Air Quality Assessment

Porsche Centre, High Wycombe

June 2021

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1. Introduction

1.1 Phlorum Limited have been commissioned by Axis 3 Design Limited to produce an Air Quality Assessment (AQA) in support of a planning application for the proposed development of a Porsche Centre on land to the east of Marlow Hill, within the wider Wycombe Sports Centre development site, in High Wycombe. The National Grid reference for the centre of the site is 485780, 191440. A site location plan has been included in Figure 1.

1.2 The development site is situated south-east of the A404 Marlow Hill, with the north-western site boundary distanced approximately 15m from the kerb. Wycombe Leisure Centre bounds the site to the south, separating the site from the M40 motorway which is located approximately 120m south of the site.

1.3 Land-use in the vicinity of the site comprises primarily commercial and residential uses, with John Hampden Grammar School located to the north-west and greenspaces also nearby.

1.4 The main sources of air pollution in the vicinity of the site are from vehicles travelling on the local road network, particularly the adjacent A404 Marlow Hill and M40 motorway.

1.5 The site is bounded to the north-west by the High Wycombe Air Quality Management Area (AQMA), covering the A404 Marlow Hill and extending north into High Wycombe town centre. Wycombe District Council (WDC) declared this AQMA in 2017 due to exceedances of the annual mean Air Quality Standard (AQS) for nitrogen dioxide (NO_2). The M40 AQMA is located approximately 100m south of the site, declared in 2001 due to exceedances of the annual mean AQS for NO_2 and later amended in 2017.

1.6 The focus of this report is to assess the impacts of the proposed development's traffic generation on air quality in the local area, and in particular the High Wycombe and M40 AQMAs. In addition, it assesses the suitability of the site, in air quality terms, for the introduction of new receptors.

2. Policy Context

The UK Air Quality Strategy

2.1 The UK Air Quality Strategy (UKAQS)[1] sets 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 "objective" 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.

Pollutant	Averaging Period	Air quality standard ($\mu g.m^{-3}$)	Air quality objective
Nitrogen dioxide (NO_2)	1 hour	200	200 $\mu g.m^{-3}$ not to be exceeded more than 18 times a year
	Annual	40	40 $\mu g.m^{-3}$
Particulate Matter (PM_{10})	24-hour	50	50 $\mu g.m^{-3}$ not to be exceeded more than 35 times a year
	Annual	40	40 $\mu g.m^{-3}$
Particulate Matter ($PM_{2.5}$)	Annual	25	25 $\mu g.m^{-3}$

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 2000[2], 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.

Local Air Quality Management

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. Air quality is managed locally by WDC who have declared three AQMAs within the district due to exceedances of the annual mean AQS for NO_2.

2.6 WDC recently updated their AQAP in 2019 with the *Wycombe District Air Quality Action Plan*[3]. The action plan outlines numerous actions and strategies being implemented with the aim of reducing pollution levels in the district, with a particular focus on encouraging public transport use, raising public awareness of how an individual's actions can contribute to pollution and providing electric vehicle (EV) charging infrastructure throughout the district.

National Planning Policy Framework

2.7 The National Planning Policy Framework (NPPF)[4], 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:

2 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.
3 Wycombe District Council. (2018). *Wycombe District Air Quality Action Plan.*
4 Department for Communities and Local Government (DCLG), (2019), National Planning Policy Framework.

"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."

2.9 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 (PPG)

2.11 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (PPG)[5], 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:

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

"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 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 Wycombe Development Plan is made up of several key planning documents, including two local plans. Wycombe's key planning document is the *Wycombe District Local Plan*[6], supported by the *Adopted Delivery and Site Allocations Plan*[7].

2.16 Adopted in August 2019, the *Wycombe District Local Plan* outlines the long-term vision for Wycombe by identifying the local need for development and ensuring this development is executed to a high standard whist being suitably located within the district. This Local Plan introduces the following policies which relate directly or indirectly to air quality:

Policy CP12: *Climate Change:*

"The Council promotes mitigation and adaptation to climate change through:

1. *A development strategy that minimises the need to travel by allocating sites and generally directing development to locations with better services and facilities, or where they are capable of being improved.*

2. *Ensuring allocations in this plan have taken account of climate change allowances using the information provided by the Strategic Floor Risk Assessment level 1 and 2 through the sequential testing of sites, and ensuring through detailed development management policy that applications fully factor in climate change through their flood risk assessments.*

3. *Integrating blue and green infrastructure into the design of new development, including the use of Sustainable Drainage Systems (SuDS).*

4. *Adopting higher water efficiency standards to contribute to alleviating water stress across the District.*

5. *Introducing a requirement that new development should be designed to contribute towards mitigating urban heat island effects and increases in air pollution.*

6. *Supporting the integration of renewable technologies into residential and commercial developments of all sizes and the use of district heating or combined heat and power on larger scale developments."*

6 Wycombe District Council. (2019). *Wycombe District Local Plan*
7 Wycombe District Council. (2013). *Adopted Delivery and Site Allocations Plan.*

Policy DM33 - *Managing Carbon Emissions: Transport and Energy Generation:*

"Development is required to:

a) Be located to provide safe, direct and convenient access to jobs, services and facilities via sustainable transport modes;

b) Be provided with safe and convenient access to the local highway network for all modes and appropriate access for servicing;

c) Make provision for alternative vehicle types and fuels;

d) Include measures to reduce reliance on single occupancy car trips and to increase the use of sustainable transport modes;

e) Provide for parking sufficient to mee the needs of future occupants and to ensure there is no significant adverse impact from overspill parking;

f) Ensure that any material adverse impacts on existing and forecast traffic conditions are mitigated;

g) Integrate renewable technologies into developments;

h) Investigate, and where feasible, implement, district wide energy or heating schemes, for larger scale developments."

Policy DM2 - *Transport Requirements of Development Sites*:

"All developments that require the submission of a Transport Assessment, in line with Appendix B of the DfT Guidance on Transport Assessment (March 2007), or any replacement to this guidance, or as required by the Highway Authority, should provide, wherever possible:

Public Transport

a) Access to a high quality, fully accessible, attractive public transport service.

b) A new or enhanced service where development is not already served by a high quality attractive train or bus service. This may be provided directly or by way of financial contribution, so that the service is maintained for a period of at least five years from an agreed occupation level.

Walking and Cycling

c) *Routes for pedestrians and cyclists which are designed to be safe, direct, attractive and convenient according to the principles of community safety including that of natural surveillance from the built development;*

Travel Plans

d) *Travel Plans, in line with BCC guidance on Travel Plans, that set out the long term travel management strategy for an organization or site, built on an appropriate package of measures aimed at promoting sustainable travel. They should include model share targets and mitigation measures as well as the measures outlined below.*

Car Clubs

e) *Car Club infrastructure in the form of parking spaces, drop off and pick-up points, and, where appropriate car club vehicles, and/or subsidized cost of car club membership, and facilities for electric vehicle charging points.*

Car Sharing

f) *Priority parking spaces for car sharers at developments that are primarily destinations (i.e. non residential uses)*

Design of development should allow, where feasible:

a) *the penetration of buses through the site and priority routing of buses onto the main traffic network; and*

b) *traffic management that ensures traffic ques associated with new development are managed in a way to mitigate their impact on the highway network; and*

c) *layout and design of transport infrastructure, that creates high quality places that are locally distinct and not dominated by the needs of vehicular traffic in line with principles of Manual for Streets, Manual for Streets 2 or replacement design guide."*

Policy DM20: *Matters to be determined in accordance with the National Planning Policy Framework:*

"The following matters will be determined in accordance with the NPPF:

1. *Development which is affected by contaminated land.*

2. *Development which raises pollution issues (including air quality, noise issues, and light pollution) […]."*

The Local Plan also details Policy CP1: *Sustainable Development* which states the following:

[…] The Council will require all new development to contribute towards delivering sustainable development by contributing to achieving both the objectives of this Plan and the principles for the main places in the District."

2.17 Furthermore, in 2020 WDC published their *Air Quality Supplementary Planning Document* (SPD)[8], which supports the Local Plan, setting out the Council's preferred approach to applying policies in relation to air quality.

8 Wycombe District Council. (2020). *Air Quality Supplementary Planning Document (SPD).*

3. Assessment Methodology

Guidance

3.1 The Defra LAQM Technical Guidance LAQM.TG(16)[9] was followed in carrying out the assessment in addition to the latest Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance on *Planning for Air Quality*[10].

3.2 Guidance published by the IAQM[11] on the *Assessment of Dust from Demolition and Construction* was also used when assessing the construction phase of the proposed development. The Greater London Authority (GLA) Supplementary Planning Guidance[12] 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.

3.3 Finally, WDC's Air Quality SPD[8] has been referred to throughout the assessment.

Baseline Air Quality

3.4 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.

Background Maps

3.5 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website[13]. These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km^2 National Grid square locations across the UK. At the time of writing, the most recent background maps were from August 2020 and based on monitoring data from 2018.

9 Defra. (2021). Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management, Technical Guidance (LAQM.TG(16))
10 EPUK & IAQM. (2017). Land-Use Planning & Development Control: Planning For Air Quality.
11 IAQM. (2014). Guidance on the assessment of dust from demolition and construction.
12 Greater London Authority. (2014). The Control of Dust and Emissions During Construction and Demolition.
13 Defra: UK-AIR. www.uk-air.defra.gov.uk

3.6 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.

3.7 WDC automatic and non-automatic monitoring data were reviewed to establish baseline air quality. The most recent available local monitoring data from WDC's *2020* Air Quality Annual Status Report (ASR)[14] have been reviewed and assessed.

Construction Phase

3.8 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.

3.9 The IAQM's guidance[11] 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.

3.10 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.

3.11 The Multi Agency Geographic Information for the Countryside (MAGIC) website[15], which incorporates Natural England's interactive maps, has been reviewed to identify whether 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.

Construction Significance

3.12 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 WDC. (2020). *2020 Air Quality Annual Status Report (ASR) covering the former Wycombe District Council area only.*
15 Natural England and MAGIC partnership organisations. Multi Agency Geographic Information for the Countryside. http://www.magic.gov.uk/ [Accessed 1st April 2021].

3.13 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.

3.14 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.

3.15 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 PM_{10}, 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."*

3.16 Based on these factors, the area is categorised as being of '*Low*', '*Medium*' or '*High*' sensitivity.

3.17 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.

3.18 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

3.19 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 $PM_{2.5}$). 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.

3.20 As it is elevated annual mean concentrations of NO_2 and PM_{10} that have resulted in the declaration of most AQMAs across the UK, these are the pollutants of most concern and they have therefore been the focus of this air quality assessment. $PM_{2.5}$, which is another fraction of particulate matter, has also been considered.

3.21 The latest EPUK & IAQM planning guidance[10] provides indicative thresholds for changes in traffic flows which would require a detailed air quality assessment when within an AQMA. These are a change in 24-hour average annual daily traffic (AADT) flows of >100 light duty vehicles (LDVs) and/or >25 heavy duty vehicles (HDVs). Changes below these thresholds can be reasonably considered to have an insignificant impact on air quality.

Emissions Mitigation Assessment

3.22 The Emissions Mitigation Assessment (EMA) has been undertaken in line with guidance from WDC's Air Quality SPD[8] and Defra's latest Damage Cost guidance[16], which provide an emission calculation methodology using emission calculator tools provided by Defra, including the Emissions Factor Toolkit (EFT)[17] and the Air Quality Damage Cost Appraisal Toolkit[18].

Pollutant Emissions Calculation

3.23 The emissions calculation utilised the latest Defra EFT (v10.1)[17] to determine the total transport related emissions (NO_x and $PM_{2.5}$) that would be generated by the proposed development.

3.24 Defra provides Damage Costs[16] which are a set of impact values, defined per tonne of pollutant for use in this calculation. Damage costs estimate the societal costs associated with changes in pollutant emissions and are then combined with the forecast emissions changes to provide an approximate valuation of the cost (or benefit) to society caused by development.

16 Defra. (2021). Air quality appraisal: damage cost guidance. https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance#damage-costs
17 Defra. (2020). Emissions Factor Toolkit (version 10.1).
18 Defra. (2021). Air quality damage cost appraisal toolkit. https://www.gov.uk/government/publications/assess-the-impact-of-air-quality

3.25 Defra's Appraisal Toolkit[18], which incorporates the latest damage cost values, was used in the emissions cost calculation. The principal of the calculation is summarised in the equation below:

EFT output x Damage costs x 5 years = 5-year exposure cost value (in £)

3.26 As a number of the inputs are based on assumptions, the resulting figure should be treated with caution, but it can be used to give an idea of the scale of a development in terms of total generated transport emissions and therefore a gauge of what level of mitigation might be appropriate.

3.27 It is usual for costs established in this way to be apportioned to low emission measures associated with a proposed development. In doing this it should be possible for damage costs to be offset.

Consultation

3.28 Buckinghamshire Council's (BC) Pollution Control Department were contacted on 4th June 2021 to discuss and agree the proposed scope of this assessment.

3.29 It was proposed that as the Porsche Centre development is located on a plot of land previously permitted for office use under the wider Wycombe Sports Centre Development (Ref: 12/06261/R4OUT), the need to undertake a dispersion modelling assessment of the potential impact of scheme-generated traffic on local air quality could be scoped out, as the Porsche Centre development is expected to generate AADT flows of 1,022 vehicle trips lower than the previously consented office use.

3.30 It was also proposed that the EMA undertaken in Section 8 of this report, costed for development-generated NO_x and $PM_{2.5}$ emissions, in line with the latest Defra Damage Cost Guidance[16], as opposed to costing for NO_x and PM_{10} as stipulated by WDC's Air Quality SPD[8].

3.31 A response was received on 9th June 2021, stating the following:

"I can confirm that I am happy with your methodology and specifically the assessment of $PM_{2.5}$ instead of PM_{10}."

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 NO_2, PM_{10} 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. National Grid Reference: 485500, 191500).

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	21.3	20.5	19.5	18.5	17.5	16.8	annual mean	40
PM_{10}	17.4	17.1	16.8	16.6	16.4	16.2	annual mean	40
$PM_{2.5}$	11.7	11.5	11.2	11.1	10.9	10.8	annual mean	25

4.3 The data in Table 4.1 show that annual mean background concentrations of NO_2, PM_{10} 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, NO_2, PM_{10} and $PM_{2.5}$ concentrations were predicted to be below their AQSs by 51.3%, 58.0% and 55.2%, 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 local, national and international efforts 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.

4.6 At the time of writing, the most recent ASR[14] published by WDC contained local monitoring data from 2019, these data have been reviewed and assessed.

Automatic Monitoring

4.7 WDC undertook automatic (continuous) monitoring of NO_2 at two sites within the District in 2019. The most recent available NO_2 monitoring data from these monitors are included in Table 4.2 below.

Table 4.2: Long-term NO_2 monitoring data from WDC automatic monitors.

Monitor	Type	Distance from the application site (km)	NO_2 annual mean concentration (µg.m^{-3})			
			2016	2017	2018	2019
Wycombe Abbey 4	R	1.0	29.8	21.6	23.9	25.8
Stokenchurch	S	10.0	29.1	30.7	28.8	28.9

Note: "R" = Roadside; "S" = Suburban.

4.8 The data in Table 4.2 show that air quality measured at the roadside and suburban automatic monitoring stations remained well below the 40µg.m^{-3} AQS between 2016 and 2019.

4.9 The Wycombe Abbey automatic monitoring station is located approximately 7.5m from the kerb, on the eastern side of the A404 Marlow Hill, approximately 1.0km north-east of the development site. This monitor recorded annual mean NO_2 concentration of 25.8µg.m^{-3} in 2019, which is 35.5% below the 40µg.m^{-3} AQS. Considering the location of this monitoring station, adjacent to the A404 Marlow Hill, pollutant concentrations recorded at this monitor are considered to be representative of likely conditions on the north-west site boundary fronting Marlow Hill.

4.10 WDC's Stokenchurch monitor is located in a residential area, off Marcourt Road, on the eastern side of the M40. This monitor recorded an annual mean NO_2 concentration below the 40µg.m^{-3} AQS by 27.8% in 2019. Pollutant concentrations recorded at this monitor are not considered to be representative of likely conditions at the site due to the proximity of this monitor to the M40 and the 10.0km separation distance to the development site.

4.11 The hourly mean NO_2 monitoring results for the Wycombe Abbey 4 and Stokenchurch automatic monitors are included in Table 4.3 below.

Table 4.3: Hourly mean NO_2 monitoring data from WDC automatic monitors.

Monitor	Type	Distance from the application site (km)	Number of hourly means >200µg.m^{-3}			
			2016	2017	2018	2019
Wycombe Abbey 4	R	1.0	0	1	0	0
Stokenchurch	S	10.0	0	7	0	0

Note: "R" = Roadside; "S" = Suburban. Exceedance = More than 18 hourly means > 200µg.m^{-3}.

4.12 The data in Table 4.3 show that no exceedances of the hourly mean AQS for NO_2 (200µg.m^{-3} not to be exceeded more than 18 times per year) were recorded at either monitor between 2016 and 2019.

4.13 Furthermore, no exceedances of the 200µg.m^{-3} hourly mean limit value been recorded at either automatic monitor since 2017. The Wycombe Abbey 4 automatic monitor is located just 7.5m from the kerb of the A404 Marlow Hill, whereas the development site is located at least 12m from Marlow Hill at its closest point, this provides a good indication that air quality across the development site is likely to be below the short-term AQS for NO_2.

4.14 WDC do not currently undertake automatic (continuous) monitoring of PM_{10} or $PM_{2.5}$ within the district.

Non-Automatic Monitoring

4.15 WDC operate an extensive NO_2 diffusion tube monitoring network comprising 51 measurement sites, deployed in strategic locations across the District.

4.16 The most recent available data for diffusion tubes located within 1.5km of the site have been included in Table 4.4 below.

Table 4.4: Monitoring data from WDC NO_2 diffusion tubes.

Monitor	Type	Distance from the application site (km)	NO_2 annual mean concentration (µg.m^{-3})			
			2016	2017	2018	2019
S13	R	0.3	30	29.4	25.9	26.2
S57	R	0.3	-	-	34.8	37.5
S40	S	0.4	32.9	31.8	29.7	30.1
S44	R	0.8	29.1	28.8	29.2	21.1
S26/27/28	R	1.1	30.2	28.9	26.9	26.3
S4	R	1.2	**69.5**	**64.9**	**72.1**	**48.8**
S25	UB	1.4	21.6	19.8	26.6	27.1
S56	R	1.4	-	-	27.3	26.4

Note: "R" = Roadside; "S" = Suburban; "UB" = Urban Background. "**Bold**" denotes exceedance of the annual mean AQS. "**Underline**" denotes indicative exceedance of the hourly mean AQS.

4.17 The data in Table 4.4 indicate that air quality in the local area is generally good, and the AQSs are infrequently exceeded, even at roadside measurement sites. Just one of the eight monitors within 1.5km of the site recorded exceedances of the AQSs between 2016 and 2019.

4.18 WDC diffusion tube S13 is located closest to the development site, situated at School Close, off the A404 Marlow Hill, approximately 300m north of the site. This monitor recorded an annual mean NO_2 concentration of 26.2µg.m^{-3} in 2019, which is 34.5% below the 40µg.m^{-3} AQS. Given the 17m separation distance between this monitor and the A404 Marlow Hill, monitored pollutant concentrations are likely to be representative of those expected at the north-western site boundary which is similarly distanced from Marlow Hill.

4.19 Diffusion tube S4 was the only monitor within 1.5km of the site boundary to record exceedances of the AQS between 2016 and 2019. This monitor recorded an annual mean NO_2 concentration of 48.8µg.m^{-3} in 2019, which is above the 40µg.m^{-3} AQS by 22%. Pollutant concentrations recorded at this monitor are not considered to be representative of likely conditions across the development site, as this monitor is distanced just 4.8m from the kerb of a steeply-sloped and canyon-like section of the A404 Marlow Hill, within the Wycombe AQMA. However, it is worth noting that NO_2 concentrations recorded at this monitor show a general decrease over the monitoring period, indicative of improvements in local air quality.

4.20 WDC undertook non-automatic monitoring of NO_2 at one urban background location within 1.5km of the site in 2019, situated in a residential area off Shuffield Road, approximately 1.4km north of the site. An annual mean NO_2 concentration of 27.7µg.m^{-3} was recorded at this urban background monitor in 2019, which is 32.0% below the 40µg.m^{-3} AQS. This monitor is likely to be fairly representative of background pollutant concentrations across the development site, as the majority of the site is well distanced from local major sources of pollution.

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 No demolition will be required for the construction of the proposed development. As such, the demolition phase is not considered further within this assessment.

Earthworks

5.4 The total site area is 17,320m^2, which falls into the IAQM's *Large* dust emission magnitude category.

5.5 It is anticipated that between 20,000 and 100,000 tonnes of earth will be moved during construction, and this will be done by between 5 and 10 heavy earth moving vehicles, which is considered to have a *Medium* dust emission magnitude with reference to the IAQM guidance[11]. There will be no formation of bunds on site.

5.6 Therefore, considering the above and with reference to the IAQM guidance, the potential dust emission magnitude for the earthworks phase of construction can be defined as *Medium.*

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. It is anticipated that piling will be required on site, however there will be no requirement for sandblasting or concrete batching during construction.

5.8 Construction materials and methods with a low potential for dust release will be used as the buildings will be steel framed with metal cladding systems to the walls and roof.

5.9 The total volume of buildings to be constructed on site is between 25,000m^2 and 100,000m^2. Based on this, the potential dust emission magnitude for the construction phase can be defined as *Medium* with reference to the IAQM guidance.

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.

5.11 It is anticipated that less than 10 HDVs will visit the construction site over the course of any one day, and there will be no use of unpaved road surfaces by vehicles accessing the site. The proposed access road for the site will be formed for use by construction traffic. Therefore, with reference to the IAQM guidance, the potential dust emission magnitude for trackout can be defined as *Small*.

Emission Magnitude Summary

5.12 A summary of the dust emission magnitude as a result of the activities of Demolition, 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	Medium
Construction	Medium
Trackout	Small

Sensitivity of the Area

5.13 Having established the potential dust 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. High sensitivity human receptors include residential dwellings, schools, and hospitals. Medium sensitivity human receptors include locations where humans would not reasonably be expected to spend the same amount of time in as their homes, such as workplaces, parks and leisure centres.

5.14 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.

5.15 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.

5.16 The approximate number of high and medium 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 and Medium Sensitivity Human Receptors within 350m of the development site.

Distance to site (m)	Approximate number of receptors	Receptor Details
<20	1	Wycombe Leisure Centre (Medium)
<50	50*	Residential; Hungry Caterpillar Day Nursery (High)
<100	>1000*	Residential; John Hampden Grammar School (High)
<350	>2000*	Residential; Wycombe High School (High)

*Includes approximate number of pupils at educational institutions.

5.17 Figure 3 displays the wind rose for Heathrow Airport (2019). It shows that the likely prevailing wind directions at the application site are from the south-west, with additional, frequent but lesser winds from the north-east. As summarised in Table 5.2 and displayed in Figure 2, there are several highly sensitive receptors within 100m of the application site. Therefore, with reference to the IAQM guidance, the sensitivity of the area to dust soiling impacts can be defined as *Medium*.

5.18 UK-AIR predicted annual mean concentrations of PM_{10} are below 24µg.m^{-3}. This provides a good indication that PM_{10} concentrations for both annual mean and daily mean concentrations are likely to be below the respective AQSs at the site and adjacent uses. Therefore, the sensitivity of the area to human health impacts is defined as *Low*.

5.19 Review of the MAGIC website[15] which incorporates Natural England's interactive maps, has identified no statutory ecological sensitive receptors within 50m of the site, or within 50m of roads expected to be used, up to 500m from the site. The nearest sensitive statutory ecological receptor is the Chairborough Road Local Nature Reserve (LNR), located approximately 1.1km north west from the development site. Therefore, the construction phase of the proposed development can be assumed to have a Negligible impact on local sensitive ecological sites.

5.20 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	PM_{10}	Ecology
Earthworks	Medium	Low	Negligible
Construction	Medium	Low	Negligible
Trackout	Negligible	Negligible	Negligible

5.21 Overall, the proposed redevelopment is considered to present a *Medium Risk* for nuisance dust soiling effects, *Low Risk* for PM_{10} health effects and *Negligible* for ecology, in the absence of mitigation.

Site Specific Mitigation

5.22 The GLA guidance[12] 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 redevelopment 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.

5.23 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.

5.24 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

5.25 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. Operational Phase

Impacts on Local Air Quality

6.1 The latest EPUK & IAQM planning guidance[10] provides indicative thresholds for changes in traffic flows which would require a detailed air quality assessment when within, or adjacent to, an AQMA. When within an AQMA, these are a change in 24-hour AADT flows of more than 100LDVs and/or 25 HDVs. Changes below these thresholds can reasonably be considered to have an insignificant impact on local air quality.

6.2 The development site is not situated within an AQMA, but is adjacent to the High Wycombe AQMA. Access roads for the site will link into the existing access roads for the wider Wycombe Sports Centre Site, which in turn, link with the A404 Marlow Hill, intersecting the High Wycombe AQMA. Therefore, the 100LDV and/or 25HDV threshold applies.

6.3 The development is located within the plot of land previously permitted for Office use (land-use Class B1) under the wider Wycombe Sports Centre redevelopment scheme (Ref: 12/06261/R4OUT), which comprised the following:

"a coachway to include park and ride services with 400 parking spaces and passenger facilities; new sports and leisure centre with 323 parking spaces; up to 34,971 sqm of offices (Class B1) with parking for 850 cars; a 150 bed hotel (Class C1) with 50 car parking spaces; food store (Class A1) of up to 3,600sqm gross external floorspace with 200 parking spaces; an amenities building (Class D1) of up to 420sqm with 35 parking spaces; and associated access, landscaping and open space."

6.4 The project's transport consultants anticipate that the proposed Porsche Centre development would generate 24-hour traffic flows below the existing permitted Office use (Class B1) by 1,022 vehicles. Therefore, it can be assumed that the operation of the proposed development would have a beneficial impact on local air quality when compared to the currently permitted office use, and the need to undertake a detailed dispersion modelling assessment of the proposed development's impact on local air quality was not considered necessary.

Site Suitability

6.5 The LAQM.TG(16) guidance[9] (Tables 7.7 and 7.8) sets out the classification of monitoring locations and where these are in relation to sources of pollution. The guidance states that an *Urban background* location is, as follows:

"An urban location distanced from sources and therefore broadly representative of city-wide background conditions, e.g. urban residential areas."

6.6 The AEA *Diffusion Tube for Ambient NO_2 Monitoring: Practical Guide*[19] (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, it can be reasonably defined as being set in an urban background location, away from adverse impacts associated with emissions from road sources:

- >50m from any major source of NO_2 (e.g., multi-storey car parks);
- >30m from any *very busy* road (>30,000 vehicles per day);
- >20m from any *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.

6.7 According to traffic counts undertaken by the Department for Transport (DfT)[20], the A404 Marlow Hill had a predicted AADT flow of 37,906 vehicles in 2019. Therefore, with reference to the AEA guidance, the A404 Marlow Hill can be classified as a *very busy* road.

6.8 Although the north-western boundary of the site varies in distance between 12m and 14m from the kerb of Marlow Hill, all buildings proposed on site are distanced at least 30m from Marlow Hill. Therefore, using the above criteria, areas where receptors are likely to spend the majority of their time (i.e. the buildings) at the development site can be classified as being set in an urban background location. Following the AEA and LAQM.TG(16) guidance, it is expected that pollutant concentrations in these areas of the site are likely to be similar to those identified at urban background sites within the area, which are well below the respective thresholds indicative of short-term AQS exceedances for NO_2 and PM_{10}.

19 AEA Energy and Environment (2008). *Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance for Laboratories and Users.*
20 Department for Transport (2020). Manual Count Points: Site number 27079. https://roadtraffic.dft.gov.uk/manualcountpoints/27079 [Accessed 10th June 2021].

6.9 Furthermore, the proposed development is not considered to be particularly sensitive to air quality, as it is unlikely that sensitive receptors (customers) would spend lengths of time in excess of 1-hour at the proposed development. WDC's local NO_2 monitoring data from the Wycombe Abbey 4 automatic monitor, situated adjacent to the A404 Marlow Hill, approximately 1.0km north-east of the site, show that even at this roadside monitor, no exceedances of the hourly mean AQS for NO_2 have been recorded since 2017. This indicates that NO_2 concentrations across the site, which is distanced at least 12m from Marlow Hill, are likely to comply with the short-term AQS for NO_2.

6.10 UK-AIR estimates and WDC automatic monitoring data indicate that NO_2, PM_{10}, and $PM_{2.5}$ concentrations across the development site are likely to be well below their relevant AQSs, and are expected to decrease further in future years.

6.11 Therefore, considering the above, the development site is anticipated to be suitable, in air quality terms, for its proposed end-use.

7. Emissions Mitigation Assessment

Emissions Cost Calculation

7.1 Following the March 2021 update to Defra's emissions cost calculation guidance[16], an emissions cost calculation has been produced to estimate the value of the impact of NO_x and $PM_{2.5}$ emitted as a result of the proposed development.

7.2 WDC's Air Quality SPD stipulates the need to cost for the impacts of scheme-generated NO_x and PM_{10} emissions, however, Defra's recent updates to the calculation put greater emphasis on $PM_{2.5}$ as it is deemed to have greater health implications than PM_{10}. As such, the calculation has costed for the impacts of scheme-generated NO_x and $PM_{2.5}$ emissions, in line with the latest Defra guidance and the approach agreed with the Buckinghamshire Council (BC) pollution control department.

Input Data

7.3 The latest Defra EFT (v10.1)[17] was used to determine the total transport related emissions that would be generated by the proposed development. The inputs used in the emissions cost calculation are shown in Table 7.1 below.

Table 7.1: Emissions Cost Calculation Inputs.

Input	Value	Unit	Source/guidance
Trip Length	10	km	WDC Air Quality SPD
Traffic Flow (All vehicles)	554	AADT	Transport Consultant
EFT Road Type	Urban (not London)	-	EFT & WDC Air Quality SPD
EFT Year	2023 - 2027	-	In line with EFT estimates
Average Speed	50	$km.hr^{-1}$	EPUK & IAQM; Sussex-air (Standard best practice)
Appraisal period	5	years	WDC Air Quality SPD

7.4 The total emission 'damage' cost was calculated using Defra's appraisal toolkit[18] and is presented in Tables 7.2 and 7.3. The calculation is provided for the 5-year period after the opening of the development, which is expected to be in 2023.

7.5 The calculation accounts for an 'uplift factor' of 2% cumulatively per annum and a 'discount rate' in line with the latest 2021 damage cost guidance[16]. Central estimate damage costs for '*Road Transport Urban Medium*' were based on Defra 2021 prices.

Table 7.2: Emissions Cost Calculation for NO_x.

Year	2023	2024	2025	2026	2027
NO_X increase (tonnes)	0.4179	0.3784	0.3414	0.3072	0.2752
Central Damage cost (£)	£9,259	£9,445	£9,634	£9,826	£10,023
Adjusted Damage cost (£)	£3,869	£3,453	£3,070	£2,723	£2,404
Total	**£15,519**				

Table 7.3: Emissions Cost Calculation for PM_{10}.

Year	2023	2024	2025	2026	2027
$PM_{2.5}$ increase (tonnes)	0.0358	0.0355	0.0353	0.0351	0.0350
Central Damage cost (£)	£81,232	£82,857	£84,514	£86,204	£87,928
Adjusted Damage cost (£)	£2,911	£2,843	£2,783	£2,729	£2,680
Total	**£13,946**				

7.6 The total damage costs are summarised as follows:

NO_X emission 'damage' (cost, £) = £15,519+

$PM_{2.5}$ emission 'damage' (cost, £) = £13,946

TOTAL (cost, £) = £29,465

Mitigation

7.7 The resulting value of the pollutant emissions calculation indicates the value of an appropriate package of mitigation to offset any potential impacts from the proposed development. The value of the mitigation package implemented should at least equate to the **£29,465** 'emissions cost'.

7.8 WDC's Air Quality SPD[8] states that for *major* classified proposals, major mitigation measures are required in addition to Type 1 and 2 measures set out for minor development.

7.9 All new development should include Electric Vehicle (EV) charging infrastructure, in line with the Air Quality SPD, for uses other than residential, this will comprise:

- EV charging provision at 10% of parking spaces which may be phased with 5% initial provision and the remainder at an agreed trigger level;

- include at least 1 EV charging unit for every 10 disabled parking spaces; and
- where 50 (or more) parking spaces are provided, 1 rapid charging unit per 50 spaces is required.

7.10 The following mitigation measures should also be considered for all *major* classified development:

- Monitored travel plan, including EV plan and designated parking spaces for electric/hybrid vehicles;
- Measures to support public transport infrastructure and promote use;
- Measures to support cycling and walking infrastructure;
- Measures to support any EV plans/strategies implemented by the Council;
- Support growth in low and ultra-low emission public transport;
- Car clubs (including electric) and car sharing schemes;
- Cycling hubs and corridors, including hire of bikes and e-bikes;
- Infrastructure for low emission, alternative fuels;
- Support for measures outlined in WDC's AQAP[3].

7.11 A travel plan[21] has been produced for the proposed development. This travel plan aims to reduce reliance on private car usage for trips associated with the proposed development and to manage travel demand through behavioural change measures geared towards sustainable modes of travel.

7.12 The proposed development will provide a total of 111 customer and staff car parking spaces (49 customer car parking spaces and 62 staff car parking spaces). The remainder of the parking spaces at the site will be used for service, demo, display, vehicle storage and courtesy car use. EV charging provision at the site will comprise 14 charging bays with the following:

- 2 x 320kW rapid chargers (Porsche Turbo Chargers), representing a significant investment of approximately £250,000; and
- 7 x 22kW chargers (within customer parking) comprising 4 charging points for the Porsche customer car parking and 3 charging points for the Bentley customer car parking, with a total value of approximately £21,000.

7.13 As such, it is anticipated that the provision of EV charging infrastructure alone, which is anticipated to cost approximately **£271,000**, goes beyond the **£29,465** 'emissions cost'. Therefore, it is considered that the proposed development includes an appropriate level of mitigation.

21 Stantec. (2021). Porsche Centre, High Wycombe, Buckinghamshire: Workplace Travel Plan.

8. Discussion

8.1 WDC declared the Wycombe AQMA, which encompasses the A404 Marlow Hill, and extends north into Wycombe Town Centre in 2017 due to exceedances of the long-term AQS for NO_2. The development site is situated adjacent to this AQMA. WDC also declared the M40 AQMA in 2001 due to exceedances of the long-term AQS for NO_2, this AQMA spans a section of the M40 motorway, approximately 100m to the south of the site.

8.2 Local pollutant monitoring data indicate that air quality in the local area is generally good, even at roadside measurement sites. UK-AIR predicted concentrations and local monitoring also indicate that pollutant concentrations across the development site are likely to be well below the key AQSs for NO_2, PM_{10}, and $PM_{2.5}$.

8.3 An air quality assessment was primarily required to assess the following:

- Potential impacts of the construction phase of the development;
- Potential for new receptors to be introduced into an area of poor air quality; and
- Potential for the proposed development to effect local air quality.

8.4 The construction phase of the development could give rise to emissions which could cause dust soiling effects on adjacent uses. With reference to the IAQM guidance, the construction phase of this development can be considered to be *Medium risk*. After the implementation of appropriate mitigation measures to reduce emissions and their potential impact, as detailed in Appendix A, emissions from the construction programme will be reduced, and the residual significance of impact for the construction phase is expected to be *Negligible*.

8.5 The proposed development is located on the plot of land previously permitted for office use under the Wider Wycombe Sports Centre redevelopment scheme. As the transport consultant's for the project expect the Porsche Centre to generate substantially fewer daily vehicular trips relative to the previously permitted office use, it can be assumed that the operation of the proposed Porsche Centre development would have a beneficial impact on local air quality when compared to the currently permitted office use, and the need to undertake a detailed dispersion modelling assessment of the proposed development's impact on local air quality has been screened out.

8.6 The need for a detailed pollutant dispersion modelling assessment of the proposed development's sensitivity to local air quality has been screened out using Defra and AEA guidance along with local pollutant monitoring data. This is primarily due to the proposed end use not being particularly sensitive to air quality, and the site being well distanced from the A404 Marlow Hill.

8.7 An EMA has been undertaken in line with the WDC Air Quality SPD and identified that the total 'emissions cost' for the proposed development is expected to be **£29,465**. A travel plan has already been produced for the proposed development and EV charging provision in excess of the required standards will be provided at the site, to a total value of approximately **£271,000**.

9. Conclusions

9.1 Phlorum Limited were commissioned by Axis 3 Design Limited undertake an air quality assessment for the proposed development of a Porsche Centre on land to the east of the A404 Marlow Hill, within the wider Wycombe Sports Centre redevelopment site.

9.2 UK-AIR background concentrations and local air quality monitoring results from the wider area suggest that whilst air quality can sometimes be elevated at roadside locations, concentrations across the site are likely to be below the relevant UK Air Quality Standards.

9.3 During construction, adopting appropriate measures should prevent any significant air quality effects on the surrounding area. Construction phase impacts at the development site can be minimised through the adoption of best practice measures in the monitoring, reporting, and setting of targets for dust deposition.

9.4 The proposed development is not expected to introduce new, sensitive receptors into an area of poor air quality, nor is it anticipated to adversely impact local air quality.

9.5 The combined cost of mitigation measures to be implemented at the proposed development is expected to go beyond exceeding the development's calculated 'emissions cost'. Therefore, it is considered that the proposed development includes an appropriate level of mitigation.

9.6 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

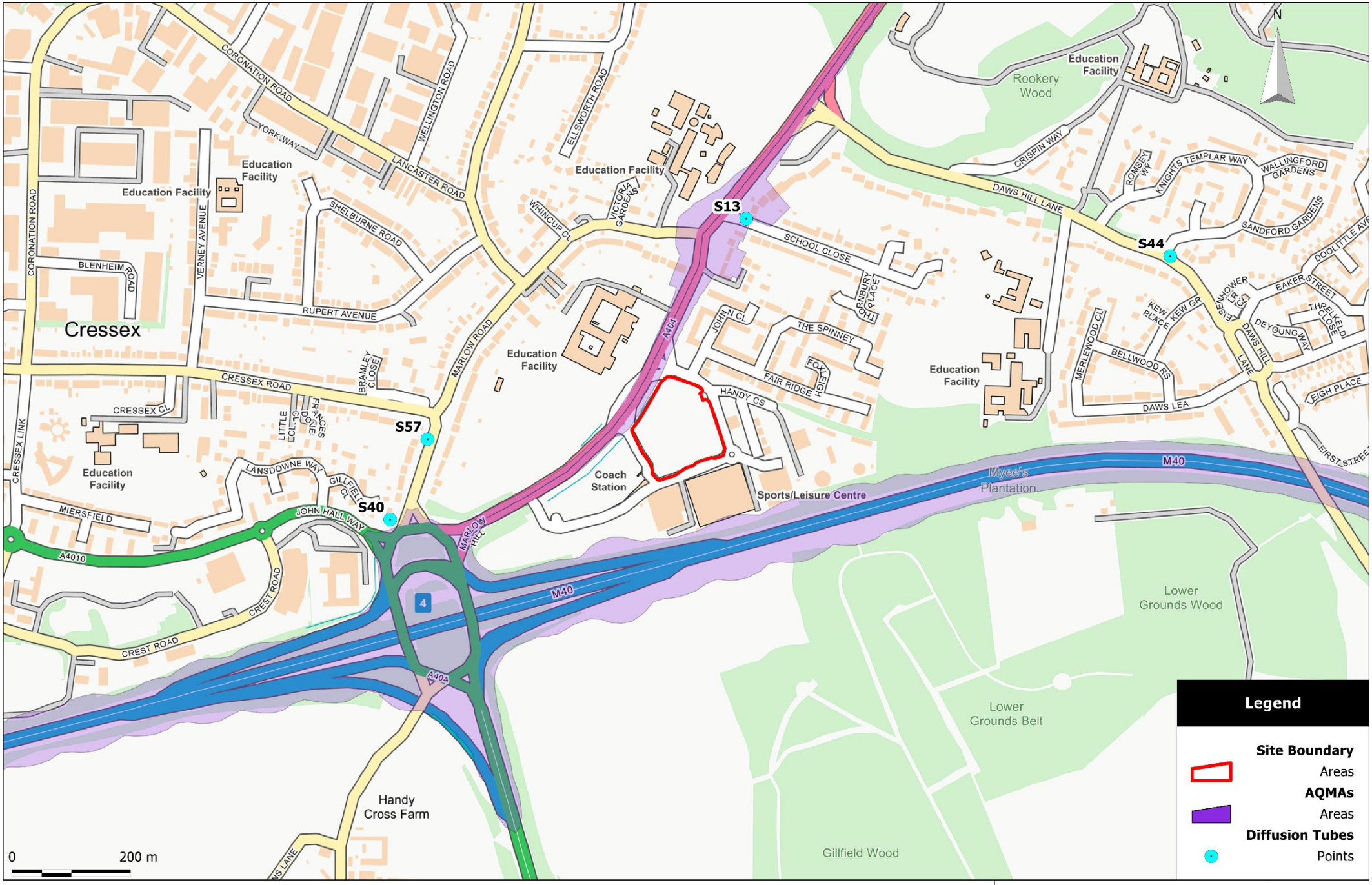

Figure 1: Site Location Plan

Job No: 10614.S
Drawn by: JM
Printed at: 10.06.2021
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Figure 2: Construction Phase Receptors

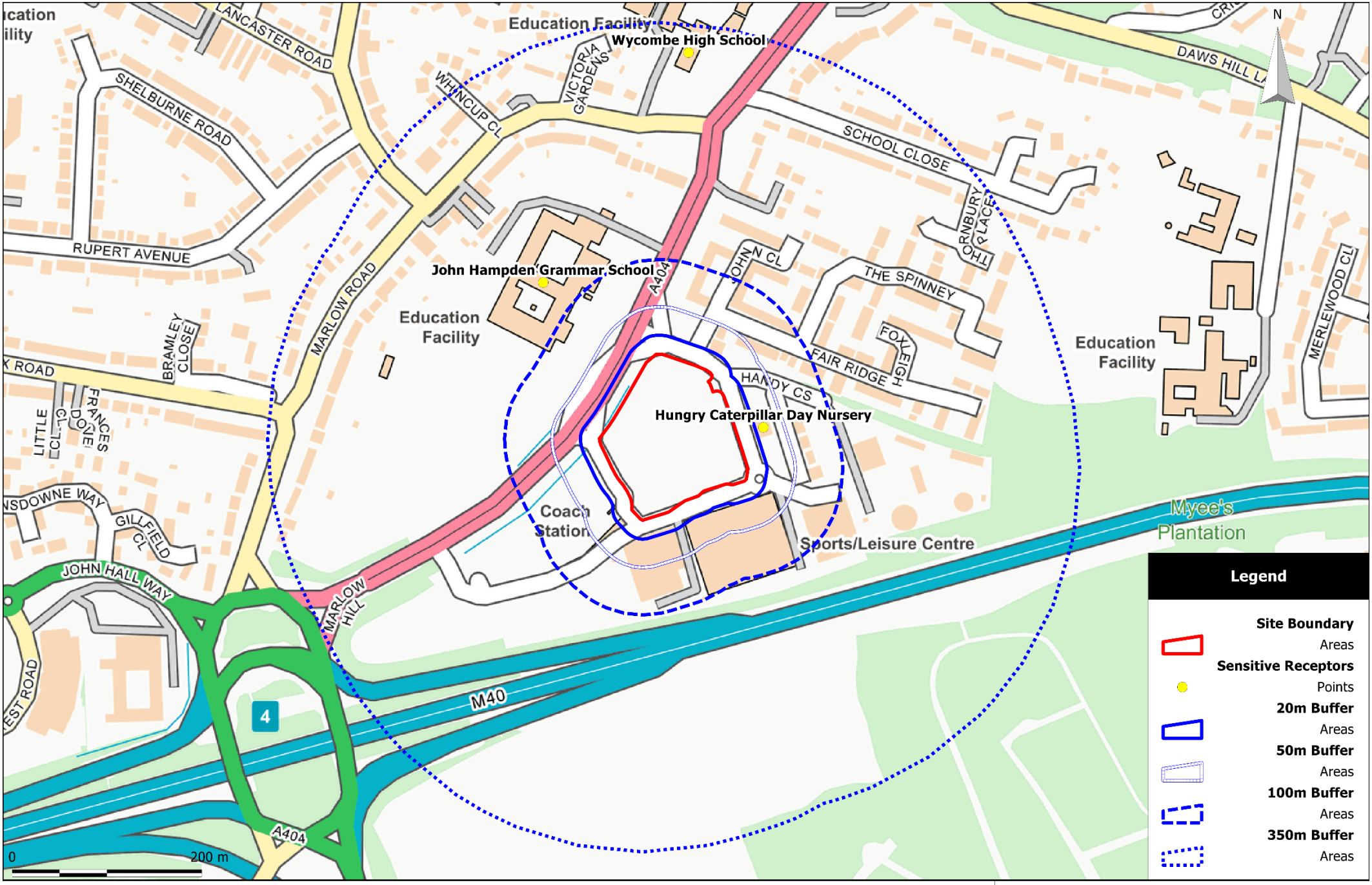
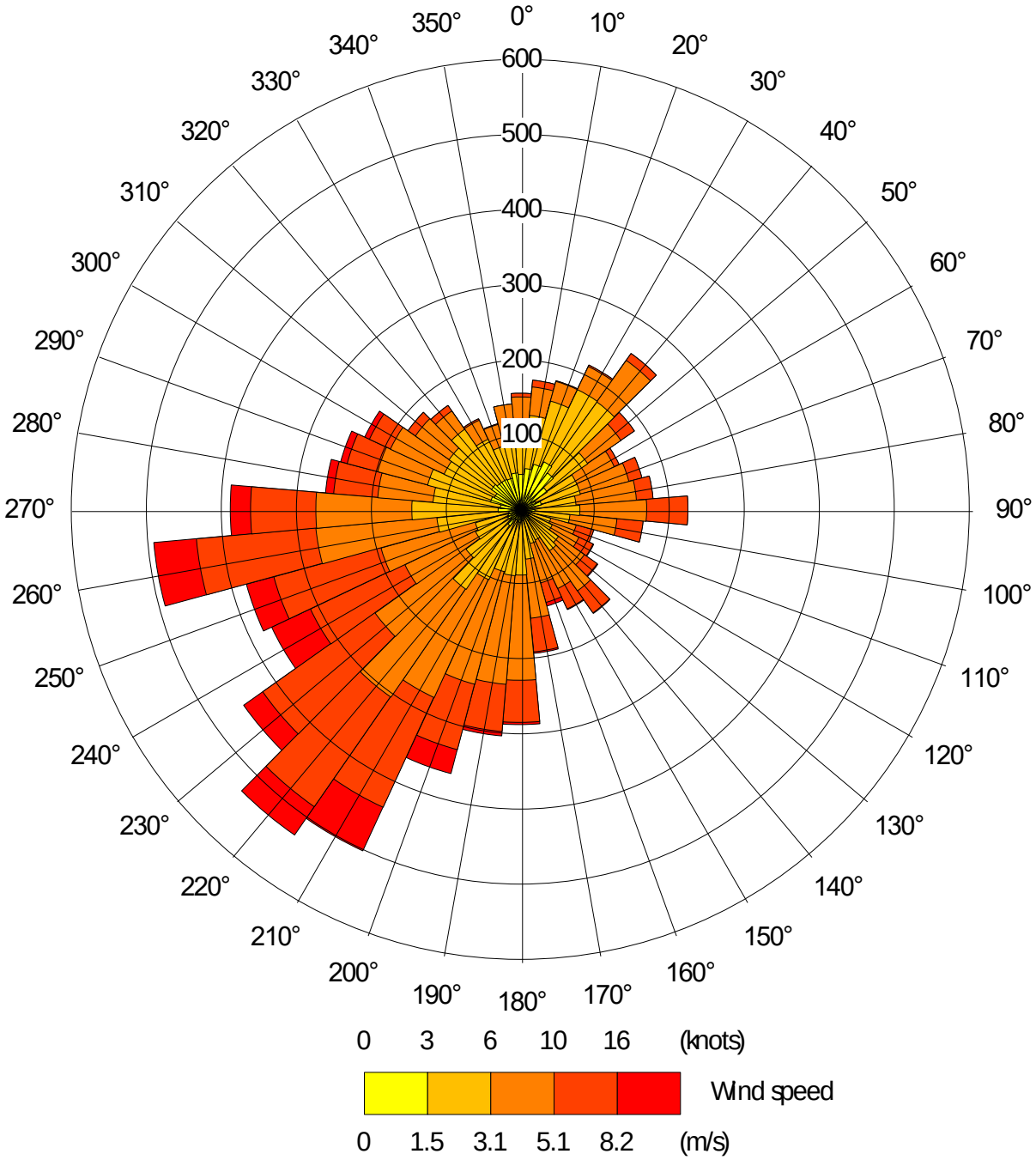


Figure 2: Construction Phase

Job No: 10614.S
Drawn by: JM
Printed at: 10.06.2021
www.phlorum.com

Figure 3: Wind Rose for Heathrow Airport (2019)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600
500
400
300
200
100
0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

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)*[11] and *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2018)*[22] 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 PM_{10} 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 PM_{10} 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.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.

[22] 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

- 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 bowsers 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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