Air Quality Assessment:
Hillingdon Water Sports Facility and Activity Centre (HWSFAC), Broadwater Lake

November 2023

Experts in air quality management & assessment

Document Control

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Executive Summary

The air quality impacts associated with the proposed recreational development at Broadwater Lake, in Uxbridge, Hillingdon have been assessed. The development will comprise sailing/rowing facilities, a camping area, staff seasonal accommodation, and associated activity centres.

Specifically, planning permission is sought for the following development:

"*Redevelopment of the site to create the Hillingdon Watersports Facility and Activity Centre including demolition of existing Broadwater Lake Sailing Club (BSC) clubhouse at the north of the lake and erection of a building to be occupied by HOAC and BSC including changing facilities, meeting rooms, storage, Workshop and seasonal worker accommodation (sui generis), activity shelters; installation of pontoons and concrete slipways; boat shed; equipment storage huts (north of lake and at entrance); boat parking and racking areas; camping area; outdoor activity areas; ecological enhancement throughout the site; new pedestrian routes through the peninsula; landscaping including new woodland, dense vegetation screens and boundary treatment; new access and access road; localised dredging and land reclamation; relocation of existing sailing area and creation of floating and fixed islands within the lake; coach drop off and turning area; vehicle parking; cycle parking; and associated works.*"

During the construction works, a range of best practice mitigation measures will be implemented to reduce dust emissions and the overall effect will be 'not significant'; appropriate measures have been set out in this report, to be included in the Dust Management Plan for the works.

The assessment has demonstrated that future users of the proposed development will experience acceptable air quality, with pollutant concentrations well below the relevant air quality objectives.

The proposed development will generate additional traffic on the local road network; however, the trip generation is below the relevant published screening criteria. It will also be provided with heat and hot water via an all-electric system, therefore, there will be no significant point sources of emissions within the proposed development.

The proposed development has also been shown to meet the London Plan's requirement that new developments are at least 'air quality neutral'.

Overall, the construction and operational air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed recreational development at Hillingdon Water Sports Facility and Activity Centre (HWSFAC), Broadwater Lake, Moorhall Road, Harefield, UB9 6PE (hereafter referred to as the 'Site'). The proposed development is described as (hereafter referred to as the 'Development'):

"*Redevelopment of the site to create the Hillingdon Watersports Facility and Activity Centre including demolition of existing Broadwater Lake Sailing Club (BSC) clubhouse at the north of the lake and erection of a building to be occupied by HOAC and BSC including changing facilities, meeting rooms, storage, Workshop and seasonal worker accommodation (sui generis), activity shelters; installation of pontoons and concrete slipways; boat shed; equipment storage huts (north of lake and at entrance); boat parking and racking areas; camping area; outdoor activity areas; ecological enhancement throughout the site; new pedestrian routes through the peninsula; landscaping including new woodland, dense vegetation screens and boundary treatment; new access and access road; localised dredging and land reclamation; relocation of existing sailing area and creation of floating and fixed islands within the lake; coach drop off and turning area; vehicle parking; cycle parking; and associated works.*"

1.2 The Development lies approximately 890 m to the northwest of an Air Quality Management Area (AQMA) declared by the London Borough of Hillingdon (LBH) for exceedances of the annual mean nitrogen dioxide (NO_2) objective, and approximately 2 km to the east of an AQMA declared by Buckinghamshire Council, also for the annual mean nitrogen dioxide objective. It is also located approximately 2.9 km to the northwest of one of the Greater London Authority's (GLA's) air quality Focus Areas; these are locations with high levels of human exposure where the annual mean limit value for nitrogen dioxide is exceeded.

1.3 The Development will introduce new sensitive exposure into the area; thus, an assessment is required to determine the air quality conditions that future users will experience. It will also generate additional traffic on local roads, which may impact on air quality at existing residential properties along the affected road network. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.4 The location and setting of the Development are shown in Figure 1, along with the nearby AQMAs and Focus Area.

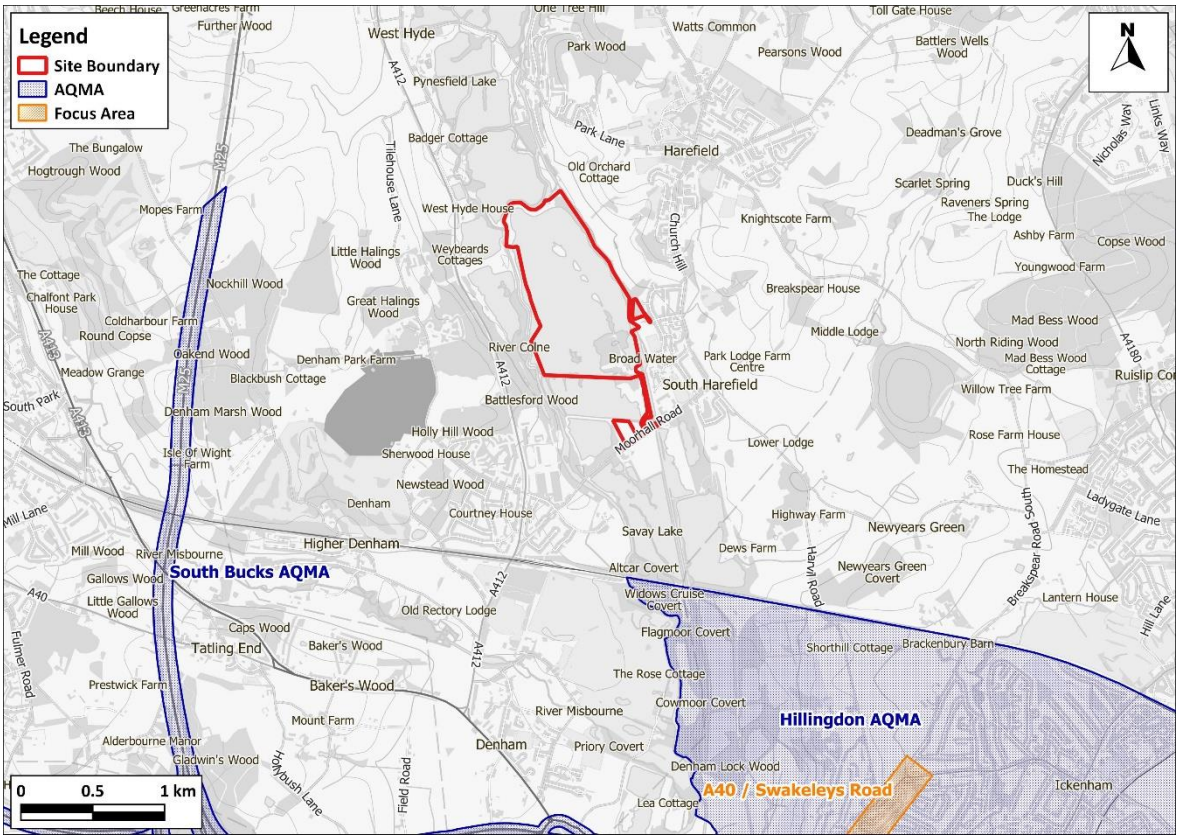

Figure 1: Proposed Development Setting in the Context of Air Quality

1.5 The Development will be supplied with heat and hot water via a connection to an existing 6.6 kV electricity sub-station in the northeast corner of the peninsula, supplemented with photovoltaic panels (PVs) located both at ground and rooftop locations. There will be no centralised combustion plant, and thus no significant point sources of emissions within the Development.

1.6 The Greater London Authority's (GLA's) London Plan (GLA, 2021a) requires new developments to be air quality neutral. The air quality neutrality of the Development has been assessed following the methodology provided in the latest GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023a).

1.7 The GLA has also released Supplementary Planning Guidance on the Control of Dust and Emissions from Construction and Demolition (GLA, 2014). The SPG outlines a risk assessment approach for construction dust assessment and helps determine the mitigation measures that will need to be applied. A construction dust assessment has been undertaken and the appropriate mitigation has been set out.

1.8 This report describes existing local air quality conditions (base year 2019; 2020 and 2021 were not used due to the impacts of the Covid-19 pandemic). The assessment of traffic-related impacts

focuses on 2024, which is the anticipated year of (partial) opening. The assessment of construction dust impacts focuses on the anticipated duration of the works.

1.9 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with LBH.

2 Policy Context

2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy 2007

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an AQMA and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality Strategy 2023

2.3 The Air Quality Strategy: Framework for Local Authority Delivery 2023 (Defra, 2023a) sets out the strategic air quality framework for local authorities and other Air Quality Partners in England. It sets out their powers and responsibilities, and actions the government expects them to take. It does not replace other air quality guidance documents relevant to local authorities.

Clean Air Strategy 2019

2.4 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

2.5 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have

zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.6 The paper sets out a number of measures by which Government will support this transition but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Environment Act 2021

2.7 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets. It also establishes an Office for Environmental Protection (OEP), responsible for holding the government to account and ensuring compliance with these targets.

2.8 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2023 No. 96) sets two new targets for future concentrations of $PM_{2.5}$. These targets are described in Paragraph 3.5.

Environmental Improvement Plan 2023

2.9 Defra published its 25 Year Environment Plan in 2018 (Defra, 2018a). The Environment Act (2021) requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2023 (Defra, 2023b) is the first revision. This outlines the progress made since 2018 and adds detail to the goals defined in the 2018 Plan, including that of achieving clean air.

2.10 The Environmental Improvement Plan 2023 sets out the new air quality targets which have been set for concentrations of $PM_{2.5}$. These targets, which are described in more detail in Paragraph 3.5, include the long-term targets in the Statutory Instrument described in Paragraph 2.8, and interim targets to be achieved by 2028.

2.11 The 2023 Plan outlines the role of local authorities in helping it meet both its targets and existing commitments. It also outlines the respective roles of industry, agricultural sectors, and the Department for Transport in providing the coordinated action required to meet both its new, and pre-existing targets and commitments.

Planning Policy

National Policies

2.12 The National Planning Policy Framework (NPPF) (2021) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

2.13 To prevent unacceptable risks from air pollution, Paragraph 174 of the NPPF states that:

"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 quality".

2.14 Paragraph 185 states:

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

2.15 More specifically on air quality, Paragraph 186 makes clear that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".

2.16 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified".

2.17 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

2.18 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*". In addition, the PPG makes clear that *"…dust can also be a planning concern, for example, because of the effect on local amenity"*.

2.19 Regarding the need for an air quality assessment, the PPG states that:

"Whether 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".

2.20 The PPG sets out the information that may be required in an air quality assessment, making clear 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".

2.21 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"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".

London-Specific Policies

2.22 The key London-specific policies are summarised below, with more detail provided, where required, in Appendix A1.

The London Plan

2.23 The London Plan (GLA, 2021a) sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The key policy relating to air quality is Policy SI 1 on *Improving air quality*, Part B1 of which sets out three key requirements for developments:

"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".

2.24 The Policy then details how developments should meet these requirements, stating:

"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".

2.25 Part C of the Policy introduces the concept of Air Quality Positive for large-scale development, stating:

"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:

1) how proposals have considered ways to maximise benefits to local air quality, and

2) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this."

2.26 The Development is not large-scale development; however, following advice from the air quality officer at LBH an Air Quality Positive statement has been prepared, due to the location of the Site (covering a large area of the Mid-Colne Valley Site of Special Scientific Interest (SSSI)).

2.27 Regarding construction and demolition impacts, Part D of Policy SI 1 of the London Plan states:

"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".

2.28 Part E of Policy SI 1 states the following regarding mitigation and offsetting of emissions:

"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".

2.29 The explanatory text around Policy SI 1 of the London Plan states the following with regard to assessment criteria:

"The Mayor is committed to making air quality in London the best of any major world city, which means not only achieving compliance with legal limits for Nitrogen Dioxide as soon as possible and maintaining compliance where it is already achieved, but also achieving World Health Organisation targets for other pollutants such as Particulate Matter.

The aim of this policy is to ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality. This means that new developments, as a minimum, must not cause new exceedances of legal air quality standards, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits. Where limit values are already met, or are predicted to be met at the time of completion, new developments must endeavour to maintain the best ambient air quality compatible with sustainable development principles.

Where this policy refers to 'existing poor air quality' this should be taken to include areas where legal limits for any pollutant, or World Health Organisation targets for Particulate Matter, are already exceeded and areas where current pollution levels are within 5 per cent of these limits"[1].

[1] The London Plan policy was developed based on a World Health Organisation guideline for $PM_{2.5}$ of 10 $\mu g/m^3$ (see Paragraph 2.31).

2.30 The London Plan includes a number of other relevant policies, which are detailed in Appendix A1.

London Environment Strategy

2.31 The London Environment Strategy was published in May 2018 (GLA, 2018a). The strategy considers air quality in Chapter 4; the Mayor's main objective is to create a *"zero emission London by 2050".* Policy 4.2.1 aims to *"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".* The strategy sets a target to achieve, by 2030, the guideline value for $PM_{2.5}$ which was set by the World Health Organisation (WHO) in 2005. An implementation plan for the strategy has also been published which sets out what the Mayor will do between 2018 and 2023 to help achieve the ambitions in the strategy.

Mayor's Transport Strategy

2.32 The Mayor's Transport Strategy (GLA, 2018b) sets out the Mayor's policies and proposals to reshape transport in London over the next two decades. The Strategy focuses on reducing car dependency and increasing active sustainable travel, with the aim of improving air quality and creating healthier streets. It notes that development proposals should *"be designed so that walking and cycling are the most appealing choices for getting around locally".*

GLA SPG: The Control of Dust and Emissions During Construction and Demolition

2.33 The GLA's SPG on The Control of Dust and Emissions During Construction and Demolition (GLA, 2014) outlines a risk assessment based approach to considering the potential for dust generation from a construction site, and sets out what mitigation measures should be implemented to minimise the risk of construction dust impacts, dependent on the outcomes of the risk assessment. This guidance is largely based on the Institute of Air Quality Management's (IAQM's [2]) guidance (IAQM, 2016), and it states that "*the latest version of the IAQM Guidance should be used*".

Air Quality Focus Areas

2.34 The GLA has identified 160 air quality Focus Areas in London. These are locations that not only exceed the annual mean limit value for nitrogen dioxide, but also have high levels of human exposure. They do not represent an exhaustive list of London's air quality hotspot locations, but locations where the GLA believes the problem to be most acute. They are also areas where the GLA considers there to be the most potential for air quality improvements and are, therefore, where the GLA and Transport for London (TfL) will focus actions to improve air quality. The Development is not located close to any air quality Focus Areas.

[2] The IAQM is the professional body for air quality practitioners in the UK.

Local Policies

2.35 The Local Plan Part 1: Strategic Policies (London Borough of Hillingdon, 2012) was adopted by LBH in November 2012, and includes the following two Strategic Objectives (SOs) and four policies that are directly related to air quality and are relevant to the Development. The SOs include SO10: "*Improve and protect air… quality…*", and SO11: "*…minimise emissions of… local air quality pollutants from new development and transport*".

2.36 The Local Plan Policies include:

- Policy E2 'Location of Employment Growth', which states that *"…The Council will promote development in highly accessible locations that delivers sustainable travel patterns and contributes to the improvement of existing networks to reduce emissions and impacts on air quality…"*;
- Policy BE1 'Built Environment', which states that "*The Council will require all new development to improve and maintain the quality of the built environment in order to create successful and sustainable neighbourhoods, where people enjoy living and working and that serve the long-term needs of all residents. All new development should… maximise the opportunities for all new homes to contribute to… reducing emissions of local air quality pollutants…*";
- Policy EM1 'Climate Change Adaptation and Mitigation' states that:

  "*The Council will ensure that climate change mitigation is addressed at every stage of the development process by:*

  - *Promoting the use of decentralised energy within large scale development whilst improving local air quality levels…;*
  - *Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality;*
  - *Targeting areas of poor air quality for additional emissions reductions"*.

- Policy EM8 'Land, Water, Air and Noise' states that:

  "All development should not cause deterioration in the local air quality levels and should ensure the protection of both existing and new sensitive receptors.

  All major development within the Air Quality Management Area (AQMA) should demonstrate air quality neutrality (no worsening of impacts) where appropriate; actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels; deliver

increased planting through soft landscaping and living walls and roofs; and provide a management plan for ensuring air quality impacts can be kept to a minimum.

The Council seeks to reduce the levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy. London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Action plans, in particular where Air Quality Management Areas have been designated.

The Council has a network of Air Quality Monitoring stations but recognises that this can be widened to improve understanding of air quality impacts. The Council may therefore require new major development in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements".

2.37 LBH adopted the Local Plan Part 2: Development Management Policies (London Borough of Hillingdon, 2020) in January 2020, which delivers the detail of the strategic policies set out in the Local Plan Part 1: Strategic Policies. Together the documents form a comprehensive development strategy for the Borough up to 2026. The Local Plan Part 2 includes five policies that relate to air quality and are relevant to the Development.

2.38 Policy DMEI 1 'Living Walls and Roofs and on-site Vegetation' states that *"…Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate"*.

2.39 Policy DMEI 3 'Decentralised Energy' states that *"…The Council will support the development of DENs* [Decentralised Energy Networks] *and energy centres in principle, subject to meeting the wider policy requirements of this plan and in particular on design and air quality"*.

2.40 Policy DMEI 14 'Air Quality' states that:

"A) Development proposals should demonstrate appropriate reductions in emissions to sustain compliance with and contribute towards meeting EU limit values and national air quality objectives for pollutants.

B) Development proposals should, as a minimum:

i) be at least 'air quality neutral';

ii) include sufficient mitigation to ensure there is no unacceptable risk from air pollution to sensitive receptors, both existing and new; and

iii) actively contribute towards the improvement of air quality, especially within the Air Quality Management Area".

2.41 Policy DMT 1 'Managing Transport Impacts' states that *"…In order for developments to be acceptable they are required to… have no significant adverse transport or associated air quality… impacts on the local and wider environment, particularly on the strategic road network…"*.

2.42 Policy DMT 2 'Highways Impacts' states that *"Development proposals must ensure that… they do not contribute to the deterioration of air quality…"*.

2.43 The LBH has also adopted a Supplementary Planning Document (SPD) on Planning Obligations (London Borough of Hillingdon, 2014) in July 2014, which states that:

"Obligations may be sought to ensure no detrimental impacts on air quality and/or to ensure compliance with the objective of the AQMA. The following circumstances may establish a requirement for planning obligations:

- *As a recommendation of an air quality assessment;*
- *To mitigate the impacts from emissions from new development where these cannot be resolved through other means such as planning conditions, travel plans or statutory licenses;*
- *To mitigate impacts on new development where floor space is to be occupied for significant parts of the day, such as residential, where located in an area of poor air quality; and*
- *To mitigate air quality impacts during the construction phase where these cannot be controlled through conditions or other statutory licenses."*

Building Standards

2.44 Part F(1) of Schedule 1 of the Building Regulations 2010 as amended June 2022 (Ministry of Housing, Communities & Local Government, 2022) places a duty on building owners, or those responsible for relevant building work[3], to ensure adequate ventilation is provided to building occupants.

2.45 Approved Document F (HM Government, 2021a), which accompanies the Building Regulations, explains that care should be taken to minimise entry of external air pollutants. Specific steps should be taken to manage ventilation intakes where the building is near to a significant source of emissions, or if local ambient concentrations exceed values set in the Air Quality Standards Regulations 2010 (see Paragraph 3.10, later). These steps include maximising the distance between emission source and air intake, considering likely dispersion patterns, and considering the timing of pollution releases when designing the ventilation system.

2.46 Part S(1) of Schedule 1, and Regulation 44D, of the Building Regulations 2010 (Ministry of Housing, Communities & Local Government, 2022) define a requirement for the provision of infrastructure for

[3] Building work is a legal term for work covered by the Building Regulations. With limited exemptions, the Regulations apply to all significant building work, including erecting or extending a building.

charging electric vehicles. Precise requirements are explained further within Approved Document S (HM Government, 2021b) and depend on the overall number of parking spaces provided and the average financial cost of installation.

2.47 Compliance with the Building Regulations is not required for planning approval, but it is assumed that the Regulations will be complied with in the completed development.

Air Quality Action Plans

National Air Quality Plan

2.48 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018b) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ). There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in the modelling undertaken for this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.49 The LBH has declared an AQMA for nitrogen dioxide for the south of the borough, defined by the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook and north until its intersection with the Chiltern-Marylebone railway line. The Development is located approximately 890 m to the north of the AQMA. The Council has since developed an Air Quality Action Plan (London Borough of Hillingdon, 2019). This plan identifies the Council's objectives to:

"a) improve the areas of poorer air quality as soon as possible;

b) to continue to improve air quality across the borough and reduce public exposure to air pollution, especially for vulnerable groups within our communities such as the young, the old and those already suffering with associated respiratory illnesses".

2.50 With these objectives in mind, LBH will prioritise the following actions:

- *"Lead by example;*
- *Prioritise reducing public exposure and improving air quality around schools;*

- *Prioritise the implementation of improvement strategies in the AQ Focus Areas;*
- *Ensure the integration of the Healthy Streets approach in relevant council work programmes;*
- *Ensure the planning system supports the achievement of air quality improvements in relation to new developments;*
- *Raise awareness via targeted campaigns;*
- *Promote the use of greener walking and cycling routes to help the delivery of the Council's transport objective of an increased mode share for walking and cycling; and*
- *Work with external stakeholders."*

3 Assessment Criteria

3.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

3.2 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 (Defra, 2022).

3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. The GLA explains where these objectives will apply in London (GLA, 2019). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals and care homes etc., the gardens of residential properties, school playgrounds and the grounds of hospitals and care homes. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

3.4 For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value (see Paragraph 3.10), originally set at 25 µg/m^3 and currently set at 20 µg/m^3.

3.5 Defra has also recently set two new targets, and two new interim targets, for $PM_{2.5}$ concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by the end of 2040, with the interim target being a value of 12 µg/m^3 by the start of 2028[4]. The second set of targets relate to reducing overall

[4] Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 µg/m^3 would not exceed the 10 µg/m^3 target.

population exposure to $PM_{2.5}$. By the end of 2040, overall population exposure to $PM_{2.5}$ should be reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

3.6 Defra will assess compliance with the population exposure targets by averaging concentrations measured at its own background monitoring stations. This will not consider small changes over time to precisely where people are exposed (such as would relate to exposure introduced by a new development). Furthermore, as explained in Paragraph 2.11, all four new targets provide metrics against which central Government can assess its own progress. While local authorities have an important role delivering the required improvements, these are expected to relate to controlling emissions and not to directly assessing $PM_{2.5}$ concentrations against the targets.

3.7 In March 2023, the Department for Levelling Up, Housing and Communities (DLUHC, 2023) explained that the new $PM_{2.5}$ targets will:

"need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of $PM_{2.5}$. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance."

3.8 For the time being, therefore, no assessment is required, and indeed no robust assessment is possible, in relation to the new $PM_{2.5}$ targets and they are not considered further.

3.9 As explained in Paragraph 2.31, the GLA has set a target to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by 2030. This target was derived from an air quality guideline set by WHO in 2005. In 2021, WHO updated its guidelines, but the London Environment Strategy (GLA, 2018a) considers the 2005 guideline of 10 µg/m^3. While there is no explicit requirement to assess against the GLA target of 10 µg/m^3, it has nevertheless been included within this assessment.

3.10 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010)[5]. The limit values for nitrogen dioxide, PM_{10} are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national obligation rather than a local one and concentrations are reported to the nearest whole number. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

[5] As amended through The Air Quality Standards (Amendment) Regulations 2016 and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

3.11 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Value
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
PM_{10}	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
$PM_{2.5}$	Annual Mean	20 µg/m^3 [a]
	Annual Mean	10 µg/m^3 by 2030

[a] There is no numerical $PM_{2.5}$ objective for local authorities (see Paragraph 3.4). Convention is to assess against the UK limit value which is currently 20 µg/m^3.

Construction Dust Criteria

3.12 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the IAQM (2016) has been used (the GLA's SPG (GLA, 2014) recommends that the assessment be based on the latest version of the IAQM guidance). Full details of this approach are provided in Appendix A2.

Screening Criteria for Road Traffic Assessments

3.13 Environmental Protection UK (EPUK) and IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A3, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

3.14 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A3) inside an AQMA are a change in flows of more than 25 Heavy Duty Vehicles (HDVs) or 100 Light Duty Vehicles (LDVs) per day; outside of an AQMA the thresholds are 100 HDVs or 500 LDVs. Where these criteria are exceeded, a detailed assessment is likely to be required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

4 Assessment Approach

Consultation

4.1 The assessment follows a methodology agreed with LBH via an email correspondence between Val Beale (Air Quality Officer at LBH) and Dr Kate Wilkins (Air Quality Consultants) on 12 April 2023. Specifically, the following key points were discussed and agreed:

- a construction dust risk assessment will be undertaken, following the GLA's Supplementary Planning Guidance on the Control of Dust and Emissions from Construction and Demolition (GLA, 2014);
- traffic generated by the operation of the Development will be below published screening criteria, thus dispersion modelling is not deemed necessary and a qualitative assessment of the impacts of emissions from Development-generated traffic will be undertaken; and
- the air quality neutrality of the Development will be assessed following the methodology provided in the GLA's London Plan Guidance 'Air Quality Neutral (GLA, 2023a).

4.2 An EIA Scoping Report was prepared and submitted to the LBH by Quod in February 2023, requesting a formal Scoping Opinion. A Scoping Opinion was subsequently received on 22 March 2023, in which LBH requested that, in conjunction with the above, an Air Quality Positive statement should be prepared, and the effect of the Development on the Mid Colne Site of Special Scientific Interest (SSSI) should be considered. An Air Quality Positive statement has been included as a section within this assessment. An assessment of Development-generated traffic emissions on the Mid Colne SSSI has been undertaken (ref no. J20/13430A/10/2/F1), to be included as an Appendix to the Biodiversity chapter of the Environmental Statement being prepared to support the planning application.

Existing Conditions

4.3 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2023c);
- local sources have been identified through examination of the Council's Air Quality Review and Assessment reports;
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2023e). These cover the whole of the UK on a 1x1 km grid. The background

annual mean nitrogen oxides and nitrogen dioxide maps for 2019 have been calibrated against concurrent measurements from national monitoring sites (AQC, 2020). The calibration factor calculated has also been applied to future year backgrounds. Mapped background concentrations of PM_{10} and $PM_{2.5}$ have not been adjusted; and

- whether or not there are any exceedances of the annual mean limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020; 2023f). These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2023f), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Construction Impacts

4.4 The construction dust assessment considers the potential for impacts within 350 m of the site boundary, or within 50 m of roads used by construction vehicles. The assessment methodology follows the GLA's SPG on the Control of Dust and Emissions During Construction and Demolition (GLA, 2014), which is based on that provided by IAQM (2016). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A2 explains the approach in more detail.

Road Traffic Impacts

Impacts of Development-Generated Road Traffic

4.5 The first step in considering the road traffic impacts of the Development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.13 and detailed further in Appendix A3. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Impacts of Road Traffic on Future Users of the Proposed Development

4.6 The impacts of nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations on users of the Development have been assessed qualitatively, taking account of local air quality monitoring data and proximity to local roads, as well as the GLA's LAEI predicted concentrations.

4.7 The assessment examines air quality conditions in 2019 and assumes these are representative of air quality conditions at the time the Development is occupied; this assumption is considered to be worst-case as it is generally expected that nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations will decline in future years.

Assessment of Significance

Construction Dust Significance

4.8 Guidance from IAQM (2016) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. This is the latest version of the guidance upon which the assessment methodology set out in the GLA guidance (GLA, 2014) is based (the GLA guidance advises that the latest version of the IAQM guidance should always be used). The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Operational Significance

4.9 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A4. Full details of the EPUK/IAQM approach are provided in Appendix A3.

'Air Quality Neutral'

4.10 The GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023a) sets out guidance on how an 'air quality neutral' assessment should be undertaken. It also provides a methodology for calculating an offsetting payment if a development is not 'air quality neutral' and it is not possible to identify or agree appropriate and adequate mitigation.

4.11 Appendix A5 sets out the emissions benchmarks from the guidance. The approach has been to calculate the emissions from the development and to compare them with these benchmarks.

‘Air Quality Positive’

4.12 The London Plan (GLA, 2021a) details expectations regarding ‘Air Quality Positive’. The full text is quoted in Paragraph A1.3 in Appendix A1, but the expectations can be summarised as follows:

- air quality should be considered at an early stage in the project design;
- existing good practice measures should be drawn together in a holistic fashion to identify which options deliver the greatest improvement to air quality, both in terms of on-site exposure and off-site impacts;
- a statement should be developed setting out how air quality can be improved across the proposed area of the development;
- these measures should be incorporated into the design; and
- delivery of an air quality positive approach is project specific and relies on the opportunities on site or in the surrounding area to improve air quality.

4.13 The GLA has published guidance on how the requirements for Air Quality Positive development should be met (GLA, 2023b), which has been followed when preparing this report.

5 Baseline Conditions

Relevant Features

5.1 The Development is located approximately 1 km to the southwest of Harefield village centre, in the London Borough of Hillingdon. The Site is bounded by agricultural land, open space and residential properties to the east, the Broadwater Lake Nature Reserve to the south, Riven Colne to the west and Rickmansworth Sailing Club and Horse Show Bay to the north. The Site comprises a section of the Mid Colne Valley SSSI and two residential properties which will be retained.

5.2 The Development is located approximately 890 m from the Hillingdon AQMA and approximately 2 km from the nearest air quality Focus Area, as highlighted in Figure 1.

Industrial Sources

5.3 No significant industrial or waste management sources have been identified that are likely to affect the Development, in terms of air quality.

Local Air Quality Monitoring

5.4 LBH operates 12 automatic monitoring stations within its area, however, none of these are in close proximity to the Development. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko International Ltd (using the 50% TEA in acetone method), with the closest site located within 1.2 km of the Development. Buckinghamshire Council also measures air quality within its administrative boundary, with two diffusion tube monitoring sites located within 3.5 km of the Development. Annual mean results for the years 2017 to 2021 are summarised in Table 2. The monitoring locations are shown in Figure 2. The monitoring data have been taken from LBH's 2022 Annual Status Report (ASR) (London Borough of Hillingdon, 2022) and from Buckinghamshire Council's 2022 ASR (Buckinghamshire Council, 2022).

Table 2: Summary of Annual Mean NO_2 Monitoring (2017-2021) (µg/m^3) [a]

Site ID	Site Type	Location	2017	2018	2019	2020	2021
HILL14	Background	Harefield Hospital, Hill End Road	22.1	20.5	22.4	15.5	15.4
SB39, SB40	Roadside	Fulmer	**41.0**	38.5	38.7	26.3	28.5
SB46	Roadside	Alderbourne Cottage	-	33.6	30.7	20.4	22.3
Objective			**40**				

[a] Exceedances of the objectives are shown in bold.

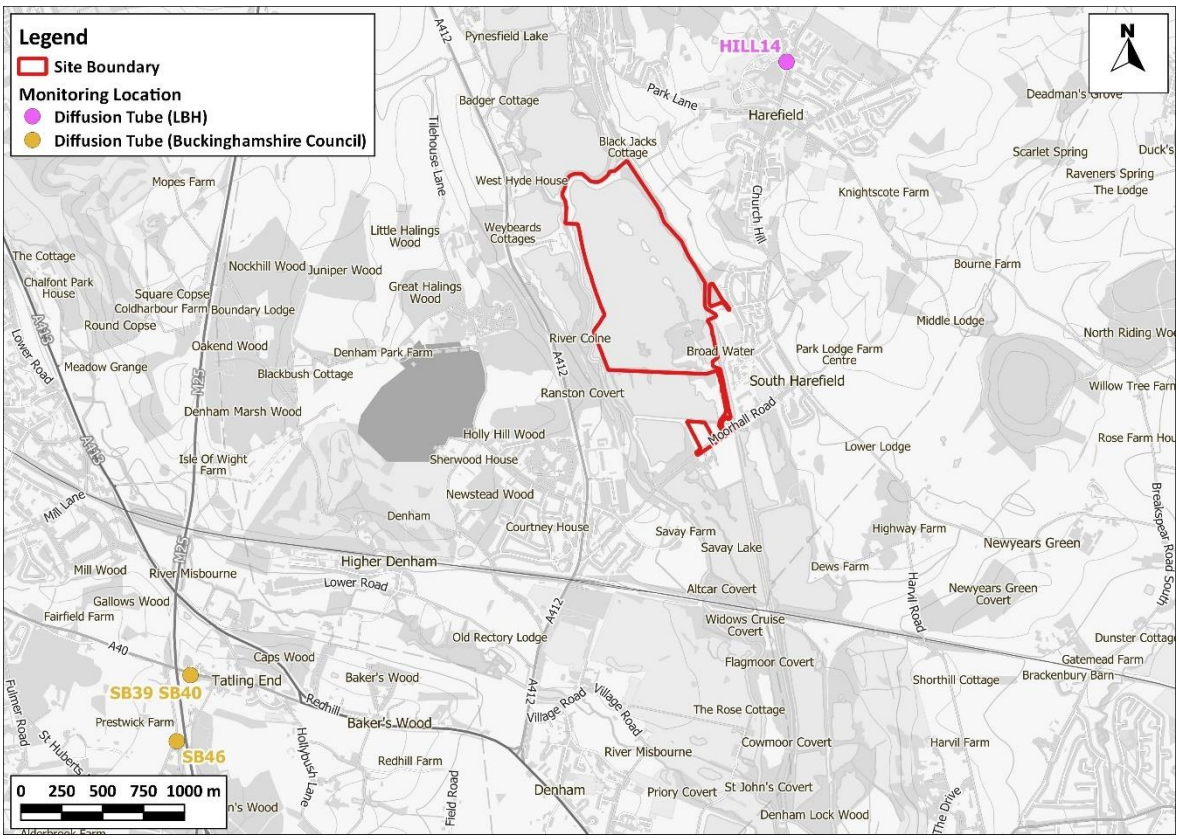

Figure 2: Monitoring Locations and the Application Site Boundary

5.5 As shown in Table 2, only one exceedance of the annual mean nitrogen dioxide objective was measured at diffusion tube monitoring site 'SB39, SB40' in 2017; the objective was not exceeded in any other year or at the other monitoring locations. Concentrations measured at the 'HILL14' monitoring station are considered to be most representative of conditions at the Site, as both the Development and the monitoring site are located a similar distance from nearby major roads.

5.6 All measured annual mean nitrogen dioxide objective concentrations have remained below 60 µg/m^3 in all years, indicating that the 1-hour mean nitrogen dioxide objective is unlikely to have been exceeded.

5.7 While 2020 and 2021 results have been presented in this Section for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality conditions due to the considerable impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.

5.8 LBH monitor PM_{10} and $PM_{2.5}$ concentrations at a number of monitoring sites, however, none of these are in close proximity to the Development. Measured concentrations at all sites have been well below the relevant objectives in all recent years. Additionally, the GLA $PM_{2.5}$ target of 10 µg/m^3 was not exceeded in 2019 at any monitoring site (London Borough of Hillingdon, 2022).

Exceedances of Limit Value

5.9 There are several AURN monitoring sites within the Greater London Urban Area that have measured exceedances of the annual mean nitrogen dioxide limit value (Defra, 2023d). Furthermore, Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2023f), which are used to identify and report exceedances of the limit value, identify exceedances of this limit value in 2019 along many roads in London, but not for the roads close to the Development. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the Development by the time that it is operational.

5.10 Defra's Air Quality Plan requires the GLA to prepare an action plan that will *"deliver compliance in the shortest time possible"*, and the 2015 Plan assumed that a CAZ was required. The GLA has already implemented an LEZ and a ULEZ, thus the authority has effectively already implemented the required CAZ. These have been implemented as part of a package of measures including 12 Low Emission Bus Zones, Low Emission Neighbourhoods, the phasing out of diesel buses and taxis and other measures within the Mayor's Transport Strategy.

Background Concentrations

5.11 Estimated background concentrations at the Development are set out in Table 3 and are all well below the objectives. The background annual mean $PM_{2.5}$ concentrations are also below the GLA target value of 10 µg/m^3.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2019 and 2024 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2019	14.2	14.1	9.8
2024	11.7	13.2	9.0
Objective / GLA target	**40**	**40**	**20/10** [a]

[a] The 20 µg/m^3 $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. 10 µg/m^3 is the GLA target for annual mean $PM_{2.5}$; again, there is no requirement for local authorities to meet this.

6 Construction Phase Impact Assessment

Construction Traffic

6.1 It is expected that no more than six Heavy Goods Vehicles (HGVs) will access the site on any given day, thus the additional heavy vehicle movements on local roads will be well below the 100 AADT screening criterion recommended by EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017). It is, therefore, not considered necessary to assess the impacts of traffic emissions during the construction phase and it can be concluded that the Development will not have a significant impact on local roadside air quality as a result of construction traffic emissions.

On-Site Exhaust Emissions

6.2 The IAQM guidance (IAQM, 2016) states:

"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur".

6.3 The Site is large, and the majority of the site area is more than 50 m from any sensitive receptors. The areas in which NRMM and site traffic will typically operate are thus likely to be located more than 50 m away from any sensitive properties for the majority of the time. In line with the GLA's Control of Dust and Emissions During Construction and Demolition SPG, and as described in Appendix A6, NRMM are expected to comply with emissions standards. Additionally, there will be no idling when vehicles are not in use, and machinery will be located away from sensitive receptors as far as possible at all times. It is judged that there no risk of significant effects at existing receptors as a result of on-site machinery emissions.

Construction Dust and Particulate Matter Emissions

6.4 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix A2), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

6.5 There will be a requirement to demolish a number of existing concrete structures on-Site, as well as the Broadwater Sailing Club building, with an approximate total volume of 1,000 m^3. The method of

demolition has not yet been decided. A mobile crusher may be used on site before removal of the material, but this has not yet been decided; such crushing plant may require a valid Environmental Permitting Regulations permit. The demolition works are anticipated to last approximately four weeks for the concrete structures and four weeks for the sailing club. Based on the example definitions set out in Table A2.1 in Appendix A2, the dust emission class for demolition is considered to be *small.*

Earthworks

6.6 The characteristics of the soil at the site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2023), as set out in Table 4. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 4: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Mixed (Deep – Intermediate – Shallow)
Soil Parent Material Grain Size	Mixed (Argillaceous [a] – Arenaceous [b] – Rudaceous [c])
European Soil Bureau Description	Mixed (River Terrace Sand/Gravel – Riverine Clay and Floodplain Sands and Gravel)
Soil Group	Light (Sandy) to Medium (Sandy)
Soil Texture	Mixed (Sand to Sandy Loam [d] – Clay to Sandy Loam)

[a] Grain size < 0.06 mm.

[b] Grain size 0.06 – 2.0 mm.

[c] Grain size > 2.0 mm.

[d] A loam is composed mostly of sand and silt.

6.7 The site covers approximately 80,000 m^2, however the majority of the earthworks will be limited to an area of approximately 51,000 m^2 which will be subject to excavation, haulage, tipping, stockpiling, landscaping and dredging. Dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil). Based on the example definitions set out in Table A2.1 in Appendix A2, the dust emission class for earthworks is considered to be *large*.

Construction

6.8 Construction will involve the erection of a number of buildings including the main building, activity shelters, workshops and water sports stores, with a total building volume of approximately 11,000 m^3. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials. The construction will take place over a 60-week period. Based on the example definitions set out in Table A2.1 in Appendix A2, the dust emission class for construction is considered to be *small*.

Trackout

6.9 It is expected that no more than six HGVs will access the site on any given day, and thus there will be a maximum of six outward heavy movements which may track out dust and dirt. Based on the example definitions set out in Table A2.1 in Appendix A2, the dust emission class for trackout is considered to be *small*.

6.10 Table 5 summarises the dust emission magnitude for the Development.

Table 5: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	Small
Earthworks	Large
Construction	Small
Trackout	Small

Sensitivity of the Area

6.11 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

6.12 The IAQM guidance, upon which the GLA's guidance is based, explains that residential properties are 'high' sensitivity receptors to dust soiling and human health effects, while places of work are a 'medium' sensitivity receptors (Table A2.2 in Appendix A2). There are two residential properties within 20 m of the area where the construction works will take place (see Figure 3).

Figure 3: 20 m Distance Band around the Construction Site Boundary

Imagery ©2023 Google, Imagery ©2023 Bluesky, Getmapping plc, Infoterra Ltd & bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2023

6.13 Table 5 shows that the dust emission magnitude for trackout is *small* and Table A2.3 in Appendix A2 thus explains that there is a risk of material being tracked 50 m from the site exit. The construction vehicles are expected to enter and exit the Site via Moorfield Road, west of the Site exit, from the direction of Denham Green. There are no residential properties within 20 m of the roads along which material could be tracked, but there is one place of work (see Figure 4).

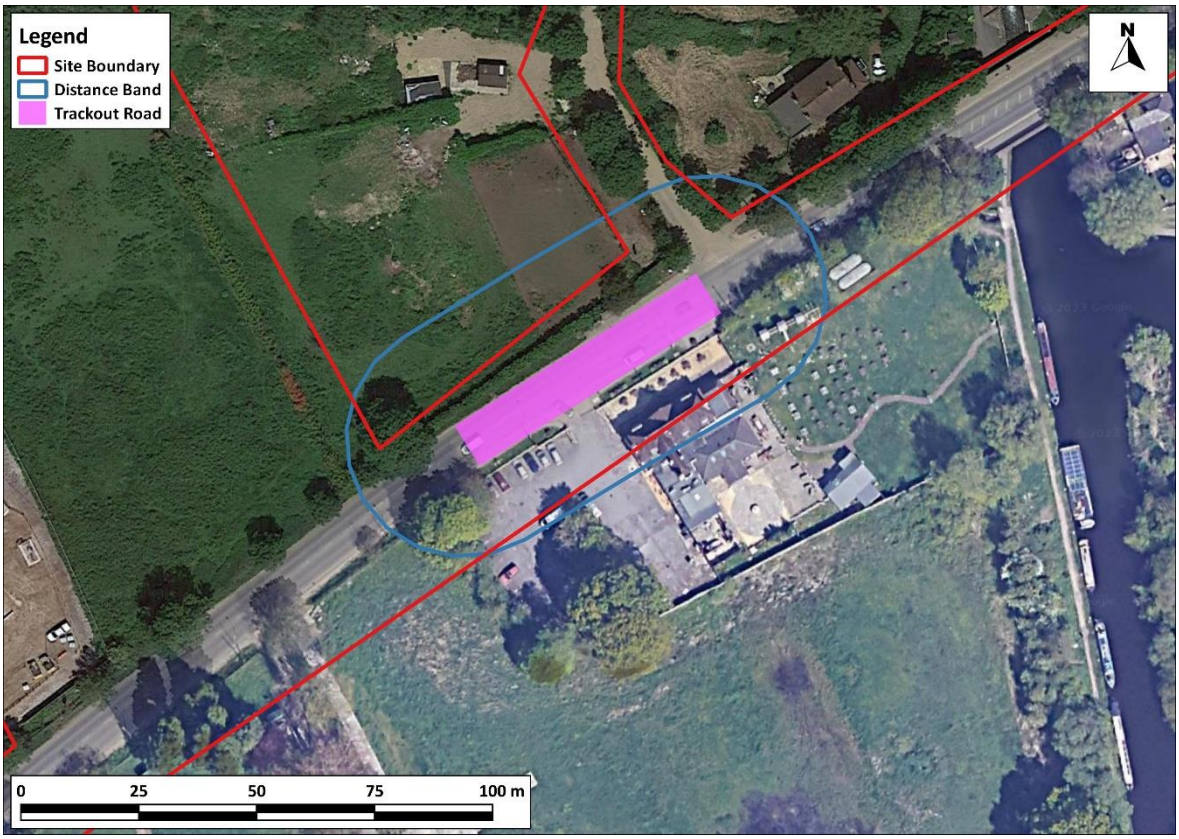

Figure 4: 20 m Distance Band around Roads Used by Construction Traffic Within 50 m of the Site Exit

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Sensitivity of the Area to Effects from Dust Soiling

6.14 Using the information set out in Paragraph 6.12 and Figure 3 alongside the matrix set out in Table A2.3 in Appendix A2, the area surrounding the onsite works is of 'medium' sensitivity to dust soiling. Using the information set out in Paragraph 6.13 and Figure 4 alongside the same matrix, the area is of 'medium' sensitivity to dust soiling due to trackout.

Sensitivity of the Area to any Human Health Effects

6.15 The matrix in Table A2.4 in Appendix A2 requires information on the baseline annual mean PM_{10} concentration in the area. The properties nearest the site are well away from any major roads and the existing annual mean PM_{10} concentration is best described by the background concentration from Table 3 (14.1 µg/m^3). Using the information set out in Paragraphs 6.12 and Figure 3 alongside the matrix in Table A2.4 in Appendix A2, the area surrounding the onsite works is of 'low' sensitivity to human health effects. Using the information set out in Paragraph 6.13 and Figure 4 alongside the same matrix, the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Sensitivity of the Area to any Ecological Effects

6.16 The guidance considers SSSIs with dust-sensitive features to be of 'medium' sensitivity. Greengage, the appointed ecological consultants for this scheme, have confirmed that the growth of plants (trees / herbs) can be significantly impacted by long-term localised dust deposition (e.g., quarries or waste processing or composting and recycling plant). However, the Development construction works are anticipated to last for a short period of time and are therefore unlikely to have a significant adverse effect on onsite vegetation. However, for a robust assessment, it has been assumed that there are dust sensitive features within the Mid Colne Valley SSSI, and thus using Table A2.5 in Appendix A2 shows that the area is of 'medium' sensitivity to ecological effects.

Summary of the Area Sensitivity

6.17 Table 6 summarises the sensitivity of the area around the proposed construction works.

Table 6: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Medium Sensitivity	Medium Sensitivity
Human Health	Low Sensitivity	Low Sensitivity
Ecological	Medium Sensitivity	Medium Sensitivity

Risk and Significance

6.18 The dust emission magnitudes in Table 5 have been combined with the sensitivities of the area in Table 6 using the matrix in Table A2.6 in Appendix A2, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 7. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 9 (step 3 of the assessment procedure).

Table 7: Summary of Risk of Impacts Without Mitigation

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

The IAQM guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant' (IAQM, 2016).

7 Operational Phase Impact Assessment

Impacts at Existing Receptors

7.1 Robert West, the appointed transport consultants for the scheme, have confirmed that the Development is expected to generate a total of 55 daily LDV trips and four HDV trips. These daily trip rates are below the screening threshold of 500/100 LDVs/HDVs recommended for use outside of an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.14). As such, it is judged that the relevant screening thresholds will not be exceeded and there is no requirement for a detailed assessment of road traffic impacts at existing receptors; it can be concluded that the Development will not have a significant impact on local roadside air quality.

Impacts of Existing Sources on Future Users of the Development

Preliminary Air Quality Assessment

7.2 The London Plan (GLA, 2021a) requires that a Preliminary Air Quality Assessment be carried out for all major developments to inform the design process and ensure that the development reduces exposure to air pollution as far as is practicable.

7.3 A preliminary air quality assessment has been produced in support of the planning application for the Development (AQC, 2022) and is also provided in Appendix A7. The preliminary assessment identified the Site as likely to be suitable for recreational use in terms of air quality.

Assessment of Traffic Emissions

7.4 The recreational aspect of the Development represents relevant exposure to the short-term (1-hour) nitrogen dioxide objective only, while the camping and seasonal staff accommodation aspects of the Development represent relevant exposure to the 1-hour mean nitrogen dioxide and 24-hour mean PM_{10} objectives.

7.5 The Development is located well away from any busy roads, the nearest of which is Moorhall Road located more than 350 m away from any area where any future users are expected to be present for the averaging times of the objectives, in an area where pollutant concentrations are expected to be close to background levels. Background concentrations at the Site are well below the annual mean objectives (see Table 3), as well as being well below the proxy values which indicate the potential for exceedances of the short-term objectives for nitrogen dioxide and PM_{10} (i.e., 60 µg/m^3 and 32 µg/m^3, respectively). The GLA target of 10 µg/m^3 for $PM_{2.5}$ concentrations is not expected to be exceeded at the Site, based on its distance from major roads and the background concentrations shown in Table 3 (however as it is an annual mean target, it is not relevant to the Development). It can, therefore, be concluded that future users will experience acceptable air quality, and there is no need for more detailed assessment.

Significance of Operational Air Quality Effects

7.6 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A3, and takes account of the assessment that:

- pollutant concentrations within the Development will all be well below the relevant objectives, thus future users will experience acceptable air quality; and
- the Development will generate traffic well below industry screening thresholds, thus its impacts on air quality at existing sensitive receptor locations can be expected to be negligible.

8 'Air Quality Neutral'

8.1 The purpose of the London Plan's requirement that development proposals be 'air quality neutral' is to prevent the gradual deterioration of air quality throughout Greater London. The 'air quality neutrality' of a Development, as assessed in this section, does not directly indicate the potential of the Development to have significant impacts on human health (this has been assessed separately in the previous section). The air quality assessment has been undertaken using the latest GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023a).

Building Emissions

8.2 As discussed in Paragraph 1.5, the Development will be provided with heat and hot water via an all-electric system. As such, there will be no associated pollutant emissions and no direct building emissions.

Road Transport Emissions

8.3 Robert West have advised that the Development is expected to generate a total of 19,710 car trips per year, as set out in Table 8. Appendix A5 provides the Benchmark Trip Rates for the 'Assembly and Leisure' land use category based on the Gross Internal Area (GIA) of the Development. The GIA has been provided by Space Place. Table 8 shows calculation of the TEB for this Development.

8.4 The total development trip rate is significantly less than the TEB. The Development is thus air quality neutral in terms of transport emissions.

Table 8: Calculation of Transport Benchmarks for the Development [a]

Use Class	GIA (m^2)	Benchmark		Annual Trips from Development
		trips/m^2/yr	Trips/yr	
Assembly and Leisure	4,274	47.2	201,733	19,710

[a] Each trip is 1-way (i.e., a return journey would be two trips). Considers car trips only.

Summary

The building and transport related emissions associated with the Development are both below the relevant benchmarks. The Development therefore complies with the requirement that all new developments in London should be at least air quality neutral.

9 'Air Quality Positive' Statement

9.1 AQC has been involved since early in the design process for the Development and produced a Preliminary Air Quality Assessment to inform the design (see Appendix A7), including liaising on the air quality constraints and measures to maximise the benefits on air quality.

9.2 The design measures included within the Development, and their benefits in terms of air quality and exposure to air pollution, are summarised in the Air Quality Positive Statement, which is provided in Table 9.

Table 9: Air Quality Positive Statement

Measure	Summary of the Measure	Reason for Undertaking Measure	Expected Benefits	Assessment and Reporting			How Will This Measure Be Secured
				Methods	Quantitative	Qualitative	
Better Design and Reducing Exposure							
Location of sensitive land uses	The proposed masterplan shows that any areas where future users are expected to be present will be more than 350 m away from the nearest road (Moorhall Road).	To reduce exposure for future users.	Future users will experience acceptable air quality.	Air quality assessment shows air quality will be acceptable for future users.	N	Y	Secured through approved plans.
Building Emissions							
Energy strategy	Heat and hot water will be provided via an all-electric system.	The Energy Strategy sets out the rationale for the measures.	Minimises requirement for onsite sources of combustion.	Energy Strategy	N	Y	Energy infrastructure secured by approved plans or conditions.
Transport Emissions							
Pedestrian and cycle access	The Development will provide cycle and pedestrian access and include cycle parking that meets the requirements of Policy T5 of the London Plan.	To encourage users to travel using sustainable modes of transport.	Reduced emissions associated with increased walking and cycling.	Transport Assessment	N	Y	Transport infrastructure secured by approved plans or conditions.

EV charging	EV charging to be compliant with the London Plan Policy T6.4, all operational parking must provide infrastructure for electric or Ultra Low Emission vehicles, including active charging points for all taxi spaces.	To promote the use of EVs in line with the London Plan.	Increased availability of suitable charging infrastructure will incentivise EV use which will help to reduce tailpipe emissions from road traffic in the future.	Transport Assessment	N	Y	Transport infrastructure secured by approved plans or conditions.

10 Mitigation

Construction Impacts

10.1 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise effects upon nearby sensitive receptors.

10.2 The site has been identified as a *Medium* Risk site during earthworks, *Low* Risk during demolition and construction, and *Negligible* Risk for trackout with regards to dust soiling impacts, and a *Negligible* Risk site during demolition, construction and for trackout, and *Low* Risk for earthworks, with regards to human health impacts, as set out in Table 7. The GLA's SPG on *The Control of Dust and Emissions During Construction and Demolition* (GLA, 2014) describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on what monitoring should be undertaken during the construction phase. This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix A6.

10.3 The mitigation measures should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan (CEMP) and may require monitoring. The GLA's guidance suggests that, for a Medium Risk site, automatic monitoring of particulate matter (as PM_{10}) will be required, however with regards to human health impacts, which relate to PM_{10} emissions, the Site is considered to be Low Risk. It also states that, on certain sites, it may be appropriate to determine the existing (baseline) pollution levels before work begins. However, the guidance is clear that the Local Authority should advise as to the appropriate air quality monitoring procedure and timescale on a case-by-case basis.

10.4 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Road Traffic Impacts

10.5 The assessment has demonstrated that the overall air quality effect of the Development will be 'not significant'. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

10.6 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). The local air quality action plan that the GLA is required to produce in order to address limit value exceedances in its area will also help to improve air quality.

10.7 Policy T6.4 of the London Plan (GLA, 2021a) requires that for hotel and leisure uses all operational parking must provide infrastructure for electric or other Ultra Low Emission vehicles, including active charging points for all taxi spaces. The Development will include this allowance for electric vehicle charging, which will assist in minimising the impacts of the development, as identified in Section 7, as the uptake of electric vehicles increases.

11 Residual Impacts

Construction

11.1 The IAQM guidance, on which the GLA's guidance is based, is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Section 10 and Appendix A6 are based on the GLA guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant'.

11.2 The IAQM guidance does, however, recognise that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall, the effects will be 'not significant'.

Road Traffic Impacts

11.3 The residual impacts will be the same as those identified in Section 7. The overall effects of the proposed development will be 'not significant'.

12 Conclusions

12.1 The assessment has considered the impacts of the Development on local air quality in terms of dust and particulate matter emissions during construction and emissions from road traffic generated by the completed and occupied Development. It has also identified the air quality conditions that future users will experience and whether or not the Development is air quality neutral (as required by the London Plan).

Construction Impacts

12.2 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions. Appropriate measures have been recommended and, with these measures in place, it is expected that any residual effects will be 'not significant'.

Operational Impacts

12.3 Air quality conditions for future users of the Development have been shown to be acceptable, with concentrations well below the relevant air quality objectives throughout the site.

12.4 The assessment has demonstrated that the incremental changes to traffic flows on the local road network will be below published screening criteria, and that the effects of road traffic on existing sensitive receptors will be insignificant.

Air Quality Neutral

12.5 The building and transport related emissions associated with the Development are both below the relevant benchmarks. The Development therefore complies with the requirement that all new developments in London should be at least air quality neutral.

Policy Implications

12.6 Taking into account these conclusions, it is judged that the Development is consistent with Paragraph 185 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 186, as it will not affect compliance with relevant limit values or national objectives.

12.7 The proposed development is compliant with Policy SI 1 of the London Plan in the following ways:

- it will not lead to further deterioration of existing poor air quality;
- it will not cause or extend and exceedances of legal air quality limits;
- it will not create unacceptable risk of high levels exposure to poor air quality; and
- it is better than air quality neutral.

12.8 The Development is also consistent with Policy DMEI 14 ‘Air Quality’ parts B) *i)* and *ii)* of the Local Plan Part 2: Development Management Policies in that it is at least air quality neutral, and there is no unacceptable risk from air pollution to existing or new sensitive receptors.

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14 Glossary

AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
BEB	Building Emissions Benchmark
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
Focus Area	Location that not only exceeds the annual mean limit value for NO_2 but also has a high level of human exposure
GIA	Gross Internal Floor Area
GLA	Greater London Authority
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LB	London Borough of Hillingdon
LDV	Light Duty Vehicles (<3.5 tonnes)

LEZ	Low Emission Zone
µg/m^3	Micrograms per cubic metre
NO_2	Nitrogen dioxide
NPPF	National Planning Policy Framework
NRMM	Non-road Mobile Machinery
OEP	Office for Environmental Protection
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PV	Photovoltaic panels
PHV	Private Hire Vehicle
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
SPG	Supplementary Planning Guidance
SPD	Supplementary Planning Document
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide
TEB	Transport Emissions Benchmark
TfL	Transport for London
TRAVL	Trip Rate Assessment Valid for London
ULEZ	Ultra Low Emission Zone
WHO	World Health Organisation
ZEC	Zero Emission Capable

15 Appendices

A1 London-Specific Policies and Measures

London Plan

Design-led Approach

A1.1 Policy D3 on optimising site capacity through the design-led approach states that *"development proposals should…help prevent or mitigate the impacts of noise and poor air quality"*. The explanatory text around this Policy states the following:

"Measures to design out exposure to poor air quality and noise from both external and internal sources should be integral to development proposals and be considered early in the design process. Characteristics that increase pollutant or noise levels, such as poorly-located emission sources, street canyons and noise sources should also be designed out wherever possible. Optimising site layout and building design can also reduce the risk of overheating as well as minimising carbon emissions by reducing energy demand".

Preliminary Air Quality Assessment

A1.2 The London Plan sets out expectations around the consideration of air quality in the design of all major developments:

"For major developments, a preliminary Air Quality Assessment should be carried out before designing the development to inform the design process. The aim of a preliminary assessment is to assess:

- *The most significant sources of pollution in the area*
- *Constraints imposed on the site by poor air quality*
- *Appropriate land uses for the site*
- *Appropriate design measures that could be implemented to ensure that development reduces exposure and improves air quality.*

Further assessments should then be carried out as the design evolves to ensure that impacts from emissions are prevented or minimised as far as possible, and to fully quantify the expected effect of any proposed mitigation measures, including the cumulative effect where other nearby developments are also underway or likely to come forward".

Air Quality Positive

A1.3 The London Plan explains what is meant by 'Air Quality Positive' in the explanatory text around Policy SI 1:

"An air quality positive approach is linked to other policies in the London Plan, such as Healthy Streets, energy masterplanning and green infrastructure. One of the keys to delivering this will be to draw existing good practice together in a holistic fashion, at an early stage in the process, to ensure that the development team can identify which options deliver the greatest improvement to air quality. Large schemes, subject to Environmental Impact Assessment, commonly have project and design teams representing a range of expertise, that can feed in to the development of a statement to set out how air quality can be improved across the proposed area of the development.

Single-site schemes, including referable schemes, are often constrained by pre-existing urban form and structure, transport and heat networks. These constraints may limit their ability to consider how to actively improve local air quality. By contrast, large schemes, particularly masterplans, usually have more flexibility to consider how new buildings, amenity and public spaces, transport and heat networks are deployed across the area and will therefore have greater opportunities to improve air quality and reduce exposure through the careful choice of design and infrastructure solutions. Delivery of an air quality positive approach will be project specific and will rely on the opportunities on site or in the surrounding area to improve air quality.

Statements for large-scale development proposals, prepared in response to Part C of this policy, should set out:

- *How air quality is intended to be analysed and opportunities for its improvement identified as part of the design process.*
- *How air quality improvements have informed the design choices made about layout and distribution of buildings, amenity spaces and infrastructure.*
- *What steps will be taken to promote the uptake and use of sustainable and zero-emission modes of transport beyond minimum requirements. This may include specific measures in transport plans or delivery against Healthy Streets indicators.*
- *How air pollutant emissions from the buildings or associated energy centres can be reduced beyond the minimum requirements set out in Part B of this policy. This may include specific measures in heating masterplans or working with existing heat network providers to reduce or eliminate energy centre emissions.*
- *How specific measures that are identified to deliver air quality improvements will be evaluated and secured, including whether more detailed design specifications will be required so that the final development meets the desired performance".*

Electric Vehicle Charging

A1.4 To support the uptake of zero tailpipe emission vehicles, Policy T6.4 of the London Plan states:

"All operational parking must provide infrastructure for electric or other Ultra-Low Emission vehicles, including active charging points for all taxi spaces".

London Environment Strategy

A1.5 The air quality chapter of the London Environment Strategy sets out three main objectives, each of which is supported by sub-policies and proposals. The Objectives and their sub-policies are set out below:

"Objective 4.1: Support and empower London and its communities, particularly the most disadvantaged and those in priority locations, to reduce their exposure to poor air quality.

- *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*

Objective 4.2: Achieve legal compliance with UK and EU limits as soon as possible, including by mobilising action from London Boroughs, government and other partners

- *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*

Objective 4.3: Establish and achieve new, tighter air quality targets for a cleaner London by transitioning to a zero emission London by 2050, meeting world health organization health-based guidelines for 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"*

A1.6 While the policies targeting transport sources are significant, there are less obvious ones that will also require significant change. In particular, the aim to phase out fossil-fuels from building heating and cooling and from NRMM will demand a dramatic transition.

Low Emission Zone (LEZ)

A1.7 The LEZ was implemented as a key measure to improve air quality in Greater London. It entails charges for vehicles entering Greater London not meeting certain emissions criteria, and affects diesel-engined lorries, buses, coaches, large vans, minibuses and other specialist vehicles derived from lorries and vans. Since 1 March 2021, a standard of Euro VI has applied for HGVs, buses and coaches, while a standard of Euro 3 has applied for large vans, minibuses and other specialist diesel vehicles since 2012.

Ultra Low Emission Zone (ULEZ)

A1.8 London's ULEZ was introduced on 8 April 2019. The ULEZ currently operates 24 hours a day, 7 days a week in the same area as the current Congestion Charging zone. All cars, motorcycles, vans and minibuses are required to meet exhaust emission standards (ULEZ standards) or pay an additional daily charge to travel within the zone. The ULEZ standards are Euro 3 for motorcycles, Euro 4 for petrol cars, vans and minibuses and Euro 6 for diesel cars, vans and minibuses. The ULEZ does not include any requirements relating to heavy vehicle (HGV, coach and bus) emissions, as these are addressed by the amendments to the LEZ described in Paragraph A1.7.

A1.9 The ULEZ currently covers the entire area within the North and South Circular roads, applying the emissions standards set out in Paragraph A1.8. The ULEZ is to be expanded across all London boroughs in August 2023.

Other Measures

A1.10 Since 2018, all taxis presented for licencing for the first time had to be zero emission capable (ZEC). This means they must be able to travel a certain distance in a mode which produces no air pollutants, and all private hire vehicles (PHVs) presented for licensing for the first time had to meet Euro 6 emissions standards. Since January 2020, all newly manufactured PHVs presented for licensing for the first time had to be ZEC (with a minimum zero emission range of 10 miles). The Mayor's aim is that the entire taxi and PHV fleet will be made up of ZEC vehicles by 2033.

A1.11 The Mayor has also proposed to make sure that TfL leads by example by cleaning up its bus fleet, implementing the following measures:

- TfL will procure only hybrid or zero emission double-decker buses from 2018;
- a commitment to providing 3,100 double decker hybrid buses by 2019 and 300 zero emission single-deck buses in central London by 2020;
- introducing 12 Low Emission Bus Zones by 2020;
- investing £50m in Bus Priority Schemes across London to reduce engine idling; and
- retrofitting older buses to reduce emissions (selective catalytic reduction (SCR) technology has already been fitted to 1,800 buses, cutting their NOx emissions by around 88%).

A2 Construction Dust Assessment Procedure

A2.1 The criteria developed by IAQM (2016), upon which the GLA's guidance is based, divide the activities on construction sites into four types to reflect their different potential impacts. These are:

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

A2.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A2.3 An assessment is required where there is a human receptor within 350 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

A2.4 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

A2.5 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

A2.6 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

A2.7 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table A2.1.

Table A2.1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	
Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
Small	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months
Construction	
Large	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout [a]	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

A2.8 The sensitivity of the area is defined taking account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

A2.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in Table A2.2. These receptor sensitivities are then used in the matrices set out in Table A2.3, Table A2.4 and Table A2.5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

A2.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table A2.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A2.11 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix A6.

STEP 4: Determine Significant Effects

A2.12 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.

A2.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

Table A2.2: Principles to be Used When Defining Receptor Sensitivities

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium	users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land	playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM_{10}		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A2.3: Sensitivity of the Area to Dust Soiling Effects on People and Property [6]

[6] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 500 m from sites with a *large* dust emission magnitude for trackout, 200 m from sites with a *medium* dust emission magnitude and 50 m from sites with a *small* dust emission magnitude, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

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

Table A2.4: Sensitivity of the Area to Human Health Effects [6]

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

Table A2.5: Sensitivity of the Area to Ecological Effects [6]

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

Table A2.6: Defining the Risk of Dust Impacts

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

A3 EPUK & IAQM Planning for Air Quality Guidance

A3.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A3.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A3.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A3.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A3.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A3.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A3.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A3.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A3.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A3.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A3.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A3.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A3.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A3.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A3.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A3.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A3.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A3.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A4.

A4 Professional Experience

Dr Denise Evans, BSc (Hons) PhD MIEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 23 years' relevant experience. She has prepared air quality review and assessment reports for local authorities and has appraised local authority air quality assessments on behalf of the UK governments and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

Dr Kate Wilkins, BSc (Hons) MSc PhD MIEnvSc MIAQM

Dr Wilkins is a Senior Consultant with AQC with over five years' experience in the field of air quality. Since joining AQC in January 2018, she has undertaken numerous air quality impact assessments for road traffic, combustion plant and construction dust throughout the UK for both standalone assessments and for EIAs and has also prepared local authority reports and literature reviews. She has contributed her technical skills in programming, specialist software and data analysis to a range of large-scale projects, including the third runway at Heathrow airport. Previously, Kate completed a PhD at the University of Bristol, researching atmospheric dispersion modelling and satellite remote sensing of volcanic ash. Prior to her PhD she spent a year working at the Environment Agency in Flood Risk Management. She is a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

George Chousos, BSc MSc AMIEnvSc AMIAQM

Mr Chousos is a Consultant with AQC, having joined in May 2019. Prior to joining AQC, he completed an MSc in Air Pollution Management and Control at the University of Birmingham, specialising in air pollution control technologies and management, and data processing using R. He also holds a degree in Environmental Geoscience from the University of Cardiff, where he undertook a year in industry working in the field of photo-catalytic technology. Since joining AQC, George has been gaining experience in undertaking air quality assessments, both qualitatively and using atmospheric dispersion modelling, to accompany planning and permitting applications. Projects have ranged in scale, from small scale residential development to Environmental Impact Assessments (EIAs). The assessments have considered the effects on both human health and ecological habitats. George also has experience completing construction dust risk assessments, Air Quality Neutral assessments, Local Authority Annual Status Reports (ASRs), as well as odour assessments.

A5 'Air Quality Neutral'

A5.1 The GLA's London Plan Guidance; Air Quality Neutral (GLA, 2023a) provides an approach to assessing whether a development is air quality neutral. The approach is to compare the expected emissions from the building's energy use and vehicle trips against defined benchmarks for buildings and transport in London.

A5.2 The benchmarks for heating and energy plant (termed 'Building Emissions Benchmarks' or 'BEBs') are set out in Table A5.1, while the 'Transport Emissions Benchmarks' ('TEBs') are set out in Table A5.2.

A5.3 The average trip length and average emission per vehicle are required if there is a need to calculate offset payments. The values given by GLA are set out in Table A5.3 and Table A5.4 respectively.

Table A5.1: Building Emissions Benchmark NO_x Emission Rates ($gNO_x/m^2/annum$) [a]

Land Use [b]	Individual Gas Boilers	Gas Boiler Network	CHP + Gas Boiler Network	Heat Pumps + Gas Boiler Network
Residential (including student accommodation and large-scale purpose-built shared living development)	3.5	5.7	7.8	5.7
Retail	0.53	0.97	4.31	0.97
Restaurants and bars	1.76	3.23	14.34	3.23
Offices	1.43	2.62	11.68	2.62
Industrial	1.07	1.95	8.73	1.95
Storage and distribution	0.55	1.01	4.5	1.01
Hotel	9.47	15.42	38.16	15.42
Care homes and hospitals	9.15	14.90	36.86	14.90
Schools, nurseries, doctors' surgeries, other non-residential institutions	0.90	1.66	7.39	1.66
Assembly and leisure	2.62	4.84	21.53	4.84

[a] Solid and liquid biomass appliances also emit fine particulate matter in addition to NO_x. The benchmark emission rate for particulate matter is zero.

[b] Separate use classes for commercial uses, including retail and offices, have now been replaced by use class E. If these separate uses are specified in the development proposal, they should be used for this assessment. Where the intended use is not specified, or where use class E has been specified, the benchmark for retail should be used.

Table A5.2: Benchmark Trip Rates

Land Use	Annual trips per	Benchmark Trip Rates		
		Central Activities Zone (CAZ)	Inner London (excluding CAZ)	Outer London
Residential (including student accommodation and large-scale purpose-built shared living development)	dwelling	68	114	447
Office / Light Industrial	m^2 (GIA)	2	1	16
Retail (Superstore)	m^2 (GIA)	39	73	216
Retail (Convenience)	m^2 (GIA)	18	139	274
Restaurant / Café	m^2 (GIA)	64	137	170
Drinking establishments	m^2 (GIA)	0.8	8	N/A
Hot food takeaway	m^2 (GIA)	N/A	32.4	590
Industrial	m^2 (GIA)	N/A	5.6	6.5
Storage and distribution	m^2 (GIA)	N/A	5.5	6.5
Hotels	m^2 (GIA)	1	1.4	6.9
Care homes and hospitals	m^2 (GIA)	N/A	1.1	19.5
Schools, nurseries, doctors' surgeries, other non-residential institutions	m^2 (GIA)	0.1	30.3	44.4
Assembly and leisure	m^2 (GIA)	3.6	10.5	47.2

Table A5.3: Emission factors per vehicle-km

Pollutant	Emission factors (g/veh-km)		
	Central Activities Zone (CAZ)	Inner London [a] (excluding CAZ)	Outer London [a]
NOx	0.48	0.39	0.35
$PM_{2.5}$	0.036	0.032	0.028

[a] Inner London and Outer London as defined in the London Plan (GLA, 2021a).

Table A5.4: Average Distance Travelled by Car per Trip

Land use	Distance (km)		
	Central Activity Zone	Inner	Outer
Residential	4.2	3.4	11.4
Office	3.0	7.2	10.8
Retail	9.2	5.5	5.4

A6 Construction Mitigation

A6.1 Table A6.1 presents a set of best-practice measures from the GLA guidance (GLA, 2014) that should be incorporated into the specification for the works. These measures should be written into a Dust Management Plan. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the Dust Management Plan.

Table A6.1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Site Management		
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site		✓
Develop a Dust Management Plan (DMP)		✓
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 site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions 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 ensure that the action taken to resolve the situation is recorded in the log book		✓
Preparing and Maintaining the Site		
Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible		✓
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site		✓
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period		✓
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution	✓	
Avoid site runoff of water or mud		✓
Keep site fencing, barriers and scaffolding clean using wet methods		✓

Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below		✓
Cover, seed, or fence stockpiles to prevent wind whipping		✓
Carry out regular dust soiling checks of buildings within 100 m of site boundary and provide cleaning if necessary	✓	
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly		✓
Agree monitoring locations with the Local Authority		✓
Where possible, commence baseline monitoring at least three months before work begins		✓
Operating Vehicle/Machinery and Sustainable Travel		
Ensure all on-road vehicles comply with the requirements of the London LEZ (and ULEZ)		✓
Ensure all Non-road Mobile Machinery (NRMM) comply with London's NRMM emission standards. Currently, NRMM used on any site within Greater London are required to meet Stage IIIB of EU Directive 97/68/EC (The European Parliament and the Council of the European Union, 1997) and its subsequent amendments as a minimum, while NRMM used on any site within the Central Activity Zone, Canary Wharf or one of London's Opportunity Areas are required to meet Stage IV of the Directive as a minimum. The proposed development is not within an area where this stricter requirement applies. From January 2025, NRMM used anywhere in London will be required to meet stage IV, while from January 2030 the stage V standard will apply. From January 2040 only zero emission machinery will be allowed.		✓
Ensure all vehicles switch off engines when stationary – no idling vehicles		✓
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable		✓
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-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 staff 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 suppression/mitigation, using non-potable water where possible and appropriate		✓
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		✓
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 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		✓
Measures Specific to Earthworks		
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable	✓	
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	✓	
Only remove the cover from small areas during work, not all at once	✓	
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	✓	

A7 Preliminary Air Quality Assessment

Air Quality CONSULTANTS

Preliminary Air Quality Assessment: Broadwater Lake, Hillingdon

December 2022

Experts in air quality management & assessment

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Document Control

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1 Introduction

1.1 This report provides a preliminary air quality assessment, as required by the Greater London Authority's (GLA's) London Plan (GLA, 2021a), for the proposed development at Broadwater Lake, in the London Borough of Hillingdon (LBH) (hereafter referred to as the 'proposed development'). The proposed development comprises a sailing club and outdoor activity centre.

1.2 Policy SI 1 of the London Plan specifically states *"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".*

1.3 This preliminary air quality assessment has thus been undertaken to identify any constraints to the proposed development in terms of air quality, and to allow for air quality design principles to be included within the design of the proposed development. The aim of the preliminary assessment is to assess:

- the most significant sources of pollution in the area;
- constraints imposed on the site by poor air quality;
- appropriate land uses for the site; and
- appropriate design measures that could be implemented to ensure that the proposed development reduces exposure and improves air quality.

1.4 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

1.5 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. The GLA explains where these objectives will apply in London (GLA, 2019). The annual mean objectives for nitrogen dioxide (NO_2), and PM_{10} and $PM_{2.5}$ are considered to apply at the façades of residential properties, schools, hospitals etc., the gardens of residential properties, school playgrounds and the grounds of hospitals and care homes. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

1.6 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
NO_2	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
PM_{10}	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
$PM_{2.5}$	Annual Mean	25 µg/m^3 [a]

[a] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

1.7 The GLA has set a target to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by 2030. This target was derived from an air quality guideline set by the World Health Organisation (WHO) in 2005. In 2021, WHO updated its guidelines, but the London Environment Strategy (GLA, 2018) considers the 2005 guideline of 10 µg/m^3. The guideline is not currently in UK regulations and there is no explicit requirement to assess against it.

2 Baseline Air Quality

2.1 The proposed development is located approximately 1.2 km to the northwest of an Air Quality Management Area (AQMA) declared by LBH for exceedances of the annual mean nitrogen dioxide objective, and approximately 2 km to the east of an AQMA declared by Buckinghamshire Council, also for the annual mean nitrogen dioxide objective. The proposed development is located approximately 3 km to the northwest of one of the GLA's Air Quality Focus Areas, as shown in Figure 1; these are locations with high levels of human exposure where the annual mean limit value for nitrogen dioxide is exceeded.

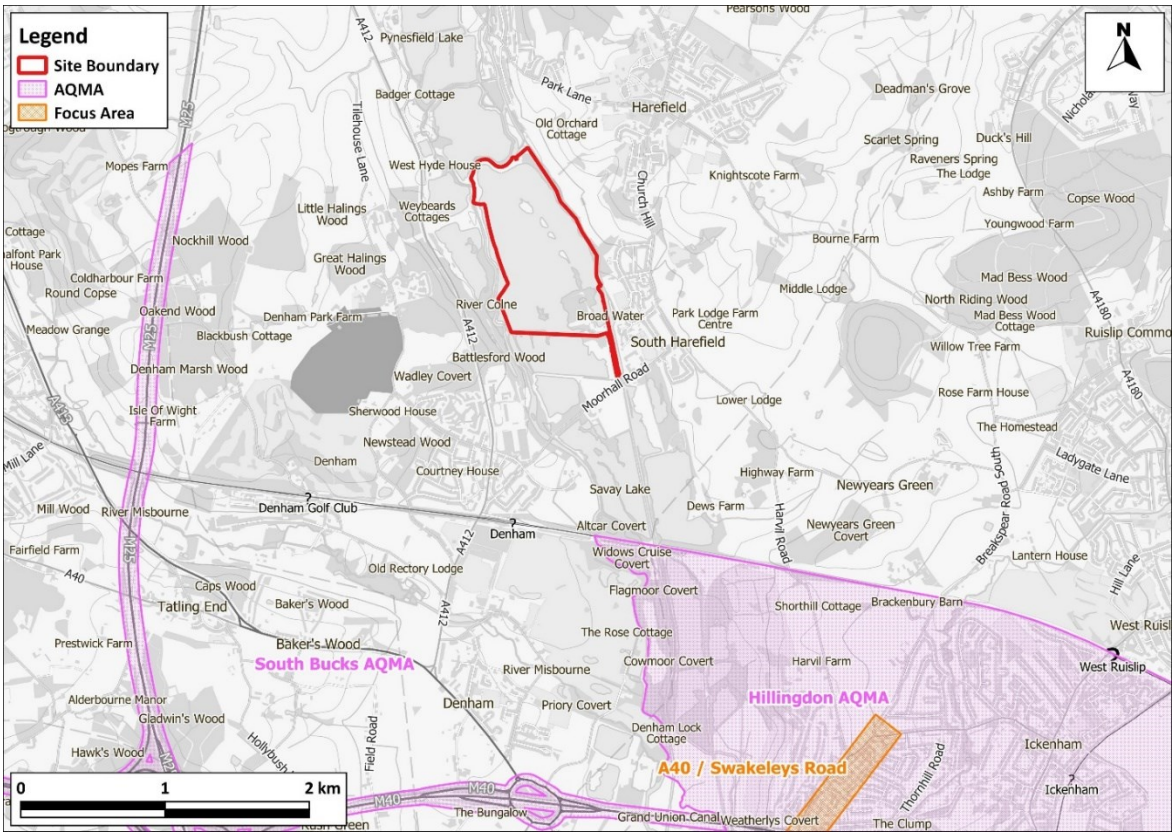

Figure 1: Proposed Development, AQMAs and Focus Areas

2.2 A search of the UK Pollutant Release and Transfer Register website (Defra, 2022a) has not identified any significant industrial or waste management sources that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

2.3 LBH currently operates 12 automatic monitoring stations within its area; however, none of these are in close proximity to the proposed development. LBH also operates a network of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko International Ltd (using the 50% TEA in acetone method). There is one diffusion tube situated within 1.2 km of the proposed development. Annual mean results from this monitoring site for the years 2015 to 2021 are summarised in Table 2, and the location of the diffusion tube is displayed in Figure 2. Although results for 2020 and 2021 are presented for completeness, they should be treated with caution; reduced vehicle activity brought about by the Covid-19 pandemic has generally resulted in reduced pollutant concentrations.

Table 2: Summary of Annual Mean NO_2 Monitoring (2015 – 2021) (µg/m^3) [a]

ID	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
HILL14	Background [b]	Harefield Hospital, Hill End Road	19.8	19.1	22.1	20.5	22.4	15.5	15.4
Objective			**40**						

[a] Data taken from the LBH's Air Quality Annual Status Report (ASR) for 2021 (LBH, 2022).

[b] As described in LBH's 2021 ASR.

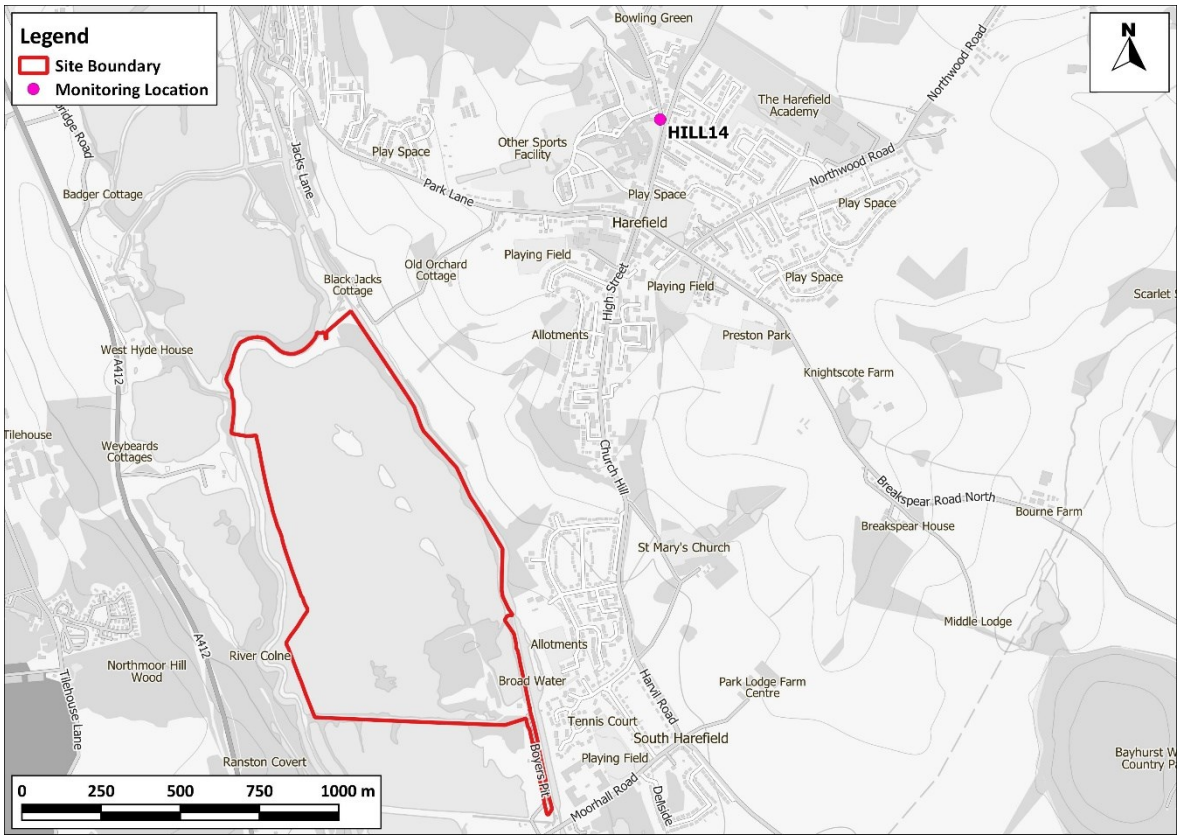

Figure 2: Monitoring Location and the Application Site Boundary

2.4 The data presented in Table 2 confirm that there have been no measured exceedances of the annual mean nitrogen dioxide objective at the 'HILL14' diffusion tube monitoring site in any of the years presented, with measured concentrations well below the objective in each year.

2.5 All measured annual mean nitrogen dioxide concentrations have remained well below 60 µg/m^3 [1] in

[1] Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022b).

all years, indicating that the 1-hour mean nitrogen dioxide objective is unlikely to have been exceeded.

2.6 There is no monitoring of particulate matter concentrations undertaken in close proximity to the proposed development, however, measured concentrations within the Borough have been well below the relevant objectives in recent years at all monitoring sites. The GLA $PM_{2.5}$ target was also met in 2019 at all sites.

3 LAEI Mapped Concentrations

3.1 Modelled annual mean nitrogen dioxide concentrations presented in the London Atmospheric Emissions Inventory (LAEI) database (GLA, 2021b) in the vicinity of the proposed development are shown in Figure 3. The maximum modelled annual mean concentration in 2019 within the proposed development site boundary (located in the southwest corner of the site) is 20.0 µg/m^3, which is well below both the annual mean objective and 60 µg/m^3, indicating that an exceedance of the 1-hour mean objective is unlikely. The maximum 2019 annual mean PM_{10} and $PM_{2.5}$ concentrations within the site boundary are 13.2 µg/m^3 and 9.3 µg/m^3, respectively, well below the relevant objectives and also below the GLA $PM_{2.5}$ target.

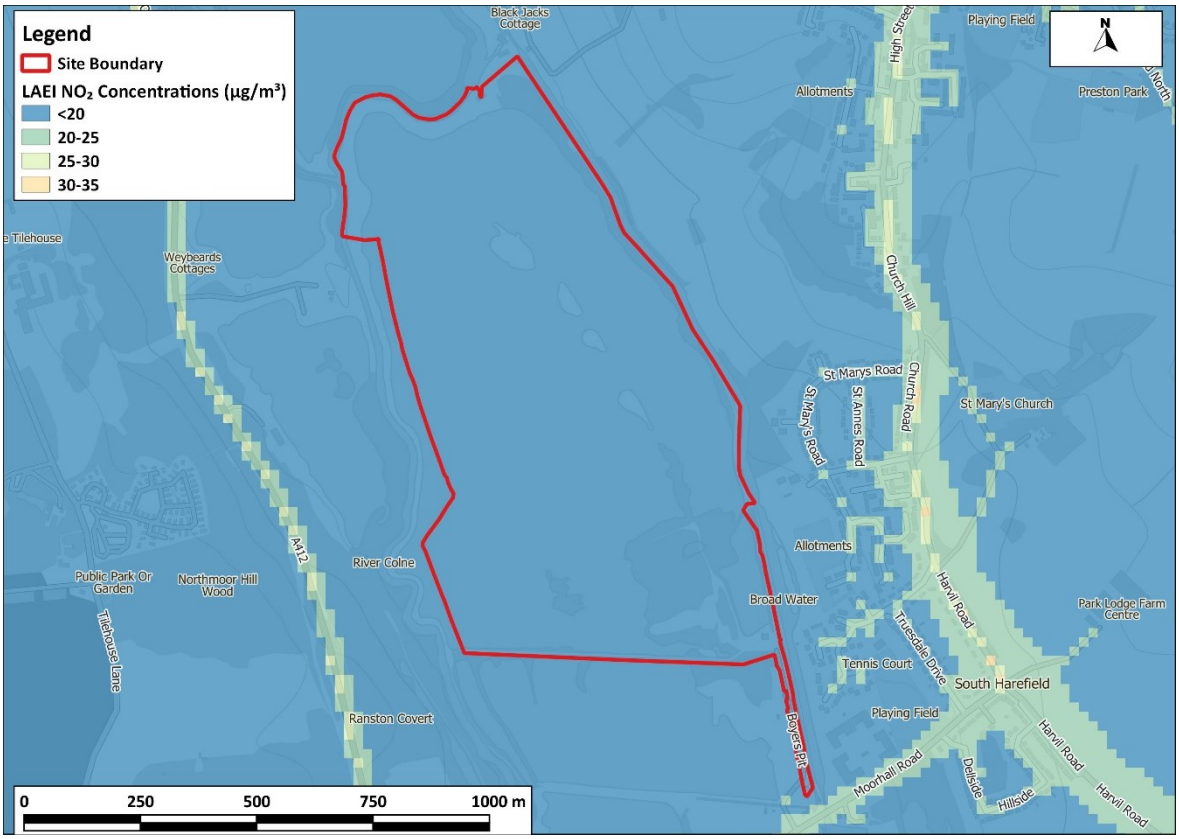

Figure 3: LAEI modelled 2019 NO_2 concentrations

4 Proposed Development Emissions

4.1 The application site is bounded by agricultural land, open space and residential properties to the east, the Broadwater Lake Nature Reserve to the south, River Colne to the west, and Rickmansworth Sailing Club and Horse Shoe Bay to the north. There are two residential properties within the development site boundary that will be retained. The nearest residential properties outside the site boundary are in South Harefield, are shown in Figure 2.

4.2 The trip generation of the proposed development is currently unknown, however, it is anticipated that the proposed development will not generate more than 500 Light Duty Vehicle (LDV) trips, as an Annual Average Daily Traffic (AADT) flow rate, or 100 Heavy Duty Vehicle (HDV) AADT trips on the local road network once operational; on this basis the air quality impacts from development-generated road traffic emissions can be considered to be 'not significant'. Should these thresholds be exceeded, then detailed dispersion modelling of road traffic emissions will need to be undertaken to determine the impact of these emissions upon existing residential properties in the surrounding area.

4.3 It is anticipated that the proposed development will be provided with heat and hot water via a connection to an existing electricity sub-station in the northeast corner of the application site, comprising air/water source heat pumps; the proposals do not include any emergency generators. As such, there will be no associated on-site emissions and there will be no adverse impacts on local air quality as a result.

5 Site Suitability

5.1 The sailing club, outdoor activity centre and any publicly accessible elements of the proposed development represent relevant exposure to the 1-hour mean nitrogen dioxide objective only.

5.2 The data presented in Section 2 confirm that the 1-hour mean nitrogen dioxide objective is unlikely to have been exceeded in close proximity to the proposed development in recent years. Since the proposed development is well away from any nearby main roads, it is reasonable to assume that concentrations will remain well below the objective at the proposed development site, and that future users of the development will experience acceptable air quality.

5.3 Additionally, concentrations are expected to reduce in future years due to a range of national and regional measures, including improvements in emission standards, and the implementation of the London Environment Strategy (GLA, 2018), and therefore concentrations in earliest year of occupation will remain well below the statutory objectives.

6 Air Quality Design Principles

6.1 The following design principles to reduce exposure to air pollution and improve air quality should be considered and incorporated within the design of the proposed development:

- Ensuring that any ventilation air intakes, where proposed, are distanced appropriately from sources of air pollution;
- Maximise access to public transport options, prioritisation of cycle parking, as well as cycle and walking routes to minimise private car trips to and from the site;
- Provision of cycle storage facilities at locations which are easy to access and are close to cycle routes both within and outside of the proposed development, and showers / changing facilities for commercial uses to enable staff to cycle to work;
- Incorporating the Healthy Streets Approach into the scheme to reduce the need to travel, or to promote sustainable transport opportunities;
- Provision of car-sharing schemes, season ticket loans or discount for users; and

- Electric vehicle charging provision in line with the London Plan requirements.

7 Conclusions

7.1 The proposed development is located approximately 1.2 km to the northwest of the closest AQMA and is also located approximately 3 km away from the closest of the GLA's air quality Focus Areas.

7.2 Baseline conditions show pollutant concentrations in the Harefield area to be well below the relevant objectives. Concentrations are expected to reduce in future years through the implementation of stringent vehicle emission standards, reduced background pollutant concentrations and the uptake of zero emission vehicles within the fleet. It is therefore judged that future users will experience acceptable air quality in the anticipated year of opening.

7.3 The trip generation of the proposed development is expected to be below published thresholds, and the impact of additional road traffic emissions will not, therefore, be significant. Further assessment of road traffic emissions will, however, be undertaken if the thresholds are exceeded, to determine the air quality impacts upon sensitive land-uses in the surrounding area, utilising detailed dispersion modelling.

7.4 It is anticipated that the proposed development will be provided with heat and hot water via a connection to an existing electricity sub-station in the northeast corner of the application site, comprising air/water source heat pumps; the proposals do not include any emergency generators. As such, there will be no associated on-site emissions and there will be no adverse impacts on local air quality as a result.

7.5 A list of design principles to reduce exposure to air pollution has been provided, which should be considered and incorporated within the design of the proposed development.

8 References

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9 Glossary

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
Focus Area	Location that not only exceeds the EU annual mean limit value for NO_2 but also has a high level of human exposure
GLA	Greater London Authority
LBH	London Borough of Hillingdon
µg/m^3	Microgrammes per cubic metre
NO_2	Nitrogen dioxide
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide
WHO	World Health Organisation

10 Appendices

A1 Professional Experience

Dr Denise Evans, BSc (Hons) PhD MIEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 23 years' relevant experience. She has prepared air quality review and assessment reports for local authorities and has appraised local authority air quality assessments on behalf of the UK governments and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

Dr Kate Wilkins, BSc (Hons) MSc PhD MIEnvSc MIAQM

Dr Wilkins is a Senior Consultant with AQC with over nine years' postgraduate and work experience in the field of Environmental and Earth Sciences. Since joining AQC in January 2018, she has undertaken numerous air quality impact assessments for road traffic, combustion plant and construction dust throughout the UK for both standalone assessments and for EIAs and has also prepared local authority reports and literature reviews. She has contributed her technical skills in programming and specialist software to a range of large-scale projects, including the third runway at Heathrow airport. Previously, Kate completed a PhD at the University of Bristol, researching atmospheric dispersion modelling and satellite remote sensing of volcanic ash. Prior to her PhD she spent a year working at the Environment Agency in Flood Risk Management. She is a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

George Chousos, BSc MSc AMIEnvSc AMIAQM

Mr Chousos is a Consultant with AQC, having joined in May 2019. Prior to joining AQC, he completed an MSc in Air Pollution Management and Control at the University of Birmingham, specialising in air pollution control technologies and management, and data processing using R. He also holds a degree in Environmental Geoscience from the University of Cardiff, where he undertook a year in industry working in the field of photo-catalytic technology. He is now gaining experience in the field of air quality monitoring and assessment.