Hertfordshire County Council

Baldock

Air Quality Assessment

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Executive Summary

WYG have conducted an Air Quality Assessment for the proposed residential development at Land off Royston Road, Baldock.

The potential effects during the construction phase include fugitive dust emissions from site activities, such as demolition, earthworks, construction and trackout. The impacts during the operational phase take into account of exhaust emissions from additional road traffic generated due to the proposed development.

During the construction phase, it is anticipated that dust sensitive receptors will potentially experience increased levels of dust and particulate matter before using any mitigation and control measures. However, these are predicted to be short term and temporary impacts. Throughout this period, the potential impacts from construction on air quality will be managed through site specific mitigation measures detailed within this assessment. With these mitigation measures in place, the effects from the construction phase are not predicted to be significant.

The assessment of the predicted on-site concentrations of NO_2, PM_{10} and $PM_{2.5}$ with both the committed and proposed developments are all determined to be below their respective AQOs. Therefore, the proposed development site will not be significantly affected by existing levels of pollutants and no additional mitigation is required.

Following the adoption of the recommended mitigation measures during the construction phase, the development is not considered to be contrary to any of the national, regional or local planning policies.

The assessment of the significance of the effects associated with both the committed and proposed developments with respect to NO_2, PM_{10} and $PM_{2.5}$ exposure is determined to be 'negligible' for all existing receptors.

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.

1. Introduction

Hertfordshire County Council commissioned WYG Environmental Planning and Transport (WYG) to prepare an updated Air Quality Assessment to support an application for the proposed residential development at land off Royston Road, Baldock.

1.1 Site Location and Context

The approximate United Kingdom National Grid Reference (NGR) is approximately 525740, 234321. The Site is bounded to the north by Warren Farm and Royston Road, to the east by open land, and to the south and west by existing residential properties. The area to the east of the site is proposed to be developed in future to include a new link road as part of the approved Baldock North and Baldock East planning applications. Reference should be made to Figure 1 and 2 for a map of the proposed development site and surrounding area.

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; and,
- 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 based on 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 significance of the changes have been referenced to non-statutory guidance issued by Environmental Protection UK (EPUK).

2. 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, Department for Communities and Local Government, Revised July 2018;
- Planning Practice Guidance: Air Quality, March 2014;
- The Air Quality Standards Regulations, Amendments 2016;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007;
- The Environment Act, 1995;
- Local Air Quality Management Technical Guidance LAQM.TG16, DEFRA, 2018;
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07 - Air Quality, Highways Agency, 2007;
- Air Pollution: Outdoor Air Quality and Health, NICE guideline NG70, June 2017;
- Air Quality guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide, World Health Organisation, 2005;
- Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, 2017; and,
- Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2014.

Websites Consulted

- Google maps (maps.google.co.uk);
- The UK National Air Quality Archive (www.airquality.co.uk);
- Department for Transport Matrix (www.dft.go.uk/matrix);
- emapsite.com;
- Multi-Agency Geographic Information for the Countryside (http://magic.defra.gov.uk/);
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/);
- North Hertfordshire District Council (http://www.north-herts.gov.uk/); and
- North Hertfordshire District Council Air Quality Planning Guidance, September 2016.

Site Specific Reference Documents

- North Hertfordshire District Council Air Quality Annual Status Report, 2018;
- North Hertfordshire District Council Local Plan, Adopted April 1996; and,
- North Hertfordshire District Council Local Plan 2011 – 2031, Proposed Submission, October 2016.

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.

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 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 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

Table 2.1 Air Quality Standards, Objectives, Limit 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	50µg/m^3 by end of 2004 (max 35 exceedances a year)	24-hour mean	1st January 2005	50µg/m^3 by end of 2004 (max 35 exceedances a year)	1st January 2005	Retain Existing
	UK	40µg/m^3 by end of 2004	Annual mean	1st January 2005	40µg/m^3	1st January 2005	
$PM_{2.5}$	UK	25µg/m^3	Annual Mean	31st December 2010	25µg/m^3	1st January 2010	Retain Existing
NO_2	UK	200µg/m^3 not to be exceeded more than 18 times a year	1-Hour Mean	31st December 2005	200µg/m^3 not to be exceeded more than 18 times a year	1st January 2010	Retain Existing
	UK	40µg/m^3	Annual Mean	31st December 2005	40µg/m^3	1st January 2010	

Within the context of this assessment, the annual mean objectives are those against which residential receptors will be assessed and the short-term objectives apply to all receptor locations, both residential and non-residential.

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). For each AQMA, the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Planning and Policy Guidance

National Policy

The National Planning Policy Framework (NPPF), revised July 2018, principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPS states that:

> *'Planning policies and decision should sustain and contribute towards compliance with relevant limit values or national objectives for pollutant, taking into account the presence of Air Quality Management Areas or 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 or 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'*

The Planning Practice Guidance (PPG) web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following guidance:

> *'When deciding whether air quality is relevant to a planning application, local planning authorities should consider whether the development would:*
>
> *Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*
>
> *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant;*

centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area.

Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.

Give rise to potentially significant impact (such as dust) during construction for nearby sensitive locations.

Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.'

Local Policy

The North Hertfordshire Council are currently in the process of creating a new local plan core strategy. The current adopted District Local Plan (adopted April 1996) sets out the planning framework for guiding decisions on all developments within the area. Whilst there are no specific policies for air quality within the adopted plan, the following policies from the current adopted plan have been identified as relevant to air quality:

"Policy 8: Development in Towns;

Within the towns of Baldock, Hitchin, Letchworth, and Royston, and at North East Stevenage (Policy 4), the Council will normally permit proposals to meet the majority of the development needs of the District if the aims of other relevant policies are met."

Within the current Proposed Submission Local Plan (submitted October 2016), North Hertfordshire have suggested the following policies to be adopted, which have been identified as relevant to air quality:

"Policy D4: Air Quality;

Planning permission will be granted where development proposals:

a. Give consideration to the potential or actual impact on local air quality, both during the demolition/ construction phase and as a result of its final occupation and use;

b. Propose appropriate levels of mitigation to minimise emissions to the atmosphere and their potential effects upon health and the local environment; and

c. Carry out air pollution impact assessments, where required, to determine the impact on local air quality of the development, otherwise the development may be refused.

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

3. Assessment Methodology

The potential environmental effects of the operational phase of the proposed development are identified as far as current knowledge of the site and development allows. The significance of potential environmental effects is assessed according to the latest guidance produced by EPUK and IAQM in January 2017.

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.

3.1 Determining Significance of the Air Quality Effects

The significance 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 significance 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 Assessment Level (AQAL), which may be an AQO, EU limit or target value, or an Natural Resources Wales Assessment Level (NRWAL)';
2. The absolute concentrations are also considered in terms of the AQAL 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 AQAL;
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 AQAL will have higher severity compared to a relatively large change at a receptor which is significantly below the AQAL;
4. The effects can be adverse when air quality concentration increase or beneficial when concentration decrease as a result of development;
5. The judgement of overall significance 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 significance 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 AQAL.

Table 3.1 Significance of Effects Matrix

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

4. Baseline Conditions

4.1 Air Quality Review

This section provides a review of the existing air quality in the vicinity of the proposed development 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 proposed development site has been defined from a number of sources, as described in the following sections.

Local Air Quality Management (LAQM)

As required under section 82 of the Environment Act 1995, North Hertfordshire District Council (NHDC) has conducted 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 a number of locations of relevant public exposure within the Council. NHDC has designated two Air Quality Management Areas (AQMAs) that are described below:

- North Hertfordshire District Council Air Quality Management Order No.1 2012: Properties on the south side of Stevenage Road, Hitchin, fronting on to the road, between the Hitchin Hill Three Moorhens PH roundabout and 94-98 Stevenage Road; and,
- NHDC AQMA Order No.2 2016: One residential property located adjacent to the Paynes Park Roundabout. The south east façade of which is exposed to nitrogen dioxide concentrations above the annual mean Air Quality Objective.

The proposed development is 8.9 km north east of the North Hertfordshire District Council AQMA. Due to the large distance, it is unlikely that the proposed development will have any significant impacts on air quality within the AQMA and therefore has not been included within the modelling assessment.,

Air Quality Monitoring

Monitoring of air quality within NHDC is undertaken through continuous and non-continuous monitoring methods. These have been reviewed in order to provide an indication of existing air quality in the area surrounding the proposed development site.

<u>Continuous Monitoring</u>

NHDC operated two continuous monitoring stations in 2016, one of which monitored NO_2 and one of which monitored PM_{10}. The closest automatic monitoring station is located approximately 8 km south west of the proposed site boundary.

Table 4.1 Monitored Annual Mean NO_2 Concentrations at Automatic Monitoring Stations

Site ID	Location	Exposure Height (m)	Distance to Kerb (m)	Site Type	NO_2 Annual Mean Concentration 2016 (µg/m^3)
NH1	Stevenage Road	1.5	2.0	Roadside	50.0

As indicated in Table 4.1, the automatic monitoring station exceeded the AQO (40µg/m^3 annual mean) in 2016.

Non - Continuous Monitoring

NHDC operates a network of diffusion tubes. The closest diffusion tube is located approximately 960 m south west of the site boundary. Reference should be made to Figure 1 for the locations of the diffusion tubes within NHDC's area of jurisdiction.

The representative diffusion tube data is from 2016, which is presented in Table 4.2.

Table 4.2 Monitored Annual Mean NO_2 Concentrations at Diffusion Tubes

Site ID	Location	Exposure Height (m)	Distance to Kerb (m)	Site Type	NO_2 Annual Mean Concentration 2016 (µg/m^3)
NH59	Clothall Road, Baldock	2.0	3.0	Roadside	26.3
NH61	Whitehorse Street, Baldock	2.1	2.0	Roadside	27.7
NH70	Hitchin Street, Baldock	2.1	2.0	Roadside	26.4
NH72	Whitehorse Street, Baldock	2.0	2.0	Roadside	31.3
NH88	Church Street, Baldock	2.0	0.5	Kerbside	40.5

As indicated in Table 4.2, all diffusion tubes, except NH88, monitored NO_2 concentrations below the AQO (40 µg/m^3 annual mean) in 2016. All diffusion tubes within Table 4.2 lie within the extents of the main study area and as such have been utilised for model verification.

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 model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The 2016 meteorological data used in the assessment is derived from Luton Meteorological Station. This is the nearest meteorological station which is considered representative of the development site, with all the complete parameters necessary for the ADMS model. Reference should be made to Figure 3 for an illustration of the prevalent wind conditions at the Luton Meteorological Station site.

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 proposed development 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 1 for a graphical representation of the traffic data utilised within the ADMS Roads 4.1.1 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 4.3 and the spatial locations of all of the receptors are illustrated in Figure 1.

Table 4.3 Modelled Existing Sensitive Receptor Locations

Discrete Sensitive Receptor		Receptor Height (m)	UK NGR (m)	
			X	Y
R1	Residential Property, North Road	1.5	524387	234482
R2	Magdalene Court	1.5	524655	234081
R3	The Nook	1.5	524067	235097
R4	Hill Cottage	1.5	524821	234265
R5	The Knights Templar School	1.5	524278	233665
R6	63 Letchworth Road	1.5	524011	233570
R7	Residential Property, Clothall Road	1.5	525275	233468
R8	35 Clothall Road	1.5	524833	233805
R9	7 Clothall Road	1.5	524693	233974
R10	St John's RC Primary School	1.5	525032	233267
R11	53 South Road	1.5	525149	233552
R12	2 Eisenburg Close	1.5	525513	234298
R13	46 Aleyn Way	1.5	525799	234229
R14	Residential Property, North Road	1.5	524447	234358
R15	Hartsfield Junior Mixed and Infant School	1.5	524870	234074
R16	71 Clothall Road	1.5	524988	233649
R17	26 Westell Close	1.5	525390	233805
R18	Burleigh House Care Home	1.5	523901	233510

4.5 Ecological Receptors

Air quality impacts associated with the proposed re-development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations (2017) require 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. Following a search within a 1km radius of the site boundary, three ecological receptors were identified. These are detailed in Table 4.3, and have been included as receptors in the modelling assessment to establish any potential air quality effects.

Table 4.3 Modelled Existing Sensitive Receptor Locations

Discrete Sensitive Receptor		UK NGR (m)	
		X	Y
ER1	Ivel Springs (LNR)	524358	234506
ER2	Norton Common (LNR)	525189	233139
ER3	Weston Hill (LNR)	522121	233625

5. 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 10µm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. There are no formal standards or criteria for nuisance caused by deposited particles, however, a deposition rate of 200mg/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 significance 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	Dust Emission Magnitude
Demolition	N/A
Earthworks	Large
Construction	Large
Trackout	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.

Table 5.2 Sensitivity of the Area

Source	Area Sensitivity		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Medium	Low	Low
Construction	Medium	Low	Low
Trackout	Medium	Low	Low

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 construction phase, without mitigation, is presented below.

Table 5.3 Impact Significance 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	Low
Construction	Medium	Low	Low
Trackout	Low	Low	Low

Appropriate mitigation measures are detailed and presented in Section 7. Following the adoption of these measures, the subsequent impact significance of the construction phase is not predicted to be significant.

6. Assessment of Air Quality Impacts - Operational Phase

In the context of the proposed development, transportation 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, as contained within the supporting Traffic Assessment (TA), the operational phase assessment has been undertaken with an assumed operational opening year of 2022. The assessment scenarios are therefore:

- 2016 Baseline = Existing baseline conditions;
- 2022 "Do Minimum" = Baseline conditions + committed development flows; and
- 2022 "Do Something" = Baseline conditions + committed development flows + proposed development flows.

6.1 Existing and Predicted Traffic Flows

Baseline 2016 data and projected 2022 'do minimum' and 'do something' traffic data has been obtained for the operational phase assessment in the form of Annual Average Daily Traffic figures (AADT). Baseline 2016 and 2022 'do minimum' traffic data have been provided by WYG Transport consultants, as utilised for the Baldock North and Baldock East planning applications. The additional trips associated with the proposed development have been provided by Stomor Transport Consultants as outlined in the supporting Transport Assessment.

To provide a worst-case assessment, the 'do minimum' scenario is inclusive of all committed development traffic associated with the Baldock North (2800 dwellings) and Baldock East (495 dwellings) planning applications.

For the 2022 'do something' scenario, the proposed development flows contained within the supporting transport assessment have been added on to the 2022 'do minimum' flows. It is assumed the average vehicle speeds on the local road network in an opening year of 2022 will be broadly the same as the ones in 2016.

Emission factors for the 2016 baseline and 2022 projected 'do minimum' and 'do something' scenarios have been calculated using the Emission Factor Toolkit Version 8.0.1 (December 2017).

For the purposes of the air quality assessment, only roads predicted to experience significant changes in flows have been included in the air quality model. These represent the primary access routes to the proposed

development site. Where unavailable, traffic speeds have been estimated based on-site observations and national speed limits.

A 50m 20km/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 1. Detailed traffic figures are provided in the Table 6.1.

Table 6.1 Traffic Data

Link	Speed (km/h)	2016		2022			
		AADT	HGV %	Without Proposed Development		With Development	
				AADT	%HGV	AADT	%HGV
A1M N	112	43,984	9.70	46,609	9.70	46,653	9.70
A1M S	112	44,863	9.00	47,972	9.00	48,016	9.00
A507 West of A1M	48	21,000	3.80	21,236	3.80	21,247	3.80
A507 East of A1	48	16,205	7.20	24,980	7.20	24,991	7.20
North Road North	48	12,441	4.60	21,523	4.60	21,693	4.60
North Road	48	11,540	5.60	14,832	5.60	15,002	5.60
North Road South/Station Road	48	13,399	3.70	16,841	3.70	17,011	3.70
Clothall Road	48	6,731	4.30	8,804	4.30	8,974	4.30
Clothall Road South	48	10,007	4.70	14,749	4.70	14,919	4.70
North Link Road (North Road)	48	0	5.00	25,114	5.00	25,114	5.00
North Link Road (Royston Road)	48	0	5.00	9,725	5.00	9,725	5.00
Bygrave Road	48	2,135	0.90	2,401	0.90	2,401	0.90
Royston Road	48	8,542	4.20	9,604	4.20	9,859	4.20
South Link Road	48	0	5.00	7,652	5.00	7,652	5.00
Wallington Road	48	6,247	4.00	15,073	4.00	15,243	4.00
A505	96	40,028	3.80	41,921	3.80	42,091	3.80
Whitehorse Street	48	8,033	3.20	10,188	3.20	10,358	3.20
Letchworth Road/Hitchin Road	48	14,879	3.50	17,675	3.50	17,845	3.50
Letchworth Road	48	12,399	3.80	16,559	3.80	16,729	3.80
Site Access Road	20	0	0.00	0	0.00	299	0.00

6.2 Background Concentrations

Defra Published Background Concentrations for 2016

Background concentrations below were obtained 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 development site. In November 2017, Defra issued revised 2015 based background maps for nitrogen oxide (NO_X), NO_2, PM_{10} and $PM_{2.5}$. The mapped background concentrations are summarised in Table 6.2.

Table 6.2 Published Background Air Quality Levels (µg/m³)

Receptor Location	2016			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
Diffusion Tube Monitoring Locations				
NH59	11.97	16.18	13.66	9.15
NH61	13.65	18.70	13.42	9.06

Receptor Location	2016			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
NH70	13.65	18.70	13.42	9.06
NH72	13.65	18.70	13.42	9.06
NH88	13.65	18.70	13.42	9.06
Modelled Receptor Locations				
R1	11.97	16.18	13.66	9.15
R2	11.97	16.18	13.66	9.15
R3	10.24	13.65	14.21	9.39
R4	11.97	16.18	13.66	9.15
R5	13.65	18.70	13.42	9.06
R6	13.65	18.70	13.42	9.06
R7	12.54	16.95	14.55	9.58
R8	13.65	18.70	13.42	9.06
R9	13.65	18.70	13.42	9.06
R10	12.54	16.95	14.55	9.58
R11	12.54	16.95	14.55	9.58
R12	11.09	14.88	13.96	9.26
R13	11.09	14.88	13.96	9.26
R14	11.97	16.18	13.66	9.15
R15	11.97	16.18	13.66	9.15
R16	13.65	18.70	13.42	9.06
R17	12.54	16.95	14.55	9.58
R18	17.95	25.60	15.46	10.18
ER1	11.97	16.18	13.66	9.15
ER2	12.54	16.95	14.55	9.58
ER3	12.75	17.39	13.14	8.93
PR1	11.09	14.88	13.96	9.26
PR2	11.09	14.88	13.96	9.26
PR3	11.09	14.88	13.96	9.26
PR4	11.09	14.88	13.96	9.26
PR5	11.09	14.88	13.96	9.26
PR6	11.09	14.88	13.96	9.26

Local Authority Monitoring Background

In areas where it has been considered that the Defra published background maps are unrepresentative of local air quality background contributions, alternate background data have been utilised where appropriate. Where considered more representative, LA NO_2 monitoring data diffusion tubes have been used. Table 6.4 below shows the data used to represent the background air quality conditions at existing receptor locations within the detailed modelling assessment.

As the Defra background maps have predicted unrepresentatively low NO_2 and NO_x background concentrations at the closest monitoring locations, background NO_x and NO_2 concentrations have been considered individually across the model area for receptors where similar background contributions are

expected based on the LA monitored NO_2 at diffusion tubes shown in Table 6.3. As these diffusion tubes monitor roadside NO_2, to determine the likely background NO_2 for each area, the unadjusted baseline ADMS model output NO_2 for each monitoring location has been subtracted from the monitored NO_2. A review of the potential background contributions (monitored results less modelled traffic contribution) in each area has been undertaken to determine the most appropriate background levels (accounting for variation in monitored levels due to micro-siting and local non-traffic sources).

Table 6.3 Roadside Modelled Contribution at Tubes

Tube	Monitored NO_2 (µg/m³)	Modelled Traffic Contribution NO_2 (µg/m³)	Non-Traffic NO_2 (µg/m³)
NH59	26.30	8.15	18.15
NH61	27.70	14.02	13.68
NH70	26.40	14.11	12.29
NH72	31.30	5.72	25.58
NH88	40.50	11.74	28.76

To calculate the background NO_x for each location, the following guidance has been utilised.

As the Environment Agency Air Quality Modelling and Assessment Unit (AQMAU) Document states that the *Case Specific Scenarios* approach should be used within an assessment.

> "*Operators are asked to justify their use of percentages lower than 35%, for short-term and 70% for long-term in their application reports.*"
>
> For the long-term:
>
> - NO_x to NO_2 = 70%
> - NO_2/NO_x = 70%
> - Therefore, $NO_x = NO_2/0.7 = 1.43$

Therefore, for locations where background monitoring data is considered more representative, a factor of 1.43 has been applied to the NO_2 to produce the NO_x value.

These background concentrations have been utilised in the model verification, and the main body of the operational phase modelling assessment.

Table 6.4 Background Concentrations Used

Receptor location	Background Source	Background Concentration Utilised	
		NO_2	NO_x
Diffusion Tube Monitoring Locations			
NH59	Monitored Data	18	26
NH61	Monitored Data	14	20
NH70	Monitored Data	12	18
NH72	Monitored Data	26	37

Receptor location	Background Source	Background Concentration Utilised	
		NO_2	NO_x
NH88	Monitored Data	29	41
Receptor Locations			
R1	NH59	18	26
R2	NH59	18	26
R3	NH72	26	37
R4	NH59	18	26
R5	NH70	12	18
R6	NH88	29	41
R7	NH59	18	26
R8	NH59	18	26
R9	NH59	18	26
R10	NH70	12	18
R11	NH72	26	37
R12	NH59	18	26
R13	NH72	26	37
R14	NH72	26	37
R15	NH70	12	18
R16	NH59	18	26
R17	NH70	26	37
R18	NH88	29	41
ER1	NH59	18	26
ER2	NH70	12	18
ER3	NH59	18	26
PR1	NH59	18	26
PR2	NH59	18	26
PR3	NH59	18	26
PR4	NH59	18	26
PR5	NH59	18	26
PR6	NH59	18	26

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 TG16 guidance note and uses the most recently available diffusion tube monitoring data to best represent this.

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 TG16. 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

Tube location	NO_2 µg/m^3		
	Monitored NO_2	Modelled NO_2	Difference (%)
NH59	26.30	26.24	-0.22
NH61	27.70	28.05	1.26
NH70	26.40	26.25	-0.57
NH72	31.30	31.65	1.10
NH88	40.50	40.12	-0.94

The final model produced data at the monitoring locations to within 10% of the monitoring results, as the requirement by TG16 guidance.

The final verification model correlation coefficient (representing the model uncertainty) is 0.99[1]. This figure demonstrates that the model predictions were in line with the road traffic emissions at the monitoring locations.

[1] This was achieved by applying a model correction factor of 1.38 to roadside predicted NO_X concentrations before converting to NO_2

6.4 Summary of 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	**Luton Meteorological Station**, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**1m** representing a typical surface roughness for **Cities and Woodlands.**
Latitude	Allows the location of the model area to be set	United Kingdom = **52.0**
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.**
Elevation of Road	Allows the height of the road link above ground level to be specified.	All 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".	5m Canyons were utilised along Whitehorse Street and Letchworth Road.
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 **8.0.1 (2017)** dataset was used.
Year	Predicted EFT emissions rates depend on the year of emission.	**2016** data for verification and baseline operational phase assessment **2022** data for the operational phase assessment.

6.5 ADMS Modelling Results

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.

Assessment Scenarios

For the operational year of 2022, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken under two scenarios:

- Scenario 1: Using the Emissions Factor Toolkit 2022 emissions rates which take into account the rate of reduction in emission from road vehicles into the future.

In Scenario 1, for the operational year of 2022, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken using the Emissions Factor Toolkit emissions rates which take into account of the rate of reduction in emission from road vehicles into the future with the following factors

- 2016 Baseline = Existing baseline conditions;
- 2022 "No development" = Baseline conditions + committed development flows;
- 2022 "With development"= Baseline conditions + committed development flows + proposed development flows.

- Scenario 2: Using the Theoretical Style assessment with emission factors of the year of 2016 for the future 2022 'no and with' development scenarios. This scenario assumes no reduction in emissions rates from road vehicles from 2016 to 2022.

In Scenario 2, this is an additional theoretical scenario which uses emission factors for 2016 for the 'no development' and 'with development' based on a recent appeal decision (planning reference no.APP/D3830/A/14/22269877) that favoured the uncertainty of emissions forecasts. It should be noted that this is a theoretical scenario which assumes that the government (Defra) predictions for reduction in emissions over the forthcoming years will not occur. However, this should be not be considered as a 'more correct' scenario in accordance with the 2010 note [http://laqm.defra.gov.uk/laqm-faqs/faq5.html] which confirms that: '*There is no evidence to suggest that background concentrations associated with the other (non-traffic) source contributions should not behave as forecast. This disparity in the historical data highlights the uncertainty of future year projections of both NO_x and NO_2, but at this stage there is no robust evidence upon which to base any revised road traffic emissions projections'*.

- 2022 'No development' Theoretical Scenario = Baseline + committed development (**using 2016 traffic emission factors**);
- 2022 'With development' Theoretical Scenario = Baseline + committed development + Proposed development (**using 2016 traffic emission factors**);

The Scenario 2 assessment results are presented in **Appendix B**.

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 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)			
		Baseline 2016	No development 2022	With development 2022	Development Contribution
R1	Residential Property, North Road	23.61	22.99	23.03	0.04
R2	Magdalene Court	23.85	22.28	22.35	0.07
R3	The Nook	32.70	32.02	32.06	0.04
R4	Hill Cottage	22.02	20.88	20.93	0.05
R5	The Knights Templar School	14.62	13.85	13.86	0.01
R6	63 Letchworth Road	34.62	33.00	33.02	0.02
R7	Residential Property, Clothall Road	21.75	21.12	21.15	0.03
R8	35 Clothall Road	20.36	19.79	19.81	0.02
R9	7 Clothall Road	21.10	20.35	20.38	0.03
R10	St John's RC Primary School	13.33	12.95	12.95	<0.01
R11	53 South Road	30.38	30.47	30.52	0.05
R12	2 Eisenburg Close	20.69	19.99	20.02	0.03
R13	46 Aleyn Way	28.11	28.20	28.21	0.01
R14	Residential Property, North Road	31.42	30.24	30.28	0.04
R15	Hartsfield Junior Mixed and Infant School	13.68	13.28	13.29	0.01
R16	71 Clothall Road	20.52	19.94	19.97	0.03
R17	26 Westwell Close	29.16	30.06	30.10	0.04
R18	Burleigh House Care Home	42.15	37.92	37.94	0.02
ER1	Ivel Springs (LNR)	32.80	30.33	30.44	0.11
ER2	Norton Common (LNR)	13.59	13.10	13.11	0.01
ER3	Weston Hill (LNR)	18.35	18.24	18.24	<0.01
PR1	Proposed Residential Receptor	-	-	21.21	-
PR2	Proposed Residential Receptor	-	-	20.51	-
PR3	Proposed Residential Receptor	-	-	19.69	-
PR4	Proposed Residential Receptor	-	-	19.64	-
PR5	Proposed Residential Receptor	-	-	20.24	-
PR6	Proposed Residential Receptor	-	-	20.41	-
Annual Mean AQO not to be exceeded		**40 µg/m^3**			

All modelled existing and proposed 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 the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is 0.11 µg/m^3 at Ivel Springs LNR (ER1).

The significance of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table 6.8.

Table 6.8 Significance of Effects at Key Receptors (NO_2)

NO_2 Significance Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change (% of AQO)**	**% Change in Concentration Relative to AQAL**	**% Annual Mean Concentration in Assessment Year**	**Significance**
R1	0.04	0.10	0%	≤75% of AQAL	Negligible
R2	0.07	0.17	0%	≤75% of AQAL	Negligible
R3	0.04	0.10	0%	76-94% of AQAL	Negligible
R4	0.05	0.12	0%	≤75% of AQAL	Negligible
R5	0.01	0.02	0%	≤75% of AQAL	Negligible
R6	0.02	0.05	0%	76-94% of AQAL	Negligible
R7	0.03	0.07	0%	≤75% of AQAL	Negligible
R8	0.02	0.05	0%	≤75% of AQAL	Negligible
R9	0.03	0.07	0%	≤75% of AQAL	Negligible
R10	<0.01	0.00	0%	≤75% of AQAL	Negligible
R11	0.05	0.12	0%	76-94% of AQAL	Negligible
R12	0.03	0.07	0%	≤75% of AQAL	Negligible
R13	0.01	0.02	0%	≤75% of AQAL	Negligible
R14	0.04	0.10	0%	76-94% of AQAL	Negligible
R15	0.01	0.02	0%	≤75% of AQAL	Negligible
R16	0.03	0.07	0%	≤75% of AQAL	Negligible
R17	0.04	0.10	0%	≤75% of AQAL	Negligible
R18	0.02	0.05	0%	95-102% of AQAL	Negligible
ER1	0.11	0.27	0%	76-94% of AQAL	Negligible
ER2	0.01	0.02	0%	≤75% of AQAL	Negligible
ER3	<0.01	0.00	0%	≤75% of AQAL	Negligible
*0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

The magnitude of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing residential receptors the significance is determined to be 'negligible' at all receptors, based on the methodology outlined in section 3.

Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Particulate Matter

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 development, based on modelled 'no development' and 'with development' scenarios.

Table 6.9 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m³)			
		Baseline 2016	No development 2022	With development 2022	Development Contribution
R1	Residential Property, North Road	14.46	14.73	14.74	0.01
R2	Magdalene Court	14.42	14.49	14.50	0.01
R3	The Nook	15.17	15.56	15.57	0.01
R4	Hill Cottage	14.27	14.31	14.33	0.02
R5	The Knights Templar School	13.73	13.74	13.75	0.01
R6	63 Letchworth Road	14.13	14.16	14.17	0.01
R7	Residential Property, Clothall Road	15.11	15.26	15.27	0.01
R8	35 Clothall Road	13.75	13.80	13.81	0.01
R9	7 Clothall Road	13.86	13.92	13.93	0.01
R10	St John's RC Primary School	14.72	14.73	14.73	<0.01
R11	53 South Road	15.12	15.41	15.42	0.01
R12	2 Eisenburg Close	14.36	14.40	14.41	0.01
R13	46 Aleyn Way	14.27	14.46	14.47	0.01
R14	Residential Property, North Road	14.49	14.64	14.65	0.01
R15	Hartsfield Junior Mixed and Infant School	13.88	13.91	13.92	0.01
R16	71 Clothall Road	13.78	13.84	13.85	0.01
R17	26 Westell Close	14.99	15.37	15.38	0.01
R18	Burleigh House Care Home	16.86	16.73	16.73	<0.01
ER1	Ivel Springs (LNR)	15.63	16.15	16.18	0.03
ER2	Norton Common (LNR)	14.76	14.77	14.77	<0.01
ER3	Weston Hill (LNR)	13.18	13.18	13.18	<0.01
PR1	Proposed Residential Receptor	-	-	14.59	-
PR2	Proposed Residential Receptor	-	-	14.51	-
PR3	Proposed Residential Receptor	-	-	14.32	-
PR4	Proposed Residential Receptor	-	-	14.31	-
PR5	Proposed Residential Receptor	-	-	14.45	-
PR6	Proposed Residential Receptor	-	-	14.46	-
Annual Mean AQO not to be exceeded		**40 µg/m³**			

As indicated in Table 6.9, the maximum predicted increase in the annual average exposure to PM_{10} at any existing receptors, due to changes in traffic movements associated with the development, is 0.03 µg/m³ at Ivel Springs LNR (ER1).

All modelled receptor locations are predicted to meet the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios. Although not a statutory objective, all modelled PM_{10} concentrations are also below the WHO guidelines 20 µg/m³ guidelines.

The significance of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 6.10.

Table 6.10 Significance of Effects at Key Receptors (Particulate Matter)

PM_{10} Significance Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change (% of AQO)**	**% Change in Concentration Relative to AQAL**	**% Annual Mean Concentration in Assessment Year**	**Significance**
R1	0.01	0.02	0%	≤75% of AQAL	Negligible
R2	0.01	0.03	0%	≤75% of AQAL	Negligible
R3	0.01	0.02	0%	≤75% of AQAL	Negligible
R4	0.02	0.03	0%	≤75% of AQAL	Negligible
R5	0.01	0.01	0%	≤75% of AQAL	Negligible
R6	0.01	0.01	0%	≤75% of AQAL	Negligible
R7	0.01	0.02	0%	≤75% of AQAL	Negligible
R8	0.01	0.01	0%	≤75% of AQAL	Negligible
R9	0.01	0.02	0%	≤75% of AQAL	Negligible
R10	<0.01	0.00	0%	≤75% of AQAL	Negligible
R11	0.01	0.02	0%	≤75% of AQAL	Negligible
R12	0.01	0.02	0%	≤75% of AQAL	Negligible
R13	0.01	0.01	0%	≤75% of AQAL	Negligible
R14	0.01	0.02	0%	≤75% of AQAL	Negligible
R15	0.01	0.01	0%	≤75% of AQAL	Negligible
R16	0.01	0.01	0%	≤75% of AQAL	Negligible
R17	0.01	0.02	0%	≤75% of AQAL	Negligible
R18	<0.01	0.01	0%	≤75% of AQAL	Negligible
ER1	0.03	0.06	0%	≤75% of AQAL	Negligible
ER2	<0.01	0.00	0%	≤75% of AQAL	Negligible
ER3	<0.01	0.00	0%	≤75% of AQAL	Negligible
*0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

The magnitude of the effects of changes in traffic as a result of the proposed development, with respect to annual mean PM_{10} exposure, the significance has been determined to be 'negligible' based on the methodology outlined in section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Particulate Matter

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 development, based on modelled 'no development' and 'with development' scenarios.

Table 6.11 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		**$PM_{2.5}$ (µg/m³)**			
		Baseline 2016	**No development 2022**	**With development 2022**	**Development Contribution**
R1	Residential Property, North Road	9.63	9.74	9.75	0.01
R2	Magdalene Court	9.61	9.61	9.62	0.01

Receptor		$PM_{2.5}$ (µg/m³)			
		Baseline 2016	No development 2022	With development 2022	Development Contribution
R3	The Nook	9.98	10.15	10.16	0.01
R4	Hill Cottage	9.51	9.51	9.52	0.01
R5	The Knights Templar School	9.25	9.24	9.24	<0.01
R6	63 Letchworth Road	9.51	9.48	9.49	0.01
R7	Residential Property, Clothall Road	9.92	9.98	9.99	<0.01
R8	35 Clothall Road	9.26	9.27	9.27	<0.01
R9	7 Clothall Road	9.32	9.34	9.34	<0.01
R10	St John's RC Primary School	9.69	9.68	9.68	<0.01
R11	53 South Road	9.93	10.07	10.08	0.01
R12	2 Eisenburg Close	9.50	9.51	9.51	<0.01
R13	46 Aleyn Way	9.45	9.54	9.54	<0.01
R14	Residential Property, North Road	9.65	9.69	9.70	0.01
R15	Hartsfield Junior Mixed and Infant School	9.28	9.29	9.29	<0.01
R16	71 Clothall Road	9.28	9.29	9.30	0.01
R17	26 Westell Close	9.85	10.05	10.05	<0.01
R18	Burleigh House Care Home	11.14	10.95	10.95	<0.01
ER1	Ivel Springs (LNR)	10.35	10.55	10.56	0.01
ER2	Norton Common (LNR)	9.72	9.71	9.71	<0.01
ER3	Weston Hill (LNR)	8.95	8.95	8.95	<0.01
PR1	Proposed Residential Receptor	-	-	9.62	-
PR2	Proposed Residential Receptor	-	-	9.57	-
PR3	Proposed Residential Receptor	-	-	9.46	-
PR4	Proposed Residential Receptor	-	-	9.46	-
PR5	Proposed Residential Receptor	-	-	9.53	-
PR6	Proposed Residential Receptor	-	-	9.54	-
Annual Mean AQO not to be exceeded		**25 µg/m³**			

As indicated in Table 6.11, the maximum predicted increase in the annual average exposure to $PM_{2.5}$ at any existing receptors, due to changes in traffic movements associated with the development, is 0.01 µg/m³ at Ivel Springs (LNR) (R3).

All modelled receptor locations are predicted to meet the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios. Although not a statutory objective, all modelled $PM_{2.5}$ concentrations are also below the WHO guidelines 20 µg/m³ guidelines.

The significance of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 6.12.

Table 6.12 Significance of Effects at Key Receptors (Particulate Matter)

$PM_{2.5}$ Significance Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change (% of AQO)**	**% Change in Concentration Relative to AQAL**	**% Annual Mean Concentration in Assessment Year**	**Significance**
R1	0.01	0.02	0%	≤75% of AQAL	Negligible
R2	0.01	0.02	0%	≤75% of AQAL	Negligible
R3	0.01	0.02	0%	≤75% of AQAL	Negligible
R4	0.01	0.02	0%	≤75% of AQAL	Negligible
R5	<0.01	0.00	0%	≤75% of AQAL	Negligible
R6	0.01	0.02	0%	≤75% of AQAL	Negligible
R7	<0.01	0.00	0%	≤75% of AQAL	Negligible
R8	<0.01	0.00	0%	≤75% of AQAL	Negligible
R9	<0.01	0.00	0%	≤75% of AQAL	Negligible
R10	<0.01	0.00	0%	≤75% of AQAL	Negligible
R11	0.01	0.02	0%	≤75% of AQAL	Negligible
R12	<0.01	0.00	0%	≤75% of AQAL	Negligible
R13	<0.01	0.00	0%	≤75% of AQAL	Negligible
R14	0.01	0.02	0%	≤75% of AQAL	Negligible
R15	<0.01	0.00	0%	≤75% of AQAL	Negligible
R16	0.01	0.02	0%	≤75% of AQAL	Negligible
R17	<0.01	0.00	0%	≤75% of AQAL	Negligible
R18	<0.01	0.00	0%	≤75% of AQAL	Negligible
ER1	0.01	0.02	0%	≤75% of AQAL	Negligible
ER2	<0.01	0.00	0%	≤75% of AQAL	Negligible
ER3	<0.01	0.00	0%	≤75% of AQAL	Negligible
*0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

The magnitude of the effects of changes in traffic as a result of the proposed development, with respect to annual mean $PM_{2.5}$ exposure, the significance has been determined to be 'negligible' based on the methodology outlined in section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

North Hertfordshire Air Quality Damage Costs Assessment

The North Hertfordshire Supplementary Air Quality for Planning Guidance document outlines that for Minor Scale Developments, an air quality damage costs assessment is not required. The development was confirmed as a minor scale development within the Environmental Health response dated 2nd March 2018.

7. Mitigation

7.1 Construction Phase

The dust risk categories have been determined in Section 5 for each of the four construction activities. The assessment has determined that the potential impact significance 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 below:

Table 7.1 Highly Recommended Construction Phase 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.
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.
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 a 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
No action required.

Table 7.2 Desirable Construction Phase Mitigation Measures

Communication
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)
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
Use water-assisted dust sweeper(s) on the 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.
Record all inspections of haul routes and any subsequent action in a site log book.
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

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

8. Conclusions

WYG have undertaken an Air Quality Assessment for proposed development at land off Royston Road, Baldock in accordance with the methodology and parameters described within this report.

Prior to the implementation of appropriate mitigation measures, the potential impact significance of dust emissions associated with the construction phase of the proposed development has potential as 'medium risk' at some worst affected receptors without mitigation. However, appropriate site specific mitigation measures have been recommended based on '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 emissions from the construction phase will not be significant.

All modelled existing and proposed receptors are predicted to meet the AQO for NO_2 for the 'no development' and 'with development' scenario. The 2022 assessment of the effects of emissions from the proposed traffic associated with the scheme, has determined the maximum predicted increase in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is 0.11 µg/m^3 at Ivel Springs (LNR) (ER1).

For PM_{10}, the maximum predicted increase in the annual average exposure at any existing and proposed receptors, due to changes in traffic movements associated with the development, is 0.03 µg/m^3 at Ivel Springs (LNR) (ER1).

For $PM_{2.5}$, the maximum predicted increase in the annual average exposure at any existing and proposed receptors, due to changes in traffic movements associated with the development, is 0.01 µg/m^3 at Ivel Springs (LNR) (ER1).

The assessment of the predicted on-site concentrations of NO_2, PM_{10} and $PM_{2.5}$ with both the committed and proposed developments in place are all determined to be below their respective AQOs. Therefore, the proposed development site is deemed to be acceptable for the proposed development with regards to Air Quality.

The magnitude of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2, PM_{10} and $PM_{2.5}$ exposures for existing residential receptors, is determined to be 'negligible'.

Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'. In conclusion, following the adoption of the recommended mitigation measures, the development is not considered to be contrary to any of the national and local planning policies.

Figures

Figure 1 Air Quality Study Area

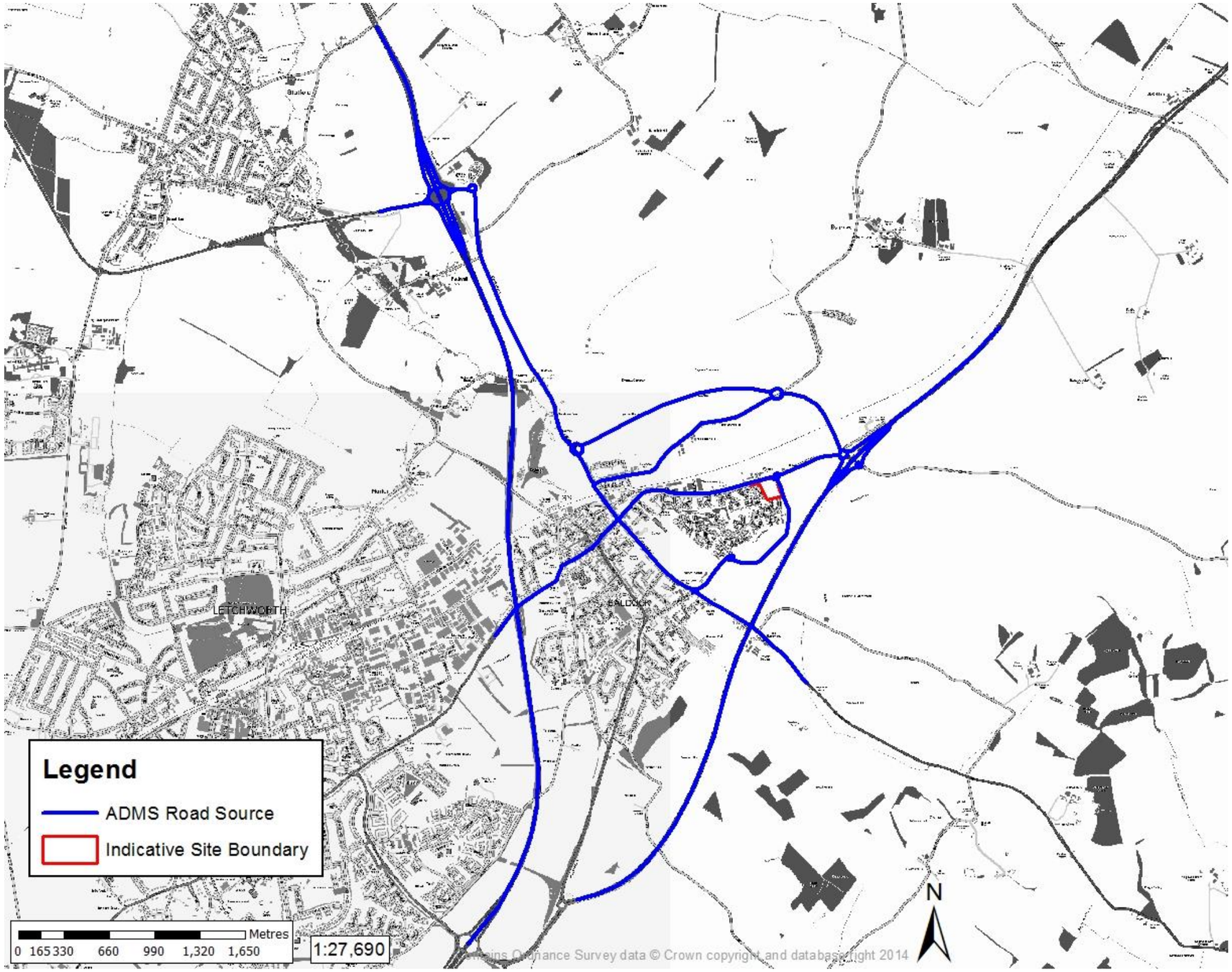


Figure 2 Air Quality Modelled Receptors

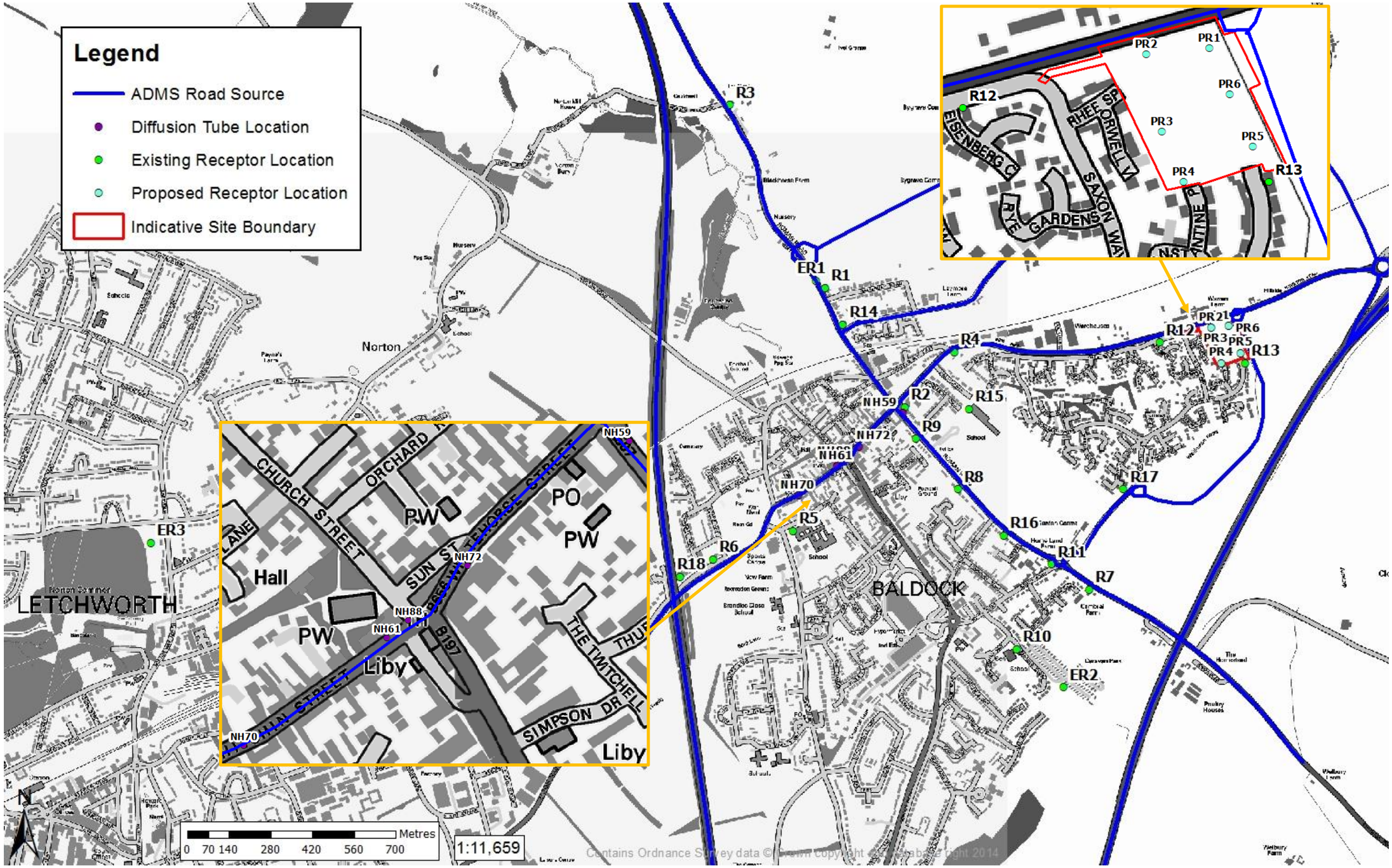


Figure 3 Luton 2016 Meteorological Station Wind Rose

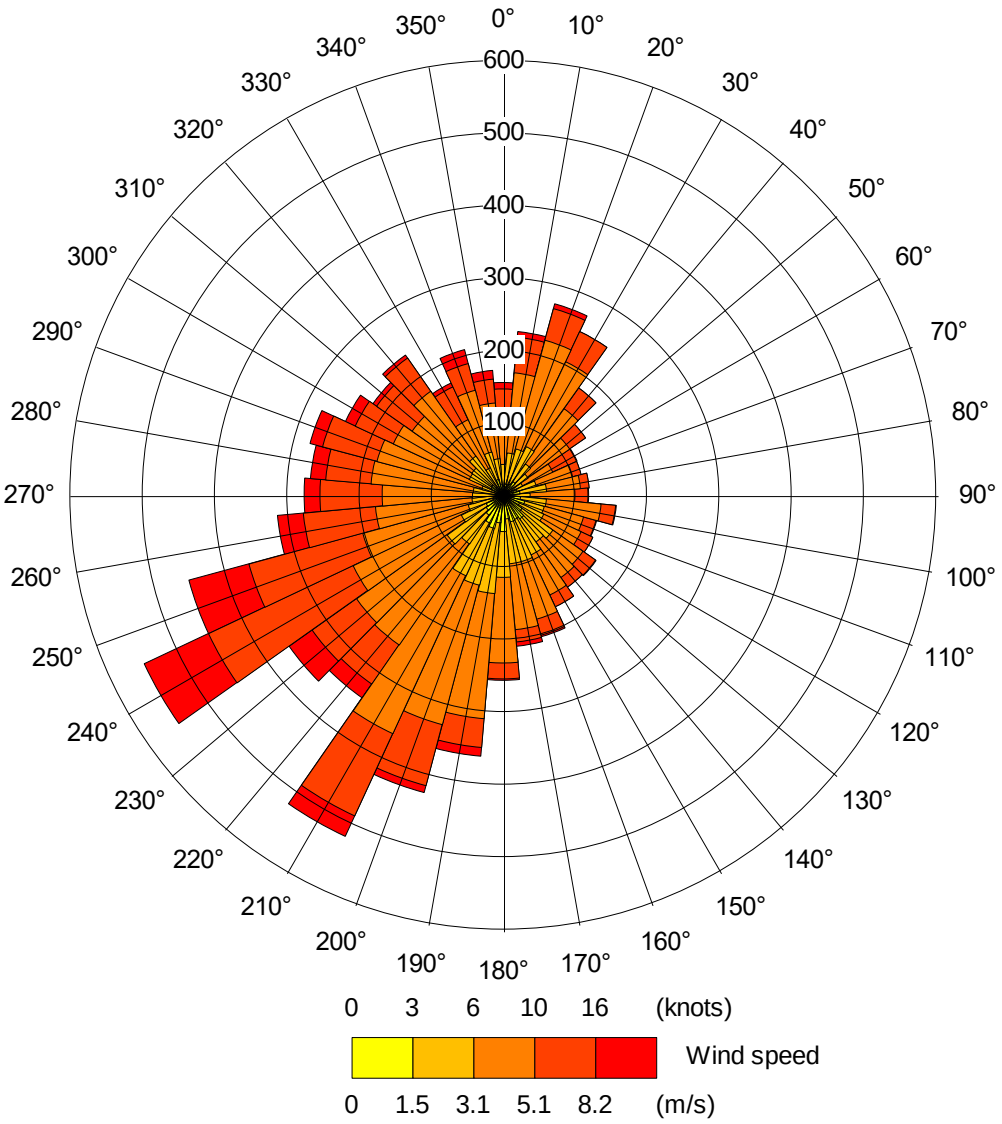
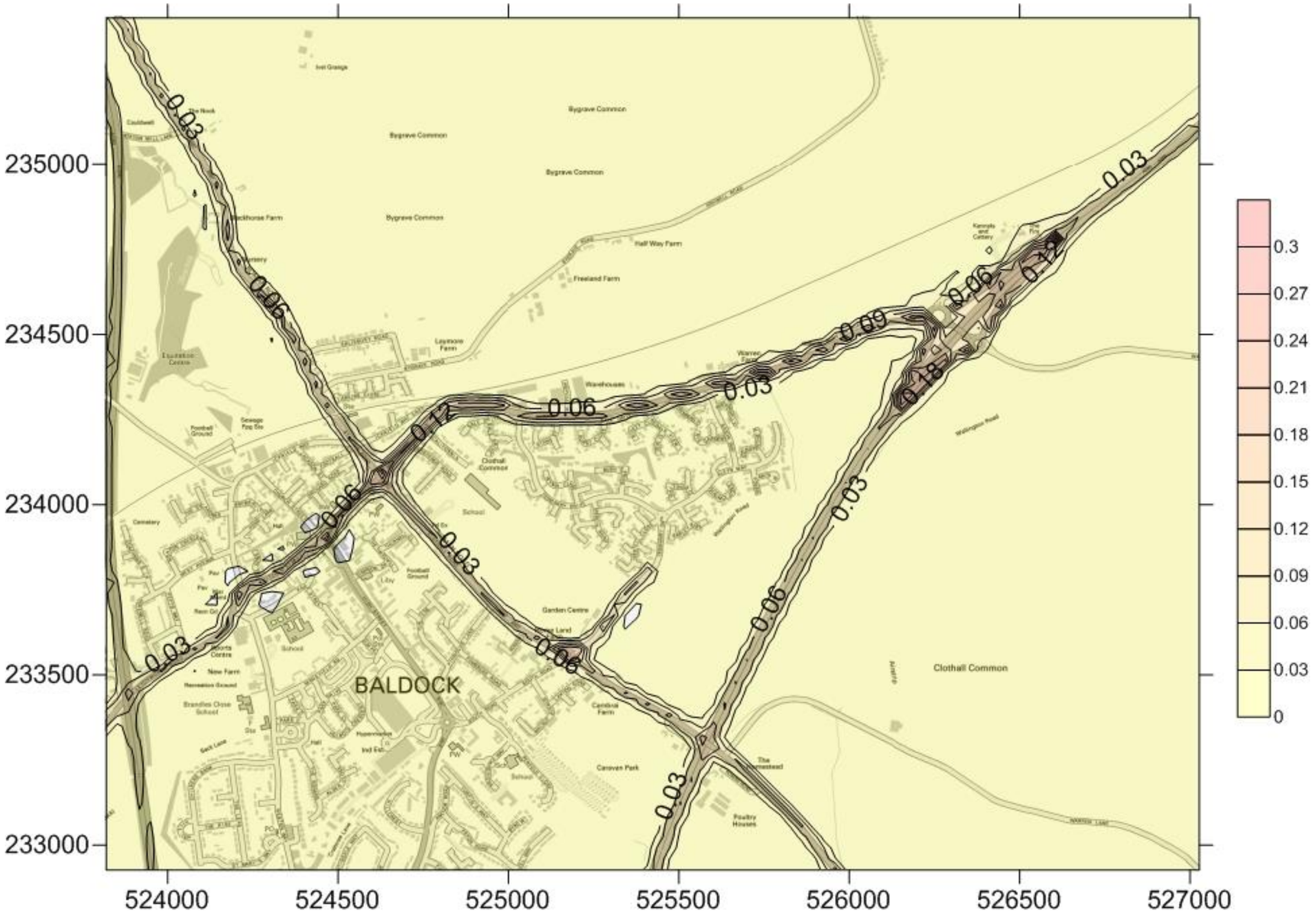


Figure 4 Predicted Contribution Concentration of NO_2 – Contour Map



Appendix A 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[2].

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,

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

- *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 a 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 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 A1– 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 A2 - 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 ·g/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 ·g/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 ·g/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 ·g/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 A3 - 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 A4 - 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 A5 - 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 A6 - 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 A7 - 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 B Theoretical Scenario Results

Scenario 2 (Theoretical Scenario) Results

Table B1 Theoretical Scenario NO_2 Results

Receptor		NO_2 Annual Mean Concentration (µg/m³)			
		Baseline 2016	No Development 2022	With Development 2022	Development Contribution (DS-DM)
R1	Residential Property, North Road	23.61	26.62	26.68	0.06
R2	Magdalene Court	23.85	25.29	25.40	0.11
R3	The Nook	32.70	36.09	36.15	0.06
R4	Hill Cottage	22.02	22.88	22.96	0.08
R5	The Knights Templar School	14.62	15.13	15.15	0.02
R6	63 Letchworth Road	34.62	35.68	35.71	0.03
R7	Residential Property, Clothall Road	21.75	23.30	23.35	0.05
R8	35 Clothall Road	20.36	21.04	21.08	0.04
R9	7 Clothall Road	21.10	21.99	22.04	0.05
R10	St John's RC Primary School	13.33	13.62	13.62	0.00
R11	53 South Road	30.38	33.61	33.69	0.08
R12	2 Eisenburg Close	20.69	21.40	21.45	0.05
R13	46 Aleyn Way	28.11	29.77	29.78	0.01
R14	Residential Property, North Road	31.42	33.18	33.24	0.06
R15	Hartsfield Junior Mixed and Infant School	13.68	14.19	14.21	0.02
R16	71 Clothall Road	20.52	21.30	21.34	0.04
R17	26 Westell Close	29.16	32.88	32.93	0.05
R18	Burleigh House Care Home	42.15	43.56	43.59	0.03
ER1	Ivel Springs (LNR)	32.80	39.02	39.19	0.17
ER2	Norton Common (LNR)	13.59	13.88	13.88	<0.01
ER3	Weston Hill (LNR)	18.35	18.40	18.41	0.01
PR1	Proposed Residential Receptor	-	-	23.56	-
PR2	Proposed Residential Receptor	-	-	22.30	-
PR3	Proposed Residential Receptor	-	-	20.91	-
PR4	Proposed Residential Receptor	-	-	20.81	-
PR5	Proposed Residential Receptor	-	-	21.85	-
PR6	Proposed Residential Receptor	-	-	22.15	-
Annual Mean AQO not to be exceeded		**40 µg/m³**			

Table B2 Significance of Effects at Key Receptors (NO_2)

NO_2 Significance Effects at Key Receptors					
Receptor	Change Due to Development (DS-DM) (µg/m³)	Change (% of AQO)	% Change in Concentration Relative to AQAL	% Annual Mean Concentration in Assessment Year	Significance
R1	0.06	0.15	0%	≤75% of AQAL	Negligible
R2	0.11	0.27	0%	≤75% of AQAL	Negligible
R3	0.06	0.15	0%	76-94% of AQAL	Negligible
R4	0.08	0.20	0%	≤75% of AQAL	Negligible
R5	0.02	0.05	0%	≤75% of AQAL	Negligible
R6	0.03	0.07	0%	76-94% of AQAL	Negligible
R7	0.05	0.12	0%	≤75% of AQAL	Negligible
R8	0.04	0.10	0%	≤75% of AQAL	Negligible
R9	0.05	0.12	0%	≤75% of AQAL	Negligible

NO_2 Significance Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change (% of AQO)**	**% Change in Concentration Relative to AQAL**	**% Annual Mean Concentration in Assessment Year**	**Significance**
R10	0.00	0.00	0%	≤75% of AQAL	Negligible
R11	0.08	0.20	0%	76-94% of AQAL	Negligible
R12	0.05	0.12	0%	≤75% of AQAL	Negligible
R13	0.01	0.02	0%	≤75% of AQAL	Negligible
R14	0.06	0.15	0%	76-94% of AQAL	Negligible
R15	0.02	0.05	0%	≤75% of AQAL	Negligible
R16	0.04	0.10	0%	≤75% of AQAL	Negligible
R17	0.05	0.12	0%	76-94% of AQAL	Negligible
R18	0.03	0.07	0%	103-109 of AQAL	Negligible
ER1	0.17	0.42	0%	95-102% of AQAL	Negligible
ER2	<0.01	0.00	0%	≤75% of AQAL	Negligible
ER3	0.01	0.02	0%	≤75% of AQAL	Negligible
*0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					

Table B3 Theoretical Scenario PM_{10} Results

Receptor		**PM_{10} Annual Mean Concentration (µg/m³)**			
		Baseline 2016	**No Development 2022**	**With Development 2022**	**Development Contribution (DS-DM)**
R1	Residential Property, North Road	14.46	14.87	14.88	0.01
R2	Magdalene Court	14.42	14.61	14.63	0.02
R3	The Nook	15.17	15.74	15.75	0.01
R4	Hill Cottage	14.27	14.40	14.41	0.01
R5	The Knights Templar School	13.73	13.80	13.80	<0.01
R6	63 Letchworth Road	14.13	14.29	14.30	0.01
R7	Residential Property, Clothall Road	15.11	15.35	15.36	0.01
R8	35 Clothall Road	13.75	13.85	13.86	0.01
R9	7 Clothall Road	13.86	13.99	14.00	0.01
R10	St John's RC Primary School	14.72	14.75	14.75	<0.01
R11	53 South Road	15.12	15.53	15.54	0.01
R12	2 Eisenburg Close	14.36	14.46	14.47	0.01
R13	46 Aleyn Way	14.27	14.53	14.53	<0.01
R14	Residential Property, North Road	14.49	14.76	14.77	0.01
R15	Hartsfield Junior Mixed and Infant School	13.88	13.95	13.95	<0.01
R16	71 Clothall Road	13.78	13.90	13.91	0.01
R17	26 Westell Close	14.99	15.48	15.49	0.01
R18	Burleigh House Care Home	16.86	17.04	17.05	0.01
ER1	Ivel Springs (LNR)	15.63	16.50	16.53	0.03
ER2	Norton Common (LNR)	14.76	14.80	14.80	<0.01
ER3	Weston Hill (LNR)	13.18	13.19	13.19	<0.01
PR1	Proposed Residential Receptor	-	-	14.69	-
PR2	Proposed Residential Receptor	-	-	14.58	-
PR3	Proposed Residential Receptor	-	-	14.36	-
PR4	Proposed Residential Receptor	-	-	14.36	-
PR5	Proposed Residential Receptor	-	-	14.51	-
PR6	Proposed Residential Receptor	-	-	14.53	-
Annual Mean AQO not to be exceeded		**40 µg/m³**			

Table B4 Theoretical Scenario $PM_{2.5}$ Results

Receptor		$PM_{2.5}$ Annual Mean Concentration (µg/m³)			
		Baseline 2016	No Development 2022	With Development 2022	Development Contribution (DS-DM)
R1	Residential Property, North Road	9.63	9.88	9.89	0.01
R2	Magdalene Court	9.61	9.73	9.73	0.01
R3	The Nook	9.98	10.32	10.33	0.01
R4	Hill Cottage	9.51	9.58	9.59	0.01
R5	The Knights Templar School	9.25	9.30	9.30	<0.01
R6	63 Letchworth Road	9.51	9.61	9.61	<0.01
R7	Residential Property, Clothall Road	9.92	10.06	10.07	0.01
R8	35 Clothall Road	9.26	9.32	9.32	<0.01
R9	7 Clothall Road	9.32	9.40	9.41	0.01
R10	St John's RC Primary School	9.69	9.71	9.71	<0.01
R11	53 South Road	9.93	10.19	10.20	0.01
R12	2 Eisenburg Close	9.50	9.56	9.57	0.01
R13	46 Aleyn Way	9.45	9.60	9.61	0.01
R14	Residential Property, North Road	9.65	9.81	9.82	0.01
R15	Hartsfield Junior Mixed and Infant School	9.28	9.32	9.32	<0.01
R16	71 Clothall Road	9.28	9.35	9.35	<0.01
R17	26 Westell Close	9.85	10.15	10.16	0.01
R18	Burleigh House Care Home	11.14	11.25	11.25	<0.01
ER1	Ivel Springs (LNR)	10.35	10.88	10.90	0.02
ER2	Norton Common (LNR)	9.72	9.74	9.74	<0.01
ER3	Weston Hill (LNR)	8.95	8.96	8.96	<0.01
PR1	Proposed Residential Receptor	-	-	9.70	-
PR2	Proposed Residential Receptor	-	-	9.64	-
PR3	Proposed Residential Receptor	-	-	9.51	-
PR4	Proposed Residential Receptor	-	-	9.50	-
PR5	Proposed Residential Receptor	-	-	9.59	-
PR6	Proposed Residential Receptor	-	-	9.61	-
Annual Mean AQO not to be exceeded		**25 µg/m³**			

Emission Factor Scenario 2 Results

The assessment has determined the maximum predicted change in the annual average exposure to NO_2 at any existing receptors, due to changes in traffic movements associated with the development, is 0.17 µg/m³ at Ivel Springs (LNR) (ER1).

For PM_{10}, the maximum predicted change in the annual average exposure to PM_{10} at any existing, due to changes in traffic movements associated with the development, is 0.03 µg/m³ at Ivel Springs (LNR) (ER1).

For $PM_{2.5}$, the maximum predicted change in the annual average exposure to $PM_{2.5}$ at any existing, due to changes in traffic movements associated with the development, is 0.02 µg/m³ at Ivel Springs (LNR) (ER1).

The assessment of the significance of the effects of the proposed development with respect to NO_2 exposure is determined to be 'negligible' for all existing receptors.

With respect to predicted PM_{10} and $PM_{2.5}$ exposure, the significance of the proposed development is determined to be 'negligible' for all existing receptors.

In conclusion, following the adoption of the recommended mitigation measures, the development is not considered to be contrary to any of the national and local planning policies.

End of Report