the adjacent Tritax Scheme) which would affect flows on the roads included in

this assessment. As such, the predictions of future pollutant concentrations presented in this chapter take account of cumulative effects.

9.8.6 The cumulative effects of the Development in combination with the Tritax Scheme have been discretely modelled and compared against the 'Without Development' scenario. The combined impacts of both schemes are predicted to be the same as those presented in Paragraphs 9.7.13 to 9.7.17.

9.8.7 Predicted annual mean nitrogen dioxide concentrations are predicted to be below the objectives, with impacts described as negligible at all receptors, with the exception of receptor 7, where concentrations are predicted to be above the objective, and the impact is described as moderate adverse. Predicted annual mean $PM_{10}$ and $PM_{2.5}$ concentrations are predicted to be below the objectives at all receptors, and the impacts are described as negligible. The full modelling results are provided in Appendix 9.6.

Table 9.21: Summary of Residual Effects

| Effect | Receptor (Sensitivity) | Geographic Scale | Temporal Scale | Magnitude of Impact | | Mitigation and Monitoring | | Residual Effect | |
|---|---|---|---|---|---|---|---|---|---|
| *Construction* | | | | | | | | | |
| Dust soiling and human health impacts from emissions of $PM_{10}$ | Existing residential properties (high) | Local | Temporary | Eastern Development | Low risk | Eastern Development | Adherence to CEMP / DMP / mitigation measures | Eastern Development | Negligible (not significant) |
| | | | | Western Development | Medium risk | Western Development | | Western Development | Negligible (not significant) |
| | | | | Development | Medium risk | Development | | Development | Negligible (not significant) |
| Emissions from construction vehicles | Existing residential properties (high) | Local, district | Temporary | Development | Negligible | Development | N/A | Development | Negligible (not significant) |
| Emissions from on-site plant | Existing residential properties (high) | Local | Temporary | Development | Negligible | Development | | Development | Negligible (not significant) |
| *Completed Development* | | | | | | | | | |
| Human health impacts from emissions from additional operational road traffic | Existing residential properties (high) | Local, district | Permanent | Eastern Development | Negligible | Eastern Development | N/A | Eastern Development | Negligible (not significant) |
| | | | | Western Development | Negligible | Western Development | | Western Development | Negligible (not significant) |
| | | | | Development | Negligible – Moderate Adverse | Development | | Development | Negligible (not significant) |

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