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BELLWAY HOMES
PROPOSED RESIDENTIAL DEVELOPMENT
BATTLE HOSPITAL, PORTMAN ROAD,
READING

AIR QUALITY ASSESSMENT

FEBRUARY 2018

the journey is the reward

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Bellway Homes

Proposed Residential Development

Battle Hospital, Portman Road, Reading

Air Quality Assessment

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1 Introduction

1.1 Mayer Brown Ltd has been commissioned by Bellway Homes to undertake an Air Quality Assessment (AQA) in support of a planning application for a proposed residential-led development at the former Battle Hospital Site, Portman Road, Reading.

1.2 The site is located off Portman Road, to the west of Reading town centre in Berkshire. The location of the proposed development in relation to the local highway network, is illustrated in **Figure 1.1** below.

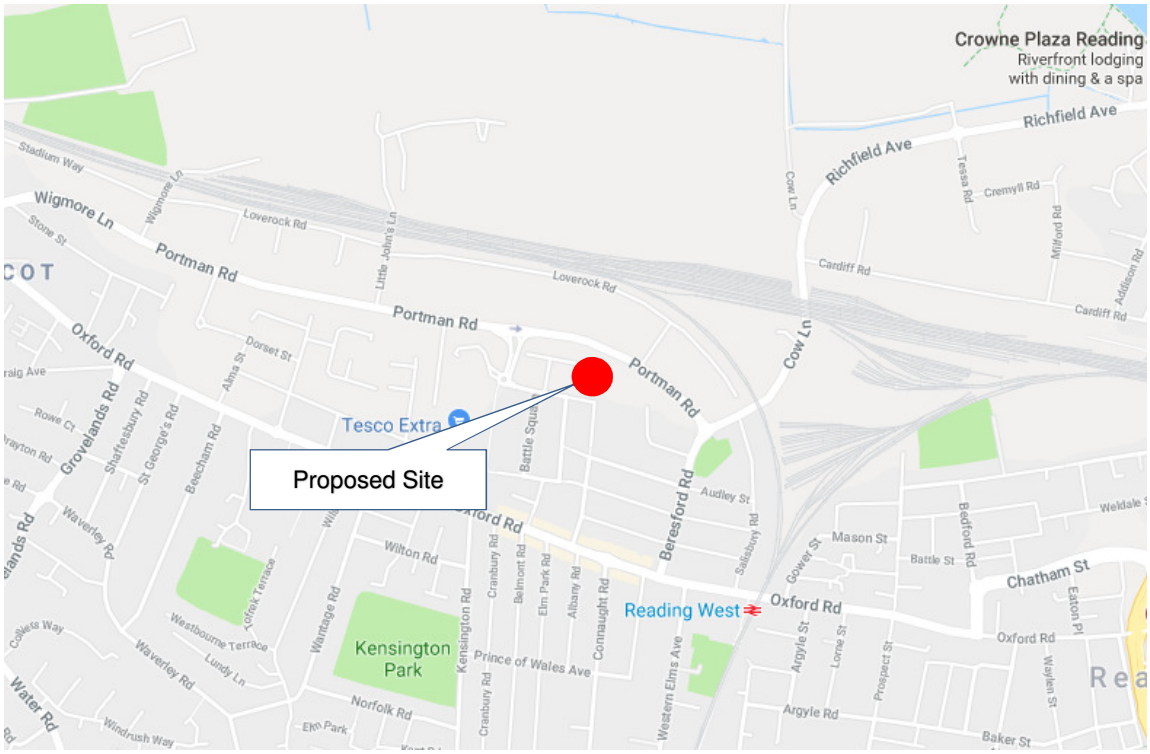

Figure 1.1: Proposed Development Site Location

1.3 The site is bounded by Portman Road to the north, existing residential development to the east, residential development to the south including new dwellings forming part of the wider Battle Hospital development, and a supermarket and petrol station to the west. The site is brownfield

1.4 The area of the site is approximately 3ha of brownfield developed land and is currently occupied by buildings forming part of the former Battle Hospital, including ambulance storage, workshops, offices and a former incinerator.

1.5 The existing site layout and surroundings are illustrated in **Figure 1.2** below.

Figure 1.2: Existing Site Layout

1.6 The proposed development includes the provision of 214 residential dwellings, in a mix of houses and apartments from single to 6 storey in height with associated amenity space, landscaping and new vehicular access from the south, via Portman Way.

1.7 The proposed development is illustrated in **Figure 1.3** below:

To be inserted when pdf is circulated

Figure 1.3: Illustrative Masterplan

1.8 The following AQA has been undertaken in order to assess any likely air quality impacts associated with the proposed development upon the surrounding area and to establish whether the site location is considered suitable for the proposed use.

1.9 In the event that potential impacts are identified, specific mitigation measures have been recommended in order to minimise significant pollution impacts and help safeguard the health and wellbeing of any existing and proposed sensitive receptors within the local area.

2 Legislation and Policy Content

The Air Quality Strategy

2.1 Part IV of the Environment Act 1995[1] requires local authorities to review and assess the air quality within their boundaries. As a result, the Air Quality Strategy (AQS) was adopted in 1997, with national health based standards and objectives set out for the then, key eight air pollutants of benzene, 1-3 butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulphur dioxide.

2.2 The purpose of the AQS was to identify areas where air quality was unlikely to meet the objectives prescribed in the regulations. The strategy was reviewed in 2000 and the amended AQS for England, Scotland, Wales and Northern Ireland (2000) was published. This was followed by an Addendum in February 2003 and in July 2007 an updated AQS was published[2].

2.3 The AQS sets standards and objectives for pollutants to protect human health, vegetation and ecosystems. The pollutant objectives are the future dates by which each standard is to be achieved, taking into account economic considerations, practical and technical feasibility.

2.4 The AQS also sets out a framework for Local Authorities to reduce adverse health effects from air pollution and ensures that international commitments are met (the Local Air Quality Management system).

2.5 Air quality objectives and limit values that currently apply in the United Kingdom can be divided into four groups:

- United Kingdom air quality objectives set down in regulations for the purpose of Local Air Quality Management (LAQM);
- United Kingdom national air quality objectives not included in regulations;
- European Union (EU) Limit Values transcribed into United Kingdom legislation; and
- Guidelines: e.g. World Health Organization (WHO) guidelines.

[1] Department for Environment, Food and Rural Affairs (1995) The Environment Act. HMSO, London.

[2] Department of the Environment, Transport and the Regions (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Island (Volume 2). HMSO, London.

2.6 The main air quality pollutants of concern with regards to new developments such as the one proposed at this Application Site are the traffic related pollutants of Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10} and $PM_{2.5}$).

2.7 The relevant air quality standards and objectives are presented in **Table 2.1** below.

Pollutant	Air Quality Objectives		Date to be Achieved by
	Concentration	Measured As	
Nitrogen Dioxide (NO_2)	200 µg m^{-3}	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg m^{-3}	Annual mean	31/12/2005
Particles (PM_{10})	50 µg m^{-3}	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40 µg m^{-3}	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25 µg m^{-3}	Annual mean (target)	2020
	15% cut in annual mean (urban background exposure)		2010 - 2020

Table 2.1: Air Quality Objectives (England)

2.8 The LAQM Technical Guidance (2009)[3] outlines the review and assessment process to be followed by Local Authorities in relation to air quality. If following a detailed assessment, a Local Authority considers that one or more of the air quality objectives is not being met, an Air Quality Management Area (AQMA) must be declared.

2.9 In response to the issuing of an AQMA, an Air Quality Action Plan (AQAP) must be submitted within 12 - 18 months by the Local Authority setting out the measures intended to reach the exceeded air quality objectives.

Air Quality Standards Regulations, 2010

2.10 The air quality limit values set out in EU Directive (2008/50/EC, 2008) are transposed in English law by the Air Quality Standards Regulations (2010).[4] This imposes duties on the Secretary of State relating to achieving the limit values.

2.11 With regards to dust, it is recognised that major construction works may give rise to dust emissions within the PM_{10} and $PM_{2.5}$ size fraction and it is noted within section 79 of the Environmental Protection Act 1990 that a statutory nuisance is defined as:

3 Department of Environment, Food and Rural Affairs (2009). Local Air Quality Management Technical Guidance, TG (16). HMSO, London.

4 UK Parliament (2010). The Air Quality Standards Regulations 2010, SI 2010/1001. HMSO, London.

'Any dust or effluvia arising from an industrial, trade or business premises and being prejudicial to health or a nuisance'

The National Planning Policy Framework (2012) [5]

2.12 The purpose of the National Planning Policy Framework (NPPF) is to help achieve sustainable development. Section 11 of the NPPF refers to the conservation and enhancement of the natural environment, and identifies air pollution as a development risk.

2.13 Section 11: Conserving and Enhancing the Natural Environment states that the planning system should contribute to and enhance the natural and local environment by:

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

2.14 Paragraph 124 of the NPPF states that planning policies should take into account the presence of any AQMAs and the cumulative impact on air quality of individual sites whilst maintaining compliance with the LAQM procedure, and states that '*Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan'.*

Planning Practice Guidance (2014) (as amended)

2.15 The Planning Practice Guidance (PPG)[6] details the circumstances when air quality would be relevant to a planning application. Considerations could include whether a development would:

- *'Generate or increase traffic volumes or congestion, changing vehicle speeds;*
- *Introduce new sources of air pollution;*
- *Expose people to existing sources of air pollution;*
- *Give rise to unacceptable impacts during construction for sensitive receptors; and*
- *Affect biodiversity by deposition or concentration of pollutants.'*

5 Department of Communities and Local Government (2012). National Planning Policy Framework. HMSO, London.
6 Department for Communities and Local Government (2014). Planning Pratice Guidance. HMSO, http://planningguidance.planningportal.ov.uk/

2.16 The PPG provides guidance for the completion of air quality assessments, stating the importance of an assessment to be location specific, and being:

'*proportionate to the nature and scale of development proposed and the level of concern about air quality.'*

2.17 The mitigation measures necessary for a development are stated to be:

'location specific, depend on the proposed development and should be proportionate to the likely impact.'

2.18 The PPG states:

"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)".

Regional and Local Planning Policy

The South East Plan - Regional Spatial Strategy for the South East[7]

2.19 The Regional Spatial Strategy (RSS) for the South East of England (known as the South East Plan) sets out the long term spatial planning framework for the region over the years 2006-2026. The Plan is a key tool to help achieve more sustainable development, protect the environment and combat climate change. It provides a spatial context within which Local Development Frameworks and Local Transport Plans need to be prepared, as well as other regional and sub-regional strategies and programmes that have a bearing on land use activities.

2.20 POLICY CC1: SUSTAINABLE DEVELOPMENT

"The principal objective of the Plan is to achieve and to maintain sustainable development in the region. Sustainable development priorities for the South East are identified as:

i. achieving sustainable levels of resource use

[7]Government Office for The South East. The South East Plan - Regional Spatial Strategy for the South East (May 2009). Communities and Local Government. TSO, London.

ii. ensuring the physical and natural environment of the South East is conserved and enhanced

iii. reducing greenhouse gas emissions associated with the region

iv. ensuring that the South East is prepared for the inevitable impacts of climate change

v. achieving safe, secure and socially inclusive communities across the region, and ensuring that the most deprived people also have an equal opportunity to benefit from and contribute to a better quality of life…"

2.21 POLICY NRM9: AIR QUALITY

"Strategies, plans, programmes and planning proposals should contribute to sustaining the current downward trend in air pollution in the region. This will include seeking improvements in air quality so that there is a significant reduction in the number of days of medium and high air pollution by 2026. Local development documents and development control can help to achieve improvements in local air quality through:

i. ensuring consistency with Air Quality Management Plans

ii. reducing the environmental impacts of transport, congestion management, and support the use of cleaner transport fuels

iii. mitigating the impact of development and reduce exposure to poor air quality through design, particularly for residential development in areas which already, or are likely to, exceed national air quality objectives

iv. encouraging the use of best practice during construction activities to reduce the levels of dust and other pollutants

v. assessing the potential impacts of new development and increased traffic levels on internationally designated nature conservation sites, and adopt avoidance and mitigation measures to address these impacts.

Core Strategy[8]

2.22 This document sets out the Council's adopted planning strategy for the Borough. It sets out how planning and development will achieve the Reading 2020 Vision for the town. It provides a framework for how Reading can grow in a sustainable way in the future.

[8]Reading Borough Local Development Framework. Core Strategy (January 2008 with Alteration Adopted 27th January 2015). Reading Borough Council.

2.23 In relation to sustainable buildings, the main thrust of National, Regional and Strategic policy is to address the causes and potential impacts of climate change. This is to be achieved through reducing energy use, reducing greenhouse gas emissions, promoting high standards of energy efficiency, promoting increased development of renewable energy sources and making efficient use and re-use of existing resources.

2.24 Policy CS1: Sustainable Construction and Design

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

To meet these requirements:

All new housing is required to meet the most up to date Eco-Homes 'Very Good' as a minimum standard, and all new commercial developments are required to meet the most up to date BREEAM 'Very Good' as a minimum standard;

On larger developments of more than 10 dwellings or 1,000 m2 of floorspace, ensure that 50% of the provision meets the most up to date Eco-Homes and BREEAM 'Excellent' standards;

All new developments maximise the use of energy efficiency and energy conservation measures in their design, layout and orientation to reduce overall energy demand;

All developments of more than 10 dwellings or 1000m2 floorspace incorporate on-site generation of energy from renewable sources and energy efficient design measures (including the use of CHP where appropriate) to off-set at least 20% of predicted carbon dioxide emissions from the estimated energy usage of the completed and occupied development; …"

2.25 Policy CS34: Pollution and Water Resources

"Development will only be permitted where it would not be damaging to the environment through air, land, noise or light pollution; where it would preserve or ideally enhance ground and surface water quality; and where existing water resources, sewerage and wastewater treatment infrastructure are adequate to support the proposed development.

Proposals for development that are sensitive to the effects of air, noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.

Development will be permitted on land affected by contamination where it can be demonstrated, to the satisfaction of the LPA, that the contamination can be satisfactorily remediated so that it is suitable for the proposed end use."

Sites and Detailed Policies Document[9]

2.26 DM19: AIR QUALITY

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

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

- *Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would significantly reduce air quality;*
- *Whether the development is within, or accessed via, an Air Quality Management Area; and*
- *Whether it can be demonstrated that a local reduction in air quality would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*

Ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application.

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

2.27 DM3: INFRASTRUCTURE PLANNING

[9]Reading Borough Local Development Framework. Sties and Detailed Policies Document (October 2012 with Alteration Adopted 27th January 2015). Reading Borough Council.

"Proposals for development will make appropriate provision for the following infrastructure, services, resources and amenities. Such provision will be secured through planning obligations and/or the Community Infrastructure Levy as relevant.

In determining appropriate provision or contributions, the highest priority will be given to the following:

…

Where relevant a high priority will also be given to the appropriate provision of the following:

- *Energy infrastructure, including decentralised energy projects;*

…

Other measures, as follows, may also be considered, where a specific need is identified and justified: -

- *Environmental improvements outside the Central Area, such as within local centres, including off site street tree and other tree planting;*
- *Measures to tackle poor air quality or for on-going air quality monitoring; and*

…"

2.28 SA8: OTHER SITES FOR HOUSING DEVELOPMENT

"The following sites will be developed for residential use according with the principles set out in this policy:

…

SA8f PART OF FORMER BATTLE HOSPITAL, PORTMAN ROAD

Development for residential use, potentially including live/work units.

Development should:

- *Be accessed from the south rather than directly from Portman Road; Enhance pedestrian and cycle permeability through the site, including provision of a footpath/cycleway along the northern frontage of the site;*
- *Mitigate any impacts on Cow Lane Bridges and the Norcot Road/ Oxford Road/Portman Road roundabout;*
- *Take account of the potential for contamination and noise effects;*

- *Take account of the potential for flooding, including from surface water, and incorporate Sustainable Drainage Systems (SUDS); and*
- *Take account of potential archaeological significance."*

Revised Battle Hospital Planning Brief (2015)[10]

2.29 The Battle Hospital Planning Brief provides more guidance on the development. This document continues to be relevant.

Draft Reading Local Plan (not adopted yet)[11]

2.30 CC9: SECURING INFRASTRUCTURE

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

…

Where relevant a high priority will also be given to the appropriate provision of the following:

- *Energy infrastructure, including decentralised energy projects;*

…

Other measures, as follows, may also be considered, where a specific need is identified and justified:

...

- *Measures to tackle poor air quality or for on-going air quality monitoring; and …"*

2.31 EN15: AIR QUALITY

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

[10]Supplementary Planning Document. Revised Battle Hospital Planning Brief (July 2005). Reading Borough Council. Reading

[11]Draft Reading Borough Local Plan. Regulation 18 of the Town and Contry Planning (Local Planning) Regulations 2012. (May 2017). Reading Borough Council. Reading.

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

- *Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would significantly worsen air quality;*
- *Whether the development is within, or accessed via, an Air Quality Management Area; and*
- *Whether it can be demonstrated that a local worsening in air quality would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*

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

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

2.32 WR3: OTHER SITES FOR DEVELOPMENT IN WEST READING AND TILEHURST

"The following sites will be developed according with the principles set out in this policy:

…

WR3i PART OF FORMER BATTLE HOSPITAL, PORTMAN ROAD

Development for residential.

Development should:

- *Be accessed from the south rather than directly from Portman Road;*
- *Enhance pedestrian and cycle permeability through the site, including provision of a footpath/cycleway along the northern frontage of the site;*
- *Mitigate any impacts on Cow Lane Bridges and the Norcot Road/Oxford Road/Portman Road roundabout;*
- *Avoid adverse effects on important trees including those protected by TPO;*
- *Provide for a green link along the Portman Road frontage;*

- *Address flood risk issues arising from a Flood Risk Assessment, including from surface water;*
- *Take account of potential archaeological significance;*
- *Take account of the location of a pumping station in close proximity, which will require liaison with Thames Water; and Address any contamination on site.*

Site size: 2.77 ha 160-240 dwellings"

3 Assessment Methodology and Significance Criteria

3.1 This section outlines the assessment methodology and the criteria that have been used to assess the significance of risk associated with the proposed development.

Data Sources	Details
Department for Environment, Food and Rural Affairs (Defra)	LAQM Technical Guidance, TG (16) [12]: Published by DEFRA in 2016 in order to provide technical guidance to local authorities in the assessment of key air pollutants.
	The Local Air Quality Management Tools contain information pertaining to monitoring networks across the UK and provides tools, which aid in the estimation of pollutant concentrations with reference to the year of study.
	Defra (2015). LAQM Background Maps - 1 x 1 km grid background maps for NO_x, NO_2, PM10 and $PM_{2.5}$ (2015-2030)
Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM)	EPUK (2010). Development Control: Planning for Air Quality, (2010 Update) This guidance has been produced to help ensure that air quality is properly accounted for in local development control processes.
	IAQM (2014). Guidance on the assessment of dust from demolition and construction
	The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality (2015) [13] provides advice and guidance on how an air quality assessment should be undertaken.
The National Atmospheric Emissions Inventory (NAEI)[14]	This is a website run by Ricardo AEA Technology where emission data can be obtained which relates the vehicle fleet composition for the year of study.
London Councils	Air Quality and Planning Guidance[15]. This guidance is aimed at local authorities, developers and their consultants, and provides technical advice on how to deal with planning applications that could have an impact on air quality.

Table 3.1: Key Information Sources

Scope of Air Quality Assessment

3.2 The following sections assess the suitability of the site for the proposed development and whether any significant air quality impacts are expected as a result of the construction and operation of the proposed development.

3.3 A staged assessment approach has been adopted. This ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. Where a simple review of the likely impacts associated with the proposed development shows that the risk of a health/annoyance impact is negligible, this will be sufficient to conclude that no further assessment is necessary.

[12] Department for Environment, Food and Rural Affairs (2013) Local Air Quality Management Technical Guidance LAQM, TG (16). DEFRA. London
[13] Environmental Protection UK & Institute of Air Quality Management (EPUK & IAQM) (2015) Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, London
[14] http://naei.defra.gov.uk
[15] London Councils. (2007) Air Quality and Planning Guidance, The London Air Pollution Planning and the Local Environment (APPLE) working group, London

3.4 In cases where the risk involved cannot be regarded as insignificant, a more detailed and quantitative assessment will be undertaken.

3.5 The specific methodology used in this assessment is presented below.

Dust Assessment

3.6 In February 2014, the Institute of Air Quality Management (IAQM) published guidance on how to assess and mitigate the impacts the dust emissions from demolition and construction sites. The guidance supersedes the 2012 IAQM guidance on the assessment of the impacts of construction on air quality and the determination of their significance. This approach is broadly replicated within the Greater London Authority (GLA) draft construction dust document (2013) and provides detail for a clear and concise construction dust assessment.

3.7 Potential dust impacts associated with construction activities will be assessed in accordance with guidance from the IAQM and the GLA best practice documents. The IAQM provides guidance on a five-step process to assess the potential impacts of construction dust pre-mitigation, provide mitigation measures specific to the risk and assess the post-mitigation impacts.

3.8 The assessment procedure follows the framework set out below:

- Screen the requirement for a more detailed assessment;
- Assess the risk of dust impacts of the four phases of construction (demolition, earthworks, construction and trackout), taking into account:
  - the scale and nature of the works, which determines the potential Dust Emission Magnitude; and
  - the sensitivity of the area.
- Determine the site-specific mitigation for the potential activities;
- Examine the residual effects and determine whether or not these are significant; and
- Prepare the Construction Dust Assessment.

3.9 In the process of screening the need for a detailed assessment, the following criteria will be used:

"An assessment will normally be required where there is:

- *a 'human receptor' within:*

- *350m of the boundary of the site; or*
- *50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).*

- *an 'ecological receptor' within:*
  - *50m of the boundary of the site; or*
  - *50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)."*

3.10 When defining the sensitivity of an area/receptor, the following factors will be used.

Area Sensitivity	Human Receptors	Ecological Receptors
High	Very densely populated area, 10-100 dwellings within 20m of site. Annual mean concentrations of PM10 close to/in exceedence of the national objective (40 µg m-3). Very sensitive receptors (e.g. residential properties, hospitals, schools, care homes).	Internationally or nationally designated site, the designated features may be affected by dust soiling. A location where there is dust sensitive species present.
Medium	Densely populated area, 1-10 dwellings within 20m of site. Annual mean concentrations of PM10 below the national objective (> 28 µg m-3). Medium sensitivity receptors (e.g. office and shop workers).	Nationally designated site where the features may be affected by dust deposition. A location with a particularly important plant species where its dust sensitivity is unknown.
Low	Sparsely populated area, 1 dwelling within 20m of site. Annual mean concentrations well below the national objectives (< 28 µg m-3). Low sensitivity receptors (e.g. public footpaths, playing fields, shopping streets).	Locally designated site where the features may be affected by dust deposition.

Table 3.2: IAQM Factors for Defining the Sensitivity of an Area.

Energy Strategy

3.11 At this early stage the proposed energy strategy has not been confirmed yet. Any emissions associated with the proposed energy strategy should be qualitatively assessed, if required, at the appropriate stage, when all the required detailed plant technical information is confirmed.

3.12 Compliance with relevant regulations and standards, at this stage, should be secured through planning conditions, where necessary.

Traffic Exhaust Emissions

3.13 The assessment of traffic impacts will be carried out in accordance with guidance prepared by EPUK and IAQM in order to help establish indicative criteria, which may trigger the requirement for an air quality assessment.

The Development Will:	Indicative Criteria to proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on roads with relevant receptors.	A change of LDV flows of: • more than 100 vehicles per day (vpd) within or adjacent to an AQMA or within 100m of an internationally or nationally designated habitat; and • more than 500 vpd elsewhere. Coupled with relevant receptors within: • 10m of roads with AADT flows 5,000 to 10,000 vpd; • 20m of roads with AADT flows 10,000 to 30,000 vpd; and • 30m of roads with AADT flows > 30,000 vpd.
2. Cause a significant change in Heavy Duty Vehicles (HDV) flows on local roads with relevant receptors.	A change of HDV flows of: • more than 25 vpd within or adjacent to an AQMA or within 100m of an internationally or nationally designated habitat; and • more than 100 vpd elsewhere. Coupled with relevant receptors within: • 10m of roads with AADT flows 5,000 to 10,000 vpd; • 20m of roads with AADT flows 10,000 to 30,000 vpd; and • 30m of roads with AADT flows > 30,000 vpd.
3. Cause a significant change in road alignment bringing roads closer to relevant receptors.	Where relevant receptors will be within: • 10m of roads with AADT flows 5,000 to 10,000 vpd; • 20m of roads with AADT flows 10,000 to 30,000 vpd; and • 30m of roads with AADT flows > 30,000 vpd.
4. Introduce a new junction near to relevant receptors.	The junction will cause vehicles to slow down and accelerate, e.g. traffic lights. Coupled with relevant receptors within 50m of the junction.
5. Introduce or change a bus station.	Where bus flows will be: • more than 25 vpd within or adjacent to an AQMA; and • more than 100 vpd elsewhere. Coupled with relevant receptors within: • 50m of the buses within the bus station.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes.	Where the combustion unit is: • any centralised plant using biomass fuel; • a CHP unit > 15kWe; • any other combustion plant with thermal input > 400kWth; and • a standby emergency generator associated with a centralised energy centre.
Note – Where distances from the road are presented, they are from the edge of the nearest carriageway to the nearest relevant receptor, taking account of vertical and horizontal dimensions. Where traffic flows are presented they are Annual Average Daily Traffic (AADT) in vehicles per day (vpd). Where HDV flows are specified, they include lorries and buses. Where LDV's are specified they include cars and vans (with a gross vehicle weight ≤ 3.5 tonnes).	

Table 3.3: EPUK &IAQM Indicative Criteria for Proceeding to an Air Quality Assessment

3.14 If any of the above criteria are met, then the significance of air pollution impacts must be assessed. This may be either a Simple or a Detailed Assessment. In accordance with the EPUK and IAQM guidance, a Simple Assessment is one relying on already published information and without quantification of impacts, in contrast to a Detailed Assessment that must be completed with the aid of a dispersion model.

Impact Criteria

3.15 In the event that the initial screening indicates that there is a potential risk of impact, guidance is provided by the IAQM and EPUK on how to determine the magnitude and significance of any likely changes in air pollutant concentrations and/or exposure as a result of a proposed development.

3.16 This process takes the following into account:

- the magnitude of the change (% change of annual mean concentration);
- the concentration relative to the AQS objective (above or below the objective); and
- the direction of change (adverse or beneficial).

3.17 The magnitude of an impact should be described by using the EPUK criteria set out in Table 3.4 below. The criteria are based upon the change in concentration resulting from the proposed development as a percentage of the Air Quality Action Level (AQAL) which in this case is NO_2 and PM_{10} annual mean objective levels of 40 µg m^3.

Change Magnitude	NO_2/PM_{10} Annual Mean	No Days PM10> µg m^{-3}
Large	Increase/decrease >10% (>4 µg m^3)	Increase/decrease >4 days
Medium	Increase/decrease 6-10% (2.4-4 µg m^3)	Increase/decrease 2-4 days
Small	Increase/decrease 2-5% (0.8-2 µg m^3)	Increase/decrease 1-2 days
Imperceptible	Increase/decrease <1% (<0.4 µg m^3)	Increase/decrease <1 day

Table 3.4: Impact Magnitude for Changes in NO_2 and PM_{10} Concentrations

3.18 The significance of the impact will be dependent upon the magnitude of change in relation to the relevant AQAL. This is set out in **Table 3.5** below, which is based on the EPUK and IAQM guidance.

Long term average Concentration at receptor in assessment year.	% Change in concentration relative to Air Quality Assessment Level (AQAL)*			
	1	2-5	6-10	>10
Increase With Scheme				
75% of less of AQAL (<30 µg m^{-3})	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL (30-38 µg m^{-3})	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL (38-41 µg m^{-3})	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL (41 - 44 µg m^{-3})	Moderate	Moderate	Substantial	Substantial

110% or more of AQAL (>44 µg m^{-3})	Moderate	Substantial	Substantial	Substantial

*Air Quality Action Level – in this case the objective levels.

Table 3.5: Impact Descriptors for Individual Receptors

3.19 Therefore, once the magnitude and the significance of the change has been established, the impact at each relevant receptor can be described. The impact magnitude at each receptor location can be described using the changes stated above as of Negligible, Minor, Moderate or Major magnitude and of Negligible, Slight Moderate or Substantial significance and also as being either Temporary or Permanent.

3.20 The overall significance should be described separately for both the impact of emissions related to the proposed development on existing receptors, and for the impacts of emissions from existing source(s) on new exposure being introduced from the proposed development. This is discussed below.

Exposure Criteria

3.21 When determining both the significance of exposure to air pollution and the levels of mitigation required, consideration should be given to the following Air Pollution Exposure Criteria (APEC) specified within the London Councils Air Quality and Planning Guidance[16].

3.22 Whilst this guidance has been developed for London, and is consistently adopted for urban areas across the UK. The guidance takes into account the now superseded Planning Policy Statement 23: Planning and Pollution Control, with a view of reducing exposure to air pollution across the whole of London, and is considered relevant for this Development Site. The APEC criteria is set out in **Table 3.6** below.

	Applicable Range Nitrogen Dioxide Annual Mean	Applicable Range PM_{10}	Recommendation
APEC – A	> 5% below national objective	**Annual Mean:** > 5% below national objective **24 hr:** > 1-day less than national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered.

[16] London Councils. (2007),Air Quality and Planning Guidance, The London Air Pollution Planning and the Local Environment (APPLE) working group, London

APEC – B	Between 5% below or above national objective	**Annual Mean:** Between 5% above or below national objective **24 hr:** Between 1-day above or below national objective.	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g., Maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised.
APEC – C	> 5% above national objective	**Annual Mean:** > 5% above national objective **24 hr:** > 1-day more than national objective.	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.

Table 3.6 Air Pollution Exposure Criteria

3.23 It should be noted that air quality is not well suited to the rigid application of a generic significance matrix to determine the overall significance of a development and individual receptor sensitivity should also be taken into account. Therefore, professional judgement should be employed throughout, and the assessment should take into account site specific considerations.

3.24 Both the impact and exposure criteria will be applied to the findings of this assessment.

4 Baseline Conditions

Baseline Conditions

4.1 The proposed development site falls within the jurisdiction of the Reading Borough Council (RBC).

4.2 Under the Air Quality Strategy, there is a duty on all Local Authorities to consider the air quality within their boundaries and prepare an annual update report.

4.3 A review of the Air Quality Assessments undertaken by Reading Borough Council (RBC) has indicated that an Air Quality Management Area (AQMA) has been declared within the Borough as a result of exceedences of the annual mean for Nitrogen Dioxide (NO_2) and 24-hour mean for PM_{10}.

4.4 The declared AQMA covers Reading Town Centre, areas along the major radial road routes into Reading (including J11 of the M4) and along the railway lines where they pass through built-up areas.

4.5 Although the proposed development is not located within the AQMA boundary, it is surrounded by it on all facades, which will be highly sensitive to any traffic alterations as a result of the proposed development.

4.6 The proposed development is located adjacent to Reading AQMA, meaning that any air quality impacts will need to be carefully considered. The location of Reading AQMA in relation to the proposed development site is illustrated in **Figure 4.1** below.

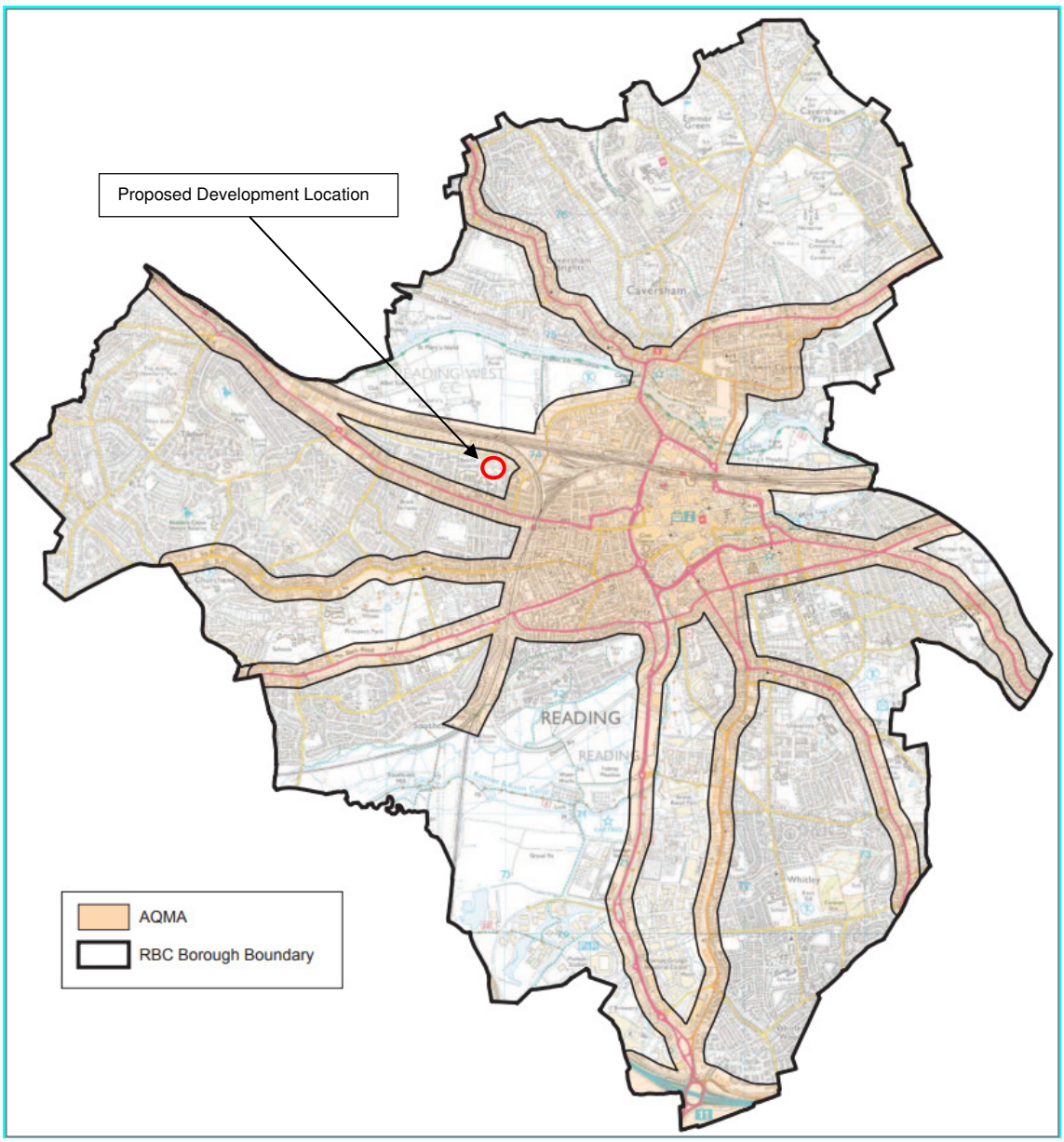

Figure 4.1: Reading Air Quality Management Area

Monitored Concentrations.

4.7 RCB undertakes automatic and non-automatic monitoring at various roadside and background locations throughout the Borough.

Automatic

4.8 Reading Borough Council undertook automatic (continuous) monitoring at 4 sites during 2016, 3 roadside locations and 1 background, as follows:

- RD1 (Caversham Road) is situated approximately 3 metres from the kerb of the A4155, approximately 1.2Km north east of Battle Hospital proposed development site. The monitoring station is classified as 'roadside' and collects both Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) data .
- RD3 (Oxford Road) is situated approximately 6 metres from the kerb of Oxford Road, approximately 1.2Km north west of Battle Hospital proposed development site. The monitoring station is classified as 'roadside' and collects both Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) data.
- Reading AURN Background Automated monitoring station is located 3.5km east from the site, and collects Nitrogen Dioxide (NO_2), Particulate Matter (PM_{10} and $PM_{2.5}$) and Ozone (O_3).
- RD4 is located 3.7 km east from the site, it was moved from Kings Road and it is first year of operation at London Road. RD4 is situated approximately 3.5 metres from the kerb of London Road, classified as 'roadside', collects both Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) data.

4.9 **Figure 4.2** below illustrates the location of the automatic monitoring locations in relation to the proposed development site.

4.10

Figure 4.2: Automated Monitoring Locations in Relation to Development Site.

4.11 The most recent published data for the automated monitoring stations is set out in **Tables 4.1, 4.2 and 4.3** below.

Site	Location	Site Coord.(X,Y)	Annual Mean Concentration $N0_2$ (µg m^{-3})				
			2013	2014	2015	2016	2017
Reading (Urban Background)	Reading AURN	473441 173198	27	27	22	34	29*
RD1 (Roadside)	Caversham Rd	471153 174429	**43**	**41**	38	39	37*
RD2 (Roadside)	Kings Road	473057 173205	**61**	**50**	**49**	**--**	**--**
RD3 (Roadside)	Oxford Road	468700 174126	**43**	35	31	30	28*
RD4 (Roadside)	London Road	473703 173409	**--**	--	--	32	29*

*Provisional data from Air Quality England

Table 4.1: Automated Stations NO_2 Annual Mean Monitoring Concentrations

Site	Location	Site Coord. (X,Y)	Annual Mean Concentration PM_{10} (µg m^{-3})				
			2013	2014	2015	2016	2017
Reading (Urban Background)	Reading AURN	473441 173198	13	14	12	13	12*
RD1 (Roadside)	Caversham Rd	471153 174429	34	33	28	20	21*
RD2 (Roadside)	Kings Road	473057 173205	32	31	25	--	--
RD3 (Roadside)	Oxford Road	468700 174126	20(23)	20	23	22	20*
RD4 (Roadside)	London Road	473703 173409	**--**	--	--	19	17*

*Provisional data from Air Quality England

Table 4.2: Automated Stations PM_{10} Annual Mean Monitoring Concentrations

Site	Location	Site Coord. (X,Y)	Annual Mean Concentration $PM_{2.5}$ (µg m^{-3})				
			2013	2014	2015	2016	2017
Reading (Urban Background)	Reading AURN	473441 173198	8	8	6	9	10

Table 4.3: Automated Stations $PM_{2.5}$ Annual Mean Monitoring Concentrations

Non-Automatic

4.12 Diffusion tube monitoring of NO_2 is currently undertaken at fifty six sites across the Borough. The closest diffusion tubes to the proposed development site are located within the Reading AQMA. These are Cow Lane Bridges, 606 Oxford Road, 494 Oxford Road,

327 Oxford Road, 252 Oxford Road and 281 Oxford Road. These diffusion tubes are all roadside monitoring locations between 200-600m from the proposed development site.

4.13 The location of the closest diffusion tubes in relation to the proposed development site are illustrated in **Figure 4.3** below:

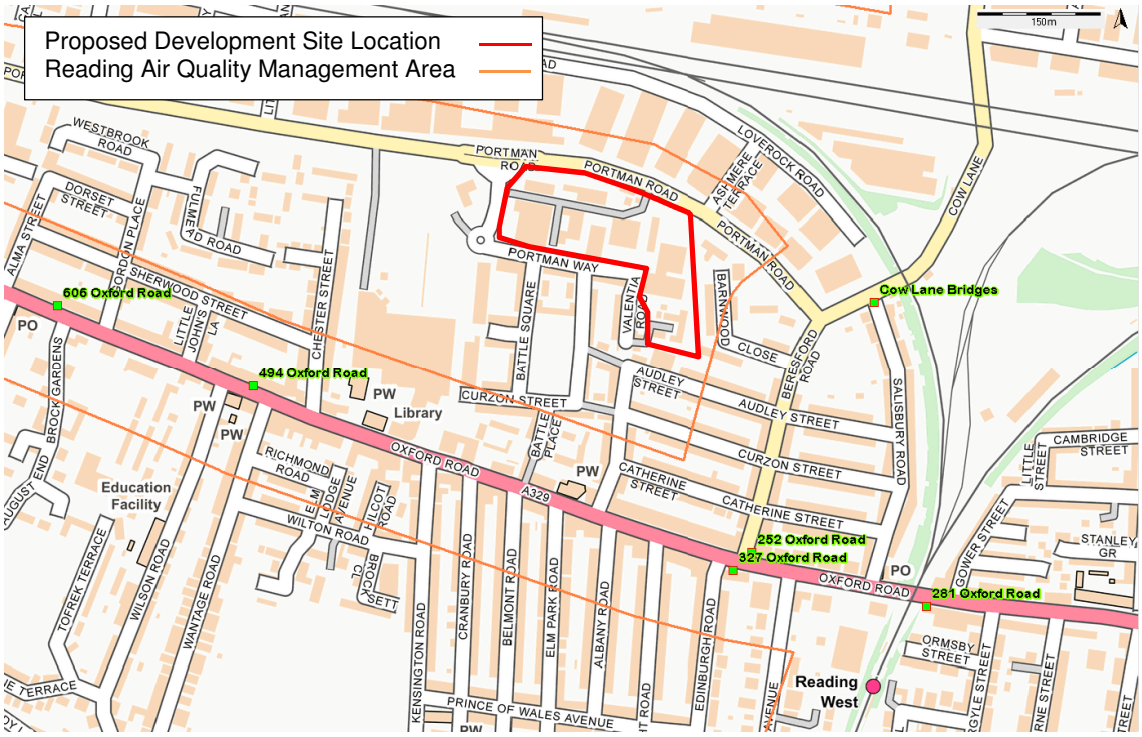

Figure 4.3: Dif.Tubes Locations in Relation to Battle Hospital Development Site.

4.14 The most recent published data for the closest diffusion tubes is set out in **Table 4.4** below.

Site	Location	Site Coordinates (X,Y)	Annual Mean Concentration NO_2 (µg m^{-3})				
			2012	2013	2014	2015	2016
DT27 (Roadside)	606 Oxford Road	469230 173814	33	34	32	-	-
DT28 (Roadside)	494 Oxford Road	469470 173715	38	38	38	35	37
DT29 (Roadside)	Cow Lane Bridges	470230 173818	34	35	37	31	32
DT30 (Roadside)	327 Oxford Road	470057 173489	**50**	**47**	**49**	**43**	**40**
DT31 (Roadside)	252 Oxford Road	470080 173511	41	43	37	32	35
DT32 (Roadside)	281 Oxford Road	470294 173445	**47**	**49**	**48**	**45**	**44**

Table 4.4: Closest Diffusion Tubes NO_2 Annual Mean Monitoring Concentrations

Background

4.15 The Defra background mapping tool (Reference Year 2015) has been used to establish the pollutant background concentration within the corresponding 1 x 1km grid square where the site is located. The site lies between (X:469500, Y:173500) and (X:470500, Y:173500). However, the second one has been selected as worse case, as it is more representative of the background of the AQMA nearby.

4.16 The NOx, NO_2, PM_{10}, and $PM_{2.5}$ background concentrations for 2015 and 2017 and are provided in **Table 4.5** below.

Pollutant	Year (2015) (µg m^{-3})	Current Year (2017) (µg m^{-3})
NOx	44.4	40.9
NO_2	27.7	26.0
PM_{10}	15.5	15.0
$PM_{2.5}$	9.6	9.3

Table 4.5: Defra Annual Mean Background Concentrations.

4.17 As previously discussed above, RBC also undertake automatic NO_2 monitoring at background locations within their borough.

4.18 A comparison between the Defra background data and the most recent published data for automated station Reading AURN is set out in **Table 4.6** below.

Site	Location	Site Coord. (X,Y)	Annual Mean Concentration (µg m^{-3})				
			2013	2014	2015	2016	2017
Reading (Urban Background)	Reading AURN	473441 173198	27	27	22	34	29**
Defra Background*	1km Square	470500 173500	--	--	27.7	26.8	26.0

*Estimated background Air Pollution Maps (base year 2015)

**Online report from Air Quality England, provisional data.

Table 4.6: NO_2 Defra Background vs NO_2 Background AURN station.

4.19 **Table 4.6** demonstrates that the Defra background concentrations for NO_2 are lower than RBC's own monitoring background location in the last two years. Since Reading

AURN station provides background concentrations for all pollutants being assessed, as worst-case scenario, Reading AURN data will be used in the assessment.

4.20 Although data suggest a considerable reduction in NO_2 background concentrations for 2017, this data is not fully ratified yet. Therefore, fully ratified background data for 2016 will be used instead. This is set out in **Table 4.7** bellow:

Pollutant	Year (2016) ($\mu g\ m^{-3}$)
NOx	59
NO_2	34
PM_{10}	13
$PM_{2.5}$	9

Table 4.7: Reading AURN Annual Mean Background Concentrations year 2016.

5 Evaluation of Potential Impacts

Construction

Construction Dust

5.1 During the demolition and construction phases, there is the potential for emissions of dust to cause annoyance, nuisance and health effects to sensitive receptors, located close to the site.

5.2 The construction activities associated with the proposed development can be separated into four stages:

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

5.3 There are a number of human receptors within 350m of the site boundary therefore a dust assessment has been undertaken in order to minimise potential dust effects during the aforementioned four stages.

5.4 The construction dust assessment is included in **Appendix A**.

Construction Traffic and Plant

5.5 It is anticipated that, throughout the construction period, there will be a number of construction vehicles, stationary plant and vehicles used by the construction workforce. These may temporarily present an additional source of air pollutants in the vicinity of the proposed development site.

5.6 Any likely pollutant impacts should be addressed through Best Available Techniques (BAT) mitigation measures. Likely BAT are provided in section 7.

Completed Development

Development Traffic

5.7 Development traffic air quality impacts have been quantitatively assessed by modelling the effect of the development traffic flows along local roads, in the vicinity of the site. This is included in Section 6 of this report.

Energy Strategy

5.8 As previously stated, the detailed technical specifications for the proposed space and water heating plant have not yet been confirmed at this stage.

5.9 Any operational plant effects will need to be considered further, if required, at the appropriate stage, when all the required detailed plant technical information is confirmed.

5.10 Compliance with relevant regulations and standards, at this stage, should be secured through the use of a suitable planning condition, where necessary.

6 Road Traffic Emissions

Vehicular Traffic Assessment Model

6.1 A quantitative assessment of traffic related air quality impacts has been undertaken. The modelling tool which has been used is the dispersion model ADMS Roads, which has been developed by the Cambridge Environmental Research Consultants.

6.2 This model uses the following input data:

- Hourly Average Traffic - derived from diurnal traffic counts and provided by the transport consultants; speed provided by traffic consultants based on speed limits.
- Defra average background concentrations for 2015 (X:469500, Y:173500);
- Latest relevant Emission Factor Toolkit (v8.0);
- Geo-referenced mapping data; and
- Hourly Sequential ADMS format MET data for the closest suitable site – Heathrow, for 2016

Emissions

6.3 There are numerous sources of NO_2, PM_{10} and $PM_{2.5}$ which include for example, industry and domestic origins. However, the main source is usually road transport. For the purpose of this assessment and due to the lack of other sources in the area, only road traffic emissions have been modelled.

Study Scenarios

6.4 Traffic related air quality impacts associated with the operation of the proposed development have been assessed for the following scenarios:

- **Baseline** - The predicted levels for NO_2, PM_{10} and $PM_{2.5}$ in the locality in 2016.
- **Proposed Opening Year 2021 (Do Nothing)** - This includes baseline, traffic growth but excludes proposed development traffic, and;
- **Proposed Opening Year 2021 (Do Something)** - This includes baseline, traffic growth + proposed development traffic.

Traffic Data

6.5 Traffic data for all the above scenarios has been provided by iTransport LLP.

6.6 Worst-case development traffic air quality impacts have been quantitatively assessed by modelling the effect of the development traffic flows along the proposed routes for the 3

above mentioned scenarios. The resultant predicted changes in air quality have then been assessed against the criteria set out in section 3, in order to establish the magnitude and significance of any impacts.

6.7 The traffic data used in this assessment is described in **Table 6.1** below.

Road	Speed (kph)	Baseline 2017 (Validation)		Proposed Completion Year (2021) Without PW Development		Proposed Completion Year (2021) With PW Development	
		AADT	HDV	AADT	HDV	AADT	HDV
Cow Lane	48	12,617	0.78%	12,617	0.78%	13,434	0.79%
Beresford Road	48	7,332	1.73%	7,332	1.73%	7,808	1.73%
Portman Road (West of Cown Lane Roundabout)	64	14,768	1.15%	14,768	1.15%	15,727	1.16%
Portman Road (East of Signals)	64	13,437	0.74%	13,437	0.74%	14,309	0.74%
Portman Road (West of Signals)	64	14,009	1.14%	14,009	1.14%	14,917	1.14%
Portman Road (North East of Western Roundabout)	64	15,989	2.65%	15,989	2.65%	17,027	2.65%
Oxford Road (East)	48	18,326	3.60%	18,326	3.60%	19,514	3.60%
Norcot Road	48	11,182	2.56%	11,182	2.56%	11,907	2.56%
Oxford Road (West)	48	17,864	3.20%	17,864	3.20%	19,022	3.21%

Table 6.1: Average Daily Flows used in Modelling

6.8 Time variation hourly factors have been derived from Gov.UK statistics publication (2016) and applied to all of the scenarios modelled. This is included in **Appendix B.**

6.9 **Receptor Types and Locations**

6.10 The receptors, which have been assessed, relate to existing and proposed potentially sensitive receptors within and in the vicinity of the site.

6.11 For the purpose of the air quality assessment, sensitive human receptors have been identified where the public is regularly present and likely to be exposed over the averaging period of the objective. This assessment focuses on modelling annual mean concentrations.

6.12 All the receptor locations, which have been assessed, are listed in **Table 6.2** and illustrated in **Figure 6.1** below.

Receptor No.	Description	Coordinates (X,Y)		Height
P1	Proposed Building Façade Ground Floor	469828	173975	1.5
P2	Proposed Building Façade Ground Floor	469906	173961	1.5
P3	Proposed Building Façade Ground Floor	469988	173929	1.5
E1	781 Oxford Rd	468429	174325	1.5
E2	30 Wigmore Ln	468789	174244	1.5
E3	32 Wigmore Ln	468986	174147	1.5
E4	18 Westbrook Rd	469269	174052	1.5
E5	30 Portman Rd	469574	173998	1.5
E6	6 Portman Rd	470136	173798	1.5
E7	8-10 Portman Rd	470044	173895	1.5
E8	1 Cow Ln	470217	173811	1.5
E9	1 Cow Ln	470248	173828	1.5
E10	58 Beresford Rd	470129	173697	1.5
E11	17 Beresford Rd	470090	173585	1.5
E12	220 Oxford Rd	470165	173489	1.5
E13	254 Oxford Rd	470066	173512	1.5
E14	321A Oxford Rd	470091	173481	1.5
E15	369-371 Oxford Rd	469948	173527	1.5
E16	350 Oxford Rd	469741	173620	1.5
E17	510 Oxford Rd	469446	173725	1.5
E18	Xtc Ltd	469209	173806	1.5
E19	511 Oxford Rd	469568	173658	1.5
E20	6 Groveland Pl	468857	173984	1.5
E21	Winslet Place	468761	174092	1.5
E22	Norcot Rd	468562	174156	1.5
E23	Norcot Rd	468474	174148	1.5

Table 6.2: Potentially Sensitive Receptor Locations

Figure 6.1: Potentially Sensitive Receptor Locations

Background

6.13 As previously discussed in Section 4, the following background data will be used.

Pollutant	Year (2016) ($\mu g\ m^{-3}$)
NOx	59
NO_2	34
PM_{10}	13
$PM_{2.5}$	9

Table 6.3: Reading AURN Annual Mean Background Concentrations year 2016.

NO_x: NO_2 Chemistry

6.14 Vehicles emit NO_x with different proportions of NO_2. In the atmosphere, chemical reactions take place between NO, NO_2 and Ozone. In this assessment, the screening of NOx emissions has taken place and the resulting NO_2 concentration has been calculated post modelling using the DEFRA NO_x to NO_2 Calculator (version 6.1, 17 October 2017) [17].

[17] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc

Meteorological Data

6.15 The meteorological data required for the ADMS model must be from a representative location to the site and include a full year of sequential readings. The MET office has advised that the most suitable site with the most complete/representative set of data is located at Heathrow. Subsequently, 2016 data has been obtained and used. Relevant wind rose is illustrated in **Figure 6.2** below.

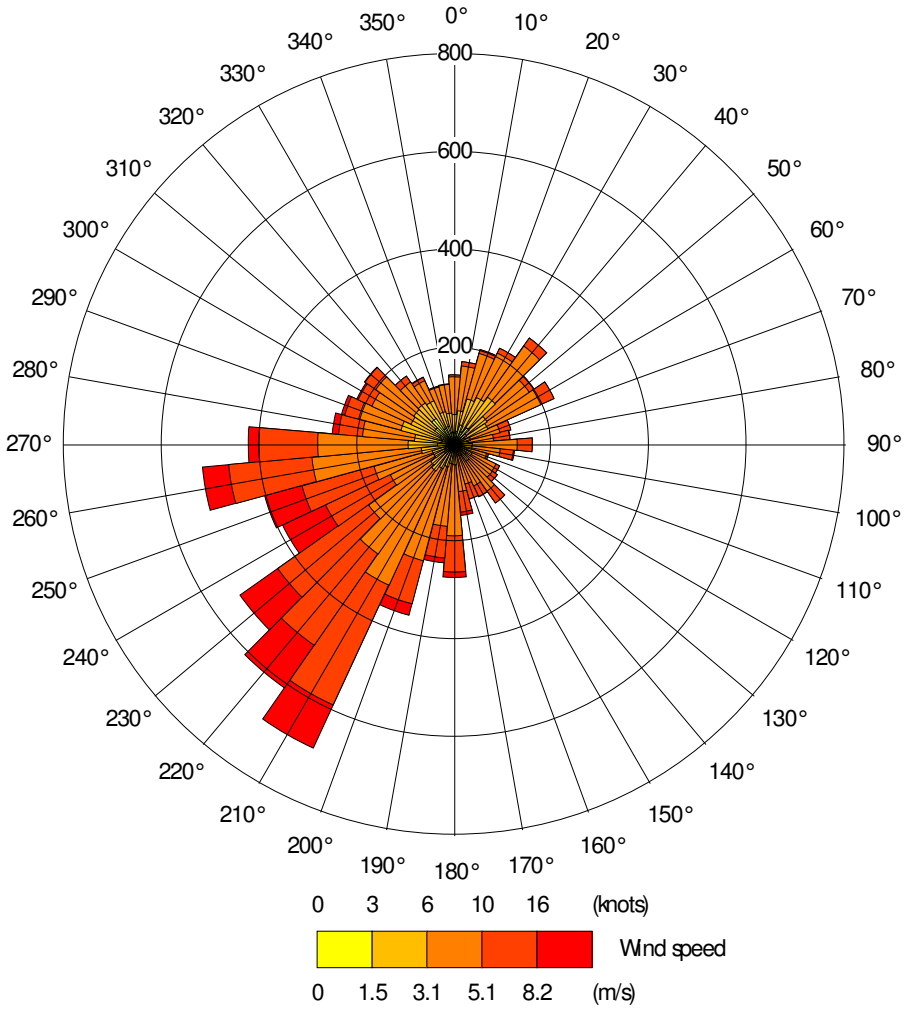

Figure 6.2: 2016 Heathrow Meteorological Data Wind rose.

Model Verification

6.16 Model verification is required to demonstrate that the model is performing within an acceptable margin of error. Therefore, it is necessary to undertake modelling at a location where air quality levels are known (and for where traffic data is available for), and to compare the result with ratified monitored data for that location.

6.17 Although not considered ideal due to risk of overestimation, kerbside monitoring sites may be used within the model verification process where there is relevant for exposure, for example properties fronting directly onto the road. Since this is the case along the road assessed, the closest roadside monitoring locations will be used.

6.18 The closest monitoring locations to the proposed development site are DT28 - 494 Oxford Road, , DT30 - 327 Oxford Road, DT31 - 252 Oxford Road, DT32 -281 Oxford, located 5m, 1m, 7.5m, 3.5m and 6.5m respectively from the kerb Oxford Street; and DT29 - Cow Lane Bridges, located 1m from the kerb of Cow Lane

6.19 The Location of the closest monitoring locations for verification purposes is shown in **Figure 6.3** below

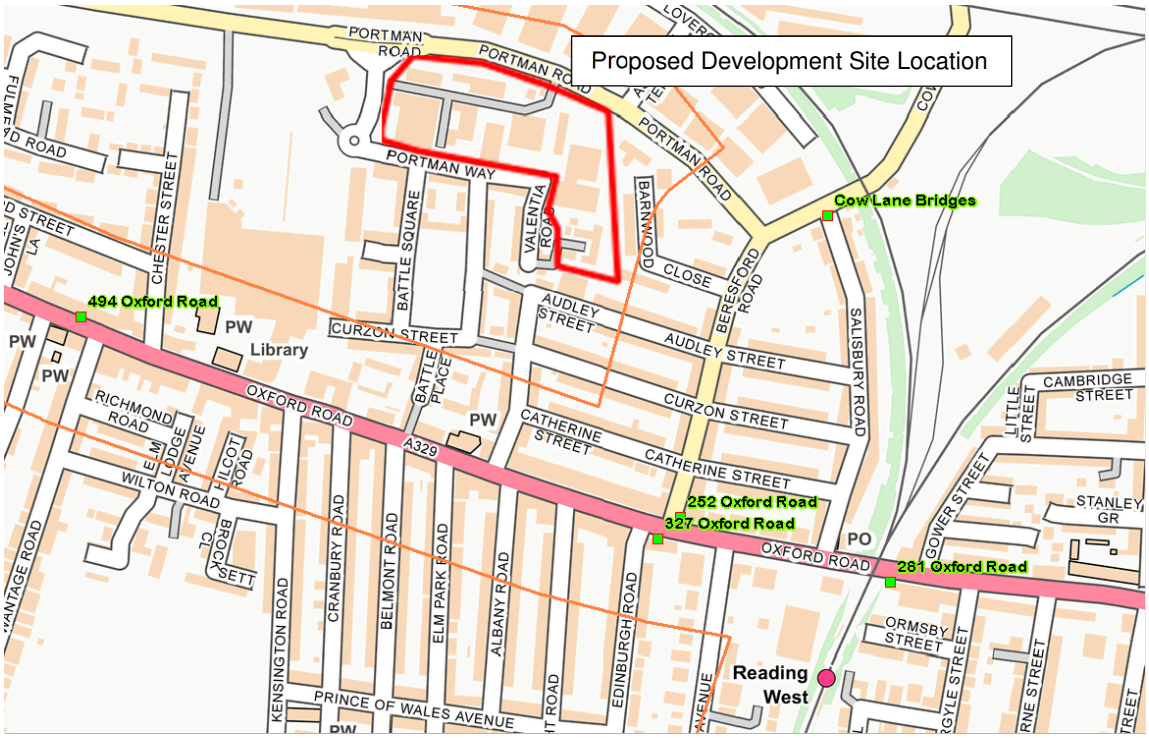

Figure 6.3: Diffusion Tube Monitoring Locations used for Verification.

6.20 Monitored values for 2016 NO_2 have been used in the verification exercise.

6.21 The traffic data used for verification purposes is set out in **Table 6.4** below.

Road	Speed (kph) Lights (Heavies)	Validation Projected Baseline 2015/2016		Values for ADMS Hourly Average	
		AADT	HDV	Lights	Heavies
Cow Lane	48	12,617	0.78%	522	4
Beresford Road	48	7,332	1.73%	300	5
Portman Road (West of Cown Lane Roundabout)	64	14,768	1.15%	608	7
Portman Road (East of Signals)	64	13,437	0.74%	556	4
Portman Road (West of Signals)	64	14,009	1.14%	577	7
Portman Road (North East of Western Roundabout)	64	15,989	2.65%	649	18
Oxford Road (East)	48	18,326	3.60%	736	28
Norcot Road	48	11,182	2.56%	454	12
Oxford Road (West)	48	17,864	3.20%	721	24

Table 6.4: Traffic Data used for Verification.

6.22 The model verification exercise is set out in **Table 6.5** below:

Site	Location	Monitored NO_2	Modelled NO_2*	% Diff**
DT28	469470, 173715	37	38.12	3.0 %
DT29	470230, 173818	32	37.06	14.7 %
DT30	470057, 173511	**40**	38.66	3.4 %
DT31	470294, 173715	35	37.41	6.7 %
DT32	470080, 173445	**44**	38.46	13.4 %

*calculated using modelled results for road-NO_x and NOx to NO_2 calculator.

**[modelled-monitored]/((modelled+monitored)/2) x 100.

Table 6.5: Results of Verification Exercise without Adjustment

6.23 The model was found to have a margin of error between 3 and14%. Ideally, modelled results should be within 25% margin of error when compared to the monitored values at same location, which is considered acceptable within TG16.

6.24 Therefore, in accordance with the TG16 recommendations, no correction is required.

Assumptions and Limitations

6.25 This assessment focuses on modelling annual mean concentrations. This is because it is inherently more difficult to make satisfactory predictions for short-term behaviour of pollutants than it is to model an annual mean value.

6.26 It should also be noted that the modelling process is dependant in the first instance upon projected traffic data. Where this data is subject to change, this may affect the results of the modelling process. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

6.27 An important stage in the process is model verification, which involves comparing the model output with measured concentrations. Because the model has been verified, there can be reasonable confidence in the prediction of baseline year (2016) concentrations.

6.28 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections as to what will happen to traffic volumes and vehicle emissions.

6.29 The above limitations have been taken into consideration in the assessment.

Potential Impacts

6.30 The NO_2 modelling results for all receptors are represented in **Table 6.6** below.

ID	2017 'Baseline' NO_2 (µg m^{-3})	2021 'Do Nothing' NO_2 (µg m^{-3})	2021 'Do Something' NO_2 (µg m^{-3})	Difference between 'Do Nothing' and 'Do Something' (µg m^{-3})	% Relative to Annual Objective
P1	36.30	36.44	36.51	0.07	**0%**
P2	36.16	36.29	36.36	0.07	**0%**
P3	36.16	36.29	36.36	0.07	**0%**
E1	36.90	37.07	37.07	0.00	**0%**
E2	38.28	38.53	38.55	0.02	**0%**
E3	35.91	36.03	36.04	0.01	**0%**
E4	35.93	36.05	36.06	0.01	**0%**
E5	35.76	35.86	35.87	0.01	**0%**
E6	36.22	36.37	36.44	0.07	**0%**
E7	36.28	36.43	36.51	0.08	**0%**
E8	37.57	37.78	37.85	0.07	**0%**
E9	37.86	38.08	38.15	0.07	**0%**
E10	36.74	36.94	37.05	0.11	**0%**

E11	37.89	38.17	38.31	0.14	**0%**
E12	39.21	39.52	39.53	0.01	**0%**
E13	39.89	**40.26**	**40.34**	0.08	**0%**
E14	38.28	38.53	38.54	0.01	**0%**
E15	39.24	39.54	39.55	0.01	**0%**
E16	38.11	38.35	38.36	0.01	**0%**
E17	39.20	39.50	39.51	0.01	**0%**
E18	**41.97**	**42.41**	**42.41**	0.00	**0%**
E19	39.23	39.53	39.53	0.00	**0%**
E20	37.89	38.12	38.12	0.00	**0%**
E21	37.74	37.96	37.96	0.00	**0%**
E22	37.02	37.21	37.22	0.01	**0%**
E23	35.94	36.07	36.08	0.01	**0%**

Table 6.7: Modelled Annual Mean Concentrations for NO_2

6.31 **Table 6.6** demonstrates that NO_2 levels for 'Do Something' are likely to increase by <0.2 µg/m^3 when compare to 'Do Something'. Therefore, in accordance with **Tables 3.4** and **3.5** in Section 3, NO_2 impacts are considered to be imperceptible and therefore negligible.

6.32 PM_{10} modelling results for all receptors are represented in **Table 6.7** below.

ID	2017 'Baseline' PM_{10} (µg m^{-3})	2021 'Do Nothing' PM_{10} (µg m^{-3})	2021 'Do Something' PM_{10} (µg m^{-3})	Difference between 'Do Nothing' and 'Do Something' (µg m^{-3})	% Relative to Annual Objective
P1	13.5	13.5	13.5	0.02	**0%**
P2	13.4	13.5	13.5	0.02	**0%**
P3	13.4	13.5	13.5	0.02	**0%**
E1	13.5	13.6	13.6	0.00	**0%**
E2	13.9	13.9	13.9	0.00	**0%**
E3	13.4	13.4	13.4	0.00	**0%**
E4	13.4	13.4	13.4	0.00	**0%**
E5	13.4	13.4	13.4	0.00	**0%**
E6	13.4	13.5	13.5	0.01	**0%**
E7	13.5	13.5	13.5	0.02	**0%**
E8	13.7	13.7	13.8	0.01	**0%**
E9	13.8	13.8	13.8	0.01	**0%**
E10	13.5	13.6	13.6	0.02	**0%**
E11	13.7	13.8	13.8	0.03	**0%**
E12	14.0	14.1	14.1	0.00	**0%**
E13	14.1	14.2	14.2	0.02	**0%**
E14	13.8	13.9	13.9	0.00	**0%**
E15	14.0	14.0	14.0	0.00	**0%**

E16	13.8	13.8	13.8	0.00	**0%**
E17	14.0	14.0	14.1	0.00	**0%**
E18	14.5	14.6	14.6	0.00	**0%**
E19	14.0	14.0	14.0	0.00	**0%**
E20	13.7	13.8	13.8	0.00	**0%**
E21	13.7	13.8	13.8	0.00	**0%**
E22	13.6	13.6	13.6	0.00	**0%**
E23	13.4	13.4	13.4	0.00	**0%**

Table 6.7: Modelled Annual Mean Concentrations for PM_{10}

6.33 **Table 6.7** demonstrates that PM_{10} levels for 'Do Something' are likely to increase by <0.1 µg/m^3 when compare to 'Do Something'. Therefore, in accordance with **Tables 3.4** and **3.5** in Section 3, PM_{10} impacts are considered to be imperceptible and therefore negligible.

6.34 $PM_{2.5}$ modelling results for all receptors are represented in **Table 6.8** below.

ID	2017 'Baseline' $PM_{2.5}$ (µg m^{-3})	2024 'Do Nothing' $PM_{2.5}$ (µg m^{-3})	2024 'Do Something' $PM_{2.5}$ (µg m^{-3})	Difference between 'Do Nothing' and 'Do Something' (µg m^{-3})	% Relative to Annual Objective
P1	9.3	9.3	9.3	0.01	**0%**
P2	9.3	9.3	9.3	0.01	**0%**
P3	9.3	9.3	9.3	0.01	**0%**
E1	9.3	9.3	9.3	0.00	**0%**
E2	9.5	9.5	9.5	0.00	**0%**
E3	9.2	9.2	9.2	0.00	**0%**
E4	9.2	9.2	9.2	0.00	**0%**
E5	9.2	9.2	9.2	0.00	**0%**
E6	9.3	9.3	9.3	0.01	**0%**
E7	9.3	9.3	9.3	0.01	**0%**
E8	9.4	9.4	9.4	0.01	**0%**
E9	9.4	9.5	9.5	0.01	**0%**
E10	9.3	9.3	9.3	0.01	**0%**
E11	9.4	9.5	9.5	0.02	**0%**
E12	9.6	9.6	9.6	0.00	**0%**
E13	9.7	9.7	9.7	0.01	**0%**
E14	9.5	9.5	9.5	0.00	**0%**
E15	9.6	9.6	9.6	0.00	**0%**
E16	9.5	9.5	9.5	0.00	**0%**
E17	9.6	9.6	9.6	0.00	**0%**
E18	9.9	9.9	9.9	0.00	**0%**
E19	9.6	9.6	9.6	0.00	**0%**
E20	9.4	9.5	9.5	0.00	**0%**

E21	9.4	9.4	9.4	0.00	**0%**
E22	9.3	9.4	9.4	0.00	**0%**
E23	9.2	9.2	9.2	0.00	**0%**

Table 6.8: Modelled Annual Mean Concentrations for $PM_{2.5}$

6.35 **Table 6.8** demonstrates that $PM_{2.5}$ levels for 'Do Something' are likely to increase by <0.1 µg/m^3 when compare to 'Do Something'. Therefore, in accordance with **Tables 3.4** and **3.5** in Section 3, $PM_{2.5}$ impacts are considered to be imperceptible and therefore negligible.

6.36 The modelled values in **Tables 6.6, 6.7 and 6.8** clearly demonstrate that all proposed residential receptors (P1, P2 and P3) are well within the national objective levels.

6.37 This indicates that NO_2 concentration for all proposed residential receptors modelled (P1, P2 and P3), are >5% below national objective, which in accordance with **Table 3.6**, comfortably puts all proposed residential dwellings within APEC A, which states the following:

"No air quality grounds for refusal; however mitigation of any emissions should be considered."

7 Mitigation Measures

Construction

Construction Dust

7.1 A construction dust assessment has been completed for the proposed development in accordance with IAQM guidance and is presented in **Appendix A**. Within the assessment, site specific mitigation measures have been identified which ensure compliance with relevant standards.

7.2 The mitigation measures have been recommended because, although the construction magnitude and the potential for health effects is considered to be low/small, the potential for dust soiling was considered to be high.

7.3 The mitigation measures outlined below, should make up part of a Construction Environmental Management Plan (CEMP) that should be implemented to minimise the potential for adverse construction dust impacts throughout all the relevant construction stages.

Demolition:

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Wherever reasonably practicable, retain walls and windows while the rest of the building is demolished to provide a screen against dust;
- Bag and remove any biological debris or damp down such material before demolition; and
- 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 required.

Earthworks:

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Avoid carrying out any earthworks during dry weather if reasonably practicable having regard to programme and contracting arrangements for the relevant works or provide and ensure appropriate use of water to control dust; and
- Re-vegetate any earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

Construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless required for a particular process;
- Mix large quantities of cement, grouts and other similar materials in enclosed areas remote from site boundaries and potential receptors;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For small supplies of fine powder ensure bags are sealed after use and are stored appropriately to prevent dust.

Trackout:

- Ensure any vehicles arriving and leaving site are securely covered to prevent escape of materials during transport;
- Routinely clean public roads and any access routes using wet sweeping methods; and
- Avoid dry sweeping.

General Mitigation Measures:

- Ensure regular cleaning of hardstanding surfaces using wet sweeping methods;
- Display the head or regional office contact information, and the name and contact details of person(s) accountable for air quality on the site boundary;
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Log all air quality complaints, identify the cause(s), take appropriate measures to reduce emissions in a timely manner and record all measures taken. Make the complaints log available to the Local Authority when requested;
- Carry out regular on-site and off-site inspections to monitor dust soiling effects, with cleaning to be provided if necessary. Increase the frequency of inspections when activities with a high potential to produce dust are being carried out;
- Erect barriers around the site, any dusty activities and stockpiles (the last of which should be covered);
- Screen areas of the building, where dust producing activities are taking place, with debris screens or sheeting;

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Remove materials that have a potential to produce dust as soon as possible, unless they are being re-used. If they are to be re-used, on site covers should be used;
- Ensure all vehicles switch off engines when stationary, so that there are no idling vehicles;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine sprays on such equipment wherever possible;
- Avoid bonfires and the burning of waste materials; and
- Special provisions will apply for any materials containing asbestos. The safety method statement should outline the control measures necessary to minimise the risks to an acceptable level and all statutory notices will be placed with the Health and Safety Executive (HSE).

7.4 It is important that attention is paid to any construction activity that takes place in close proximity to the site boundary, potentially at the closest location to sensitive receptors.

7.5 The implementation of the specific mitigation measures given above within a CMP will ensure that any potential adverse impacts from construction dust during all construction stages are avoided. It is noted by the IAQM that, through the use of effective mitigation, the effects of dust from construction activity will normally not be considered significant.

Construction Traffic and Plant

7.6 As previously stated, there is potential for air pollutant impacts to arise from construction plant and vehicles associated with the scheme. Therefore, the following BAT should be implemented during the construction phase.

- All vehicles should switch off engines when stationary, no idling vehicles;
- Minimise the movement of construction traffic around the site;
- Maximising efficiency (this may include alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing);
- Vehicles should be well maintained and kept in a high standard of working order;
- Avoid the use of diesel or petrol powered generators by using mains electricity or battery powered equipment where possible; and
- Locate plant away from boundaries close to residential areas.

Operational

Operational Traffic

7.7 This AQA has demonstrated that the predicted net traffic impact associated with the proposed development is likely to have an imperceptible and therefore negligible impact upon the local road network. Therefore, it is not anticipated that mitigation measures will be required.

Energy Strategy

7.8 As previously stated, the detailed technical specifications for the proposed space and water heating plant have not yet been confirmed at this stage. Therefore, any operational plant effects should be reviewed further, if required, at the appropriate stage, when all the required detailed plant technical information is confirmed.

7.9 At this stage, compliance to relevant regulations and standards should be secured through planning conditions, where necessary.

Site Suitability

7.10 The AQA has demonstrated that the proposed residential units fall within APEC A for site suitability. In accordance with the exposure criteria in **Table 3.6**, means that there should be no air quality grounds for refusal and the local air quality should be suitable to safeguard the health and amenity of new residents.

8 Residual Effects and Conclusions

8.1 This assessment demonstrates that Reading Borough Council one Air Quality Management Areas (AQMAs) have been declared as a result of exceedences of the annual mean objective for Nitrogen Dioxide (NO_2) and 24-hour mean for PM_{10}.

8.2 The proposed development is located adjacent to the declared AQMA, meaning that it would be highly sensitive to any significant alterations of traffic and the likelihood of any significant impacts would need to be considered.

8.3 A quantitative assessment of traffic related air quality impacts has been undertaken. The results demonstrate that all proposed residential receptors are within the national objective levels.

8.4 This indicates that NO_2 concentration for all proposed residential receptors modelled, are >5% below national objective, which in accordance with **Table 3.6**, comfortably puts all proposed residential dwellings within APEC A, which states the following:

"No air quality grounds for refusal; however mitigation of any emissions should be considered."

8.5 Also, traffic related impacts, as a result of the proposed development for NO_2, PM_{10} and $PM_{2.5}$, are considered to be imperceptible and therefore negligible.

8.6 A construction dust assessment has been undertaken for the three stages of construction activities associated with the proposed development in accordance with IAQM and GLA guidance on the assessment of dust from demolition and construction (**Appendix A**).

8.7 Mitigation measures have been proposed for construction traffic and stationary plant associated with the proposed development.

8.8 Following the successful implementation of the suggested mitigation measures, the residual effects of construction dust and emissions from construction plant/vehicles upon the local area and sensitive receptors although adverse, will be temporary and considered to be 'not significant'.

Conclusion

8.9 The proposed development does not raise any significant or other residual adverse impacts on the health and/or quality of life for existing or proposed sensitive receptors as a result of any anticipated changes to air quality.

8.10 It is therefore concluded that the proposed development complies fully with air quality related national, regional and local planning policy and any mitigation can, if considered necessary, be enforced by means of appropriate planning conditions, consistent with paragraph 124 of the National Planning Policy Framework.

Appendix A
Construction Dust Assessment

CONSTRUCTION DUST ASSESSMENT

A.1 The construction dust assessment has been completed in accordance with 2014 IAQM guidance and follows the procedures as outlined in Section 3 of this report.

Screen the Need for a Detailed Assessment

A.2 The following screening criterion has been applied to the assessment: An assessment will normally be required where there is:

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

A.3 There are a number of human receptors within 350m of the site boundary. Therefore, a dust assessment is required due to the proposed development location meeting some of the above criteria.

Assess the Risk of Dust Impacts

A4 The construction activities associated with the proposed development have been separated into four stages:

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

A.5 The assessment of the risk of dust impacts has been completed in two stages:

- Determine the potential dust emission magnitude; and
- Determine the sensitivity of the area to dust impacts.

A.6 The potential dust emission magnitude for all four of the construction stages have been determined to be either Small, Medium or Large according to the criteria presented in Table A.1 below.

Construction Activity	Dust Emission Magnitude Scale		
	Small	Medium	Large
Demolition	Total building volume <20,000m^3, construction material with low potential for dust release, demolition activities <10m above ground, works during wetter months.	Total building volume 20,000-50,000m^3, potentially dusty construction material, demolition activities 10-20m above ground level.	Total building volume >50,000m^3, potentially dusty material, on-site crushing and screening, activities >20m above ground level.
Earthworks	Total site area <2,500m^2, soil type with large grain size, <5 heavy earth moving vehicles active at one time, bunds <4m high, total material moved <20,000t, works during wetter months.	Total site area 2,500-10,000m^2, moderately dusty soil type, 5-10 heavy earth moving vehicles active at one time, bunds 4-8m high, total material moved 20,000-100,000t.	Total site area >10,000m^2, potentially dusty soil type, >10 heavy earth moving vehicles active at one time, bunds >8m high, total material moved >100,000t.
Construction	Total building volume <25,000m^3, construction material with low potential for dust release.	Total building volume 25,000-100,000m^3, potentially dusty construction material, on site concrete batching.	Total building volume >100,000m^3, on site concrete batching, sandblasting.
Trackout	<10 HDV* outwards movements in any one day, surface material with low potential for dust release, unpaved road length <50m.	10-50 HDV outward movements in any one day, moderately dusty surface material, unpaved road length 50-100m.	>50 HDV outward movements in any one day, potentially dusty surface material, unpaved road length >100m.
* HDV – Heavy Duty Vehicle (>3.5t), Note – In each case, not all the criteria need to be met, and that other criteria may be used if justified.			

Table A.1: Dust Emission Magnitude Criteria

A.7 The completed assessment of Dust Emission Magnitude is shown in Table A.2 below.

Construction Activity	Dust Emission Magnitude	Justification
Demolition	Medium	Existing building to be demolished has been estimated to have a total volume between 20,000-50,000m^3, with potentially dusty construction material.
Earthworks	Large	Total site area >10,000m^2, potentially dusty soil type.
Construction	Medium	Total building volume estimated to be between 25,000-100,000m^3, with potentially dusty construction material.

Trackout	Large	Estimated >50 HDV outward movements in any one day, potentially dusty surface material

Table A.2: Dust Emission Magnitude Assessment

A.8 Due to the scale of the proposed development the magnitude of dust emissions has been assessed to be Medium to Large.

A.9 The sensitivity of the area has been assessed in relation to a number of factors such as; the specific sensitivities of receptors in the area, the proximity and number of those receptors and in the case of PM_{10}, the local background concentration and by following the significance criteria in Tables A3, A4 and A5 below.

Receptor Sensitivity	Number of Receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	**>100**	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	**>1**	Medium	Low	Low	Low
Low	**>1**	Low	Low	Low	Low

Table A3: Sensitivity of the Area to Dust Soiling Effects of People and Property

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>32 µg m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A5: Sensitivity of the Area to Ecological Impacts

A.10 In addition to Tables A3, A4 and A5 any site specific factors have been taken into account when defining the sensitivity of the area:

- any history of dust generating activities in the area;

- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between the source and the receptors; and
- the duration of the potential impact, as a receptor may become more sensitive over time.

A.11 The completed pre-mitigation impact risk assessment incorporating the sensitivity of the area and the dust emissions magnitude for the three construction activities is shown in Table A6 below.

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

Table A6: Summary of Dust Risk (pre-mitigation)

A.12 The risk of dust soiling has been considered high due to the risk of several receptors located in close proximity to the proposed site. The human health risk was considered Low due to the low PM_{10} background concentrations in the local area (13.0µgm^3), there are no ecological sites within 50m of the proposed site, therefore ecological sensitivity has been assessed as negligible.

A.13 Additionally, as sated above, the dust emissions magnitude, pre-mitigation, based on the scale of the development, is considered to be medium to large.

Site-specific Mitigation

A.14 From the identification of the risk of impacts with no mitigation applied in Table A6, it is possible to determine the specific mitigation measures that can be applied in relation to the level of risk associated with the construction activity. The mitigation measures described below are suggested as measures that should be included in a site-specific Construction Environmental Management Plan (CEMP).

Demolition:

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Wherever reasonably practicable, retain walls and windows while the rest of the building is demolished to provide a screen against dust;
- Bag and remove any biological debris or damp down such material before demolition; and

- 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 required.

Earthworks:

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Avoid carrying out any earthworks during dry weather if reasonably practicable having regard to programme and contracting arrangements for the relevant works or provide and ensure appropriate use of water to control dust.
- Re-vegetate any earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

Construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless required for a particular process;
- Mix large quantities of cement, grouts and other similar materials in enclosed areas remote from site boundaries and potential receptors;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For small supplies of fine powder ensure bags are sealed after use and are stored appropriately to prevent dust.

Trackout:

- Ensure any vehicles arriving and leaving site are securely covered to prevent escape of materials during transport;
- Routinely clean public roads and any access routes using wet sweeping methods; and
- Avoid dry sweeping.

General Mitigation Measures:

- Ensure regular cleaning of hardstanding surfaces using wet sweeping methods;
- Display the head or regional office contact information, and the name and contact details of person(s) accountable for air quality on the site boundary;

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Log all air quality complaints, identify the cause(s), take appropriate measures to reduce emissions in a timely manner, and record all measures taken. Make the complaints log available to the Local Authority when requested;
- Carry out regular on-site and off-site inspections to monitor dust soiling effects, with cleaning to be provided if necessary. Increase the frequency of inspections when activities with a high potential to produce dust are being carried out;
- Erect barriers around the site, any dusty activities and stockpiles (the last of which should be covered);
- Screen areas of the building, where dust producing activities are taking place, with debris screens or sheeting;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Remove materials that have a potential to produce dust as soon as possible, unless they are being re-used. If they are to be re-used, on site covers should be used;
- Ensure all vehicles switch off engines when stationary, so that there are no idling vehicles;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine sprays on such equipment wherever possible;
- Avoid bonfires and the burning of waste materials; and
- Special provisions will apply for any materials containing asbestos. The safety method statement should outline the control measures necessary to minimise the risks to an acceptable level and all statutory notices will be placed with the Health and Safety Executive (HSE).

A.15 It is important that attention is paid to any construction activity that takes place in close proximity to the site boundary, potentially at the closest location to sensitive receptors.

A.16 The implementation of the specific mitigation measures given above within a CEMP will ensure that the potential adverse impacts from construction dust during all construction stages are avoided. It is noted by the IAQM that through the use of effective mitigation, the effects of dust from construction activity will normally be considered 'not significant'.

Determine Significant Effects

A.17 Prior to the implementation of any mitigation measures the highest significance of adverse effects was high risk for dust soiling and low risk for human health, with dust emissions magnitude considered to be medium to large.

A.18 The mitigation measures listed above have been chosen due to their suitability to the site and to reduce the risk of adverse effects from the four stages of construction.

A.19 Through the implementation of site specific mitigation measures (secured by planning condition), which are designed to mitigate potential dust impact, will ensure that potential significant adverse dust effects will not occur and the residual effect will normally be 'not significant'.

Conclusions of Construction Dust Assessment

A.20 The completion of the construction dust assessment has shown that the residual effect of the proposed development in the context of construction dust emissions will be 'not significant'. This conclusion has been made based on the small dust emissions magnitude related to the scale of development and the assumption that the suggested mitigation measures will be implemented (secured by planning condition) and is relevant for all sensitive receptors within 350m of the site.

A.21 It should be noted that even with a rigorous CEMP in place, it is not possible to guarantee that all mitigation measures will be effective at all times. If there is an interruption in the water supply used for dust suppression or adverse weather conditions are experienced that exacerbate dust emissions, the receptors may experience occasional, short term dust annoyance.

A.22 However, the likely scale of this would not normally be considered sufficient to change the conclusion of this assessment. It is therefore important to consider all mitigation measures and provide a frequent review and assessment procedure at each stage, to ensure that mitigation measures continue to provide the maximum attenuation level possible.

Appendix B
ADMS - Time Variation Hourly Factors

Time Variation Hourly Factors

Profile 1 Stoke Road

Local time (hours)	Weekdays	Saturday	Sunday
1	0.15	0.27	0.3
2	0.11	0.19	0.19
3	0.09	0.14	0.12
4	0.11	0.14	0.11
5	0.19	0.18	0.12
6	0.44	0.28	0.17
7	1.05	0.49	0.29
8	1.71	0.77	0.45
9	1.74	1.13	0.67
10	1.44	1.51	1.09
11	1.35	1.85	1.56
12	1.38	2	1.87
13	1.41	1.96	1.96
14	1.45	1.84	1.87
15	1.52	1.73	1.84
16	1.66	1.65	1.89
17	1.87	1.64	1.96
18	1.89	1.61	1.86
19	1.5	1.37	1.61
20	1.03	1.04	1.37
21	0.72	0.75	1.08
22	0.53	0.56	0.78
23	0.4	0.48	0.51
24	0.26	0.4	0.32

Profile 2 Bath Road

Local time (hours)	Weekdays	Saturday	Sunday
1	0.29	0.51	0.51
2	0.16	0.28	0.33
3	0.11	0.22	0.23
4	0.1	0.14	0.24
5	0.14	0.12	0.17
6	0.3	0.24	0.19
7	0.74	0.37	0.28
8	1.32	0.58	0.43
9	1.25	0.96	0.55
10	1.38	1.29	0.96
11	1.3	1.51	1.3
12	1.37	1.66	1.74
13	1.57	1.76	1.96
14	1.61	1.79	1.99
15	1.66	1.71	1.98
16	1.7	1.68	1.85
17	1.63	1.7	1.8
18	1.2	1.54	1.55
19	1.38	1.39	1.42
20	1.35	1.31	1.34
21	1.15	1.02	1.18
22	0.94	0.9	0.9
23	0.73	0.75	0.65
24	0.58	0.58	0.46