

Air Quality Assessment

Oxford Road, Reading

September 2020

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Document Control:

Project no.	Project
9789.S	Oxford Road, Reading

Report No.	Ver/rev	Written By:	Checked by:	Authorised by:	Date
9879.S	Draft v0	J. Mills	R. Boakes	N. Jenkins	24/09/2020
	Final v1	J. Mills	R. Boakes	P. Beckett	29/09/2020

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1. Introduction

- 1.1 Phlorum Ltd has been commissioned by Nexus Planning Ltd on behalf of Stonegate Homes Ltd to undertake an Air Quality Assessment (AQA) for the proposed development site at Oxford Road, Reading, RG30 1AH, in the administrative boundary of Reading Borough Council (RBC). The National Grid Reference for the centre of the site is 469723, 173679. A site location plan is included in Figure 1.
- 1.2 It is understood that the proposal is a mix-use development consisting of 70m² of ground floor commercial space and 24 residential units.
- 1.3 The application site is situated approximately 40m off the A239 Oxford Road, 1.4km north-west of Reading city centre. The development is situated 0.5km south of Reading's main railway lines, and 0.6km west of Reading West train station. Land use in the vicinity of the site comprises primarily residential areas, with commercial uses and some greenspaces also nearby.
- 1.4 The main sources of air pollution within the vicinity of the application site are vehicles travelling on the local road network, particularly the nearby A239 Oxford road.
- 1.5 In 2006, RBC declared six Air Quality Management Areas (AQMA) due to exceedances of the annual mean Air Quality Standard for nitrogen dioxide (NO₂). RBC revoked these six AQMA and replaced them with a single AQMA in 2009. The AQMA consists of an area encompassing all the main arterial routes in and out of Reading. One of the arterial routes included in this AQMA is the A329 Oxford Road, adjacent to which the application site is located. The application site is situated within the Reading AQMA.
- 1.6 As such, a focus of this report will be to qualitatively assess the impacts of the proposed development's traffic generation on Reading AQMA. With the A329 Oxford Road in close proximity to the application site, a focus of this report will also be to qualitatively assess the suitability of the site, in air quality terms, for the introduction of new sensitive receptors.

2. Policy Context

The UK Air Quality Strategy

- 2.1 The UK Air Quality Strategy (UKAQS)¹ set out air quality standard (AQS) concentrations for a number of key pollutants that are to be achieved at sensitive receptor locations across the UK by corresponding air quality objective (AQO) dates. The sensitive locations at which the standards and objectives apply are those where the population are reasonably expected to be exposed to said pollutants over the particular averaging period.
- 2.2 For those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to compare concentrations against the standards are areas of residential housing. It is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time.
- 2.3 Schools and children's playgrounds are also often used as sensitive locations for comparison with annual mean objectives due to the increased sensitivity of young people to the effects of pollution (regardless of whether or not their exposure to the pollution could be over an annual period). For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time. A summary of the AQS relevant to this assessment are included in Table 2.1, below.

Table 2.1 UK Air Quality Standards and Objectives.

Pollutant	Averaging Period	Air quality standard ($\mu\text{g.m}^{-3}$)	Air quality objective	Objective: to achieve the standard by
Nitrogen dioxide (NO_2)	1 hour	200	200 $\mu\text{g.m}^{-3}$ not to be exceeded more than 18 times a year	31 December 2005
	Annual	40	40 $\mu\text{g.m}^{-3}$	31 December 2005
Particulate Matter (PM_{10})	24 hour	50	50 $\mu\text{g.m}^{-3}$ not to be exceeded more than 35 times a year	31 December 2004
	Annual	40	40 $\mu\text{g.m}^{-3}$	31 December 2004
Particulate Matter ($\text{PM}_{2.5}$)	Annual	25	25 $\mu\text{g.m}^{-3}$	2020

¹ Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2) July 2007.

- 2.4 The objectives adopted in the UK are based on the Air Quality (England) Regulations 2000², as amended, for the purpose of Local Air Quality Management. These Air Quality Regulations have been adopted into UK law from the limit values required by European Union Daughter Directives on air quality.
- 2.5 Obligations under the Environment Act 1995 require local authorities to declare an AQMA at sensitive receptor locations where an objective concentration has been predicted to be exceeded. In setting an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels.
- 2.6 RBC set out its AQAP³ in January 2009, following the declaration of the Reading AQMA. An updated AQAP was issued by RBC in 2016⁴, outlining progress made since 2009 along with future actions and strategies to reduce pollution levels within the AQMA and across Reading.

National Planning Policy Framework

- 2.7 The National Planning Policy Framework (NPPF)⁵, which was revised in June 2019, sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. A core principle in the NPPF that relates to air quality effects from development is that planning should "contribute to conserve and enhance the natural and local environment". In achieving this, it states in paragraph 170 that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: [...]"

preventing 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 [...]"

- 2.8 With regard to assessing cumulative effects the NPPF states the following at paragraph 180:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.

3 Reading Borough Council. (2009). *Air Quality Action Plan*.

4 Reading Borough Council. (2016). *Air Quality Action Plan Update*.

5 Department for Communities and Local Government (DCLG), (2019), National Planning Policy Framework.

- 2.9 Regarding compliance with relevant limit values and national objectives for pollutants the NPPF, paragraph 181 states:

“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.”

- 2.10 The NPPF offers a broad framework but does not afford a detailed methodology for assessments. Specific guidance for air quality continues to be provided by organisations such as the Department for Environment, Food and Rural Affairs (Defra), Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM).

National Planning Practice Guidance

- 2.11 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (PPG)⁶, which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.
- 2.12 As well as describing the importance of International, National and Local Policies (detailed elsewhere in this report), it summarises the key sources of air quality information. It also explains when air quality is likely to be relevant to a planning decision, stating:

“Considerations that may be relevant to determining a planning application include whether the development would:

- Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the*

⁶ Planning Practice Guidance (PPG) 32. (updated Nov 2019). Air Quality.
<http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/>.

proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;

-  *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
-  *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
-  *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
-  *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

2.13 Details are also provided of what should be included within an air quality assessment. Key considerations include:

-  Baseline local air quality;
-  Whether the proposed development could significantly affect local air quality during construction/operation; and
-  Whether the development is likely to expose more people to poor air quality.

2.14 Examples of potential air quality mitigation measures are also provided in the PPG.

Local Planning Policy

2.15 The Reading Borough Council Local Plan⁷ is RBC's key planning document, adopted in November 2019 with the intention of guiding development within the borough up to 2036, to improve both the quality of people's lives and the environment in which they live. The plan provides a basis for achieving a sustainable and prosperous future for Reading.

⁷ Reading Borough Council. (2019). *Reading Borough Local Plan* – Adopted November 2019.

- 2.16 RBC's Local Plan stipulates the need to abide by NPPF regulations and encourage sustainable transport amongst other actions. Policies of relevance to air quality are outlined below:

Policy CC6: Accessibility and the Intensity of Development highlights the need for developments to be accessible by a range of transport modes, including sustainable choices:

"The scale and density of development will be related to its level of accessibility by walking, cycling and public transport to a range of services and facilities, with the densest and largest scale development taking place in the most accessible locations. Unless it can be demonstrated that the accessibility of a site is to be significantly upgraded, for example, by providing high quality pedestrian routes or providing access to good public transport services, any new development must be at a scale, density and intensity appropriate to that level of accessibility."

"It is important that development is accessible by a choice of modes of transport. This means that the primary locations for new development will be those accessible by walking and cycling to a wide range of employment, services and facilities, leisure, education and health facilities, or which are accessible by walking to routes/stops of frequent public transport services that provide easy access to the aforementioned uses."

Policy CC9 – Securing Infrastructure:

"Proposals for development will not be permitted unless infrastructure, services, resources amenities or other assets lost or impacted upon as a result of the development or made necessary by the development will be provided through direct provision or financial contributions at the appropriate time".

The policy states that where identified and justified, measures to tackle poor air quality or for on-going air quality monitoring should be implemented.

Policy EN15: Air Quality states the following:

"Development should have regard to the need to improve air quality and reduce the effects of poor air quality."

- i. *Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:*

-  *Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;*

 *Whether the development is within, or accessed via, an air quality management area; and*

 *Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health, or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*

ii. *Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.*

iii. *Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring."*

2.17 Sustainability policies CC2, CC3, and CC5 relating to Sustainable Design and Construction, Adaptation to Climate Change and Waste Minimisation and Storage, respectively outline features that proposed developments can implement to help achieve sustainable development.

2.18 Policy CC2: Sustainable Design and Construction states that:

"Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change."

Policies TR1: Achieving the Transport Strategy, TR5: Car and Cycle Parking and Electric Vehicle Charging highlight the importance of reducing transport emissions to achieve improvements in air quality.

2.19 Lastly, Policy CR12: West Side Major Opportunity Area outlines the following regarding developments in the Oxford Road area:

"Development of this area will be primarily for residential, with potential for community uses. There may also be some small-scale retail and leisure uses on the Oxford Road frontage. This area is surrounded by heritage assets or low-rise residential, and inappropriate building scale at the fringes of the site will not be permitted. There is an opportunity to improve Oxford road Frontage, including with tree planning.

- 2.20 Reading Borough Council's Local Plan is supported by a Sustainable Design and Construction Supplementary Planning Document (SPD)⁸, adopted in December 2019. This SPD explains planning requirements regarding to energy, climate change, water management and waste reduction. The purpose of this document is to guide developers and decision-makers on the implementation of key sustainability policies set out in the Reading Local Plan, it is a material consideration in the determination of planning applications.
- 2.21 The Sustainable Design and Construction SPD highlights some sustainable design features that may help to alleviate air quality including the installation of green walls or living walls and protecting existing woodlands in conjunction with additional tree planting.

⁸ Reading Borough Council. (2019). *Sustainable Design and Construction Supplementary Planning Document*.

3. Assessment Methodology

Guidance

- 3.1 Defra's Local Air Quality Management Technical Guidance (LAQM.TG(16))⁹ was followed in carrying out the assessment. Guidance published by the IAQM¹⁰ on the '*Assessment of Dust from Demolition and Construction*' was also used to assess the risk of dust emissions during the construction phase of the proposed development. The Greater London Authority (GLA) Supplementary Planning Guidance¹¹ on the control of dust from construction has also been referred to, which is considered best practice guidance for the UK. It details a number of mitigation measures that should be adopted to minimise adverse impacts from dusts and fine particles.
- 3.2 The latest Environmental Protection UK (EPUK) & IAQM guidance on '*Planning for Air Quality*'¹² was also referred to throughout the assessment.

Baseline

- 3.3 The baseline air quality conditions in the vicinity of the site are established through the compilation and review of appropriately sourced background concentration estimates and local monitoring data.
- 3.4 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website¹³. These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km² National Grid square locations across the UK. At the time of writing, the most recent background maps were from September 2020 and based on monitoring data from 2018.
- 3.5 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emissions sources within the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.

9 Defra. 2016. Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management, Technical Guidance LAQM. TG(16). London: Defra.

10 IAQM. (2014). Guidance on the assessment of dust from demolition and construction.

11 Greater London Authority. (2014). The Control of Dust and Emissions During Construction and Demolition.

12 EPUK & IAQM. (2017). Land-Use Planning & Development Control: Planning For Air Quality.

13 Defra: UK-AIR. www.uk-air.defra.gov.uk

- 3.6 Monitoring at background locations is considered an appropriate source of data for the purposes of describing baseline air quality. RBC undertake extensive automatic and non-automatic monitoring across Reading, these data were reviewed to establish baseline air quality. The most recent available data at the time of writing, from RBC's 2020 annual status report (ASR)¹⁴, have been included and assessed.

Construction Phase

- 3.7 The construction phase of the proposed development will involve a number of activities that could potentially produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles.
- 3.8 The IAQM's guidance to assess the impacts of construction on human and ecological receptors has been followed in carrying out this air quality assessment. The guidance suggests that where a receptor is located within 350m (50m for statutory ecological receptors) of a site boundary and/or 50m of a route used by construction vehicles, up to 500m from the site entrance, a dust assessment should be undertaken. High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. Figure 2 shows receptors that could be sensitive to dust that are located within 350m of the boundaries of the site.
- 3.9 The Multi Agency Geographic Information for the Countryside (MAGIC) website¹⁵, which incorporates Natural England's interactive maps, has been reviewed to identify whether any statutory ecological sensitive receptors are situated within 50m of the site boundary or within 50m of any routes used by construction vehicles on the public highway, up to 500m from the site entrance. The application site at Oxford Road lies 1.3km away from the nearest designated statutory site, the Lousehill Copse nature reserve. As such, based on distance alone, impacts on statutory ecological receptors can be considered insignificant and will not be discussed further in this report.

Construction Significance

- 3.10 The IAQM guidance suggests that Demolition, Earthworks, Construction and Trackout should all be assessed individually to determine the overall significance of the construction phase.

¹⁴ Reading Borough Council. (2020). *2020 Air Quality Annual Status Report (ASR)*

¹⁵ Natural England and MAGIC partnership organisations. Multi Agency Geographic Information for the Countryside. <http://www.magic.gov.uk/> (accessed September 2020).

- 3.11 In the IAQM dust guidance, the first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered 'Negligible', 'Small', 'Medium' or 'Large' for each of the construction stages. Whilst the IAQM provides examples of criteria that may be used to assess these magnitudes, the vast number of potential variables mean that every site is different and therefore professional judgement must be applied by what the IAQM refer to as a "technically competent assessor". The construction phase assessment therefore relies on the experience of the appraiser.
- 3.12 As such, attempts to define precisely what constitutes a negligible, small, medium or large dust emission magnitude should be treated with caution. Factors such as the scale of the work, both in terms of size and time, the construction materials and the plant to be used must be considered.
- 3.13 The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:

"the sensitivity of the area takes into account a number of factors:

-  *the specific sensitivities of receptors in the area;*
-  *the proximity and number of those receptors;*
-  *in the case of PM₁₀, the local background concentrations; and*
-  *site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust."*

- 3.14 Based on these factors, the area is categorised as being of 'Low', 'Medium' or 'High' sensitivity.
- 3.15 When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The IAQM provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the stages assessed. Again, this is subject to professional judgement.
- 3.16 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the site will also be released. However, the volumes and periods over which these releases will occur are unlikely to result in any significant peaks in local air pollution concentrations and therefore this has been scoped out of the assessment.

Operational Phase

Road Transport Sources

- 3.17 Vehicle emissions will arise from the combustion of fossil fuels in vehicle engines and their subsequent release to atmosphere via tailpipe exhausts. The most significant pollutants released by cars and other vehicles are oxides of nitrogen (NO_2/NO_x) and particulate matter (PM_{10} and $\text{PM}_{2.5}$). Releases of carbon monoxide (CO) and some volatile hydrocarbons (e.g. benzene and 1,3-butadiene) are of less significance and are not assessed further in this report.
- 3.18 As it is elevated annual mean concentrations of NO_2 and PM_{10} that have resulted in the declaration of most AQMA across the UK, these are the pollutants of most concern and they have therefore been the focus of this air quality assessment. $\text{PM}_{2.5}$, which is another fraction of particulate matter, has also been considered.

Roads Assessment

- 3.19 The latest EPUK & IAQM planning guidance¹² provides indicative thresholds for changes in traffic flows which would require a detailed air quality assessment, when in or adjacent to an AQMA. These are a change in 24-hour average annual daily traffic (AADT) flows of >100 light duty vehicles (LDV) and/or >25 heavy duty vehicles (HDV). Changes below these thresholds can be reasonably considered to have an insignificant impact on air quality.
- 3.20 Traffic data provided by the transport consultants for the project, I-Transport, show that the proposed development is expected to generate an increase of approximately 78 AADT to the east of the site and 91 AADT to the west of the site. As such, the scheme-generated traffic is below the EPUK / IAQM threshold and a detailed assessment of the proposed development's impacts on local air quality is not required.
- 3.21 In addition, it is necessary to determine whether the proposed development could introduce new receptors into an area of existing poor air quality. The current proposed development is located between the A329 Oxford Road, 30m to the south and Curzon Street, the minor road located 5m north of the site. The application site is separated from the nearest major road, the A329 Oxford Road by a number of single storey and two-storey buildings. With this in mind, and using guidance set out within LAQM.TG(16)⁹ and the AEA 'Diffusion Tube for Ambient NO_2 Monitoring: Practical Guidance' document¹⁶, it is considered that annual mean pollutant concentrations at the proposed development would likely be approaching the background levels discussed in Section 4 of this report.
- 3.22 As such, it is considered unlikely that the proposed development will introduce new receptors into an area of existing poor air quality.

16 AEA Energy and Environment (2008). Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users.

- 3.23 Based on the above, the need to include a dispersion model to both assess the potential impact of the development at existing receptor locations, or to assess the suitability of the site, in air quality terms, has been scoped out.
- 3.24 Further analysis of site suitability, in air quality terms is undertaken in the Baseline Air Quality Assessment.

Consultation

- 3.25 RBC's Senior Environmental Health Officer was contacted on 22/09/2020 to discuss the scope of this assessment. A response was received on 24/09/2020 with the following agreement:

"That all sounds in line with what I would expect, I don't have any special requirements other than using the existing background levels for future years, as monitoring suggests that background levels are not falling in line with the published predictions."

- 3.26 The above agreement has been accounted for by drawing comparisons from UK-AIR predicted background concentrations from 2020 and RBC's monitoring data from 2019.

4. Baseline Assessment

- 4.1 This chapter is intended to establish prevailing air quality conditions in the vicinity of the application site.

UK-AIR Background Pollution

- 4.2 The UK-AIR predicted background pollution concentrations for NO₂, PM₁₀ and PM_{2.5} for 2018 to 2023 are presented in Table 4.1. These data were taken from the central grid square location closest to the application site (i.e. grid reference: 469500, 173500).

Table 4.1: 2018 to 2023 background concentrations of pollutants at the application site.

Pollutant	Predicted background concentration (µg.m ⁻³)						Averaging Period	Air quality standard concentration (µg.m ⁻³)
	2018	2019	2020	2021	2022	2023		
NO ₂	16.8	16.1	15.3	14.9	14.5	14.2	annual mean	40
PM ₁₀	17.5	17.2	16.8	16.6	16.5	16.3	annual mean	40
PM _{2.5}	12.5	12.3	12.0	11.9	11.7	11.6	annual mean	25

- 4.3 The data in Table 4.1 show that annual mean background concentrations of NO₂, PM₁₀ and PM_{2.5}, in the vicinity of the application site between 2018 and 2023, were predicted to be well below their respective AQSS. The data show that in 2020, NO₂, PM₁₀ and PM_{2.5} concentrations were predicted to be below their AQSSs by 61.75%, 58.0% and 52.0%, respectively.
- 4.4 Concentrations of all pollutants were predicted to decline each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles, but also due to UK national and international plans to reduce emissions across all sectors.

Local Sources of Monitoring Data

- 4.5 Air quality monitoring is considered an appropriate source of data for the purposes of describing baseline air quality. At the time of writing, the most recent ASR¹⁴ released by RBC included 2019 data.

Automatic Monitoring

- 4.6 RBC currently undertakes automatic (continuous) monitoring of NO₂ at three locations; on Caversham Road, Oxford Road and London Road. Additionally, Defra's Automatic Urban and Rural Network (AURN) operates at one location in Reading. Data from the AURN automatic monitor situated in the Reading Old Cemetery has also been included. The most recent available data from these monitors are included in Table 4.2.

Table 4.2: NO₂ Monitoring Data from RBC Automatic Monitors

Monitor	Type	Distance from the application site (km)	NO ₂ annual mean concentration (µg.m ⁻³)			
			2016	2017	2018	2019
RD3 (Oxford Rd)	R	1.1	30	28	28	26
RD1 (Caversham Rd)	R	1.6	39	37	40	35
Reading AURN	UB	3.7	34	29	26	22
RD4 (London Rd)	R	3.9	32	28	30	27

Note: "R" = Roadside; "UB" = Urban Background. "**Bold**" denotes exceedance of the AQS.

- 4.7 The data in Table 4.2 show that annual mean NO₂ concentrations at automatic monitors RD1, RD3 and RD4 were below the 40µg.m⁻³ AQS by 12.5%, 35.0% and 32.5 in 2019, respectively. The Reading AURN automatic monitor recorded annual mean NO₂ concentrations 45% below the 40µg.m⁻³ AQS. Recorded concentrations were mostly below the AQS at all monitors, between 2016 and 2019. RD1 recorded an annual mean NO₂ concentration equalling the AQS during 2018. Given the roadside locations of automatic monitors RD1, RD3 and RD4, these measurement sites are not considered to be representative of likely baseline concentrations at the application site.
- 4.8 The Reading AURN is situated in an urban background location, distanced from any significant sources of pollution. Measurements at this site are more likely to be representative of those recorded at the application site, although the Reading AURN is positioned 3.7km away from the application site.
- 4.9 RBC also undertakes automatic monitoring of PM₁₀ at all four locations mentioned previously. The most recent available PM₁₀ data from these monitors are included in Table 4.3.

Table 4.3: PM₁₀ Monitoring Data from RBC Automatic Monitors

Monitor	Type	Distance from the application site (km)	PM ₁₀ annual mean concentration (µg.m ⁻³)			
			2016	2017	2018	2019
RD3 (Oxford Rd)	R	1.1	22	21	23	21
RD1 (Caversham Rd)	R	1.6	20	23	24	24
Reading AURN	UB	3.7	13	12	13	13
RD4 (London Rd)	R	3.9	19	18	17	17

- 4.10 The data in Table 4.3 show that annual mean PM₁₀ concentrations remained well below the annual-mean AQS at all monitors from 2016 through 2019. The roadside automatic monitors RD1, RD3 and RD4 recorded 2019 PM₁₀ concentrations 40.0%, 47.5% and 57.5% below the 40µg.m⁻³ AQS.
- 4.11 The Reading AURN also recorded annual-mean PM₁₀ concentrations well below the AQS throughout the monitoring period. In 2019, recorded PM₁₀ concentrations were 67.5% below the 40µg.m⁻³ AQS.
- 4.12 RBC does not undertake any monitoring of PM_{2.5}. However, Defra's AURN undertakes monitoring of PM_{2.5}, as such the latest available PM_{2.5} monitoring data from the Reading AURN are shown in Table 4.4 below.

Table 4.4: PM_{2.5} Monitoring Data from the AURN

Monitor	Type	Distance from the application site (km)	PM _{2.5} annual mean concentration (µg.m ⁻³)			
			2016	2017	2018	2019
Reading AURN	UB	3.7	9	10	7	8

- 4.1 The data in Table 4.3 show that annual mean PM_{2.5} concentrations at the Reading AURN measurement site remained well below the annual-mean AQS throughout the monitoring period. Recorded PM_{2.5} concentrations in 2019 remained 68.0% below the 25µg.m⁻³ AQS.

Non-Automatic Monitoring

- 4.2 RBC also operates an extensive non-automatic, NO₂ diffusion tube monitoring network across the area. The most recent available monitoring data for diffusion tubes located within 1km of the application site are included in Table 4.5.

Table 4.5: Monitoring data from RBC's NO₂ diffusion tubes

Monitor	Type	Distance from the application site (km)	NO ₂ annual mean concentration (µg.m ⁻³)			
			2016	2017	2018	2019
494 Oxford Rd	R	0.24	37	32	35	29
327 Oxford Rd	R	0.36	40	40	39	34
Cow Lane Bridges	K	0.50	32	33	29	34
281 Oxford Rd	R	0.59	44	45	42	36
689 Oxford Rd	R	0.76	40	41	37	35
744 Oxford Rd	R	0.79	46	42	47	39

Note: "R" = Roadside; "K" = Kerbside. **Bold** denotes exceedance of the AQS.

- 4.3 The data in Table 4.5 show that annual mean NO₂ concentrations across Reading AQMA occasionally exceeded the 40µg.m⁻³ AQS between 2016 and 2018. During 2019 the annual mean AQS for NO₂ was not exceeded at any monitoring location within 1km of the application site.
- 4.4 The non-automatic monitor closest to the site at 494 Oxford Road recorded an annual mean NO₂ concentration of 29µg.m⁻³ in 2019, 27.5% below the 40µg.m⁻³ AQS.

- 4.5 Overall NO₂ concentrations within 1km of the application site decreased from 2016 to 2019. Four monitors recorded exceedances of the annual mean AQS for NO₂ in 2016 compared to none recording exceedances in 2019.
- 4.6 The highest annual mean NO₂ concentration recorded in 2019 was just 2.5% below the 40µg.m⁻³ AQS at the measurement site 744 Oxford Road. Measurements at this site exceeded the 40µg.m⁻³ AQS during all previous years dating back to 2016.
- 4.7 It should be noted that all diffusion tubes within a 1km radius of the application site are situated in either kerbside or roadside locations, with many adjacent to the busy A329 Oxford Road. The locations of these diffusion tubes, often adjacent to busy roads suggests that measured pollutant concentrations at these sites are unlikely to be representative of baseline conditions at the application site. The diffusion tube closest to the application site which measures NO₂ at urban background levels is situated 3.76km to the east.

Site Suitability

- 4.8 The AEA 'Diffusion Tube for Ambient NO₂ Monitoring: Practical Guidance (AEA guidance) provides further detailed definitions which help to classify urban background sites. Specifically, section 3.2.2. states that, where a site meets the following criteria, they can be reasonably defined as being in an urban background location, away from adverse impacts associated with emissions from road sources:
-  >50m from any major source of NO₂ (e.g. multi-storey car parks);
 -  >30m from any 'very busy' road (>30,000 vehicles per day);
 -  >20m from a 'busy' road (10,000 – 30,000 vehicles per day);
 -  >10m from any 'main' road; and
 -  >5m from locations where vehicles may stop with their engines idling.
- 4.9 Traffic data from counts conducted by the Department for Transport¹⁷ (DfT) show that in 2018, the nearby A329 Oxford Road had estimated 24-hour average annual daily traffic flow (AADT) of 13,721 vehicles. As such, the A329 Oxford Road can be classified as a 'busy' road.

17 Department for Transport (2020). <https://roadtraffic.dft.gov.uk/manualcountpoints/6924> [Accessed 16/09/2020].

- 4.10 The application site is situated 36m north from the kerbside of the A329 Oxford Road. Therefore, using the above criteria, the proposed development site at Oxford Road can be classified as an urban background site. Following the AEA and LAQM.TG(16) guidance, it is expected that pollutant concentrations at the site are likely to be similar to those identified at urban background sites within the area.
- 4.11 UK-AIR estimates and pollutant concentrations recorded at the Reading AURN suggest that background concentrations in the vicinity of the application site will be well below the relevant AQs.
- 4.12 Therefore, the site is anticipated to be suitable, in air quality terms for its proposed end use, and no further assessment of site suitability is required.

5. Construction Phase Impacts

- 5.1 The construction phase of the proposed development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust.
- 5.2 The estimates for the dust emission magnitude for demolition, earthworks, construction and trackout below are based on the professional experience of Phlorum's consultants, information provided by the client and Google Earth imagery.

Dust Emission Magnitude

Demolition

- 5.3 There is to be no demolition works at the Oxford Road application site. Therefore, no dust emission magnitude can be applied for demolition at this site, and the demolition phase is not considered further within this report.

Earthworks

- 5.4 The total area of the site within the red line boundary is 0.16 acres, which falls into the IAQM's 'Small' dust emission category.
- 5.5 It is not known exactly what amount of earth would need to be moved during earthworks.
- 5.6 The overall dust emission magnitude for the earthworks stage has been based on the total area of the site and is considered to be *Small* with reference to IAQM guidance.

Construction

- 5.7 During construction, activities that have the potential to cause emissions of dust may include concrete batching, sandblasting and piling. Localised use of cement powder and general handling of construction materials also have the potential to generate dust emissions, as does the effect of wind-blow from stockpiles of friable materials.
- 5.8 A concrete structure with masonry infills which has a moderate potential for dust release, and piling, with a large potential for dust release, are to be used and carried out on site. The proposed development will have a total construction volume of smaller than 25,000m³, falling into the IAQMs 'Small' category.
- 5.9 As such, and for conservative purposes, the overall dust emission magnitude during construction is considered to be *Medium*.

Trackout

- 5.10 Construction traffic, when travelling over soiled road surfaces, has the potential to generate dust emissions and to also add soil to the local road network. During dry weather, soiled roads can lead to dust being emitted due to physical and turbulent effects of vehicles. No unpaved road surfaces will be utilised during construction.
- 5.11 As well as the type of road surface, the number of daily heavy-duty vehicles (HDVs) accessing the site can be used to determine dust emission magnitude during construction: <10 Small; 10-50 Medium; and >50 Large. Less than 10 HDVs are anticipated to visit the site in any one day.
- 5.12 As no unpaved road surfaced will be utilised during construction and less than 10 of HDVs are anticipated to be accessing the site per day. Overall, the dust emission magnitude for the trackout phase is considered to be *Small*.

Emission Magnitude Summary

- 5.13 A summary of the dust emission magnitude as a result of the activities of Earthworks, Construction and Trackout as specified in the IAQM guidance, and discussed above, are listed in Table 5.1 below. Overall, the dust emission magnitude is considered to be *Medium*.

Table 5.1: Dust Emission Magnitude for the construction activities, based on the IAQM's guidance.

Activity	Dust Emission Magnitude
Earthworks	Small
Construction	Medium
Trackout	Small

Sensitivity of the Area

- 5.14 Having established the emission magnitudes for each phase above, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor.
- 5.15 High sensitivity human receptors include residential dwellings, schools and hospitals, but can include locations such as car showrooms when considering the impacts of dust soiling.

- 5.16 The impacts of dust emissions from the sources discussed above have the potential to cause an annoyance to human receptors living in the local area. Within distances of 20m of the site boundary there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.
- 5.17 With the exponential decline in dust with distance from dust generating activities, it is considered that for receptors more than 350m from the site boundary, the risk is negligible. Furthermore, the risks at over 100m only have the potential to be significant in certain weather conditions, e.g. downwind of the source during dry periods.
- 5.18 The approximate number of high sensitivity human receptors in the vicinity of the site is detailed in Table 5.2 below and shown in Figure 2.

Table 5.2: Approximate number of High Sensitivity Receptors close to the site.

Distance to site (m)	Approximate number of receptors	Receptor Details
<20	>10	Residential
<50	>50	Residential
<100	>150	Residential
<350	>400	Residential and Stagecoach Maidenhead

- 5.19 Figure 3 shows that the predominant wind direction at the closest relevant meteorological station at Farnborough Airport (2019) is from the south-west, with occasional strong winds from the north-east. As shown in Figure 2, there are numerous residential receptors in close proximity. As such, the sensitivity of the area to dust soiling impacts is defined as *High*.
- 5.20 UK-AIR predicted annual mean concentrations of PM₁₀ are predicted to be 50% lower than 25µg.m⁻³ at the site. This provides a good indication that PM₁₀ concentrations for both annual mean and daily mean concentrations are likely to be well below the respective AQSs at the site and adjacent uses. Therefore, the sensitivity of the area to human health impacts is defined as *Low*.

Risk of Impacts

- 5.21 Having established the potential dust emission magnitudes and sensitivity of the area, the risk of impacts can be determined in accordance with the IAQM guidance. These are summarised in Table 5.3.

Table 5.3: Summary of Impact Risk by Construction Stage based on the IAQM's dust guidance.

Stage	Impact Risk		
	Nuisance Dust	Ecology	PM ₁₀
Earthworks	Low	Negligible	Negligible
Construction	Medium	Negligible	Low
Trackout	Low	Negligible	Negligible

- 5.22 Overall, the proposed development is considered to be *Medium Risk* for nuisance dust soiling effects, *Low* for PM₁₀ health effects and to be *Negligible* for ecology, in the absence of mitigation.

Site Specific Mitigation

- 5.23 The GLA guidance¹¹ suggests a number of mitigation measures that should be adopted in order to minimise impacts from dusts and fine particles. Appropriate measures that could be included during construction of the proposed development include:
- 🌱 ideally cutting, grinding and sawing should not be conducted on-site and pre-fabricated material and modules should be brought in where possible;
 - 🌱 where such work must take place, water suppression should be used to reduce the amount of dust generated;
 - 🌱 skips, chutes and conveyors should be completely covered and, if necessary, enclosed to ensure that dust does not escape;
 - 🌱 no burning of any materials should be permitted on site;
 - 🌱 any excess material should be reused or recycled on-site in accordance with appropriate legislation;
 - 🌱 developers should produce a waste or recycling plan;
 - 🌱 following earthworks, exposed areas and soil stockpiles should be re-vegetated to stabilise surfaces, or otherwise covered with hessian or mulches;
 - 🌱 stockpiles should be stored in enclosed or bunded containers or silos and kept damp where necessary;
 - 🌱 hard surfaces should be used for haul routes where possible;
 - 🌱 haul routes should be swept/washed regularly;
 - 🌱 vehicle wheels should be washed on leaving the site;

- all vehicles carrying dusty materials should be securely covered; and
 - delivery areas, stockpiles and particularly dusty items of construction plant should be kept as far away from neighbouring properties as possible.
- 5.24 In addition, the IAQM lists recommended mitigation measures for low, medium and high Dust Impact Risks. The highly recommended mitigation measures for Medium Risk sites are included in Appendix A of this report.
- 5.25 Where dust generation cannot be avoided in areas close to neighbouring properties, additional mitigation measures should be put in place, such as: windbreaks, sprinklers, and/or time/weather condition limits on the operation of some items of plant or the carrying out of activities that are likely to generate a particularly significant amount of dust.

Residual Effects

- 5.26 After the implementation of the mitigation measures listed above and in Appendix A, the significance of each phase of the construction programme will be reduced and the residual significance of impact for the construction phase is expected to be *Negligible*.

6. Discussion

- 6.1 RBC declared an Air Quality Management Area (AQMA) which covers most of central Reading, due to exceedances in the long-term annual mean Air Quality Standards (AQSS) for NO₂. The AQMA consists of an area encompassing all the main arterial routes in and out of Reading, including the A329 Oxford Road. The proposed development is located within the Reading AQMA.
- 6.2 Pollution concentrations within and surrounding these AQMAs can be high, especially at roadside locations; however, data from the UK-AIR suggests background concentrations in the vicinity of the site are well below the key AQSS for NO₂, PM₁₀ and PM_{2.5}.
- 6.3 An air quality assessment was principally required to assess the following:
-  Potential impacts of the construction phase of the development;
 -  Potential operational impacts of generated traffic on nearby sensitive receptors; and
 -  Potential for new receptors to be introduced into an area of existing poor air quality
- 6.4 The construction phase of the proposed development could give rise to emissions which could cause dust soiling effects on adjacent uses. However, by adopting appropriate mitigation measures to reduce emissions and their potential impact, there should be no significant residual effects, thus complying with the requirements of the NPPF.
- 6.5 The need for detailed pollutant dispersion modelling has been screened out using Defra, EPUK and IAQM guidance, as well as local monitoring data. This is due to the proposed development being sufficiently distanced from the busy A329 Oxford Road. Furthermore, the proposed development is not anticipated to generate significantly large volumes of traffic.
- 6.6 The proposed development at Oxford Road currently plans to include four electric vehicle (EV) charging bays, sharing two charging points, along with 32 cycle storage spaces in line with RBC's local plan.

7. Conclusions

- 7.1 Nexus Planning Ltd, working on behalf of Stonegate Homes Limited commissioned Phlorum to undertake an Air Quality Assessment for the proposed development site at Oxford Road, Reading, RG30 1AH. The proposal is to construct a mix-use development consisting of 70m² of ground floor commercial space and 24 residential units, with associated car parking and landscaping.
- 7.2 UK-AIR background concentrations and local air quality monitoring results from the wider area suggest that whilst air quality within the surrounding Air Quality Management Area is often poor, background pollution concentrations across the site are likely to be well below the relevant UK Air Quality Strategy standard concentrations.
- 7.3 During construction, adopting appropriate mitigation measures should prevent any significant air quality effects on the surrounding area.
- 7.4 The proposed development is not expected to introduce new receptors into an area of existing poor air quality, nor is it anticipated to significantly impact local air quality.
- 7.5 The development contributes towards initiatives outlined by policies within Reading Borough Council's Local Plan by including four electric vehicle charging bays, sharing two charging stations, and 32 cycle storage spaces within the proposal.
- 7.6 As such, the proposed development is expected to comply with all relevant local and national air quality policy. Air quality should not, therefore, pose any significant obstacles to the planning process.

Figures and Appendices

Figure 1: Site Location Plan

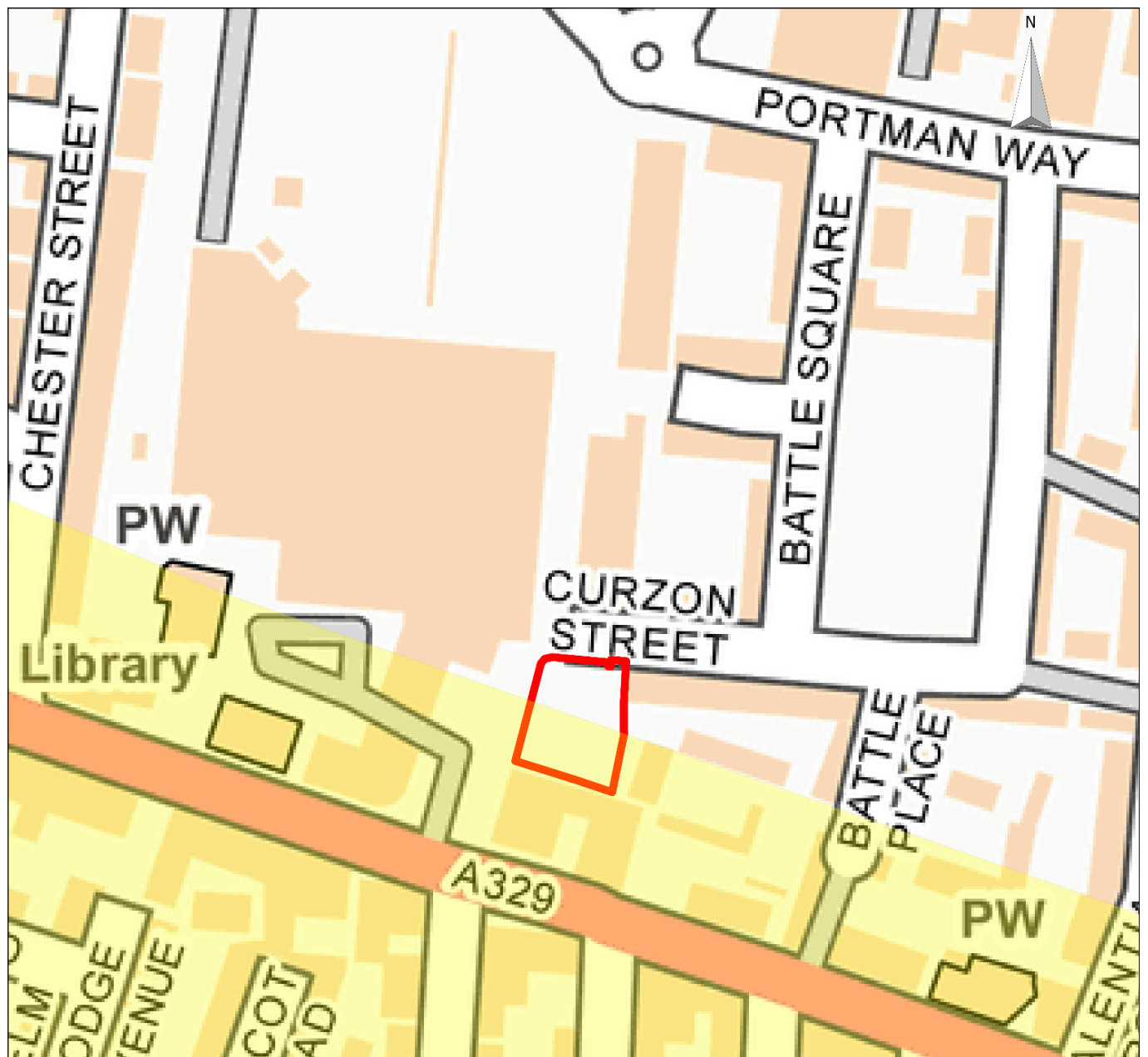


Figure 2: Construction Phase Receptors

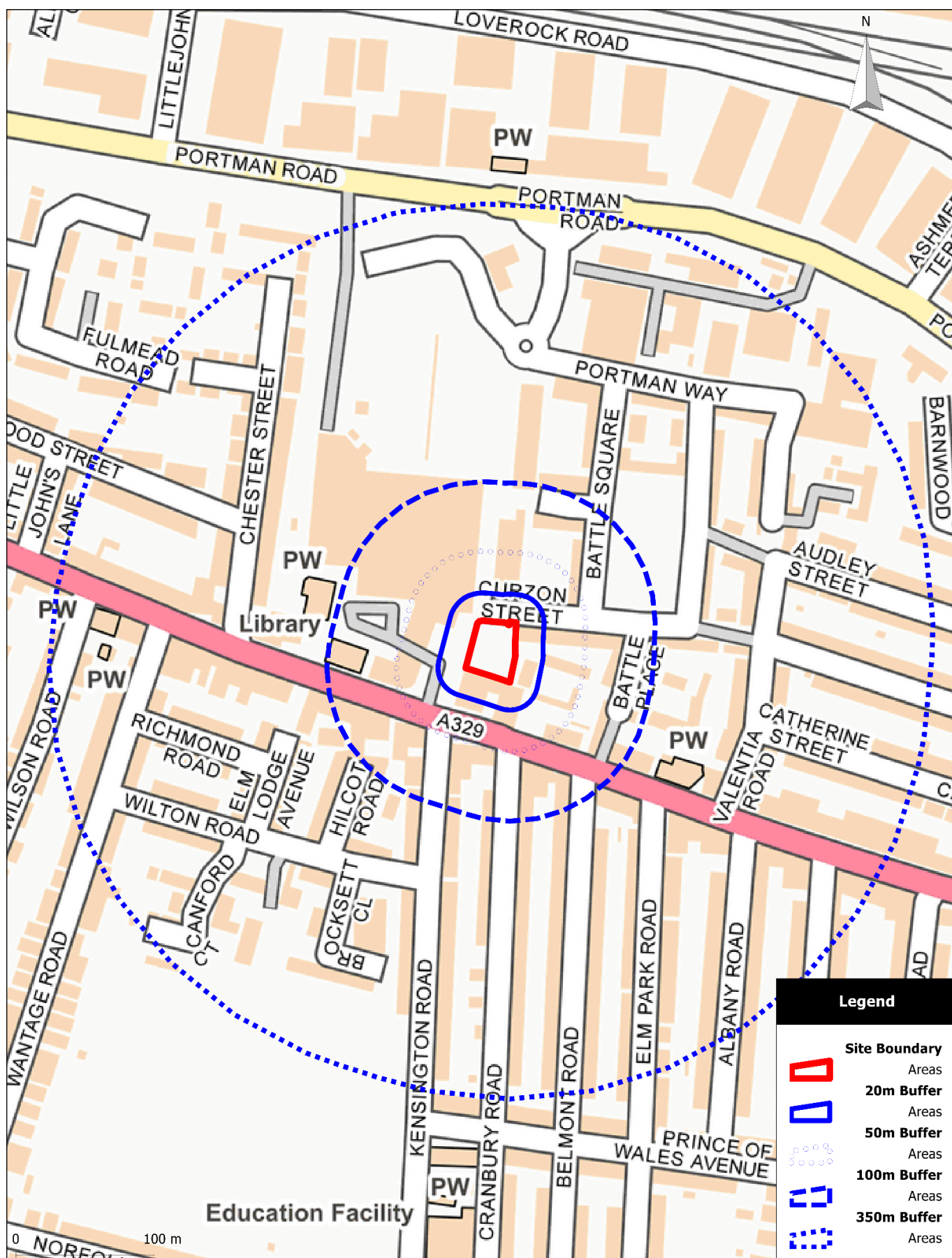


Figure 2: Construction Phase Receptors

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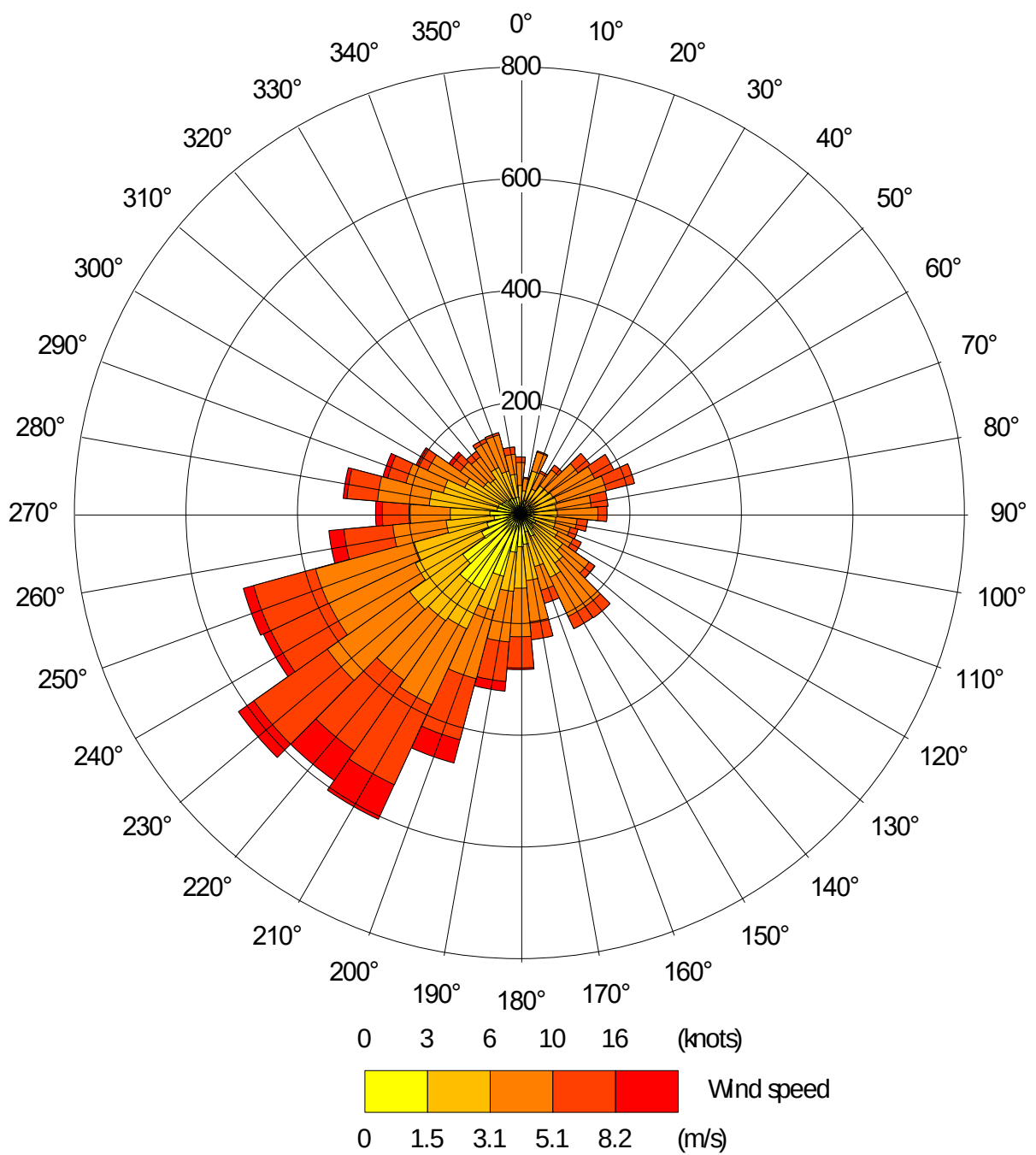
Job No:[9879.S]

Drawn by: JM

Printed at: [16/09/2020]

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Figure 3: Wind Rose for Farnborough Airport, 2019



Appendix A: IAQM Highly Recommended Mitigation Measures for Medium Risk Sites

Appendix A: IAQM Highly Recommended Mitigation Measures for sites with a Medium Risk of Dust Impacts

Please refer to the IAQM's Construction Dust Guidance (*Guidance on the assessment of dust from demolition and construction (2014)*)¹⁰ and *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2018)*¹⁸ for further, "desirable", mitigation measures.

Communications

- 🟢 Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- 🟢 Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- 🟢 Display the head or regional office contact information.
- 🟢 Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this Appendix. The DMP may include monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring and/or visual inspections.

Site Management

- 🟢 Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- 🟢 Make the complaints log available to the local authority when asked.
- 🟢 Record any exception incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- 🟢 Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- 🟢 Increase the frequency of inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- 🟢 Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by the IAQM on *monitoring during demolition, earthworks and construction*.

Preparing and Maintaining the Site

¹⁸ IAQM. (2018). Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

- 🌱 Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- 🌱 Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- 🌱 Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- 🌱 Avoid site runoff of water or mud.
- 🌱 Keep site fencing, barriers and scaffolding clean using wet methods.
- 🌱 Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site cover as described below.
- 🌱 Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- 🌱 Ensure all vehicles switch off engines when stationary – no idling vehicles.
- 🌱 Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- 🌱 Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- 🌱 Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- 🌱 Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- 🌱 Use enclosed chutes and conveyors and covered skips.
- 🌱 Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on equipment wherever appropriate.
- 🌱 Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- 🌱 Avoid bonfires and burning of waste materials.

Demolition

- 🌱 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.

Construction

- 🌱 Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Trackout

- 🌱 Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- 🌱 Avoid dry sweeping of large areas.
- 🌱 Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- 🌱 Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- 🌱 Record all inspections of haul routes and any subsequent action in a site log book.
- 🌱 Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers and regularly cleaned.
- 🌱 Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior leaving the site where reasonably practicable).
- 🌱 Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- 🌱 Access gates to be located at least 10m from receptors where possible.



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