

ROYAL HEIGHTS, READING

Air Quality Assessment

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1.0 Introduction

SLR Consulting Limited has been commissioned by Reading Heights Ltd to undertake an air quality assessment to support the planning application at 59 – 75 Queen's Road, Reading, Berkshire.

1.1 Proposed Development

This detailed planning application includes erection of a one storey roof extension, a part six, part ten storey building and mews houses comprising 4138 sqm (GEA) of new development, providing up to 50 residential units together with associated services enclosures, parking and landscaping.

1.2 Site Description and Location

The Application Site is located within Reading Borough Council (RBC) located in the east of the city centre on Queen's Road (A329) at the approximate National Grid Reference (NGR): x472192 y17373. The Application Site is presented in Figure 1.1.

The Application Site was previously used as office space. The Application Site is bounded by Kennet Side to the North and Watlington Street to the East and Queen's Road to the South.

1.3 Scope

Pre-application discussion was undertaken with the planning officer within RBC¹ in order to agree upon the scope and methodology of the air quality assessment.

The following aspects are covered in this report:

- Determination of baseline scenario using council monitoring data;
- Qualitative construction dust assessment of the Proposed Development;
- Qualitative screening operational impacts of the Proposed Development; and
- Identification of required mitigation measures.

1.4 Structure of Report

The remainder of this report is structured as follows:

- Section 2 describes the relevant legislation and guidance referred to in this assessment;
- Section 3 methodology;
- Section 4 characterises the baseline environment in the vicinity of the Application Site from an air quality perspective, with regard to Application Site location;
- Section 5 presents the results of the operational phase screening assessment;
- Section 7 presents mitigation measures recommended as part of the scheme; and
- Section 8 concludes the assessment.

¹ Email Communication with Ross Jarvis, Senior Environmental Health Officer, dated 30th April 2018

2.0 Relevant Air Quality Legislation and Guidance

2.1 Air Quality Strategy

The United Kingdom Air Quality Strategy (UK AQS) 2007 for England, Scotland, Wales and Northern Ireland² sets out the Government's policies aimed at delivering cleaner air in the United Kingdom (UK). It sets out a comprehensive strategic framework within which air quality policy will be taken forward in the short to medium term, and the roles that Government, industry, the Environment Agency (EA), local government, business, individuals and transport have in protecting and improving air quality.

2.2 Air Quality Standards

The Air Quality Standards Regulations 2010 seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001 Regulation 14 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK AQS is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution. For each nominated pollutant, the UK AQS sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the AQO for that pollutant. The UK AQS includes more exacting Objectives for some pollutants than those required by EU legislation. This Air Quality Assessment refers to UK Air Quality Standards, as compliance with these standards will also ensure that the less demanding EU Air Quality limit values would also be met.

The Air Quality Strategy defines 'standards' and 'objectives' in paragraph 17:

'For the purposes of the strategy:

standards are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive subgroups or on ecosystems;

objectives are policy targets often expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedances, within a specified timescale.'

The Air Quality Standards and Objectives considered within this Air Quality Assessment are presented within Table 2-1.

² The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA. July 2007.

Table 2-1
Relevant Air Quality Strategy Standards and Objectives

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Measured As	Equivalent percentile
Nitrogen Dioxide (NO_2)	40	Annual Mean	-
	200	1-hour Mean	99.79 th percentile of 1-hour means (equivalent to 18 1-hour exceedances)
Particulate matter within an aerodynamic diameter of less than $10\mu\text{m}$ (PM_{10}) (gravimetric)	40	Annual Mean	-
	50	24-hour mean	90.41 th percentile of 24-hour means (equivalent to 35 24-hour exceedances)
Particulate matter within an aerodynamic diameter of less than $2.5\mu\text{m}$ ($\text{PM}_{2.5}$) (gravimetric)	25	Annual Mean	-

In accordance with the Department for Environment, Food and Rural Affairs' (DEFRA) technical guidance on Local Air Quality Management (LAQM.TG (16)), the AQOs should be assessed at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. A summary of relevant exposure for the objectives presented in Table 2-1 are shown below in Table 2-2.

Table 2-2
Relevant Public Exposure

Objective Averaging Period	Relevant Locations	Objectives should apply at	Objectives should not apply at
Annual Mean	Where individuals are exposed for a cumulative period of 6-months in a year	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	Where individuals might reasonably be expected to spend one hour or longer	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

2.3 Local Authority Review and Assessment

LAs, including RBC, have formal powers to control air quality through a combination of LAQM and by use of their wider planning policies.

Section 82 of the Environment Act 1995 (Part IV) requires local authorities to periodically review and assess the quality of air within their administrative area. The reviews have to consider the present and future air quality and whether any AQOs prescribed in regulations are being achieved or are likely to be achieved in the future.

Where any of the prescribed AQOs are not likely to be achieved the authority concerned must designate an AQMA. For each AQMA the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the AQO.

DEFRA has published technical guidance for use by local authorities in their review and assessment work³. The results of RBC air quality ASR are summarised in Section 2.4.2.

2.4 Planning Policy

2.4.1 National Policy

The National Planning Policy Framework (NPPF) describes the policy context in relation to pollutants including air pollutants:

'The Government's objective is that planning should help to deliver a healthy natural environment for the benefit of everyone and safe places which promote wellbeing.'

To achieve this objective, the planning system should contribute and enhance the natural and local environment by:

[...] preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of land, air, water or noise pollution or land instability.'

Where pollution is defined as:

'Any consideration of the quality of land, air, water, soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam and odour.'

Specifically, in terms of development with regards to air quality:

'Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.'

The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

'Whether or not air quality is relevant to a planning decision will depend on the proposed development'

³ DEFRA: Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16), 2016.

and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).'

The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *"assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality [...] Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact"*.

The NPPF is currently under revision, the draft NPPF document was published in March 2018 and describes the policy context in relation to pollutants including air pollutants.

The following draft sections of the NPPF refer to air quality; Promoting sustainable transport; Conserving and enhancing the natural environment; and Ground conditions and pollution.

Promoting sustainable transport states:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of travel modes. This can help reduce congestion and emissions, and improve air quality and public health."

Conserving and enhancing the natural environment states:

"...Development should, wherever possible help to improve local environmental conditions such as air quality..."

Ground conditions and pollution 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."

The policies within the draft NPPF in relation to air pollution are considered within this Air Quality Assessment.

2.4.2 Local Policy

RBC are currently working on producing a new Local Plan which will replace the current development plans within the Core Strategy⁴.

The main planning policy relating to air quality is Policy CS34 of the Core Strategy, which states that:

'Development will only be permitted where it would not be damaging to the environment through air... there are pockets of poor air quality within Reading caused by vehicle emissions...therefore important to ensure that future development does not result in further deterioration of air...'

⁴ Reading Borough Council: Core Strategy (2008)

2.5 Regulation of Vehicular Exhaust Emissions

2.5.1 On-Road Vehicles

The emission of combustion pollutants from vehicle exhausts is regulated by European Directives with the phasing in of more stringent standards for new vehicles over the past 20-years for a range of pollutants including oxides of nitrogen (NO_x), carbon monoxide (CO), unburnt hydrocarbons and Particulate Matter (PM).

The actual emission limits vary depending on vehicle size (i.e. car, Light Duty Vehicles⁵ (LDV i.e. cars, vans), Heavy Duty Vehicles⁶ (HDV i.e. lorries and buses) and fuel type (i.e. diesel or petrol).

The latest standard, 'Euro 6', applies to new type approvals from September 2014 and all new cars and LDVs from September 2015 and requires significantly lower NO_x limits for diesel vehicles. Similarly, for HDVs, Euro VI is the current standard and also requires significant reductions in NO_x (and PM) emissions from the previous Euro V standard.

There is a widely acknowledged discrepancy between actual vehicle exhaust emissions (under real-world driving conditions) and the Euro emission standards, particularly for NO_x. However recent data indicates that emissions from Euro VI diesel HGV's are complying with Euro VI standard⁷ and by 2019 the emission standard for LGVs will also need to be achieved under 'real-world driving conditions'.

2.5.2 Non-Road Mobile Machinery

Non-road mobile machinery (NRMM) refers to mobile machines, items of transportable industrial equipment or vehicles (with or without bodywork) that is:

- not intended for carrying passengers or goods on the road; and
- installed with a combustion engine - either an internal spark ignition (SI) petrol engine, or a compression ignition diesel engine

In the UK, the legislation governing emissions produced by diesel engines fitted in NRMM is the *Non-Road Mobile Machinery (Emission of Gaseous and Particulate Pollutants) Regulations 1999*, as amended which sets emission standards for carbon monoxide (CO), hydrocarbons, NO_x and PM. These emission limits are defined by European Directive 97/68/EC (and subsequent amendments) and are Stage I-V depending on capacity of engine and date of manufacture.

Pollutants emitted by NRMM that may have the most significant potential effects on local air quality are particulate matter (PM₁₀, PM_{2.5}) and NO₂ / NO_x.

2.6 Relevant Guidance

2.6.1 Environmental Protection UK and Institute of Air Quality Management Guidance

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance⁸ to help ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how

⁵ As defined by the design manual for roads and bridges (DMRB), and includes vehicles <3.5tonnes.

⁶ As defined by the design manual for roads and bridges (DMRB), and includes vehicles ≥3.5tonnes.

⁷ In service emission performance of Euro 6/VI vehicles – a summary of testing using London drive cycles. Transport for London and Mayor of London.

⁸ EPUK and IAQM, 'Land-Use Planning and Development Control: Planning for Air Quality', v1.2 2017.

impacts should be described and assessed. Importantly, it sets out a recommended approach to assess the significance of impacts.

The guidance also states that best-practice design and operational measures should be recommended and applied to all developments that require an Air Quality Assessment, to reduce emissions and human exposure to poor air quality. Additional measures are also suggested to off-set emissions, depending on the nature and scale of the development proposals.

2.6.2 Design Manual for Roads and Bridges

The Design Manual for Roads and Bridges (DMRB) (207/07) considers the following criterion to determine 'affected roads' which have the potential to impact upon ambient air quality at surrounding receptors:

- road alignment will change by 5m or more;
- daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) or more;
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more;
- daily average speed will change by 10km/hour or more; or
- peak hour speed will change by 20km/hour or more.

The DMRB⁹ considers any receptor within 200m of a road source to be potentially affected by that operation. Receptors, including ecological designations within 200m of a road source require further assessment of potential impacts.

If none of the roads in the network meet any of the traffic / alignment criteria or there are no properties or relevant Designated Sites near the affected roads, then the impact of the scheme can be considered to be neutral in terms of local air quality and no further air quality assessment is required.

2.6.3 Construction Dust Demolition Guidance

The Institute of Air Quality Management (IAQM) in 2014 published guidance¹⁰ setting out a methodology for assessing the potential dust impacts that demolition and construction sites could generate. The guidance describes the factors which affect the potential for dust to be created and released from the Application Site during construction activities and to migrate to, and be deposited on surfaces and cause nuisance and potentially affect human health.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

⁹ DMRB, Volume 11, Section 3, Part 1, HA 207/07 – Air Quality, Highways Agency, 2007.

¹⁰ IAQM, Guidance on the assessment dust from demolition and construction, v1.1, 2016.

3.0 Methodology

3.1 Construction Dust Assessment

Assessment of the risk of impact associated with the generation of dust during the construction phases of the Proposed Development and determination of subsequent mitigation measures necessary has been undertaken following Institute of Air Quality Management (IAQM) guidelines⁹.

The assessment is based on a series of steps: screening the requirement for a detailed assessment, classification of the likely magnitude of dust emissions; characterisation of the area of influence and establishment of its sensitivity to dust; and establishment of the overall risk of impact. The risk of impact from dust emissions from the Proposed Development considers effects on human health, nuisance as a result of dust soiling and ecological receptors from four main activities: demolition; earthworks; construction, and trackout. The potential for dust emissions from each activity should be considered, unless any of them are not relevant to the Proposed Development.

The guidelines identify appropriate screening criteria for the identification of potential receptors, based on a conservative approach and in consideration of the exponential decline in both airborne concentrations and the rate of deposition with distance. A detailed assessment of the impact of dust from construction sites will be required where:

- a 'human receptor' is located within 350 m of the boundary of the Site or within 50m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance;
- an 'ecological receptor' is located within 50 m of the boundary of the Site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance.

The magnitude of dust emissions for each activity is classified following the IAQM guidance as small, medium or large depending upon the scale of the works proposed, materials involved and level of activity required. The Proposed Development is unlikely to satisfy all criteria within the guidance; therefore, professional judgement and site specific information are used to identify appropriate emission magnitude.

Consideration is given to the likely sensitivity of the area to the impacts of dust, establishing a sensitivity of low, medium or high for dust soiling, human health and ecological receptors. The sensitivity of the area considers a number of factors, including the specific sensitivities of receptors in the area, the proximity and number of those receptors, local baseline conditions such as background concentration and can be defined in line with the Construction Dust guidance presented in Appendix 01.

The risk of dust related impacts from the Proposed Development is established from the sensitivity of the area and the likely dust emission magnitude. The risk should be established, on the worst-case area sensitivity and in the absence of mitigation, for each of the construction related activities (demolition, earthworks, construction and trackout) following the matrix in Table 3-1.

Table 3-1
Risk of Dust Impacts from Each Activity

Sensitivity of Area	Activity	Dust Emission Magnitude		
		<i>Large</i>	<i>Medium</i>	<i>Small</i>
High	Demolition	High Risk	Medium Risk	Medium Risk
	Earthworks	High Risk	Medium Risk	Low Risk
	Construction	High Risk	Medium Risk	Low Risk
	Trackout	High Risk	Medium Risk	Low Risk
Medium	Demolition	High Risk	Medium Risk	Low Risk
	Earthworks	Medium Risk	Medium Risk	Low Risk
	Construction	Medium Risk	Medium Risk	Low Risk
	Trackout	Medium Risk	Low Risk	Negligible
Low	Demolition	Medium Risk	Low Risk	Negligible
	Earthworks	Low Risk	Low Risk	Negligible
	Construction	Low Risk	Low Risk	Negligible
	Trackout	Low Risk	Low Risk	Negligible

The IAQM guidelines identify a range of mitigation measures intended to reduce the emission and effects of dust from construction sites, and identify their likely applicability to a development based on the level of impact risk attributed. Consideration is given to these in the development of mitigation measures, with the significance of the residual effect based on professional judgement. The detail of the dust assessment methodology is provided in Appendix 01.

3.2 Operational Phase Screening Assessment

The assessment has been undertaken with reference to the following documents:

- Local Air Quality Technical Guidance (LAQM.TG (16));
- DMRB Volume 11, Section 3, Part 1 HA207/07 – Air Quality (an Interim Advice Note); and
- Land – Use Planning and Development Control: Planning for Air Quality (v1.2, 2017) – EPUK and IAQM.

The operational phase screening criteria used in this Air Quality Assessment are as defined within the EPUK and IAQM Guidance and reproduced in Appendix 02 of this report.

4.0 Baseline Environment

4.1 Location

The Application Site is located within RBC's area of administration at the approximate National Grid Reference (NGR): x472192, y173273. The Proposed Development is situated to the east of Reading City Centre with the surrounding locale characterised by residential and office buildings. The Application Site is currently an existing office block, but already has planning permission to be converted to residential use.

The Application Site is defined and bound by:

- Kennet Side Road and the River Kennet immediately to the north, beyond which lies office blocks, The Bear Pub and Pizza Restaurant and Back of Beyond Bar;
- Queen's Road, residential buildings and Amazing Grace Chinese Church are immediately south, beyond which lie further residential dwellings;
- Watlington Street and office blocks are immediately east, beyond which lie residential dwellings; and
- Immediately west are office blocks, beyond which lies residential buildings, NCP car park and further office blocks.

4.2 Baseline Air Quality

4.2.1 Local Authority Review and Assessment

As required under Section 82 of the Environment Act (1995) (Part IV), RBC have conducted an ongoing exercise to review and assess air quality within their area of administration. This process has indicated that concentrations of annual mean NO₂ are above, and likely to remain above, the relevant AQOs at locations of relevant public exposure within RBC's administrative area. As such, an AQMA has been declared across Reading for exceedances of the annual mean NO₂ concentrations, entitled 'Reading AQMA'.

4.2.2 Automatic Air Quality Monitoring

UK Automatic Urban and Rural Network (AURN) is a countrywide network of air quality monitoring stations operated on behalf of DEFRA. Monitoring data for AURN sites is available from the UK Air Information Resource website (UK AIR)¹¹.

The closest AURN monitor to the Application Site is Reading AURN (NGR: x473441 y173198) located approximately 1.3km to the east. This monitor is classified as an 'Urban Background' monitoring location, defined as defined as '*an urban location distanced from sources and therefore broadly representative of city-wide background conditions. E.g. urban residential areas*'. NO₂ PM₁₀ and PM_{2.5} monitoring results from recent years are displayed in Table 4-1 and Table 4-2. Exceedances of the relevant AQOs are highlighted in **bold**.

¹¹ DEFRA, UK Air Information Resource (UK-AIR) website, <http://uk-air.defra.gov.uk/>, accessed November 2017.

Table 4-1
AURN NO₂ Monitoring Results: Reading Urban Background

Year	Annual Mean Concentration (µg/m ³)	Number of Hours >200µg/m ³	Data Capture (%)
2015	22	0	N/A
2016	34	4	76

Table 4-1 indicates that the measured annual mean NO₂ concentrations at Reading AURN are in compliance with the annual AQO (40µg/m³). Further to this, there have been no exceedances of the 1-hour mean NO₂ AQO (18 exceedances per year are permitted) recorded during recent years.

Table 4-2
AURN PM₁₀ Monitoring Results: Reading Urban Background

Year	Annual Mean Concentration (µg/m ³)	Number of Hours > 50µg/m ³	Data Capture (%)
2015	12	0	N/A
2016	13	3	96

Table 4-2 indicates that measured PM₁₀ concentrations at Reading AURN monitor are in compliance with the annual AQO (40µg/m³). Further to this, there have been no exceedances of the 1-hour mean PM₁₀ AQO (35 exceedances per year are permitted) recorded during recent years.

Table 4-3
PM_{2.5} Monitoring Results: Reading Urban Background

Year	Annual Mean Concentration (µg/m ³)	Data Capture (%)
2015	7	88
2016	9	88

Table 4-3 indicates that measured PM_{2.5} concentrations at Reading AURN monitor are in compliance with the annual AQO (25µg/m³).

Automatic monitoring is also undertaken by RBC at 3 locations across the Reading administrative area.

The closest monitor to the Application Site is the RD4 (NGR: x473073 y173409) which is approximately 1.5km east of the Application Site. The monitor is classified as 'Roadside' 'A site sampling typically within one to five meters of the kerb of a busy road (although distance can be up to 15m from the kerb in some cases)'. NO₂ and PM₁₀ monitoring results from recent years are displayed in Table 4-4 and Table 4-5 are highlighted in **bold**.

Table 4-4
Automatic NO₂ Monitoring Results: RD4 Roadside

Year	Annual Mean Concentration (µg/m ³)	Number of Hours >200µg/m ³	Data Capture (%)
2016	32	0	75

Table 4-4 indicates that measured NO₂ concentrations at RD4 Roadside monitor are in compliance with the annual AQO (40µg/m³). No exceedances of the 1-hour mean NO₂ AQO (18 exceedances per year are permitted) were recorded in 2016.

Table 4-5
Automatic PM₁₀ Monitoring Results: RD4 Roadside

Year	Annual Mean Concentration (µg/m ³)	Number of Hours > 50µg/m ³	Data Capture (%)
2016	19	2	64

Table 4-5 indicates that measured PM₁₀ concentrations at RD4 Roadside monitor are in compliance with the annual AQO (40µg/m³). No exceedances of the 1-hour mean PM₁₀ AQO (35 exceedances per year are permitted) were recorded in 2016.

4.2.3 Passive Diffusion Tube Monitoring

Passive diffusion tube monitoring is currently undertaken by Reading Borough Council across the Reading area as part of their commitment to the LAQM. The diffusion tubes are located in areas which are deemed to require further assessment of NO₂ concentrations.

At the time of the assessment the closest diffusion tubes to the Application Site were:

- DT01 – Kings Oak Flats, Queens Road located approximately 190m west; and
- DT09 – 276 Kings Road located approximately 570m east.

A summary of the NO₂ monitoring results for 2016 are presented within Table 4-6. Any exceedances of the annual mean AQO are highlighted in **bold**.

Table 4-6
Passive Diffusion Tube Monitoring Results

Monitoring Location		Site Classification	NGR (m)		2017 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) ^(A)
			X	Y	
DT01	Kings Oak Flats, Queens Road	Roadside ^(B)	472012	173223	31.36
DT09	276 Kings Road	Roadside ^(B)	472716	173218	32.11

Notes:

(A) Bias corrected.

(B) Roadside sites defined as 'A site sampling typically within one to five meters of the kerb of a busy road (although distance can be up to 15m from the kerb in some cases)'.

Table 4-6 shows that measured NO₂ concentrations at DT01 and DT09 are in compliance with the annual AQO (40 $\mu\text{g}/\text{m}^3$).

4.2.4 National Air Quality Archive

Background pollutant concentration data on a 1km x 1km spatial resolution is provided by DEFRA through the UK Air Information Resource (AIR) website and is routinely used to support LAQM and Air Quality Assessments.

Mapped background concentrations of NO_x, NO₂ and PM₁₀ based upon the 2015 base year DEFRA update¹² were downloaded for the grid squares containing the Application Site. The Application Site is situated within the grid square x472500, y173500. Therefore, background concentrations for each pollutant at the Application Site were gained by averaging pollutant concentrations found within both grid squares.

Background pollutant concentrations for 2016 (representing worst-case background concentrations) through to 2019 are displayed in Table 4-7.

Table 4-7
Background Concentrations for the Application Site (x472500, y173500)

Pollutant	Mapped Background Concentration ($\mu\text{g}/\text{m}^3$)					
	2015	2016	2017	2018	2019	2020
NO ₂	26.09	25.36	24.62	23.72	22.81	21.84
NO _x	40.71	39.22	37.73	36.0	34.32	32.54
PM ₁₀	15.52	15.32	15.11	14.91	14.71	14.51
PM _{2.5}	9.89	9.74	9.60	9.46	9.31	9.17

4.2.5 Summary of Baseline Air Quality Data

Measured NO₂ concentrations have not exceeded the AQO at locations close to the Application Site during 2015 or 2016. Further to this, the measured 1-mean concentrations have not been seen to exceed the AQO during 2015 or 2016. Background NO₂ concentrations modelled by Defra are not predicted to exceed annual mean NO₂ AQO.

¹² Background mapping data for local authorities – <http://uk-air.defra.gov.uk/data/laqm-background-home>, accessed November 2017.

Measured data shows that PM₁₀ concentrations have met both the short-term and long-term AQO's close to the Application Site. PM₁₀ concentrations modelled by Defra are also predicted to meet the relevant objectives.

Measured data indicates that PM_{2.5} concentrations have met the annual mean AQO close to the Application Site. PM_{2.5} concentrations modelled by Defra are also predicted to meet the annual objective.

4.3 Meteorology

In relation to construction dust the generation, release and dispersion of fugitive dust are dependent upon weather conditions and the nature of the handled material. The prevailing meteorological conditions at any site would be dependent upon many factors including its location in relation to macroclimatic conditions as well as more site specific, microclimatic conditions. The most important climatic parameters governing the emission and magnitude of impact of dust are:

- wind direction which determines the broad transport of the emission and the direction in which it is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of pollutants in the emission; it will also affect the potential for dust entrainment.

Rainfall is also an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)¹³ rainfall greater than 0.2mm per day is sufficient to suppress dust emissions.

4.3.1 Wind Speed and Direction Data

The meteorological station considered to represent conditions at the Application Site is Heathrow which located approximately 34km east. A wind rose for this section is presented in Figure 4-1. It can be seen the majority of winds and the fastest winds are from the south-west and west (210° - 260° and 270°) with winds from these sectors occurring approximately 35 % of the year. Therefore, on this basis, the locations in the north-east and eastern sectors have the highest potential for impacts from any dust emissions originating from the Site.

¹³ Arup & Ove Arup Environmental. Environment Effects of Surface Mineral Workings. DoE, October 1995.

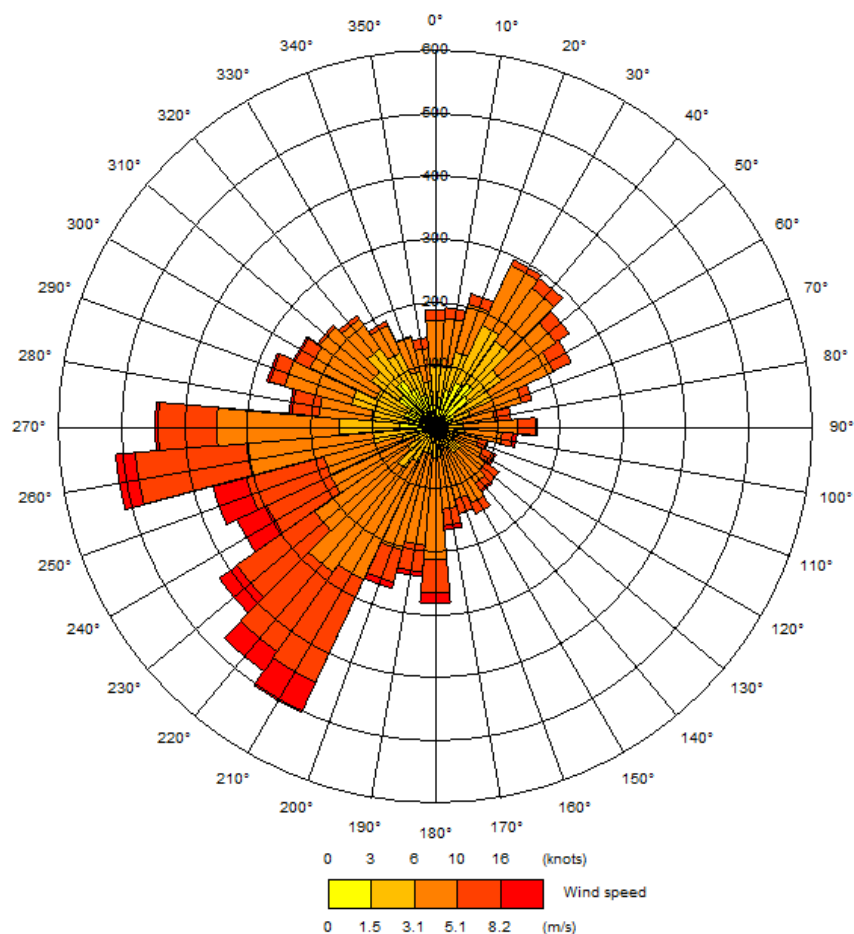


Figure 4-1
Wind Rose for Heathrow (2016)

4.3.2 Rainfall

Relevant rainfall data applicable to the Application Site has been obtained from the Met Office website¹⁴ of UK mapped climate averages for 1981 – 2010. The closest climate station to the Application Site is located at Reading University, situated at approximately 1.2km to the south east. The number of days with an average annual rainfall of >1mm is 111 days, comprising 30% of the year.

4.4 Sensitive Receptors

The term 'sensitive receptors' includes any persons, locations or systems that may be susceptible to changes in abiotic factors as a consequence of the development. These have been identified as construction dust and ecological sensitive receptors to which the AQOs and stated guidance apply, in the following sections.

¹⁴ Met Office, <http://www.metoffice.gov.uk/public/weather/climate>, accessed November 2017

4.4.1 Construction Dust Receptors

The main receptors likely to be affected by the generation of construction dust are those existing receptors within approximately 100m of the development boundary and/or within 50m of the route(s) used by vehicles on the public highway. However, for those receptors sited in a downwind location from the Application Site boundary, potential dust impacts can be witnessed at a distance of greater than 100m on occasion under worst case conditions.

4.4.2 Ecological Receptors

Air quality impacts associated with the construction and operational phases of the Proposed Development has the potential to impact on receptors of ecological sensitivity within the vicinity of the Application Site. The Conservation of Habitats and Species Regulations (2010) requires competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Areas of Conservation (SAC)).

Guidance from the IAQM¹⁵ states that dust impacts at ecological receptors require assessment at locations up to 50m from a development boundary. The DMRB¹⁶ furthermore states that '*SACs including candidate sites, Special Protection Areas (SPAs including potential sites), Sites of Special Scientific Interest (SSSIs) and Ramsar sites within 200m of an 'affected road' require an assessment of the potential impact upon ambient air quality*'.

A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within 50m of the Application Site boundary, to determine the potential impact resulting from the construction phase movements. This was completed using the Magic web-based interactive mapping service¹⁷, which draws together information on key environmental designations.

A search within 50m of the development boundary and 200m of a potentially 'affected' road indicated no sensitive ecological receptors.

¹⁵ IAQM, Guidance on the assessment dust from demolition and construction v1.1, 2016.

¹⁶ Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07 - Air Quality, Highways Agency, 2007.

¹⁷ Natural England, www.magic.gov.uk, accessed November 2017.

5.0 Assessment of Construction Phase Impacts

This section presents the potential air quality impacts associated with the construction of the Proposed Development.

During the construction phase of the Proposed Development possible construction activities will include:

- Construction operations;
- Materials handling, storage, stockpiling, spillage and disposal; and
- Associated vehicle movements (including track-out of material by construction phase movements).

Potential air quality impacts associated with the above construction activities have been identified as:

- Generation of dust emissions on-site during construction works;
- Generation of vehicle emissions from construction phase road traffic, including Light Duty Vehicles (LDVs) carrying construction workers to and from the development site and HDV movements involved with the export and import of construction material; and
- Generation of vehicle emissions from NRMM plant on-site.

5.1 Construction Dust

The following subsections provide a consideration of potential construction dust and conclude with a determined emission class and risk category, from each of the four categories identified by the IAQM Guidance.

As shown in Section 4.4 and Figure 5.1, there are 'human receptors' within 100m of the Application Site, but no ecological receptors within 50m of the Application Site boundary or within 50m of the Application Site access roads (assessed up to 500m from the Application Site entrance). Therefore, an assessment of construction dust on ecological receptors can be screened out from this assessment, but an assessment of construction dust at human receptors is required.

5.1.1 Potential Dust Emission Magnitude

The likely magnitude of dust emissions from the Proposed Development for the four main activities has been assessed, as identified in Table 5-1.

Table 5-1
Predicted Magnitude of Dust Emissions from Proposed Development

Activity	Magnitude	Justification
Demolition	N/A	No demolition is envisaged due to the Proposed Development comprising of re-development and extension of an existing office block.
Earthworks	Small	The site area is 2,200 m ² . There will be need for excavation for the extension of the existing building and there will also be need for a small amount of levelling and landscaping across the site.
Construction	Small	The total volume of the new construction within the Proposed Development is 1,300 m ³ . The construction material will predominantly be glazed and lightweight non-vision elements. Therefore, there will be a small construction dust magnitude.
Trackout	Small	There will be a maximum of 10 HDV movements per day on readymade ground as there are existing office blocks on the Application Site. Therefore, there will be a small trackout dust magnitude.

5.1.2 Receptor Sensitivity

The Application Site is located within a built up urban area, compromising of office, retail and residential use.

The closest sensitive receptors are located east, south and west of the Application Site. Receptor sensitivity to 'dust soiling' and 'PM₁₀ sensitivity' has been determined in accordance with based upon the IAQM dust method (see Table 01-1 presented within Appendix 01), as detailed in the following subsections.

Dust Soiling Sensitivity

In terms of dust soiling sensitivity, there are <100 sensitive receptors within 20m of the Application Site boundary. Sensitive receptors consist of office space, a school and restaurants, where users can reasonably expect enjoyment of a high level of amenity. Therefore, the sensitivity of the area is considered to be 'high'.

PM₁₀ Human Health Sensitivity

It should be noted, that the background PM₁₀ concentration from the closest automatic 'urban background' monitor was 12µg/m³ within 2015 and 13 µg/m³ within 2016 presented within Table 4-2. The concentration from the closest 'roadside' monitor was 19 µg/m³ within 2016 presented within Table 4-5. Therefore, background concentrations are considered to be 'well below', the annual mean AQO of 40µg/m³, in accordance with EPUK and IAQM guidance¹⁸. However, due to the densely populated urban area there are a high number of sensitive receptors within close proximity of the Application Site. Therefore, in accordance with the IAQM guidance presented within Appendix 01, the sensitivity of the area to human health impacts is defined as 'medium'.

Ecological Sensitivity

As discussed within Section 4.3.2, there are no ecological receptors 50m of the Application Site boundary or within 50m of the Application Site access roads (assessed up to 500m from the Application Site entrance, as a worst-case scenario) of the Application Site. As such, impacts have not been considered within the assessment.

Sensitive Summary

Table 5-2
Sensitivity of the Area to Dust Emission Impacts

Impact Type	Receptor Sensitivity	No. Receptors	Background Concentration	Distance from Source	Sensitivity of Area
Dust Soiling	High	10 – 100	-	<20 m	High
	Medium	10 – 100	-	<50 m	Medium
	Low	>1	-	<50 m	Low
Human Health	High	10 – 100	<24 µg/m ³	<20 m	Low
	Medium	10 – 100	<24 µg/m ³	<50 m	Low
	Low	>1	-	<50 m	Low

¹⁸ EPUK and IAQM, 'Land-Use Planning and Development Control: Planning for Air Quality', v1.2 2017.

5.1.3 Risk of Impact

Consequently, the risk of dust impacts and the significance of effect as a result of dust emissions are presented in Table 5-3, which considers the magnitude of dust emission from the Application Site (Table 5-1) and the sensitivity of the surrounding area (Table 5-2). Following the IAQM guidance, the risk of impacts is based on the worst-case sensitivity identified.

Table 5-3
Risk of Dust Related Impacts from the Proposed Development

Activity	Dust Soiling	Human Health	Ecological
Demolition	Negligible	Negligible	Negligible
Earthworks	Low Risk	Negligible	Negligible
Construction	Low Risk	Negligible	Negligible
Trackout	Low Risk	Negligible	Negligible

5.2 Construction Phase – Vehicular Pollutants

Road traffic emissions associated with vehicle movements, particularly HDV movements, during the construction phase of the development have the potential to result in increased concentrations of combustion related pollutants, such as NO₂ and PM₁₀ in the vicinity of the Application Site.

The DMRB states that further assessment of potential air quality impacts should be undertaken if the following criteria are met on any link affected by a Proposed Development:

- increase in 24-hour AADT flow of more than 1,000-vehicles; and/or
- increase in 24-hour AADT flow of more than 200-HDV.

Further guidance¹⁹ provided by EPUK and IAQM, states that a detailed assessment of potential air quality impacts should be undertaken if the following criteria are met on any link affected by a Proposed Development:

- change in 24-hour LDV flows of:
 - more than 100 AADT within or adjacent to an AQMA; or
 - more than 500 AADT elsewhere.
- change in 24-hour HDV flows of:
 - more than 25 AADT within or adjacent to an AQMA; or
 - more than 100 AADT elsewhere.

The Application Site is located within an AQMA and therefore the lower screening criterion (i.e. 100 LDV and 25 HDV) would apply.

Information on traffic movements anticipated during construction works was unavailable for the completion of the Air Quality Assessment. However, the development quantum is not anticipated to result in a significant increase in movements above the DMRB or the EPUK and IAQM criterion. The duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in

¹⁹ EPUK and IAQM, 'Land-Use Planning and Development Control: Planning for Air Quality', v1.2 2017.

accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle trips during the construction phase of the scheme” *can be considered to have insignificant effects*” on air quality.

With regard to the DMRB criteria, the predicted increase in traffic on the surrounding road links is considered to be below the defined threshold (1,000 AADT or 200 HDV movements) for an ‘affected road’ and traffic can be controlled via a Construction Management Plan. Therefore, in accordance with the DMRB Guidance, *“the impact of the scheme [from construction phase vehicle movements] can be considered to be neutral in terms of local air quality and no further work is required”*.

5.3 Construction Phase – Non-road Machinery

NRMM refers to mobile machines, transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads.

Pollutants emitted by NRMM that may have the most significant potential effects on local air quality are particulate matter (PM₁₀ and PM_{2.5}), and NO_x/NO₂. Typically, NRMM is associated with construction sites and, therefore there is a potential for NRMM emissions to adversely affect local air quality as a result of the Proposed Development.

However, LAQM.TG(16) guidance states, in relation to exhaust emission from on-site NRMM that²⁰, *‘with suitable control measures and site management they are unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed’*.

Therefore, considering the number of NRMM on site at any one time, potential emissions from NRMM are not considered to be significant and have not been considered further within the context of this assessment.

²⁰ Local Air Quality Management Technical Guidance LAQM.TG(16), DEFRA, April 2016. Page 7-9.

6.0 Assessment of Operational Phase Impacts

This section presents the potential air quality impacts associated with the operational phase of the Proposed Development.

6.1 Trip Generation

Vehicle movements associated with the Proposed Development could generate additional emissions, such as NO₂ and PM₁₀, on the local and regional road networks.

Table 6-1 below presents the net impact the Proposed Development will have on traffic flows. It is noted that at present the Application Site is not in use and the Proposed Development will provide 8 parking spaces.

Table 6-1
Net Impact of the Proposed Development on Traffic Flow

	IN	Out	Total
AM	1	1	2
PM	2	1	3
Daily	14	14	28

Table 6-1 shows that there will be a daily total net increase in traffic flow of 28, provided by Cannon Consulting Engineers.

6.2 Screening Assessment – Consideration and Potential Impacts

In accordance with the EPUK and IAQM Guidance, developments within an AQMA require consideration of potential air quality impacts where additional development trips are in excess of 100 AADT as LDV trips, or 25 AADT as HDV trips.

As the Proposed Development includes 8 car parking spaces, as shown in Table 6-1, there will be an increase of trips from the Proposed Development. The number of development trips over a 24-hour AADT period is below the indicative criterion.

Therefore, in accordance with the EPUK and IAQM Guidance, *'the impacts [on air quality from operational phase trips] can be considered to have insignificant effects'*.

With regard to the DMRB criteria, the predicted increase in traffic on the surrounding road links is below the defined threshold (1,000 AADT or 200 HDV movements) for an 'affected road'.

Therefore, in accordance with the DMRB Guidance, *'the impact of the scheme can be considered to be neutral in terms of local air quality and no further work is required'*.

7.0 Mitigation Measures

This section presents any mitigation measures required during the construction and operational phases of the Proposed Development to reduce the potential impact of the predicted effects.

7.1 Construction Dust Phase

An assessment of the significance of impacts associated with construction phase dust has been undertaken in accordance with the IAQM methodology. A summary of the risk category associated with each identified source of construction phase dust is presented within Table 5-3, for the purposes of identifying mitigation requirements.

The risk of dust soiling effects from demolition was 'negligible' and 'low risk' from earthwork, construction and trackout activities.

The risk of human health effects from PM₁₀ were assessed as 'negligible' from demolition, earthworks, construction and trackout activities.

Given the close proximity of receptors, it is recommended that effective dust mitigation measures in accordance with those listed as 'highly recommended' within the IAQM guidance document should be implemented in order to mitigate potential dust effects.

In accordance with the IAQM guidance, no additional mitigation beyond that required by legislation is required.

In order to control potential impacts, the mitigation measures presented within Table 7-1 are recommended for the scheme and can be enforced via a Construction Management Plan required by condition.

Table 7-1
Construction Dust Mitigation Measures

Site Application	Mitigation Measures
General Dust Management	Display name and contact details of the person(s) accountable for air quality and dust issues on the site boundary.
	Record all dust and air quality complaints and take appropriate measures to reduce emissions
	Record any exceptional; incidents that cause dust off Site.
	Undertake daily visual inspection of dust soiling and dust generation and record in Site log (available for the local authority if requested)
	Ensure an adequate supply of water is available onsite for effective dust suppression
	Use enclosed chutes and conveyors and cover skips
	Minimise drop heights from conveyors, loading shovels and other material handling equipment
	Ensure all vehicles engines are switched off when stationary
	Plan Site layout so machinery is located away from receptors as far as possible

Site Application	Mitigation Measures
	Erect solid barriers around dusty activities or the Site boundary
	Enclose specific operations where there is a high potential for dust production
	Avoid Site runoff of water or mud
	Keep Site fencing, barriers and scaffolding clean using wet methods
	Remove material that have the potential to produce dust from the Site as soon as possible
Construction	Avoid scabbling (roughing of concrete surfaces) if possible
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	Use water assisted dust sweepers on the access and local roads to removed tracked out material is necessary
	Avoid dry sweeping large areas
	Ensure vehicles entering and leaving Site are covered to prevent escape of materials during transport
	Implementation of wheel washing system with hard surfacing between facility and public road
	Access gates to be located at least 10m from receptors where possible

Potential dust effects during the construction phase considered to be temporary in nature. The impacts are determined to be temporary as they will only potentially occur throughout the construction phase and short-term because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine.

However, the application of the above dust control and mitigation measures, it is considered that impacts at all receptors will be 'not significant' in accordance with the IAQM guidance.

7.2 Construction Phase Road Traffic Emissions

Potential air quality impacts associated with construction phase road traffic emissions (principally HDV movements) have been screened out for further assessment with associated impacts on air quality predicted to result in an 'insignificant' effect. Therefore, mitigation measures are not considered to be required.

7.3 Construction Phase NRMM Emissions

NRMM and plant should be well maintained. If any emissions of dark smoke occur then the relevant machinery should stop immediately and any problem rectified. In addition, the following controls should apply to NRMM:

- all NRMM should use fuel equivalent to ultralow sulphur diesel;
- all NRMM should comply with either the current or previous EU Directive Staged Emission Standards;
- all NRMM should be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting);
- the on-going conformity of plant retrofitted with DPF, to a defined performance standard; and

- implementation of fuel conservation measures including instructions to throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the Site and while they are being loaded or unloaded, ensure equipment is properly maintained to ensure efficient fuel consumption.

Successful implementation of the above mitigation measures would ensure that emissions from the construction phase and NRMM used during construction are 'not significant'.

7.4 Operational Phase Road Traffic Emissions

Potential air quality impacts associated with operational phase development trips have been screened out from further assessment as '*the impacts [on air quality from operational phase movements] can be considered to have insignificant effects*' in accordance with the EPUK and IAQM Guidance. Therefore, mitigation measures are not considered to be required.

8.0 Conclusions

SLR Consulting limited has undertaken an assessment of potential air quality impacts associated with the proposed re-development and extension at of 59 – 75 Queen's Road, Reading, Berkshire.

The baseline review did not find any exceedences of NO₂ concentrations, from the RBC air quality monitoring local to the Application Site within recent years. Further to this, background NO₂ concentrations modelled by Defra are not predicted to exceed annual mean NO₂ objectives.

Measured data shows that PM₁₀ concentrations have met both the short-term and long-term national objective at an urban background location within RBC. PM₁₀ concentrations modelled by Defra are also predicted to meet the relevant objectives.

Measured data indicates that PM_{2.5} concentrations have met the annual mean national objective at an urban background location within RBC. PM_{2.5} concentrations modelled by Defra are also predicted to meet the annual objective.

A qualitative assessment of the potential dust impacts during the construction of the development has been undertaken. Through good practice and implementation of appropriate mitigation measures, it is expected that the release of dust would be effectively controlled and mitigated, with resulting impacts considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature.

Due to the low additional number of HDV trips anticipated during the construction phase of the development, there is predicted to be a neutral impact / insignificant effect on air quality from road vehicle emissions.

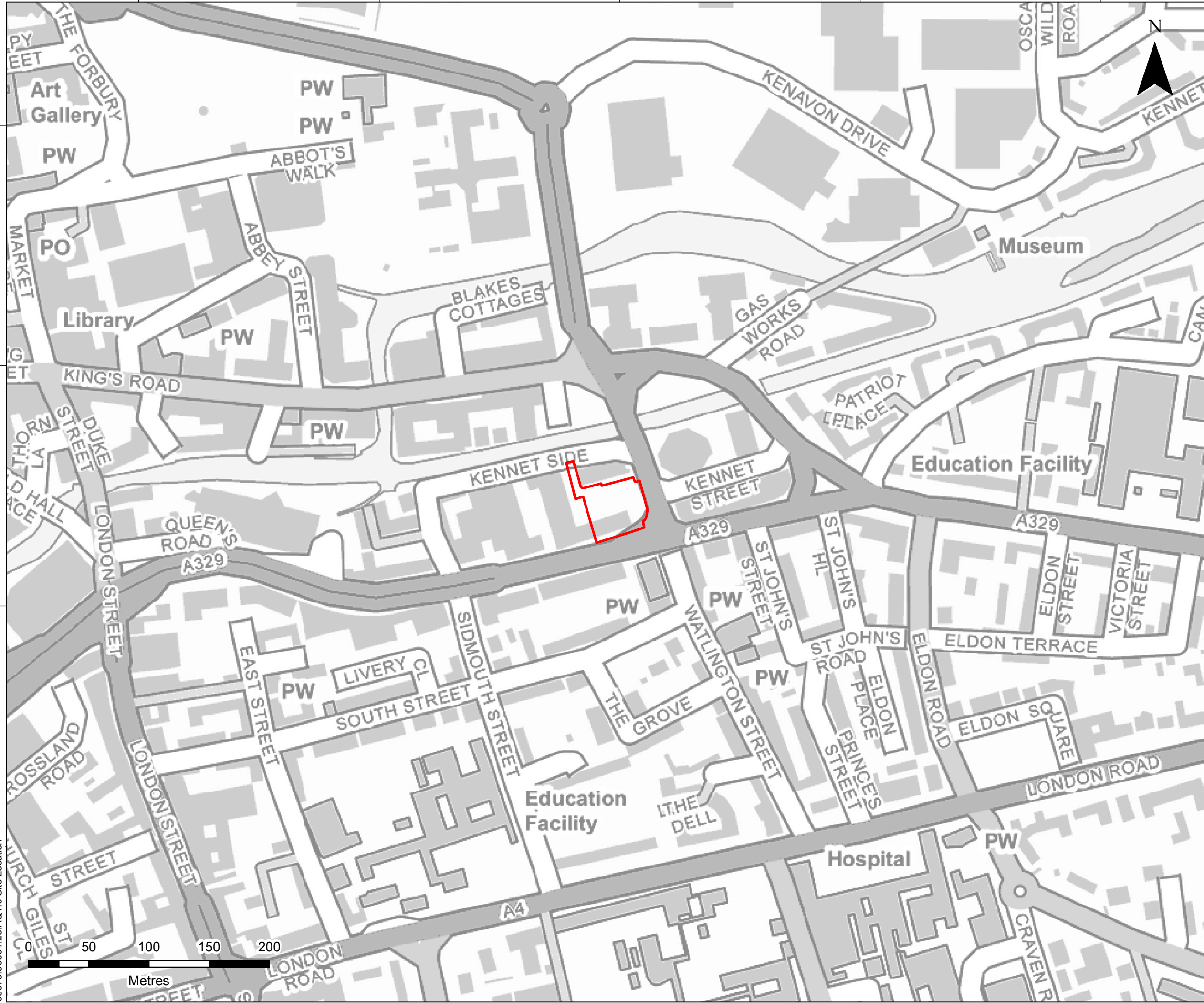
The results of the Operational Phase Screening Assessment indicate that the additional development flows associated with the operation of the Proposed Development are not in excess of the EPUK and IAQM criteria for further assessment. Therefore, the potential air quality impact of additional development trips can be considered to result in an insignificant effect in accordance with the stated guidance.

As such, it is not considered that air quality represents a material consideration to the development proposals, which conform to the principles of National Planning Policy Framework and the Reading Borough Council Core Strategy.

FIGURES

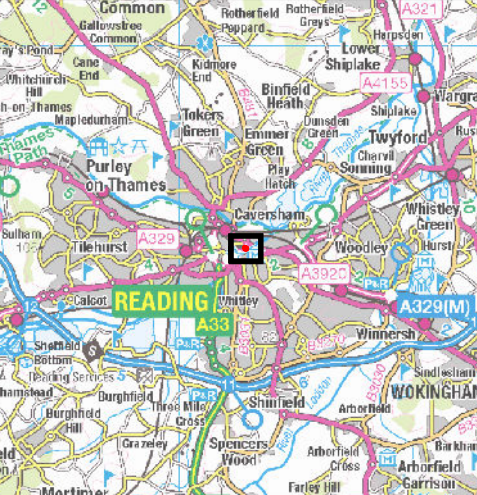
471800 472000 472200 472400 472600

173600 173400 173200



LEGEND

SITE BOUNDARY



A small inset map showing the location of the site within the city of Reading, with a red square indicating the specific area shown in the main map.

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ROYAL HEIGHTS
READING

AIR QUALITY ASSESSMENT

SITE LOCATION

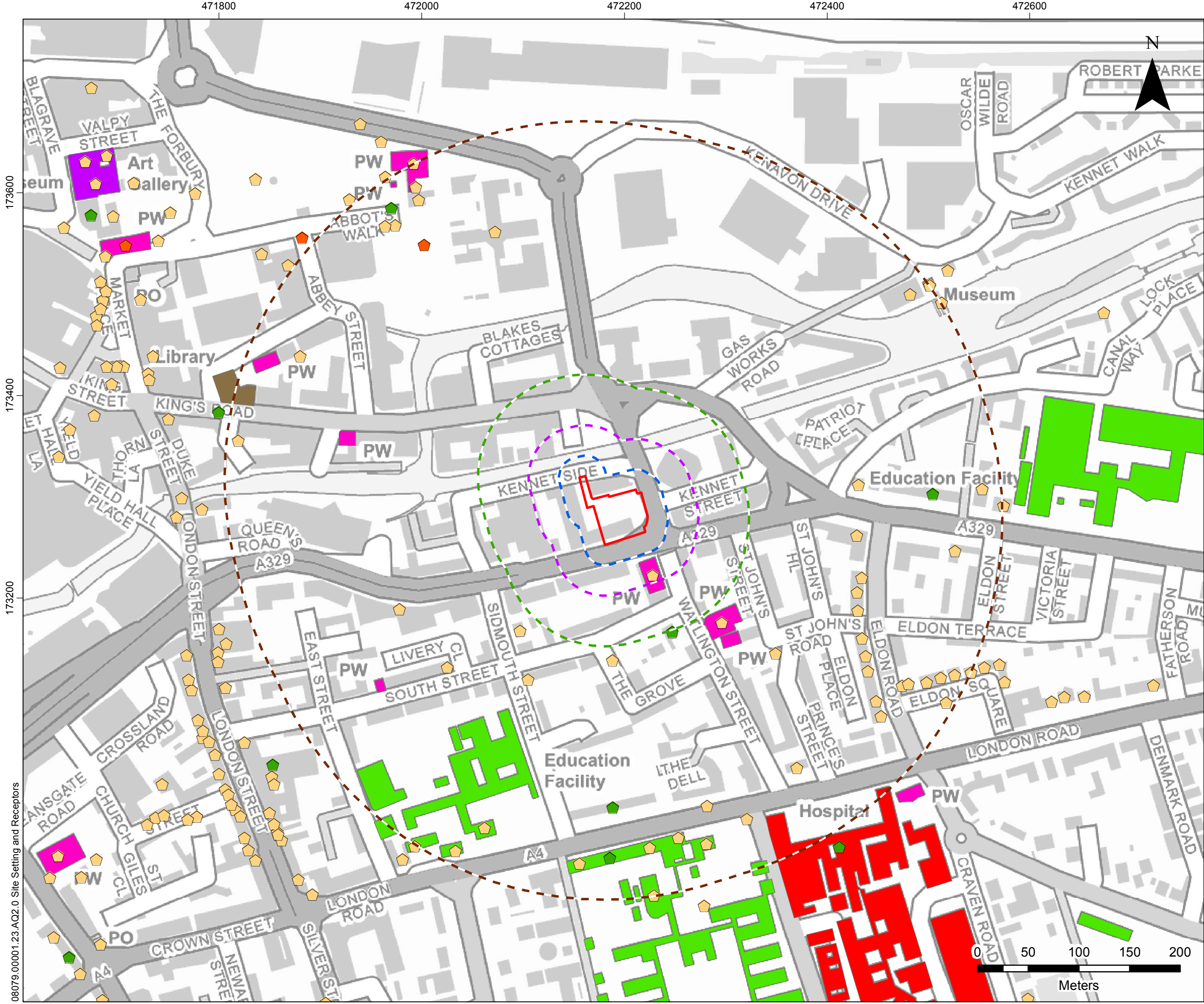
AQ1

Scale

1:3,000 @ A3

Date

APRIL 2018



LEGEND

	SITE BOUNDARY
	20m BUFFER FROM SITE
	50m BUFFER FROM SITE
	100m BUFFER FROM SITE
	350m BUFFER FROM SITE
	ART GALLERY
	SCHOOL / COLLEGE
	HOSPITAL
	MUSEUM / LIBRARY
	MUSEUM
	PLACE OF WORSHIP

LISTED BUILDING (GRADE)

	I
	II*
	II

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AIR QUALITY ASSESSMENT

**SITE SETTING AND CONSTRUCTION
PHASE SENSITIVE RECEPTORS**

AQ2

Scale 1:3,500 @ A3

Date APRIL 2018

0 50 100 150 200
Meters

APPENDIX 01

Construction Dust Assessment Methodology

Predicting Risk

The assessment of risk is determined by considering the predicted change in conditions as a result of the development. The risk category for potential dust effects arising from Site works is defined into 4No. potential activities:

- demolition;
- earthworks;
- construction; and
- trackout.

The determination of risk categories presented above are based upon the descriptors presented within IAQM: Guidance on the assessment of dust from demolition and construction.

Sensitivity of Receptor

To determine the significance of dust effects associated with the construction phase of the development, an evaluation of the sensitivity of the surrounding area is required. Receptors can demonstrate different sensitivities to changes in their environment, and are classified as detailed within Table AQ1-1.

Quoted distances to the nearest receptor are from the dust emission sources. Where this is not known, receptor distances are determined from the Site boundary. The risk category is based upon the distance of Site works to the nearest receptor.

Table 01-1
Methodology for Defining Sensitivity to Dust Effects

Sensitivity of Area	Examples		
	Human Receptors		Ecological Receptors ^(A)
	Dust Soiling Effects	Health Effects of PM ₁₀	
High	- users can reasonably expect an enjoyment of a high level of amenity; or - the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. - indicative examples include dwellings, museums and other culturally important collections, medium and longterm car parks and car showrooms.	- locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). - Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	- locations with an international or national designation and the designated features may be affected by dust soiling; or - locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. - indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local Site designated for lichens adjacent to the demolition of a large Site containing concrete (alkali) buildings.
Medium	- users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or - the appearance, aesthetics or value of their property could be diminished by soiling; or • the people or property	locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	- locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or - locations with a national designation where the features may be affected by dust deposition. - indicative example is a Site of Special

Sensitivity of Area	Examples		
	wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. indicative examples include parks and places of work.	indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.	Scientific Interest (SSSI) with dust sensitive features.
Low	- the enjoyment of amenity would not reasonably be expected; or - property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or - there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal - pattern of use of the land. - indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	- locations where human exposure is transient. - indicative examples include public footpaths, playing fields, parks and shopping streets.	- locations with a local designation where the features may be affected by dust deposition. - indicative example is a local Nature Reserve with dust sensitive features.
Notes: (A) Only applicable if ecological habitats are present which may be sensitive to dust effects.			

Assessment of Impact Significance – Dust Effects

Table AQ1-2 to Table AQ1-4 illustrate how the sensitivity of the area may be determined for dust soiling, human health and ecosystem impacts, respectively. The highest level of sensitivity from each table should be recorded.

Table 01-2
Sensitivity of Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	Medium	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	<1	Low	Low	Low	Low

Table 01-3
Sensitivity of Area to Human Health Impacts

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

	24 – 28µg/m ³	1 – 10	Low	Low	Low	Low	Low
		>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	<24µg/m ³	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	-	1	Low	Low	Low	Low	Low

Table 01-4
Sensitivity of Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m) ^(A)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low
Note: (A) For trackout, the stances should be measured from the side of the roads used by construction traffic.		

Defining the Risk of Impact

Table AQ1-5 to Table AQ1-8 illustrates how the dust emission magnitude should be combined with the sensitivity of the area to determine the risk of impacts with no mitigation measures applied.

Table 01-5
Risk of Dust Impacts – Demolition

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

Table 01-6
Risk of Dust Impacts – Earthworks

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

Sensitivity of Area	Dust Emission Magnitude		
Low	Low Risk	Low Risk	Negligible

Table 01-7
Risk of Dust Impacts – Construction

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

Table 01-8
Risk of Dust Impacts – Trackout

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

APPENDIX 02

Traffic Related Emissions Technology

Air Quality Assessment requirements

The EPUK and IAQM guidance provides a two stage approach to determining the need to assess development impacts in an Air Quality Assessment. Stage 1 is used to screen out smaller developments which are likely to have an insignificant effect. Stage 2 relates to the likelihood of air quality impacts with regards to more site specific details.

Stage 1, shown in Table A02-1, provides the criteria used to assess the need to proceed to Stage 2. If any of the criteria under (A) coupled with any of the criteria under (B) are met then Stage 2 should be undertaken.

Table 02-1
Stage 1 Assessment Criteria

Criteria to Proceed to Stage 2	
A	10 or more residential units or a Site area of more than 0.5ha - more than 1,000m² of floor space for all other uses or a Site area greater than 1ha
B	- the development has more than 10 parking spaces - the development will have a centralised energy facility or other combustion process

The Stage 2 site specific criteria, stated in Table A02-2, should be reviewed to determine if a full Air Quality Assessment is required. If none of these criteria are met, then there is no requirement to undertake a full Air Quality Assessment and impacts can be considered insignificant.

Table 02-2
Stage 2 Assessment Criteria

The Development Will:	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in LDV traffic flows on local roads with relevant receptors	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA; or - more than 500 AADT elsewhere.
Cause significant change HDV flows on local roads with relevant receptors	A change of HDV flows of - more than 25 AADT within or adjacent to an AQMA; or - more than 100 AADT elsewhere.
Realign roads, i.e. changing the proximity of receptors to traffic lanes	Where the change is 5m or more and the road is within the AQMA
Introduce a new junction or remove an existing junction near to relevant receptors	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts
Introduce or change a bus station	Where bus flows will be: more than 25 AADT within or adjacent to an AQMA; or

	more than 100 AADT elsewhere.
Have an underground car park with extraction system	The ventilation extract for the car par will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movement per day (total in and out)
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. This includes combustion plant associated with standby emergency generators (typically associated with centralized energy centers) and shipping.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plum may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favorable, a much higher emission rate may be acceptable.

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