Air Quality Assessment
Dunsbury Park Plot 600/601

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Executive summary

Overview

Eight Versa has been commissioned to carry out an Air Quality Assessment (AQA) for the proposed development at Dunsbury Park Plot 600/601, Havant, PO9 4EE, in the Havant Borough Council. The proposal comprises of the construction of a warehouse and office within outline plot 600/601 with associated works, including landscaping, internal access roads, drainage infrastructure and the provision of car parking spaces.

The unmitigated risk to local sensitive receptors from emissions of dust and pollution from construction is deemed to be medium. However, the risk will be mitigated further through the measures set out in the Air Quality & Dust Management Plan (AQDMP), which will be implemented through the contractor's Construction Environmental Management Plan. With the mitigation measures in place, the residual effects arising from the construction phase of the proposed development would be deemed 'not significant'.

A total of two NO_2 diffusion tubes and two automatic monitoring station, monitoring mean annual NO_2 concentrations, have been identified appropriate for the dispersion modelling. The data show that the NAQO for mean annual NO_2 concentration (for the mean annual concentration to be no more than 40 $\mu g/m^3$) closest to the development site, has been consistently achieved across all sites between the latest reporting years of 2020-2023. Moreover, there is a decreasing trend in NO_2 levels. Additionally, the NAQO for the hourly mean (for no more than 18 exceedances of the 200 $\mu g/m^3$ hourly mean) has been consistently achieved at both automatic monitoring stations C4 and C7 for the years 2020-2023, where relevant. The Defra modelled background concentration of NO_2 is 11.9 $\mu g/m^3$ for 2023, decreasing to 10.0 $\mu g/m^3$ by 2027. It is likely that mean annual NO_2 concentrations currently achieve the NAQO but exceed the WHO guideline at the development site.

Nearby monitored mean annual PM_{10} concentrations and 24-hourly PM_{10} concentrations at C4 and C7 consistently achieved the NAQOs. Nearby monitored mean annual $PM_{2.5}$ concentrations at C4 and C7 consistently achieved the NAQOs.

Atmospheric dispersion modelling was carried out. The performance of the modelled receptors at the plot 600/601 and existing sensitive receptors in the area, indicates the effects of NO_2, PM_{10} and $PM_{2.5}$ concentrations in the three different scenarios, 'Baseline 2023', '2027 no development' and '2027 with development' are not significant. Therefore, residents of the local area will not be exposed to high levels of pollution.

Even though further mitigation measures to reduce exposure of future occupants to pollutants are not explicitly required, the design mitigation hierarchy has been applied nonetheless, to maximise air quality for occupants, where feasible. Measures include, provision of sustainable transport modes, integration of low carbon energy technologies, urban greening and a well-designed mechanical ventilation system.

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Introduction

Project Overview

Eight Versa has been commissioned to carry out an Air Quality Assessment (AQA) for the proposed development at Dunsbury Park Plot 600/601, Havant, PO9 4EE, in the Havant Borough Council. The proposal comprises of the construction of multiple warehouses and offices across outline plot 600/601 with associated works, including landscaping, internal access roads, drainage infrastructure and the provision of car parking spaces.

The development is in close proximity to A3. Due to the proposed nature of the development, introducing new sensitive receptors into an area with existing poor air quality, mainly influenced by emissions from road transport using A3, an AQA has been undertaken to accompany the planning application.

Scope of Assessment

An AQA has been undertaken in accordance with relevant planning policy and best-practice guidance at national, regional and local levels. The AQA includes:

- Establishment of nearby sensitive receptors to air pollution.
- Assessment of air quality and dust impacts during the construction phase.
- Establishment and review of existing air quality.
- Evaluation of outline proposals against the Air Quality Neutral (AQN) benchmarks.
- Assessment of air quality impacts expected during the operation of the new development.
- Assessment of the mitigation strategy to limit the exposure of building users and nearby receptors, to air pollution.

Key policy and guidance documents considered in the AQA are outlined in Table 1.

Table 1: National, regional and local policies and guidance.

National	National Planning Policy Framework (Ministry of Housing, Communities & Local Government, 2024)
	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Department for Environment, Food & Rural Affairs, Defra, 2007)
	Land-Use Planning & Development Control: Planning for Air Quality (Environmental Protection UK (EPUK), Institute of Air Quality Management (IAQM), 2017)
	Clean Air Strategy (Department for Environment, Food & Rural Affairs, Defra, 2019)
	Air Quality Plan for Nitrogen dioxide (NO_2) in UK (Defra, 2017)
	Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)
	Environment Act 2021 (Ministry of Housing, Communities & Local Government, 2021)
	A Guide to The Assessment of Air Quality Impacts on Designated Nature Conservation Sites (IAQM, 2020)
	The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ministry of Housing, Communities & Local Government, 2019)
	Local Air Quality Management: Technical guidance LAQM.TG (22) (Department for Environment, Food & Rural Affairs, Defra, 2022)
Local	Havant Borough Local Plan (Core Strategy) (Havant Borough Council, 2011)
	Climate Change Strategy and Action Plan 2024–2030 (Havant Borough Council, 2024)
	Local Air Quality Management – Annual Status Reports (Havant Borough Council)

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Policy Review

National Legislation and Policy

The Air Quality Standards Regulations 2016 implements the requirements of EU Directive 2008/50/EC into UK legislation. Defra, on behalf of the UK Government, has produced a series of plans for the UK to meet the EU targets in the shortest possible time, the latest being the UK plan for tackling roadside NO_2 concentrations in July 2017 (NO_2 being identified as the primary pollutant for which the EU limit values are exceeded). An overview document has been produced, together with detailed plans for 37 zones where the objectives for NO_2 were not met in 2015.

The plan for the Greater London area sets out a range of measures to reduce NO_2 concentrations and indicates that with these measures, London will be compliant by 2025.

Table 2 sets out the ambient air quality standards for a range of key pollutants requiring specific objectives for ambient concentrations for pollutants UK and WHO limit values, respectively to be achieved and maintained.

Table 2: UK and WHO limit values for key pollutants.[1]

Pollutants	UK Concentrations	WHO Concentrations	Measured as	Date to be achieved by (UK only)
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times per year	25 µg/m^3	24-hour mean	31 December 2005
	40 µg/m^3	10 µg/m^3	Annual mean	31 December 2005

Table 2: UK and WHO limit values for key pollutants (continued).

Pollutants	UK Concentrations	WHO Concentrations	Measured as	Date to be achieved by (UK only)
Particles (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times per year	45 µg/m^3	24-hour mean	31 December 2004
	40 µg/m^3	15 µg/m^3	Annual mean	31 December 2004
Particles ($PM_{2.5}$)	-	15 µg/m^3	24-hour mean	-
	20 µg/m^3	5 µg/m^3	Annual mean	31 December 2010
Carbon monoxide (CO)	10 mg/m^3	-	Max. daily 8-hour mean	31 December 2003
Sulphur dioxide (SO_2)	266 µg/m^3 not to be exceeded more than 35 times per year	-	15-minute mean	31 December 2005
	350 µg/m^3 not to be exceeded more than 24 times per year	-	1 hour mean	31 December 2004
	125 µg/m^3 not to be exceeded more than 3 times per year	40 µg/m^3	24-hour mean	31 December 2004
Ozone (O_3)	100 µg/m^3 not to be exceeded more than 10 times per year	100 µg/m^3	8-hour mean	31 December 2005

[1] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. The full 2021 WHO can be viewed on WHO website.

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National Planning Policy Framework (Ministry of Housing, Communities & Local Government, 2024)

The National Planning Policy Framework (NPPF) published in December 2024 sets out the UK Government's planning policies for England. Planning law requires that applications for planning permission must be determined in accordance with the local development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It states that the purpose of the planning system is to contribute to the achievement of sustainable development; and that planning decisions on individual applications must reflect statutory requirements. Specifically, in terms of air quality, it requires the planning system to prevent development from contributing to or being put at unacceptable risk from unacceptable levels of air pollution.

Planning policies should promote compliance with or contribute towards achievement of EU limit values and NAQOs, taking into account the presence of AQMAs and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development within an AQMA is consistent with the local Air Quality Action Plan (AQAP).

The NPPF is supported by a series of Planning Practice Guidance (PPG) documents. The guidance in relation to air quality (PGG – Air Quality, November 2019) provides guiding principles on how planning can take account of the impact of new development on air quality.

Environment Act 2021 (Ministry of Housing, Communities & Local Government, 2021)

The Secretary of State must by regulations set a target ("the $PM_{2.5}$ air quality target") in respect of the annual mean level of $PM_{2.5}$ in ambient air. The $PM_{2.5}$ air quality target may, but need not, be a long-term target. In this section "$PM_{2.5}$" means particulate matter with an aerodynamic diameter not exceeding 2.5 micrometres. Regulations setting the $PM_{2.5}$ air quality target may make provision defining "ambient air". The duty in subsection (1) is in addition to (and does not discharge) the duty in section 1(2) to set a long-term target in relation to air quality. Section 1(4) to (9) applies to the $PM_{2.5}$ air quality target and to regulations under this section as it applies to targets set under section 1 and to regulations under that section. In this Part "the $PM_{2.5}$ air quality target" means the target set under subsection.

National Air Quality Management

Part IV of the Environment Act 1995 requires the UK Government to publish an Air Quality Strategy and for local authorities to review, assess and manage air quality within their areas, known as Local Air Quality Management (LAQM).

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Defra, 2007)

The 2007 Air Quality Strategy establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (NAQOs) for the protection of human health and vegetation for 11 pollutants. Those NAQOs included as part of LAQM are prescribed in the Air Quality Standards Regulations 2016 and the Air Quality (Amendment) (England) Regulations 2002. It should be noted that the EU limit values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and legal responsibility.

The EU limit values are mandatory whereas the NAQOs are policy objectives. Local authorities are not required to achieve them but have to work towards their achievement. In addition, the EU limit values apply in all locations except where members of the public do not have access and there is no fixed habitation, on factory premises or at industrial installations, and on the carriageway/central reservation of roads except where there is normally pedestrian access. Where a local authority's review and assessment of its air quality identifies that air quality is likely to exceed the NAQOs, it must designate these areas as AQMAs and develop an Air Quality Action Plan (AQAP) setting out measures to reduce pollutant concentrations with the aim of meeting the NAQOs.

Clean Air Strategy (Defra, 2019)

Additionally, the Clean Air Strategy 2019 sets outs goals that will be more stringent than EU requirements with the aim of reducing human exposure to toxic pollutants by taking into account the World Health Organisation's guidelines. The policies in the Strategy aim to reduce $PM_{2.5}$ concentrations across the UK so that the number of people living in locations above the WHO annual mean guideline limit of 10 µg/m3 is reduced by 50% by 2025. Moreover, the Strategy will feed information to local authorities on how the cumulative impacts of nitrogen deposition in natural habitats should be assessed and mitigated through the planning system.

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Local Policy and Guidance

Havant Borough Local Plan (Core Strategy) (Havant Borough Council, 2011)
The Havant Borough Local Plan Core Strategy is the overarching planning policy document for the Borough. It forms part of Havant Borough Council's Local Development Framework and sets out the strategic planning policies to guide development across the Borough.

Climate Change Strategy (Havant Borough Council, 2024)
This Climate Change Strategy and Action Plan is a high-level document setting out Havant Borough Council's response to the urgency of climate change and its role in supporting the Borough to mitigate and adapt to climate change risks. Achieving a net zero council by 2035 and a net zero borough by 2045 will require commitment, innovation and collaboration from local authorities, organisations, businesses and residents within Havant Borough.

Local Air Quality Management – Annual Status Reports (Havant Borough Council)
Havant Borough Council monitors and reviews air quality across the Borough in accordance with the Local Air Quality Management (LAQM) regime. Annual Status Reports are prepared to assess compliance with national air quality objectives and to identify any locations where air quality may be at risk of exceeding relevant standards. Havant Borough Council recognises that air pollution can have adverse effects on human health, particularly for vulnerable groups, and continues to monitor and manage air quality with a focus on emissions from road traffic.

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Site Overview

The development site at Dunsbury Park Plot 600/601 is on the east side of A3 in the north of the Havant Borough Council. The approximate OS grid reference for the site is X (Eastings) 470173, Y (Northings) 109476and the postcode is PO9 4EE. It is bound by a highway to the west, park to the south, park to the north and residential area to the east, as illustrated in Figure 1. The total area of the development is approximately 11,535m^2.

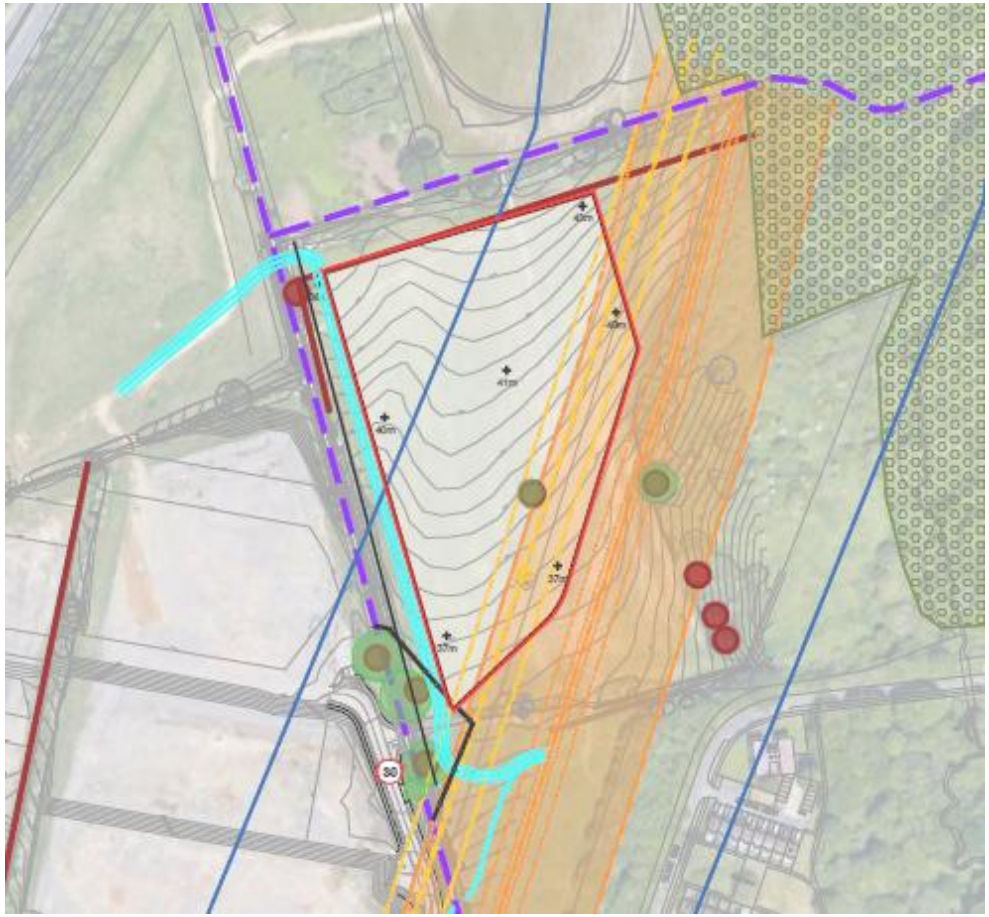

Figure 1: The red line illustrates the approximate location of the development site. The blue line illustrates the approximate location of the existing Dunsbury Park Plot 600/601.

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Development Overview

Description of Proposed Development

The illustrative proposals show multiple warehouse units with ancillary offices on outline Plot 600/601 with associated works, including landscaping, internal access roads, drainage infrastructure and the provision of car parking spaces. Illustrative proposed plot layout is shown in Figure 2.

Figure 2: Illustrative proposed plot layout.

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Local Receptors

Overview of Local Sensitive Receptors

A sensitive receptor is a location that may be affected by the emission of pollutants and / or particulate matter during construction or from the operation of a completed development, including from building plant and transport uses as a result of the new development.

In accordance with the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction', the need for a detailed assessment of the air quality impacts from construction should be determined where the following receptors are present:

- Where there is a human receptor within:
  - 350m of the boundary of the site; and/or
  - 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- Where there is an ecological receptor within:
  - 50m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

For the purposes of identifying receptors, which may be sensitive to potential air quality impacts of dust and emissions from construction, a 350m radius from the development site is used for human receptors, a 50m radius for ecological receptors and a 500m radius is used for the trackout route for both types of receptors, as shown in Figure 3.

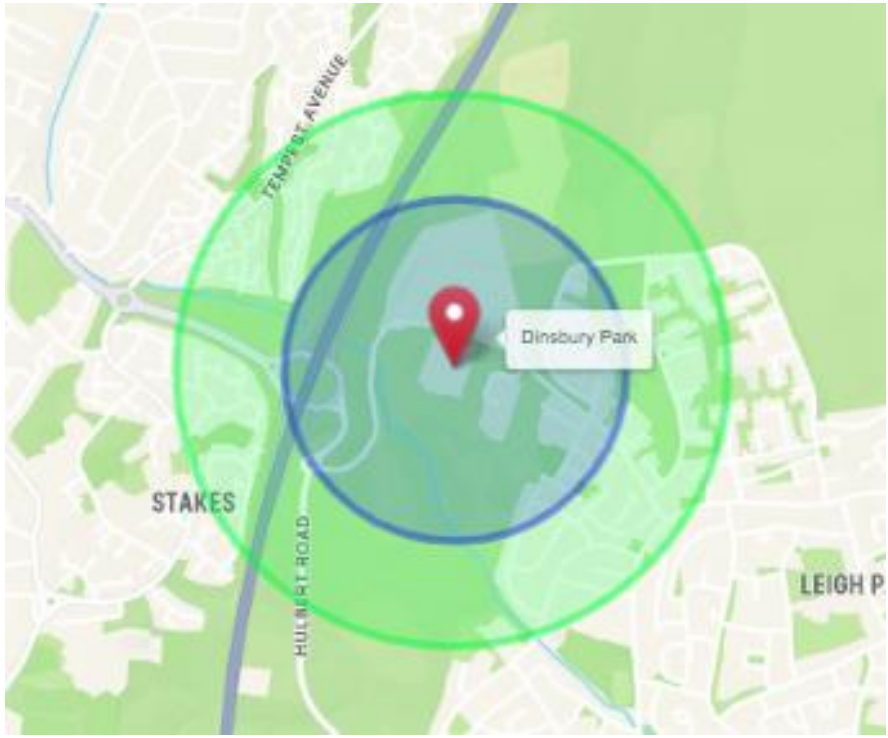

Figure 3: Map view showing a 800m radius (green), a 500m radius (blue) from the site.

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Human Receptors

A human receptor refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the air quality objectives, as defined in the Government's technical guidance for Local Air Quality Management. In terms of annoyance effects, this will most commonly relate to residential dwellings, but may also refer to other premises such as schools, hospitals, museums, vehicle showrooms, food manufacturers and amenity areas.

The surrounding area consists predominantly of commercial, park and residential spaces. Key human receptors are described below (all distances detailed are approximate).

Schools

The following schools have been identified within 350m of the development or within 500m of the trackout route:

- Prospect School 11 - 16 years – approximately 450m south-west.
- St Clares Pre-School – approximately 500m west.

Nurseries

The following nurseries / pre-schools have been identified within 350m of the development or within 500m of the trackout route:

- Girls and Boys Day Nursery Warren Park– approximately 450m west.

Hospitals

No hospitals have been identified within 350m of the development or within 500m of the trackout route.

Doctors

No doctors have been identified within 500m of the trackout route.

Ecological Receptors

Potential sensitive ecological receptors have been determined using geographic information obtained from MAGIC's website, according to a Guide to the Assessment of Air Quality Impacts On Designated Nature Conservation Sites (IAQM, 2020) and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Ministry of Housing, Communities & Local Government, 2019).

The following statutory or non-statutory ecological sites have been identified within 50m of the development or within 500m of the trackout route:

- Nitrate Vulnerable Zones 2017 Designations (England).

No sites that could represent ecological receptors but not defined as either statutory or non-statutory ecological site, have been identified within 500m of the development site:

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Construction Phase Impacts

Construction phase impacts, as a result of the proposed development, have been assessed using the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction'. The construction phase impacts have been assessed for their risks in line with section 5 of the IAQM guidance.

Assessment of Construction Impacts

Using the evaluation criteria within the IAQM's guidance, the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 3.

Table 3: Dust emission magnitudes for construction activities.

Activity	Dust emission magnitude	Justification
Demolition	Negligible	Total building volume <12,000 m3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months.
Earthworks	Small	Total site area <18,000 m2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height;
Construction	Medium	Total building volume 12,000 m3 – 75,000 m3, potentially dusty construction material (e.g. concrete), on site concrete batching;
Trackout	Small	Small:<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

The overall sensitivity of the surrounding area to dust soiling, human health impacts and ecological effects has been determined by reviewing the sensitivity of the receptors and distance from the source. A summary of sensitivity of nearby receptors to dust impacts is given in Table 4.

Table 4: Sensitivity of nearby receptors to dust impacts.

Sensitivity of people to dust soiling	Sensitivity of people to PM_{10} health impacts	Sensitivity to ecological effects
Medium 10-100 receptors within 50m	Medium 24-28 µg/m^3 PM_{10} and 10-100 high sensitivity receptors within 50m	Medium Ecological receptors within 50m-350m
indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	locations with a local designation where the features may be affected by dust deposition. indicative example is a local Nature Reserve with dust sensitive features.

The dust emission magnitude determined in Table 3 has been combined with the sensitivity assessment in Table 4 to define the risk of impacts for each phase of development in the absence of mitigation measures. The sensitivity of the surrounding area has been defined in accordance with IAQM guidance and the results are given in Table 5.

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Table 5: Risk to local sensitive receptors from construction dust impacts.

	Risk without mitigation	Activity			
		Demolition	Earthworks	Construction	Trackout
Potential impact	Dust soiling	Low	Low	Medium	Low
	Human health	Low	Low	Medium	Low
	Ecological effects	Low	Low	Medium	Low
Overall risk of dust impacts with no mitigation		Medium risk			

The overall risk of dust impacts from the construction phase without mitigation measures proposed has been assessed as being medium risk. The risk across the four construction activities has been determined to be medium risk to negligible. The risk of all the activities with regards to ecology is deemed to be low. Therefore, no further mitigation measures need specifically be recommended for protecting ecology.

Effects of Mitigation Measures

A schedule of mitigation measures has been developed for the construction phase, based on the 'Control of Dust and Emissions during Construction and Demolition: Supplementary Planning Guidance' (Mayor of London, 2014). These measures are outlined in the Air Quality & Dust Management Plan (AQDMP) (Appendix A). The measures will be incorporated in the appointed Contractor's Construction Environmental Management Plan.

The recommended AQDMP measures address the key construction activities identified and a summary of the proposed measures to satisfactorily reduce the risks from the respective construction phases is given in Table 6. The implementation of the proposed measures is deemed to mitigate the risk for each activity and thus the residual effects are deemed to be negligible.

Table 6: Summary of proposed AQDMP mitigation measures for construction phase.

Activity	Relevant mitigation measures
General (all activities)	Site management measures 1-10. Preparing and maintaining the site measures 11-23. Operating vehicle/machinery and sustainable travel measures 24-30. Operations measures 31-35. Waste management measure 36-37.
Demolition	Measures 38-41.
Earthworks	Measures 42-44
Construction	Measures 45-48.
Trackout	Measures 49-58.

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Existing Air Quality

Current Local Status

Havant Borough Council has not declared any Air Quality Management Areas (AQMAs) within the Borough. Air quality is monitored and reviewed through the Local Air Quality Management (LAQM) regime and reported annually within the Council's Annual Status Reports. The site is therefore not located within an AQMA.

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Local Monitoring Stations

Monitoring sites have been identified from Havant Borough Council Local Air Quality Management Annual Status Reports, supplemented where appropriate by nearby national air quality monitoring stations. Based on their proximity to the development site, completeness of data and relevance to the site, the following monitoring sites are reviewed in Table 7. Two automatic monitoring station and two non-automatic monitoring sites have been identified that are considered to be most suitable for dispersion modelling due to the proximity to the roads that are leading to the site.

Table 7: Air quality monitoring stations identified near the site.

Site ID	Site name and type	Pollutants monitored	X (Eastings)	Y (Northings)	Inlet height (m)	Distance from site (m)
162	Column 51 Eastern Road, diffusion tube, roadside	NO_2	467441	104208	2.48	5,400
163	Column 52 Eastern Road, diffusion tube, roadside	NO_2	467423	104211	2.48	5,400
C4	Gatcombe Park Primary School (AURN), automatic, Urban Background	NO_2, PM_{10}, $PM_{2.5}$ and O_3	465403	103952	2.5	6,800
C7	Mile End Road, automatic, roadside	NO_2, PM_{10}, $PM_{2.5}$ and O_3	464397	101270	1.8	9,500

A map, showing the approximate locations of the closest automatic monitoring stations and NO_2 diffusion tubes, in relation to the development site, is shown in Figure 4.

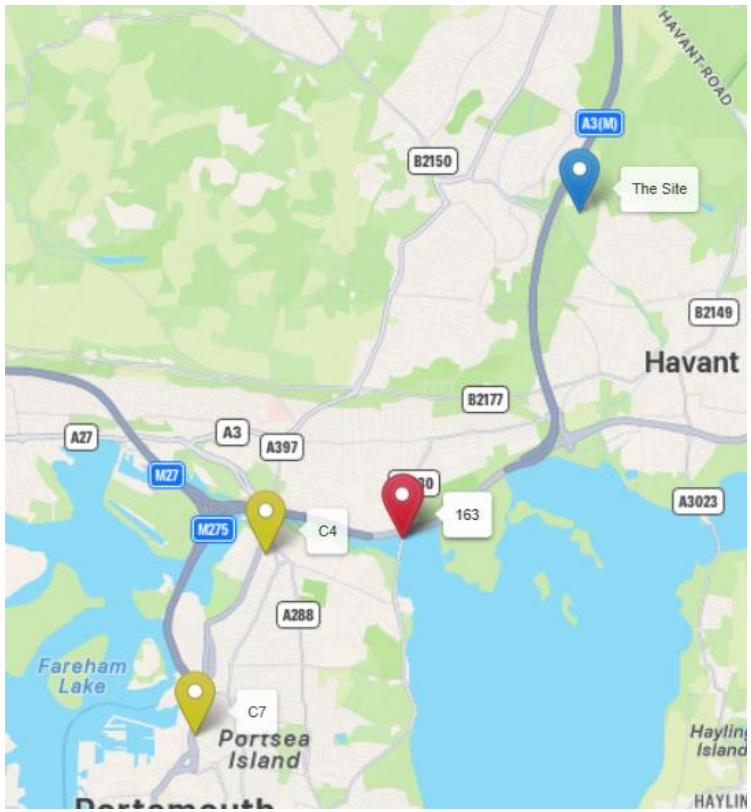

Figure 4: Map showing location of development site (shown in blue) in relation to nearby automatic monitoring stations (shown in yellow) and NO_2 diffusion tubes (shown in red). Diffusion tubes 162 and 163 are overlapping each other.

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Monitored Nitrogen Dioxide (NO_2)

A summary of the latest monitoring results for NO_2 annual mean concentrations at the closest monitoring stations to the development site is given in Table 8. Exceedances of the NO_2 annual mean AQO of 40µg/m^3 are shown in bold. NO_2 annual means in excess of 60µg/m^3, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

The data show that the NAQO for mean annual NO_2 concentration (for the mean annual concentration to be no more than 40 µg/m^3) closest to the development site, has been consistently achieved at all sites between the latest reporting years of 2020-2023. Moreover, there is a decreasing trend in NO_2 levels, except 2020-2021 due to reduced transport use. Additionally, air quality is predicted to improve in the future with actions such as the introduction of electric vehicles.

Table 8: 2020-2023 NO_2 annual mean concentrations near the site.[2]

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2020	2021	2022	2023
162	Column 51 Eastern Road, diffusion tube, roadside	5,400	32.68	39.70	36.98	37.04
163	Column 52 Eastern Road, diffusion tube, roadside	5,400	30.45	30.45	30.45	30.45
C4	Gatcombe Park Primary School (AURN), automatic, Urban Background	6,800	17.37	17.37	17.37	17.37
C7	Mile End Road, automatic, roadside	9,500	26.57	26.57	26.57	26.57

A summary of the latest monitoring results for the annual exceedances of the NO_2 hourly mean concentration of 200 µg/m^3 is given in Table 9. The NAQO (for no more than 18 exceedances of the 200 µg/m^3 hourly mean) has been consistently achieved at automatic monitoring stations C4 and C7 for the years 2020-2023, where relevant.

Table 9: 2020-2023 NO_2 annual exceedances of hourly mean of 200 µg/m^3 near the site.

Site ID	Monitoring station type	Distance from site (m)	Count of annual exceedances of hourly mean of 200 µg/m^3			
			2020	2021	2022	2023
C4	Gatcombe Park Primary School (AURN), automatic, Urban Background	6,800		0	0	3
C7	Mile End Road, automatic, roadside	9,500	1	0	0	0

[2] Data are obtained from the Portsmouth City Council Air Quality Annual Status Report 2023. A National Bias Adjustment Factor of 0.885 is applied to diffusion tubes data for 2023. PM_{10} monitoring does not require correction.

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Monitored Particulate Matter under 10 µm diameter (PM_{10})

A summary of the latest monitoring results for PM_{10} annual mean concentrations at the closest monitoring stations to the development site is given in Table 10. The NAQO (for the mean annual concentration to be no more than 40 µg/m^3) has consistently been met at automatic monitoring sites C4 and C7 for the years 2020-2023, where relevant.

Table 10: 2020-2023 PM_{10} annual mean concentrations near the site.[2]

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2020	2021	2022	2023
C4	Gatcombe Park Primary School (AURN), automatic, Urban Background	6,800	16.62	16.62	16.62	16.62
C7	Mile End Road, automatic, roadside	9,500	14.9	14.9	14.9	14.9

A summary of the latest monitoring results for the annual exceedances of the PM_{10} daily mean concentration of 50 µg/m^3 is given in Table 11. The NAQO (for no more than 35 exceedances of the 50 µg/m^3 daily mean) has been consistently met at automatic monitoring sites C4 and C7 for the years 2020-2023, where relevant.

Table 11: 2020-2023 PM_{10} annual exceedances of daily mean of 50 µg/m^3 near the site.

Site ID	Monitoring station type	Distance from site (m)	Count of annual exceedances of daily mean of 50 µg/m^3			
			2020	2021	2022	2023
C4	Gatcombe Park Primary School (AURN), automatic, Urban Background	6,800	0	0	0	0
C7	Mile End Road, automatic, roadside	9,500	1	2	0	0

Monitored Fine Particulate Matter 2.5 µm diameter ($PM_{2.5}$)

A summary of the latest monitoring results for $PM_{2.5}$ annual mean concentrations at the closest monitoring stations to the development site is given in Table 10. The NAQO (for the mean annual concentration to be no more than 20 µg/m^3) has consistently been met at automatic monitoring sites C4 and C7 for the years 2020-2023, where relevant.

Table 12: 2020-2023 PM_{10} annual mean concentrations near the site.[2]

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2020	2021	2022	2023
C4	Gatcombe Park Primary School (AURN), automatic, Urban Background	6,800	9.45	9.45	9.45	9.45
C7	Mile End Road, automatic, roadside	9,500	9.40	9.40	9.40	9.40

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Modelled Background Concentrations

Defra provides modelled background concentrations for key pollutants across the UK. The 2023-2027 modelled background concentrations for NO_2, PM_{10} and $PM_{2.5}$ for the area surrounding the site are given in Table 13. The background concentrations for NO_2, PM_{10} and $PM_{2.5}$ consistently achieve the NAQOs and unfailingly decrease between the modelled years of 2023-2027.

Table 13: 2023-2027 modelled background concentrations near the site.[3]

Pollutant/particulate matter	Background concentration (µg/m³)				
	2023	2024	2025	2026	2027
NO_2	11.9	11.4	10.9	10.4	10.0
PM_{10}	12.5	12.3	12.2	12.2	12.1
$PM_{2.5}$	7.6	7.5	7.4	7.3	7.2

Existing Air Quality Conclusions

Nitrogen Dioxide (NO_2)

A total of two NO_2 diffusion tubes and two automatic monitoring station, monitoring mean annual NO_2 concentrations, have been identified appropriate for the dispersion modelling. The data show that the NAQO for mean annual NO_2 concentration (for the mean annual concentration to be no more than 40 µg/m³) closest to the development site, has been consistently achieved across all sites between the latest reporting years of 2020-2023. Moreover, there is a decreasing trend in NO_2 levels.

Additionally, the NAQO for the hourly mean (for no more than 18 exceedances of the 200 µg/m³ hourly mean) has been consistently achieved at both automatic monitoring stations C4 and C7 for the years 2020-2023, where relevant. The Defra modelled background concentration of NO_2 is 11.9 µg/m³ for 2023, decreasing to 10.0 µg/m³ by 2027. It is likely that mean annual NO_2 concentrations currently achieve the NAQO but exceed the WHO guideline at the development site.

Coarse particulate matter (PM_{10})

Nearby monitored mean annual PM_{10} concentrations and 24-hourly PM_{10} concentrations at C4 and C7 consistently achieved the NAQOs. The Defra modelled background concentration of PM_{10} is 12.5 µg/m³ for 2023, decreasing to 12.1 µg/m³ by 2027. It is likely that the mean annual PM_{10} concentrations at the development site currently achieve the NAQO but exceed the WHO guideline at the site.

Fine particulate matter ($PM_{2.5}$)

Nearby monitored mean annual $PM_{2.5}$ concentrations at C4 and C7 consistently achieved the NAQOs. The Defra modelled background concentration of $PM_{2.5}$ is 7.6 µg/m³ for 2023, decreasing to 7.2 µg/m³ by 2027. It is likely that mean annual $PM_{2.5}$ concentrations at the development site currently achieve the NAQO but exceed the WHO guidelines.

[3] Defra Local Air Quality Management – Background Maps. Data are obtained for the Havant Borough Council for the nearest grid square (X coordinate 469500, Y coordinate 109500) for years 2023-2027 (from 2021 baseline).

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Dispersion Modelling

Operational Impacts: Dispersion Modelling

A detailed assessment of effects of the development onto existing sensitive receptors, has been undertaken using the atmospheric dispersion modelling software, ADMS-Roads Extra[4].

ADMS-Roads is a comprehensive tool for investigating air pollution problems due to networks of roads that may be in combination with industrial sites, for instance small towns or rural road networks. The software uses a steady state gaussian dispersion model and incorporates advanced meteorological pre-processing, along with computation of vertical profiles of wind, turbulence, and temperature.

Model Inputs

A summary of the key model inputs and parameters is given in Appendix B. An overview of the dispersion model scenarios is given in this section of the report.

Modelled scenarios

Three scenarios are modelled as part of the assessment:

- '2023 baseline' – existing baseline traffic flows, 2023 meteorological data and emissions factors.
- '2027 no development' – projected 2027 traffic flows, 2023 meteorological data and 2027 emissions factors.
- '2027 with development' – projected 2027 traffic flows and additional traffic from the proposed development, 2023 meteorological data and 2027 emissions factors.

Emissions sources

For the purpose of this assessment, emissions from local roads close to the site, and for which adequate traffic flow data exists, have been modelled. These roads predominantly comprise the primary access routes to the proposed development site. Pollutant concentrations from all other sources, including all non-local emissions and local emissions from all other sources apart from the roads which are predicted to significantly change are derived from the Defra modelled background concentrations.

Traffic flow data

An overview of all traffic flow data is given in Appendix C. Baseline traffic flow data for the average annual daily traffic flow (AADF) for the local road network has been obtained from the Department for Transport (DfT) website[5]. The latest DfT reporting year, 2023, has been selected for the '2023 baseline' scenario.

[4] ADMS-Roads Extra version 5 (Cambridge Environmental Research Consultants (CERC)). Further details can be found on the website.

[5] Department for Transport (DfT) Road Traffic Statistics. Accessed from the website.

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Traffic flow data (continued)

Traffic flow data for 2027, the projected opening year of the development, has been obtained using the English and Welsh Regional Traffic Growth and Speed Forecasts (RTFs) and the local TEMPRO factor[6], as illustrated in Table 14.

- Final Growth Factor = RTF factor x (Local TEMPRO factor / Regional TEMPRO factor)[7]

Table 14: Traffic growth factor values for the period of 2023-2027.

Growth Factor	Value
RTF 2027	1.0489
TEMPRO Growth Factor for South England (2023-2027)	1.0840
TEMPRO Growth Factor for Havant (2023-2027)	1.0824
Final Growth Factor for 2027	1.0474

The final growth factor can then be used to predict the AADF in 2027 in the 'no development' scenario.

Transport consultant (Paul Basham Associates) has completed a Transport Statement in September 2025 and the following proposed traffic values were applied:

TRIP GENERATION	AM		Total	PM		Total	Daily (5am-Midnight)
UNIT 600	Arr	Dep		Arr	Dep		
TOTAL VEHICLE	4	3	7	3	4	7	103
PSV	0	0	0	0	0	0	0
OGV	1	2	3	2	1	3	32
LGV	1	1	1	0	0	1	15
CAR	3	1	3	1	3	4	53

TRIP GENERATION	AM		Total	PM		Total	Daily (5am-Midnight)
UNIT 601	Arr	Dep		Arr	Dep		
TOTAL VEHICLE	17	14	31	13	18	31	425
PSV	0	0	0	0	0	0	1
OGV	4	7	11	8	3	11	133
LGV	3	3	6	2	2	3	62
CAR	10	3	14	3	13	16	221

Thus, the final growth factor and the additional trips above are used in the '2027 with development' scenario.

[6] The TEMPRO factor is obtained from Trip End Model Presentation Program (TEMPro) (Department for Transport).

[7] The methodology is obtained from LAQM.

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Traffic speeds

Traffic speeds have been estimated based on-site observations and national speed limits. As such, an average traffic speed of 70 miles/hour is applied to all the road sections. Furthermore, it is assumed that the average traffic speeds on the local road network are the same for the opening year of 2027, as they are for the baseline year of 2023. See Appendix C for the full traffic flow data used for each modelling scenario and Appendix D for the layout of roads used in the model.

Street canyon effect

Narrow streets with tall buildings on either side have the potential to create a confined space, which can interfere with the dispersion of pollution from traffic and may result in heightened pollutant concentrations in these streets. In dispersion modelling, these narrow streets are described as street canyons, defined as 'narrow streets where the height of buildings on both sides of the road is greater than the road width'. ADMS-Roads includes a street canyon module to account for the additional turbulent flow patterns occurring inside such a narrow street, with relatively tall buildings on both sides. Street canyon effects have not been incorporated in the dispersion model.

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Modelled pollutants

Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been modelled. Note that NO_2 concentrations have been modelled as NO_x and converted to NO_2, using the Defra NO_x to NO_2 Calculator[8], in accordance with Local Air Quality Management: Technical Guidance (TG22) (Defra, 2025).

Meteorological data

Hourly meteorological data from the Brighton Airport meteorological station, as the closest and most applicable station, has been used. Wind speed and direction data from Brighton Airport meteorological station has been plotted as a wind rose in Figure 5. Most frequent wind is from south-west with most frequent wind speed 5.1-8.2 m/s.

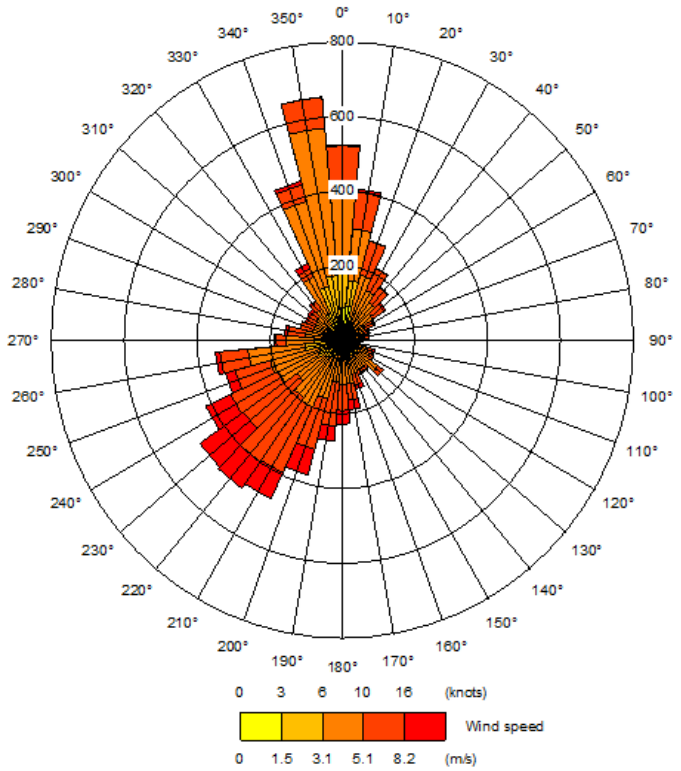

Figure 5: Wind rose for Brighton Airport (2023).

[8] Defra (2024) NO_x to NO_2 Calculator v9. Accessed from the website.

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Background concentrations

Background concentrations of pollutants and particulate matter have been obtained from Defra as listed in Table 13. Defra provides a breakdown of the contribution of background concentrations from specific source types for most pollutants. The background concentration contributed by road transport from within the local area has been removed, to isolate the modelled effects of the road transport emissions on concentrations.

2023 background concentrations are used for the '2023 baseline' scenario and 2027 background concentrations are used for the '2027 no development' and '2027 with development' scenarios.

Model Outputs

Dispersion models cannot predict short-term concentrations as accurately as mean annual concentrations. Furthermore, model verification for short-term concentrations is challenging, particularly with limited monitoring stations capable of recording short-term concentrations. As such, only mean annual concentrations of NO_2 and PM_{10} and $PM_{2.5}$ will be modelled. TG22 (Defra, 2025) provides guidance on estimating NO_2 hourly NAQO and PM_{10} 24-hourly NAQO exceedances, where it is not possible to model the hourly and 24-hourly impacts, respectively. See the sections 'Results for NO_2' and 'Results for PM_{10}' for further details.

Model Verification

Systematic errors in dispersion modelling results may arise from a range of factors, such as uncertainties in vehicle traffic flows, speeds, and the composition of the vehicle fleet. Such errors can be addressed and corrected for by making comparisons with monitoring data. The accuracy of the future year modelling results is relative to the accuracy of the base year results. Therefore, greater confidence can be placed in the future year concentrations if good agreement is found for the base year.

Verification of the dispersion model has been undertaken, by comparing modelled pollutant concentrations to monitored pollutant concentrations for the baseline year. Model verification is used to determine the performance of the model against 'real-world' monitored pollutant concentrations and has been undertaken in accordance with the Local Air Quality Management: Technical Guidance (TG22) (Defra, 2025).

Discrepancies between modelled and measured concentrations can arise for a number of reasons, for example:

- Traffic data uncertainties, including uncertainties in emissions factors caused by discrepancies between test cycle and real-world emissions.
- Background concentration estimates.
- Meteorological data uncertainties.
- Sources not explicitly included within the model e.g. car parks and bus stops.
- Overall model limitations, including treatment of roughness and meteorological data, treatment of traffic speeds, slowing down and idling at junctions).
- Uncertainty in monitoring data, particularly diffusion tubes.

Dispersion models may perform differently when comparing results for kerbside, roadside and background monitoring sites. For example, models may predict reasonable concentrations towards background sites, but under-predict at locations closer to the roadside. In addition to the consideration of kerbside, roadside and background sites during model verification, the different types of locations should be considered when comparing modelled and monitored concentrations. For example, modelling undertaken for roadside sites in urban areas (including areas with street canyons) may require a different adjustment to modelling undertaken for roadside sites near motorways or trunk roads in open settings.

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Model refinement
Initially, the dispersion model was run using all the receptors identified in Table 7. The roads identified were A3, A27 and M275. Several refinements were carried out and the final model consisted only of monitoring sites C4, C7 and 163.

Comparison
Mean annual NO_2 concentrations have been used for model verification. A comparison of monitored and modelled concentrations is given in Table 15.

Table 15: Comparison of modelled and monitored concentrations for NO_x and NO_2 (µg/m^3).

Site ID	2023 monitored NO_2	2023 monitored road contribution NO_x	2023 modelled road contribution NO_x	Ratio of monitored to modelled road contribution NO_x
163	30.45	49.87	7.24	6.89
C4	17.37	16.13	1.49	10.84
C7	26.57	38.97	5.77	6.75

The mathematical relationship between monitored and modelled road contribution NO_x is given in Figure 6, with a trendline passing through zero and its derived equation.

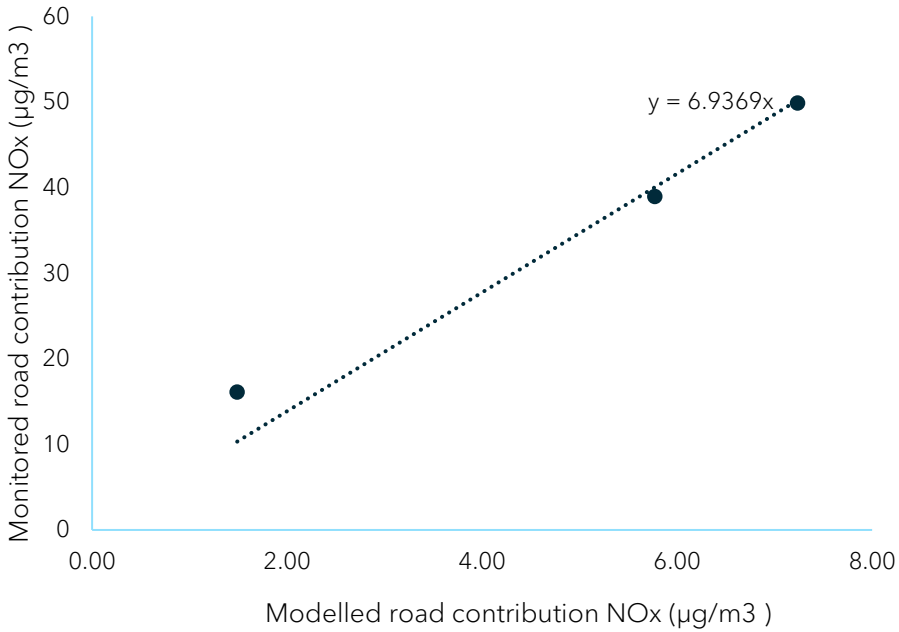

Figure 6: Comparison of monitored and modelled road contribution of NO_x at monitoring sites.

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Adjustment

The adjustment factor derived from Figure 6 (6.9369) has been applied to the modelled road contribution NO_x concentrations before being converted to annual mean NO_2 concentrations using the Defra NO_x to NO_2 calculator (Table 16).

Table 16: Model verification results for NO_x and NO_2 ($\mu g/m^3$).

Site ID	Road contribution NO_x adjustment factor	Adjusted 2023 modelled road contribution NO_x	2023 modelled total NO_2	2023 monitored NO_2	% difference modelled to monitored NO_2
163	6.9369	50.2	33.34	30.5	-8.7%
C4	6.9369	10.3	16.16	17.4	7.5%
C7	6.9369	40.0	29.36	26.6	-9.5%

The correlation between modelled and monitored NO_2 concentrations at the monitoring sites has been achieved by applying a model correction factor, detailed in Table 16. The final adjusted model results in modelled concentrations that are within 10% of the monitored concentrations, as required by TG22 (Defra, 2025). This demonstrates that the adjusted model predictions are in line with the 'real-world' monitored concentrations.

The NO_x adjustment process and derived road contribution NO_x adjustment factor has subsequently been applied to predicted concentrations at receptors for the '2023 baseline', '2027 no development' and '2027 with development' scenarios. The road contribution NO_x adjustment factor (6.9369) has subsequently been applied to all predicted concentrations of PM_{10} and $PM_{2.5}$, in accordance with TG22 (Defra, 2025).

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Modelled Receptors

Dispersion modelling determines the concentrations of pollutants at specified receptors. Receptors have been modelled at plot 600 and 601, as well as at existing sensitive receptors but at different heights as detailed in Table 17. A plan of the modelled receptor locations is given in Figure 7.

Table 17: Summary of modelled receptors.

Receptor ID	X coordinate	Y coordinate	Description	Height (m)
P600-1	470173	109476	Plot 600, ground floor	2.5
P600-2	470173	109476	Plot 600, first floor	5.5
P601-1	470186	109754	Plot 601, ground floor	2.5
P601-2	470186	109754	Plot 601, first floor	5.5
EA	469582	109641	Crystal Way, Waterlooville, Havant, Hampshire, England, PO7 8NB, United Kingdom, ground floor	2.5
EB	469270	108599	Woodsedge, Stakes, Havant, Hampshire, England, PO7 8PQ, United Kingdom, ground floor	2.5
EC	469577	106557	Brooklands Road, Bedhampton, Havant, Hampshire, England, PO9 3NU, United Kingdom, ground floor	2.5
ED	469078	105678	Chalk Dock Avenue, Bedhampton, Havant, Hampshire, England, PO9 3FJ, United Kingdom, ground floor	2.5

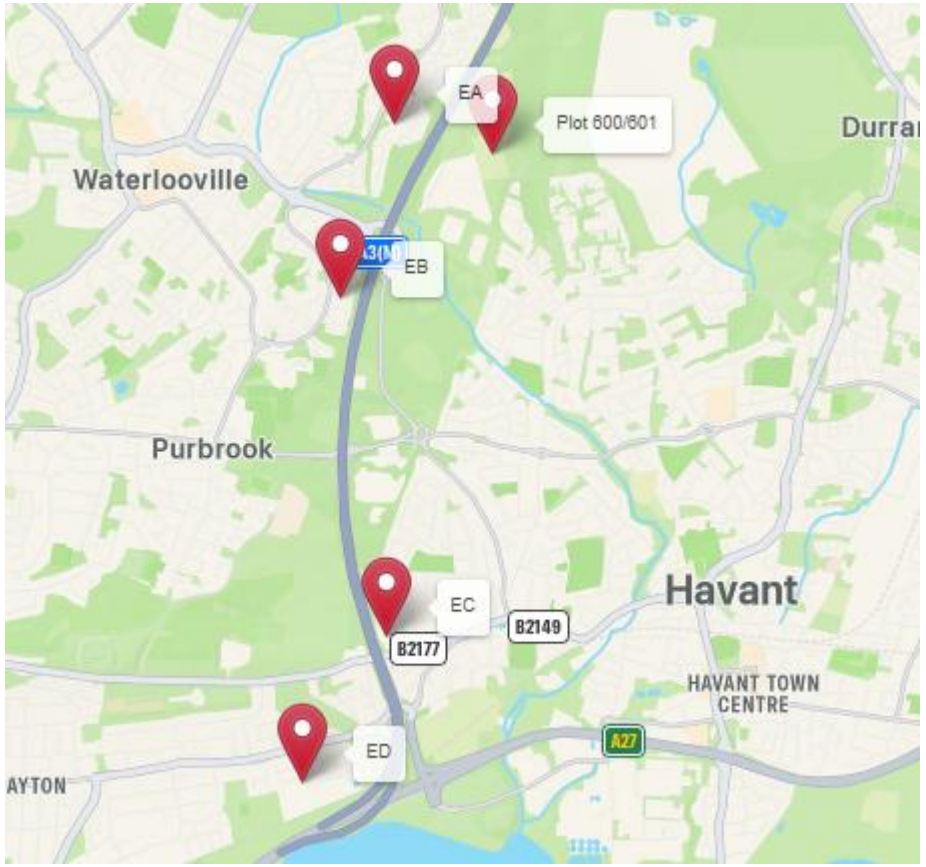

Figure 7: Plan of modelled receptors at the development and existing sensitive receptors.

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Significance of Effects

The significance of effects from the operational phase of the development may be assessed by comparing the change in mean annual concentrations at receptors between the modelled scenarios, in accordance with the EPUK and IAQM's 'Land-Use Planning & Development Control: Planning For Air Quality' (2017) guidance. Significance of the effects of changing concentrations is defined in accordance with the qualitative descriptors and thresholds defined in Table 18.

The significance of effects is a measure of both the pre-development concentration at a receptor (for the '2027 no development' scenario), and the change from the pre-development concentration to post-development ('2027 with development' scenario), against the relevant Air Quality Assessment Level (AQAL). In this case, the AQAL is the respective National Air Quality Objective (NAQO) for NO_2, PM_{10} and $PM_{2.5}$. Note that changes of 0% or less (i.e. less than 0.5%) are described as 'negligible'.

Table 18: Significance of effects matrix.

Long-term average concentration at receptor	% change in mean annual concentration relative to 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

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Results for NO_2

Table 19: Results of NO_2 annual mean concentrations (µg/m^3) for '2023 baseline', '2027 no development' and '2027 with development' and significance of effects from NO_2 mean concentrations for '2027 with development'.

Receptor ID	2023 baseline	2027 no development	2027 with development	Significance of effects from NO_2
P600-1	15.4	12.5	12.5	Negligible
P600-2	15.4	12.5	12.5	Negligible
P601-1	17.5	14.0	14.1	Negligible
P601-2	17.4	13.9	14.0	Negligible
EA	13.0	10.8	10.9	Negligible
EB	13.6	11.2	11.2	Negligible
EC	27.2	21.1	21.3	Negligible
ED	17.1	13.7	13.7	Negligible

NO_2 annual mean concentration

Table 19 provides an overview of the predicted mean annual NO_2 concentrations for all modelled receptors at the development site:

- NO_2 concentrations for the '2023 baseline' were significantly below the NAQO (mean annual NO_2 concentration of 40 µg/m^3) and below 36 µg/m^3, accounting for a potential 10% margin for error at all receptors.
- NO_2 concentrations for the '2027 no development' and '2027 with development' scenarios are predicted to be significantly below the NAQO and below 36 µg/m^3, accounting for a potential 10% margin for error at all receptors. The concentrations of NO_2 are similar for both scenarios mainly because the scheme is proposed to be car-free and the proposed trips for deliveries are minimal. The WHO limit (mean annual NO_2 concentration of 10 µg/m^3) is exceeded at all receptors.
- Residents using the amenity spaces and existing sensitive receptors are predicted not to be exposed to high levels of NO_2 annual mean concentrations.

NO_2 hourly mean NAQO exceedances

Research undertaken on behalf of Defra in 2003[9] identified that exceedances of the NO_2 hourly mean NAQO are unlikely to occur where the annual mean is below 60 µg/m^3. In accordance with TG22 (Defra, 2025), this assumption is still considered to be valid, particularly for roadside locations, where road traffic is the primary source of emissions. The dispersion modelling predicts that this would be achieved at all receptors for the '2027 no development' and '2027 with development' scenarios.

Significance of impacts

With reference to the EPUK and IAQM's (2017) guidance, the significance of effects from NO_2 concentrations on the proposed development is 'negligible' at all modelled receptors, as shown in Table 19. As the percentage change in relation to NAQO is never greater than, or equal to, 0.5%, the significance of effects at all receptors is defined as 'negligible'. The impact of NO_2 concentrations on the development and existing sensitive receptors is not deemed to be significant.

[9] Laxen D and Marner B (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites. Accessed here.

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Results for PM_{10}

Table 20: Results of PM_{10} annual mean concentrations (µg/m^3) for '2023 baseline', '2027 no development' and '2027 with development' and significance of effects from PM_{10} mean concentrations for '2027 with development'.

Receptor ID	2023 baseline	2027 no development	2027 with development	Significance of effects from PM_{10}
P600-1	13.2	12.7	12.7	Negligible
P600-2	13.1	12.7	12.7	Negligible
P601-1	13.5	13.1	13.1	Negligible
P601-2	13.5	13.1	13.1	Negligible
EA	12.7	12.3	12.3	Negligible
EB	12.8	12.4	12.4	Negligible
EC	15.5	15.0	15.1	Negligible
ED	13.5	13.0	13.0	Negligible

PM_{10} annual mean concentration

Table 20 provides an overview of the predicted mean annual PM_{10} concentrations for all modelled receptors at the development site:

- PM_{10} concentrations at the site are predicted to be slightly higher for the '2023 baseline' scenario (Table 20), decreasing for the '2027 no development' and '2027 with development' scenarios. PM_{10} concentrations for the '2023 baseline' were significantly below the NAQO (mean annual PM_{10} concentration of 40 µg/m^3) and below 36 µg/m^3, accounting for a potential 10% margin for error at all receptors. The WHO guideline (mean annual PM_{10} concentration of 15 µg/m^3) was exceeded at all receptors.
- PM_{10} concentrations are predicted to be well below the NAQO (mean annual PM_{10} concentration of 40 µg/m^3) and below 36 µg/m^3, accounting for a potential 10% margin for error, for the '2027 no development' and '2027 with development' scenarios at all receptors. The WHO limit (mean annual PM_{10} concentration of 15 µg/m^3) is exceeded at all receptors.
- Residents using the amenity spaces and existing sensitive receptors are predicted not to be exposed to high levels of PM_{10} annual mean concentrations.

PM_{10} 24-hour mean NAQO exceedances

TG22 (Defra, 2025) provides a methodology to estimate the likely 24-hourly concentrations for PM_{10} from annual mean concentrations as shown in the equation below. The highest PM_{10} concentration for the '2023 baseline' scenario (15.6 µg/m^3) results in an estimated number of annual occurrences of the 24-hourly mean above 200 µg/m^3 of 0.2 (significantly less than the NAQO of 18). It is therefore concluded that this NAQO would be achieved at the site.

$$likely\ 24\ hourly\ PM_{10}\ concentrations\ = -18.5 + 0.00145 \times Annual\ Mean^3 + \frac{206}{Annual\ Mean}$$

Significance of impacts

The significance of effects of PM_{10} concentrations on the proposed development and existing sensitive receptors is deemed to be 'negligible' at all receptors, as demonstrated in Table 20.

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Results for $PM_{2.5}$

Table 21: Results of $PM_{2.5}$ annual mean concentrations (µg/m^3) for '2023 baseline', '2027 no development' and '2027 with development' and significance of effects from $PM_{2.5}$ mean concentrations for '2027 with development'.

Receptor ID	2023 baseline	2027 no development	2027 with development	Significance of effects from $PM_{2.5}$
P600-1	8.1	7.6	7.7	Negligible
P600-2	8.1	7.6	7.7	Negligible
P601-1	8.3	7.9	7.9	Negligible
P601-2	8.3	7.9	7.9	Negligible
EA	7.8	7.4	7.4	Negligible
EB	7.9	7.5	7.5	Negligible
EC	9.6	9.0	9.1	Negligible
ED	8.3	7.8	7.8	Negligible

$PM_{2.5}$ annual mean concentration

Table 21 provides an overview of the predicted mean annual $PM_{2.5}$ concentrations for all modelled receptors at the development site:

- $PM_{2.5}$ concentrations at the site are predicted to be marginally higher for the '2023 baseline' scenario (Table 21), decreasing for the '2027 no development' and '2027 with development' scenarios. $PM_{2.5}$ concentrations for the '2023 baseline' were significantly below the NAQO (mean annual $PM_{2.5}$ concentration of 20 µg/m^3) and below 18 µg/m^3, accounting for a potential 10% margin for error at all receptors. However, the WHO guideline was not achieved.
- $PM_{2.5}$ concentrations are predicted to be well below the NAQO (mean annual $PM_{2.5}$ concentration of 20 µg/m^3) and below 18 µg/m^3, accounting for a potential 10% margin for error for 2027 no development' and '2027 with development' scenarios at all receptors. The WHO limits (mean annual $PM_{2.5}$ concentration of 5 µg/m^3) are exceeded at all modelled receptors.
- Residents using the amenity spaces and existing sensitive receptors are predicted not to be exposed to high levels of PM2.5 annual mean concentrations.

Significance of impacts

The significance of effects from $PM_{2.5}$ concentrations on the proposed development and existing sensitive receptors is deemed to be 'negligible' at all receptors, as demonstrated in Table 21.

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Mitigation Measures

Pollution Mitigation Hierarchy

The development passes the AQN test for transport and building emissions. Additionally, the impact of NO_2, PM_{10} and $PM_{2.5}$ concentrations on the development are deemed to be insignificant as per the air dispersion modelling. Therefore, no additional mitigation or offsetting measures for the operational phase of the development will be required.

However, the principles of the pollution mitigation hierarchy, outlined in the Institute of Air Quality Management (IAQM) 'Mitigation of Development Air Quality: Position Statement', have been applied to the proposed development to minimise the exposure of future building users and occupants.

1. Prevention and Avoidance

Preference should be given to preventing or avoiding exposure/impacts to the pollutant in the first place by eliminating or isolating potential sources or by replacing sources or activities with alternatives.

Sustainable energy technologies

The Energy Statement will exclude any use of biomass, combined heat and power (CHP) and gas-fired boilers for the scheme. It is proposed to use an air source heat pump to provide heating to office and reception areas. Electric panel heating is proposed the rest of the areas. Hot water is provided by electric instant point of use

2.a Reduction and Minimisation: Mitigation Measures that act on the Source

Reduction and minimisation of exposure/impacts should next be considered, once all options for prevention/avoidance have been implemented so far as is reasonably practicable (both technically and economically).

No mitigation measures are proposed.

2.b. Reduction and Minimisation: Mitigation Measures that act on the Pathway

Urban greening

The proposed development will include soft landscaping within the communal amenity. These strategies of urban greening will help alleviate pollution, benefitting the air quality of the development. In addition, it will introduce a new biodiversity to the development, contributing to the ecology of the area.

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2.c. Reduction and Minimisation: Mitigation Measures at or Close to the Point of Receptor Exposure

Ventilation strategy

The ventilation strategy for the development will use mechanical ventilation with heat recovery. Intakes for the mechanical ventilation system should be located as far as possible from the primary sources of pollution. In accordance with the latest BREEAM V6 Hea 02 Ventilation guidance, fresh air intakes should preferably be at least 10m away from all external pollution sources, as well as at least 10m away from ventilation exhausts (to prevent recirculation of air).

All mechanical ventilation systems should be designed in accordance with BS EN 16798:2017 'Energy Performance of Buildings – Ventilation for Buildings' and BS EN ISO 16890:2016 'Air Filters for General Ventilation'. In accordance with these standards, consideration must be given to the quality of the outdoor air at the proposed location of the building and the design should incorporate the following mitigation measures:

- Air intakes should be located where the outdoor air is least polluted, where outdoor air pollution concentrations are not uniform around the building.
- Some form of filtration and/or air cleaning should be applied, where outdoor air pollution concentrations are significant. Tables 16 and 17 of BS EN 16798:2017 (Part 3) should be followed to determine the appropriate required level of filtration efficiency for particulate and gaseous filtration systems.

To verify that the filtration system continues to operate as designed, the records of air filtration maintenance must be obtained, including evidence that filters have been properly maintained as per the manufacturer's recommendations. Additionally, activated carbon filters or combination particulate/carbon filters may be considered for installation in the main air ducts to filter recirculated air.

3. Off-setting

Off-setting a new development's air quality impact by proportionately contributing to air quality improvements elsewhere (including those identified in Air Quality Action Plans and low emission strategies) should only be considered once the solutions for preventing/avoiding, and then for reducing/minimising, the development-specific impacts have been exhausted. Even then, offsetting should be limited to measures that are likely to have a beneficial impact on air quality in the vicinity of the development site. It is not appropriate to attempt to offset local air quality impacts by measures that may have some effect remote from the vicinity of the development site.

The mitigation measures proposed are appropriate to the scale and nature of the development (see sections 1. to 2.c. above). No additional off-setting measures are proposed.

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Conclusion

Conclusions

The unmitigated risk to local sensitive receptors from emissions of dust and pollution from construction is deemed to be medium. However, the risk will be mitigated further through the measures set out in the Air Quality & Dust Management Plan (AQDMP), which will be implemented through the contractor's Construction Environmental Management Plan. With the mitigation measures in place, the residual effects arising from the construction phase of the proposed development would be deemed 'not significant'.

A total of two NO_2 diffusion tubes and two automatic monitoring station, monitoring mean annual NO_2 concentrations, have been identified appropriate for the dispersion modelling. The data show that the NAQO for mean annual NO_2 concentration (for the mean annual concentration to be no more than 40 µg/m^3) closest to the development site, has been consistently achieved across all sites between the latest reporting years of 2020-2023. Moreover, there is a decreasing trend in NO_2 levels. Additionally, the NAQO for the hourly mean (for no more than 18 exceedances of the 200 µg/m^3 hourly mean) has been consistently achieved at both automatic monitoring stations C4 and C7 for the years 2020-2023, where relevant. The Defra modelled background concentration of NO_2 is 11.9 µg/m^3 for 2023, decreasing to 10.0 µg/m^3 by 2027. It is likely that mean annual NO_2 concentrations currently achieve the NAQO but exceed the WHO guideline at the development site.

Nearby monitored mean annual PM_{10} concentrations and 24-hourly PM_{10} concentrations at C4 and C7 consistently achieved the NAQOs. Nearby monitored mean annual $PM_{2.5}$ concentrations at C4 and C7 consistently achieved the NAQOs.

Atmospheric dispersion modelling was carried out. The performance of the modelled receptors at the plot 600/601 and existing sensitive receptors in the area, indicates the effects of NO_2, PM_{10} and $PM_{2.5}$ concentrations in the three different scenarios, 'Baseline 2023', '2027 no development' and '2027 with development' are not significant. Therefore, residents of the local area will not be exposed to high levels of pollution.

Even though further mitigation measures to reduce exposure of future occupants to pollutants are not explicitly required, the design mitigation hierarchy has been applied nonetheless, to maximise air quality for occupants, where feasible. Measures include, provision of sustainable transport modes, integration of low carbon energy technologies, urban greening and a well-designed mechanical ventilation system, if applicable.

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Appendix A

Air Quality & Dust Management Plan: Roles and Responsibilities

The Site Manager will have overall responsibility for dust management during construction and will ensure that all site personnel are effectively briefed and given adequate resources to undertake the air quality and dust management requirements, as set out in this Air Quality & Dust Management Plan (AQDMP).

Key roles and responsibilities for the Site Manager and site personnel are outlined in Table A-1.

Table A-1: Schedule of AQDMP responsibilities.

Role	Responsibilities
Site manager	Ensure that the mitigation and monitoring requirements outlined in the AQDMP are carried out during works on site.
	Ensure that staff are aware of the requirements of the AQDMP and have access to the document. Regular training of staff should be implemented.
	Undertake and record dust inspections of the site as required by the AQDMP.
	Ensure that site documentation (including method statements and risk assessments) include adequate dust mitigation.
	Act on complaints and dust alerts as detailed in the AQDMP.
	Maintain up-to-date site log of air quality events and complaints.
	Investigate the cause of air quality events and apply additional mitigation are required.
	Act as the key point of contact for queries and complaints regarding air quality emissions from site.
	Report observations of dust events or deviations from the AQDMP procedures.

Table A-1: Schedule of AQDMP responsibilities (continued).

Role	Responsibilities
Site personnel	Carry out the works in accordance with the AQDMP requirements.
	Report observations of dust events or deviations from the AQDMP procedures.
	Attend environmental management training.

Hours of Work

Normal working hours for Dunsbury Park Plot 600/601 construction site will be as follows:

- Monday – Friday: 08:00 - 18:00.
- Saturday: 08:00 - 13:00.

There will not typically be any construction activities undertaken outside of the stated working hours, including on Sundays, Public Holidays or Bank Holidays. In the event that construction activities are sought to be undertaken outside of the normal working hours, these will be agreed in writing with the local planning authority in advance.

Measures Relevant for Demolition, Earthworks, Construction and Trackout

Robust site management will be required to control the dust emissions from construction activities. Mitigation methods, in accordance with 'The Control of Dust and Emissions during Construction and Demolition' SPG (Mayor of London, 2014) have been proposed for the site.

All 'required' mitigation measures must be implemented. We would strongly recommend that all 'recommended' measures are implemented, along with those that are 'not required' where feasible.

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It is recommended that these measures, as detailed in Table A-2, be set out in the site-specific Construction Environmental Management Plan, which will form part of the proposed development's overall Construction Management Plan.

Table A-2: Schedule of construction phase mitigation measure requirements.

Mitigation for all sites: Communications	
Mitigation measure	Compliance requirements
1) Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Highly recommended
2) 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.	Highly recommended
3) Display the head or regional office contact information	Highly recommended

Mitigation for all sites: Dust Management	
Mitigation measure	Compliance requirements
4) Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	Highly recommended
Site Management	
5) 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.	Highly recommended
6) Make the complaints log available to the local authority when asked.	Highly recommended
7) Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	Highly recommended
8) Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	Not required
Monitoring	
9) Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	Desired
10) 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.	Highly recommended
11) 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.	Highly recommended
12) Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	Highly recommended
Preparing and maintaining the site	
13) Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Highly recommended
14) Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Highly recommended
15) Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period	Highly recommended
16) Avoid site runoff of water or mud.	Highly recommended
17). Keep site fencing, barriers and scaffolding clean using wet methods.	Highly recommended
18) 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.	Highly recommended
19) Cover, seed or fence stockpiles to prevent wind whipping.	Highly recommended
Operating vehicle/machinery and sustainable travel	

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20) Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	Highly recommended
21) Ensure all vehicles switch off engines when stationary – no idling vehicles.	Highly recommended
22) Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Highly recommended
23) 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)	Desired
24) Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Not required
25) Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	Desired
Operations	
26) 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.	Highly recommended
27) Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate.	Highly recommended
28) Use enclosed chutes and conveyors and covered skips.	Highly recommended
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly recommended
30) 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.	Highly recommended
Waste management	
31) Avoid bonfires and burning of waste materials.	Highly recommended

Table A-2: Schedule of construction phase mitigation measure requirements (continued).

Measures specific to demolition	
Mitigation measure	Compliance requirements
32) Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Desired
33) Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Highly recommended
34) Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Highly recommended
35) Bag and remove any biological debris or damp down such material before demolition.	Highly recommended

Measures specific to earthworks	
Mitigation measure	Compliance requirements
36) Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Desired
37) Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	Desired
38) Only remove the cover in small areas during work and not all at once	Desired

Measures specific to construction	
Mitigation measure	Compliance requirements
39) Avoid scabbling (roughening of concrete surfaces) if possible	Desired
40) 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.	Highly recommended
41) 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.	Desired
42) For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	Desired

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Table A-2: Schedule of construction phase mitigation measure requirements (continued).

Measures specific to trackout	
Mitigation measure	Compliance requirements
43) Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	Highly recommended
44) Avoid dry sweeping of large areas.	Highly recommended
45) Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Highly recommended
46) Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	Highly recommended
47) Record all inspections of haul routes and any subsequent action in a site log book.	Highly recommended
48) Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	Highly recommended
49) Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Highly recommended
50) 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.	Highly recommended
51) Access gates to be located at least 10m from receptors where possible.	Highly recommended

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Appendix B

Dispersion Model Inputs

Table B- 1: Summary of inputs and parameters used in dispersion model.

Parameter	Description	Input value
Software type	ADMS-Roads Extra version 5.0.1.3	-
Coordinate system	Setting to align geographical data with a coordinate system.	*OSGB 1936 / British National Grid* used.
Chemistry	Settings to calculate the atmospheric chemical reactions between nitric oxide (NO), ozone (O_3) and volatile organic compounds (VOCs).	No atmospheric chemistry parameters included.
Meteorology	Representative meteorological data from a local source.	*London City Airport meteorological station*, hourly sequential data used.
Surface roughness	Setting to define the surface roughness of the model area based on its location and surface characteristics.	*1.5m* selected, representing a typical surface roughness for *large urban areas*.
Latitude	Setting to allow the location of the model area to be defined.	*52°* selected for United Kingdom.
Advanced dispersion site data	Settings to define specific surface albedo, minimum Monin-Obukhov length, Priestley-Taylor parameter and precipitation factor for site.	Advanced dispersion site parameters included for Minimum Monin-Obukhov length, and model defaults used for all other parameters.
Elevation of roads	Setting to allow the height of road links above ground level to be specified.	All road links set to ground level at *0m*.
Road width	Setting to allow the width of the road links to be specified.	Road widths selected for individual road links based on data obtained from OS map data.
Topography	Setting to allow complex terrain data to be included within the model in order to account for topographical effects on turbulence and plume spread.	No regional topographical data files available to complex terrain data inputs not used.
Time varied emissions	Setting to enable daily, weekly or monthly variations in emissions to be applied to emissions sources.	Time varied emissions data inputs are not used.
Road type	Setting to allow the effect of different types of roads to be assessed.	London (outer) road type selected.
Road speeds	Setting to accommodate the effects of road speeds on different roads on emissions sources.	Individual road speeds based on national speed limits and observations from street images.

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Table B- 1: Summary of inputs and parameters used in dispersion model (continued).

Parameter	Description	Input value
Street canyon modelling	Settings to enable both 'basic' and 'advanced' street canyon modelling of road links.	Street canyon modelling is not relevant for this site.
Road source emissions	Settings to input road source emissions based on road traffic emission calculation method.	UK Emissions Factor Toolkit (EFT) version 13.1 selected for the respective baseline and proposed operational years of the development.
Point source emissions	Settings to input point sources, for example from industrial sources and energy centres.	No point source emissions included.

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Appendix C

Dispersion Model Traffic Inputs

Table C- 1: Traffic flow data [average speed, annual average daily traffic flow (AADT) and % contribution of heavy duty vehicles (HDVs) to AADT] for each modelled scenario.

Road name	Speed (km/h)	2023 baseline		2027 no development		2027 with development	
		AADT	% HDV	AADT	% HDV	AADT	% HDV
A3	112	71,104	4%	74,473	4%	75,331	4%
A27	112	163,049	4%	170,774	4%	171,632	4%
M275	112	83,238	3%	87,182	3%	88,040	3%

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Appendix D

Dispersion Model Area

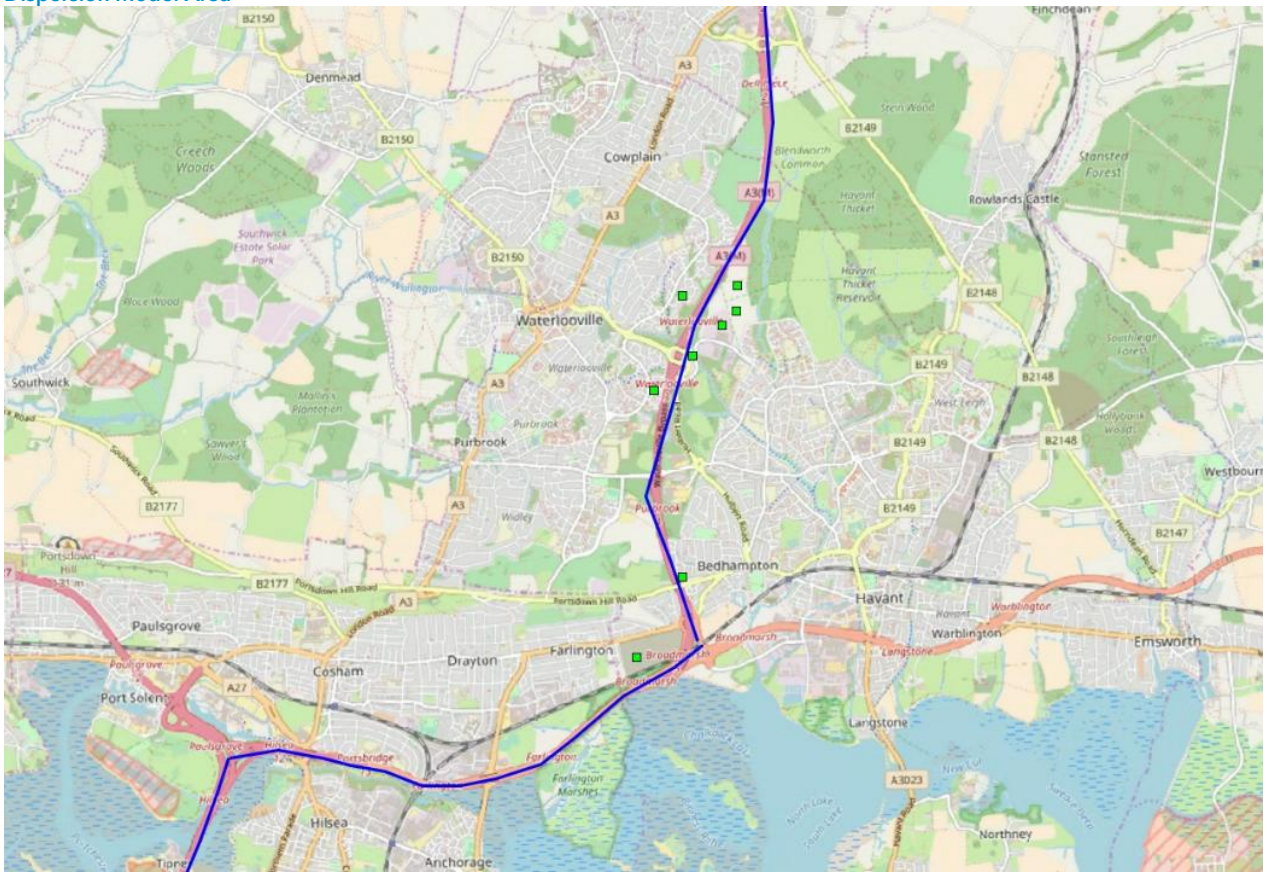

Figure D- 1: Dispersion model area, showing road emissions sources (in blue) and modelled receptors around the development (in green).