6. AIR QUALITY

Introduction

6.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of Air Quality. The chapter has been prepared by Jemima Hill (MSc, BSc (Hons), AMIEnvSc) in accordance with the main procedural requirements of the 2017 EIA Regs.

6.2 Air quality guidance advises that the organisation engaged in assessing the overall risks should hold relevant qualifications and/or extensive experience in undertaking air quality assessments. The RPS air quality team members involved at various stages of this assessment have professional affiliations that include Fellow and Member of the Institute of Air Quality Management, Chartered Chemist, Chartered Scientist, Chartered Environmentalist and Member of the Royal Society of Chemistry and have the required academic qualifications for these professional bodies. In addition, the Director responsible for authorising all deliverables has over 25 years' experience.

6.3 This air quality assessment covers the:

- Construction phase - an evaluation of the temporary effects from fugitive construction dust and construction-vehicle exhaust emissions; and the
- Operational phase – an evaluation of
    - the impacts of the development traffic on the local area
    - the impacts on future occupants of the development from their exposure to the prevailing levels of air pollution, which can be a factor in the suitability of the Development for its proposed uses.

6.4 This chapter begins by setting out the policy and legislative context for the assessment. The methods and criteria used to assess potential air quality effects have then been described. The baseline air quality conditions have been established taking into account Defra estimates, local authority documents and the results of any local monitoring. The results of the assessment of air quality impacts have been presented. A conclusion has been drawn on the significance of the residual construction-phase effects and the residual operational-phase effects.

6.5 This chapter is supported by the following Figures and Appendices:

Tables

Figures

Appendices

Policy Context

European legislation

6.6 The 2008 Ambient Air Quality Directive (2008/50/EC) [1] aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants; it sets legally binding concentration-based limit values, as well as target values. There are also information and alert thresholds for reporting purposes. These are to be achieved for the main air pollutants: particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene. This Directive replaced most of the previous EU air quality legislation and in England was transposed into domestic law by the Air Quality Standards Regulations 2010 [2], which in addition incorporates the 4th Air Quality Daughter Directive (2004/107/EC) that sets targets for ambient air concentrations of certain toxic heavy metals (arsenic, cadmium and nickel) and polycyclic aromatic hydrocarbons (PAHs). Member states must comply with the limit values (which are legally binding on the Secretary of State) and the Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the limit values.

National Legislation

6.7 The Environment Act 1995 established the requirement for the Government and the devolved administrations to produce a National Air Quality Strategy (AQS) for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2007 [3]. The Strategy sets UK air quality standards and objectives for the pollutants in the Air Quality Standards Regulations plus 1,3-butadiene and recognises that action at national, regional and local level may be needed, depending on the scale and nature of the air quality problem. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the EU Directives.

6.8 The 1995 Environment Act also established the UK system of Local Air Quality Management (LAQM), that requires local authorities to go through a process of review and assessment of air quality in their areas, identifying places where objectives are not likely to be met, then declaring Air Quality Management Areas (AQMAs) and putting in place Air Quality Action Plans to improve air quality. These plans also contribute, at local level, to the achievement of EU limit values.

6.9 For the purposes of this assessment, the limit values set out in the Air Quality Standards Regulations 2010 and the objective levels specified under the current UK AQS have been used.

6.10 The limit values and objectives relevant to this assessment are summarised in Table 6.1. Although the EU limit values and the UK AQS objectives are numerically equal, there are some differences in where they apply and who is responsible for their achievement

Table 6.1 Summary of Relevant Air Quality Limit Values and Objectives

Pollutant	Averaging Period	Objectives/ Limit Values	Not to be Exceeded More Than
Nitrogen Dioxide (NO_2)	1 hour	200 µg.m^{-3}	18 times per calendar year
	Annual	40 µg.m^{-3}	-
Particulate Matter (PM_{10})	24 Hour	50 µg.m^{-3}	35 times per calendar year
	Annual	40 µg.m^{-3}	-
Particulate Matter ($PM_{2.5}$)	Annual	25 µg.m^{-3}	-

6.11 In July 2017, Defra published the 'UK plan for tackling roadside nitrogen dioxide concentrations'. This describes the Government's plan for bringing roads with NO2 concentrations above the EU Limit Value back into compliance within the shortest possible time, covering five cities, the GLA and 23 other local authorities. A Supplement to the plan was published in October 2018, which sets out measures to bring forward compliance in a further 33 local authorities that had not been covered by actions in the July 2017 plan because they had been projected to comply with the EU Limit Value by 2021.

6.12 On 14 January 2019, Defra published the 'Clean Air Strategy 2019'. The report sets out actions that the Government intends to take to reduce emissions from transport, in the home, from farming and from industry.

National Planning Policy Framework

6.13 The National Planning Policy Framework (NPPF) [4] is a material consideration for local planning authorities and decision-takers in determining applications. At the heart of the NPPF, is a presumption in favour of sustainable development, subject to caveats where a plan or project affects a habitats Development. For determining planning applications, this means approving development proposals if they accord with an up-to-date local development plan, unless material considerations indicate otherwise. If the development plan does not contain relevant policies, or the policies are out of date, then planning permission should be granted unless the application of policies in the NPPF that protect areas or assets of particular importance provides a clear reason for refusing the development, or any adverse impacts would significantly outweigh the benefits.

6.14 The NPPF sets out three overarching objectives to achieve sustainable development. The relevant objective in the context of this air quality assessment is:

> *"an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution and adapting to climate change, including moving to a low carbon economy" (Paragraph 8c)*

6.15 Under the heading 'Promoting sustainable transport', the NPPF 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 transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making." (Paragraph 103)*

6.16 Under the heading 'Conserving and enhancing the natural environment', the NPPF states: "*Planning policies and decisions should contribute to and enhance the natural and local environment by:*

> *Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; …" (Paragraph 170)*
>
> *"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 Developments 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." (Paragraph 181)*

Planning Practice Guidance[5]

6.17 The National Planning Practice Guidance (NPPG) was issued on-line on 6 March 2014 and is updated periodically by Government as a live document. The last major update was on 1 November 2019. The Air Quality section of the NPPG describes the circumstances when air quality, odour and dust can be a planning concern, requiring assessment.

6.18 The NPPG advises that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity. The NPPG states that when deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

> *"Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction Developments that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
>
> *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
>
> *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
>
> *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
>
> *Have a potential adverse effect on biodiversity, especially where it would affect Developments designated for their biodiversity value."*

6.19 The NPPG provides advice on how air quality impacts can be mitigated and notes *"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met."*

Regional Policy – The London Plan

6.20 The Mayor of London is responsible for all strategic planning in London. Amongst the Mayor's duties is the requirement to develop a Spatial Development Strategy for London, known as the London Plan [6]. The current version of the London Plan was published in March 2016 and incorporates Further Alterations to the London Plan published in July 2011. The Plan acts as an integrating framework for a set of strategies, including improvements to air quality.

6.21 The key policy relating to air quality is Policy 7.14: Improving Air Quality:

> *"Strategic*
>
> *A. The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.*
>
> *Planning decisions*
>
> *B Development proposals should:*
>
> *a. minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)*
>
> *b. promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'*
>
> *c. be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs))*
>
> *d. ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-Development. Where it can be demonstrated that on-Development provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches*
>
> *e. where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no*

adverse air quality impacts from the biomass boiler are identified."

6.22 The Mayor's London Environment Strategy [7] sets out the following policies seeking to improve London's air quality to the point where air pollution no longer poses a significant risk to human health:

> *"Policy 4.1.1 Make sure that London and its communities, particularly the most disadvantaged and those in priority locations, are empowered to reduce their exposure to poor air quality.*
>
> *Policy 4.1.2 Improve the understanding of air quality health impacts to better target policies and action*
>
> *Policy 4.2.1 Reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport*
>
> *Policy 4.2.2 Reduce emissions from non-road transport sources, including by phasing out fossil fuels*
>
> *Policy 4.2.3 Reduce emissions from non-transport sources, including by phasing out fossil fuels*
>
> *Policy 4.2.4 The Mayor will work with the government, the London boroughs and other partners to accelerate the achievement of legal limits in Greater London and improve air quality*
>
> *Policy 4.2.5 The Mayor will work with other cities (here and internationally), global city and industry networks to share best practice, lead action and support evidence based steps to improve air quality*
>
> *Policy 4.3.1 The Mayor will establish new targets for $PM_{2.5}$ and other pollutants where needed. The Mayor will seek to meet these targets as soon as possible, working with government and other partners*
>
> *Policy 4.3.2 The Mayor will encourage the take up of ultra low and zero emission technologies to make sure London's entire transport system is zero emission by 2050 to further reduce levels of pollution and achieve WHO air quality guidelines*
>
> *Policy 4.3.3 Phase out the use of fossil fuels to heat, cool and maintain London's buildings, homes and urban spaces, and reduce the impact of building emissions on air quality*
> *Policy 4.3.4 Work to reduce exposure to indoor air pollutants in the home, schools, workplace and other enclosed spaces"*

6.23 The Intend to Publish London Plan: Spatial Development Strategy for Greater London, 2019,[8] contains policies relevant to Air Quality:

> `*Policy SI 1 Improving air quality*
>
> - *A - Development Plans, through relevant strategic, site-specific and area-*

based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

- *B To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:*
  1 - Development proposals should not:
  (a) lead to further deterioration of existing poor air quality
  (b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits
  (c) create unacceptable risk of high levels of exposure to poor air quality.
  2 - In order to meet the requirements in Part 1, as a minimum:
  (a) development proposals must be at least Air Quality Neutral
  (b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures
  (c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1
  (d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.
- *C Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:*
  (a) how proposals have considered ways to maximise benefits to local air quality, and
  (b) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.
- *D - In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.*
- *E - Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development'*

6.24 In April 2014, the Greater London Authority (GLA) published Supplementary Planning Guidance (SPG) Sustainable Design and Construction [9]. The SPG reinforces the existing need for a 'conventional' Air Quality Assessment where pollutant concentrations, at the point of human exposure, are compared with the relevant national objectives; however, the SPG also details how major developments must demonstrate they are achieving 'Air Quality Neutral'. The Air Quality Neutral calculations have been undertaken for the Development and areprovided in a separate report.

Local Planning Policy

6.25 The "Shaping The Borough" Draft Local Plan [10] was put forward for consultation in July 2019, setting out policies between 2020-2035. In September 2004, the Planning & Compulsory Purchase Act introduced a new development plan system intended to streamline the local planning process. Under the new system, Local Plans will be replaced by a Local Development Framework (LDF).

6.26 Relevant policies to this assessment have been summarised below.

Policy 39 – Managing Change in Designated Employment Areas

Proposals for the regeneration of parts or whole areas of designated employment areas (SIL) and (BEA) will be supported where:
Appropriate design mitigations can be provided for the non-employment uses to be accommodated, with regard to the following;
i. Safety and security
ii. Layout, orientation, access, servicing and delivery arrangements of uses;
iii. Design quality, public realm, visual impact and amenity for residents;
iv. Vibration and noise;
v. Air quality including dust, odour and emissions;

Policy 59 – High Quality Environment

High quality and healthy environments can be encouraged by:
Supporting new developments that meet appropriate environmental standards to minimise air, water, noise and light pollution and address the risks arising from contaminated land and hazardous substances, to ensure satisfactory amenity is provided for future and surrounding occupiers

Policy 64 – Amenity

New development should respect the amenity of existing and future occupiers, neighbours and the surrounding area by:
Avoiding adverse impacts through poor microclimate conditions, air pollution, odour, noise and vibration and/or light pollution

Policy 67 – Liveable Neighbourhoods for All

Development will be supported where it contributes to the Council's objective to deliver Liveable Neighbourhoods for all residents in Waltham Forest by:
Contributing towards enhancing streets to meet Healthy Streets indicators across the public realm in the borough;
Increasing the number of trips made by walking, cycling and public transport, and improve local connections to these modes;
Reducing motor dominance and increase the active use of streets and public spaces;
Provide legible, prominent and coherent wayfinding for walking and cycling to strategic and local active travel networks, public transport hubs, amenities, schools and green spaces. Being permeable for active modes of travel, and prioritise road space for cycling, walking and public transport;
Creating safe neighbourhood environments, including reducing road danger, improving personal security and meeting the Mayor of London's Transport Strategy objective for Vision Zero;

Improving air quality to create more attractive neighbourhoods for residents and visitors;
Improving quality and resilience of the public realm, ensuring public space is accessible for people from all walks of life;
Ensuring neighbourhoods have good connections to public transport.

Policy 93 – Air Pollution

New development should mitigate any adverse air pollution impacts by:
Ensuring development meets, and where possible improves upon, air quality neutral standards over its lifetime and does not contribute to a decrease in air quality during the construction or operation stage;
Undertaking Air Quality Assessments (AQA's) for the following types of development:
All major developments, unless there is clear evidence that transport and building emissions will be less than the existing use;
Development in areas of sub-standard air quality and changes of use which result in an introduction of sensitive receptors to areas of poor air quality;
Development in close proximity to sensitive uses;
Developments which involve significant demolition and construction;
Ensuring development is air quality positive in air quality focus areas; Assessing existing air quality and avoiding locating sensitive uses in areas exposed to air pollution;
Minimising exposure to air pollution through the considered positioning and design of new development, considering private, communal, public open space and child play spaces;
Incorporating on-site [Development] measures to improve air quality, however where it can be demonstrated that on-site [Development] provision is impractical or inappropriate, off-site measures to improve local air quality may be acceptable, providing equivalent air quality benefits can be demonstrated

Assessment Methodology

6.27 Neither the NPPF nor the NPPG is prescriptive on the methodology for assessing air quality effects or describing significance; practitioners continue to use guidance provided by Defra and non-governmental organisations, including Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM). However, the NPPG does advise that *"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned."* It lists a number of areas that might be usefully agreed at the outset.

6.28 This air quality assessment covers the elements recommended in the NPPG. The approach is consistent with the EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality document [11], the Mayor of London's Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance [12], the IAQM Guidance on the assessment of dust from demolition and construction [13] and, where relevant, the Mayor of London's Local Air Quality Management Technical Guidance: LLAQM.TG16 [14]. It includes the key elements listed below:

•

- assessment of the existing air quality in the study area (existing baseline) and prediction of the future air quality without the development in place (future baseline), using official government estimates from Defra, publicly available air quality monitoring data for the area, and relevant Air Quality Review and Assessment (R&A) documents;
- a qualitative assessment of likely construction-phase impacts with mitigation and controls in place; and
- a quantitative prediction of the future operational-phase air quality impact with the development in place (with any necessary mitigation), encompassing
- the impacts of the development traffic on the local area
    - the impacts on future occupants of the development from their exposure to the prevailing levels of air pollution, which can be a factor in the suitability of the Development for its proposed uses.

6.29 The EIA Scoping Opinion (Appendix 6.1) confirmed that the proposed methodology of the assessment was appropriate. In line with the guidance set out in the NPPG, the Environmental Health Department at the LBWF was contacted on 18/05/20 to consult with them, to discuss the proposed methodology of the assessment. As of this date there has been no reply from LBWF.

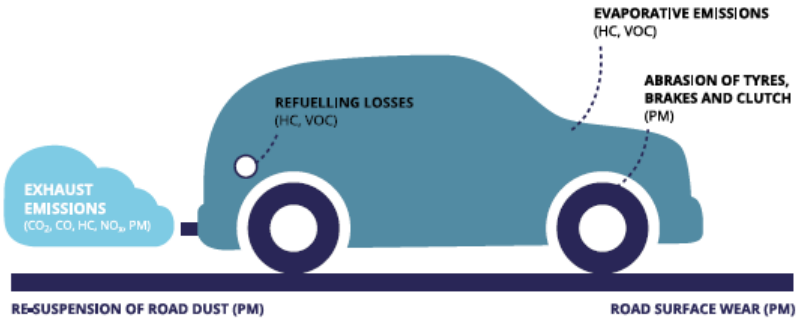
Summary of key pollutants considered

6.30 For the construction phase of the Development the key pollutant is dust, covering both the PM_{10} fraction that is suspended in the air that can be breathed, and the dust that has fallen out of the air onto surfaces and which can potentially cause temporary annoyance effects.

6.31 For the operational phase of the Development, the main pollutants from road traffic with potential for local air quality impacts are nitrogen oxides (NOx) and particulate matter (PM_{10}). Emissions of total NOx from combustion sources comprise nitric oxide (NO) and NO_2. The NO oxidises in the atmosphere to form NO_2. The assessment of operational impacts therefore focuses on changes in NO_2 and PM_{10} concentrations. The impact from fine particulate matter, known as $PM_{2.5}$ (a subset of PM_{10}) concentrations has also been considered.

Figure 6.1 Types of Vehicle Emissions

The different types of emissions from vehicles, and a comparison of the relative amounts of selected pollutants released by the latest Euro 6 petrol and diesel vehicles



Source: European Environment Agency (2016) Explaining Road Transport Emissions: A Non-technical Guide

6.32 Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and Heavy Goods Vehicles (HGVs), and other diesel-powered vehicles), these are unlikely to have a significant impact on local air quality except for large, long-term construction Developments: the EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality document indicates that air quality assessments should include developments increasing annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an AQMA and more than 100 elsewhere. The predicted construction traffic numbers (refer to Chapter 5 Construction Methodology & Phasing) do not exceed the aforementioned EPUK & IAQM thresholds for any individual road during the construction phase of this project; therefore, construction-vehicle exhaust emissions have not been assessed specifically and have been scoped out of further assessment.

Construction Phase -Methodology

6.33 Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter [15]. Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.

6.34 The effects of dust are linked to particle size and two main categories are usually considered:

- PM_{10} particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and
- Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat Developments.

6.35 The IAQM Guidance on the assessment of dust from demolition and construction sets out 350 m as the distance from the Development boundary and 50 m from the Development traffic route(s) up to 500 m of the entrance, within which there could potentially be nuisance dust and PM_{10} effects on present and future human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases. (In this particular application, there are no ecological receptors within the distances and ecological effects have been scoped out). These distances are set to be deliberately conservative.

6.36 Concentration-based limit values and objectives have been set for the PM_{10} suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or World Health Organisation (WHO) level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

6.37 The Mayor of London's Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance (hereafter referred to as the Construction and Demolition SPG) provides information relating to the approach to the assessment, recommended mitigation measures and appropriate monitoring strategies. In particular, the Construction and Demolition SPG states that the assessment methodology provided in the current version of the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction should be used.

6.38 The IAQM dust guidance aims to estimate the impacts of both PM_{10} and dust through a risk-based assessment procedure. The IAQM dust guidance document states: "*The impacts depend on the mitigation measures adopted. Therefore the emphasis in this document is on classifying the risk of dust impacts from a Development, which will then allow mitigation measures commensurate with that risk to be identified.*"

6.39 The IAQM dust guidance provides a methodological framework, but notes that professional

judgement is required to assess effects: "*This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also a wide range of factors affect the amount of dust that may arise, and these are not readily quantified.*"

6.40 Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the Development, using the well-established source-pathway-receptor approach:

- The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.
- The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area. The detail of the dust assessment methodology is provided in Appendix 6.

6.41 The dust risk categories that have been determined for each of the four activities (demolition, earthworks, construction and trackout) have been used to define the appropriate Development-specific mitigation measures based on those described in the Mayor of London's SPG. The Mayor of London's SPG states that with the recommended dust mitigation measures in place the residual impact will be minimised.

6.42 This assessment does not consider the air quality impacts of dust from any contaminated land or buildings. The Development is not expected to be heavily contaminated and this discipline has been scoped out of the ES (refer to Chapter 2 EIA Methodology). A Phase 1 Ground Conditions Assessment has been submitted alongside the planning application.

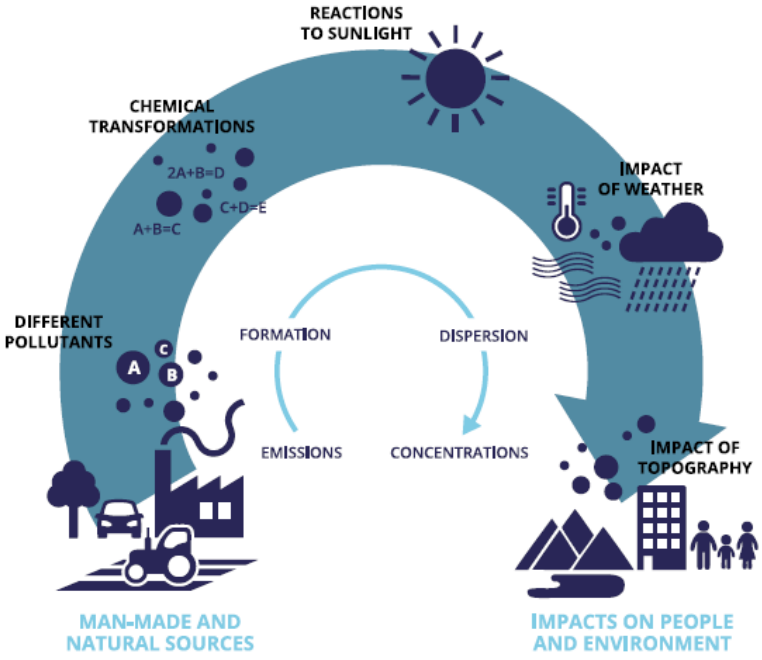
6.43 The IAQM construction assessment methodology shows whether the risks from construction, demolition, earthworks and trackout – without control or mitigation measures in place - would be classed as high, medium or low, which are then be used to make an overall judgement on the risk of the site, before control or mitigation measures are in place. High risk sites pose significant risks to surrounding receptors up to a distance of 500 m. Medium risk sites are of concern to receptors 200m from the site. Low risk developments are only a concern to receptors in close proximity to the site at a distance of up to 50m.

Operational Phase – Methodology

Atmospheric Dispersion Modelling of Pollutant Concentrations

6.44 In urban areas, pollutant concentrations are primarily determined by the balance between pollutant emissions that increase concentrations, and the ability of the atmosphere to reduce and remove pollutants by dispersion, advection, reaction and deposition. An atmospheric dispersion model is used as a practical way to simulate these complex processes; such a model requires a range of input data, which can include emissions rates, meteorological data and local topographical information. The model used and the input data relevant to this assessment are described in the following sub-sections.

Figure 6.2 Air Pollution: From Emissions to Exposure



Source: European Environment Agency (2016) Explaining Road Transport Emissions: A Non-technical Guide

6.45 The atmospheric pollutant concentrations in an urban area depend not only on local sources at a street scale, but also on the background pollutant level made up of the local urban-wide background, together with regional pollution and pollution from more remote sources brought in on the incoming air mass. This background contribution needs to be added to the fraction from the modelled sources, and is usually obtained from measurements or estimates of urban background concentrations for the area in locations that are not directly affected by local emissions sources. Background pollution levels are described in detail in Section 4.

6.46 The ADMS-Roads model has been used in this assessment to predict the air quality impacts from changes in traffic on the local road network. This is a version of the Atmospheric Dispersion Modelling System (ADMS), a formally validated model developed in the UK by Cambridge Environmental Research Consultants Ltd (CERC) and widely used in the UK and internationally for regulatory purposes.

Modelled Scenarios

6.47 The following scenarios were modelled:

- Without Development – without the Development in 2024 to assume a worst case scenario as opposed to the opening year of 2025
- With Development – with the Development in 2024 to assume a worst case scenario as opposed to the opening year of 2025

Model input data - Traffic Flow data

6.48 Traffic data used in the assessment have been provided by the project's transport consultants, WSP. The traffic flow data provided for this assessment are summarised in Table 6.2. The modelled road links are illustrated in the Appendix (Figure 6.1).

Table 6.2 Traffic Data Used Within the Assessment

Road Link ID	Road Link Name	Speed ($km.hr^{-1}$)	Daily Two Way Vehicle Flow			
			Without Development		With Development	
			LDV	HDV	LDV	HDV
1	Forest Road – A503	32	19082	239	19125	247
2	Fulbourne Road – B160	32	10488	144	10689	162

Notes: ($km.hr^{-1}$) = kilometres per hour
HDV = Heavy Duty Vehicle - vehicles greater than 3.5 t gross vehicle weight including buses
LDV = Light Duty Vehicle

6.48 The average speed on each road has been reduced by 10 km.hr-1 to take into account the possibility of slow-moving traffic near junctions and at roundabouts in accordance with LLAQM.TG16.

Vehicle Emission factors

6.49 The modelling has been undertaken using Defra's 2019 emission factor toolkit (version 9.0) which draws on emissions generated by the European Environment Agency (EEA) COPERT 5 emission calculation tool.

Meteorological data

6.50 ADMS-Roads requires detailed meteorological data as an input. The most representative observing station for the region of the study area that supplies all the data in the required format is Heathrow approximately 33 km south west of the Development. Meteorological data from that station for 2018 have been used within the dispersion model. The wind rose is presented in Figure 6.2 in the Appendices.

Receptors

6.51 The air quality assessment predicts the impacts at locations that could be sensitive to any changes. For assessing human-health impacts, such sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. LLAQM.TG16 provides examples of exposure locations and these are summarised in Table 3.2.

Table 6.3 Examples of Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual-mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building's façades), or any other location where public exposure is expected to be short-term.
Daily-mean	All locations where the annual-mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building's façade), or any other location where public exposure is expected to be short-term.
Hourly-mean	All locations where the annual and 24 hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

6.52 Representative sensitive receptors for this assessment have been selected at properties where pollutant concentrations and/or changes in pollutant concentrations are anticipated to be greatest, as listed in Table 6.4.

Table 6.4 Modelled Sensitive Receptors

ID	Description	x	y	z
1	Frederick Banner School	538317	190276	1.5
2	Residential property at Fulbourne Road/Brookscroft Road	538163	190478	1.5
3	Residential property at Crowndale Place/Fulbourne Road	538256	190246	1.5
4	Residential property on Hawker Place	538292	190151	1.5
5	Residential property on Fulbourne Road	538281	190008	1.5
6	Flat above DNR restaurant, Wood Street	538299	189937	4.5
7	Woodside Primary School	538326	189925	1.5
8	Residential property at Forest Road/Shenhall Street	538028	189831	1.5
9	Residential property at St John's Road/Forest Road	538120	189929	1.5
10	Residential property at Hale End Road/Forest Road	538601	190096	1.5
11	New Population Exposure 1	538404	190042	1.5
12	New Population Exposure 2	538452	190055	1.5
13	New Population Exposure 3	538452	190118	1.5
14	New Population Exposure 4	538498	190084	1.5
15	New Population Exposure 5	538530	190088	1.5

6.53 The annual, daily and hourly-mean AQS objectives apply at the front and rear façades of all residential properties and at Frederick Bremer School and Woodside Primary School. The approaches used to predict the concentrations for these different averaging periods are described below.

Long-term pollutant predictions

6.54 Annual-mean NOx and PM_{10} concentrations have been predicted at representative sensitive receptors using ADMS-Roads, then added to relevant background concentrations. Primary NO in the NOX emissions is converted to NO_2 to a degree determined by the availability of atmospheric oxidants locally and the strength of sunlight. For road traffic sources, annual-mean NO_2 concentrations have been derived from the modelled road-related annual-mean NOx concentration using Defra's calculator [16].

Short-term pollutant predictions

6.55 In order to predict the likelihood of exceedances of the hourly-mean AQS objectives for NO_2 and the daily-mean AQS objective for PM_{10}, the following relationships between the short-term and the annual-mean values at each receptor have been considered.

Hourly-mean AQS objective for NO_2

6.56 Research undertaken in support of LLAQM.TG16 has indicated that the hourly-mean limit value and objective for NO_2 is unlikely to be exceeded at a roadside location where the annual-mean NO_2 concentration is less than 60 $\mu g.m^{-3}$. The threshold of 60 $\mu g.m^{-3}$ NO_2 has been used as the guideline for considering a likely exceedance of the hourly-mean nitrogen dioxide objective.

Daily-mean AQS objective for PM_{10}

6.57 The number of exceedances of the daily-mean AQS objective for PM_{10} of 50 $\mu g.m^{-3}$ may be estimated using the relationship set out in LLAQM.TG16:

> *Number of Exceedances of Daily Mean of 50 µg.m-3 = -18.5 + 0.00145 * (Predicted Annual-mean PM_{10})3 + 206 / (Predicted Annual-mean PM_{10} Concentration)*

6.58 This relationship indicates that the daily-mean AQS objective for PM_{10} is likely to be met if the predicted annual-mean PM_{10} concentration is 31.8 $\mu g.m^{-3}$ or less.

6.59 The daily mean objective is therefore not considered further within this assessment if the annual-mean PM_{10} concentration is predicted to be less than 31.5 $\mu g.m^{-3}$.

Fugitive PM_{10} Emissions

6.60 Transport PM_{10} emissions arise from both the tailpipe exhausts and from fugitive sources such as brake and tyre wear and re-suspended road dust. Improvements in vehicle technologies are reducing PM_{10} exhaust emissions; therefore, the relative importance of fugitive PM_{10} emissions is increasing. Current official vehicle emission factors for particulate matter include brake dust and tyre wear which studies suggest may account for approximately one-third of the total particulate emissions from road transport; but not re-suspended road dust (which remains unquantified.)

Significance criteria for Development Impacts on the Local Area

6.61 The EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality document advises that:

> *"The significance of the effects arising from the impacts on air quality will depend on a number of factors and will need to be considered*

alongside the benefits of the development in question. Development under current planning policy is required to be sustainable and the definition of this includes social and economic dimensions, as well as environmental. Development brings opportunities for reducing emissions at a wider level through the use of more efficient technologies and better designed buildings, which could well displace emissions elsewhere, even if they increase at the development Development. Conversely, development can also have adverse consequences for air quality at a wider level through its effects on trip generation."

6.62 When describing the air quality impact at a sensitive receptor, the change in magnitude of the concentration should be considered in the context of the absolute concentration at the sensitive receptor. Table 6.5 provides the EPUK & IAQM approach for describing the long-term air quality impacts at sensitive human-health receptors in the surrounding area.

Table 6.5 Impact Descriptors for Individual Sensitive Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level			
	1	2-5	6-10	>10
75 % or less of AQAL	Negligible	Negligible	Slight	Moderate
76 -94 % of AQAL	Negligible	Slight	Moderate	Moderate
95 - 102 % of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109 % of AQAL	Moderate	Moderate	Substantial	Substantial
110 % or more than AQAL	Moderate	Substantial	Substantial	Substantial

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

2. The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as negligible.

3. The table is only designed to be used with annual mean concentrations.

4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

6.63 The human-health impact descriptors above apply at individual receptors. The EPUK & IAQM guidance states that the impact descriptors "*are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it maybe that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances*."

6.64 Professional judgement by a competent, suitably qualified professional is required to establish the significance associated with the consequence of the impacts. This judgement is likely to take into account the extent of the current and future population exposure to the impacts and the influence and/or validity of any assumptions adopted during the assessment process.

Significance criteria for New population Exposure (Development Suitability)

6.65 The EPUK & IAQM guidance considers an exceedance of an air quality objective at a building façade to be significant adverse effect unless provision is made to reduce the resident's or occupant's exposure by some means.

6.66 In addition, the London Councils' Air Quality and Planning Guidance [17] provides Air Pollution Exposure Criteria (APEC) for assessing the significance on exposure to air pollution and the levels of mitigation required when considering Development suitability. Table 6.6 provides a summary of the criteria.

Table 6.6 Summary of Air Pollution Exposure Criteria (APEC)

Criteria	Applicable Range NO2 Annual-Mean	Applicable Range PM10	Recommendation
APEC-A	> 5% below national objective	Annual-Mean >5% below national objective 24-Hour >1-day less than national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered.

Criteria	Applicable Range NO2 Annual-Mean	Applicable Range PM10	Recommendation
APEC-B	Between 5% below or above national objective	Annual-Mean Between 5% above or below national objective 24-Hour 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-Hour >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.

6.67 Concentrations have been predicted at proposed receptors to determine the APEC category that would apply.

Limitations and Assumptions

6.68 All air quality assessment tools, whether models or monitoring measurements, have a degree of uncertainty associated with the results. The choices that the practitioner makes in setting-up the model, choosing the input data, and selecting the baseline monitoring data will decide whether the final predicted impact should be considered a central estimate, or an estimate tending towards the upper bounds of the uncertainty range (i.e. tending towards worst-case).

6.69 The atmospheric dispersion model itself contributes some of this uncertainty, due to it being a simplified version of the real situation: it uses a sophisticated set of mathematical equations to approximate the complex physical and chemical atmospheric processes taking place as a pollutant is released and as it travels to a receptor. The predictive ability of even the best model is limited by how well the turbulent nature of the atmosphere can be represented.

6.70 Each of the data inputs for the model, listed earlier, will also have some uncertainty associated with them. Where it has been necessary to make assumptions, these have mainly been made towards the upper end of the uncertainty range informed by an analysis of relevant, available data.

6.71 The atmospheric dispersion model used for this assessment, ADMS Roads, has been validated

by its supplier and is widely used by professionals in the UK and overseas. A site-specific verification (calibration) provides additional certainty and is particularly important when air quality levels are close to exceeding the objectives/limit values.

6.72 LLAQM.TG16 requires that local authorities verify the results of any detailed modelling undertaken for the purposes of fulfilling their R&A duties. Model verification refers to the checks that are carried out on model performance at a local level. Modelled concentrations are compared with the results of monitoring. Where there is a disparity between modelled and monitored concentrations, the first step is to review the appropriateness of the data inputs to determine whether the performance of the model can be improved. Once reasonable efforts have been made to reduce the uncertainties in the data inputs, an adjustment may be established and applied to reduce any remaining disparity between modelled and monitored concentrations. No adjustment factor is deemed necessary where the modelled concentrations are within 25% of the monitored concentrations.

6.73 For the verification and adjustment of NOx/NO_2 concentrations for R&A purposes, it is recommended that the comparison involves a combination of automatic and diffusion monitoring, rather than a single automatic monitor. This is to ensure any adjustment factor derived is representative of all locations modelled and not unduly weighted towards the characteristics at a single monitoring site. Where only diffusion tubes are used for the model verification, the study should consider a broad spread of monitoring locations across the study area to provide sufficient information relating to the spatial variation in pollutant concentrations.

6.74 Local Authorities generally implement a broad spread of monitoring, particularly in areas that are known to be sensitive to changes in air quality. Consequently, Local Authorities are usually able to verify the models they use for R&A purposes; however for individual developments, there is less likely to be a broad range of monitoring locations within the relevant study area. Notwithstanding this, a small number of monitoring locations have been identified within the study area and a model verification study has been undertaken for the Development and is included at Appendix B.

6.75 The main components of uncertainty in the total predicted concentrations, made up of the background concentration and the modelled fraction, include those summarised in Table 6.7

Table 6.7 Approaches to Dealing with Uncertainty used Within the Assessment

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
Background Concentration	Characterisation of current baseline air quality conditions	The background concentration used within the assessment is the most conservative value from a comparison of measured and Defra mapped concentration estimate.	The background concentration is the major proportion of the total predicted concentration. The conservative assumptions adopted ensure that the background concentration used within the model contributes to the result being towards the top of the uncertainty range, rather than a central estimate.
	Characterisation of future baseline air quality (i.e. the air quality conditions in the future assuming that the development does not proceed)	The future background concentration used in the assessment is the same as the current background concentration and no reduction has been assumed. This is a conservative assumption as, in reality, background concentrations are likely to reduce over time as cleaner vehicle technologies form an increasing proportion of the fleet.	
Fraction from Modelled Sources	Traffic flow estimates	Traffic flows provided have all been based on traffic counts, rather than flows derived from a traffic model. High growth assumptions have been used to develop the traffic dataset used within the model.	The modelled fraction is a minor proportion of the total predicted concentration. The modelled fraction is likely to contribute to the result being between a central estimate and the top of the uncertainty range.
	Traffic speed estimates	Measured average traffic speeds have been used within the model. The average speed has been reduced in congested areas to take account of slow-moving and queuing traffic.	
	Road-related emission factors – projection to future years	The most recently published emission factors have been used within the modelling and these are based on the current and best understanding of the variation in emission factors in future years.	
	Meteorological Data	Uncertainties arise from any differences between the conditions at the met station and the Development , and between the historical met years and the future years. These have been minimised by using meteorological data collated at a representative measuring site. The model has been run for a full year of meteorological conditions. This means that the conditions in 8,760 hours have been considered in the assessment.	
	Receptors	Receptor locations have been identified where concentrations are highest or where the greatest changes are expected.	
	Dispersion Modelling	The model predictions have been compared with monitored concentrations. The model outputs have been adjusted accordingly. The fractional bias indicates that the model is systematically over-predicting.	

6.76 The analysis of the component uncertainties indicates that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.

Baseline Conditions

Overview

6.77 The background concentration often represents a large proportion of the total pollution concentration, so it is important that the background concentration selected for the assessment is realistic. National Planning Practice Guidance and EPUK & IAQM guidance highlight public information from Defra and local monitoring studies as potential sources of information on background air quality. LLAQM.TG16 recommends that Defra mapped concentration estimates are used to inform background concentrations in air quality modelling and states that: *"Where appropriate these data can be supplemented by and compared with local measurements of background, although care should be exercised to ensure that the monitoring site is representative of background air quality".*

6.78 For this assessment, the background air quality has been characterised by drawing on information from the following public sources:

- Defra maps which show estimated pollutant concentrations across the UK in 1 km grid squares; and
- published results of local authority Review and Assessment (R&A) studies of air quality, including local monitoring and modelling studies.

6.79 A detailed description of how the baseline air quality has been derived for the Site is summarised in the following paragraphs.

Review and Assessment Process

6.80 The LBWF has designated the entire borough as an AQMA. The Development is within the LBWF AQMA.

6.81 The LBWF produced an Air Quality Action Plan outlining actions to tackle poor air quality that they will deliver between 2018-2023. The actions in the plan have been grouped into six

categories that have been listed below:

1. Reducing emissions from developments and buildings
2. Increasing of both public health and air quality awareness
3. Reducing emissions from delivery services and freight
4. Reducing emissions from the council's own vehicles
5. Engaging in localised solutions
6. The use of cleaner transport

6.82 LLAQM.TG16 includes Air Quality Focus Areas (AQFAs) which are pollution hotspots where there is the potential for high human exposure and where the GLA believes air quality issues are the most acute. The Development and study area are not within any of the AQFAs.

Local Urban Background Monitoring

6.83 Monitors at urban background locations measure concentrations away from the local influence of emission sources and are therefore broadly representative of residential areas within large conurbations. Monitoring at local urban background locations is considered an appropriate source of data for the purposes of describing baseline air quality for this Development.

6.84 There is one local monitoring station where urban background concentrations are measured using continuous automatic instruments. The LBWF monitors NO_2 and PM_{10} at the WL1 urban background location. The most recently measured annual-mean concentrations are presented in Table 6.8.

Table 6.8 Automatically Monitored Urban Background Annual-Mean Concentrations

Monitor Name	Approximate Distance from the Application Development (km)	Pollutant	Concentration (µg.m-3)		
			2016	2017	2018
WL1	3.30	NO2	30	28	23
		PM10	18	18	17

6.85 In addition, the LBWF manually monitors NO_2 concentrations at an urban background location using passive diffusion tubes and the most recently measured annual-mean concentrations are presented in Table 6.9.

Table 6.9 Passively Monitored Urban Background Annual-Mean NO_2 Concentrations

Monitor Code	Monitor Name	Approximate Distance from the Application Development (km)	Concentration (µg.m-3)		
			2016	2017	2018
2	Dawlish Road	3.29	28.9	27.3	25.1

All concentrations have been adjusted for bias

Defra Mapped Concentration Estimates

6.86 Defra's total annual-mean NO_2 concentration estimates have been collected for the 1 km grid squares of the monitoring sites and the Development and are summarised in Table 6.10

Table 6.10 Defra Mapped Annual-Mean Background NO_2 Concentration Estimates

Monitor Code	Monitor Name	Approximate Distance from the Application Development (km)	Concentration (µg.m-3)	
			Range of Monitored	Estimated Defra Mapped
-	Application Development	-	-	30.6
WL1	Dawlish Road Automatic	3.30	23-30	31.9
2	Dawlish Road Diffusion Tube	3.29	25.1-28.9	31.9

6.87 Similarly, the Defra total annual-mean PM_{10} concentration estimates have been collected for the grid square of the monitoring sites and the Development and are summarised in Table 6.11.

Table 6.11 Defra Mapped Annual-Mean Background PM_{10} Concentration Estimates

Monitor Code	Monitor Name	Approximate Distance from the Application Development (km)	Concentration (µg.m-3)	
			Range of Monitored	Estimated Defra Mapped
-	Application Development	-	-	20.0
WL1	Dawlish Road Automatic	3.30	17-18	20.3

Appropriate Background Concentrations for the Development

6.88 For NO_2, the Defra mapped background concentration estimates are generally larger than the range of the results from monitoring and the use of the Defra data would be more conservative. The background annual-mean NO_2 concentration at the Development has been derived from the estimated Defra mapped concentration.

6.89 For PM_{10}, the Defra mapped background concentration estimate is higher than the range of results from monitoring. The background annual-mean PM_{10} concentration at the Development has been derived from the estimated Defra mapped concentration.

6.90 In the absence of local $PM_{2.5}$ monitoring, the background annual-mean concentration at the

Application Development has been derived from the Defra mapped background concentration estimate.

6.91 Table 6.12 summarises the annual-mean background concentrations for NO_2 , PM_{10} and $PM_{2.5}$ used in this assessment.

Table 6.12 Summary of Background Annual-Mean (Long-term) Concentrations used in the Assessment

Pollutant	Data Source	Concentration (µg.m-3)
NO2	Defra Mapped (2017)	30.6
PM10		20.0
PM2.5		13.7

Future Baseline

6.92 In addition to the conservative results that have been used for the baseline it has been assumed that the future baseline will remain the same as the existing baseline set out in Table 6.12, i.e. no reduction in the background has been applied for future years. That is a conservative assumption: background traffic-related NO_2 concentrations in the UK may be expected to reduce over time, due to the progressive introduction of improved vehicle technologies (such as increased electric vehicle uptake) and increasingly stringent limits on emissions. After a prolonged period through the last decade where background annual-mean NO_2 concentrations did not generally decrease in line with expectations, the most recent monitoring studies indicate ambient traffic-related NO_2 concentrations are now falling.

Likely Significant Effects

Construction Phase

Risk of Dust Impacts

6.93 The volume of the buildings on Development that would be demolished has been estimated at over 50,000 m^3. As this is over 20,000 m^3, the dust emission magnitude for the demolition phase is classified, using the IAQM dust guidance, as large.

6.94 The Development area is greater than 10,000 m^2, the dust emission magnitude for the earthworks phase is classified as large.

6.95 The total volume of the buildings to be constructed would be over 100,000 m^3 and the dust

emission magnitude for the construction phase is classified as large.

6.96 Assuming that the maximum number of outwards movements in any one day is between 10 and 50 HDVs (Chapter 5 Construction Methodology and Phasing predicts up to 50 daily movements), the dust emission magnitude for trackout would be classified as medium.

Table 6.13 Dust Emission Magnitude for Demolition, Earthworks, Construction and Trackout

Demolition	Earthworks	Construction	Trackout
Large	Large	Large	Medium

Pathway and receptor – Sensitivity of the area

6.97 All demolition, earthworks and construction activities are assumed to occur within the Site boundary. As such, receptors at distances within 20 m, 50 m, 100 m, 200 m and 350 m of the Site boundary have been identified and are illustrated in Figure 6.3 in the Appendices. The sensitivity of the area has been classified and the results are provided in Table 6.14 below.

Table 6.14 Sensitivity of the Surrounding Area for Demolition, Earthworks and Construction

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	High	Approx. >100 residential properties on Hawker Place to the north of the Development, Hale End Road to the east of the Development and Wigram Square to the south of the Development. >100 high sensitivity receptors located within 50 m of the Development boundary (Table A.5)
Human Health	Low	Approx. >100 residential properties on Hawker Place to the north of the Development, Hale End Road to the east of the Development and Wigram Square to the south of the Development. Background PM_{10} concentrations for the assessment = 20.0 $\mu g.m^{-3}$ >100 high sensitivity receptors located within 50 m of the Development boundary and PM10 concentrations below 24 $\mu g.m^{-3}$ (Table A.6)

6.98 The Dust Emission Magnitude for trackout is classified as medium and trackout may occur on roads up to 200 m from the Site. The major routes within 200 m of the Site are Fulbourne Road and Forest Road. The sensitivity of the area has been classified and the results are provided in Table 6.15.

Table 6.15 Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	High	>100 residential properties aligning Forest Road and Fulbourne Road. 10 – 100 high sensitivity receptors located within 20 m of the roads (Table A.5)
Human Health	Low	Between 10 and 100 residential properties aligning Forest Road and Fulbourne Road. Background PM_{10} concentrations for the assessment = 20.0 $\mu g.m^{-3}$ > 100 high sensitivity receptors located within 20 m of the roads and PM_{10} concentrations below 24 $\mu g.m^{-3}$ (Table A.6)

Overall Dust Risk

6.99 The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area (Tables A.5 and A.6) to give the Dust Impact Risk. Table 6.16 summarises the Dust Impact Risk for the four activities

Table 6.16 Dust Impact Risk for Demolition, Earthworks, Construction and Trackout

Source	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	Medium
Human Health	Medium	Low	Low	Low
Risk	High	High	High	Medium

6.100 Taking the Site as a whole, the overall risk is deemed to be high before dust controls and mitigation is applied. The mitigation measures appropriate to a level of risk for the Site as a whole and for each of the phases are set out in the mitigation section below.

6.101 Provided this package of mitigation measures is implemented, the residual construction dust effects will not be significant. The IAQM dust guidance states that "*For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'*." The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

Completed Development

Assessment of Operational-phase Air quality Impacts

Assessment of Air Quality Impacts on Surrounding Area

6.102 This section of the report summarises the future operational-phase air quality impacts of the key pollutants associated with the development traffic of the Development.

Nitrogen Dioxide (NO_2)

6.103 Table 6.17 presents the annual-mean NO_2 concentrations predicted at the façades of existing receptors.

Table 6.27 Predicted Annual-Mean NO_2 Impacts at Existing Receptors

Receptor ID	Concentration (µg.m^{-3})		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
1	32.0	32.0	0	Negligible
2	34.2	34.3	0	Negligible
3	34.7	34.8	0	Negligible
4	35.4	35.5	0	Negligible
5	36.2	36.3	0	Negligible
6	35.1	35.2	0	Negligible
7	36.5	36.5	0	Negligible
8	35.1	35.1	0	Negligible
9	35.5	35.5	0	Negligible
10	36.3	36.3	0	Negligible
Maximum	36.5	36.5	0	-
Minimum	32.0	32.0	0	-

6.104 Predicted annual-mean NO_2 concentrations in the opening year at the façades of the existing receptors are below the AQS objective for NO_2 . When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is 'negligible'

6.105 As all predicted annual-mean NO_2 concentrations are below 60 µg.m^{-3}, the hourly-mean objective for NO_2 is likely to be met at all receptors. The short-term NO_2 impact can be considered 'negligible' and is not considered further within this assessment.

6.106 Overall, the impact on the surrounding area from NO_2 is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Particulate matter (PM_{10})

6.107 Table 6.18 presents the annual-mean PM_{10} concentrations predicted at the façades of existing receptors.

Table 6.18 Predicted Annual-Mean PM_{10} Impacts at Existing Receptors

Receptor ID	Concentration ($\mu g.m^{-3}$)		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
1	20.4	20.4	0	Negligible
2	21.0	21.0	0	Negligible
3	21.1	21.2	0	Negligible
4	21.3	21.4	0	Negligible
5	21.5	21.5	0	Negligible
6	21.2	21.2	0	Negligible
7	21.6	21.6	0	Negligible
8	21.1	21.1	0	Negligible
9	21.3	21.3	0	Negligible
10	21.5	21.5	0	Negligible
Maximum	21.6	21.6	0	-
Minimum	20.4	20.4	0	-

6.108 Predicted annual-mean PM_{10} concentrations in the opening year at the façades of the existing receptors are well below the AQS objective for PM_{10} . When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is categorised as 'negligible' at all receptors.

6.109 As all predicted annual mean PM_{10} concentrations are below 31.5 $\mu g.m^{-3}$, the daily-mean PM_{10} objective is expected to be met at all receptors and the short-term PM_{10} impact is not considered further within this assessment.

6.110 Overall, the impact on the surrounding area from PM_{10} is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Particulate Matter ($PM_{2.5}$)

6.111 Table 6.19 presents the annual-mean $PM_{2.5}$ concentrations predicted at the façades of existing receptors.

Table 6.19 Predicted Annual-Mean $PM_{2.5}$ Impacts at Existing Receptors

Receptor ID	Concentration ($\mu g.m^{-3}$)		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
1	13.9	13.9	0	Negligible
2	14.3	14.3	0	Negligible
3	14.3	14.4	0	Negligible

Receptor ID	Concentration (µg.m^{-3})		With - Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
4	14.5	14.5	0	Negligible
5	14.6	14.6	0	Negligible
6	14.4	14.4	0	Negligible
7	14.6	14.6	0	Negligible
8	14.3	14.4	0	Negligible
9	14.5	14.5	0	Negligible
10	14.5	14.5	0	Negligible
Maximum	14.6	14.6	0	-
Minimum	13.9	13.9	0	-

AQS objective = 25 µg.m^{-3}

6.112 Predicted annual-mean $PM_{2.5}$ concentrations in the opening year at the façades of the existing receptors are below the AQS objective for $PM_{2.5}$ at all receptors. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is categorised as 'negligible' at all receptors.

6.113 Overall, the impact on the surrounding area from $PM_{2.5}$ is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Assessment of New Population Exposure (Development Suitability)

6.114 This section of the report summarises the operational-phase air quality impacts on future occupants of the Development from their exposure to the prevailing levels of air pollution, which can be a factor in the suitability of the Site for its proposed uses.

6.115 Table 6.20 presents the annual-mean NO_2 , PM_{10} and $PM_{2.5}$ concentrations predicted at the façades of proposed receptors

Table 6.20 Predicted Annual-Mean NO_2, PM_{10} and $PM_{2.5}$ Concentrations (µg.m^{-3}) at Proposed Receptors

Receptor ID	Receptor Name	NO_2	NO_2 APEC PM10 Banding		PM_{10} APEC $PM_{2.5}$ Banding	
11	New Population Exposure 1	36.0	APEC - A	21.5	APEC-A	14.6
12	New Population Exposure 2	35.3		21.3		14.5
13	New Population Exposure 3	32.2		20.4		13.9
14	New Population Exposure 4	33.9		20.9		14.2
15	New Population Exposure 5	34.4		21.0		14.3
Maximum	-	36.0		21.5		14.6
Minimum	-	32.2		20.4		13.9

6.116 The long-term and short-term objectives apply at the Development.

6.117 The predicted annual-mean NO_2 concentrations range between 32.2 and 36.0 µg.m^{-3}, well

below the annual-mean AQS objective of 40 µg.m^{-3} at all receptors. Furthermore, as the annual-mean NO_2 concentration is predicted to be less than 60 µg.m^{-3}, the hourly-mean AQS objective is expected to be met.

6.118 The predicted annual-mean PM_{10} concentrations range between 20.4 and 21.5 µg.m^{-3}, well below the annual-mean AQS objective of 40 µg.m^{-3} at all receptors. Furthermore, as the annual-mean PM_{10} concentration is predicted to be less than 31.5 µg.m^{-3}, the daily-mean AQS objective for this pollutant is expected to be met.

6.119 Table 6.21 sets out a comparison with the daily-mean AQS objective for PM_{10} at existing and proposed receptors.

Table 6.21: Predicted Exceedences of Daily Means > 50 µg.m^{-3} Objective at Receptors

Receptor ID	Land Use	Number of Daily Means > 50 µg.m-3	APEC Banding
11	Residential	5	APEC-A
12	Residential	5	
13	Residential	4	
14	Residential	5	
15	Residential	5	
Maximum (Residential)		5	

The Daily-Mean AQS Objective for PM_{10} is 50µg.m^{-3} not to be exceeded more than 35 times per calendar year

6.120 There are predicted to be a maximum of 5 exceedances of daily-mean PM_{10} concentrations of 50 µg.m^{-3}. This is significantly more than one day fewer than the national objective (which allows 35 exceedances), therefore the APEC-A category applies.

Mitigation Measures

Construction Phase

6.121 The Mayor of London's Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance lists mitigation measures for low, medium and high dust risks.

6.122 As summarised in Table 6.16, the predicted Dust Impact Risk is classified as high for Demolition, Earthworks and Construction and medium for Trackout. The general Development measures described as 'highly recommended' for High risks are listed below The 'highly recommended' measures for medium risk trackout are also listed.

Site Management
• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Develop a Dust Management Plan. • Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary. • Display the head or regional office contact information. • Record and respond to all dust and air quality pollutant emissions complaints. • Make a complaints log available to the local authority when asked. • Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked. • Increase the frequency of Development inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust (sic) are being carried out, and during prolonged dry or windy conditions. • Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book. • Hold regular liaison meetings with other high risk construction s within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.
Preparing and maintaining the site
• Plan site layout: machinery and dust causing activities should be located away from eceptors. • Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site. • Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials from site as soon as possible. • Cover, seed or fence stockpiles to prevent wind whipping. • Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary. • Agree monitoring locations with the Local Authority. • Where possible, commence baseline monitoring at least three months before phase begins. • Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.

Operating vehicle/machinery and sustainable travel
• Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone. • Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance. • Ensure all vehicles switch off engines when stationary – no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible. • Impose and signpost a maximum-speed-limit of 10 mph on surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations
• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible). • Use enclosed chutes, conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management
• Reuse and recycle waste to reduce dust from waste materials. • Avoid bonfires and burning of waste materials.
High risk measures specific to demolition
• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure effective water suppression is used during demolition operations. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition
High risk measures specific to earthworks
• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces.

• Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil. • Only remove secure covers in small areas during work and not all at once.
High risk measures specific to construction
• Avoid scabbling (roughening of concrete surfaces) if possible. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • 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.
Medium risk measures specific to trackout
• Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport. • Record all inspections of haul routes and any subsequent action in a site log book. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned. • Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. • Access gates to be located at least 10m from receptors where possible. •

6.123 The Mayor of London's SPG states that with the recommended dust mitigation measures in place the residual impact will be "minimised", and recommends the mitigation is secured by for a condition or Section 106 agreement as appropriate. The mitigation measures listed above will be implemented through the Construction Environmental Management Plan (CEMP) to be secured by planning condition.

Completed Development

Mitigation for the Operational Impact of Development on the Surrounding Area

6.124 When the change in concentration at existing sensitive receptors is considered in the context of the absolute concentration, the overall air quality impact on the surrounding area as a whole is categorised as "negligible" and the resulting effect is considered to be "not significant". On that basis, no mitigation measures are considered necessary.

Mitigation for New Population Exposure (Development Suitability)

6.125 The predicted pollutant concentrations at proposed sensitive receptors are below the relevant AQS objectives. As such, the air quality effect of exposure on future occupants is considered to be "not significant". On that basis, no mitigation measures are considered necessary.

6.126 The Development is within an existing AQMA, declared by the LBWF due to high levels of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) attributable to road traffic emissions. Nevertheless, pollution levels vary within the boundaries of an AQMA. At the specific location of the Development, the PM_{10} and $PM_{2.5}$ pollutant concentrations at the facades are predicted to be more than 5% below their respective AQS objectives and therefore fall into the London Councils' APEC-A banding for which no mitigation is required.

Residual Effects

Construction Phase

6.127 Provided this package of mitigation measures is implemented, the residual construction dust effects will not be significant.

Completed Development

Significance of Effects

6.128 The impacts predicted at individual receptors and the geographical extent over which such impacts occur, can be used to inform the judgement on the impact on the surrounding area as a whole, and whether the resulting overall effect is significant or not.

6.129 The results of the modelling indicate that with the Development, the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at existing receptors are below the relevant long and short-term AQS

objectives. When the magnitude of change in annual-mean NO_2,PM_{10} and $PM_{2.5}$ concentrations is considered in the context of the absolute predictions, the air quality impacts of the development on existing receptors are categorised as 'negligible'. Taking into account the geographical extent of the impacts predicted in this study, the overall impact of the development on the surrounding area as a whole is considered to be 'negligible', using the descriptors adopted for this assessment.

6.130 The AQS objectives for NO_2 , PM_{10} and $PM_{2.5}$ are likely to be met at the facades of the Development. On that basis, future occupants of the Development should be exposed to acceptable air quality and the Development is deemed suitable for its proposed future in this respect.

6.131 Using professional judgement, the resulting air quality effect is considered to be 'not significant' overall.

Sensitivity and Uncertainty

6.132 Section 3 provided an analysis of the sources of uncertainty in the results of the assessment. The conclusion of that analysis was that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range (i.e. tending towards worst-case predictions) rather than being a central estimate. The actual concentrations that will be found when the Development is operational are unlikely to be higher than those presented within this chapter and are more likely to be lower.

6.133 The impacts at existing receptors are shown to be not significant even for this conservative scenario. Similarly, the predicted pollutant concentrations at proposed receptors are below the relevant AQS objectives. Consequently, further sensitivity analysis has not been undertaken and, in practice, the impacts at sensitive receptors are likely to be lower than those reported in this conservative assessment.

Cumulative Effects

6.134 Cumulative effects from construction-phase dust impacts would potentially occur only in the situation of other construction sites being operational within 350 m of construction activities on the Development, and coinciding in time with those activities on the Development. In the unlikely event that this occurred, the cumulative effects would be temporary and of short duration. The residual cumulative dust effects would be expected to be negligible with the Mayor of London's recommended dust mitigation measures in place as described in the SPG.

6.135 As the operational phase of the Development produces negative vehicle trips, inclusion of committed developments near to the Development have been scoped out of the Transport Assessment and therefore this chapter. No likely significant cumulative effects are anticipated once the Development is operational.

Summary

6.136 This assessment has considered dust effects during the construction phase and the air quality impacts during the operational phase of the Development.

6.137 Impacts during the construction of the Development, such as dust generation and plant vehicle emissions, are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the Mayor of London's guidance indicates that before the implementation of mitigation and controls, the risk of dust impacts will be high. Implementation of the highly-recommended mitigation measures described in the Mayor of London's Supplementary Planning Guidance "should ensure the air quality impacts of construction and demolition are minimised and any mitigation measures employed are effective".

6.138 Regarding the impact of the Development on the surrounding area once operational, detailed atmospheric dispersion modelling has been undertaken for the first year in which the development is envisaged to receive its first occupations, 2024. This provides a worst-case scenario when compared to the year the site is expected to be fully operational, 2025. The impact of the Development on existing receptors in the local area is predicted to be 'negligible' taking into account the changes in pollutant concentrations and absolute levels. Using the criteria adopted for this assessment together with professional judgement, the overall impact on the area as a whole is described as 'negligible'.

6.139 Regarding suitability of air quality at the Site for introducing new occupants, pollutant concentrations at the façades of proposed residential receptors are predicted to be well within the relevant health-based air quality objectives. On that basis, future occupants of the Development should be exposed to acceptable air quality and the Site is deemed suitable for its proposed future use in this respect.

6.140 Using professional judgement, the resulting air quality effect of the Development is considered to be 'not significant' overall.

6.141 Table 6.23 contains a summary of the likely significant effects of the Development.

Table 6.22: Table of Significance – Air Quality

Potential Effect	Nature of Effect (Permanent/ Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/ Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/ Minor) (Beneficial/Adverse/ Negligible)
				I	UK	E	R	C	B	L	
Construction											
Dust deposition	Temporary	Major	Mitigation measures from the highly recommended category of the London guidance etc for high risk sites, to be implemented through a CEMP secured by a planning condition.							X	
Increased concentrations of suspended particulate matter	Temporary	Major	Mitigation measures from the highly recommended category of the London guidance etc for high risk sites, to be implemented through a CEMP secured by a planning condition.							X	
Completed Development											
Increased Concentrations of traffic- related pollutants	Permanent	Negligible	None							X	Negligible
Cumulative Effects											
Construction											
Dust deposition	Temporary	Negligible	See section 6.124							X	Negligible (if mitigation measures are followed)
Increased concentrations of suspended particulate matter	Temporary	Negligible	See section 6.124							X	Negligible (if mitigation measures are followed)
Operation											
Increased Concentrations of traffic- related pollutants	Permanent	Negligible	None							X	Negligible

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; L = Local

REFERENCES

[1] Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe
[2] Defra, 2010, The Air Quality Standards Regulations
[3] Defra, 2007, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 2.
[4] Communities and Local Government, February 2019, National Planning Policy Framework

[6] GLA, March 2016, The London Plan – Spatial Development Strategy for London Consolidated with Alterations since 2011.

[7]GLA, May 2018, London Environment Strategy.

[8] Intend to publish London Plan: Spatial Development Strategy for Greater London, 2019

[9] GLA, April 2014, Supplementary Planning Guidance: Sustainable Design and Construction

[10] Shaping the Borough - Waltham Forest Draft Local Plan (July 2019)

[11] EPUK & IAQM (January 2017) Land-Use Planning & Development Control: Planning For Air Quality

[12] Mayor of London (July 2014) The Control of Dust and Emissions During Construction and Demolition

[13] IAQM (2014) Guidance on the assessment of dust from demolition and construction

[14] Defra (February 2018) Local Air Quality Management Technical Guidance, 2016 (LAQM.TG16) or Mayor of London (2016) London Local Air Quality Management Technical Guidance, 2016 (LLAQM.TG16)
[15] British Standard Institute (1983) BS 6069:Part 2:1983, ISO 4225-1980 Characterization of air quality. Glossary
[16] http://laqm.defra.gov.uk/review-and-assessment/tools/tools.html
[17] London Councils' Air Quality and Planning Guidance, Revised Version January 2007