Land to the East of Hoad Way, Theale, RG7 5AR

Air Quality Assessment

784-B030924
24th August 2023

PRESENTED TO

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EXECUTIVE SUMMARY

This report presents the findings of an updated air quality assessment undertaken to assess road traffic emission and construction dust impacts in support of a planning application for the construction of a new industrial development, on the site East of Hoad Way, Theale.

Construction Phase

The potential effects during the demolition and construction phases include fugitive dust emissions from site activities, such as earthworks, construction and trackout.

During the construction phase, site specific mitigation measures detailed within this assessment will be implemented. The proposed mitigation measures can be found in Section 8.2. of the 'IAQM Guidance on the Assessment of Dust from Demolition and Construction' and are related to communication, dust management, earthwork, construction and trackout activities. These are presented in Section 7.1. With these mitigation measures in place, the effects from the construction phase are not predicted to be significant.

Operational Phase

The impacts during the operational phase take into account exhaust emissions from additional road traffic generated due to the proposed development. Detailed dispersion modelling of traffic pollutants has been undertaken for the proposed development. An operational year assessment for 2026 traffic emissions has been undertaken to assess the effects of the Proposed Development. The impacts during the operational phase take into account exhaust emissions from additional road traffic generated due to the proposed development.

The long-term (annual) assessment of the effects associated with the proposed development with respect to Nitrogen Dioxide (NO_2) is determined to be 'negligible'. With respect to PM_{10} and $PM_{2.5}$ exposure, the effect is determined to be 'negligible' at all identified existing sensitive receptor locations. The effect at ecological receptors is not predicted to be significant.

Based on the assessment undertaken and data, methodology and assumptions used within this assessment it is concluded that the site is suitable for the proposed development.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling Software
AQAL	the Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Standards
CHP	Combined Heat and Power
CL	Critical Level
CO	Carbon Monoxide
DEFRA	Department for Environment Food & Rural Affairs
EAL	Environmental Assessment Limits
EC	European Commission
EFT	The Emissions Factors Toolkit
EPUK	Environmental Protection UK
EU	European Union
EPAQS	The Expert Panel on Air Quality Standards
IAQM	The Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	The United Kingdom National Grid Reference
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
PC	Process Contribution
MHCLG	the Ministry for Housing, Communities and Local Government
NPPF	The National Planning Policy Framework
OS	the UK Ordnance Survey
PEC	Predicted Environment Concentration
PPG	Planning Policy Guidance
PPS	Planning Policy Statements
SAC	Special Areas of Conservation
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
VOC	Volatile organic compounds
WHO	World Health Organization
UK	The United Kingdom

1.0 INTRODUCTION

This report presents the findings of an updated air quality assessment undertaken to assess road traffic emission and construction dust impacts in support of a planning application for the construction of a new industrial development, on the site East of Hoad Way, Theale.

1.1 SITE LOCATION

The central Grid Reference is approximately 464757, 171484. The Site is bounded to the north by open fields, to the east by the M4, to the south by Bath Road, to the west by Hoad Way and to the north-west by existing residential properties.

Reference should be made to **Figure 1-1** for a map of the application site and surrounding area.

Figure 1-1. Satellite Image of Site and Surrounding Area

Google Imagery (2023)

1.2 CONTEXT

The primary source of the air quality pollutants associated with the proposed scheme is from vehicle movements, arriving and departing the proposed development. The traffic data generated by the development has been assessed at the surrounding sensitive receptors.

The following assessment stages have been undertaken as part of this assessment:

- Baseline evaluation;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase;
- Identification of mitigation measures (as required).

The results of the assessment are detailed in the following sections of this report.

The construction phase assessment considers the potential effects of dust and particulate emissions from site activities and materials movement using a qualitative risk assessment method based on the Institute of Air Quality Management's (IAQM) 'Guidance on the Assessment of Dust from Demolition and Construction' document, published in 2014.

The assessment of the potential air quality impacts that are associated with the operational phase has focused on the predicted impact of changes in ambient nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) and less than 2.5 µm ($PM_{2.5}$) as a result of the development at key local receptor locations. The changes have been referenced to EU air quality limits and UK air quality objectives and the magnitude and impact description of the changes have been referenced to non-statutory guidance issued by the IAQM and Environmental Protection UK (EPUK).

1.3 REPORT STRUCTURE

Following this introductory section, the remainder of this report is structured as follows:

- Section 2.0: Policy and Legislative Context
- Section 3.0: Assessment Methodology
- Section 4.0: Baseline Conditions
- Section 5.0: Assessment of Air Quality Impacts – Construction Phase
- Section 6.0: Assessment of Air Quality Impacts – Operational Phase
- Section 7.0: Mitigation
- Section 8.0: Conclusions

All technical Appendices are included at the end of this report for information.

2.0 POLICY AND LEGISLATIVE CONTEXT

2.1 DOCUMENTS CONSULTED

The following documents were consulted during the undertaking of this assessment:

Legislation and Best Practice Guidance

- National Planning Policy Framework, Ministry for Housing, Communities and Local Government, Revised July 2021;
- Planning Practice Guidance: Air Quality, Ministry for Housing, Communities and Local Government, November 2019;
- The Air Quality Standards Regulations (Amendments), 2016;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra, 2007;
- The Environment Act 1995;
- The Environment Act 2021;
- The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023;
- Local Air Quality Management Technical Guidance LAQM.TG(22), Defra, 2022;
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, LA 105 Air quality, Highways England, November 2019;
- Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, 2017;
- Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2014;
- A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1), IAQM, May 2020; and,
- Ecological Assessment of Air Quality Impacts, CIEEM, January 2021.

Websites Consulted

- Google maps (maps.google.co.uk);
- The UK National Air Quality Archive (www.airquality.co.uk);
- Department for Transport: Road Traffic Statistics (https://roadtraffic.dft.gov.uk/);
- Multi-Agency Geographic Information for the Countryside (http://magic.defra.gov.uk/);
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/); and,
- West Berkshire Council (http://www.westberks.gov.uk/).

Site Specific Reference Documents

- 2020 Air Quality Annual Status Report, West Berkshire Council;
- West Berkshire Council, West Berkshire District Local Plan 1991 – 2006;
- West Berkshire Council, Replacement Minerals Local Plan for Berkshire;
- Waste Local Plan for Berkshire, adopted December 1998; and,
- West Berkshire Council Core Strategy Development Plan Document, Adopted July 2012.

2.2 AIR QUALITY LEGISLATIVE FRAMEWORK

European Legislation

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- **Directive 1999/30/EC** – the First Air Quality 'Daughter' Directive – sets ambient air limit values for NO_2 and oxides of nitrogen, sulphur dioxide, lead and PM_{10};
- **Directive 2000/69/EC** – the Second Air Quality 'Daughter' Directive – sets ambient air limit values for benzene and carbon monoxide; and,
- **Directive 2002/3/EC** – the Third Air Quality 'Daughter' Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

The European Commission (EC) Directive Limits, outlined above, have been transposed in the UK through the Air Quality Standards Regulations. In the UK responsibility for meeting ambient air quality limit values is devolved to the national administrations in Scotland, Wales and Northern Ireland.

The European Union (Withdrawal) Act 2018 (EUWA) provides a new framework for the continuity of 'retained EU law' in the UK. EU Directives no longer have to be implemented by the UK except to any extent agreed or decided by the UK unilaterally.

EUWA retains the domestic effect of EU Directives to the extent already implemented in UK law, by preserving the relevant domestic implementing legislation enacted in UK law before 'Implementation Period' completion day. Though the EU Directives are not retained, following the UK's departure from the EU, the EUWA converts the current framework of Air Quality targets, however the role that the EU instructions were party to are lost.

UK Legislation

The Air Quality Standards Regulations (Amendments 2016) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001, Part 7 Regulation 31 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 amends the AQO for $PM_{2.5}$ outlined within the Air Quality Standards Regulations (2010 & 2016 Amendments).

The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in **Table 2-1** and **Table 2-2** along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines. The ecological levels are based on WHO and CLRTAP (Convention on Long-range Transboundary Air Pollution) guidance.

Table 2-1. Air Quality Standards, Objectives, Limits and Target Values

Pollutant	Applies	Objective	Concentration Measured as[10]	Date to be achieved and maintained thereafter	European Obligations	Date to be achieved and maintained thereafter	New or existing
PM_{10}	UK	50 µg/m^3 by end of 2004 (max 35 exceedances a year)	24-hour Mean	1st January 2005	50 µg/m^3 by end of 2004 (max 35 exceedances a year)	1st January 2005	Retain Existing
	UK	40 µg/m^3 by end of 2004	Annual Mean	1st January 2005	40 µg/m^3	1st January 2005	
$PM_{2.5}$	UK	10 µg/m^3	Annual Mean	31st December 2040	-	-	New
NO_2	UK	200 µg/m^3 not to be exceeded more than 18 times a year	1-Hour Mean	31st December 2005	200 µg/m^3 not to be exceeded more than 18 times a year	1st January 2010	Retain Existing
	UK	40 µg/m^3	Annual Mean	31st December 2005	40 µg/m^3	1st January 2010	

Table 2-2. Ecological Air Quality Standards, Objectives, Limit and Target Values

Pollutant	Applies	Objective	Concentration Measured as
NO_X	UK	30 µg/m^3	Annual Mean

Within the context of this assessment, the annual mean objectives are those against which facades of residential receptors will be assessed and the short-term objectives apply to all other receptor locations, where people may be exposed over a short duration, both residential and non-residential such as using gardens, balconies, walking along streets, using playgrounds, footpaths or external areas of employment uses.

Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves assessing present and likely future air quality against the AQOs. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA).

Environment Act 2021

The Environment Act (2021) introduces a commitment to create a legally binding duty on government to reduce the concentrations of fine particulate matter ($PM_{2.5}$) in ambient air, and to set a long-term target expected to be 10 µg/m^3, a reduction from the current Air Quality objective of 20 µg/m^3 set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. The Environment Act 2021 requires a draft of a statutory instrument (or drafts of statutory instruments) containing regulations setting the $PM_{2.5}$ air quality target must be laid before Parliament on or before 31st October 2022 to come into force thereafter.

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 was published on 31st January 2023, and came into force the following day. The 2023 Regulations introduce a reduced long-term annual average Air Quality Objective for $PM_{2.5}$ of 10 µg/m^3, a reduction from the current Air Quality objective of 20 µg/m^3 set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. Additionally, the 2023 Regulations introduce a population exposure target for $PM_{2.5}$ where there is at least a 35% reduction in population exposure by the end of 31st December 2040, as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018.

2.3 PLANNING AND POLICY GUIDANCE

National Policy

The National Planning Policy Framework (NPPF), revised July 2021, principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF states that:

Paragraph 174

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*

Paragraph 186

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

Paragraph 188

> *"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."*

The Planning Practice Guidance (PPG) web-based resource was updated by the Ministry for Housing, Communities and Local Government (MHCLG) on 1st November 2019 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following guidance (Paragraph: 001 Reference ID: 32-001-20191101):

> *"The 2008 Ambient Air Quality Directive sets legally binding limits for concentrations in outdoor air of major air pollutants that affect public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO_2).*
>
> *The UK also has national emission reduction commitments for overall UK emissions of 5 damaging air pollutants:*
>
> - *fine particulate matter ($PM_{2.5}$);*
> - *ammonia (NH_3);*
> - *nitrogen oxides (NO_x);*
> - *sulphur dioxide (SO_2); and*
> - *non-methane volatile organic compounds (NMVOCs).*
>
> *As well as having direct effects on public health, habitats and biodiversity, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity."*

Local Policy

West Berkshire Council Development Plan comprises a series of documents that set out the vision for the Council and contain policies to promote, accommodate and guide desirable development whilst protecting and enhancing the environment. This development plan currently comprises of the following documents:

- Core Strategy Development Plan Document (2006 – 2026), adopted July 2012;
- West Berkshire District Local Plan 1991 – 2006 (Saved Policies 2007);
- Replacement Minerals Local Plan for Berkshire, as amended in May 2001; and,
- Waste Local Plan for Berkshire, adopted December 1998.

Following a review of these policies, the following were identified as being relevant from an air quality perspective:

CORE STRATEGY DEVELOPMENT PLAN (2006-2026):

*"**Policy CS 13 Transport***

Development that generates a transport impact will be required to:

(...)

Minimise the impact of all forms of travel on the environment and help tackle climate change.

(...)."

WEST BERKSHIRE DISTRICT LOCAL PLAN 1991 – 2006 (SAVED POLICIES 2007):

*"**Environmental nuisance and pollution control (OVS. 5):***

The Council will only permit development proposals where they do not give rise to an unacceptable pollution of the environment. In order to minimise the adverse impact on the environment or loss of amenity proposals should have regard to:

(a) the need to ensure the adequate storage and disposal of waste materials; and

(b) the installation of equipment to minimise the harmful effects of emissions; and

(c) the hours, days or seasons of operations; and

(d) locating potential nuisance or pollution activities onto the least sensitive parts of the site or where the impacts can be best contained by physical or other appropriate measures."

3.0 ASSESSMENT METHODOLOGY

There is potential for environmental effects during the operational phase of the proposed development due to emissions from proposed vehicle movements. The significance of potential environmental effects is assessed according to the latest guidance produced by EPUK and IAQM in January 2017 '*Land-Use Planning & Development Control: Planning for Air Quality*' and May 2020 '*A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites*'.

The methodology used to determine the potential air quality effects of the construction phase of the proposed development has been derived from the IAQM '*Guidance on the Assessment of the Impacts of Dust from Demolition and Construction'* document and is summarised in Section 5.0.

3.1 DETERMINING IMPACT DESCRIPTION OF THE AIR QUALITY EFFECTS

The impact description of the effects during the operational phase of the development is based on the latest guidance produced by EPUK and IAQM in January 2017. The guidance provides a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall impact description of the air quality effects based on severity of air quality impacts.

The following rationale is used in determining the severity of the air quality effects at individual receptors:

1. The change in concentration of air pollutants, air quality effects, are quantified and evaluated in the context of AQOs. The effects are provided as a percentage of the Air Quality Objective (AQO), which may be an AQO, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)';
2. The absolute concentrations are also considered in terms of the AQO and are divided into categories for long term concentration. The categories are based on the sensitivity of the individual receptor in terms of harm potential. The degree of harm potential to change increases as absolute concentrations are close to or above the AQO;
3. Severity of the effect is described as qualitative descriptors; negligible, slight, moderate or substantial, by taking into account in combination the harm potential and air quality effect. This means that a small increase at a receptor which is already close to or above the AQO will have higher severity compared to a relatively large change at a receptor which is significantly below the AQO;
4. The effects can be adverse when pollutant concentrations increase or beneficial when concentrations decrease as a result of development;
5. The judgement of overall impact description of the effects is then based on severity of effects on all the individual receptors considered; and,
6. Where a development is not resulting in any change in emissions itself, the impact description of effect is based on the effect of surrounding sources on new residents or users of the development, i.e., will they be exposed to levels above the AQO.

Table 3-1. Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to AQO			
	1	2-5	6-10	>10
≤75% of AQO	Negligible	Negligible	Slight	Moderate
76-94% of AQO	Negligible	Slight	Moderate	Moderate
95-102% of AQO	Slight	Moderate	Moderate	Substantial
103-109 of AQO	Moderate	Moderate	Substantial	Substantial
≥110 of AQO	Moderate	Substantial	Substantial	Substantial

In accordance with explanation note 2 of Table 6.3 of the EPUK & IAQM guidance, the Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as Negligible.

3.2 ESTIMATING HOURLY AND DAILY MEAN CONCENTRATIONS

The latest Local Air Quality Management (LAQM) Technical Guidance TG(22) has been used for predicting 1 hourly and 24-hourly pollutant concentrations.

The guidance states that the one hour mean NO_2 AQO of 200 µg/m^3 is not likely to be exceeded at any roadside locations if the annual mean concentration is below 60 µg/m^3. Therefore, this assessment evaluates the likelihood of exceeding the hourly average NO_2 objective by comparing predicted annual average NO_2 concentrations at all receptors to an annual average equivalent threshold of 60 µg/m^3 NO_2. Where predicted concentrations are below this value, it can be concluded that the hourly average NO_2 objective is likely to be achieved.

In accordance with the guidance, the short term 24 hourly PM_{10} mean concentrations can be calculated using the following equation as presented below.

$$Number\ of\ 24\ hour\ mean\ exceedances = -18.5 + 0.00145\ x\ annual\ mean^3 + \left(\frac{206}{annual\ mean}\right)$$

4.0 BASELINE CONDITIONS

4.1 AIR QUALITY REVIEW

This section provides a review of the existing air quality in the vicinity of the application site in order to provide a benchmark against which to assess potential air quality impacts of the proposed development. Baseline air quality in the vicinity of the application site has been defined from several sources, as described in the following sections.

Local Air Quality Management (LAQM)

As required under section 82 of the Environment Act 1995, West Berkshire Council (WBC) has undertaken an ongoing exercise to review and assess air quality within its area of jurisdiction.

The assessments have indicated that concentrations of NO_2 are above the relevant AQOs at two location of relevant public exposure within WBC that is shown below.

Table 4-1. Local Authority AQMA Details

AQMA	Description	Date Declared	Date Amended	Pollutants Declared
Newbury AQMA	An area encompassing the roundabout junction of the A339, A343 and Greenham Road in Newbury	12/05/2009	N/A	Nitrogen Dioxide NO_2
West Berkshire Thatcham AQMA	Part of the A4 in Thatcham from the harts Hill Road junction to the junction with the Broadway	25/11/2011	N/A	Nitrogen Dioxide NO_2

The proposed development is located 2.8 km west of the Reading AQMA which is located within the jurisdiction of Reading Borough Council. Due to the large distance and proportion of traffic expected to be routed towards the AQMA, receptors within the AQMA have not been included in the modelling assessment.

Air Quality Monitoring

Monitoring of air quality within WBC has been undertaken through both continuous and non-continuous monitoring methods in 2019. These have been reviewed in order to provide an indication of existing air quality in the area surrounding the application site. The most recent monitoring data within WBC was undertaken during 2019. At the time of producing this report, latest WBC monitoring concentrations were available for 2019 and as such it has been the year used throughout the assessment. This is determined to be appropriate and robust.

Automatic Monitoring

WBC undertook automatic pollution monitoring during 2019 at one location. This monitoring location is CM1, which is located at Newbury A343, A339 & Greenham Road Junction, approximately 1.2 km north of the application site. The most recently available data is from 2019 which is presented in **Table 4-2**.

Table 4-2. Monitored Annual Mean Pollutant Concentrations at Automatic Monitoring Locations

Site ID	Location	Site Type	Distance from Kerb of Nearest Road (m)	Inlet Height (m)	2019 NO_2 Annual Mean Concentration ($\mu g/m^3$)
CM1	Newbury A343, A339 & Greenham Road Junction	Roadside	4.7	1.8	35.9

As outlined in **Table 4-2**, both monitoring locations monitored annual average NO_2 concentrations below the AQO for NO_2 AQO for NO_2 (40 $\mu g/m^3$ annual mean) during 2019.

Non - Automatic Monitoring

WBC operates a network of numerous passive diffusion tubes. The closest diffusion tube is diffusion tube DT14, which is located on Elizabeth Court, Theale, approximately 80 m southwest of the application site. The most recently available diffusion tube data is from 2019 which is presented in **Table 4-3**.

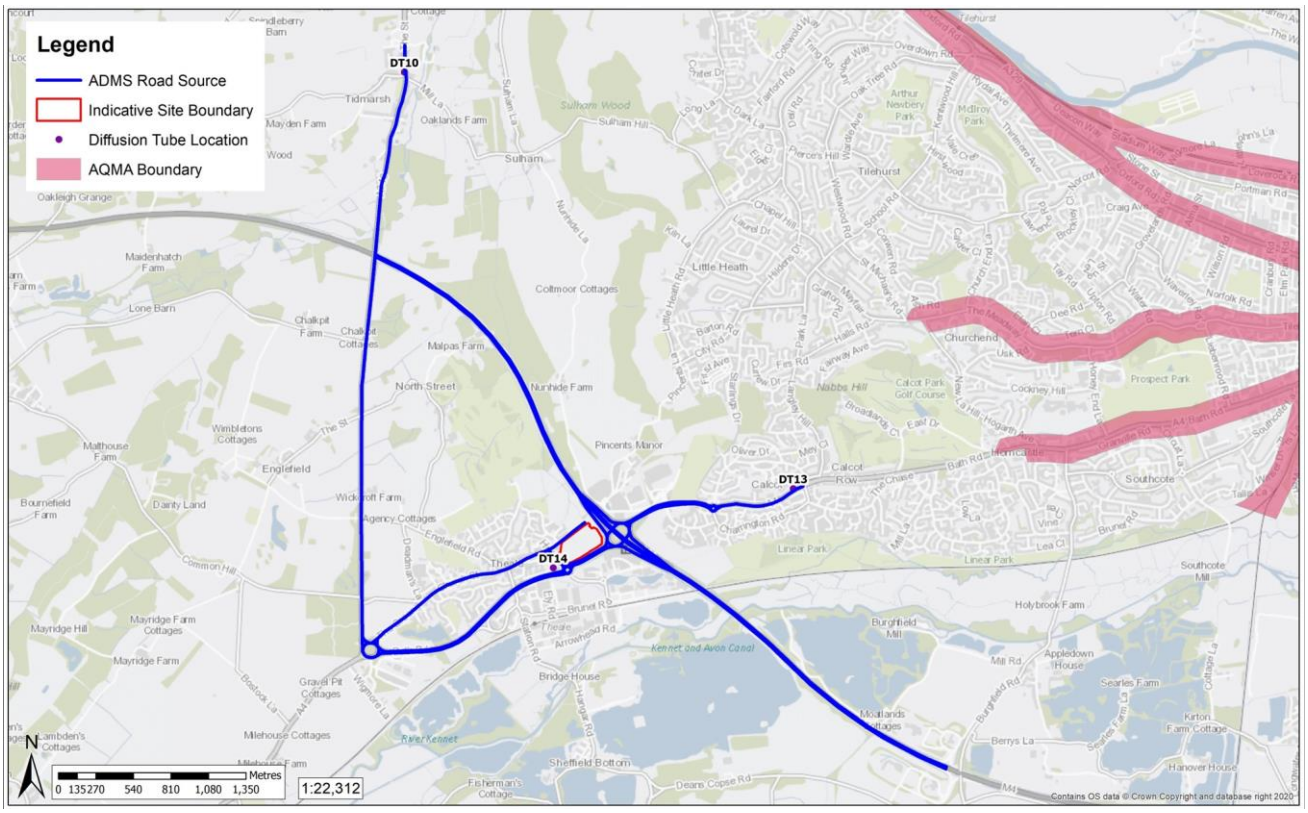
Table 4-3. Monitored Annual Mean NO_2 Concentrations at Diffusion Tubes

Site ID	Location	Site Type	Distance from Kerb (m)	Inlet Height (m)	Monitored 2019 Annual Mean NO_2 Concentration ($\mu g/m^3$)
DT10	Old Bakery, Tidmarsh	Roadside	2.2	1.9	29.5
DT13	Calcot Hotel, A4 Bath Road, Calcot	Kerbside	2.0	2.3	28.4
DT14	Elizabeth Court, Theale	Urban Background	32.0	2.0	20.3

As indicated in **Table 4-3**, all diffusion tubes located within the Air Quality Assessment area monitored annual average NO_2 concentrations below the AQO for NO_2 (40 $\mu g/m^3$ annual mean) during 2019.

It should be noted that as part of the model verification a review of diffusion tubes locations and monitoring heights was undertaken. As part of this process, the locations and monitoring heights were adjusted following desk-based review using Google Maps.

Figure 4-1. Local Authority Monitoring Locations

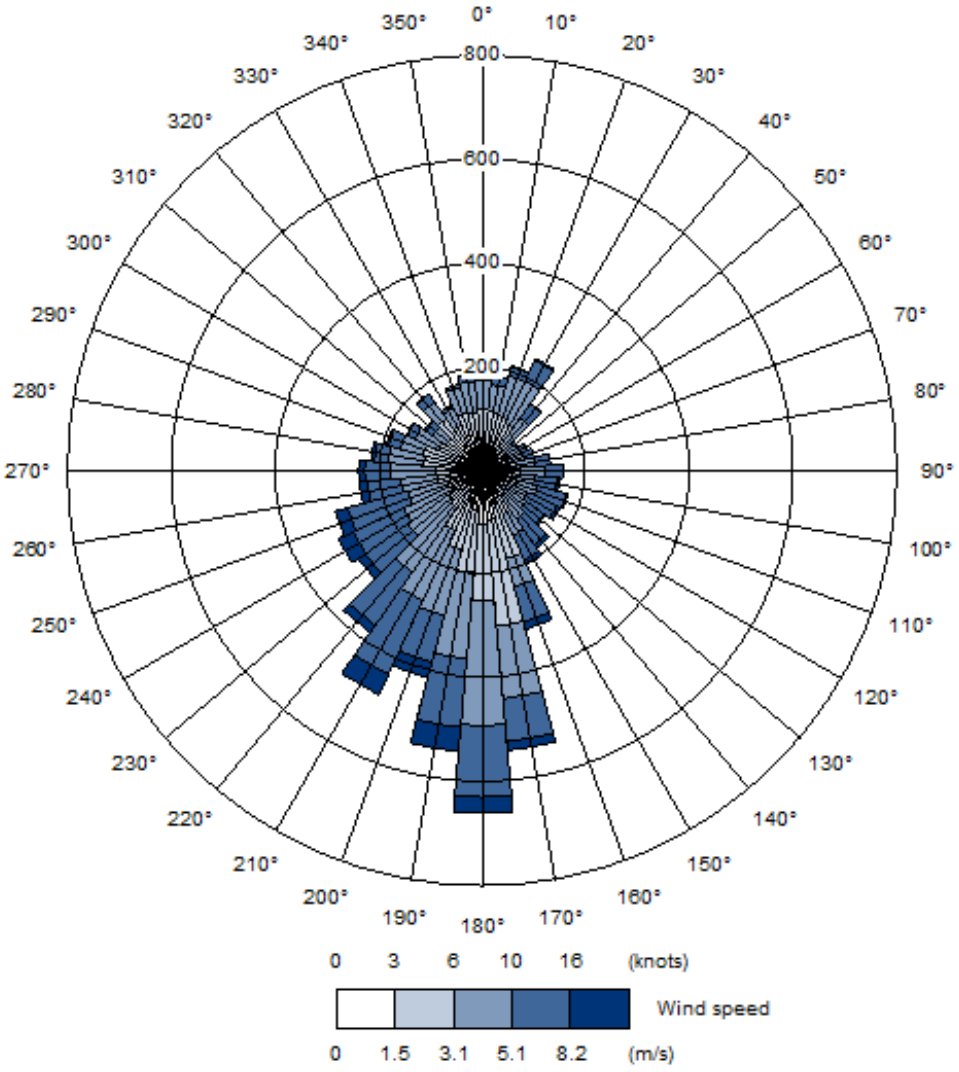


4.2 METEOROLOGY

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS (Atmospheric Dispersion Modelling System) model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data.

The 2019 meteorological data used in the assessment is derived from Benson Meteorological Station. This is the nearest meteorological station, which is considered representative of the application site, with all the complete parameters necessary for the ADMS model. Reference should be made to **Figure 4-2** for an illustration of the prevalent wind conditions at Benson Meteorological Station site.

Figure 4-2. Benson 2019 Wind Rose



4.3 EMISSION SOURCES

A desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutants likely to impact local receptors are NO_2, PM_{10} and $PM_{2.5}$.

The assessment has therefore modelled all roads within the immediate vicinity of the application site which are considered likely to experience significant changes in traffic flow as a result of the proposed development. Reference should be made to **Figure A-1** for a graphical representation of the traffic data utilised within the ADMS Roads 5.0.1.3 model.

It should be noted that the pollutant contribution of minor roads and rail sources that are not included within the dispersion model is considered to be accounted for via the use of background air quality levels.

4.4 SENSITIVE RECEPTORS

Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience significant changes in traffic flow as a result of the proposed development.

The existing receptor locations are summarised in **Table 4-4** and the spatial locations of all of the receptors are illustrated in **Figure 4-3**.

Table 4-4. Modelled Sensitive Receptor Locations

Existing Sensitive Receptor		X	Y	Receptor Height (m)
R1	2 Woodfield Way	464611	171489	1.5
R2	64 High Street	464565	171428	1.5
R3	53 Elizabeth Court	464569	171293	1.5
R4	74 Volunteer Road	463852	170789	1.5
R5	41 The Green	463457	170874	1.5
R6	1 Wigmore Lane	463132	170580	1.5
R7	Ogmoor House, Tidmarsh	463378	174277	1.5
R8	The Old Bakery, Tidmarsh	463504	174864	1.5
R9	9 Mayfield Avenue, Calcot	465678	171782	1.5
R10	29 Red Cottage Drive, Calcot	466357	171831	1.5

Ten existing sensitive receptors have been assessed to determine the effect of air quality, associated with the proposed development. The locations of the receptor are identified on **Figure 4-3**.

4.5 ECOLOGICAL RECEPTORS

Air quality impacts associated with the proposed development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The IAQM guidance on 'Air Quality Impacts on Designated Nature Conservation Sites' (2020) outlines the types of designated nature sites within 2 km of the proposed development which require air quality assessment. These are inclusive of:

- Sites of Special Scientific Interest (SSSIs);
- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- Ramsar Sites;
- Areas of Special Scientific Interest (ASSIs);
- National Nature Reserves (NNRs);
- Local Nature Reserves (LNRs);
- Local Wildlife Sites (LWSs); and,
- Areas of Ancient Woodland (AW).

The Conservation of Habitats and Species Regulations (2019) additionally requires competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

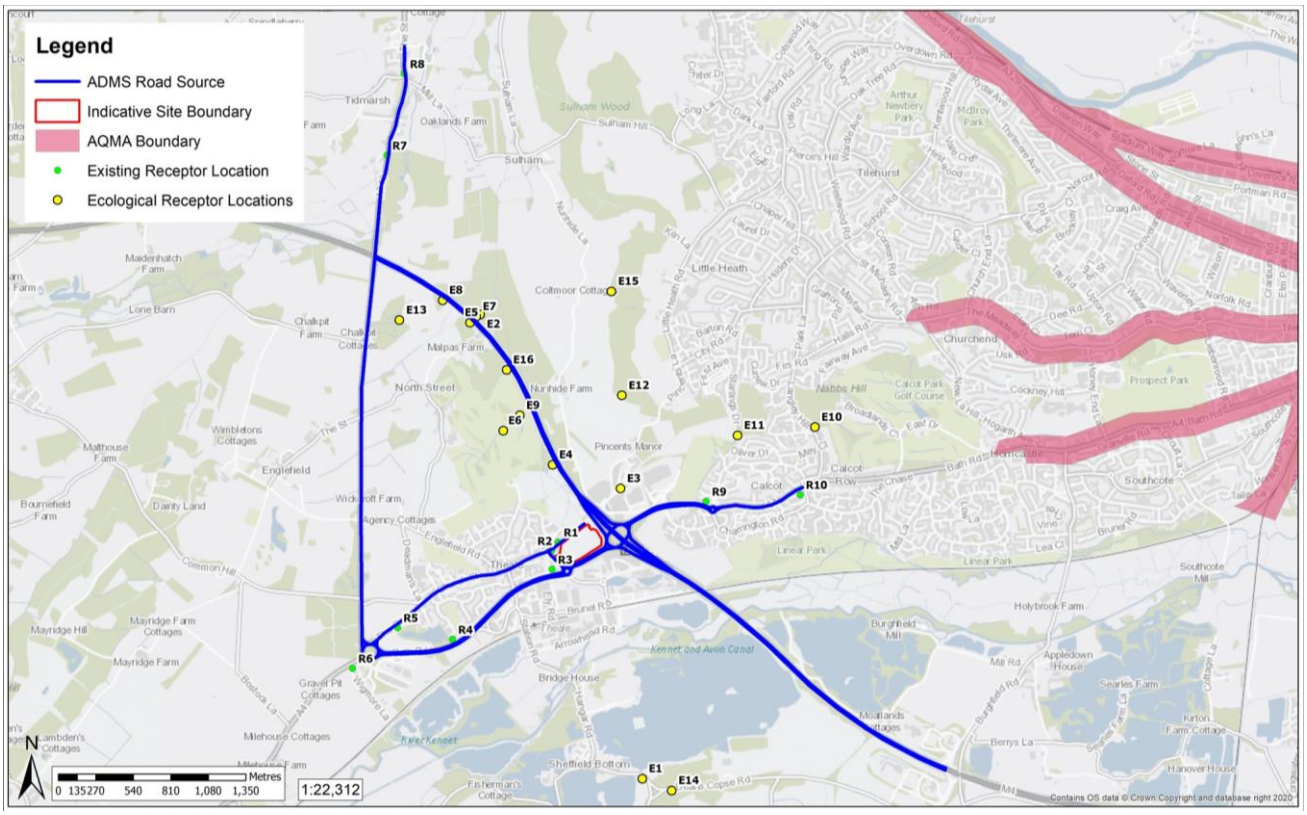
A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations/ NIEA Natural Environment Map Viewer. Following a search within a 2 km radius of the site boundary, the ecological receptors shown in **Table 4-5** were identified.

Table 4-5. Ecological Sensitive Receptor Locations

Site ID	Site	Designation	UK NGR (m)		Distance from Site (km)	Distance from Nearest Affected Road (m)
			X	Y		
E1	Hosehill Lake	LNR	465219	169785	1,682	1,285
E2	Sulham and Tidmarsh Woods and Meadows	SSSI	464051	173128	1,682	41
E3	Pincents Kiln	SSSI	465062	171875	315	221
E4	Ancient & Semi-Natural Woodland ID:1495431	AW	464572	172046	483	16
E5	Malpas Copse	AW	463978	173070	1,672	12
E6	Ancient & Semi-Natural Woodland ID:1494895	AW	464217	172292	901	247
E7	Ancient & Semi-Natural Woodland ID:1494920	AW	464023	173114	1,682	13
E8	Ashes Copse	AW	463781	173231	1,912	14
E9	Blossomend Copse	AW	464336	172402	910	87
E10	Curtiss Wood	AW	466462	172317	1,728	398
E11	Garstons/Kiln Copses	AW	465905	172258	1,203	510
E12	Harefield Copse	AW	465072	172546	906	620
E13	Horns Copse	AW	463470	173088	1,980	310
E14	James/Bennettshill Copses	AW	465431	169700	1,840	1,193
E15	Pinks Grove/Beals Copse	AW	464997	173295	1,652	877
E16	Yewtree Coppice	AW	464242	172730	1,239	25

It should be noted that the IAQM Guidance only requires the assessment of ecological receptors which are located within 200 m of the affected road network. Due to the distance from the modelled road network, ecological receptors E1, E3, E6, E10, E11, E12, E13, E14 and E15 have been scoped out of this air quality assessment

Figure 4-3. Sensitive Receptor Locations



5.0 ASSESSMENT OF AIR QUALITY IMPACTS - CONSTRUCTION PHASE

5.1 POLLUTANT SOURCES

The main emissions during construction are likely to be dust and particulate matter generated during earth moving (particularly during dry months) or from construction materials. The main potential effects of dust and particulate matter are:

- Visual - dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and/or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination; and,
- Health effects due to inhalation e.g. asthma or irritation of the eyes.

A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

Construction activities can give rise to short-term elevated dust/PM_{10} concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway, demolition or windblown stockpiles.

5.2 PARTICULATE MATTER (PM_{10})

The UK Air Quality Standards seek to control the health implications of respirable PM_{10}. However, the majority of particles released from construction will be greater than this in size.

Construction works on site have the potential to elevate localised PM_{10} concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

5.3 DUST

Particles greater than 10 µm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. Although there are no formal standards or criteria for nuisance caused by deposited particles, the IAQM 'Guidance on Monitoring in the Vicinity of Demolition and Construction Sites' (October 2018) and the Environment Agency Technical Guidance Note (TGN) M17 states that dust is usually compared with a 'complaints likely' guideline of 200 mg/m^2/day. Therefore, a deposition rate of 200 mg/m^2/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

Construction activities have the potential to suspend dust, which could result in annoyance of residents surrounding the site. Measures will be taken to minimise the emissions of dust as part of good site practice.

Recommended mitigation measures proportionate to the risk associated with the development and based on best practice guidance are discussed in the following sections.

5.4 METHODOLOGY

The construction phase assessment utilises the IAQM Guidance on the Assessment of Dust from Demolition and Construction document published in February 2014.

Four construction processes are considered; these are demolition, earthworks, construction and trackout. For each of these phases, the impact description of the potential dust impacts is derived following the determination of a dust emission magnitude and the distance of activities to the nearest sensitive receptor, therefore assessing worst case impacts. A full explanation of the methodology is contained in Appendix A.

5.5 ASSESSMENT RESULTS

Based on the methodology detailed in Appendix A, the scale of the anticipated works has determined the potential dust emission magnitude for each process, as presented in the **Table 5-1** below.

Table 5-1. Dust Emission Magnitude

Construction Process	Site Criteria	Dust Emission Magnitude
Demolition	No demolition required	N/A
Earthworks	Total Site Area: >10,000 m^2	Large
Construction	Total Building Volume >100,000 m^3	Large
Trackout	Assumed 10 - 50 HDV outward movements in any one day	Medium

The sensitivity of the surrounding area to each construction process has been determined following stage 2B of the IAQM guidance. The assessment has determined the area sensitivities as shown in the **Table 5-2**.

The sensitivity of the ecological receptors is considered not applicable within the construction phase assessment due to the distance from the application site which is greater than 50 m from the site boundary, or 50 m of roads within 500 m of the site. This is in accordance with Table 4 of the IAQM Guidance.

Table 5-2. Sensitivity of the Area

Source	Area Sensitivity					
	Dust Soiling	Site Sensitivity Criteria	Health Effects of PM_{10}	Site Sensitivity Criteria	Ecological	Site Sensitivity Criteria
Demolition	N/A	No demolition required	N/A	No demolition required	N/A	No demolition required
Earthworks	Medium	10-100 Highly Sensitive Receptors within 50 m of site	Low	Annual Mean of <24 µg/m^3 for PM_{10} 10-100 Highly Sensitive Receptors within 50 m of site	N/A	>50 m from site boundary
Construction	Medium		Low		N/A	
Trackout	Medium	10-100 Highly Sensitive Receptors within 50 m of roads within 500 m of site	Low	Annual Mean of <24 µg/m^3 for PM_{10} 10-100 Highly Sensitive Receptors within 50 m of roads within 500 m of site	N/A	>50 m from roads within 500 m from site boundary

The dust emission magnitude determined in **Table 5-1** has been combined with the sensitivity of the area determined in **Table 5-2**, to determine the risk of impacts prior to the implementation of appropriate mitigation measures. The potential impact significance of dust emissions associated with the development, without mitigation, is presented in **Table 5-3**.

Table 5-3. Impact Description of Construction Activities without Mitigation

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Medium	Low	N/A
Construction	Medium	Low	N/A
Trackout	Low	Low	N/A

Appropriate mitigation measures are detailed and presented in Section 7.0. Following the adoption of these measures, the subsequent impact significance of the construction phase is not predicted to be significant.

6.0 ASSESSMENT OF AIR QUALITY IMPACTS - OPERATIONAL PHASE

In the context of the proposed development, road traffic is identified as the dominant emission source that is likely to cause potential risk of exposure of air pollutants at receptors.

The operational phase assessment therefore consists of the quantified predictions of the change in NO_2, PM_{10} and $PM_{2.5}$ for the operational phase of the development due to changes in traffic movement. Predictions of air quality at the site have been undertaken for the operational phase of the development using ADMS Roads.

In accordance with the provided traffic data, the operational phase assessment has been undertaken with an operational opening year of 2026. The assessment scenarios are therefore:

- 2019 Baseline = Existing Baseline Conditions;
- 2026 'Do Minimum' = Baseline Conditions + Committed Development Flows (through local growth factor); and,
- 2026 'Do Something' = Baseline Conditions + Committed Development (through local growth factor) + Proposed Development.

6.1 EXISTING AND PREDICTED TRAFFIC FLOWS

Baseline 2019 traffic data projected 2026 'Do Minimum' and 'Do Something' traffic data, and average vehicle speeds have been obtained for the operational phase assessment in the form of Annual Average Daily Traffic figures (AADT). David Tucker Associates have provided development traffic flows.

Baseline 2019, and 2026 'do minimum' and 'do something' traffic data have been provided by David Tucker Associates for Hoad Way, Bath Road West and East of Hoad Way. For all other links, Baseline 2019 data was downloaded from the Department for Transport (DfT) database.

The proposed development opening year is 2026. To determine the traffic flows for the 2026 'Do Minimum' traffic flows, a TEMPro factor of 1.0825 has been applied to the 2019 Baseline traffic data.

To calculate the 2026 'Do Something' operational year traffic flows, the proposed development traffic flows have been distributed across the model area and have been added onto the 2026 'Do Minimum' scenario flows.

Emission factors for the 2019 baseline and 2026 projected 'Do Minimum' and 'Do Something' scenarios have been calculated using the Emission Factor Toolkit (EFT) Version 11.0 (November 2021).

It is assumed the average vehicle speeds on the local road network in an opening year of 2026 will be broadly the same as the ones in 2019. . It should be noted that a separate link has been used to model the change in speed along the A340, with an additional reduction to account for the speed camera located within Tidmarsh. A 50 m 20 km/hr slow down phase is included on each link at every junction and roundabout within the assessment. All of the roads within the dispersion model are illustrated in **Figure A-1**. Detailed traffic figures are provided in the **Table 6-1**.

Table 6-1. Traffic Data

Link	Speed (km/h)	2019 Baseline		2026 Do Minimum		2026 Do Something	
		AADT	HGV %	AADT	%HGV	AADT	%HGV
Hoad Way	46	5686	1.4	5858	1.4	6581	2.2
Bath Road West of Hoad Way	96	32950	6.3	33945	6.3	34153	6.3
Bath Road East of Hoad Way	96	36574	6.3	37679	6.1	38193	6.3
A340	48	12482	2.0	14483	2.0	14568	2.1
The Green/Church Street	48	5141	1.3	6615	1.3	6700	1.4
Bath Road East of M4	64	39643	2.4	46325	2.4	46603	2.5
M4 North of J12	112	91989	9.1	110430	8.6	110708	8.6
M4 South of J12	112	117305	8.4	135274	8.2	135552	8.2

6.2 BACKGROUND CONCENTRATIONS

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site. Several sources have been used to obtain representative background levels as discussed below.

The background concentrations used within the assessment have been determined with reference to the IAQM Guidance and Technical Guidance (TG(22)).

The IAQM Guidance states:

> "*A matter of judgement should take into account the background and future background air quality and whether it is likely to approach or exceed the value of the AQO.*"

Additionally, TG(22) states:

> "*Typically, only the process contributions from local sources are represented within an output by the dispersion model. In these circumstances, it is necessary to add an appropriate background concentration(s) to the modelled source contributions to derive the total pollutant concentrations.*"

Defra Published Background Concentrations for 2019

The background concentrations shown in **Table 6-2** were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the application site. In August 2020, Defra issued revised 2018 based background maps for nitrogen oxide (NO_X), NO_2, PM_{10} and $PM_{2.5}$.

Table 6-2. Published Background Air Quality Levels (µg/m^3)

Receptor Location		2019			
		NO_X	NO_2	PM_{10}	$PM_{2.5}$
Proposed Site					
464757	171484	24.94	17.76	16.46	10.89
Local Authority Monitoring					
DT10		15.41	11.58	13.75	9.26
DT13		19.97	14.62	15.57	10.63
Existing Sensitive Receptors					
R1		24.94	17.76	16.46	10.89
R2		24.94	17.76	16.46	10.89
R3		24.94	17.76	16.46	10.89
R4		17.69	13.06	15.39	9.79
R5		17.69	13.06	15.39	9.79
R6		17.69	13.06	15.39	9.79
R7		15.41	11.58	13.75	9.26
R8		15.41	11.58	13.75	9.26
R9		28.10	19.78	17.10	11.30
R10		19.97	14.62	15.57	10.63
Ecological Sensitive Receptors					
E2		16.42	12.27	14.94	9.75
E4		22.49	16.33	16.69	10.75
E5		21.97	16.03	16.20	10.41
E7		16.42	12.27	14.94	9.75
E8		21.97	16.03	16.20	10.41
E9		22.49	16.33	16.69	10.75
E16		22.49	16.33	16.69	10.75

All the Defra background concentrations detailed in **Table 6-2** for 2019, show that the background levels are predicted to be below the relevant AQO within the study area.

A breakdown of the background source apportionment of NO_X concentrations at each monitoring location and receptor is shown in **Table 6-3**.

Table 6-3. Pollutant Source Apportionment of NO_X ($\mu g/m^3$)

Receptor Location	2019						
	Total NO_x	% of NO_X from Road Sources	% of NO_X from Industrial Sources	% of NO_X from Domestic Sources	% of NO_X from Aircraft Sources	% of NO_X from Rail Sources	% of NO_X from Other Sources
Local Authority Monitoring							
DT10	15.41	29.13	4.74	3.95	<0.01	7.31	54.86
DT13	19.97	37.42	4.21	6.83	<0.01	8.22	43.32
Existing Sensitive Receptors							
R1	24.94	43.48	8.45	5.56	<0.01	3.96	38.54
R2	24.94	43.48	8.45	5.56	<0.01	3.96	38.54
R3	24.94	43.48	8.45	5.56	<0.01	3.96	38.54
R4	17.69	25.26	11.61	3.45	<0.01	7.72	51.96
R5	17.69	25.26	11.61	3.45	<0.01	7.72	51.96
R6	17.69	25.26	11.61	3.45	<0.01	7.72	51.96
R7	15.41	29.13	4.74	3.95	<0.01	7.31	54.86
R8	15.41	29.13	4.74	3.95	<0.01	7.31	54.86
R9	28.10	53.38	3.44	5.54	<0.01	5.41	32.22
R10	19.97	37.42	4.21	6.83	<0.01	8.22	43.32
Ecological Sensitive Receptors							
E2	16.42	32.22	5.05	4.35	<0.01	6.42	51.96
E4	22.49	48.79	4.41	3.73	<0.01	4.49	38.57
E5	21.97	51.33	3.45	2.58	<0.01	4.25	38.40
E7	16.42	32.22	5.05	4.35	<0.01	6.42	51.96
E8	21.97	51.33	3.45	2.58	<0.01	4.25	38.40
E9	22.49	48.79	4.41	3.73	<0.01	4.49	38.57
E16	22.49	48.79	4.41	3.73	<0.01	4.49	38.57

Table 6-3 shows that the major background source of NO_X at the monitoring, sensitive receptor locations where sources have been identified are mainly comprised of road sources.

A review of the Defra background site has determined that they are in line with the Local Authority monitoring within WBC.

Table 6-4 shows the background concentrations utilised within the assessment.

Table 6-4. Utilised Background Concentrations (µg/m^3)

Receptor Location	2019		Source
	NO_x	NO_2	
Local Authority Monitoring			
DT10	15.41	11.58	Defra Background Maps
DT13	19.97	14.62	
Existing Sensitive Receptors			
R1	24.94	17.76	Defra Background Maps
R2	24.94	17.76	
R3	24.94	17.76	
R4	17.69	13.06	
R5	17.69	13.06	
R6	17.69	13.06	
R7	15.41	11.58	
R8	15.41	11.58	
R9	28.10	19.78	
R10	19.97	14.62	
Ecological Sensitive Receptors			
E2	19.28	-	APIS
E4	26.04	-	
E5	25.82	-	
E7	18.86	-	
E8	25.82	-	
E9	26.04	-	
E16	26.04		

6.3 MODEL VERIFICATION

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Section 7 of the TG(22) guidance note and uses the most recently available diffusion tube monitoring data to best represent this. When using modelling techniques to predict concentrations, it is necessary to make a comparison between the modelling results and available roadside monitoring data, to ensure that the model is reproducing actual observations. Where systematic bias is evident in the base year verification, the modelled results are factored to better match the monitoring data and reduce the overall uncertainty in the model predictions. TG(22) (Section 'Model Validation, Verification, Adjustment and Uncertainty', Paragraphs 7.549-7.578) was followed when undertaking the verification.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of NO_X at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution NO_X emissions. These are converted into predicted roadside contribution NO_2 exposure at the relevant receptor locations based on the updated approach to deriving NO_2 from NO_X for road traffic sources published in Local Air Quality Management TG(22). The calculation was derived using the NO_X to NO_2 worksheet in the online

LAQM tools website hosted by Defra. **Table 6-5** summarises the final model/monitored data correlation following the application of the model correction factor.

Table 6-5. Comparison of Roadside Modelling & Monitoring Results for NO_2

Monitoring Site	NO_2 µg/m^3		
	Monitored NO_2	Modelled NO_2	Difference (%)
DT10	29.50	28.12	-4.68
DT13	28.40	29.89	5.26

The final model produced data at the monitoring locations to within 10% of the monitoring results at all of the verification points, as recommended by TG(22) guidance.

The nearest accessible tube to the application site with available traffic data is DT13, making it the most accurate representation.

The final verification model correlation coefficient (representing the model uncertainty) is 1.00. This was achieved by applying a model correction factor of 2.02 to roadside predicted NO_X concentrations before converting to NO_2. This figure demonstrates that the model predictions were in line with the road traffic emissions at the monitoring locations.

6.4 ADMS-ROADS MODEL INPUTS

Table 6-6. Summary of ADMS Roads Model Inputs

Parameter	Description	Input Value
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), NO_2, Ozone (O_3) and Volatile organic compounds (VOCs).	No atmospheric chemistry parameters included
Meteorology	Representative meteorological data from a local source	**Benson 2019 Meteorological Station**, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**1.5m** representing a typical surface roughness for **Large Urban Areas** was used for the Site **0.3m** representing a typical surface roughness for **Agricultural Areas** for the met. Measurement site.
Latitude	Allows the location of the model area to be set	United Kingdom = **53.0**
Monin-Obukhov Length	This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character.	Cities and Large Towns= **30m** was used for the Site Small Towns = 1**0m** was used for the met. Measurement site.
Elevation of Road	Allows the height of the road link above ground level to be specified.	All other road links were set at ground level = **0m**.
Road Width	Allows the width of the road link to be specified.	Road width used depended on data obtained from OS map data for the specific road link
Topography	This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography	No topographical information used
Time Varied Emissions	This enables daily, weekly or monthly variations in emissions to be applied to road sources	No time varied emissions used
Road Type	Allows the effect of different types of roads to be assessed.	**Urban (Not London)** settings were used for the relevant links
Road Speeds	Enables individual road speeds to be added for each road link	Based on national speed limits
Canyon Height	Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a 'street canyon'.	No canyons used within the model
Road Source Emissions	Road source emission rates are calculated from traffic flow data using the in-built EFT database of traffic emission factors.	The **EFT** Version **11.0 (2021)** dataset was used.
Year	Predicted EFT emissions rates depend on the year of emission.	**2019** data for verification and baseline Operational Phase Assessment. **2026** data for the Operational Phase Traffic Assessment.

6.5 ADMS MODELLING RESULTS

6.5.1 Traffic Assessment

The ADMS Model has predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at relevant receptor locations adjacent to roads likely to be affected by the development, as summarised in the following tables. Only receptors close to roads where there is predicted to be a change in emissions have been assessed.

6.5.2 Assessment Scenarios

For the operational year of 2026, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken using the Emissions Factor Toolkit (EFT) 2026 emissions rates which take into account of the rate of reduction in emission from road vehicles into the future with the following factors:

- 2019 Baseline = Existing Baseline conditions;
- 2026 'Do Minimum' = 2026 Baseline + Committed Development Flows (through local growth factor); and,
- 2026 'Do Something' = 2026 Baseline + Committed Development Flows (through local growth factor) + Development Traffic Flows.

6.5.3 Long-Term Operational Traffic Assessment

Nitrogen Dioxide

Table 6-7 presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the proposed development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-7. Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m^3)			
		2019 Baseline	2026 Do Minimum	2026 Do Something	Development Contribution
R1*	2 Woodfield Way	27.39	25.58	25.70	0.12
R2*	64 High Street	30.62	28.15	28.57	0.42
R3*	53 Elizabeth Court	29.79	26.90	27.04	0.14
R4*	74 Volunteer Road	22.42	20.10	20.13	0.03
R5*	41 The Green	18.24	17.16	17.18	0.02
R6*	1 Wigmore Lane	15.92	15.23	15.24	0.01
R7*	Ogmoor House, Tidmarsh	19.80	18.62	18.65	0.03
R8*	The Old Bakery, Tidmarsh	22.75	21.21	21.26	0.05
R9*	9 Mayfield Avenue, Calcot	36.19	33.75	33.86	0.11
R10*	29 Red Cottage Drive, Calcot	22.37	21.18	21.23	0.05
Annual Mean AQO		**40 µg/m^3**			

All modelled existing receptors are predicted to be below the AQO for NO_2 in both the 'Do Minimum' and 'Do Something' scenarios.

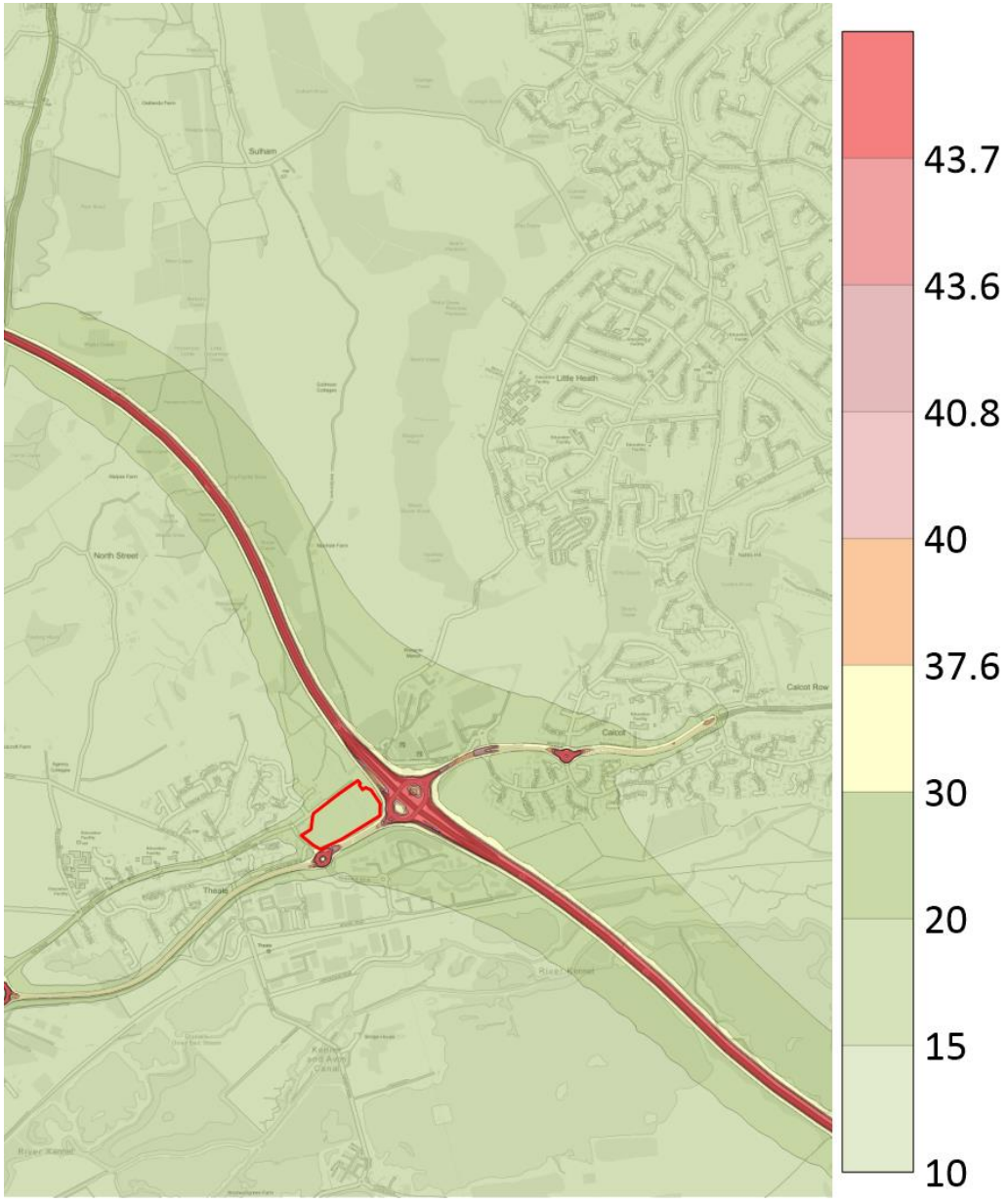
As indicated in **Table 6-7**, the maximum predicted increase in annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the proposed development is likely to be 0.42 µg/m^3 at 64 High Street (R2).

The predicted long-term NO_2 concentrations at all proposed and existing receptors are well below 60 µg/m^3 in all scenarios. Therefore, it is unlikely there will be any exceedances for the short-term NO_2 AQO at all modelled receptors as outlined in LAQM TG(22) technical guidance.

Figure 6-1 and **Figure 6-2**, below, illustrate the Total Long Term Annual Average Nitrogen Dioxide (NO_2) Contribution and Concentration at the Proposed Development (µg/m^3).

Figure 6-1. Annual Average Long-Term Nitrogen Dioxide (NO_2) Contribution from Proposed Development ($\mu g/m^3$)

Figure 6-2. Total Long Term Annual Average Nitrogen Dioxide (NO_2) Concentration Across the Study Area ($\mu g/m^3$)



The impact description of changes in traffic flow associated with the proposed development with respect to annual mean NO_2 exposure has been assessed with reference to the criteria in Section 3.0. The outcomes of the assessment are summarised in **Table 6-8**.

Table 6-8. Impact Description of Effects at Key Receptors (NO_2)

Impact Description of NO_2 Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change due to Development (% of AQO)**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Description**
R1	0.12	0.30	0%	≤75% of AQO	Negligible
R2	0.42	1.05	1%	≤75% of AQO	Negligible
R3	0.14	0.35	0%	≤75% of AQO	Negligible
R4	0.03	0.07	0%	≤75% of AQO	Negligible
R5	0.02	0.05	0%	≤75% of AQO	Negligible
R6	0.01	0.02	0%	≤75% of AQO	Negligible
R7	0.03	0.07	0%	≤75% of AQO	Negligible
R8	0.05	0.12	0%	≤75% of AQO	Negligible
R9	0.11	0.27	0%	76-94% of AQO	Negligible
R10	0.05	0.12	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all modelled receptors. This is based on the methodology outlined in Section 3.0. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

Particulate Matter (PM_{10})

Table 6-9 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the proposed development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-9. Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		**PM_{10} (µg/m³)**			
		2019 Baseline	**2026 Do Minimum**	**2026 Do Something**	**Development Contribution**
R1	2 Woodfield Way	17.93	17.99	18.01	0.02
R2	64 High Street	18.31	18.32	18.40	0.08
R3	53 Elizabeth Court	18.00	18.30	18.33	0.02
R4	74 Volunteer Road	16.49	16.94	16.95	0.01
R5	41 The Green	16.16	16.20	16.21	0.01
R6	1 Wigmore Lane	15.76	15.76	15.76	0.00
R7	Ogmoor House, Tidmarsh	15.09	15.21	15.23	0.01
R8	The Old Bakery, Tidmarsh	15.60	15.77	15.79	0.02
R9	9 Mayfield Avenue, Calcot	19.69	19.88	19.91	0.03
R10	29 Red Cottage Drive, Calcot	16.77	16.86	16.87	0.01
Annual Mean AQO		**40 µg/m³**			

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'Do Minimum' and 'Do Something' scenarios.

As indicated in **Table 6-9**, the maximum predicted increase in annual average exposure to PM10 at any existing receptor, due to changes in traffic movements associated with the proposed development is 0.08 µg/m3 at 64 High Street (R2).

The impact description of changes in traffic flow associated with the proposed development with respect to annual mean PM_{10} exposure has been assessed with reference to the criteria in Section 3.0. The outcomes of the assessment are summarised in **Table 6-10**.

Table 6-10. Impact Description of Effects at Key Receptors (PM_{10})

Impact Description of PM_{10} Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change due to Development (% of AQO)**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Description**
R1	0.02	0.06	0%	≤75% of AQO	Negligible
R2	0.08	0.20	0%	≤75% of AQO	Negligible
R3	0.02	0.06	0%	≤75% of AQO	Negligible
R4	0.01	0.02	0%	≤75% of AQO	Negligible
R5	0.01	0.02	0%	≤75% of AQO	Negligible
R6	0.00	0.01	0%	≤75% of AQO	Negligible
R7	0.01	0.03	0%	≤75% of AQO	Negligible
R8	0.02	0.04	0%	≤75% of AQO	Negligible
R9	0.03	0.07	0%	≤75% of AQO	Negligible
R10	0.01	0.03	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

The impact description of the effects of changes in traffic as a result of the proposed development, with respect to annual mean PM_{10} exposure for existing receptors is determined to be 'negligible' based on the methodology outlined in Section 3.0. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

Particulate Matter ($PM_{2.5}$)

Table 6-11 presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the proposed development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-11. Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{2.5}$ (µg/m^3)			
		2019 Baseline	2024 Do Minimum	2024 Do Something	Development Contribution
R1	2 Woodfield Way	11.75	11.74	11.75	0.01
R2	64 High Street	11.98	11.93	11.97	0.04
R3	53 Elizabeth Court	11.80	11.91	11.92	0.01
R4	74 Volunteer Road	10.43	10.64	10.65	0.01
R5	41 The Green	10.23	10.24	10.24	0.00
R6	1 Wigmore Lane	10.01	9.99	9.99	0.00
R7	Ogmoor House, Tidmarsh	10.04	10.07	10.07	0.01
R8	The Old Bakery, Tidmarsh	10.33	10.38	10.39	0.01
R9	9 Mayfield Avenue, Calcot	12.82	12.85	12.86	0.01
R10	29 Red Cottage Drive, Calcot	11.33	11.35	11.35	0.01
Annual Mean AQO		**10 µg/m^3**			

As indicated in **Table 6-11**, the maximum predicted increase in annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the proposed development is 0.06 µg/m^3 at 64 High Street (R2).

It should be noted that the proposed development is assessed against the $PM_{2.5}$ AQO as outlined in The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 which introduced the objective of 10 µg/m^3 by 2040. Additionally, it should be noted that this assessment utilises a worst-case approach, applying the baseline year background concentrations to the future year scenarios, which assumes there will be no reduction in background concentrations with time. As the Objective is to reduce the concentration of $PM_{2.5}$ to 10 µg/m^3 by 2040, and due to the fact that concentrations of air quality pollutants are predicted to reduce with time (with the reduction likely to be accelerated by the introduction of the new AQO), in combination with the mitigation measures outlined with the application Travel Plan, and the worst-case assessment methodology, it has been determined that the proposed receptor locations will experience concentrations of $PM_{2.5}$ below the AQO by 2040, and therefore, no further mitigation is required.

The impact description of changes in traffic flow associated with the proposed development with respect to annual mean $PM_{2.5}$ exposure has been assessed with reference to the criteria in Section 3.0. The outcomes of the assessment are summarised in **Table 6-12**.

Table 6-12. Impact Description of Effects at Key Receptors ($PM_{2.5}$)

Impact Description of $PM_{2.5}$ Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change due to Development (% of AQO)**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Description**
R1*	0.01	0.05	0%	≤75% of AQO	Negligible
R2*	0.04	0.18	0%	≤75% of AQO	Negligible
R3*	0.01	0.05	0%	≤75% of AQO	Negligible
R4*	0.01	0.02	0%	≤75% of AQO	Negligible
R5*	0.00	0.02	0%	≤75% of AQO	Negligible
R6*	0.00	0.01	0%	≤75% of AQO	Negligible
R7*	0.01	0.03	0%	≤75% of AQO	Negligible
R8*	0.01	0.04	0%	≤75% of AQO	Negligible
R9*	0.01	0.06	0%	≤75% of AQO	Negligible
R10*	0.01	0.03	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

The impact description of the effects of changes in traffic as a result of the proposed development, with respect to annual mean $PM_{2.5}$ exposure for existing receptors is determined to be 'negligible' based on the methodology outlined in Section 3.0. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

6.5.4 Ecological Sensitive Receptor Locations

Background concentrations at each of the ecologically sensitive sites were determined through a review of the NO_X pollutants published on the APIS website

The below assessment has been undertaken in accordance with A Guide to the Assessment of Air Quality Impacts in Designated Nature Conservation Sites (IAQM, 2020).

Nitrogen Oxide

Table 6-13 presents a summary of the predicted change in NO_X concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-13. Predicted Annual Average Concentrations of NO_X at Ecological Receptor Locations

Ecological Receptor		Predicted Maximum Annual Mean Concentration (µg/m³)				
		Do Minimum 2026 NO_X	Do Something 2026 NO_X	Process Contribution (PC)	PC as %age of AQO	Background
E2	Sulham and Tidmarsh Woods and Meadows	37.53	37.57	0.05	0.15	19.28
E4	Ancient & Semi-Natural Woodland ID:1495431	46.08	46.14	0.06	0.20	26.04
E5	Malpas Copse	48.08	48.14	0.06	0.19	25.82
E7	Ancient & Semi-Natural Woodland ID:1494920	51.90	51.98	0.08	0.08	18.86
E8	Ashes Copse	48.14	48.19	0.06	0.06	25.82
E9	Blossomend Copse	33.43	33.45	0.02	0.02	26.04
E16	Yewtree Coppice	43.10	43.14	0.05	0.15	26.04
Annual Mean AQO/Critical Level (CL)		**30 µg/m³**				

As indicated in **Table 6-13**, the maximum predicted increase in the annual average exposure to NO_X at any ecological receptor, due to changes in traffic movements associated with the development, is 0. µg/m³ at Ancient & Semi-Natural Woodland (E7).

This assessment has been undertaken in accordance with IAQM's 2020 '*A Guide to the Assessment of Air Quality Impacts in Designated Nature Conservation Sites*' guidance document. The guidance states that where an assessment indicates changes in annual mean NOx concentrations within a designated site cannot be dismissed as imperceptible (i.e. an increase of over 1% of the critical load or critical level - 0.30 µg/m³) and the NO_X critical level is exceeded, then changes in nutrient nitrogen deposition should be calculated to further evaluate the level of significance.

The maximum predicted increase in the annual average exposure to NO_x at the identified ecological receptor, due to changes in traffic movements associated with the development, , is 0.08 µg/m³ at Ancient & Semi-Natural Woodland (E7) which is below the 0.30 µg/m³ development contribution stated within the guidance of '*A Guide to the Assessment of Air Quality Impacts in Designated Nature Conservation Sites*', IAQM 2020.

7.0 MITIGATION

7.1 CONSTRUCTION PHASE

The dust risk categories have been determined in Section 5.0 for each of the four construction activities. The assessment has determined that the potential impact description of dust emissions associated with the construction phase of the proposed development is 'medium risk' at the worst affected receptors.

Using the methodology described in Appendix A, appropriate site-specific mitigation measures associated with the determined level of risk can be found in Section 8.2 of the '*IAQM Guidance on the Assessment of Dust from Demolition and Construction*'.

The mitigation measures have been divided into general measures applicable to all sites and measures applicable specifically to demolition, earthworks, construction and trackout. They are categorised into 'highly recommended' and 'desirable' measures.

The mitigation measures for the proposed development are detailed in **Table 7-1** and **Table 7-2**.

Table 7-1. IAQM Guidance on the Assessment of Dust from Demolition and Construction 'Highly Recommended' Mitigation Measures

Communications
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information.
Dust Management
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real time PM_{10} continuous monitoring and/or visual inspections.
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
Make the complaints log available to the local authority when asked.
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
Avoid site runoff of water or mud.
Keep site fencing, barriers and scaffolding clean using wet methods.
Remove materials that have the potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
Cover, seed or fence stockpiles to prevent wind whipping.
Ensure all vehicles switch off engines when stationary - no idling vehicles.
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
Use enclosed chutes and conveyors and covered skips.
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Avoid bonfires and burning of waste materials.
Earthworks
No Action Required.
Construction
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Trackout
Use water-assisted dust sweeper(s) on access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
Avoid dry sweeping of large areas.
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
Record all inspections of haul routes and any subsequent action in a site log book.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
Access gates to be located at least 10m from receptors where possible.

Table 7-2. IAQM Guidance on the Assessment of Dust from Demolition and Construction 'Desirable' Mitigation Measures

Communications
No Action Required.
Dust Management
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Earthworks
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
Only remove the cover in small areas during work and not all at once.
Construction
Avoid scabbling (roughening of concrete surfaces) if possible.
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout
No Action Required.

Following the implementation of the mitigation measures detailed in the tables above, the impact description of the construction phase is not considered to be significant.

8.0 CONCLUSIONS

This report presents the findings of an updated air quality assessment undertaken to assess road traffic emission and construction dust impacts in support of a planning application for the construction of a new industrial development, on the site East of Hoad Way, Theale.

Construction Phase

Prior to the implementation of appropriate mitigation measures, the potential impact description of dust emissions associated with the construction phase of the proposed development is 'medium risk' at the worst affected receptors without mitigation. However, appropriate site-specific mitigation measures have been proposed based on Section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition, Earthworks, Construction and Trackout. It is anticipated that with these appropriate mitigation measures in place, the risk of adverse effects due to dust emissions from the construction phase will not be significant.

Operational Assessment

The 2026 assessment of the effect of emissions from traffic associated with the scheme, has determined that the maximum predicted increase in the annual average exposure to NO_2 at any existing receptor is likely to be 0.42 µg/m^3 at 64 High Street (R2).

For PM_{10}, the maximum predicted increase in the annual average exposure is likely to be 0.08 µg/m^3 at 64 High Street (R2). For $PM_{2.5}$, the maximum predicted increase in the annual average exposure is likely to be 0.06 µg/m^3 at 64 High Street (R2).

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2, PM_{10} and $PM_{2.5}$ exposure, is determined to be 'negligible' at all existing receptors.

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2, PM_{10} and $PM_{2.5}$ exposure, is determined to be 'negligible' at all existing receptors.

Operational Assessment – Ecology

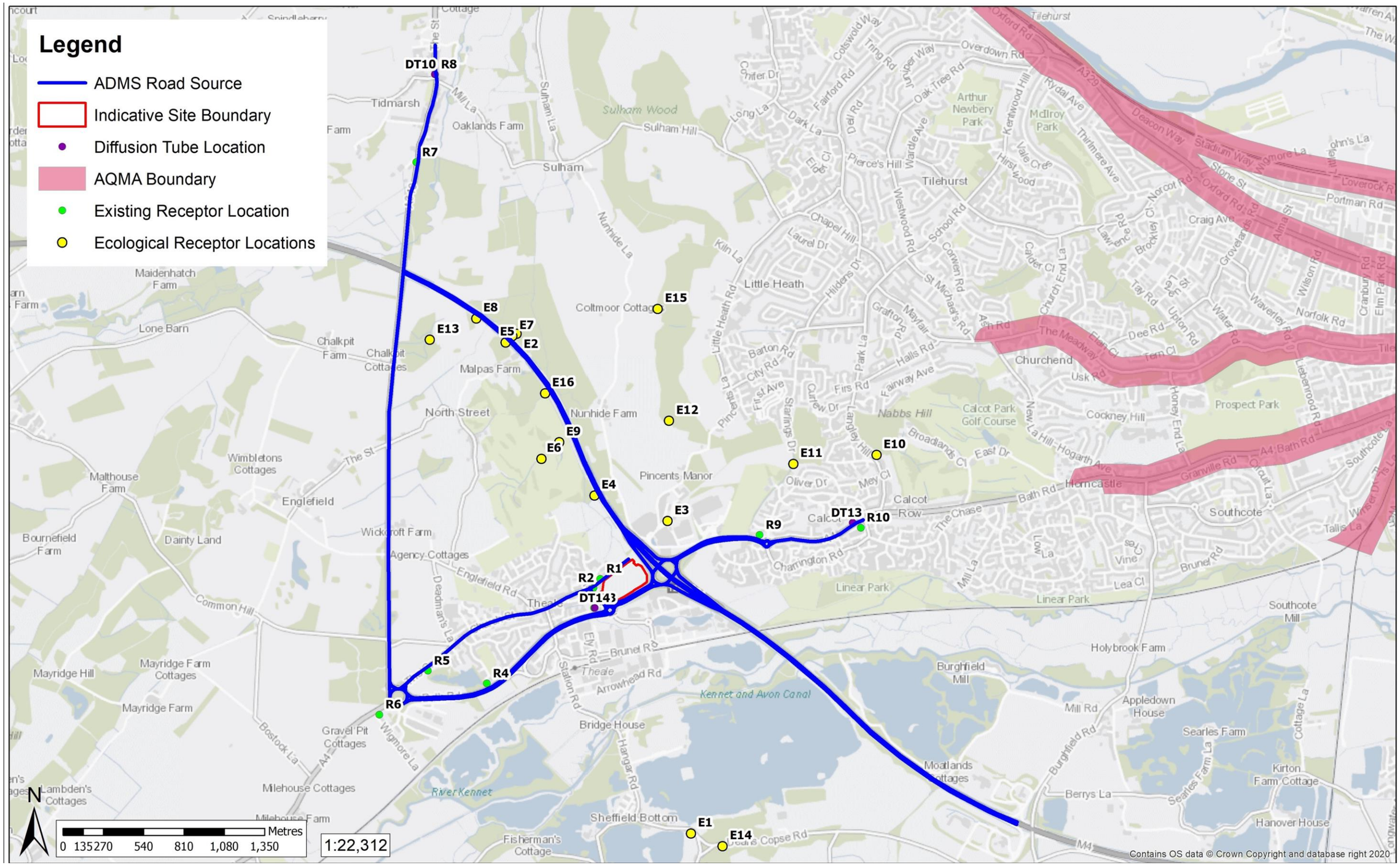
The maximum predicted increase in the annual average exposure to NO_X at the identified ecological receptor, due to changes in traffic movements associated with the development, is 0.16 µg/m^3 at Ancient & Semi-Natural Woodland (E7) which is below the 0.30 µg/m^3 development contribution stated within the guidance of '*A Guide to the Assessment of Air Quality Impacts in Designated Nature Conservation Sites*', IAQM 2020. As a result, no further assessment is required and the impact at 0.08 µg/m^3 at Ancient & Semi-Natural Woodland (E7) as this is considered to be negligible

Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

In conclusion, the development is not considered to be contrary to any of the national and local planning policies regarding air quality.

APPENDIX A - FIGURES

Figure A-1 Air Quality Assessment Area



APPENDIX B - CONSTRUCTION PHASE ASSESSMENT METHODOLOGY

The following information sets out the adopted approach to the construction phase impact assessment in accordance with the aforementioned IAQM guidance[1].

Step 1 – Screen the Requirement for a more Detailed Assessment

An assessment is required if there are sensitive receptors within 350m of the site boundary, within 50m of the route(s) used by construction vehicles on the surrounding road network, or within 500m from the site entrance. A detailed assessment is also required if there is an ecological receptor within 50m of the site boundary.

Step 2A – Define the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude for the demolition phase has been determined based on the below criteria:

- *Large*: Total building volume >50 000m^3, potentially dusty construction (e.g. concrete), on-site crushing and screening, demolition activities >20m above ground level;
- *Medium*: Total building volume 20 000m^3 – 50 000m^3, potentially dusty construction material, demolition activities 10-20m above ground level; and,
- *Small*: Total building volume <20 000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude for the planned earthworks has been determined based on the below criteria:

- *Large:* Total site area >10 000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), > 10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100 000 tonnes;
- *Medium*: Total site area 2 500m^2 – 10 000m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4m-8m in height, total material moved 20 000 tonnes – 100 000 tonnes; and
- *Small:* Total site area <2 500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10 000 tonnes, earthworks during wetter months.

Construction

The dust emission magnitude for the construction phase has been determined based on the below criteria:

- *Large:* Total building volume >100 000m^3, on site concrete batching; sandblasting
- *Medium:* Total building volume 25 000m^3 – 100 000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and,
- *Small:* Total building volume <25 000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

The dust emission magnitude for trackout has been determined based on the below criteria:

- *Large:* >50 HGV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- *Medium:* 10-50 HGV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and,
- *Small:* <10 HGV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B - Defining the Sensitivity of the Area

Sensitivities of People to Dust Soiling Effects

- *High:*
  - Users can reasonably expect an enjoyment of a high level of amenity;
  - The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably expect to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land; and,
  - Indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks

[1] Institute of Air Quality Management 2014. *Guidance on the Assessment of dust from demolition and construction.*

and car showrooms.

- *Medium:*
  - Users can reasonably expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home;
  - The appearance, aesthetics or value of their property could be diminished by soiling;
  - The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land; and,
  - Indicative examples include parks and places of work.
- *Low:*
  - The enjoyment of amenity would not reasonably be expected;
  - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling;
  - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land; and,
  - Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car parks and roads.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table B-1. Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Note - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

Sensitivities of People to the Health Effects of PM_{10}

- *High:*
  - Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day);
  - Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
- *Medium:*
  - Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day); and,
  - Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.
- *Low:*
  - Locations where human exposure is transient; and,
  - Indicative examples include public footpaths, playing fields, parks and shopping streets.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table B-2. Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Note - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

Sensitivities of Receptors to Ecological Effects

- *High:*
  - Locations with an international or national designation and the designated features may be affected by dust soiling;
  - Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain; and,
  - Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
- *Medium:*
  - Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown;
  - Locations with a national designation where the features may be affected by dust deposition; and,
  - Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
- *Low:*
  - Locations with a local designation where the features may be affected by dust deposition; and,
  - Indicative example is a local Nature Reserve with dust sensitive features.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table B-3. Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Note - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

Step 2C - Defining the Risk of Impacts

The risk of impacts with no mitigation is determined by combining the dust emission magnitude determined in Step 2A and the sensitivity of the area determined in Step 2B.

The following tables provide a method of assigning the level of risk for each activity.

Demolition

Table B-4. Risk of Dust Impacts, Demolition

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

Earthworks

Table B-5. Risk of Dust Impacts, Earthworks

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

Construction

Table B-6. Risk of Dust Impacts, Construction

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

Trackout

Table B-7. Risk of Dust Impacts, Trackout

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

Step 3 – Site Specific Mitigation

The dust risk categories for each of the four activities determined in Step 2C should be used to define the appropriate, site-specific mitigation measures to be adopted.

These mitigation measures are contained within section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction.

APPENDIX C - REPORT TERMS & CONDITIONS

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