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GLADMAN DEVELOPMENTS LIMITED

HALTERWORTH LANE, ROMSEY

AIR QUALITY ASSESSMENT

JANUARY 2024

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GLADMAN DEVELOPMENTS LIMITED

HALTERWORTH LANE, ROMSEY

AIR QUALITY ASSESSMENT

JANUARY 2024

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APPENDICES

DRAWINGS	TITLE	SCALE
GM13034-001	Air Quality Receptor Location Plan	1:20,000

EXECUTIVE SUMMARY

An air quality assessment has been undertaken to accompany an outline planning application for a proposed residential development and primary school extension to the east of Halterworth Lane, Romsey.

The assessment has considered dust and fine particulate matter during the construction phase, and road traffic emissions during the operational phase.

During the construction phase, the risk of dust soiling effects is classed as high for earthworks and construction, and medium for demolition and trackout. The risk to human health is low for all four processes, and the risk to ecological receptors is negligible for demolition, earthworks and construction, and low for trackout. Mitigation measures have been proposed to further reduce any potential impacts based on best practice guidance.

For the operational phase assessment, annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations have been modelled at fourteen existing sensitive receptor locations, using the most recent Emission Factor Toolkit available from DEFRA (EFT v12.0).

The operational phase assessment has concluded that the development will result in concentrations of NO_2, PM_{10} and $PM_{2.5}$ remaining below the air quality objectives/target value, both without and with the development for the proposed 2028 opening year. The impact of the development is predicted to be negligible at all fourteen existing sensitive receptors that were assessed. Air quality effects are therefore considered to be 'not significant'.

The assessment has demonstrated that the Proposed Development will not lead to an unacceptable risk from air pollution, or to any breach in national objectives. Therefore, there are no material reasons in relation to air quality why the proposed scheme should not proceed, subject to appropriate planning conditions.

1 INTRODUCTION

1.1 Background

1.1.1 Wardell Armstrong LLP (WA) has been commissioned by Gladman Developments Ltd to undertake an air quality assessment to accompany an outline planning application for a proposed residential development on land off Halterworth Lane, Romsey

1.1.2 The proposed development is located to the east of Romsey. The north of the site is bordered by residential dwellings off Halterworth Lane, as well as open land with Highwood Lane beyond. There is further open land to the east. The south is adjacent to existing residential dwellings off Botley Road, with Halterworth Primary School adjacent to the southwest. There are further residential dwellings to the west which front on to Halterworth Lane.

1.1.3 It is understood that the proposals comprise residential development for up to approximately 270 residential dwellings with associated infrastructure, and land for extension to the current Halterworth Primary School in the south of the proposed development site.

1.1.4 This report details the results of the air quality assessment undertaken to accompany a planning application for the proposed development. The report discusses the potential dust and fine particulate matter impacts associated with the construction phase, and an assessment of the potential air quality impacts of the additional road traffic generated by the proposed development. Air pollutant concentrations are considered at existing sensitive receptor locations in the vicinity of the proposed development, and at three proposed receptor location within the development site itself.

2 LEGISLATION AND POLICY CONTEXT

2.1 Relevant Air Quality Legislation and Guidance

2.1.1 The air quality assessment has been undertaken in accordance with the following legislation and guidance:

- The Environment Act 1995, as amended 2021;
- Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, August 2023;
- The Air Quality Standards Regulations 2010;
- Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(22), August 2022;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework, December 2023;
- Department for Communities and Local Government, Planning Practice Guidance: Air Quality, November 2019.
- EPUK and IAQM Land-Use Planning & Development Control: Planning For Air Quality Guidance, January 2017; and
- IAQM Guidance on the Assessment of Dust from Demolition and Construction, August 2023

2.1.2 Further details of these documents are included in **Appendix A**.

2.2 Assessment Criteria

2.2.1 The relevant air quality objectives and limit values for this assessment are included within Table 1.

Table 1: Air Quality Objectives and Limit Values Relevant to the Assessment*

Pollutant	Objective/Limit Value	Averaging Period	Obligation
Nitrogen Dioxide (NO_2)	200µg/m^3, not to be exceeded more than 18 times a year	1-hour mean	All local authorities
	40µg/m^3	Annual mean	All local authorities

Table 1: Air Quality Objectives and Limit Values Relevant to the Assessment*			
Pollutant	**Objective/Limit Value**	**Averaging Period**	**Obligation**
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	England, Wales and Northern Ireland
	40µg/m^3	Annual mean	England, Wales and Northern Ireland
Particulate Matter ($PM_{2.5}$)	Limit Value of 20µg/m^3	Annual mean	England, Wales and Northern Ireland
**In accordance with the Air Quality Standards Regulations 2010*			

2.2.2 Further details of where these objectives and limit values apply are detailed in **Appendix A**

3 ASSESSMENT METHODOLOGY

3.1 Consultation and Scope of Assessment

3.1.1 The assessment methodology was agreed with Lorna Taylor, Principal Environmental Health Officer at Test Valley Borough Council (TVBC) via email between the 21st and 24th August 2023.

3.1.2 A summary of the consultation undertaken is provided in Table 2.

Table 2: Summary of Consultation

Assessment Stage	Proposed Method	Response
Construction phase assessment to consider dust and fine particulate matter (PM_{10})	Qualitative assessment in accordance with Institute of Air Quality Management (IAQM) guidance	No objection to method.
Operational phase assessment to consider nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$)	Detailed assessment using the ADMS-Roads atmospheric dispersion model, in accordance with Environmental Protection UK (EPUK)/IAQM guidance, and with all predicted concentrations compared to air quality objectives.	No objection to method.
	Scenarios to be included are a base year and opening year (for without and with development).	
	2019 meteorological data from the Southampton Met Station will be used in the model.	
	Model verification using roadside diffusion tubes 1, 3, 5, 6, 7 and 8.	
	NO_2, NO_x, PM_{10} and $PM_{2.5}$ background concentrations would be obtained from the 2018-based DEFRA default maps.	
	Assessment undertaken using Emission Factor Toolkit 11 (EFT v12).	

Table 2: Summary of Consultation		
Assessment Stage	**Proposed Method**	**Response**
	There is an ecological designation within the vicinity of the proposed development. Once we receive traffic data, a detailed review of the data will be undertaken to assess if the site may be affected by the proposed development. If required, this will be included in our assessment.	

3.1.15 Ms Lorna Taylor responded via email on the 24th of August 2023, and had no objections to the methodology.

3.1.16 Since this correspondence, the Emission Factor Toolkit has been updated to version 12, and therefore this has been used in the modelling assessment rather than EFT v11.

3.2 Construction Phase Assessment

3.2.1 To assess the impacts associated with dust and fine particulate matter releases during the construction phase of the development, an assessment has been undertaken in accordance with guidance from the Institute of Air Quality Management (IAQM) [1]. Further details of the construction assessment methodology are provided in **Appendix B.**

3.2.2 The closest sensitive human receptors to where construction phase activities will take place are detailed in Table 3. However, it should be noted that the assessment includes consideration of all sensitive receptors within 350m of where these activities occur, in accordance with IAQM guidance.

Table 3: Existing Sensitive Receptors Considered in the Construction Phase Assessment		
Receptor	**Direction from the Site**	**Approximate Distance from the area of Construction Works (m)**
Existing Residential Dwellings on Highwood Lane	North	Approximately 138m at closest point
Existing Residential Dwellings on Elmtree Gardens/Botley Lane	South	Approximately 28.9m at closest point

[1] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction (v2.1), August 2023

Table 3: Existing Sensitive Receptors Considered in the Construction Phase Assessment		
Receptor	**Direction from the Site**	**Approximate Distance from the area of Construction Works (m)**
Halterworth Primary School	Southwest	Approximately 16.7m at closest point
Existing Residential Dwellings on Halterworth Lane	West	Immediately Adjacent
Existing Residential Dwellings off Feltham Close	Northwest	130m at closest point

3.2.3 An ecological receptor, in accordance with the IAQM guidance, refers to locations with an ecological designation status or a site-specific dust-sensitive feature. The Tadburn Meadows Local Nature Reserve (LNR) designated habitat site is within 50m of the site and/or within 50m of the proposed route(s) that may be used by construction vehicles on the public highway, or up to 250m from the site entrance(s), as in accordance with the IAQM guidance. Ecological effects will therefore be considered in the construction phase assessment.

3.2.4 The closest sensitive ecological receptor to where construction phase activities will take place, and its sensitivity to dust and fine particulate matter, are detailed in Table 4.

Table 4: Existing Ecological Sensitive Receptors Considered in the Construction Phase Assessment		
Receptor	**Direction from the Site**	**Approximate Distance from the area of Construction Works (m)**
Tadburn Meadows Local Nature Reserve (LNR)	West	Approximately 152m at closest point

3.2.5 The criteria used to assess the construction impact of the proposed development, and the associated significance of effects at existing sensitive receptors, are included in **Appendix B.**

3.3 Operational Phase Assessment

3.3.1 The air dispersion model ADMS-Roads (CERC, Version 5.0.1.3) has been used to assess the impacts associated with road traffic emissions during the operational phase

assessment. The impacts have been assessed in accordance with guidance from Environmental Protection UK (EPUK) and the IAQM[2] . Further details of the modelling and assessment methodology are provided in **Appendix C**.

3.3.2 NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted at existing and proposed sensitive receptors, as these are the pollutants considered most likely to exceed the objectives and limit values.

3.3.3 Air dispersion modelling has been carried out to estimate pollutant concentrations, due to road traffic emissions, for three assessment scenarios as follows:

- **Scenario 1**: 2019 Verification and Base Year, the most recent year for which traffic flow information, local monitored pollution data and meteorological data is available;
- **Scenario 2**: 2028 Opening/Future Year, without the proposed development in place but including committed developments; and
- **Scenario 3**: 2028 Opening/Future Year, with the proposed development in place and including committed developments.

3.3.4 Prime Transport Planning, the appointed transport consultant for the scheme, have confirmed that the future year scenarios above include the following committed developments:

- Land at Parkers Farm, Nursling and Rownhams;
- Hoe Farm, Hoe Lane, North Baddesley, Southampton, Hampshire SO52 9NH;
- Land South of Abbotswood House, Braishfield Road, Romsey, Hampshire;
- Land At Whitenap, Luzborough Lane, Romsey, Hampshire;
- Land To The East of Abbey Enterprise Centre, Premier Way, Romsey, Hampshire; and,
- Kings Chase South, Land South of Ganger Farm Lane, Romsey, Hampshire.

Existing Sensitive Receptors

3.3.5 Fourteen existing sensitive receptors (identified as ESR 1 to ESR 14) have been selected for consideration in the air quality assessment. These have been chosen based on their

[2] Moorcroft and Barrowcliffe et al, Land-Use Planning and Development Control: Planning for Air Quality (v1.2), January 2017

sensitivity and their proximity to roads which will be affected by development generated traffic.

3.3.6 Details of these receptors considered are provided in Table 5.

Table 5: Existing Sensitive Receptors Considered in Operational Phase Assessment

Receptor	Address	Grid Reference		Receptor Type
		Easting	Northing	
ESR 1	Residential dwellings off Silverwood Rise	437522	122189.8	Residential
ESR 2	Residential dwellings off Hestia Close	437470.2	121917.3	Residential
ESR 3	Residential dwellings off Highwood Lane	437443.5	121778.1	Residential
ESR 4	Residential dwelling off Kennett Road	437274.8	121562.4	Residential
ESR 5	Residential dwelling off Halterworth Lane	437269.2	121248.1	Residential
ESR 6	Residential dwelling off Botley Road	437298.9	120967.9	Residential
ESR 7	Residential dwelling off Carter Place	437732.9	120804.9	Residential
ESR 8	Residential dwelling off Rownhams Lane	438428.1	120566	Residential
ESR 9	Residential dwelling off Luzborough Lane	436616.9	119738.4	Residential
ESR 10	Residential dwelling off Coldharbour Lane	437051.6	117487.3	Residential
ESR 11	Residential dwelling off Palmerston Street	435479.2	121106.9	Residential
ESR 12	Residential dwelling off Alma Road	435688	121237.3	Residential
ESR 13	Residential dwelling off Winchester Road	436118.3	121407.9	Residential
ESR 14	Residential dwelling off Romsey Road	437392.4	117166.6	Residential

3.3.7 The criteria used to assess the operational impact of the proposed development, and the associated significance of effects, at existing sensitive receptors are included in **Appendix C.**

Proposed Sensitive Receptors

3.3.8 A number of proposed sensitive receptors (referred to as PSR 1 to PSR 3) have been selected within the development site boundary. These receptors are considered to be representative of the proposed residential areas which will be closest to the main existing source(s) of pollution. In this case, the main source is considered to be vehicle emissions from Halterworth Lane, Botley Road and the proposed site access roads.

3.3.9 Pollutant concentrations at the proposed receptors will be considered for scenario 3 only (as detailed in paragraph 3.3.3). It is only necessary to consider the 'with development' scenarios for the proposed receptors as they will not experience any 'without development' conditions. It is not therefore necessary to consider the changes in pollutant concentrations at the proposed receptors.

3.3.10 Details of the proposed sensitive receptors are provided in Table 6, and their locations are shown on drawing GM13034-001.

Table 6: Proposed Sensitive Receptors Considered in the Operational Phase Assessment

Receptor Point	Location	Grid Reference	
		Easting	Northing
PSR 1	Location considered to be representative of the closest proposed residential property to the northern site access road off Halterworth Lane	437413	121583
PSR 2	Location considered to be representative of the closest proposed residential property to the southern site access road off Halterworth Lane	437304	121289
PSR 3	Location considered to be representative of the closest proposed residential property to Botley Road to the south of the site	437538	121129

3.3.11 The predicted concentrations at the proposed receptors will be assessed against the air quality objectives and limit values detailed in Table 1.

3.4 Limitations and Uncertainties

3.4.1 Air quality assessments make use of official sources of information (i.e. vehicle emission factors and background concentrations) which are increasingly considered to be overly optimistic. Monitoring data collected by the UK Government and local authorities shows that annual mean NO_2 concentrations have remained higher than previously expected (especially in roadside locations). This is widely thought to be due to the lower-than-expected decline in NO_x emissions from diesel vehicles (even though new Euro standards have been introduced), coupled with an overall increase in the number of diesel vehicles on the road.

3.4.2 The vehicle emission factors used in this assessment are from Defra's Emission Factor Toolkit (EFT v12.0) , which is the most up-to-date version available.

3.4.3 A position statement was produced by the IAQM in 2018 which dealt specifically with the use of EFT v8.0 and the consideration of uncertainties in predicting future air quality. The statement concluded that the approaches for dealing with this uncertainty should be decided on a case-by-case basis but may include the use of a sensitivity test (i.e. where it is assumed that NOx emissions will not reduce as quickly over time as within the EFT).

3.4.4 A later study provided evidence that EFT v9.0 may be relied upon to predict the 'most likely' future emissions reductions, as long as model verification has been undertaken using monitored data from 2016 or later.

3.4.5 The IAQM has now withdrawn their 2018 position statement on the consideration of uncertainties in predicting future air quality. A growing body of evidence suggests that the latest COPERT vehicle emission factors used in EFT v9.0 (and later) reflect real-world NOx emissions more accurately. As a result, the IAQM judge that "an exclusively vehicle emissions-based sensitivity test is no longer necessary". This is provided that the assessment has been verified using monitoring data from 2016 or later.

3.4.6 In accordance with Defra guidance, the air quality assessment has been carried out using EFT v12.0. As model verification has been undertaken, following the latest guidance from the IAQM, it is not considered necessary to carry out a sensitivity analysis. Further information on the vehicle emission factors used in the assessment are provided in **Appendix C**.

3.4.7 Several steps have been taken to ensure the model is accurate and representative as possible. These comprise:

- Consultation has been undertaken with TVBC to confirm their agreement with the methodology used within the assessment;
- Traffic data has been obtained from Prime Transport Planning, the appointed transport consultant, following consultation to ensure its appropriateness.
- The latest Defra LAQM tools have been incorporated into the assessment following their release in November 2023;
- Meteorological data, obtained from a representative meteorological recording station, has been incorporated into the assessment;

- Six nearby TVBC operated diffusion tube monitoring locations have been considered within the assessment to allow model verification to take place. Model verification factor(s) have been applied to NO_x concentrations, which are then input into the Defra NO_x to NO_2 calculator tool to predict total NO_2 concentrations at each receptor considered in the assessment; and
- Extensive detailed modelling of the roads included in the study area has been undertaken. Individual road lengths, widths and vehicle speeds have been reviewed in detail, as have the locations of the ESRs and diffusion tube(s), in relation to their proximity to the modelled roads, to ensure all information is as accurate as possible.

4 BASELINE SITUATION

4.1 Test Valley Borough Council Local Air Quality Management

4.1.1 The proposed development site is located within the administrative area of Test Valley Borough Council (TVBC), which is responsible for the management of local air quality.

4.1.2 There are currently no declared Air Quality Management Areas (AQMAs) within the administrative area of TVBC. The nearest AQMA to the proposed development site is the Eastleigh Borough Council AQMA No.1 and No.2, located approximately 6.4km to the east. Therefore, the proposed development is not located in close proximity to an area of known poor air quality.

4.1.3 A review of the 2023 Air Quality Annual Status Report (ASR) for TVBC indicates that there are several air quality monitoring locations approximately 1.5km west of the proposed development site in Romsey.

4.1.4 During 2019, the diffusion tubes at these locations recorded annual mean NO_2 concentrations between 24.40 and 35.30µg/m^3, which are below the annual mean objective.

4.2 Background Air Pollutant Concentrations

4.2.1 The air quality assessment needs to take into account background concentrations upon which the local, traffic derived pollution is superimposed.

4.2.2 As there are currently no representative background monitoring locations in the vicinity of the proposed development site, background concentrations have been obtained from the 2018-based Defra default concentration maps for the appropriate grid squares[3].

4.2.3 The background pollutant concentrations used in this assessment are detailed in Table 7.

Table 7: Background Pollutant Concentrations Used in the Air Quality Assessment*

Receptors (x, y Grid Reference)	Oxides of Nitrogen (NO_X)	Nitrogen Dioxide (NO_2)	Particulate matter (PM_{10})	Particulate matter ($PM_{2.5}$)
2019 Annual Mean Concentrations (µg/m^3)				
ESR 1 (437500, 122500)	15.21	11.42	13.41	9.37
ESR 2-5 (437500, 121500)	15.53	11.63	14.30	9.63

[3] Accessed through the Defra Local Air Quality Management webpages (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html)

Table 7: Background Pollutant Concentrations Used in the Air Quality Assessment*				
Receptors (x, y Grid Reference)	**Oxides of Nitrogen (NO_X)**	**Nitrogen Dioxide (NO_2)**	**Particulate matter (PM_{10})**	**Particulate matter ($PM_{2.5}$)**
ESR 6-7 (437500, 120500)	17.37	12.86	13.62	9.37
ESR 8 (438500, 120500)	15.86	11.86	13.95	9.51
ESR 9 (436500, 119500)	16.18	12.10	13.89	8.99
ESR 10, ESR 14 (437500, 117500)	22.63	16.38	14.70	9.79
ESR 11-12 (435500, 121500)	18.40	13.55	14.15	9.86
ESR 13 (436500, 121500)	17.13	12.71	14.08	9.97
2028 Annual Mean Concentrations (µg/m³)				
ESR 1 (437500, 122500)	11.32	8.70	12.35	8.53
ESR 2-5 (437500, 121500)	11.69	8.95	13.24	8.79
ESR 6-7 (437500, 120500)	12.99	9.86	12.58	8.53
ESR 8 (438500, 120500)	11.92	9.12	12.90	8.68
ESR 9 (436500, 119500)	11.77	9.03	12.86	8.16
ESR 10, ESR 14 (437500, 117500)	15.33	11.51	13.63	8.94
ESR 11-12 (435500, 121500)	13.63	10.31	13.07	9.01
ESR 13 (436500, 121500)	12.70	9.67	13.00	9.13
*Obtained from the Defra 2018-based background maps.				

4.3 Modelled Baseline Concentrations at Existing Sensitive Receptors

4.3.1 The baseline assessment (i.e., scenarios 1 and 2) has been carried out for the fourteen existing sensitive receptors considered, in accordance with Defra guidance (i.e., using EFT v12). The adjusted NO_2 and unadjusted PM_{10} and $PM_{2.5}$ concentrations are detailed in Table 8.

Table 8: Predicted Adjusted NO_2 and Unadjusted PM_{10} and $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 1 and 2– Using Emission Factor Toolkit Version 12						
Receptor	**Calculated Annual Mean Concentrations (µg/m³)**					
	Scenario 1: 2019 Base Year			**Scenario 2: 2028 Opening Year, Without Development**		
	NO_2	**PM_{10}**	**$PM_{2.5}$**	**NO_2**	**PM_{10}**	**$PM_{2.5}$**
ESR 1	14.07	13.78	9.57	9.80	12.72	8.73
ESR 2	14.36	14.68	9.84	10.11	13.61	8.99
ESR 3	13.98	14.62	9.81	9.93	13.55	8.96
ESR 4	13.09	14.51	9.75	9.59	13.46	8.91

Table 8: Predicted Adjusted NO_2 and Unadjusted PM_{10} and $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 1 and 2– Using Emission Factor Toolkit Version 12

Receptor	Calculated Annual Mean Concentrations (µg/m³)					
	Scenario 1: 2019 Base Year			Scenario 2: 2028 Opening Year, Without Development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
ESR 5	13.00	14.50	9.74	9.55	13.44	8.90
ESR 6	15.51	14.01	9.58	11.12	13.01	8.75
ESR 7	15.20	13.95	9.55	10.98	12.93	8.71
ESR 8	15.94	14.50	9.82	10.98	13.49	8.99
ESR 9	14.59	14.13	9.13	10.21	13.11	8.30
ESR 10	17.85	14.85	9.88	12.15	13.78	9.01
ESR 11	22.21	15.28	10.49	14.00	14.16	9.58
ESR 12	25.82	15.76	10.75	15.37	14.56	9.78
ESR 13	27.69	16.25	11.16	14.54	14.58	9.94
ESR 14	18.80	14.88	9.91	12.51	13.80	9.03

NO_2 concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO_2 calculator[4] in accordance with LAQM.TG(22)

4.3.2 The results show that all predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations in the 2019 base year and 2028 Opening/Future year are below the relevant objectives and limit value.

[4] Defra Local Air Quality Management webpages (http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html)

5 IMPACT ASSESSMENT

5.1 Construction Phase Assessment

Step 2- Impact Assessment

5.1.1 In accordance with the IAQM guidance, the main activities to be considered during the construction phase of a proposed development are demolition, earthworks, construction and trackout.

5.1.2 The proposed development site is currently open land, with two small structures within the northern area if the site, therefore demolition activities are likely to take place.

5.1.3 Earthworks cover the processes of soil-stripping, ground-levelling, excavation and landscaping. Construction activities will focus on the proposed buildings, access roads and car parking areas. Trackout is defined as the transport of dust and dirt by vehicles travelling from a construction site onto the public road network. This may occur through the spillage of dusty materials onto road surfaces or through the transportation of dirt by vehicles that have travelled over muddy ground on the site. This dust and dirt can then be deposited and re-suspended by other vehicles.

Step 2A

5.1.4 Step 2A of the assessment defines the potential dust emission magnitude from demolition, earthworks, construction and trackout in the absence of site-specific mitigation.

5.1.5 Examples of the criteria for the dust emission classes are detailed in **Appendix B.** The results of this step are detailed in Table 8.

Step 2B

5.1.6 Step 2B of the construction phase dust assessment defines the sensitivity of the area, taking into account the significance criteria detailed in **Appendix B**, for demolition, earthworks, construction and trackout. The sensitivity of the area to each activity is assessed for potential dust soiling and human health effects and ecological effects.

5.1.7 For demolition, there are currently 1-10 receptors within 50m of where this activity will take place.

5.1.8 For earthworks and construction, there are currently between 10 and 100 receptors (mainly residential) within 20m of where these activities may take place, which is assumed to be the site boundary for the purpose of this assessment.

5.1.9 The routing of construction vehicles used in the construction of the proposed development is currently unknown and therefore a worst-case scenario has been adopted. The assessment assumes that the construction traffic will travel along Halterworth Lane in both directions.

5.1.10 As a result, for trackout, there are between 10 and 100 receptors (mainly residential) within 20m of where trackout may occur for a distance of up to 200m from the site entrance.

Step 2C

5.1.11 Step 2C of the construction phase dust assessment defines the risk of impacts from each activity, by combining the dust emission magnitude with the sensitivity of the surrounding area.

5.1.12 The risk of dust impacts from each activity, with no mitigation in place, has been assessed in accordance with the criteria detailed in **Appendix B.** The results of this step are detailed in Table 8.

Summary of Step 2

5.1.13 Table 9 details the results of Step 2 of the construction phase assessment for human receptors.

Table 9: Construction Phase Dust Assessment for Human Receptors

	Activity			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Step 2A				
Dust Emission Magnitude	Small[a]	Large[b]	Large[c]	Medium[d]
Step 2B				
Human Receptors				
Sensitivity of Closest Receptors	High	High	High	High
Sensitivity of Area to Dust Soiling Effects	Medium	High	High	High

Table 9: Construction Phase Dust Assessment for Human Receptors				
	Activity			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Sensitivity of Area to Human Health Effects	Low[e]	Low[e]	Low[e]	Low[e]
Ecological Receptors				
Sensitivity of Ecological Receptors	Low[f]	Low[f]	Low[f]	Low[f]
Sensitivity of Area to Ecological Effects	Low[f]	Low[f]	Low[f]	Low[f]
Step 2C				
Dust Risk: Dust Soiling	Medium Risk	High Risk	High Risk	Medium Risk
Dust Risk: Human Health	Low Risk	Low Risk	Low Risk	Low Risk
Dust Risk: Ecological Effects	Low Risk	Low Risk	Low Risk	Negligible
a. Total building volume estimates to be <12,000m^3 with low potential for dust release *b. Total site area estimated to be more than 110,000m^2* *c. Total building volume estimated to be >75,000^3, with potentially dusty construction materials* *d. Number of construction phase vehicles estimated to be between 20 – 50 movements per day* *e. Background annual mean PM_{10} concentration is taken from the LAQM Defra default concentration maps, for the appropriate grid square for 2023* *f. The ecological receptor is a Local Nature Reserve (LNR) with dust sensitive features and low sensitivity*				

Step 3 – Mitigation

5.1.14 During the construction phase, the implementation of effective mitigation measures will substantially reduce the potential for nuisance dust and particulate matter to be generated.

5.1.15 Step 2C of the assessment has identified that the risk of dust soiling and human health effects is only negligible for the effect of trackout on ecological effects, however not for any other activities and therefore site-specific mitigation will need to be implemented to ensure dust effects from these activities will be not significant, examples of which can be found below.

Recommendations for Site-Specific Mitigation

5.1.16 Specific mitigation relating to dust control may be in the form of construction best

practices or could include a dust action plan. Recommendations for mitigation within the IAQM guidance are found in Table 10 below.

Table 10: Dust Control & Mitigation Measures	
Issue	**Control Measure**
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to 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 logbook.
Monitoring	• Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. • 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.
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or the site 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 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

Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. • Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced 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) • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)
Operations	• 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.
Waste Management	• Avoid bonfires and burning of waste materials.
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable • Only remove the cover in small areas during work and not all at once

Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place • 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. • 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 logbook. • 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. • 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 10 m from receptors where possible.

5.1.17 All dust and air quality complaints should be recorded and appropriate measures be taken to identify causes and reduce emissions in a timely manner. Exceptional incidents which cause dust and/or emissions, and the action taken to resolve the situation, should be recorded in a log book and made available to TVBC on request.

5.1.18 It is recognised that the final design solutions will be developed with the input of the Contractor to maximise construction efficiencies, to use modern construction techniques and sustainable materials and to incorporate the particular skills and experience offered by the appointed contractor.

Step 4- Residual Effects

5.1.19 Step 4 of the construction phase dust assessment has been undertaken to determine the significance of the dust effects arising from demolition, earthworks, construction and trackout associated with the proposed development.

5.1.20 The implementation of effective mitigation measures during the construction phase, such as those detailed in Step 3, will substantially reduce the potential for nuisance dust and fine particulate matter to be generated and any residual impact should be not significant.

5.2 Operational Phase Assessment

Existing Sensitive Human Receptors- 2028 Opening Year

5.2.1 The impact assessment has been carried out for the fourteen representative existing sensitive receptors considered (ESR 1 to ESR 14) using EFT v12. The impact will be assessed in accordance with the descriptors included in **Appendix C**.

5.2.2 Table 11 details the predicted NO_2 concentrations for the 2028 opening year, for both the 'Without Development' and 'With Development' scenarios, in accordance with Defra guidance. The impact has been assessed in accordance with the descriptors included in **Appendix C.**

Table 11: Predicted Adjusted NO_2 Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3 – Using the Emission Factor Toolkit Version 12

Receptor	Calculated Annual Mean NO_2 Concentrations (µg/m³)[a]				
	Without Development	With Development		Concentration Change as Percentage of AQAL	Impact[b]
		Concentration	Percentage in Relation to AQAL		
ESR 1	9.80	9.84	<75%	<0.5%	**Negligible**
ESR 2	10.11	10.17	<75%	<0.5%	**Negligible**
ESR 3	9.93	9.97	<75%	<0.5%	**Negligible**
ESR 4	9.59	9.67	<75%	<0.5%	**Negligible**
ESR 5	9.55	9.69	<75%	<0.5%	**Negligible**
ESR 6	11.12	11.22	<75%	<0.5%	**Negligible**
ESR 7	10.98	11.04	<75%	<0.5%	**Negligible**
ESR 8	10.98	11.01	<75%	<0.5%	**Negligible**
ESR 9	10.21	10.28	<75%	<0.5%	**Negligible**
ESR 10	12.15	12.16	<75%	<0.5%	**Negligible**
ESR 11	14.00	14.02	<75%	<0.5%	**Negligible**
ESR 12	15.37	15.40	<75%	<0.5%	**Negligible**
ESR 13	14.54	14.54	<75%	<0.5%	**Negligible**
ESR 14	12.51	12.52	<75%	<0.5%	**Negligible**

Table 11: Predicted Adjusted NO_2 Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3 – Using the Emission Factor Toolkit Version 12					
Receptor	**Calculated Annual Mean NO_2 Concentrations (µg/m³)[a]**				
	Without Development	**With Development**		**Concentration Change as Percentage of AQAL**	**Impact[b]**
		Concentration	**Percentage in Relation to AQAL**		
a. NO_2 concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO_2 calculator, in accordance with LAQM.TG(22)					
b. Assessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible					

5.2.3 Table 12 details the PM_{10} concentrations for the 2028 opening year, for both the 'Without Development' and 'With Development' scenarios. The impact has been assessed in accordance with the descriptors included in **Appendix C.**

Table 12: Predicted Unadjusted PM_{10} Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3 – Using Emission Factor Toolkit Version 12					
Receptor	**Calculated Annual Mean PM_{10} Concentrations (µg/m³)**				
	Without Development	**With Development**		**Concentration Change as Percentage of AQAL**	**Impact[a]**
		Concentration	**Percentage in Relation to AQAL**		
ESR 1	12.72	12.73	<75%	<0.5%	**Negligible**
ESR 2	13.61	13.63	<75%	<0.5%	**Negligible**
ESR 3	13.55	13.56	<75%	<0.5%	**Negligible**
ESR 4	13.46	13.48	<75%	<0.5%	**Negligible**
ESR 5	13.44	13.49	<75%	<0.5%	**Negligible**
ESR 6	13.01	13.04	<75%	<0.5%	**Negligible**
ESR 7	12.93	12.95	<75%	<0.5%	**Negligible**
ESR 8	13.49	13.50	<75%	<0.5%	**Negligible**
ESR 9	13.11	13.12	<75%	<0.5%	**Negligible**
ESR 10	13.78	13.78	<75%	<0.5%	**Negligible**
ESR 11	14.16	14.17	<75%	<0.5%	**Negligible**
ESR 12	14.56	14.57	<75%	<0.5%	**Negligible**
ESR 13	14.58	14.58	<75%	<0.5%	**Negligible**
ESR 14	13.80	13.80	<75%	<0.5%	**Negligible**
a. Assessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible					

5.2.4 Table 13 details the $PM_{2.5}$ concentrations for the 2028 opening year, for both the 'Without Development' and 'With Development' scenarios. The impact has been assessed in accordance with the descriptors included in **Appendix C.**

Table 13: Predicted Unadjusted $PM_{2.5}$ Concentrations at Existing Sensitive Receptors for Scenarios 2 and 3 – Using Emission Factor Toolkit Version 12					
Receptor	**Calculated Annual Mean $PM_{2.5}$ Concentrations (µg/m³)**				
	Without Development	**With Development**		**Concentration Change as Percentage of AQAL**	**Impact[a]**
		Concentration	**Percentage in Relation to AQAL**		
ESR 1	8.73	8.73	<75%	<0.5%	**Negligible**
ESR 2	8.99	9.00	<75%	<0.5%	**Negligible**
ESR 3	8.96	8.96	<75%	<0.5%	**Negligible**
ESR 4	8.91	8.92	<75%	<0.5%	**Negligible**
ESR 5	8.90	8.92	<75%	<0.5%	**Negligible**
ESR 6	8.75	8.77	<75%	<0.5%	**Negligible**
ESR 7	8.71	8.72	<75%	<0.5%	**Negligible**
ESR 8	8.99	9.00	<75%	<0.5%	**Negligible**
ESR 9	8.30	8.31	<75%	<0.5%	**Negligible**
ESR 10	9.01	9.01	<75%	<0.5%	**Negligible**
ESR 11	9.58	9.58	<75%	<0.5%	**Negligible**
ESR 12	9.78	9.79	<75%	<0.5%	**Negligible**
ESR 13	9.94	9.94	<75%	<0.5%	**Negligible**
ESR 14	9.03	9.03	<75%	<0.5%	**Negligible**
a. Assessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible					

5.2.5 The results of the assessment show that all predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations, in all scenarios considered, are well below the relevant objectives and limit value.

Proposed Sensitive Receptors

5.2.6 Pollutant concentrations have been modelled for the PSR's for the 2028 'With Development' Scenario, as detailed in Table 14.

Proposed Sensitive Receptor	**Table 14: Predicted Adjusted NO_2, and Unadjusted PM_{10} and $PM_{2.5}$ Concentrations at Proposed Sensitive Receptors for Scenario 3- Using Emission Factor Toolkit Version 12**		
	NO_2	**PM_{10}**	**$PM_{2.5}$**
PSR 1	9.12	13.29	8.82
PSR 2	9.43	13.40	8.88
PSR 3	9.12	12.63	8.56

5.3 Assessment of Significance for Human Receptors

5.3.1 The significance of the overall effects of the proposed development has been assessed in accordance with the EPUK/IAQM guidance. This assessment is based on professional judgement and details of the assessor's experience is included in **Appendix D.**

5.4 Recommendations for Mitigation

5.4.1 The impact of the proposed development is not significant for human receptors. However, mitigation measures will assist in reducing any potential impact and general best practice measures in relation to air quality could be implemented.

5.4.2 Electric Vehicle (EV) charging points are now standard for all new residential developments with associated car parking spaces[5].

5.4.3 However, additional mitigation measures could include the use of low NO_x boilers and the implementation of a green travel plan.

[5] The Building Regulations 2010, "Infrastructure for the Charging of Electric Vehicles" (2021)

6 CONCLUSIONS

6.1 Construction Phase

6.1.1 The construction phase assessment has been undertaken to determine the risk and significance of dust and fine particulate matter effects from demolition, earthworks, construction and trackout associated with the proposed development, in accordance with guidance published by the IAQM.

6.1.2 With site specific mitigation in place, the significance of dust and fine particulate matter effects from demolition, earthworks, construction and trackout is considered to be not significant.

6.2 Operational Phase

Existing Sensitive Receptors

6.2.1 An air quality assessment has been undertaken to consider the potential impact of development generated vehicle trips on air quality at fourteen existing sensitive human receptors.

6.2.2 The assessment has been undertaken in accordance with Defra guidance, by using the latest vehicle emission factors from EFT v12.

6.2.3 Pollutant concentrations in 2028, with the development in place, are below the relevant annual mean objectives and limit values at the receptors considered.

6.2.4 The assessment predicts that the development will have a negligible impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at all fourteen existing sensitive receptors considered in 2028. Pollutant concentrations are predicted to be below the air quality objectives in all scenarios considered.

6.2.5 The effect of the proposed development on human receptors is therefore considered to be not significant.

Proposed Sensitive Receptors

6.2.6 The assessment has also predicted pollutant concentrations at three proposed receptors within the development site.

6.2.7 Predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the annual mean air quality objective and limit value concentrations, for 2028, at the proposed sensitive receptors.

6.2.8 Air quality effects within the site are, therefore, considered to be Not Significant.

Recommendations for Mitigation

6.2.9 Mitigation measures will assist in reducing any potential impact and general best practice measures in relation to air quality could be implemented. EV charging points are now standard for all new residential developments with associated car parking spaces. Additional mitigation measures could include the use of low NOx boilers and the implementation of a green travel plan.

Summary

6.2.10 The assessment has demonstrated that the proposed development will not lead to an unacceptable risk from air pollution, nor will it lead to any breach of national objectives as required by national policy. The proposed development will be in accordance with all relevant national policy and there are no material reasons in relation to air quality why the proposed scheme should not proceed.

APPENDICES

Appendix A: Air Quality Legislation and Guidance

National Air Quality Strategy

A.1 The Environment Act 1995 requires the UK government to prepare a national Air Quality Strategy. The first UK strategy was published in March 1997, setting out policies for the management of ambient air quality. This was subsequently updated in 2007[1].

A.2 The 2007 strategy establishes the framework for air quality management in England, Scotland, Wales and Northern Ireland. Air quality standards and objectives are set out for eight pollutants which may potentially occur at levels that give cause for concern. The strategy also provides details of the role that local authorities are required to take in working towards improvements in air quality, known as the Local Air Quality Management (LAQM) regime.

Air Quality Standards and Objectives

A.3 Air quality standards and objectives are set out in the strategy for the following pollutants: nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), lead (Pb), fine particulate matter (PM_{10}), benzene (C_6H_6), 1, 3–butadiene (C_4H_6) and ozone (O_3).

A.4 Objectives for each pollutant, except O_3, were first given statutory status in the Air Quality Regulations 2000[2] and Air Quality (Amendment) Regulations 2002[3]. These objectives are defined in the strategy as:

"the maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, within a specified timescale."

A.5 EU limit values, set out within the Ambient Air Quality Directive 2008/50/EC[4] (i.e. the CAFE Directive), were transposed into UK legislation on 11th June 2011 as The Air Quality Standards Regulations 2010. These are mostly the same as the air quality objectives in terms of concentrations; however, there are differences in determining how compliance is achieved. Although the UK is no longer part of the EU, no changes

[1] Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. July 2007
[2] The Air Quality Regulations 2000. SI No 928
[3] The Air Quality (Amendment) Regulations 2002
[4] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

have yet been made to the objectives and limit values used in the management and assessment of air quality.

A.6 Whilst there is no specific objective for $PM_{2.5}$ in England and Wales, a limit value of 20µg/m^3 is referred to in the regulations, which has been adopted for use in this assessment (as recommended by the LAQM Helpdesk). An objective has been set for $PM_{2.5}$ in Scotland since early 2016. The Environment Act 2021 sets out a requirement to establish a target objective for $PM_{2.5}$, however it is not known what this objective will be or when it will come in to force.

A.7 Examples of where these objectives and limit values apply are detailed in the Defra LAQM Technical Guidance document LAQM.TG(22)[5] and are included in Table A1.

Table A1: Examples of Where the Air Quality Objectives Should Apply

Averaging Period	Objectives Should Apply at:	Objectives Should Generally Not Apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes, etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties[a]	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend one hour or longer	Kerbside sites where public would not be expected to have regular access

[5] Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG(22), August 2022

Table A1: Examples of Where the Air Quality Objectives Should Apply		
Averaging Period	**Objectives Should Apply at:**	**Objectives Should Generally Not Apply at:**
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	
[a] *Such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied*		

Local Air Quality Management

A.8 LAQM legislation in the Environment Act 1995 requires local authorities to conduct the periodic review and assessments of air quality. These aim to identify all those areas where the objectives are being, or are likely to be, exceeded. Where exceedances are likely to occur, local authorities are required to declare an Air Quality Management Area (AQMA).

A.9 LAQM.TG (22) presents a streamlined approach for LAQM in England and Scotland; however, Northern Ireland is still considering changes to LAQM and therefore works according to the previous regime.

A.10 The Welsh Government amended the LAQM regime in Wales in 2017 by issuing new statutory policy guidance in order to bring the system into line with the Well-being of Future Generations (Wales) Act 2015[6]. This aims to achieve compliance with the national air quality objectives in specific hotspots and to reduce exposure to pollution more widely, so as to achieve the greatest public health benefit.

A.11 Local authorities in England are required to produce Annual Status Reports (ASRs), and in Scotland and Wales, Annual Progress Reports (APRs). These replace all other reports which previously had to be submitted including Updating and Screening Assessments, Progress Reports and Detailed Assessments (which would be produced to assist with an AQMA declaration).

A.12 Local authorities now have the option of a fast track AQMA declaration option. This allows more expert judgement to be used and removes the need for a Detailed Assessment where a local authority is confident of the outcome. Detailed Assessments should however still be used if there is any doubt.

[6] Well-being of Future Generations (Wales) Act 2015 (anaw 2)

A.13 As part of the UK Government's requirement to improve air quality, selected local authorities in England are also currently investigating the feasibility of setting up Clean Air Zones (CAZs). These are areas where targeted action and co-ordinated resources aim to improve air quality within an urban setting, in order to achieve compliance with the EU limit values within the shortest possible time.

A.14 The first CAZs were implemented in Bath in March 2021, and in Birmingham in June 2021. Since then CAZ's have also been declared in Bradford, Bristol, Portsmouth, Sheffield and Tyneside (Newcastle and Gateshead). In addition, the London Ultra Low Emission Zone (ULEZ) has now been expanded to incorporate all London Boroughs. The Greater Manchester CAZ, due to be introduced from 30 May 2022, has been delayed and is currently under review.

National Planning Policy Framework

A.15 The National Planning Policy Framework (NPPF)[7], introduced in March 2012 and most recently updated in December 2023, requires that:

"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 AQMAs and CAZs, 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 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 AQMAs and CAZs is consistent with the local air quality action plan."

Planning Practice Guidance

A.16 The Planning Practice Guidance (PPG)[8], updated in November 2019, states that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impacts in an area where air quality is known to be

[7] Ministry of Housing, Communities and Local Government, National Planning Policy Framework, September 2023
[8] Department for Communities and Local Government. Planning Practice Guidance: Air Quality, November 2019

poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).

A.17 Where a proposed development is anticipated to give rise to concerns about air quality, an appropriate assessment needs to be carried out. Where the assessment concludes that the proposed development (including mitigation) will not lead to an unacceptable risk from air pollution, prevent sustained compliance with national objectives or fail to comply with the requirements of the Habitats Regulations, then the local authority should proceed to decision with appropriate planning conditions and/or obligations.

Local Planning Guidance

A.18 The Romsey Town Access Plan Supplementary Planning Document (2015) (SPD) sets out a shared vision for how access to facilities and services within the town will be improved. It acts as a mechanism for allocating and directing funding towards these improvements.

A.19 Although the Romsey Town Access Plan SPD does not mention air quality, it sets out improvements to accessibility in Romsey. This includes improving cycle routes and reducing congestion at junctions for pedestrians, which in turn will lead to improvements in air quality.

A.20 The Revised Cycle Network and Strategy SPD (2015) sets out the proposed approach to improve facilities for cyclists, including a network of potential cycle routes across the Borough. It forms part of the Local Development Framework (LDF) for the area.

A.21 The Local Transport Plan, which is set out in the Revised Cycle Network and Strategy SPD, continues to support the delivery of the existing Town Access Plans and District Statements covering each Hampshire district which include sustainable transport measures to improve accessibility and modal choice. The Local Transport Plan recognises that increasing the proportion of journeys made on foot and by bicycle has the potential to assist in achieving local goals including carbon reduction, improved air quality and healthier communities.

Appendix B: Methodology for Construction Phase Assessment

Institute of Air Quality Management Guidance

B.1 The methodology for the construction phase dust assessment is set out in guidance from the Institute of Air Quality Management (IAQM)[9].

Step 1

B.2 Step 1 is to screen the requirement for a more detailed assessment. The guidance states that an assessment will normally be required where there are existing sensitive human receptors within 250m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

B.3 With regards to ecological receptors, the guidance states that an assessment will normally be required where there are existing receptors within 50m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

B.4 Where any of these criteria are met, it is necessary to proceed to Step 2.

Step 2

B.5 Step 2 determines the potential risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological impacts. The risk is related to:

- The activities being undertaken (demolition, number of vehicles and plant etc);
- The duration of these activities;
- The size of the site;
- The meteorological conditions (wind speed, direction and rainfall);
- The proximity of receptors to the activity;
- The adequacy of the mitigation measures applied to reduce or eliminate dust; and
- The sensitivity of receptors to dust.

B.6 The risk of dust impacts is determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based upon the following two factors (known as Step 2A and Step 2B).

[9] Institute of Air Quality Management, Guidance on the Assessment of Dust from Demolition and Construction (v2.1), August 2023

B.7 **Step 2A** assesses the scale and nature of the works which determines the potential dust emission magnitude as small, medium or large. Examples of how the magnitude may be defined are included in Table B1.

Table B1: Determining the Dust Emission Magnitude of Construction Phase Activities

Activity	Dust Emission Class		
	Large	**Medium**	**Small**
Demolition	Total building volume >75,000m^3; Potentially dusty construction material (e.g. concrete); On-site crushing and screening; Demolition activities >12m above ground level	Total building volume 12,000-75,000m^3; Potentially dusty construction material; Demolition activities 6-12m above ground level	Total building volume <12,000m^3; Construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months
Earthworks	Total site area >110,000m^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 >6m in height;	Total site area 18,000-110,000m^2; Moderately dusty soil type (e.g. silt); 5-10 heavy earth moving vehicles active at any one time; Formation of bunds 3-6m in height;	Total site area <18,000m^2; Soil type with large grain size (e.g. sand); <5 heavy earth moving vehicles active at any one time; Formation of bunds <4m in height;
Construction	Total building volume >75,000m^3; On-site concrete batching; Sandblasting	Total building volume 12,000-75,000m^3; Potentially dusty construction material (e.g. concrete); On-site concrete batching	Total building volume <12,000m^3; Construction material with a low potential for dust release (e.g. metal cladding or timber)
Trackout	>50 HDV (>3.5t) outward movements[a] in any one day[b]; Potentially dusty surface material (e.g. high clay content); Unpaved road length >100m	20-50 HDV (>3,5t) outward movements[a] in any one day[b]; Moderately dusty surface material (e.g. high clay content); Unpaved road length 50-100m	<20 HDV (>3.5t) outward movements[a] in any one day[b]; Surface material with low potential for dust release; Unpaved road length <50m

a. A vehicle movement is a one way journey i.e. from A to B, and excludes the return journey
b. HDV movements during a construction project may vary over its lifetime, and the number of movements is the maximum not the average

B.8 **Step 2B** considers the sensitivity of the area to dust impacts which is defined as low, medium or high. The sensitivity categories for different types of receptors are described in Table B2.

Table B2: Sensitivity Categories for Dust Soiling, Human Health and Ecological Effects

Sensitivity Category	Dust Soiling Effects	Health effects of PM_{10}	Ecological Effects
High	Users can reasonably expect to enjoy a high level of amenity; Appearance, aesthetics or value of a property would be diminished; Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car show rooms	Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM_{10}; Examples include residential properties, hospitals, schools, and residential care homes	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; Examples include a Special Area of Conservation with dust sensitive features
Medium	Users would 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; People or property wouldn't reasonably be expected to be continuously present or regularly for extended periods of time; Examples include parks and places of work	Locations where people are exposed as workers and exposure is over a period of time relevant to the air quality objective for PM_{10}; Examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}	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; Examples include a Site of Special Scientific Interest with dust sensitive features
Low	Enjoyment of amenity would not reasonably be expected; Property would not be diminished in appearance, aesthetics or value; People or property would be expected to be present only for limited periods of time;	Locations where human exposure is transient; Examples include public footpaths, playing fields, parks and shopping streets	Locations with a local designation where the features may be affected by dust deposition; Examples include a Local Nature Reserve with dust sensitive features

Table B2: Sensitivity Categories for Dust Soiling, Human Health and Ecological Effects			
Sensitivity Category	**Dust Soiling Effects**	**Health effects of PM_{10}**	**Ecological Effects**
	Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads		

B.9 Based on the sensitivity of individual receptors, the overall sensitivity of the area to dust soiling, human health and ecological effects is then determined using the criteria detailed in Tables B3 to B5, respectively.

Table B3: Sensitivity of the Area to Dust Soiling Effects on People and Property[ab]					
Receptor Sensitivity	**Number of Receptors**	**Distance from Source (m)[c]**			
		<20m	**<50m**	**<100m**	**<350m**
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

a. The sensitivity to the area should be derived for each of the four activities
b. Estimate the total number of receptors within the stated distance. Only the highest level of sensitivity from the table needs to be considered
c. For trackout, distances should be measured from the side of the roads used by construction traffic. Without site specific mitigation, trackout may occur for up to 500m from large sites, 200m from medium sites and 50m from small sites, measured from the site exit. The impact declines with distance from the site and it is only necessary to consider trackout impacts up to 50m from the edge of the road

Table B4: Sensitivity of the Area to Human Health Impacts[ab]							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration[c]**	**Number of Receptors[d]**	**Distance from Source (m)[e]**				
			<20m	**<50m**	**<100m**	**<200m**	**<350m**
High	>32µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low

Table B4: Sensitivity of the Area to Human Health Impacts[ab]							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration[c]**	**Number of Receptors[d]**	**Distance from Source (m)[e]**				
			<20m	**<50m**	**<100m**	**<200m**	**<350m**
	28-32µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

a. *The sensitivity to the area should be derived for each of the four activities*
b. Estimate the total number of receptors within the stated distance. Only the highest level of sensitivity from the table needs to be considered
c. Most straightforwardly taken from the national background maps, but should also take account of local sources. The values are based on 32µg/m^3 being the annual mean concentration at which an exceedance of the 24-hour mean objective is likely in England, Wales and Northern Ireland. In Scotland, there is an annual mean objective of 18µg/m^3
d. In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, just include the number of properties
e. For trackout, distances should be measured from the side of the roads used by construction traffic

Table B5: Sensitivity of the Area to Ecological Impacts[ab]		
Receptor Sensitivity	**Distance from the Source (m)[c]**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

a. *The sensitivity to the area should be derived for each of the four activities*
b. Only the highest level of sensitivity from the table needs to be considered
c. For trackout, distances should be measured from the side of the roads used by construction traffic

B.10 These two factors are combined in **Step 2C** to determine the risk of dust impacts with no mitigation applied.

B.11 The risk of dust effects is determined for four types of construction phase activities, with each activity being considered separately. If a construction phase activity is not taking place on the site, then it does not need to be assessed. The four types of activities to be considered are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

B.12 The risk of dust being generated by demolition activities at the site is determined using the criteria in Table B6.

Table B6: Risk of Dust Impacts for 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

B.13 The risk of dust being generated by earthworks and construction at the site is determined using the criteria in Table B7.

Table B7: Risk of Dust Impacts for Earthworks and 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

B.14 The risk of dust being generated by trackout at the site is determined using the criteria in Table B8.

Table B8: Risk of Dust Impacts for 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

B.15 Step 3 of the assessment determines the site-specific mitigation required for each of the activities, based on the risk determined in Step 2. Mitigation measures are detailed in guidance published by the Greater London Authority[10], recommended for use outside the capital by LAQM guidance, and the IAQM guidance document itself. Professional judgement should be used to determine the type and scale of mitigation measures required.

B.16 If the risk is classed as negligible, no mitigation measures beyond those required by legislation will be necessary.

Step 4

B.17 Step 4 assesses the residual effect, with mitigation measures in place, to determine whether or not these are significant.

[11] Greater London Authority, The Control of Dust and Emissions from Construction and Demolition: Supplementary Planning Guidance, 2014

Professional Judgement

B.18 The IAQM guidance makes reference to the use of professional judgement when assessing the risks of dust and fine particulate matter from demolition and construction sites. Details of the experience of the personnel involved with the project are provided in **Appendix D**.

Appendix C: Methodology for Operational Phase Assessment

Air Dispersion Modelling Inputs

C.1 The air dispersion model ADMS-Roads (CERC, Version 5.0.13) has been used to assess the potential air quality impacts associated with development-generated road traffic emissions. This dispersion model is widely used and accepted for the purpose of undertaking assessments to support both planning and Environmental Permit applications.

Traffic Flow Data

C.2 The ADMS-Roads model requires the input of detailed road traffic flow data for those routes which may be affected by the proposed development. Traffic flow data has been provided for this project by Prime Transport Planning, the appointed transport consultants for the project. The study extent of the model is shown in Figure C.1.

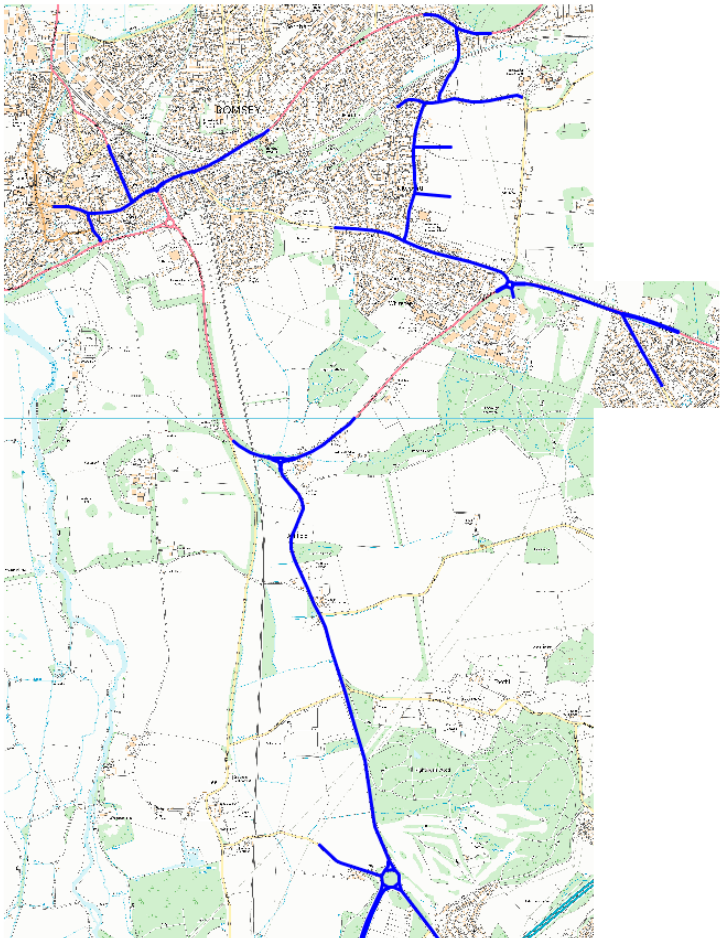


Figure C.1: Study Extent of Air Dispersion Model. The roads modelled in the assessment can be seen in blue (‘*Reproduced from Ordnance Survey Maps © Crown Copyright All Rights Reserved Licence No. 0100031673’)*

C.3 Data has been provided as 24-hour Annual Average Daily Traffic (AADT) flows, with HGV percentages. The appointed transport consultant, Prime Transport Planning, provided average speed information for several links used in the model. Average speed information wasn't available for all road links, and therefore speed limits have been used, with a reduction to 20kph in locations where congestion or the slowing down of vehicles would be expected. Table C2 shows links where speed limits have been utilised by using an asterisk symbol.

C.4 2019 base year data was not available for the study area, which was the only year that could be modelled for verification. After thorough consultation with Prime Transport Planning, it was decided that 2023 base year data was representative of 2019 traffic flows. This is justified by the following text provided by Prime Transport Planning:

'Extensive traffic surveys on the local roads have been undertaken during a neutral period in late 2023. We have reviewed publicly accessible DfT data to consider an adjustment factor from 2023 to 2019, however, the coverage is limited. It is reasonable to assume that 2023 flows are comparable to 2019 flows as traffic flows are rebounding to pre-pandemic levels'.

C.5 For robustness, the traffic data includes potential increase in traffic flows on the network from six committed development sites, these are listed in Table C1

Table C1: Committed Developments Included in the Traffic Data		
Name	**Reference**	**Details**
Land at Parkers Farm, Nursling and Rownhams	14/00726/OUTS	Demolition of two dwellings and existing farmhouse and associated farm buildings; the construction of up to 320 residential dwellings and a 60 unit extra care facility; the construction of a livery comprising stables for up to 30 horses and manage; the change of use of land from agricultural to paddocks and associated road/footway/cycleway provision, open space and landscaping. Surface water attenuation and ancillary works.
Hoe Farm, Hoe Lane, North Baddesley, Southampton, Hampshire SO52 9NH.	16/02432/OUTS	Outline application for up to 300 dwellings with associated open space, roads, parking, service infrastructure, allotments and landscaping and potential for ancillary uses including employment, retail and health provision; along with the creation of new vehicular access points to Hoe Lane and Sylvian Drive.
Land South of Abbotswood House, Braishfield Road, Romsey, Hampshire	20/00599/FULLS	Erection of 63 residential dwellings, with associated landscaping, parking and reconfiguration of roundabout to form new vehicular access.
Land At Whitenap, Luzborough Lane, Romsey, Hampshire	22/01213/OUTS	Outline application for up to 1,100 dwellings including affordable homes with associated open space, roads, parking, service infrastructure, local food production and landscaping. Employment areas (commercial, business and service), visitor accommodation, local community uses, community hall, medical consulting rooms, 1.5 form entry primary school, early years/nursery provision, conversion and/or new build at Whitenap Barns to provide commercial, business, service and local community uses with associated infrastructure. Creation of two new vehicular access points to Luzborough Lane (A27), pedestrian and cycle connection to St Barbe Close, and improvement of existing Whitenap Lane access. Provision of Suitable Alternative Natural Greenspace (SANG), provision of Sustainable Urban Drainage System (SuDs). All matters other than access to be reserved.
Land To The East of Abbey Enterprise Centre, Premier Way, Romsey, Hampshire.	22/03069/OUTS	Proposed extension of Abbey Park Industrial Estate for B1, B2 and B8 purposes.
Kings Chase South, Land South of Ganger Farm Lane, Romsey, Hampshire	23/00964/OUTS	Residential development of up to 309 dwellings, delivered across 3 severable residential parcels and 1 access parcel with associated infrastructure and works; all matters reserved other than access.

C.6 The traffic flow data used in the assessment is included in Table C2

Table C2: 24-hour AADT traffic data used in the assessment								
Link	Link Name	Speed Info (kph)	Scenario 1: 2017 Verification and Base Year		Scenario 2: 2024 Without Development		Scenario 3: 2024 Opening/Future Year, With Development	
			LGV	HGV	LGV	HGV	LGV	HGV
1	A3090 Winchester Road to the West of Halterworth Lane	30*	9260	54	9957	54	10124	55
2	A3090 Winchester Road to the East of Halterworth Lane	30*	5775	41	5907	41	6114	43
3	Halterworth Lane to the South of A3090 Winchester Road	20*	6436	21	7110	21	7486	22
4	Halterworth Lane to the North of Highwood Lane	20*	6441	8	7126	8	7514	9
5	Halterworth Lane to the West of Highwood Lane	30*	2476	12	2862	12	3249	14
6	Highwood Lane to the East of Halterworth Lane	40*	4320	4	4620	4	4620	4
7	Jenner Way to the West of Halterworth Lane	30*	368	4	368	4	368	4
8	Halterworth Lane to the South of Jenner Way	30*	2629	8	3019	8	3407	9
9	Halterworth Lane to the North of Proposed Northern Site Access	25.88	2761	0	3155	0	3528	0
10	Proposed Northern Site Access	20*	N/A	N/A	N/A	N/A	459	0
11	Halterworth Lane to the South of Proposed Northern Site Access	25.88	2761	0	3155	0	3683	0
12	Halterworth Lane to the North of Proposed Southern Site Access	22.58	2728	0	3118	0	3646	0
13	Proposed Southern Site Access	20*	N/A	N/A	N/A	N/A	680	0
14	Halterworth Lane to the South of Proposed Southern Site Access	22.58	2728	0	3118	0	3884	0
15	Halterworth Lane to the North of Botley Road	30*	2633	17	3014	17	3772	21
16	Botley Road to the West of Halterworth Lane	30*	7381	88	8969	88	9148	89
17	Botley Road to the East of Halterworth Lane	28.32	7758	67	9556	67	10326	72
18	Botley Road to the North of A27	30*	15692	237	17922	242	18677	252
19	Botley Road to the East of A27	38.95	17195	312	20100	354	20413	359
20	Premier Way to the South of A27	30*	1860	33	3608	93	3608	93

Table C2: 24-hour AADT traffic data used in the assessment								
Link	Link Name	Speed Info (kph)	Scenario 1: 2017 Verification and Base Year		Scenario 2: 2024 Without Development		Scenario 3: 2024 Opening/Future Year, With Development	
			LGV	HGV	LGV	HGV	LGV	HGV
21	A27 to the West of Botley Road	36.82	10384	190	12851	220	13182	225
22	Botley Road to the West of Rownhams Lane	38.95	17152	294	20064	335	20386	341
23	Botley Road to the East of Rownhams Lane	40*	11359	224	13379	265	13619	270
24	Rownhams Lane to the South of Botley Road	30*	6791	70	7692	70	7774	71
25	A27 to the West of A3057	50*	12822	410	15162	427	15162	427
26	A27 to the East of A3057	60*	9448	258	14444	333	14772	341
27	A3057 to the South of A27	60*	13579	461	17410	520	17737	529
28	A3057 to the North of M271	60*	13317	355	17102	393	17438	401
29	A3057 to the East of M271	60*	8979	110	9757	110	9819	111
30	M271 to the South of A3057	70*	12538	347	15815	385	16090	391
31	Coldharbour Lane to the West of A3057	30*	89	0	89	0	89	0
32	A3090 Winchester Road to the East of Botley Road	19.84	11283	0	12893	0	12893	0
33	Alma Road to the North of The Hundred	19.27	9227	0	9884	0	9930	0
34	The Hundred to the West of Alma Road	19.19	3531	0	3878	0	3924	0
35	Palmerston Street to the South of The Hundred	14.79	5274	0	5883	0	5918	0
*Speed limits have been used for link speeds								

Vehicle Emission Factors

C.7 The air quality assessment has used vehicle emission factors calculated using the Emissions Factor Toolkit (EFT) version 12.0, released in November 2023. This is the most up-to-date version of the EFT currently available.

C.8 As discussed in the section 3.4 of the report, in accordance with the latest guidance from the IAQM, a sensitivity analysis has not been undertaken as model verification has been undertaken using data from later than 2016[11].

[11] Available on the Institute of Air Quality Management website (https://iaqm.co.uk/wp-content/uploads/2013/02/iaqm_uncertainty_vehicle_NOx_emission_withdrawn-02.pdf)

C.9 As a result, vehicle emission factors from EFT v12.0 have been used for the assessment, with the appropriate year factors applied to the modelling scenarios.

Street Canyons

C.10 LAQM.TG(22) states that 'street canyons can generally be defined as narrow streets where the height of buildings on both sides of the road is greater than the road width'. The principal effects of a street canyon on the dispersion of pollution from a road source are:

- Pollution being channelled along the canyon;
- Pollution being dispersed across the canyon by circulating flow at road height;
- Pollutants being trapped in recirculation regions;
- Pollutants leaving the canyon between gaps in the buildings;
- Pollutants leaving the canyon from the canyon top; and
- Pollutants leaving the canyon from the downstream end of the canyon.

C.11 Gradients have been applied to seven model links and included in all scenarios. These are:

- Winchester Road
- Alma Road
- Palmerston Street

Meteorological Data

C.12 The meteorological data used in the air quality modelling has been obtained from ADM Limited and is from the Southampton Meteorological recording station, covering the period between 1st January and 31st December 2019. This has complete data capture for wind and temperature.

C.13 The Southampton Meteorological recording station is located approximately 9km from the proposed development and is considered to be the most representative of the conditions at the proposed development, due to its relative location and similar altitude.

C.14 The 2019 wind rose for the Southampton Meteorological Recording Station is shown in Figure C2.

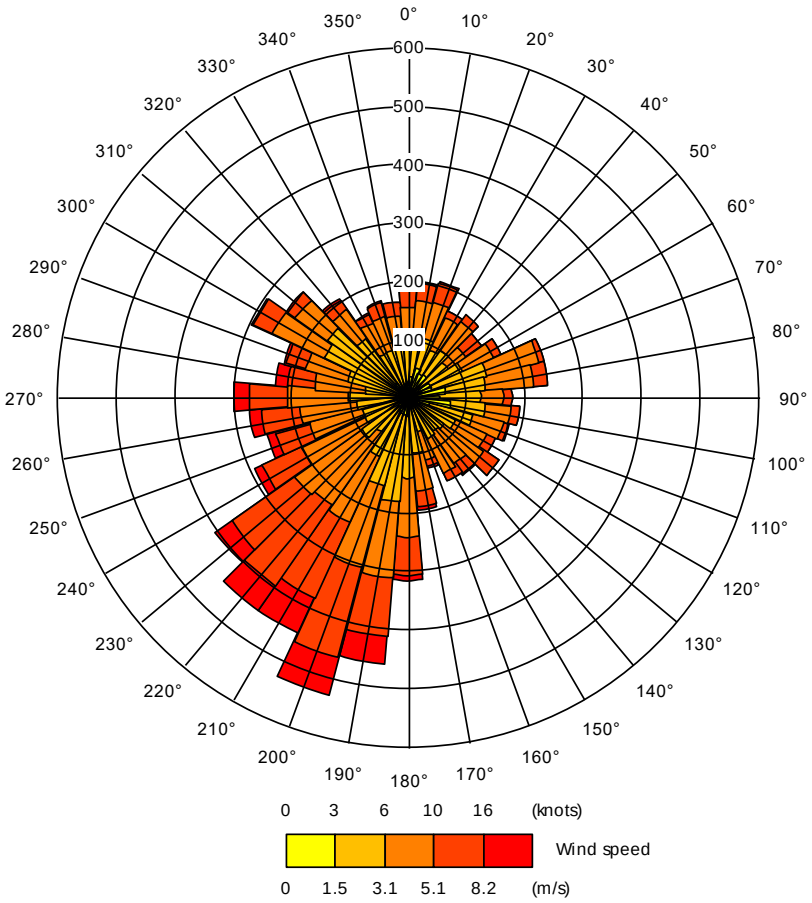


Figure C.2: 2019 Wind Rose for the Southampton Meteorological Station

Dispersion and Meteorological Site Characteristics

C.15 The characteristics for the dispersion site and meteorological sites, included in the ADMS-Roads model, are detailed in Table C3.

Table C3: Dispersion and Meteorological Site Characteristics

Setting	Dispersion Site	Meteorological Site
Surface Roughness	0.5m	0.5m
Surface Albedo	0.23	0.23
Minimum Monin-Obukhov Length	30m	1m
Priestley-Taylor Parameter	1	1

NO_x to NO_2 Conversion

C.16 In accordance with the guidance within LAQM.TG(22), the ADMS-Roads model has been run to predict the road-contribution NO_x concentrations for each receptor location. These have then been converted to NO_2 concentrations using the Defra NOx to NO2 calculator[12].

Model Validation and Verification

C.17 LAQM.TG(22) refers to model validation as "the general comparison of modelled results against monitoring data carried out by model developers". ADMS-Roads is widely accepted by regulatory authorities for use in this type of assessment.

C.18 Model verification is used to check the performance of the model at a local level. The verification of the ADMS-Roads air dispersion model is achieved by modelling concentration(s) at existing monitoring location(s) in the vicinity of the proposed development, and comparing the modelled concentration(s) with the measured concentration(s).

C.19 Following review of the 2023 Annual Status Report (ASR) for Test Valley Borough Council, it is understood there are six roadside air quality monitoring location in close proximity to the proposed development site. Therefore, these diffusion tubes has been used to verify the results of the model.

C.20 As no PM10 or PM2.5 monitoring locations are situated along roads where traffic flow data is available, it has not been possible to carry out model verification for modelled PM10 or PM2.5 concentrations.

C.21 The monitoring data that has been used in the model verification procedure is detailed in Table C4.

Table C4: NO_2 Monitoring Data Used for Verification Purposes

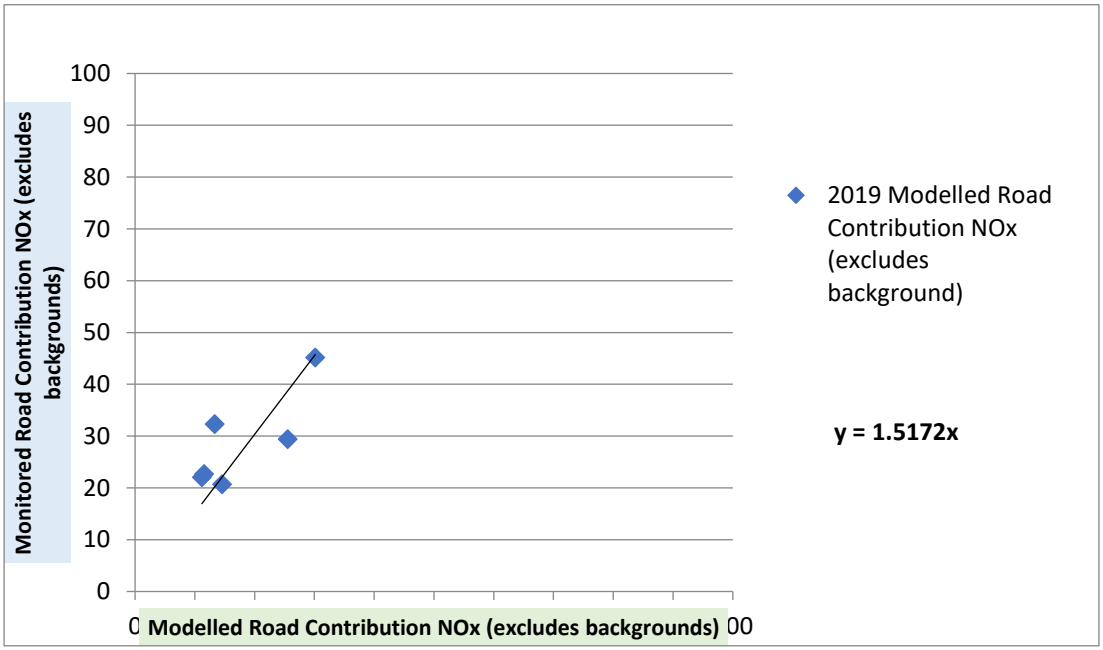
Monitoring Location Reference	Type	Approximate Grid Reference		2019 Bias Adjusted NO_2 Annual Average Concentration (µg/m^3)
		Easting	Northing	
S1	Roadside Diffusion Tube	436129	121398	35.3
S3	Roadside Diffusion Tube	435474	121089	30.1
S5	Roadside Diffusion Tube	435473	121125	25.4

[12] Defra Local Air Quality Management web pages [http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html]

Table C4: NO_2 Monitoring Data Used for Verification Purposes				
Monitoring Location Reference	**Type**	**Approximate Grid Reference**		**2019 Bias Adjusted NO_2 Annual Average Concentration (µg/m³)**
		Easting	**Northing**	
S6	Roadside Diffusion Tube	436075	121387	27.9
S7	Roadside Diffusion Tube	435597	121244	24.4
S8	Roadside Diffusion Tube	435630	121403	25.1

C.22 The modelled road-contribution NO_x concentration for the diffusion tube has been compared against the measured road-contribution NO_x concentration for the same location. The measured concentrations have been derived using the Defra NO_x to NO_2 calculator, taking into account the background NO_x concentration for the local area.

C.23 The comparison is shown in the below graph. The equation of the trend line is based on linear regression through zero, which provides an overall adjustment factor of 1.5172.



C.24 This adjustment factor has been applied to the modelled road-contribution NO_x concentrations. The total NO_2 concentrations have been derived by combining the adjusted road-contribution NO_x concentration and background NO_2 concentration,

using the Defra NO_x to NO_2 calculator.

C.25 A final comparison has been made between the total measured NO_2 concentrations and total modelled NO_2 concentrations, as shown in Table C5. Following adjustment, modelled concentrations are all within 20% of measured concentrations.

Table C5: Comparison Between Measured and Monitored NO_2 Concentrations

Monitoring Location Reference	Measured Total NO_2 Concentration ($\mu g/m^3$)	Modelled Total NO_2 Concentration ($\mu g/m^3$)	Difference (%)
S1	35.30	35.56	0.74
S3	30.10	24.16	-19.73
S5	25.40	22.81	-10.20
S6	27.90	32.36	15.99
S7	24.40	25.11	2.91
S8	25.10	22.53	-10.24

C.26 It should be noted that some of the diffusion tubes included within the model could be discounted from the verification process, in accordance with guidance detailed in the LAQM.TG(22), which would reduce the difference between measured and modelled NO_2 concentrations further. These tubes have been included in the model in order to make use of as much monitored data as possible, however, the justification for removing the tubes, as detailed in LAQM.TG(22), is below:

- Diffusion tubes S3 and S8: Both diffusion tubes are located adjacent to a road sign on the lamppost that they were mounted on. Therefore, the road sign could act as a barrier for pollutants, as well as preventing proper air flow around the tube which could lead to an overestimation of pollution concentrations. *"It is important to place diffusion tubes where there is free circulation of air around the tube."*

- Diffusion tube S6: This diffusion tube is located outside of the entrance to a car park, therefore pollutant levels at this tube will likely be increased due to the idling of vehicles in this area, and the monitor won't be representative of the area as a whole. It is difficult to replicate this in the model to ensure the model is as representative of real world conditions and means there will be a larger disparity between the monitored and modelled concentrations at this location.

- Diffusion tube S7: This tube is location situated within dense vegetation, which is likely to limit the air flow around the tube, "The site should be open to the sky, with no overhanging vegetation"

C.27 A Root Mean Square Error (RMSE) calculation has been undertaken as part of the model verification for NO_2 concentrations. This has been carried out for the monitoring location included within the model verification, in accordance with the guidance detailed in LAQM.TG(22).

C.28 The RMSE calculation following adjustment is detailed in Table C6.

Table C6: RMSE Calculation for Nitrogen Dioxide Concentrations

Diffusion Tube Location	After Verification			
	Observed Value	Predicted Value	Difference	RMSE
S1	35.30	35.56	0.26	**3.39**
S3	30.10	24.16	-5.94	
S5	25.40	22.81	-2.59	
S6	27.90	32.36	4.46	
S7	24.40	25.11	0.71	
S8	25.10	22.53	-2.57	

C.29 LAQM.TG(22) states that *"ideally an RMSE value within 10% of the objective would be derived"*, although a value of within 25% is considered acceptable.The results of the calculation show that following model verification, the RMSE value is within 10% (i.e. 4µg/m^3) of the objective (i.e. 40µg/m^3). Therefore, the model is considered to be performing to an acceptable standard.

Assessment Criteria

Assessing the Impact of a Proposed Development on Human Receptors

C.30 Guidance has been prepared by Environmental Protection UK (EPUK) and the IAQM[13] with relation to the assessment of the air quality impacts of proposed developments and their significance.

[13] Moorcroft and Barrowcliffe et al, Land-Use Planning and Development Control: Planning for Air Quality (v1.2), January 2017

C.31 The impact of a development is usually assessed at specific receptors, and takes into account both the long-term background concentrations, in relation to the relevant Air Quality Assessment Level (AQAL) at these receptors, and the change with the development in place.

C.32 The impact descriptors for individual receptors are detailed in Table C7.

Table C7: Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year*	Percentage Change in Concentration Relative to Air Quality Assessment Level (AQAL)*			
	1%	2-5%	6-10%	>10
75% or less 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% or more of AQAL	Moderate	Substantial	Substantial	Substantial

**Percentage pollutant concentrations have been rounded to whole numbers, to make it easier to assess the impact. Changes of 0% (i.e. less than 0.5% or 0.2µg/m^3) should be described as Negligible*

Determining the Significance of Effects

C.33 Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as either 'significant' or 'not significant'.

C.34 Once the impact of the proposed development has been assessed for the individual impacts, the overall significance is determined using professional judgement. This takes into account a number of factors such as:

- The existing and future air quality in the absence of the development;
- The extent of the current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Appendix D: Professional Experience of Assessors

D.1 The assessment of air quality impacts, and the significance of the associated effects, takes into account the professional judgement of the assessor. Details of the experience of the personnel involved with the project are provided below:

Hannah Fleming — **Environmental Scientist**
BSc (Hons), AIAQM, AMIEnvSc — **(Air Quality)**

Hannah joined Wardell Armstrong in 2022 after finishing a Bachelor of Science degree in Environmental Science from the University of Leeds and is part of the Acoustic and Air Quality team. Hannah has experience of carrying out air quality assessments for a variety of developments, including residential and commercial. She is involved in all aspects of the assessment, from carrying out air quality monitoring studies to analysing data, modelling and writing technical reports or chapters as part of an Environmental Statement.

Paul Threlfall — **Principal Environmental Scientist (Air Quality & Odour)**
BSc (Hons), MSc

Paul joined Wardell Armstrong in October 2017 as an Air Quality Scientist, after completing his MSc Water, Energy and the Environment at Liverpool John Moores University. The majority of his work is carried out in support of planning applications and, therefore, he has experience of undertaking air quality assessments for a wide range of projects including residential developments, commercial developments, and mixed-use developments. Paul also has extensive experience of undertaking detailed air quality assessments for large industrial developments for both planning and permit applications.

Paul has a broad range of skills and knowledge of air quality modelling and monitoring through his involvement in air quality projects, both as individual commissions and as part of Environmental Impact Assessments (EIAs). Paul also has extensive knowledge and experience of undertaking odour assessments, ranging from qualitative desk-based assessments to more detailed odour dispersion

modelling assessments using AERMOD, as well as extensive experience of undertaking odour 'sniff test' observations.

Malcolm Walton **Technical Director**
BSc (Env Health) Dip (Acoustics & Noise Control)
MCIEH AMIOA

Malcolm holds a Bachelor of Science degree in Environmental Health and the Diploma in Acoustics and Noise Control. Malcolm is a Member of the Chartered Institute of Environmental Health and an Associate Member of the Institute of Acoustics. Malcolm joined Wardell Armstrong in September 2001 following 12 years working as an Environmental Health Officer in several local authorities, responsible for the enforcement of environmental legislation and in particular air pollution and noise nuisance.

Malcolm has experience in the technical co-ordination of environmental appraisal of large schemes to UK and international standards. Malcolm regularly carries out and co-ordinates noise and air quality assessment work associated with planning applications including EIA work and PPC permit application/compliance. He regularly acts as expert witness in planning inquiries in respect of noise, air quality and odour.

DRAWINGS/FIGURES

Notes:

Boundaries are indicative.

Aerial imagery shown for context purposes only.

REVISION	DETAILS	DATE	DRAWN	CHKD	APP'D
B	REVISED BOUNDARIES	07/23	GER	LG	HK
A	FIRST ISSUE	05/23	SRW	LG	HK

CLIENT

GLADMAN DEVELOPMENTS LIMITED

PROJECT

HALTERWORTH LANE ROMSEY

DRAWING TITLE

AIR QUALITY RECEPTOR LOCATION PLAN

DRG No.		REV
GM13034-001		
DRG SIZE	SCALE	DATE
A3	1:20,000	18/12/2023
DRAWN BY	CHECKED BY	APPROVED BY
HF	PT	MW

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