



AIR QUALITY ASSESSMENT LANGSTONE TECHNOLOGY PARK, HAVANT

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**REPORT PREPARED FOR: AG LANGSTONE B.V AND TRINITY
INVESTMENT MANAGEMENT.**

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**DELIVERING ENVIRONMENTAL
AND RISK MANAGEMENT SOLUTIONS**



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EXECUTIVE SUMMARY

Resource and Environmental Consultants Limited was commissioned by AG Langstone B.V and Trinity Investment Management to undertake an Air Quality Assessment in support of a proposed redevelopment at Langstone Technology Park, Havant

The proposals comprise full planning permission for the part-demolition of Building 1000, installation of a new flank elevation to the East, a new elevation to the North of Building 4000 as a result of the aforementioned part-demolition of Building 1000, the erection of new buildings in flexible B1c, B2 and B8 use in the South-West corner of the site with associated parking; and the creation of new car parking areas and the rationalisation of existing parking areas.

Due to the scale of the proposed development, there is the potential for the development to cause adverse impacts at nearby sensitive receptor locations as a result of increased road vehicle exhaust emissions generated by the development and fugitive dust emissions generated by the construction phase. As such, an Air Quality Assessment was required to quantify baseline conditions, consider the suitability of the site for the proposed end-use and assess potential impacts as a result of the development. This is detailed in the following report.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Dispersion modelling was also undertaken in order to predict pollutant concentrations to predict air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the proposed development. Results were subsequently verified using monitoring data obtained from Havant Borough Council.

The assessment concluded that impacts on pollutant levels as a result of operational phase pollutant emissions were predicted to be **not significant** at any sensitive location in the vicinity of the site. The use of robust assumptions, where necessary, was considered to provide sufficient results confidence for an assessment of this nature.

Based on the assessment results, air quality is not considered a constraint to planning consent for both phases of the proposed development.



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1. INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Limited was commissioned by AG Langstone B.V to undertake an Air Quality Assessment in support of a proposed industrial redevelopment at Langstone Technology Park, Havant.

1.2 Site Location and Context

The proposed development is located, at approximate National Grid Reference (NGR): 471300, 105700. Reference should be made to Figure 1 in Appendix I for a location plan.

The proposals comprises full planning permission for the part-demolition of Building 1000, installation of a new flank elevation to the East, a new elevation to the North of Building 4000 as a result of the aforementioned part-demolition of Building 1000, the erection of new buildings in flexible B1c, B2 and B8 use in the South-West corner of the site with associated parking; and the creation of new car parking areas and the rationalisation of existing parking areas.

Due to the scale of the proposed development, there is the potential for the development to cause adverse impacts at nearby sensitive receptor locations as a result of increased road vehicle exhaust emissions generated by the development and fugitive dust emissions generated by the construction phase. As such, an Air Quality Assessment was required to quantify baseline conditions, consider the suitability of the site for the proposed end-use and assess potential impacts as a result of the development. This is detailed in the following report.

1.3 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.



2. LEGISLATION AND POLICY

2.1 European Legislation

European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new air quality objectives for particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}). The consolidated Directives include:

- ▶ Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) for NO₂, oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- ▶ Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and
- ▶ Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

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

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

2.2 UK Legislation

The Air Quality Standards (Amendment) Regulations (2017) came into force on 31st December 2017. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007¹. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m ³)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year

¹ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.



Pollutant	Air Quality Objective	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period
PM ₁₀	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
PM _{2.5}	25	Annual Mean

Table 2 summarises the advice provided in DEFRA guidance LAQM (TG16)² on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives Should 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 façades 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	All locations where the annual mean objective would apply, together with hotels. 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
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations 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 where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.3 Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV), Local Authorities (LAs) are required to periodically review and assess air quality within their area of administration under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations

² Local Air Quality Management Technical Guidance 2017 LAQM (TG16), DEFRA, 2017.



where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2018) are those provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

Enforcement of the Act, in regard to nuisance, is currently under the administration of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

2.5 National Planning Policy

2.5.1 National Planning Policy Framework

The National Planning Policy Framework³ (NPPF) was published on 24th July 2018 (updated in 19th February 2019) and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

"The planning system should contribute to and enhance the natural and local environment by:

[...]

Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability

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

³ National Planning Policy Framework, Department for Communities and Local Government, 2018.



The implications of the NPPF have been considered throughout this assessment.

2.5.2 National Planning Practice Guidance

The National Planning Practice Guidance (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The relevant air quality sections are highlighted below:

Paragraph 001 states that: "Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values" and "It is important that the potential impact of new development on air quality is taken into account, where the national assessment indicates that relevant limits have been exceeded or are near the limit". The role of Local Authorities under LAQM are stated and that Air Quality Action Plans should "identify measures that will be introduced in pursuit of the objectives"

Paragraph 005 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 impact in an area where air quality is known to be 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"

Paragraph 007 states that "Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality". In terms of mitigation, it states that "Mitigation options where necessary will be location specific, will depend on the proposed development and should be proportionate to the likely impact".

Paragraph 009 shows a flow chart highlighting how the assessment of air quality impacts should fit into the development management process. It makes it clear that air quality impact risks, AQLVs and AQOs should be considered in the decision-making process.

These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6 Local Planning Policy

Havant Borough Council (HBC) Local Plan Core Strategy was adopted in 2011 and sets out the planning framework for our communities until 2026. It addresses local needs, especially for housing and economic development, with an emphasis on high quality design and stewardship of the borough's high quality natural and built environment

A review of the Core Strategy highlighted the following policy in relation to air quality:

"DM10 Pollution

Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation and other pollutants will only be permitted where all of the following relevant criteria can be met:

- 1. The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk*



2. *National air quality standards or objectives would not be breached.*
3. *The water environment would not be detrimentally affected.*
4. *It would not lead to an unacceptable deterioration in the quality or potential yield of coastal, surface and ground water resources.*
5. *External lighting is of the minimum level of illumination and duration required for security and operational purposes.*
6. *External lighting would not interfere with safe navigation in either Chichester or Langstone Harbours and other coastal locations.*

The Draft Havant Borough Local Plan 2036⁴ went out to public consultation between 8th January and 16th February 2018. A review of the Draft Local Plan 2036 indicated the following policy in relation to air quality:

“E20 Amenity and Pollution

Development proposals will be permitted where:

- a. Projected levels of air, noise, odour, vibration, light, water or other pollution do not have an actual or likely significant negative effect on the amenity of existing and future users of the site, nearby occupiers and residents or the wider environment; and*
- b. Where any significant negative effects are identified, applicants will be required to provide appropriate mitigation measures which can be demonstrated to be suitable for the purposes intended, and will ensure that any likely or actual negative effect on receptor(s) identified by criteria a. are limited to an acceptable level.”*

The council has an adopted Local Plan which is made up of the Core Strategy⁵. This will remain in place until the Havant Borough Local Plan 2036 is adopted.

Reference has been made to these policies by assessing impacts on existing sensitive receptors as a result of the proposals as well as assessing the suitability of the site for the proposed end use.

⁴ Draft Havant Borough Local Plan 2036

⁵ Havant Borough Core Strategy, 2011



3. METHODOLOGY

There is the potential for the proposed development to expose future site users to elevated pollution concentrations and to cause impacts at sensitive locations during the construction and operational phases. These have been assessed in accordance with the following methodology.

3.1 Construction Phase Assessment

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction'⁶.

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

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

The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- ▶ Annoyance due to dust soiling;
- ▶ Harm to ecological receptors; and
- ▶ The risk of health effects due to a significant increase in exposure to PM₁₀ and PM_{2.5}.

The assessment steps are detailed below.

3.1.1 Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2. Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

3.1.2 Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated to a risk category based on two factors:

- ▶ The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and
- ▶ The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B)

⁶ Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2017.



The two factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures.

3.1.3 Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

3.1.4 Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM⁶ guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix III.

3.2 Operational Phase Assessment

Additional traffic generated by the proposals will result in increased emissions from the development. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site for the following scenarios:

- ▶ 2017 Verification;
- ▶ Opening year do-minimum (DM) (predicted traffic flows in 2020 should the proposals not proceed); and
- ▶ Opening year do-something (DS) (predicted traffic flows in 2020 should the proposals be completed, with the addition of traffic generated by the proposed development).

The DM (i.e. without development) scenario is representative of anticipated traffic data for 2020. The DS (i.e. with development) scenario is representative of anticipated traffic data for 2020 with the addition of predicted variations in traffic flow patterns as a result of the proposals.

It should be noted that air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2017 were utilised within the dispersion model. The use of 2020 traffic data and 2017 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

Reference should be made to Appendix II for assessment input data details of the verification process.

Receptors potentially sensitive to changes in NO₂, PM₁₀ and PM_{2.5} concentrations were identified within 200m of the affected highway network in accordance with the guidance provided within the IAQM guidance⁷ on the likely limits of pollutant dispersion from road sources. LAQM (TG16)² provides the following examples of where annual mean AQOs should apply:



- ▶ Residential properties;
- ▶ Schools;
- ▶ Hospitals; and
- ▶ Care homes.

The sensitivity impact significance of each receptor was defined in accordance with the criteria shown in Table 3. These are based upon the guidance provided within the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance 'Land-Use Planning and Development Control: Planning for Air Quality'⁷.

Table 3 Operational Traffic Exhaust Emissions – Assessment of Impacts

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

The criteria shown in Table 3 is adapted from the EPUK and IAQM guidance 'Land-Use Planning and Development Control: Planning for Air Quality'⁷ with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.

Following the prediction of impacts at discrete receptor locations utilising the criteria in Table 3 the EPUK and IAQM⁶ document states that this framework is to be used as a starting point to make a judgement on significance of effect but other influences might need to be accounted for. Whilst impacts might be determined as 'slight', 'moderate' or 'substantial' at individual receptors, overall effect might not necessarily be deemed as significant in some circumstances. The following factors may provide some assistance in determining the overall significance of a development:

- ▶ Number of properties affected by significant air quality impacts and a judgement on the overall balance;
- ▶ Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
- ▶ The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
- ▶ Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and
- ▶ The extent to which an objective is exceeded e.g. an annual mean NO₂ concentration of 41µg/m³ should attract less significance than an annual mean of 51µg/m³.

⁷ Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2017.



These factors were considered and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.



4. BASELINE

Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following sections.

4.1 Local Air Quality Management

As required by the Environment Act (1995), Havant Borough Council (HBC) has undertaken a Review and Assessment of air quality within their area of administration. This process concluded that concentrations of all pollutants considered within the AQs are currently below the relevant AQOs within the area. Currently, no AQMAs have been declared.

4.2 Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by HBC using diffusion tubes throughout their area of administration. A review of HBC's most recent Air Quality Annual Status Report⁸ indicated that they do not currently operate any automatic monitoring stations.

HBC utilise passive diffusion tubes to monitor NO₂ concentrations throughout the district. A review of the most recent monitoring data available indicated that there are 18 diffusion tubes located in the vicinity of the proposed development. Recent NO₂ monitoring results from these locations are shown in Table 4. Any exceedances of the AQO are shown in **bold**.

Table 4 Diffusion Tube Monitoring Results

ID	Site Name	Type	NGR (m)		Annual Mean NO ₂ Concentration (µg/m ³)	
			X	Y	2016	2017
1(B)	Langstone Road (West)	Roadside	471610	105592	38.47	34.18
2	Rectory Road	Suburban	471742	105794	27.99	25.07
5	South Street	Urban Centre	471789	106205	25.94	20.98
6(B)	Park Road South (West Street)	Roadside	471555	106298	33.76	31.39
7(B)	Brockhampton Lane	Urban Centre	471180	106063	28.11	25.89
12(B)	Xyratex	Roadside	471611	105680	34.21	29.87
13	Grove Road	Suburban	471988	106076	19.80	19.21
14	Elm Park Road	Suburban	471777	106759	20.84	19.62
19(B)	Langstone Road (East, Bus Stop)	Kerbside	471640	105794	56.32	45.75
19(C)	Langstone Road East (Woodbury)	Roadside	471637	105686	N/A	37.33
20	Bosmere Junior	Urban Centre	471693	105920	28.87	26.99
21	Park Road South (Solent Road)	Other	471589	106132	40.94	38.77

⁸ 2017 Air Quality Annual Status Report, Havant District Council, 2017



ID	Site Name	Type	NGR (m)		Annual Mean NO ₂ Concentration (µg/m ³)	
			X	Y	2016	2017
22	Park Road South (Bulbeck Road)	Roadside	471573	106200	35.75	30.68
23	Park Road South (Elm Lane)	Other	471571	106374	43.31	41.45
27	Havant Precinct	Urban Background	471654	106287	N/A	25.75
28	Park Road South (West Street)	Roadside	471577	106280	N/A	30.64
29	Orchard Road	Suburban	472019	105800	N/A	24.16
W10	Compton Court	Roadside	471368	106805	30.10	26.91

As indicated in Table 4, in recent years there were three exceedances of the annual mean AQO for NO₂. This is due to the roadside and kerbside location of the tubes. Reference should be made to Figure 2 within Appendix I for a graphical representation of the monitoring locations.

4.3 Background Pollutant Concentrations

The total concentration of a pollutant is comprised of explicit local emission sources (such as roads and industrial sources) and the background component. The background component consists of indeterminate sources which are transported into an area from further away by meteorological conditions. Background pollutant concentrations are therefore the ambient level of pollution that is not affected by local sources of pollution.

Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located across grid square NGR: 471500, 105500. Data for these locations was downloaded from the DEFRA website⁹ for the purpose of this assessment for the verification year (2017) and the predicted development opening year (2020). An average concentration for each pollutant has been calculated based on the two grid squares for use within the assessment, and is summarised in Table 5.

Table 5 Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m ³)	
	2017	2020
NO _x	32.51	28.89
NO ₂	21.42	19.45
PM ₁₀	15.25	14.78
PM _{2.5}	10.58	10.18

⁹ <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.



As shown in Table 5, background pollutant concentrations do not exceed the relevant AQOs. Comparison with the monitoring results indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations. It should be noted that maximum predicted pollutant concentrations were utilised to represent conditions across the site. This was to ensure a worse case and robust assessment was undertaken.

4.4 Construction Phase Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for construction dust impacts in the following Sections.

4.4.1 Construction Phase Sensitive Receptors

Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 6.

Table 6 Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	10 – 100	0
20 - 50	10 – 100	0
50 - 100	More than 100	-
100 - 350	More than 100	-

Reference should be made to Figure 3 within Appendix I for a graphical representation of earthworks and construction dust buffer zones.

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access route. These are summarised in Table 7. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed that construction traffic would access the development via Langstone Road.

Table 7 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Residential Receptors	Approximate Number of Ecological Receptors
Less than 20	More than 100	0
20 - 50	More than 100	0

Reference should be made to Figure 4 within Appendix I for a graphical representation of trackout dust buffer zones.

There are no ecological receptors within 50m of the site or trackout boundary. As such, ecological



impacts have not been assessed further within this report.

A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 8.

Table 8 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The site is located in a predominantly industrial/residential location. There is likely to have been a history of dust generating activities due to industrial processes and residential regeneration in the locality
The likelihood of concurrent dust generating activity on nearby sites.	A review of the HBC Planning Portal indicated that there are no large-scale planning applications within 500m of the site There is therefore little potential for concurrent dust generation as a result of construction of the site.
Pre-existing screening between the source and the receptors	There is sparse vegetation present along all boundaries of the site. If retained, this could provide some natural protective screening to receptors in these directions
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the southwest of the development, as shown in Figure 5 within Appendix I. As such, properties to the northeast of the site would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently the duration of the construction phase is unknown but considering the 2020 opening year it is unlikely to extend over two years
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline

4.4.2 Operational Phase Sensitive Receptors

A desk-top study was undertaken in order to identify any sensitive receptor locations in the vicinity of the site that require specific consideration during the assessment. These were modelled at a height of 1.5m in order to represent ground floor level and are summarised in Table 9.



Table 9 Existing Sensitive Human Receptors

Receptor		NGR (m)	
		X	Y
R1	10 Regent Court	471694.0	105813.4
R2	The Limes	471657.1	105800.0
R3	9 Regent Court	471644.9	105750.4
R4	35 Langbrook Close	471603.7	105659.6
R5	29 Langbrook Close	471527.0	105673.6
R6	33 Langbrook Close	471578.0	105674.0
R7	2 Langbrook Close	471601.2	105600.3
R8	11A Langstone Road	471650.7	105619.9
R9	9 Woodbury Avenue	471651.0	105660.5
R10	Bosmere Junior School	471704.0	105943.6
R11	Juniper Square	471761.4	105897.4
R12	30 Orchid road	471906.3	105824.9
R13	20 Hamilton Close	471931.4	105724.4
R14	18 Rectory Road	471756.6	105792.8
R15	4 Langstone Road	471601.6	105542.2
R16	23 Langstone Road	471629.5	105501.8
R17	29 Langstone Road	471585.6	105430.2
R18	4 The Mallards	471591.5	105277.3
R19	45 Langstne Road	471639.2	105306.8

The sensitive receptors identified in Table 9 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the proposed development that have not been individually identified above. Reference should be made to Figure 6 within Appendix I for a graphical representation of operational phase emission sensitive human receptor locations.



5. ASSESSMENT

There is the potential for air quality impacts as a result of the construction and operation of the proposed development in addition to the exposure of future site users to elevated pollution levels. These are assessed in the following Sections.

5.1 Construction Phase Assessment

5.1.1 Step 1 - Screening

The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul road and highway surfaces.

The desk-study detailed in Section 3.1 identified a number of highly sensitive receptors within 350m of the site boundary, and within 50m of the anticipated trackout routes. As such, a detailed assessment of potential dust impacts was required, and summarised in the below sections.

Reference should be made to Appendix III for details of the relevant IAQM⁶ construction phase assessment criteria, which were utilised in conjunction with site specific information.

5.1.1 Step 2A – Magnitude

The scale and nature of the works was determined to assess the magnitude of dust arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix III, with the outcome of Step 2A is summarised below in Table 10.

Demolition

The proposed development will include full demolition of the existing building. The volume of buildings to be demolished is likely to be approximately 7,000m³. With this considered the magnitude of potential dust emissions related to demolition activities is **small**.

Earthworks

The proposed development site is estimated to cover an approximate area of 46,000m². Based on this information the magnitude of potential dust emissions related to earthwork activities is therefore considered **large**.

Construction

The proposals comprise the construction of 12 industrial units, given the scale of the development the total building volume is likely to be approximately 13,500m². The magnitude of potential dust emissions related to construction activities is therefore considered **small**.

Trackout

Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project. Based on the site area, it is anticipated that the



unpaved road length is likely to be less than 50m. The magnitude of potential dust emissions from trackout is therefore **small**.

Table 10 Dust Emission Magnitude

Magnitude of Activities			
Demolition	Earthworks	Construction	Trackout
Small	Large	Small	Small

5.1.2 Step 2B – Sensitivity

The next step (Step 2B) is to determine the sensitivity of the surrounding area, based on general principles such as amenity and aesthetics, as well as human exposure sensitivity.

Dust Soiling

As shown in Table 6 and Table 7, the desk top study indicated are approximately **10 - 100** sensitive receptors within 20m of the proposed development boundary, and **more than 100** within 20m of the anticipated trackout routes. Based on the assessment criteria detailed in Appendix III, the sensitivity of the receiving environment to potential dust soiling impacts was considered to be **high** for all construction activities. This is because users would expect to enjoy a reasonable level of amenity and residents would be expected to be present for extended periods of time.

Human Health

The annual mean concentration of PM₁₀ is less than 24 µg/m³ as detailed in Table 5. Given the presence of **10 - 100** sensitive receptors within 20m of the proposed development boundary, and **more than 100** within 20m of the anticipated trackout routes. Based on the assessment criteria detailed in Appendix III, the area is considered to be of **low** sensitivity for earthworks and construction phase activities and **high** for trackout activities.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria detailed in Appendix III is summarised in Table 11

Table 11 Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Medium

5.1.3 Step 2C – Risk

Both the magnitude and sensitivity factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures.

It should be noted that the potential for impacts depends significantly on the distance between the



dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase. A summary of the risk from each dust generating activity is provided in Table 12.

Table 12 Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	High	Low	Low
Human Health	Negligible	Low	Negligible	Negligible

5.1.3 Step 3 – Mitigation

The IAQM guidance⁶ provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the development site as summarised in Table 13. The mitigation measures outlined in Table 13 can be reviewed prior to the commencement of construction works incorporated into the existing strategies as applicable.

Table 13 Fugitive Dust Mitigation Measures

Issue	Control Measure
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Develop and implement a stakeholder communications plan that includes community engagement • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dusty and air quality complaints and make the complaints log available to the LA when asked • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation • Make complaints log available to LA when asked • Hold regular liaison meetings with other high-risk construction sites that are within 500m of the site boundary. Ensuring plans are co-ordinated and dust and particulate matter emission are minimised
Monitoring	• Undertake daily on-site and off-site inspection where receptors are nearby to monitor dust • Carry out regular site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors • Fully enclose site or specific operations where there is a high potential for dust production and the site active for an extensive period



Issue	Control Measure
	• 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 • Cover, seed or fence stockpiles to prevent wind whipping Use water as dust suppressant where applicable
Operating Vehicle/ Machinery and Sustainable Travel	• All vehicles to switch off engines - no idling vehicles • Avoid the use of diesel or petrol powered generators where practicable • Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph in unsurfaced haul roads • Produce a Construction Logistics Plan to manage sustainable deliveries • Implement a Travel Plan that supports and encourages sustainable travel
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure adequate water supply on the site for effective dust/particulate matter suppression/mitigation • Use enclosed chutes and covered skips • Minimise drop heights • Ensure equipment is readily available on site to clean any spillages
Waste Management	• Avoid bonfires and burning of waste material
Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • 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. • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Earthworks and Construction	• Re-vegetate earthworks and exposed areas • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate • Only remove the cover in small areas during work and not all at once • Avoid scabbling • Ensure sand and other aggregates are stored and not able to dry out, unless it is required for a specific process
Trackout	• Use water-assisted dust sweeper on the access and local roads • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving sites are covered to prevent escape of materials • Inspect on-site routes for integrity, instigate necessary repairs and record in site log book • Implement a wheel washing system at a suitable location near site exit



5.1.4 Step 4 – Residual Impacts

Assuming the relevant mitigation measures outlined in Table 13 are implemented, the residual effect from all dust generating activities is predicted to be **negligible**, in accordance with the IAQM guidance⁶.

5.2 Operational Phase Assessment

Additional vehicle movements associated with the operation of the proposed development will generate exhaust emissions, such as NO₂, PM₁₀ and PM_{2.5}, on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

The assessment considered the following scenarios:

- ▶ 2017 Verification;
- ▶ 2020 DM Opening year; and
- ▶ 2020 DS Opening year.

The DM (i.e. without development) scenarios are representative of anticipated traffic data for 2020. The DS (i.e. with development) scenarios are representative of anticipated traffic data for 2020, with the addition of predicted variations in traffic flow patterns as a result of the proposals.

For the purpose of this assessment traffic data was supplied for 2020, the proposed development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors for 2017 were utilised within the dispersion model. The use of 2020 traffic data and 2017 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

Reference should be made to Appendix II for full assessment input details.

5.2.1 Nitrogen Dioxide

Predicted Concentrations at the Development Site

As discussed previously in Section 3.2, it should be noted that the proposed development does not include any relevant exposure to long term pollutant concentrations, such as residential units. As a result, consideration of annual mean NO₂, PM₁₀ and PM_{2.5} concentrations are not required across the development as in accordance with LAQM (TG16)². Subsequently, this aspect of the assessment has not been considered further in the context of pollutant exposure.

Predicted Concentrations at Sensitive Receptors

Annual mean NO₂ concentrations were predicted for 2020 DM and DS scenarios and are summarised in Table 14.



Table 14 Predicted Annual Mean NO₂ Concentrations

Sensitive Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	10 Regent Court	38.24	34.47	-3.77
R2	The Limes	38.41	36.48	-1.93
R3	9 Regent Court	37.19	36.34	-0.85
R4	35 Langbrook Close	30.73	30.39	-0.34
R5	29 Langbrook Close	26.16	25.81	-0.35
R6	33 Langbrook Close	27.94	27.55	-0.39
R7	2 Langbrook Close	29.94	29.72	-0.22
R8	11A Langstone Road	29.69	29.43	-0.26
R9	9 Woodbury Avenue	30.92	30.56	-0.36
R10	Bosmere Junior School	28.96	28.08	-0.88
R11	Juniper Square	30.83	29.00	-1.83
R12	30 Orchid road	33.25	29.59	-3.66
R13	20 Hamilton Close	31.93	29.72	-2.21
R14	18 Rectory Road	36.20	32.12	-4.08
R15	4 Langstone Road	32.09	31.95	-0.14
R16	23 Langstone Road	30.30	30.19	-0.11
R17	29 Langstone Road	30.92	30.84	-0.08
R18	4 The Mallards	28.20	28.16	-0.04
R19	45 Langstone Road	27.81	27.77	-0.04

As indicated in Table 14, annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptor locations. It should be noted negative values are an indication of a beneficial impacts due to estimated reductions in traffic flows as a result of the proposed development.

Predicted impacts on annual mean NO₂ concentrations are summarised in Table 15.

Table 15 Predicted NO₂ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	10 Regent Court	-9.43	76-94% of the AQO	Moderate



Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R2	The Limes	-4.83	76-94% of the AQO	Slight
R3	9 Regent Court	-2.12	76-94% of the AQO	Slight
R4	35 Langbrook Close	-0.85	75% or Less of the AQO	Negligible
R5	29 Langbrook Close	-0.88	75% or Less of the AQO	Negligible
R6	33 Langbrook Close	-0.98	75% or Less of the AQO	Negligible
R7	2 Langbrook Close	-0.55	75% or Less of the AQO	Negligible
R8	11A Langstone Road	-0.65	75% or Less of the AQO	Negligible
R9	9 Woodbury Avenue	-0.90	76-94% of the AQO	Negligible
R10	Bosmere Junior School	-2.20	75% or Less of the AQO	Negligible
R11	Juniper Square	-4.58	75% or Less of the AQO	Negligible
R12	30 Orchid road	-9.15	75% or Less of the AQO	Slight
R13	20 Hamilton Close	-5.53	75% or Less of the AQO	Slight
R14	18 Rectory Road	-10.20	76-94% of the AQO	Moderate
R15	4 Langstone Road	-0.35	76-94% of the AQO	Negligible
R16	23 Langstone Road	-0.27	75% or Less of the AQO	Negligible
R17	29 Langstone Road	-0.20	76-94% of the AQO	Negligible
R18	4 The Mallards	-0.10	75% or Less of the AQO	Negligible
R19	45 Langstone Road	-0.10	75% or Less of the AQO	Negligible

As indicated in Table 15, impacts on annual mean NO₂ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at 13 receptor locations, **slight** at 4 receptor locations, and **moderate** at a further 2 receptor locations.

It is critical to note that the proposed development leads to a net decrease in traffic as a result of the proposed change of use. Subsequently, associated impacts on all existing sensitive receptors can be considered as **beneficial**.

It is therefore considered that the overall impacts as a result of the proposed development are **not significant**. Further justifications are discussed in Section 5.3.



5.2.2 Particulate Matter (PM₁₀)

Predicted Concentrations at Sensitive Receptors

Annual mean PM₁₀ concentrations were predicted for 2020 DM and DS scenarios and are summarised in Table 16.

Table 16 Predicted Annual Mean PM₁₀ Concentrations

Sensitive Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	10 Regent Court	18.27	17.49	-0.78
R2	The Limes	18.18	17.78	-0.40
R3	9 Regent Court	17.97	17.79	-0.18
R4	35 Langbrook Close	16.87	16.80	-0.07
R5	29 Langbrook Close	16.04	15.98	-0.06
R6	33 Langbrook Close	16.34	16.27	-0.07
R7	2 Langbrook Close	16.76	16.72	-0.04
R8	11A Langstone Road	16.71	16.66	-0.05
R9	9 Woodbury Avenue	16.91	16.84	-0.07
R10	Bosmere Junior School	16.51	16.35	-0.16
R11	Juniper Square	16.90	16.54	-0.36
R12	30 Orchid road	17.41	16.70	-0.71
R13	20 Hamilton Close	17.17	16.74	-0.43
R14	18 Rectory Road	17.94	17.12	-0.82
R15	4 Langstone Road	17.17	17.14	-0.03
R16	23 Langstone Road	16.84	16.81	-0.03
R17	29 Langstone Road	16.95	16.94	-0.01
R18	4 The Mallards	16.45	16.44	-0.01
R19	45 Langstone Road	16.38	16.37	-0.01

As indicated in Table 16, annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptor locations.

Predicted impacts on annual mean PM₁₀ concentrations are summarised in Table 17.



Table 17 Predicted PM₁₀ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	10 Regent Court	-1.95	75% or Less of the AQO	Negligible
R2	The Limes	-1.00	75% or Less of the AQO	Negligible
R3	9 Regent Court	-0.45	75% or Less of the AQO	Negligible
R4	35 Langbrook Close	-0.18	75% or Less of the AQO	Negligible
R5	29 Langbrook Close	-0.15	75% or Less of the AQO	Negligible
R6	33 Langbrook Close	-0.18	75% or Less of the AQO	Negligible
R7	2 Langbrook Close	-0.10	75% or Less of the AQO	Negligible
R8	11A Langstone Road	-0.13	75% or Less of the AQO	Negligible
R9	9 Woodbury Avenue	-0.18	75% or Less of the AQO	Negligible
R10	Bosmere Junior School	-0.40	75% or Less of the AQO	Negligible
R11	Juniper Square	-0.90	75% or Less of the AQO	Negligible
R12	30 Orchid road	-1.78	75% or Less of the AQO	Negligible
R13	20 Hamilton Close	-1.08	75% or Less of the AQO	Negligible
R14	18 Rectory Road	-2.05	75% or Less of the AQO	Negligible
R15	4 Langstone Road	-0.08	75% or Less of the AQO	Negligible
R16	23 Langstone Road	-0.08	75% or Less of the AQO	Negligible
R17	29 Langstone Road	-0.02	75% or Less of the AQO	Negligible
R18	4 The Mallards	-0.02	75% or Less of the AQO	Negligible
R19	45 Langstone Road	-0.02	75% or Less of the AQO	Negligible

As indicated in Table 17, impacts on annual mean PM₁₀ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. Similar, to NO₂, concentration negative values are an indication of a **beneficial** impacts due to estimated reductions in traffic flows as a result of the proposed development.

It is therefore considered that the overall impacts as a result of the proposed development are **not significant**. Further justifications are discussed in Section 5.3.



5.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} has not been modelled within the assessment as the predicted concentrations relating to annual mean PM₁₀ remain below the AQO for PM_{2.5} (25 µg/m³). Since PM₁₀ contains all particulate matter with an aerodynamic diameter of less than 10µm, PM_{2.5} is effectively accounted for within these predictions; and at worst could be considered that PM_{2.5} concentrations would be equal to the predicted PM₁₀ concentrations.

5.3 Queuing Traffic Sensitivity Analysis

Due to the nature of the eastern site access, there is potential for queueing to arise at the Langstone Technology Park site access leading from Langstone Road. There is therefore potential to cause impacts at nearby sensitive receptors.

Whilst a review undertaken by DTA associates, considered that queueing from the site would be limited to peak hours and subsequently would not be considered a significant concern; it was identified that slower moving traffic would present on the Langstone Technology Park/Langstone Road between the hours of 0800 to 0900 and 1700 to 1800.

In order to assess the worst case, an additional modelling scenario was undertaken to represent the traffic movements and emissions experienced at sensitive receptors, at this junction. To represent these queueing events, an additional modelling scenario was undertaken with an assigned average annual speed of 10km/h on all relevant junction links modelled. It was assumed in the model that there would be queueing in both the DM and DS scenario order to show the impacts of the slower traffic as a result of the development.

Reference should be made Figure 8 within Appendix II for modelled junction links and associated sensitive receptor locations.

5.3.1 Nitrogen Dioxide

Annual mean NO₂ concentrations for sensitive receptors in close proximity to the junction were predicted for 2020 DM and DS scenarios and are summarised in Table 18.

Table 18 Predicted NO₂ Impacts from Queuing Traffic

Sensitive Receptor	Predicted Annual Mean NO ₂ Concentration (µg/m ³)			% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
	DM	DS	Change			
R4	31.86	31.79	-0.07	-0.18	76-94% of the AQO	Negligible
R5	24.30	24.22	-0.08	-0.20	75% or Less of the AQO	Negligible
R6	26.72	26.63	-0.09	-0.23	75% or Less of the AQO	Negligible
R7	31.94	31.94	0.00	0.00	76-94% of the AQO	Negligible
R8	31.04	31.03	-0.01	0.00	76-94% of the AQO	Negligible
R9	32.01	31.96	-0.07	-0.17	76-94% of the AQO	Negligible



As indicated in Table 18 impacts on annual mean NO₂ concentrations as a result of road vehicle exhaust emissions from queuing vehicles predicted to be **negligible** at all receptor locations. Critically, there are no exceedances in the annual mean AQO for NO₂. Reference should be made to Table AII.3 within Appendix II for a comparison of average vehicle speeds between the DM and DS scenarios.

It should be noted that these results represent a worst-case scenario as it was assumed that the queuing traffic would be present all year round during the DS scenario, 24 hours a day. In reality and as confirmed by the transport consultant queuing is only likely to occur during the hours of 0800 to 0900 and 1700 to 1800. It is therefore considered that the overall impacts as a result of the proposed development, with consideration to additional queuing traffic scenarios, are **not significant**.

5.3.2 Particulate Matter (PM₁₀)

Annual mean PM₁₀ concentrations for sensitive receptors in close proximity to the junction were predicted for 2020 DM and DS scenarios and are summarised in Table 19.

Table 19 Predicted PM₁₀ Impacts from Queuing Traffic

Sensitive Receptor	Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)			% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
	DM	DS	Change			
R4	16.47	16.46	-0.01	-0.02	75% or Less of the AQO	Negligible
R5	15.58	15.57	-0.01	-0.02	75% or Less of the AQO	Negligible
R6	15.86	15.85	-0.01	-0.02	75% or Less of the AQO	Negligible
R7	16.48	16.48	0.00	0.00	75% or Less of the AQO	Negligible
R8	16.37	16.36	-0.01	-0.03	75% or Less of the AQO	Negligible
R9	16.47	16.46	-0.01	-0.02	75% or Less of the AQO	Negligible

As indicated in Table 19 impacts on annual mean PM₁₀ concentrations as a result of road vehicle exhaust emissions from queuing vehicles predicted to be **negligible** at all receptor locations modelled.

It is therefore considered that the overall impacts as a result of the proposed development are **not significant**.

Critically, whilst there alongside the decreases in emissions concentrations during these peak periods, there were no exceedances of the annual mean AQOs for NO₂ or PM₁₀ at any location within the modelling extent.



5.3.3 Impact Significance

The overall significance of operational phase road traffic emission impacts for 2020 was determined as **not significant**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in Section 5.2. Further justifications are provided in Table 20.

The EPUK and IAQM² guidance states that "where a single development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect, and a 'negligible' or 'slight' impact will not have a significant effect.

Table 20 Overall Road Emissions Impact Significance

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on NO₂ concentrations at sensitive receptor locations were predicted to be negligible at 13 representative locations, slight at 4 locations and moderate at 2 locations. The slightly and moderately impacted receptors represents a significant reduction in traffic, and as such are judged as beneficial impacts and considered not significant. With regards to the queuing traffic analysis impacts were predicted to be negligible at all representative locations. There are decreases in the overall emissions as a result for the development. This is related to significant reductions to mean vehicle speed which are likely only to occur during peak traffic hours. Assuming an average annual speed is therefore a significant overestimation. Furthermore, all affected receptors are predicted well below the annual mean AQO and do not lead to unacceptable risk. As previously noted, the associated impacts were based upon a robust approach which may lead to overestimations, and as such the overall balance is judged as not significant.
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The proposed development will not result in any new exposure to pollutant concentrations above the AQOs at sensitive locations and as such no new exposure has been introduced.
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The change in concentration relative to the AQO was predicted to range from: ▶ -0.01% to -0.1% for NO₂, ▶ -2.05% to -0.02% for PM₁₀; Impacts upon NO₂ concentrations were predicted to range between negligible, slight and moderate according to the IAQM/EPUK guidance. Critically, these impacts relate to beneficial impacts.



Guidance	Comment
	With regards to the queuing traffic analysis, the change in concentration relative to the AQO was predicted to range from: ▶ -0.23% to 0.00% for NO₂, ▶ -0.01% to 0.00% for PM₁₀; Impacts upon NO₂ concentrations were predicted to range between negligible. Given suitable headroom between the annual mean AQO associated impacts are deemed not significant. Impacts upon PM₁₀ concentrations were deemed negligible at all locations during each scenario. Resulting impacts were therefore deemed not significant during both scenarios.
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were no exceedances of the annual mean AQOs for NO ₂ , PM ₁₀ and PM _{2.5} at any location within the modelling extent
The extent to which an objective is exceeded e.g. an annual mean NO ₂ concentration of 41µg/m ³ should attract less significance than an annual mean of 51µg/m ³	There were no exceedances of the annual mean AQOs for NO ₂ , PM ₁₀ and PM _{2.5} at any sensitive receptor location within the modelling extent

It should also be noted that the use of 2020 traffic data and 2017 emission factors is considered to provide a worst-case scenario, which may lead to overestimations of actual pollutant concentrations during the operation of the proposals. As such, the overall significance of operational phase road traffic emission impacts on annual mean NO₂ concentration was determined not significant.



6. CONCLUSION

REC Ltd was commissioned by AG Langstone B.V and Trinity Investment Management to undertake an Air Quality Assessment in support of a proposed industrial redevelopment at Langstone Technology Park, Havant.

During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **not significant**.

Dispersion modelling was undertaken in order to predict air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the development. Results were subsequently verified using monitoring results obtained from HBC.

Predicted impacts on annual mean NO₂ and PM₁₀ concentrations as a result of operational phase exhaust emissions were predicted to be **negligible, slight and moderate**. Critically, these impacts relate to **beneficial** impacts as a result of net traffic reductions as a result of the proposed development.

Queueing traffic analysis at the eastern site access indicates that pollutant levels at sensitive locations in close proximity to the junction were predicted to be **negligible** at affected sensitive locations in the vicinity of the junction.

The overall significance of potential impacts was determined to be **not significant**, in accordance with the EPUK and IAQM guidance.

Based on the assessment results, air quality is not considered a constraint to planning consent for the proposed development.

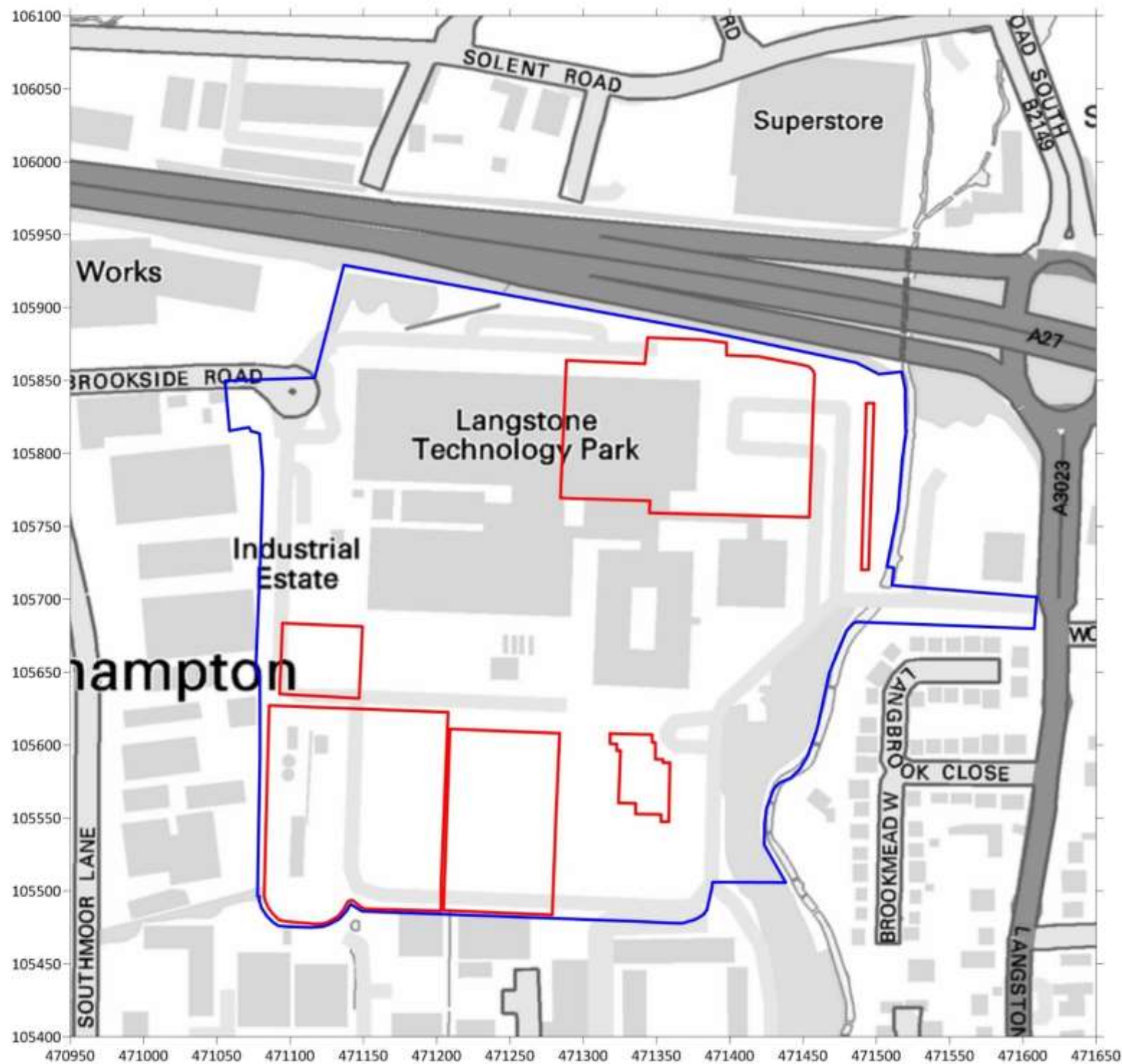


7. WABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EPUK	Environmental Protection UK
EU	European Union
HBC	Havant Borough Council
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
REC	Resource and Environmental Consultants
TEMPRO	Trip End Model Presentation Program
Z ₀	Roughness Length



APPENDIX I - FIGURES



Legend

-  Proposed Development Boundary
-  Site Boundary

Title

Figure 1
Site Location

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

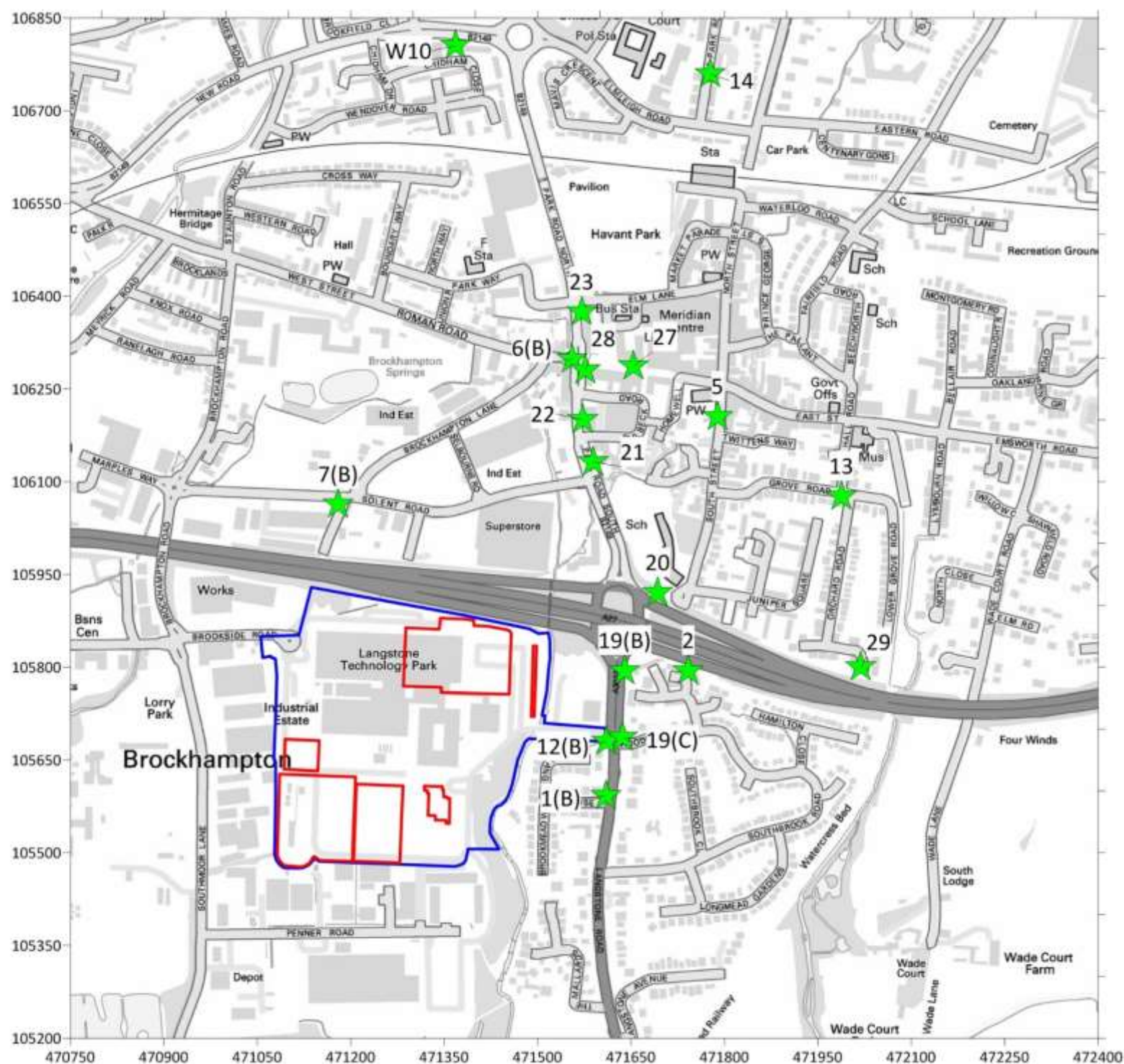
AQ107578

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www.recitd.co.uk



Legend

-  Proposed Development Boundary
-  Site Boundary
-  Diffusion Tube Monitoring Location

Title

Figure 2
Diffusion Tube Monitoring Locations

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

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Legend

-  Proposed Development Boundary
-  Proposed Development Boundary
-  20m from Site Boundary
-  50m from Site Boundary
-  100m from Site Boundary
-  350m from Site Boundary

Title

Figure 3
Demolition, Earthworks and Construction
Dust Buffer Zones

Project

Air Quality Assessment
Langstone Technology Park, Havant

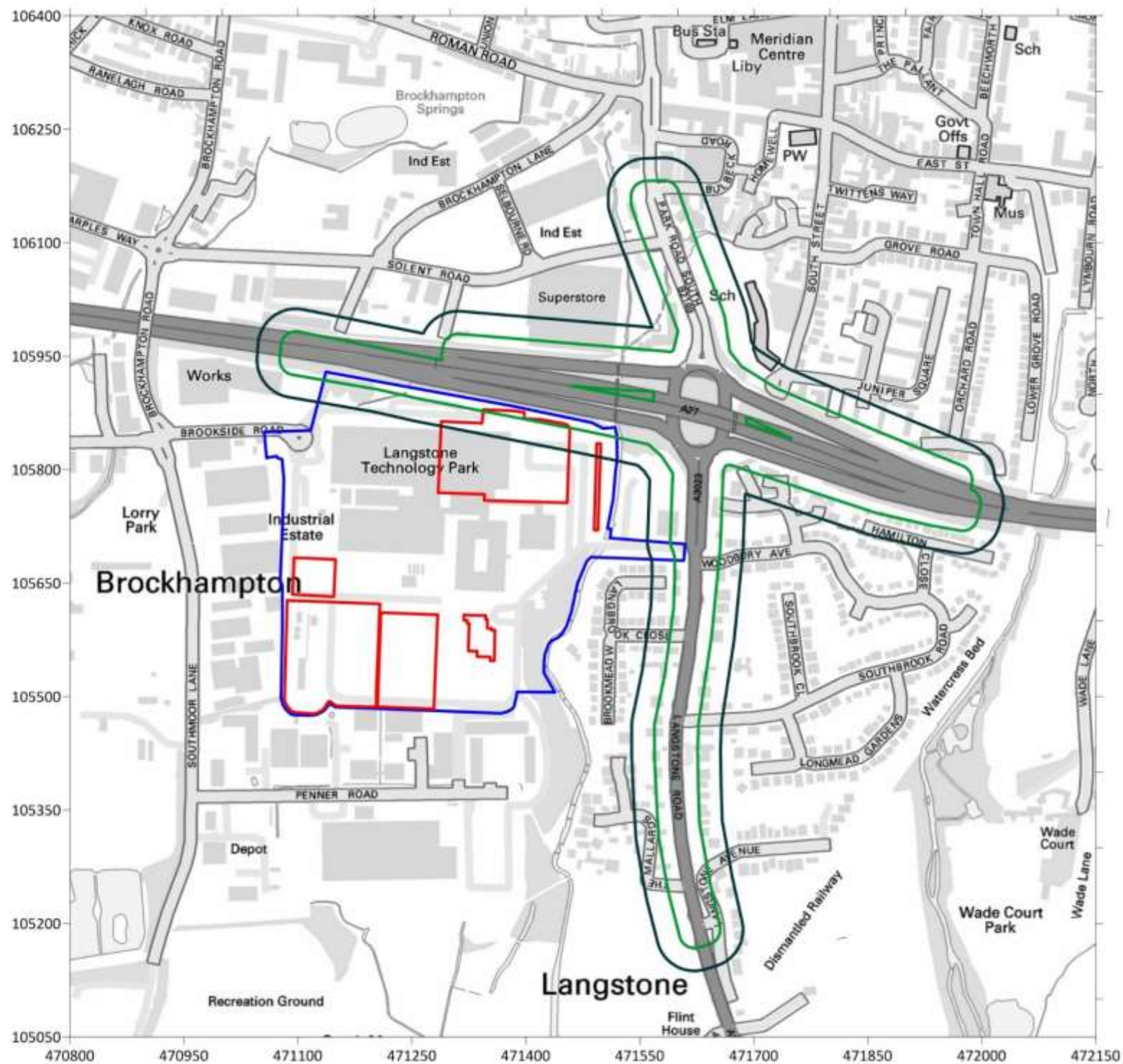
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Legend

- Proposed Development Boundary
- Site Boundary
- 20m from Site Access Route
- 50m from Site Access Route

Title

Figure 4

Trackout Dust Buffer Zones

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

AQ107578

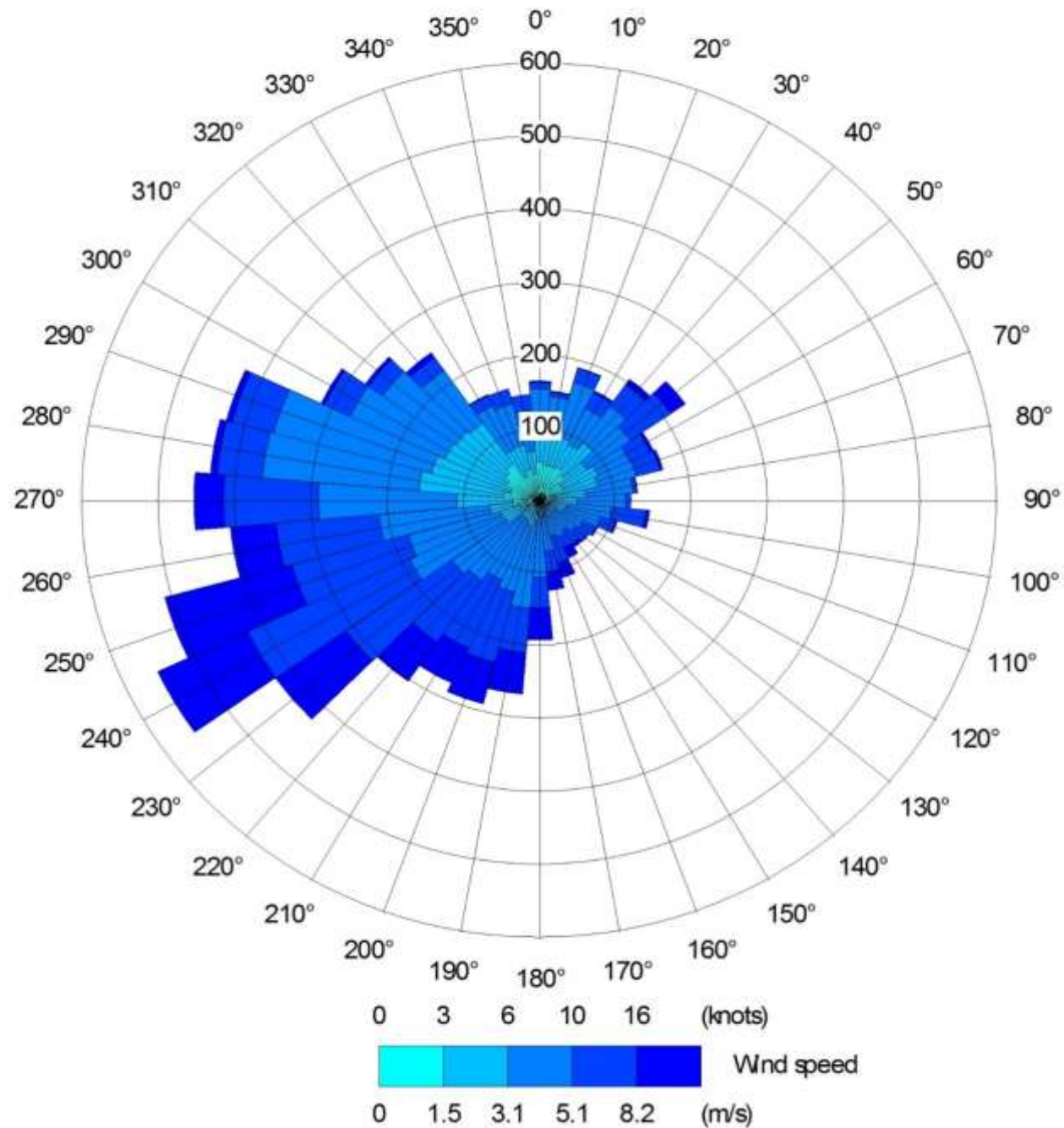
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Title

Figure 5

Wind Rose Thorney Island 2017
Meteorological Station

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

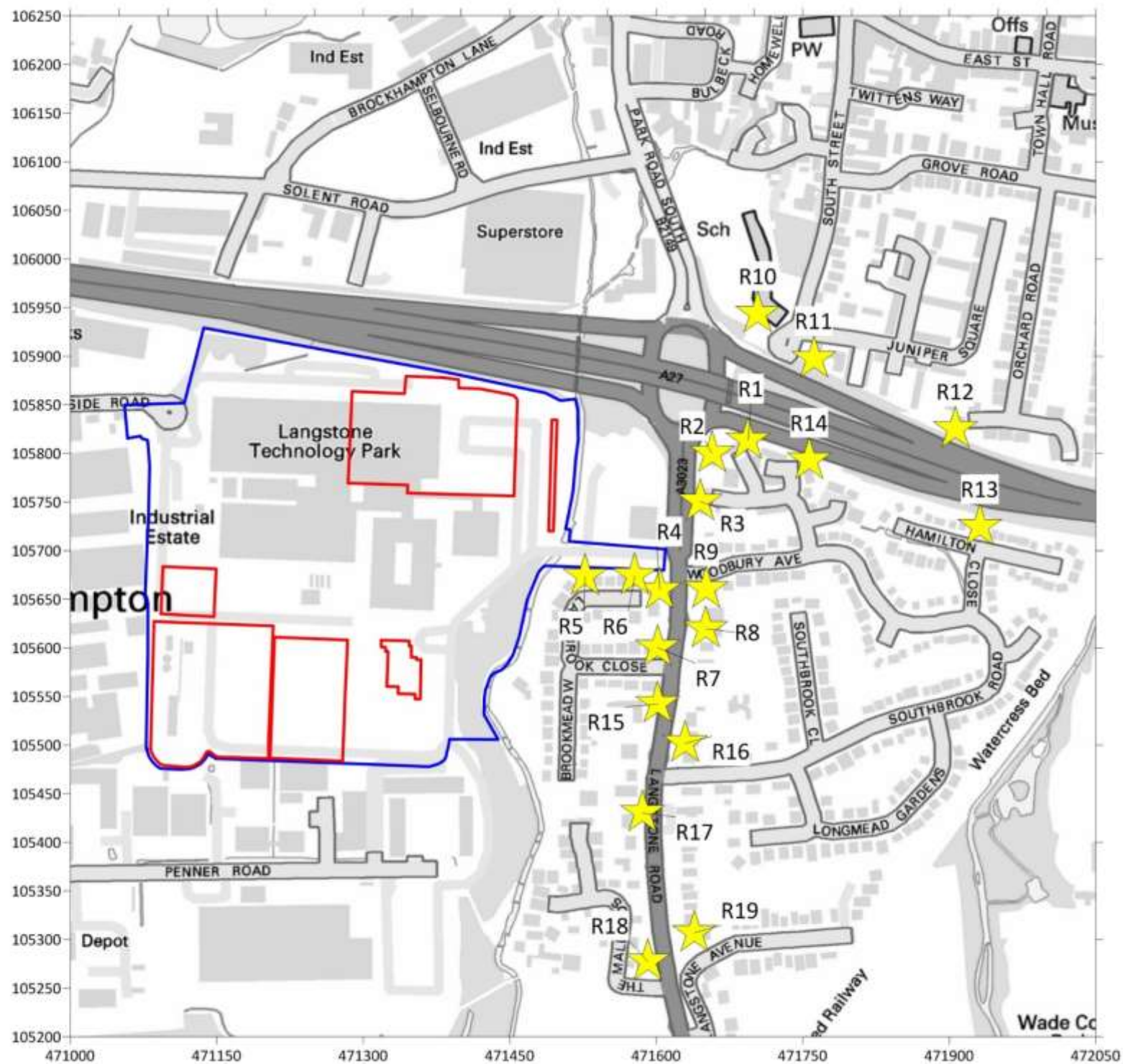
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Legend

-  Proposed Development Boundary
-  Site Boundary
-  Sensitive Receptor Location

Title

Figure 6
Traffic Exhaust Emissions
Sensitive Receptor Locations

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

AQ107578

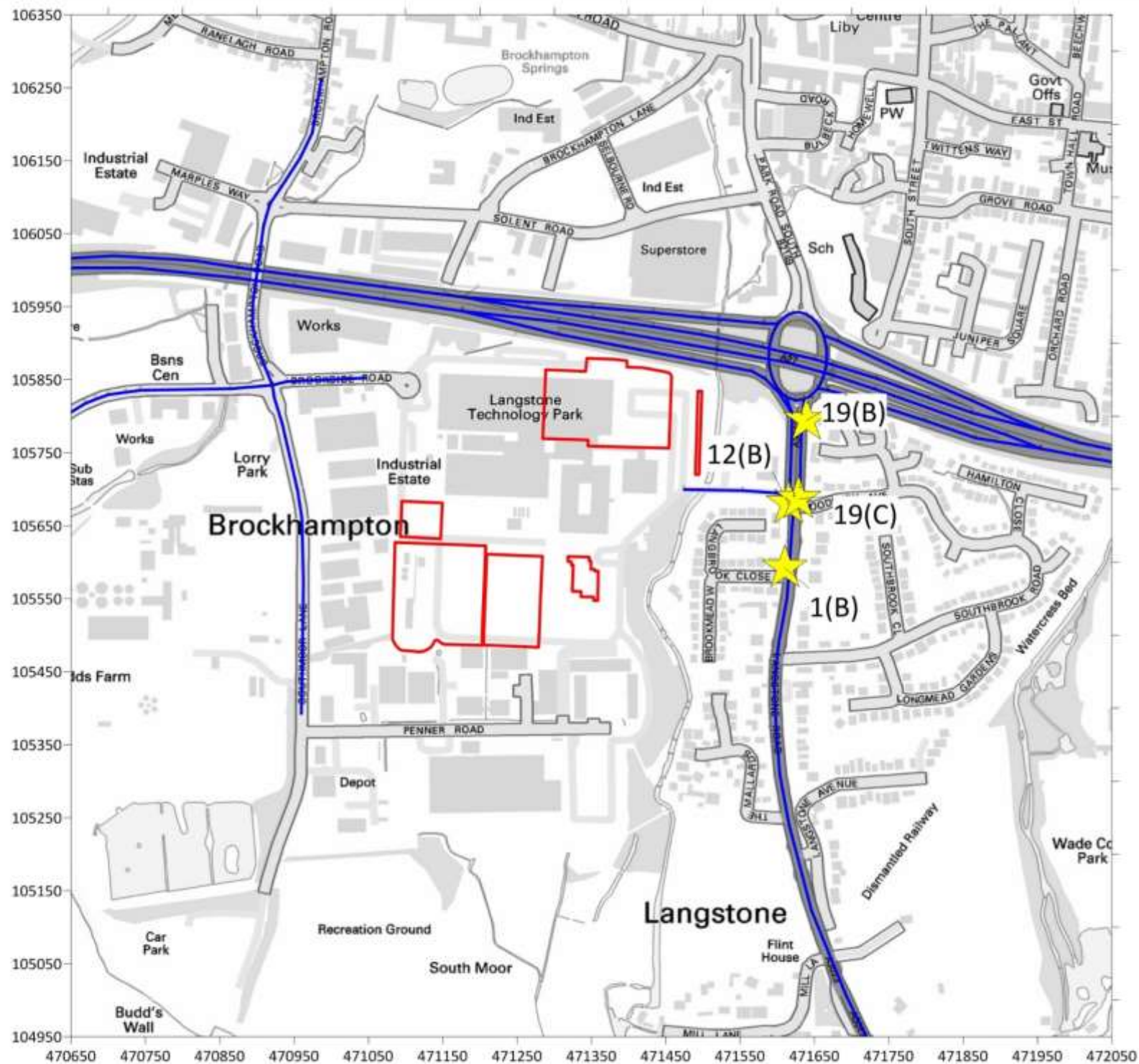
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Legend

-  Site Boundary
-  Modelled Road Link
-  Diffusion Tube Monitoring Location

Title

Figure 7
ADMS-Roads Input

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

AQ107578

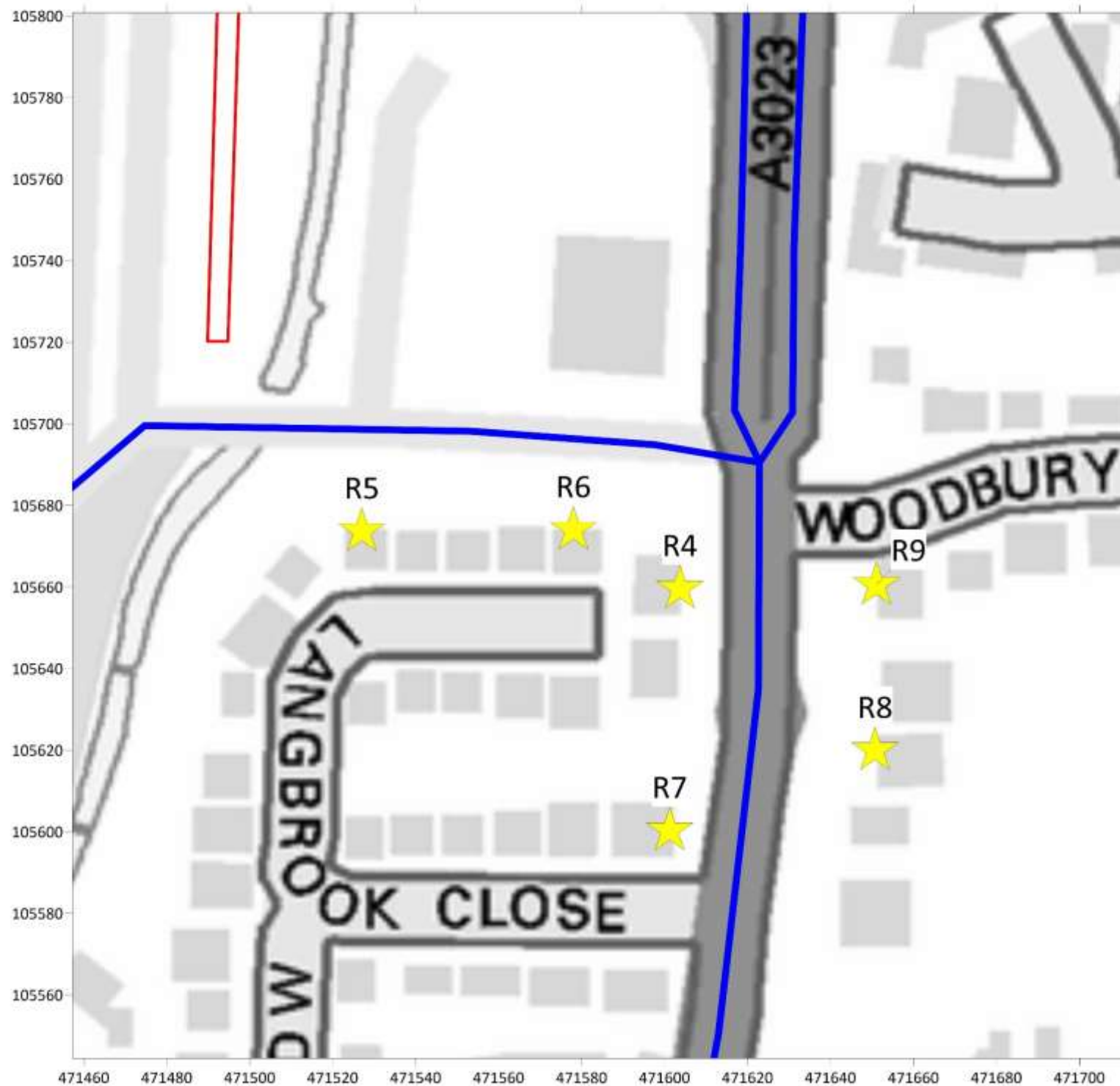
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Legend

-  Site Boundary
-  Modelled Road Link
-  Sensitive Receptor Locations

Title

Figure 8
Road Junction Analysis

Project

Air Quality Assessment
Langstone Technology Park, Havant

Project Number

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APPENDIX II - ASSESSMENT INPUTS



Assessment Inputs

The proposed development has the potential to introduce future site users to poor air quality, as well as the potential to cause impacts during the construction and operational phases of the development. Dispersion modelling using ADMS Roads was therefore undertaken to predict NO₂, PM₁₀ and PM_{2.5} concentrations across the site and at sensitive locations both with and without the development in place, to consider potential impacts and assess site suitability for the proposed end-use.

The model requires input data that details the following parameters:

- ▶ Assessment area;
- ▶ Traffic flow data;
- ▶ Vehicle emission factors;
- ▶ Spatial co-ordinates of emissions;
- ▶ Street width;
- ▶ Meteorological data;
- ▶ Roughness length; and
- ▶ Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.0.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Assessment Area

Ambient concentrations were predicted over surrounding affected highway network. Reference should be made to Figure 7 within Appendix I for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including base flows and development flows, was provided by DTA transport Planning Consults, the appointed Transport Consultants for the scheme.

Growth factors provided by the Trip End Model Presentation Program (TEMPRO) software package were utilised to allow for conversion from the obtained 2017 traffic flow to 2020 which was used to represent the opening year scenario. A TEMPRO factor of 1.0106 was applied to 2017 base traffic flow to represent the 2020 opening year scenario.

Vehicle speeds were estimated based on the free flow potential of each link and local speed limits. Road widths were estimated from aerial photography and UK highway design standards.



Reference should be made to Figure 7 within Appendix I for a graphical representation of the road link locations.

A summary of the traffic data used in the verification scenarios is provided in Table AII.1.

Table AII.1 2017 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L1	Langstone Road North	7.7	26,671	1.6	40
L2	Langstone Road North Approach	9.6	13,335	1.6	30
L3	Langstone Road onto A27 Slip on	10.9	6,668	1.6	20
L4	A27 Roundabout	9.8	18,173	2.3	25
L5	Langstone Road onto Roundabout	5.3	6,668	1.6	20
L6	Langstone Road North Speed Up	8.8	13,335	1.6	30
L7	A27 Slip off onto Langstone Road	5.2	6,668	1.6	25
L8	Langstone Road off Roundabout	5.3	6,668	1.6	25
L9	Site Access	10.6	2,276	0.8	15
L10	Site Access	9.5	2,276	0.8	20
L11	A27 Slip off onto Roundabout	5.3	3,321	4.7	25
L12	A27 Westbound Slip off	7.5	6,642	4.7	40
L13	A27 Westbound	7.9	33,212	4.7	50
L14	A27 Westbound Slip on	7.6	6,642	4.7	25
L15	A27 Westbound	7.4	33,212	4.7	50
L16	A27 Eastbound	9.7	34,903	4.3	50
L17	A27 Eastbound Slip on	8.3	6,981	4.3	40
L18	Roundabout onto A27 Slip on	8.3	6,981	4.3	25
L19	A27 Eastbound	8.2	34,903	4.3	50
L20	A27 Eastbound Slip off	6.9	6,981	4.3	40
L21	A27 Slip off onto Roundabout	11.5	6,981	4.3	15
L22	A27 Westbound	7.8	26,569	4.5	50
L23	A27 Eastbound	8.2	27,923	4.5	50



Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L24	Brookside Road (Site access 2)	9.8	2,022	1.4	40
L25	Harts Farm Way	7.0	13,204	2.4	40
L26	Brockhampton Road	9.4	8,300	2.8	40
L27	Southmoor Road	6.7	8,381	3.0	40

The road width, height and mean vehicle speed shown in Table AII.1 remained the same for the 2020 scenarios.

A summary of the 2020 traffic data is shown in Table AII.2.

Table AII.2 2020 Traffic Data

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L1	Langstone Road North	27,640	1.60	27,629	1.60
L2	Langstone Road North Approach	14,857	1.51	14,754	1.51
L3	Langstone Road onto A27 Slip on	7,428	1.51	7,377	1.51
L4	A27 Roundabout	19,466	2.21	19,364	2.21
L5	Langstone Road onto Roundabout	7,428	1.51	7,377	1.51
L6	Langstone Road North Speed Up	14,864	1.51	14,760	1.51
L7	A27 Slip off onto Langstone Road	7,428	1.51	7,377	1.51
L8	Langstone Road off Roundabout	7,428	1.51	7,377	1.51
L9	Site Access	3,512	0.60	3,394	0.60
L10	Site Access	3,512	0.60	3,394	0.60
L11	A27 Slip off onto Roundabout	3,548	4.57	3,537	4.57
L12	A27 Westbound Slip off	7,135	4.55	7,109	4.55
L13	A27 Westbound	34,383	4.70	34,371	4.70
L14	A27 Westbound Slip on	7,137	4.55	7,109	4.55
L15	A27 Westbound	34,558	4.71	34,530	4.71



Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L16	A27 Eastbound	36,128	4.30	36,116	4.30
L17	A27 Eastbound Slip on	7,324	4.25	7,312	4.25
L18	Roundabout onto A27 Slip on	7,324	4.25	7,312	4.25
L19	A27 Eastbound	36,315	4.34	36,287	4.34
L20	A27 Eastbound Slip off	7,486	4.17	7,458	4.17
L21	A27 Slip off onto Roundabout	7,486	4.17	7,458	4.17
L22	A27 Westbound	27,420	4.54	27,420	4.57
L23	A27 Eastbound	28,817	4.50	28,817	4.53
L24	Brookside Road (Site access 2)	3,188	7.98	3,105	7.98
L25	Harts Farm Way	14,664	3.72	14,606	3.72
L26	Brockhampton Road	8,684	2.72	8,659	2.72
L27	Southmoor Road	8,646	3.02	8,646	3.02

A summary of the traffic data used in the Queuing Traffic Sensitivity Analysis is provided in Table AII.3. Please note only road links associated with the A320 (South of the A27) and the proposed site access were adjusted with reduced average traffic speeds to reflect queuing.

Table AII.3 2020 Queuing Traffic Sensitivity Analysis Data

Road Link		DM			DS		
		24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L1	Langstone Road North	27,640	1.6	10	27,629	1.60	10
L2	Langstone Road North Approach	14,857	1.5	10	14,754	1.51	10
L6	Langstone Road North	14,864	1.5	10	14,760	1.51	10
L9	Site Access	3,512	0.8	10	3,394	0.60	10
L10	Site Access	3,512	0.8	10	3,394	0.60	10



Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 8.0.1) released in 2017, which incorporates updated COPERT 5 vehicle emissions factors for NO_x and vehicle fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2017 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to the development opening year in order to provide a robust assessment

It should be noted that PM₁₀ emission factors were calculated using the Emission Factor Toolkit (version 8.0.1) for the 2017 Verification scenario and the 2020 DM and DS scenarios.

Meteorological Data

Meteorological data used in this assessment was taken from Thorney meteorological station over the period 1st January 2017 to 31st December 2017 (inclusive). Thorney meteorological station is located at approximate NGR: 476380, 102500, which is approximately 6.1km North West of the proposed development.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 within Appendix I for a wind rose of utilised meteorological data.

Roughness Length

A roughness length (z_0) of 0.5m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'Parkland, Open Suburbia'.

A z_0 of 0.2m was utilised to represent the morphology of the meteorological station location and is suggested as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used in this dispersion modelling study. This value is considered appropriate for the nature of the assessment area and is suggested within ADMS-Roads as being suitable for 'mixed urban/industrial'.

A minimum Monin-Obukhov length of 10m was used in this dispersion modelling study. This value is considered appropriate for the nature of the meteorological station location and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.



Background Concentrations

An annual mean NO₂ concentration of 21.42µg/m³, a PM₁₀ concentration of 15.25µg/m³ and a PM_{2.5} concentration of 10.58µg/m³ as predicted by DEFRA, was used to represent background levels in the vicinity of the site, the diffusion tube and sensitive receptor locations.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO₂ concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LAQM (TG16)².

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- ▶ Estimates of background concentrations;
- ▶ Uncertainties in source activity data such as traffic flows and emission factors;
- ▶ Variations in meteorological conditions;
- ▶ Overall model limitations; and
- ▶ Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2017, using traffic data, meteorological data and monitoring results from this year.

HBC undertakes monitoring of NO₂ concentrations at 4 locations suitable for verification purposes within the assessment extents. It should be noted that diffusion tubes 5, 7(B), 13, 21, 22, 28 and 29 were located on roads where traffic data was unavailable, as such were ejected from the model verification process.

The road contribution to total NO_x concentration was calculated from the monitored NO₂ result for use in the verification process. This was undertaken following the methodology contained within DEFRA guidance LAQM (TG16)².

The dispersion model was run with the traffic input data previously detailed for 2017 to predict the NO_x concentration at the monitoring locations. The results are shown in Table AII.4.



Table AII.4 NO_x Verification Results

ID	Monitoring Location	Modelled Road NO _x Concentration (µg/m ³)	Monitored Road NO _x Concentration (µg/m ³)	Difference (%)
1b	Langstone Road (West)	14.30	26.42	45.87%
12b	Xyratex	17.80	17.11	-4.03%
19b	Langstone Road (East, Bus Stop)	25.30	53.54	52.75%
19c	Langstone Road East (Woodbury)	25.10	33.48	25.03%

The monitored and modelled NO_x road contribution concentrations were graphed and the equation of the trendline based on the linear progression through zero calculated, as shown in Graph 1. This indicated that a verification factor of **1.6061** was required to be applied to all NO_x modelling results, showing the model overestimated rather than underestimated, pollutant concentrations throughout the assessment extents.

Graph 1 Verification Adjustment Factor

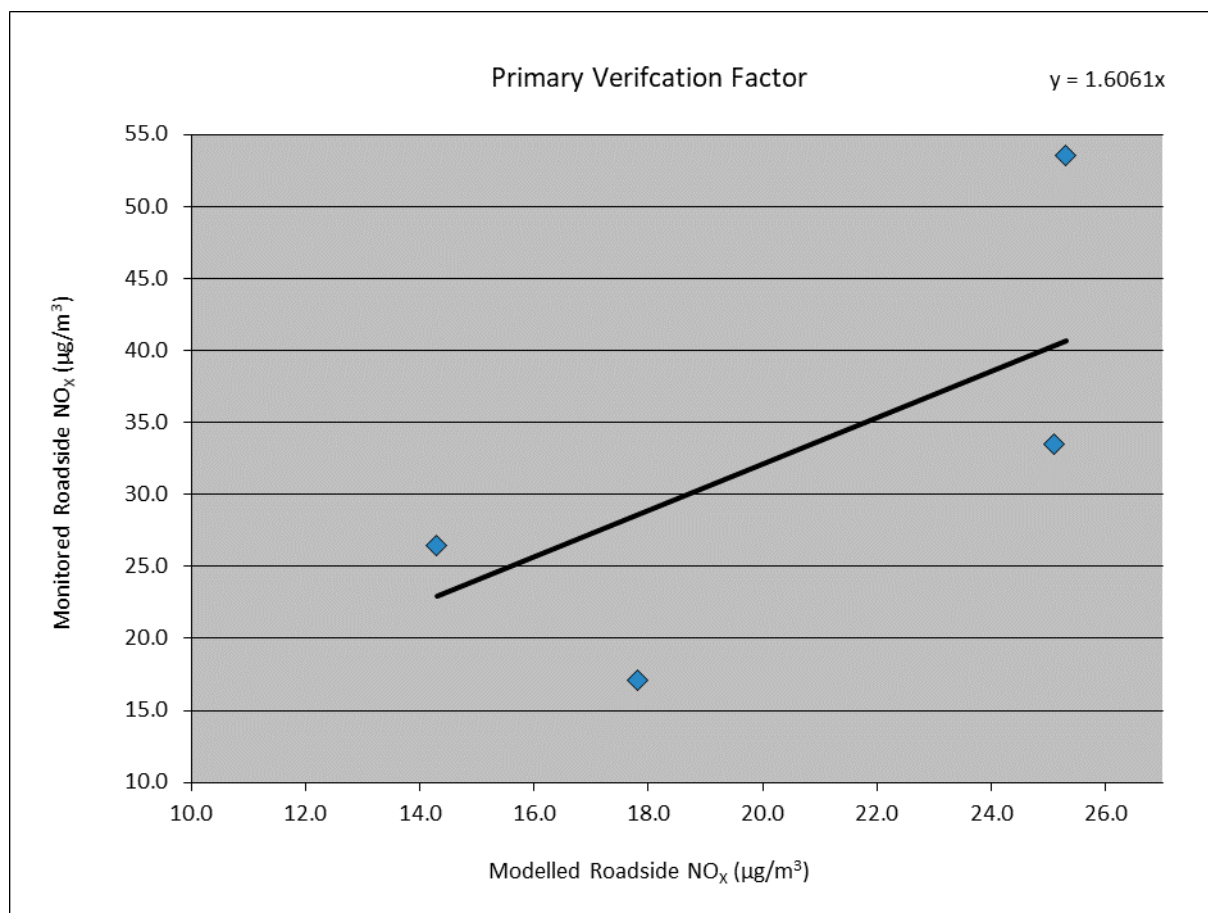




Table AII.6 presents the monitored annual mean NO_x concentrations and the adjusted modelled total NO₂ concentration based on the above verification factor. Exceedances of the relevant AQO are highlighted in **bold**.

Table AII.6 2017 NO₂ Monitoring Results

ID	Monitoring Location	Monitored NO ₂ Concentration (µg/m ³)	Adjusted Modelled Total NO ₂ Concentration (µg/m ³)	Difference (%)
1b	Langstone Road (West)	34.18	32.60	4.62%
12b	Xyratex	29.87	35.16	-17.73%
19b	Langstone Road (East, Bus Stop)	45.75	40.41	11.66%
19c	Langstone Road East (Woodbury)	37.33	40.28	-7.92%

As PM₁₀ monitoring is not undertaken within the assessment extents, the NO_x adjustment factor of **1.6061** was utilised to adjust model predictions of particulate matter in accordance with the guidance provided within LAQM (TG16)².



APPENDIX III CONSTRUCTION PHASE ASSESSMENT CRITERIA



CONSTRUCTION PHASE METHODOLOGY

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction'¹⁰.

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

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

The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- ▶ Annoyance due to dust soiling;
- ▶ Harm to ecological receptors; and
- ▶ The risk of health effects due to a significant increase in exposure to PM₁₀ and PM_{2.5}.

The assessment steps are detailed below.

Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2.

Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated to a risk category based on two factors:

- ▶ The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and
- ▶ The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

¹⁰ Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2017.



Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table AIII.1.

Table AIII.1 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	Earthworks	• Total site area greater than 10,000m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m³ • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m³ to 50,000m³ • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m² to 10,000m² • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m³ to 100,000m³ • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m



Magnitude	Activity	Criteria
Small	Demolition	- Total building volume under 20,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber) - Demolition activities less than 10m above ground level - Demolition during wetter months
	Earthworks	- Total site area less than 2,500m² - Soil type with large grain size (e.g. sand) - Less than 5 heavy earth moving vehicles active at any one time - Formation of bunds less than 4m in height - Total material moved less than 20,000 tonnes - Earthworks during wetter months
	Construction	- Total building volume less than 25,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	- Less than 10 HDV trips per day - Surface material with low potential for dust release - Unpaved road length less than 50m

Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table AIII.2.

Table AIII.2 Examples of Factors Defining Sensitivity of an Area

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	- Users expect of high levels of amenity - High aesthetic or value property - People expected to be present continuously for extended periods of time - Locations where members of the public are exposed over a time period relevant to the AQO for PM₁₀ e.g. residential properties, hospitals, schools and residential care homes	Internationally or nationally designated site e.g. Special Area of Conservation



Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Medium	- Users would expect to enjoy a reasonable level of amenity - Aesthetics or value of their property could be diminished by soiling - People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	Nationally designated site e.g. Sites of Special Scientific Interest
Low	- Enjoyment of amenity would not reasonably be expected - Property would not be expected to be diminished in appearance - Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads	Locally designated site e.g. Local Nature Reserve

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts during the construction phase:

- ▶ Any history of dust generating activities in the area;
- ▶ The likelihood of concurrent dust generating activity on nearby sites;
- ▶ Any pre-existing screening between the source and the receptors;
- ▶ Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- ▶ Any conclusions drawn from local topography;
- ▶ Duration of the potential impact, as a receptor may become more sensitive over time; and
- ▶ Any known specific receptor sensitivities which go beyond the classifications given in the document.

These factors were considered in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table AIII.3.

Table AIII.3 Sensitivity of the Area to Dust Soiling Effects on People and Property

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



Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

Table AIII.4 outlines the sensitivity of the area to human health impacts.

Table AIII.4 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m ³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m ³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m ³	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m ³	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low



Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
Low	-	More than 1	Low	Low	Low	Low	Low

Table AIII.5 outlines the sensitivity of the area to ecological impacts.

Table AIII.5 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table AIII.6 outlines the risk category from demolition activities

Table AIII.6 Dust Risk Category from Demolition

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

Table AIII.7 outlines the risk category from earthworks and construction activities.

Table AIII.7 Dust Risk Category from Earthworks and Construction

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

Table AIII.8 outlines the risk category from trackout.



Table AIII.8 Dust Risk Category from Trackout

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

Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.



APPENDIX IV - ASSESSOR'S CURRICULUM VITAE



CONAL KEARNEY

Head of Noise and Air

BEng(Hons), MSc, MIAQM, MEnvSc

KEY EXPERIENCE:

Conal is Head of Noise and Air with specialist experience in the air quality and odour sector. His key capabilities include:

- ▶ Advanced atmospheric air dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS and AIRVIRO.
- ▶ Preparation of factual and interpretative Air Quality Assessment reports and Air Quality Environmental Statement chapters in the vicinity of proposed schemes and developments in accordance with DEFRA, Environment Agency and Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) methodologies.
- ▶ Management and delivery of project work on key, land development and urban regeneration projects.
- ▶ Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- ▶ Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- ▶ Dust and Odour impact assessments from minerals and waste sites
- ▶ Representing clients at public enquiries and planning hearings.

QUALIFICATIONS:

- ▶ Bachelor of Engineering
- ▶ Master of Science
- ▶ Member of Institute of Air Quality Management
- ▶ Member of the Institute of Environmental Science (IES)

SELECT PROJECTS SUMMARY:

Industrial Developments

Buck Park, Denholme - AQA and dust assessment for proposed mineral extraction and site restoration project.

Messingham Quarry, North Lincolnshire - AQA and dust impacts for proposed new sand extraction site.

Arden Quarry, Derbyshire - AQA for proposed mineral extraction and site restoration

Calder Brick Works, Yorkshire - AQA for proposed site restoration plan

Coopers Moss, St Helens AQA and dust assessment for materials import and site restoration.

Clayton Hall Landfill, Chorley - AQA and odour assessment for proposed landfill extension and mineral extraction.

Highways Developments

Alderley Edge Bypass, Cheshire - AQA for major new road scheme.

South Heywood – EIA for new link road and mixed use joint development

Residential Developments

Beck's Mill, Silsden – AQA and emissions calculation for proposed residential development

Bredbury Curve, Stockport - AQA assessment for proposed residential development in AQMA.

Hollin Lane, Middlewich – AQA for large scale residential development.

Friars School, Southwark, London. School development for mixed use education and residential building in AQMA.

Abbotsford House, Bearsden, Scotland – AQA and dust assessment for residential development

Kelvedon Street, Newport, South Wales – AQA for new housing development

Westcraig, Edinburgh - EIA for residential development

Public Sector

Technical advisor on Manchester Airport Consultative Committee - advise members on environmental technical matters in relation to the airport's operations.

Cheshire County Council - compile AQ chapters for Local Transport Plan

Cheshire East Council - specialist AQ advice on highways, minerals and waste projects

Local Air Quality Management

Broughton Gyratory, Chester - dispersion model for City Centre detailed assessment report

Congleton town centre - dispersion modelling assessment for detailed and further assessment reports.

Disley - dispersion modelling assessment for detailed and further assessments

Holmes Chapel - dispersion modelling assessment for detailed and further assessment reports for road and rail sources.

Crewe - town centre dispersion modelling for detailed and further assessment reports.

Commercial Developments

Granta Park Daycare Centre, Oxfordshire. AQA for new build daycare centre adjacent to major road.

Curzon Cinema, Colchester. Air quality assessment for town centre new build cinema.

Newfoundland Circus, Bristol - AQA for hotel development in city centre

Salesians School, Chertsey - AQA for school extension near M25



Rachael Harrison

Graduate Air Quality Consultant

BSc (Hons).

KEY EXPERIENCE:

Rachael is a Graduate Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- ▶ Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail and commercial sectors.
- ▶ Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use.
- ▶ Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- ▶ Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- ▶ Production of air quality mitigation strategies for developments throughout the UK.
- ▶ Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- ▶ Bachelor of Science

SELECT PROJECTS SUMMARY:

Environmental Impact Assessment:

Warburton Lane, Trafford – EIA for a large scale residential development of 473 dwellings

Residential Development:

Smithy Bridge Air Quality Assessment in support of a proposed development comprising of 200 residential dwellings in close proximity to the A58. Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads to consider site suitability for the proposed end-use. Pollutant concentrations were predicted to be above the air quality standards at sensitive locations across the site and as such mitigation measures were required and referenced. Subject to the inclusion of the relevant mitigation measures, air quality issues were not considered a constraint to planning consent

Minster Way, East Yorkshire AQA for a Large scale residential development comprising a two phase development of circa 400 residential units.

Hucknall, Nottinghamshire AQA In support of a residential development of the site to provide 60 residential dwelling.

Vaughan Way, Leicester AQA in support of an extension to an existing building to provide 39 residential units across four additional floors.

Thame Park Road, Thame AQA in support of 175 residential dwellings with an additional 25 residential dwellings for a second phase.

Mixed Use Development:

Rotherhithe Street, Southwark - Air Quality Assessment in support of a proposed mixed use scheme mixed use development comprising of circa 7 residential units and one commercial unit. Concerns were raised as the site was located within the London Borough of Southwark AQMA. Subsequently, there were concerns the proposals would introduce future users to poor air quality. Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads to consider site suitability for the proposed end-use. Pollutant concentrations were predicted to be below the relevant AQO across the site, air quality was not considered to be a planning constraint

Commercial Development

132 Broughton Street, Manchester - AQA in support of a proposed Cash and carry Warehouse located in the vicinity of Great Manchester AQMA.

Weston Hall Farm, Crewe AQA in support of the proposal comprising the change of use of current agricultural buildings to form a new commercial warehouses.

Holloway Road, Islington AQA in support of a two storey extension above the existing site to provide approximately 430m² of additional floor space for office use Concerns were raised as the site was located within the London Borough of Islington AQMA