BELLWAY HOMES LTD. (NORTH LONDON)

WELWYN GARDEN CITY CAMPUS EAST – STAGE 2

AIR QUALITY ASSESSMENT

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1.0 INTRODUCTION

Proposed Development

1.1 Ardent Consulting Engineers (ACE) have been commissioned by Bellway Homes Ltd (North London) to carry out an air quality assessment (AQA) in support of a planning application for a proposed residential development (hereafter known as the 'Site') located within the Welwyn Hatfield Borough Council (WHBC) area.

1.2 The proposal involves the demolition of all existing buildings and structures followed by the erection of five buildings to provide 313 residential units (Use Class C3) including 30% affordable housing, plus ancillary community building, resident's car parking, cycle storage, refuse storage, hard and soft landscaping, external lighting, drainage, infrastructure and all associated works.

Scope

1.3 This report describes baseline air quality within the study area and considers both the suitability of the Site for the proposed development and the potential impact of the proposed development on local air quality during both the demolition and construction and the operational phases.

1.4 The main air pollutants of concern related to the demolition and construction phase are dust and particulate matter (PM_{10}) from on-site demolition and construction activities and as a result of material tracked out by demolition and construction vehicles, and emissions of nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) from demolition and construction vehicle emissions which may impact on existing sensitive human locations. There is also a potential for impacts on existing designated ecological sites as a result of emissions of nitrogen oxides (NO_x), NO_2 and ammonia (NH_3) from demolition and construction development-generated vehicles.

1.5 The main air pollutants of concern at existing receptors related to the operational phase are emissions of NO_2, PM_{10} and $PM_{2.5}$ associated with operational traffic generation which may impact on existing sensitive human locations. There is also a potential for impacts on nearby designated ecological sites as a result of emissions of NO_X, NO_2 and NH_3 from operational development-generated vehicles.

1.6 The main air pollutants of concern in terms of the suitability of the Site for its proposed end-use are concentrations of NO_2, PM_{10} and $PM_{2.5}$ within the Site as a result of emissions from the local road network, the nearby railway network and background concentrations.

1.7 The proposed energy strategy is anticipated to comprise electric panel heaters with individual air-source heat pumps (ASHPs) to provide hot water[1]. The energy strategy will not produce any on-site emissions and, therefore, does not have the potential to result in significant effects.

1.8 This AQA has been prepared taking into account relevant local and national guidance, policy and legislation.

Consultation

1.9 Consultation has been carried out between ACE and WHBC's Environmental Protection Officer via email correspondence in March 2022 in order to discuss and agree the scope and methodology for this assessment.

[1] Information provided by the project's Energy and Sustainability consultant; Energist.

2.0 LEGISLATION, POLICY AND GUIDANCE

National Air Quality Legislation and Strategy; Human Health

The Air Quality Strategy

2.1 The Air Quality Strategy (Defra, 2007) established the policy framework for ambient air quality management in the UK, with the objective of ensuring a quality of ambient air for all that would not pose a significant risk to health of quality of life. This document set out the National Air Quality Objectives (NAQOs) and the policy for achieving them. It followed part IV of the Environment Act (UK Government, 1995) which introduced a system of Local Air Quality Management (LAQM) requiring local authorities to regularly review and assess air quality within their boundary and appraise plans in light of these assessments.

2.2 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) which should include measures expected to ensure that the NAQOs are met within the AQMA.

National Air Quality Objectives

2.3 NAQOs were defined by The Air Quality Strategy (Defra, 2007) and enshrined in regulations by the Air Quality Standards Regulation (Statutory Instrument, 2010, No 1001) and Air Quality Standards (Amendment) Regulations (Statutory Instrument, 2016 No. 1184) which implemented the European Union Directive on ambient air quality and cleaner air for Europe (Directive 2008/50/EC). Relevant objectives are set out in **Table 2-1**.

2.4 The Environment Act 2021 (UK Government, 2021) establishes a legally binding duty on government to set a long-term target for at least one air quality matter, in addition to a separate requirement to set a target regarding annual mean $PM_{2.5}$ concentrations, by October 2022. An online consultation was undertaken regarding

the proposed new targets[2] (Defra, 2022) between March and June 2022, closing 27th June. As these proposed new targets are still subject to consultation and approval, the consideration of air quality within this AQA is undertaken in the context of the currently approved objectives only, as set out in **Table 2-1**.

Table 2-1: NO_2, PM_{10} and $PM_{2.5}$ Objectives

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour mean	200 µg/m³ not to be exceeded more than 18 times a year
	Annual mean	40 µg/m³
Particulate Matter (PM_{10})	24-hour mean	50 µg/m³ not to be exceeded more than 35[3] times a year
	Annual mean	40 µg/m³ [4]
Particulate Matter ($PM_{2.5}$)	Annual mean	25 µg/m³ [5]
	Annual mean	20 µg/m³ [6]
	Exposure reduction target	15% reduction between 2010 and 2020 at Urban Background sites

2.5 Analysis of long-term monitoring data suggests that if the annual mean NO_2 concentration is less than 60 µg/m³ then the 1-hour mean NO_2 objective is unlikely to be exceeded where road transport is the main source of pollution (Defra, 2022). This concentration has therefore been used in this AQA to screen

[2] Proposed air quality targets are 1) Annual Mean $PM_{2.5}$ Concentration Target of 10 µg/m³ to be met across England by 2040; and 2) Population Exposure $PM_{2.5}$ Reduction Target of a 35% reduction in population exposure by 2040 (as compared to a base year of 2018).

[3] 7 times a year for Scotland.

[4] 18 µg/m³ for Scotland.

[5] 12 µg/m³ for Scotland.

[6] Indicative stage 2 limit value post 2020, derived based on the exposure reduction target of a 15% reduction between 2010 and 2020. This value has been used as the relevant air quality objective throughout this assessment in order to ensure a conservative approach.

whether an exceedance of the 1-hour mean NO_2 objective is likely. Similarly, an annual mean PM_{10} concentration of 32 $\mu g/m^3$ is used to screen whether an exceedance of the 24-hour mean PM_{10} objective is likely.

2.6 Local Air Quality Management Technical Guidance 2016 (LAQM.TG(22)) (Defra, 2022) provides guidance to local authorities as to where NAQOs apply. These are summarised in **Table 2-2**.

Table 2-2: Relevant Exposure

Averaging Period	Relevant Locations	Objectives should apply	Objectives don't usually apply
Annual mean	Where individuals are exposed for a cumulative period of 6 month in a year	Facades of residential properties, schools and hospitals	Gardens, facades of offices, hotels and shops or kerbside sites
24-hour mean	Where individuals are expected to be exposed for 24-hours or longer	As above, with the addition of hotels and gardens of residences	Kerbside sites and areas where the public is unlikely to spend significant time
1-hour mean	Where individuals are expected to spend one hour or longer	As above, with the addition of locations with regular access such as car parks, bus stations, parks and cafes	Locations not publicly accessible or where occupation is not regular

National Air Quality Plan for Nitrogen Dioxide (NO_2) in the UK

2.7 The National Air Quality Plan (Defra and DfT, 2017) was written as a joint venture between The Department For Environment, Food and Rural Affairs (Defra) and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO_2 in the UK. It includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.

2.8 The plan requires all local authorities in England with areas expected not to meet the Objectives by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in *"the shortest time possible".* These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the local authority may need to consider implementation of a Clean Air Zone which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

The Road to Zero Strategy

2.9 The 'Road to Zero' strategy (HM Government, 2018) set out the governments aims regarding zero emissions vehicles. These include the aim that all new cars and vans have zero tailpipe emissions by 2040 and for almost every car to be zero emission by 2050. Measures are aimed at encouraging uptake of the cleanest vehicles and supporting electric charging infrastructure.

Clean Air Strategy

2.10 The Clean Air Strategy (Defra, 2019) sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 µg/m^3 by 50% by 2025.

National Air Quality Legislation; Ecology

2.11 Poor air quality can have a negative impact on ecological habitats as well as human health. The Conservation of Habitats and Species Regulations (Statutory Instrument, 2017) was put in place in order to protect ecological sites following the publication of European Directive 92/43/EEC (European Economic Community (EEC), 1992) regarding the designation of Special Areas of Conservations (SACs) and 2009/147/EC (European Community, 2009) regarding the designation of Special Protection Areas (SPAs). These regulations require that the competent authority (the planning authority in this case) consider whether a development

will have a likely significant effect on an SAC or SPA (known as 'European Sites'). Should this be considered to be likely then an 'appropriate assessment' is required to identify whether the new development will indeed have a significant adverse effect on the ecological site(s).

2.12 The Wildlife and Countryside Act (UK Governmant, 1981) sets out the requirement for the identification of areas of land that are considered to be of 'special interest' (due to flora, fauna and / or geological or physiographical features) as Sites of Special Scientific Interest (SSSIs), and the Countryside and Rights of Way (CROW) Act (HM Government, 2000) sets out the specific protections afforded to SSSI, stating that where a development is 'likely to damage' a SSSI then the appropriate conservation body must be consulted.

2.13 The Environment Act (UK Government, 1995) and the Natural Environment and Rural Communities Act (HM Government, 2006) set out a general requirement for conservation of biodiversity.

Critical Levels

2.14 Critical levels have been set for a number of gaseous pollutants. These are the concentrations of pollutants below which there is no known harmful effects on vegetation or ecosystems. These levels have been set by UK government and are considered to be relevant objectives for all internationally designated sites, as well as for nationally designated sites such as SSSIs, and locally designated sites such as Local Nature Reserves (LNRs) and Ancient Woodlands (AWs). The relevant critical levels are set out in **Table 2-3**.

Table 2-3: Ecological Critical Levels

Pollutant	Time Period	Objective
Nitrogen Oxides (expressed as NO_2)	Annual Mean	30 µg/m^3
Ammonia (NH_3)	Annual Mean	3 µg/m^3 (unless lichens or bryophytes are present, then 1 µg/m^3)

Critical Loads

2.15 Critical loads represent the amount of pollutant deposited to a given ecosystem over a year, below which it is understood that there is no harmful effect to the ecosystem. Critical loads have been identified for a number of different types of ecosystem, based on their sensitivity to adverse effects. Critical loads for the deposition of nitrogen have been set for the protection from eutrophication, whilst critical loads for the purpose of protection against acidification have been set for deposition of both nitric acid and sulphuric acid, together termed as acid deposition. Critical loads for sensitive ecological sites vary throughout the UK.

Planning Policy

National Planning Policy

2.16 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2021) sets out the Government's planning policies for England and how they expect these to be implemented. Consideration of air quality within planning is considered an important element of this framework which recommends that transport and the potential impact on the environment should be considered at an early stage in order to allow for mitigation or even avoidance of impacts through location and layout of developments.

2.17 It is recommended that both the impacts of a potential development on the environment and the risk to new development from existing pollution be taken into account when planning policy is drafted. Furthermore these should contribute to compliance with relevant limit values or objectives and should be consistent with any local AQAP.

2.18 The NPPF also recommends that *"existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

2.19 The NPPF also states that:

"*Planning policies and decisions should contribute to and enhance the natural and local environment by:*

- *Protecting and enhancing…sites of biodiversity or geological values…*
- *minimising impacts on…biodiversity…"*

2.20 The Planning Practice Guidance (PPG) provides guidance on how planning can enact the policies set out in NPPF. It is set out as separate papers for different sectors and, therefore, the 'Air Quality' PPG (Ministry of Housing, Communities and Local Government, 2019) is aimed at addressing policy relating specifically to air quality. This document gives guidelines for when air quality is likely to be relevant to a planning decision:

"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."

2.21 The 'Air Quality' PPG also states that more detailed information such as whether the development could have a significant impact on air quality, baseline air quality and whether occupiers of the development could experience poor air quality may be required in order to make an informed decision. Further, it notes that any assessment should be proportionate, taking into account the scale of the proposed development, as well as any potential impacts.

2.22 Some suggestions on mitigation measures are set out within the PPG, such as separation distances, filtration/ventilation, green infrastructure, promotion of low emission forms of transport, control of dust and emissions from demolition and construction and, finally, contributing funding to measures such as those identified in AQAPs to offset impacts from the development.

Local Policy

WHBC Local Plan

2.23 WHBC published their 'Draft Local Plan Proposed Submission' in August 2016 which sets out the Council's planning framework for the Borough by identifying how much and what type of development is needed, and where it should or should not be accommodated (WHBC, 2016). The Draft Local Plan covers the period between 2013 and 2032 and includes the following relevant policies:

- Policy SP 11 – 'Protection and enhancement of critical environmental assets' states the following:

  "The protection, enhancement and management of the environmental, ecological and historic assets within the borough, will be sought commensurate with their status, significance and international, national and/or local importance …

  … Development that would secure positive improvements to and ensure the long-term conservation of ecological … assets for the enjoyment of future generations will be supported…";

- Policy SADM 18 'Environmental Pollution' states the following:

  "When considering development proposals, the Council will adopt the approach set out below to ensure that pollution will not have an unacceptable impact on human health, general amenity, critical environmental assets or the wider natural environment …

  Air Quality

  Prevailing air quality and potential impacts upon air quality arising from airborne emissions, dust and odour associated with the construction and operation of a proposal (including vehicular traffic) will be considered when determining planning applications. Proposals that would result in or be subject to unacceptable risk to human health and the natural environment from air pollution, or would prejudice compliance with national air quality objectives, will be refused.

An Air Quality Assessment that demonstrates how prevailing air quality and potential impacts upon air quality have been considered and how air quality will be kept to an acceptable standard through avoidance and mitigation will be required for major and minor development proposals that are:

i. Likely, due to the nature of the proposal, to give rise to significant air pollution;

ii. Within an Air Quality Management Area;

iii. Within 50 metres of a major road[7] or heavily trafficked route[8];

iv. Within proximity to a source of air pollution which could present a significant risk to human health; and/or

v. Particularly sensitive to air pollution due to their nature, such as schools, health care establishments or housing for older people.

The potential impact of proposals upon odour levels, or their sensitivity to prevailing sources and levels of odour, should be considered and addressed. Where appropriate, the Council will require an Odour Impact Assessment to be provided, including an Odour Management Plan where necessary."

2.24 Until the new Draft Local Plan is formally adopted, the current 'Welwyn Hatfield District Plan' remains in place (WHBC, 2005) and includes the following relevant policy:

- Policy R18 'Air Quality' states the following:

[7] "As defined under the Environmental Noise (England) Regulations 2006 Regulation 3(8) – trunk roads, motorways and principal or classified roads with more than three million vehicle passages a year; and considered by the Secretary of State to be regional, national or international. In 2016, the A1(M), A414, A1000, A1001, A1057 and A6129 met this definition".
[8] "Heavily trafficked routes in the borough are defined as the B156, B197, B656, B1000 and Coopers Green Lane."

"The Council will have regard to the potential effects of a development on local air quality when determining planning applications. Consideration will be given to both the operational characteristics of the development and to the traffic generated by it. Any development within areas designated as Air Quality Management Areas must have regard to guidelines for ensuring air quality is maintained at acceptable levels as set out in the Air Quality Strategy."

Assessment Guidance

2.25 This assessment has been based on a number of guidance documents, the most significant of which are set out below:

Local Air Quality Management Technical Guidance (LAQM.TG(22))

2.26 The LAQM.TG(22) guidance (Defra, 2022) was published for use by local authorities in review and assessment work, but also includes a number of technical guidelines on carrying out modelling assessment and management of monitoring data which set out best practice and are, therefore, relevant to all air quality assessments.

Land-Use Planning and Development Control: Planning for Air Quality

2.27 The Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published joint guidance on the assessment of air quality impacts for planning purposes (EPUK & IAQM, 2017). This includes information on when an air quality assessment is required, what should be included in an assessment and the assessment of significance.

Guidance on the Assessment of Dust from Demolition and Construction

2.28 The IAQM have produced guidance which includes a methodology for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout (IAQM, 2014). This is then used to identify the level of mitigation necessary in order for the overall residual effect to be 'not significant'.

A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites

2.29 The IAQM guidance on 'Assessment of Air Quality Impacts on Designated Nature Conservation Sites' (IAQM, 2020) sets out the appropriate approach for this element of assessment. Due to the complexity of ecological impacts, an air quality professional alone can only identify whether emissions are unlikely to have a significant impact when compared against the relevant critical load / level. Where it cannot be ascertained that emissions are below this level, the combined input of both an air quality professional and an ecologist is required; the former to identify any changes to concentrations of deposition and the latter to consider the overall effect taking into consideration the location and sensitivity of any given habitat.

3.0 METHODOLOGY

3.1 The methodology set out in the following sections has been identified as being the most appropriate approach to assess potential impacts associated with the proposed development, along with any required mitigation.

Baseline Air Quality

3.2 Information regarding 'current'[9] and 'future'[10] baseline air quality has been obtained by collating the results of monitoring carried out by WHBC, referring to identified AQMAs, considering any exceedances of the EU Limit Values predicted by Defra's Pollution Climate Mapping (PCM) model (Defra, 2020a) or measured by any nearby Automatic Urban and Rural Network (AURN) monitoring site(s) and by considering predicted background concentrations defined based on the national pollution maps published by Defra (Defra, 2020b).

Demolition and Construction Dust Impacts

3.3 There is a potential for dust and PM_{10} from onsite activities and off-site trackout during the demolition and construction period to have an impact on sensitive human and ecological receptors within the study area.

3.4 The suspension of dust and particulate matter is related to weather conditions and wind direction, ground and particle characteristics and on-site activities. There is a potential for impacts to occur when dust generating activities coincide with dry, windy conditions and where sensitive receptors are located downwind of the dust source.

3.5 Separation distance is an important factor as large particles (>30 µm) which are responsible for most dust annoyance largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m but are less likely to trigger annoyance. Significant annoyance is therefore generally limited to a few

[9] The 'current' baseline year for the purposes of this assessment has been taken to be 2019 as this is the most recent year for which representative local monitoring data are available.

[10] The 'future' baseline year has been taken to be 2026 as this is the earliest year that any part of the proposed development is anticipated to be occupied.

hundred metres of the source. Small particles (<10 µm) are deposited slowly and may travel up to 1 km. Whilst these particles are responsible for most impacts on human health, impacts are not likely to be experienced at significant distance due to dispersion effects.

3.6 The assessment of demolition and construction dust impacts has been carried out following the IAQM 'Guidance on the Assessment of Dust from Construction and Demolition' (IAQM, 2014). Within the guidance, an 'impact' is described as a change in pollutant concentration or dust deposition and an 'effect' is described as the consequence of an impact.

3.7 The assessment considers three potential dust impacts:

- Loss of amenity due to dust soiling;
- Human health effects due to an increase in concentrations of PM_{10}; and
- Harm caused to ecological receptors due to dust deposition.

3.8 Full details of the approach taken to assessing dust are provided in **Appendix B**. The stages of the assessment are:

- Identify whether there are sensitive receptors within the relevant distances (study area) for site activities during the demolition and construction phase;
- Assess risk of dust impacts for each site activity type (demolition, earthworks, construction and trackout) – this includes identifying the emissions magnitude for each activity type, the sensitivity of the area and then combining these factors to identify risk;
- Identify mitigation measures, based on assessed risk, sufficient to ensure off-site effects are 'not significant'; and
- Assess impacts with mitigation in place. This should normally result in residual effects which are 'not significant'.

3.9 The IAQM guidance makes it clear that no assessment of the significance of effects without mitigation should be carried out as mitigation measures will be required due to planning conditions as well as best practice for demolition and construction

companies. The IAQM guidance also states that the residual effect, taking into account the proposed mitigation will usually be 'not significant'.

Development-Generated Demolition and Construction Road Traffic Impacts

Human Health

3.10 The potential impacts on existing sensitive locations as a result of development-generated demolition and construction traffic have been qualitatively assessed taking into consideration the likely volumes, composition and routing of development-generated demolition and construction traffic, the anticipated duration of the demolition and construction period and any anticipated mitigation measures that are likely to be applied.

3.11 Where it is not possible to screen out significant effects from road sources, detailed modelling is then generally required.

Ecology

3.12 The potential impacts on nearby designated ecological sites as a result of development-generated demolition and construction traffic have been qualitatively assessed taking into consideration the likely volumes, composition and routing of development-generated demolition and construction traffic, the anticipated duration of the demolition and construction period and any anticipated mitigation measures that are likely to be applied.

3.13 Where it is not possible to screen out significant effects from road sources, detailed modelling and / or additional assessment in conjunction with an ecologist is then generally required.

Development-Generated Operational Road Traffic Impacts

Human Health

Screening Assessment

3.14 The EPUK/IAQM guidance 'Land Use Planning and Development Control: Planning for Air Quality' (EPUK & IAQM, 2017) includes a list of indicative criteria for where

a detailed air quality assessment would be needed. The relevant criteria for screening air quality impacts relating to additional traffic are:

- An increase in Light Duty Vehicle (LDV) traffic of >500 annual average daily traffic (AADT) (or >100 AADT within or adjacent to an AQMA); and/or
- An increase in Heavy Duty Vehicle (HDV) traffic of >100 AADT (or >25 AADT within or adjacent to an AQMA).

3.15 The above criteria apply to any individual link and therefore, a development generating >500 AADT (or >100 AADT within an AQMA) may be considered to fall below the screening criteria where the increase is spread over a number of different road links.

3.16 Where it is not possible to screen out significant effects from road sources, detailed modelling is then generally required.

Ecology

Screening Assessment

3.17 Based on the IAQM guidance (IAQM, 2020) there is a potential for 'significant' effects on ecology as a result of transport emissions in cases where sensitive designated ecological sites are located within 200 m of a road where a development alone, or in combination with other committed developments, will increase traffic flows by >1,000 total AADT and / or >200 HDV AADT.

3.18 In cases where committed development traffic is not available and / or the screening criteria referenced by the IAQM guidance is exceeded, then an alternative screening criteria of >50 total AADT and / or >10 HDV AADT for development-generated operational traffic only is commonly used.

3.19 Where it is not possible to screen out significant effects from road sources, detailed modelling and / or additional assessment in conjunction with an ecologist is then generally required.

Site Suitability

Screening Assessment

3.20 The potential for exceedances of the relevant objectives at sensitive locations within the proposed development has been screened qualitatively, taking into consideration the location of proposed sensitive receptors in relation to nearby emission sources (including local roads and railway lines), the layout of the proposed development and baseline air quality conditions within the Site and in the surrounding area.

3.21 Where it is not possible to screen out the potential for significant effects, detailed assessment is then generally required.

3.22 The potential for significant effects as a result of emissions associated with moving locomotives using the nearby railway line has been assessed using the screening criteria outlined within LAQM.TG(22) (Defra, 2022)**.** This guidance outlines that there is only a risk of exceedances of the annual mean NO_2 objective as a result of moving locomotives in instances where:

- There is relevant exposure within 30 m of rail lines with a heavy traffic of diesel passenger trains (as set out within the guidance); AND
- Background annual mean NO_2 concentrations are >25 µg/m^3.

3.23 Where it is not possible to screen out the potential for significant effects, then further assessment is generally required.

Air Quality Impacts Significance Criteria

3.24 In the absence of official guidance in the UK on how to assess the significance of the air quality impacts for a new development, this assessment has been limited to a comparison of predicted pollutant concentrations within the proposed development, against the relevant objectives (as set out in **Table 2-1** and **Table 2-2**).

4.0 BASELINE CONDITIONS

Site Context and Study Area

4.1 The Site is set within urban surroundings, predominantly consisting of residential properties, commercial premises and educational facilities. The Site is bound to the north by residential properties, to the east by the Great Northern route railway line and Welwyn rail depot, to the south by a supermarket with incorporated car parking and to the west by College Way, residential properties and Oaklands College Welwyn Garden City Campus. The Site is currently occupied by the Campus East car park.

4.2 The Sherrardspark Wood SSSI, LNR and AW is located approximately 650 m to the west and northwest of the Site.

4.3 The study area in relation to air quality has been defined as:

- For the demolition and construction dust risk assessment, the study area is the area up to 350 m from the Site boundary and up to 50 m of the route(s) used by demolition and construction vehicles on the public highway (up to 500 m from the site exit(s)). This is based on the IAQM guidance (IAQM, 2014);
- For the assessment of the effect of demolition and construction and operational development-generated traffic on human health, the study area incorporates all main roads (and adjacent sensitive human receptors) along which vehicles generated by the proposed development may travel;
- For the assessment of the effect of demolition and construction and operational development-generated traffic on ecology, the study area incorporates all main roads located within 200 m of a designated ecological site along which vehicles generated by the proposed development may travel, as well as parts of the designated ecological site located within 200 m of the road;
- For the assessment of Site suitability, the study area has been identified as the area within the boundary of the Site and sources which will influence this area.

EU Limit Values and Clean Air Zones

4.4 WHBC has not been identified by The National Air Quality Plan (Defra and DfT, 2017) as being required to implement a CAZ, nor produce a local action plan to address predicted exceedances of the NO_2 EU Limit Value within its area.

4.5 There are no AURN monitoring sites located in close proximity to the Site and, therefore, no nearby exceedances of the EU Limit Values have been measured.

4.6 Defra's PCM model does not predict any exceedances of the NO_2 annual mean EU Limit Value on roads in close proximity to the Site in 2019 or 2026. No exceedances of the PM_{10} and $PM_{2.5}$ EU Limit Values were predicted in close proximity to the Site in 2018, 2020[11] and 2025.

LAQM

4.7 WHBC has assessed air quality within its area as part of its responsibilities under LAQM. There are no declared AQMAs within the Borough.

Monitoring

4.8 WHBC carried out NO_2 monitoring at 33 diffusion tube monitoring sites in 2019. The closest and most representative locations are identified in **Figure 4-1** and measured concentrations from 2015 to 2020[12] are shown in **Table 4-1.**

4.9 Exceedances of the NO_2 annual mean objective were measured at monitoring sites WH2 and WH18 in 2016. However, published concentrations from WH2 in 2016 appears to have been annualised as the monitor was moved during the year. Concentrations did not exceed 60 µg/m^3 at any of the identified monitoring sites

[11] 2019 data are not available for PM and, therefore, data for 2018, 2020 and 2025 have been considered instead.

[12] As a result of the Covid-19 pandemic and associated behavioural changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 are not considered to be representative of 'normal' conditions. As such, measured 2020 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

between 2015 and 2019, suggesting that exceedances of the 1-hour mean objective were not likely during this period at these monitoring sites.

4.10 Overall, a trend of decreasing measured NO_2 concentrations is apparent at diffusion tube monitoring site WH18 from 2015 to 2019 and at diffusion tube monitoring site WH28 from 2016 to 2019. No trend can be identified for WH2, WH8, WH11 or WH16 as these monitors were moved one or more times during the 5 year period and results are therefore not comparable over time.

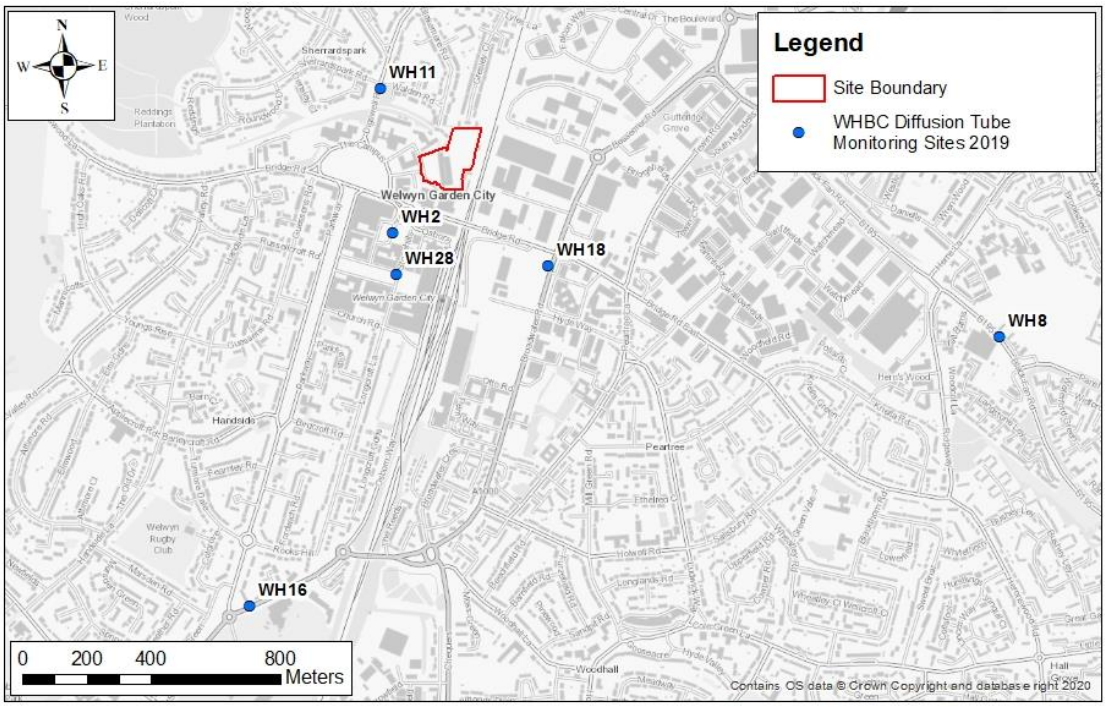

Figure 4-1: Local Monitoring Locations (2019)

Table 4-1: Measured Annual Mean NO_2 Concentrations (µg/m³)

Site ID	Site Name	Site Type	2015	2016	2017	2018	2019	2020
Diffusion Tube Sites								
WH2 [a]	Parkway, WGC	Urban Background	24	24	-*	-*	-*	-*
	Wigmores North, WGC		-*	**43**	35	21	22	-*
	Bessemer Road	Roadside	-*	-*	-*	-*	-*	27
WH8[a,b]	Black Fan Road, Opp Morrisons	Roadside	-*	-*	-*	-*	27	21
WH11[a,b]	Digswell Road, WGC	Roadside	-*	-*	-*	28	29	-*
	Knightsfield, WGC	Roadside	-*	-*	-*	-*	-*	16
WH16[a,b]	Stanborough Road, Near Stanborough Close	Roadside	-*	-*	-*	-*	38	30
WH18	B195 / Broadwater Road, WC	Roadside	35	**40**	37	35	31	24
WH28	Taxi Rank, WGC	Roadside	-*	33	27	25	24	17
Objective			**40**					

Exceedances of the annual mean objective are shown in **BOLD.**
Data taken from WHBC's 2020 Air Quality Annual Status Report (ASR) (WHBC, 2020).
[a] Where diffusion tube monitor have been relocated between 2015 and 2020, annual mean NO_2 concentrations have been presented for each location. Where there is overlap from two separate monitoring locations in a single year, annual mean NO_2 concentrations have been presented for both years.
[b] Where previous diffusion tube monitor locations are not representative of the study area, results have not been presented.
*No data available.

4.11 WHBC also carried out $PM_{2.5}$ monitoring at WHBAM 'Great North Road / A1000' automatic monitoring site in 2019, however, this monitoring site is not located in close proximity to the development Site.

4.12 WHBC did not undertake monitoring of PM_{10} within its area.

Predicted Background Concentrations

4.13 Predicted background concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been obtained from national maps provided by Defra (Defra, 2020b).

4.14 The mapped NO_2 backgrounds were compared against concentrations measured at a local background monitoring site. Details of the calibration are shown in **Appendix C**. The calibrated NO_2 backgrounds are shown in **Table 4-2**.

4.15 It has not been possible to calculate specific PM_{10} or $PM_{2.5}$ calibration factors as there are no suitable nearby PM monitoring sites. The uncalibrated PM_{10} and $PM_{2.5}$ backgrounds are shown in **Table 4-2**.

4.16 The predicted background concentrations are all well below the relevant objectives within the Site in both 2019 and 2026.

Table 4-2: Predicted Annual Mean Background Concentrations (µg/m³)

Year	Location	NO_2	PM_{10}	$PM_{2.5}$
2019	Site West	22	14	10
	Site East	26	15	10
2026	Site West	17	13	9
	Site East	20	14	9
Objectives		**40**	**40**	**20**

Predicted concentrations are rounded as appropriate taking into consideration the level of accuracy of the data source as well as the relevant objectives.

5.0 PREDICTED IMPACTS

Demolition and Construction Dust Impacts

Screening Assessment

5.1 The primary potential effects during the demolition and construction phase relate to annoyance and loss of amenity caused by dust soiling, health impacts relating to PM_{10} and ecological impacts due to dust deposition. Based on the screening criteria set out by the IAQM, it is considered necessary to carry out a demolition and construction dust risk assessment as there are sensitive human receptors within 350 m of the development Site boundary and within 50 m of the roads along which dust may be tracked out by demolition and construction vehicles.

5.2 There are no designated ecological sites located within 50 m of the Site boundary and /or roads along which dust may be tracked and, therefore, the assessment of dust deposition on ecological sites can be scoped out.

Further Assessment

Dust Emission Magnitude

5.3 The dust emission magnitude relating to demolition, earthworks and construction activities and as a result of trackout have been determined based on the IAQM guidance (as set out in **Appendix B**).

5.4 Proposed demolition activities include the demolition of the existing car parking facility with a volume of approximately <20,000 m^3. The dust emission magnitude associated with demolition activities is, therefore, considered to be 'small'.

5.5 Proposed earthworks activities include excavation for the foundations of the proposed development. Works could extend up to approximately 22,000 m^2 (the approximate area of the Site). The soil composition at the Site is deep with a loam to clayey loam / locally chalky texture and a glacial till subsoil with mixed grains being argillaceous[13] to rudaceous[14] in size (UK Soil Observatory, 2022). As such,

[13] Typical particle size of <0.06 mm.

[14] Typical particle size of > 2.0 mm.

the soil composition is considered to have the potential to be moderately dusty and, therefore, the dust emission magnitude associated with earthworks activities is considered to be 'large'.

5.6 The development will involve the construction of six residential blocks, ranging between three and six storeys in height, with an estimated total building volume of between 25,000 m^3 and 100,000 m^3 in total. The dust emission magnitude associated with construction activities is, therefore, considered to be 'medium'.

5.7 The maximum number of vehicles exiting the Site which may track material onto roads is unknown, however, given the size and nature of the demolition and construction activities at the Site, peak movements are expected to be between 10 and 50 HDVs per day. Based on this, the dust emission magnitude associated with trackout is considered to be 'medium'.

Area Sensitivity

5.8 The sensitivity of the area to dust soiling impacts and human health impacts has been assessed based on the criteria shown in **Appendix B**.

5.9 Residential properties and educational facilities are considered to be of 'high' sensitivity' to dust soiling. There are between 10 and 100 residential properties and the Oaklands College Welwyn Garden City Campus[15] located within 20 m of the Site boundary. As such, the sensitivity of the area surrounding the Site to dust soiling impacts is considered to be 'high'.

5.10 The guidance states that trackout can occur on roads up to 500 m from 'large' sized sites. As demolition and construction vehicle routing is not currently known, the worst-case assumption has been made that all main roads may be used by vehicles exiting the Site, and that dust and mud may be tracked up to 500 m along these roads from the Site exit(s). There are between 10 and 100 residential

[15] When considering the number of receptors present within affected areas of the Oaklands College Welwyn Garden City Campus, the approach of considering each individual within the college as a single receptor has been taken, as this is worst-case and will provide a more conservative assessment.

properties and the Oaklands College[15] located within 20 m of roads along which material may be tracked. The sensitivity to dust soiling impacts relating to trackout is, therefore, considered to be 'high'.

5.11 Residential properties and educational facilities are also considered to be of 'high' sensitivity in terms of human health impacts. For the purposes of the demolition and construction dust risk assessment, the assumption has been made that annual mean concentrations of PM_{10} within the study area are comparable to background concentrations in the 'current'[9] year (i.e. 15 µg/m^3, as shown in **Table 4-2**). Taking into account the assumed background PM_{10} concentrations and the number of sensitive receptors located within 20 m of the Site boundary (see Paragraph 5.9) and within 20 m of the roads where trackout may occur (see in Paragraph 5.10), the sensitivity of the surrounding area to human health impacts is, therefore, considered to be 'medium' for on-site activities and 'medium' for trackout activities.

Risk of Impacts

5.12 The risk of demolition and construction dust impacts, without mitigation, has been assessed based on the tables provided in **Appendix B** and the identified risks are shown in **Table 5-1**.

Table 5-1: Risk of Demolition and Construction Dust Impacts Without Mitigation

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

5.13 Overall, taking into consideration the risks set out in **Table 5-1**, appropriate mitigation measures corresponding to a 'high' risk site are required, although where measures relate to demolition, construction and trackout activities only, measures corresponding to a 'medium' risk site will be sufficient. The recommended list of mitigation measures is set out in **Section 6.0**.

5.14 The IAQM recommends that no judgement of the significance of demolition and construction dust effects should be made without taking mitigation into account.

This is due to the fact that mitigation measures are assumed to be secured by planning conditions and legal requirements as well and construction codes of conduct. Following implementation of the recommended mitigation (as set out in **Section 6.0**), residual effects will be 'not significant'.

Development-Generated Demolition and Construction Road Traffic Impacts

Human Health

5.15 The volume of demolition and construction traffic generated by the proposed development is not available, however, there is likely to be significant fluctuation in the numbers of vehicle movements associated with proposed development throughout the demolition and construction period. When these vehicle movements are averaged over a year, they will be significantly lower than peak movements.

5.16 Volumes of demolition and construction traffic generated by the proposed development are anticipated to be lower than volumes of development-generated operational traffic, as this is typically the case for developments of this size and type. This being the case, it is reasonable to expect that impacts associated with emissions from demolition and construction vehicles will be less adverse than those described in Paragraph 5.23.

5.17 It should also be taken into consideration that any impacts associated with the demolition and construction phase will be temporary in nature, with the demolition and construction phase anticipated to have a maximum duration of up to four years. Furthermore, it is anticipated that a Construction Environmental Management Plan (CEMP) is likely to be developed and will include measures to minimise emissions associated with demolition and construction vehicles, thus further reducing any potential impacts.

5.18 On the basis of the above, it is judged that the overall effect of development-generation demolition and construction traffic on nearby existing sensitive human receptors is likely to be 'not significant'.

Ecology

5.19 As described in Paragraph 5.15, specific details regarding the volume and routing of demolition and construction traffic generated by the proposed development are not available, however, the average vehicle movements during the demolition and construction phase are likely to be significantly lower than peak movements. The volume and routing of demolition and construction traffic associated with nearby committed developments in the local area are also not known.

5.20 Volumes of demolition and construction traffic generated by the proposed development are anticipated to be lower than volumes of development-generated operational traffic, as this is typically the case for developments of this size and type. This being the case, it is reasonable to expect that impacts associated with emissions from demolition and construction vehicles will be less adverse than those described in Paragraph 5.27.

5.21 It should also be noted that the construction period will be temporary (with an anticipated duration of approximately four years) and it is likely that emissions will be controlled through the implementation of a CEMP.

5.22 On the basis of the above, it is judged that the overall effect of development-generated demolition and construction traffic on nearby sensitive designated ecological sites is likely to be 'not significant'.

Development-Generated Operational Road Traffic Impacts

5.23 The proposed development is anticipated to generate approximately 1,040 total AADT (comprising 10 HDV AADT) during the operational phase[16]. However, when operational traffic associated with the (currently operational) existing use of the Site (i.e. the Campus East car park) is taken into account, the proposed development is expected to result in a net reduction in traffic of approximately 10 total AADT during the operational phase[16].

[16] Traffic data have been provided by the project's transport consultant; ACE.

Human Health

5.24 The operational traffic generation falls below the EPUK/IAQM screening criteria (see Paragraphs 3.14 and 3.15) and, therefore, it is possible to screen out the overall effect of development-generated operational traffic on existing sensitive human receptors as being 'not significant' without the need for further detailed assessment.

Ecology

5.25 The 'Sherrardspark Wood' SSSI, LNR and AW are located within 200 m of Brockswood Road, along which proposed development-generated operational traffic is anticipated to travel.

5.26 As the volume and routing of operational traffic associated with nearby committed developments is not known, it is not possible to directly compare combined proposed development and committed development operational traffic flows with the relevant screening criteria (see Paragraph 3.17). As such, the alternative screening criteria (see Paragraph 3.18) has been considered.

5.27 The operational traffic generation falls below the alternative screening criteria (see Paragraph 3.18) and, therefore, it is possible to screen out the overall effect of development-generated operational traffic on nearby sensitive designated ecological sites as being 'not significant', without the need for further detailed assessment.

Site Suitability

5.28 The proposed development will introduce new areas of sensitive exposure which are sensitive to the annual mean and short-term NO_2, PM_{10} and $PM_{2.5}$ objectives (i.e. the proposed residences).

5.29 The Site is located adjacent to College Way (a minor road) on the southwestern boundary and is located to the north of Bridge Road (B195).

5.30 The proposed residences are set back approximately 50 m from College Crescent and by approximately 80 m from the B195. As pollutant concentrations reduce rapidly with distance from the source such as local roads, it is reasonable to expect

emissions associated with College Crescent and the B195 to disperse considerably before reaching the closest facades of the proposed residences. As such, all of the proposed residences are likely to experience pollutant concentrations comparable to background conditions. Predicted background annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ are well below the annual mean objectives in 2019[9] and 2026[10] (i.e. the earliest year of development occupation) (see **Table 4-2**). Moreover, background diffusion tube monitoring site WH2, which is set back from the B195 at a similar distance as the proposed development Site in 2019 and therefore considered to be representative of concentrations within the Site, measured 22 µg/m^3 of NO_2 in 2019 (as presented in **Table 4-1**); well below the annual mean NO_2 objective.

5.31 Furthermore, it is reasonable to assume that receptors within the development Site will experience lower concentrations than those measured at the WH18 diffusion tube monitoring site, located approximately 360 m to the southeast of the Site, which measured 31 µg/m^3 in 2019 (as presented in **Table 4-1**), since this monitoring site is located 5 m from Broadwater Road, as well as the WH11 diffusion tube monitoring site, located approximately 250 m to the northwest of the Site, which measured 29 µg/m^3 in 2019 (as presented in **Table 4-1**), since this monitoring is located 2 m from Digswell Road; the closest façades of the proposed properties are set well back from the these roads, as discussed in Paragraph 5.30.

5.32 On the basis that concentrations of pollutants within the Site are anticipated to be well below the relevant objectives in 2019 based on local monitoring, background conditions, the proximity of the development Site to nearby emission sources, and the reasonable assumption that air quality will improve between 2019 and the earliest proposed year of operation (i.e. 2026), it is judged that future residents of the proposed development will experience good air quality and the Site is considered suitable for the proposed end-use.

5.33 Sensitive locations within the proposed development are located within 30 m of nearby railway lines. However, these lines are not identified by the LAQM.TG(22) (Defra, 2022) as having a heavy traffic of diesel passenger trains, and annual mean background NO_2 concentrations within the Site are predicted to be <25 µg/m^3 by the earliest proposed year of operation (i.e. 2026) (see **Table 4-2**).

As such, according to the screening criteria set out in LAQM.TG(22) (see Paragraph 3.22), it is possible to screen out the potential risk of exceeding the annual mean NO_2 objective as a result of emissions associated with moving locomotives.

6.0 MITIGATION

Embedded Mitigation

6.1 It should be taken into account that, the proposed development will reduce the number of trips generated by the Site, thus providing a real-world benefit in terms of transport emissions.

6.2 Furthermore, the proposed development already includes the following mitigation measures which will further reduce emissions associated with operational development-generated transport[16]:

- 310 no. cycle parking spaces will be provided on-site;
- 92 no. electric vehicle charging points will be provided at the Site (i.e. EV charging will be provided for 50% of parking spaces); and
- A Travel Plan will be implemented at the Site, with the aim of encouraging sustainable travel patterns at the development, in particular by cycling and walking modes. This will be monitored with targets set to ensure progress is made towards more sustainable travel patterns once the site is operational.

Demolition and Construction Dust

6.3 The following standard mitigation measures have been identified as being appropriate for a 'high' risk site for earthworks activities and 'medium' risk for demolition, construction and trackout activities (see **Table 5-1**). This is based on the recommendations within the IAQM's 'Guidance on the assessment of dust from demolition and construction' (IAQM, 2014).

6.4 A Dust Management Plan (DMP) should be submitted to WHBC prior to works commencing on Site.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager; and

- Display the head or regional office contact information.

Dust Management

- Develop and implement a DMP, which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM_{10} continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;

- Make the complaints log available to the local authority when asked;

- Record any exceptional incidents that cause dust and/or air quality pollutant emissions, either on- or off- site, and the action taken to resolve the situation in the log book; and

- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary;

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;

- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and

- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and maintaining the site

- Plan 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 actives for an extensive period;

- Avoid site runoff of water or mud;

- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced 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; and
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;

- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and

- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;

- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and

- Bag and remove any biological debris or damp down such material before demolition.

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; and

- Only remove the cover in small areas during work and not all at once.

Construction

- Avoid scabbling (roughening of concrete surfaces), if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);

- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors where possible.

Development-Generated Demolition and Construction Traffic Impacts

6.5 The overall effects, without mitigation, of traffic generated by the proposed development during the demolition and construction phase on existing sensitive human and ecological receptors in the study area are likely to be 'not significant'. Therefore, no further mitigation measures are considered to be necessary.

Development-Generated Operational Traffic Impacts

6.6 The overall effects, without mitigation, of traffic generated by the proposed development during the operational phase on existing sensitive human and ecological receptors in the study area will be 'not significant'. Therefore, no further mitigation measures are considered to be necessary.

Site Suitability

6.7 Future[10] concentrations of pollutants at sensitive locations within the proposed development Site are anticipated to be well below the relevant objectives. Therefore, air quality for future residents is considered to be good and no mitigation is recommended as being necessary.

7.0 CONCLUSIONS

7.1 The potential air quality impacts associated with the proposed residential development at the Campus East Site, in WHBC have been assessed.

7.2 There is the potential for dust and PM_{10} impacts during the demolition and construction phase. However, with the proposed mitigation measures in place, the overall residual effect will be 'not significant'.

7.3 Taking into consideration anticipated volumes of demolition and construction traffic, the maximum duration of the demolition and construction phase and the anticipated implementation of a CEMP, it is judged that the overall effects of emissions from development-generated demolition and construction traffic on existing sensitive human and ecological receptors are likely to be 'not significant'.

7.4 The impacts of operational traffic generation associated with the proposed development have been considered and are anticipated to fall below the relevant screening criteria. As such, the overall effect of development-generated traffic on existing sensitive human and ecological receptors will be 'not significant'.

7.5 The impact of pollutant concentrations within the Site on future residents of the proposed development has been qualitatively assessed. Taking into consideration the proximity of the development Site to nearby emission sources, the proposed development layout and baseline air quality conditions within the Site and in the local area, it is anticipated that pollutant concentrations at sensitive locations within the proposed development will be well below the relevant objectives. As such, it is judged that new residents of the proposed development will experience good air quality and the Site is, therefore, suitable for its proposed end-use.

7.6 Overall, it is concluded that there are no air quality constraints to the proposed development which is in accordance with local, regional and national policy and guidance.

8.0 REFERENCES

Defra. (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Norwich: HMSO.

Defra. (2019). Clean Air Strategy. London: HMSO.

Defra. (2020a). *2020 NO2 and PM10 Projections Data (2018 Reference Year)*. Retrieved from UK Air: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data

Defra. (2020b, March 10). *LAQM Support.* Retrieved from Defra: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

Defra. (2022). *Consultation on Environmental Targets.*

Defra. (2022). Local Air Quality Management Technical Guidance.

Defra and DfT. (2017). UK plan for tackling roadside nitrogen dioxide concentrations. London: HMSO.

Directive 2008/50/EC. (n.d.). Ambient air quality and cleaner air for Europe.

EPUK & IAQM. (2017). Land-Use Planning and Development Control: Planning For Air Quality. London: IAQM.

European Community. (2009, November 30). Directive 2009/147/EC on the Conservation of Wild Birds.

European Economic Community (EEC). (1992, May 21). Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive).

HM Government. (2000). Countryside and Rights of Way Act.

HM Government. (2006). Natural Environment and Rural Communities Act.

HM Government. (2018). Road to Zero Strategy. London: HMSO.

IAQM. (2014). Guidance on the assessment of dust from demolition and construction. London: IAQM.

IAQM. (2020, May). A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites.

Ministry of Housing, Communities and Local Government. (2019). Planning Practice Guidance. London: HMSO.

Ministry of Housing, Communities and Local Government. (2021). National Planning Policy Framework. London: HMSO.

Statutory Instrument. (2010, No 1001). Air Quality Standards Regulations. London: HMSO.

Statutory Instrument. (2016 No. 1184). The Air Quality Standards (Amendment) Regulations 2016. London: HMSO.

Statutory Instrument. (2017). No. 1012 The Conservation of Habitats and Species Regulations. London: HMSO.

UK Governmant. (1981). *Wildlife and Countryside Act.*

UK Government. (1995). Part IV Environment Act. London: HMSO.

UK Government. (2021). Environment Act.

UK Soil Observatory. (2022). *UK Soil Map Viewer*. Retrieved from UK Soil Observatory: http://mapapps2.bgs.ac.uk/ukso/home.html

UNESCO. (1971). *Convention on Wetlands of International Importance especially as Waterfowl Habitat.*

WHBC. (2005). Welwyn Hatfield District Plan.

WHBC. (2016, August). Draft Local Plan Proposed Submission.

WHBC. (2020, November). 2020 Air Quality Annual Status Report (ASR).

Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
ACE	Ardent Consulting Engineers
AQA	Air Quality Assessment
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
ASHP	Air Source Heat Pumps
ASR	Annual Status Report
AURN	Automatic Urban and Rural Network
AW	Ancient Woodland
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
CROW Act	Countryside and Rights of Way Act
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube (DT)	A passive sampler used for collecting NO_2 in the air
DMP	Dust Management Plan
EC	European Community
EEC	European Economic Community
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes, includes Heavy Goods Vehicles and buses
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle; a vehicle with a gross vehicle weight equal to or less than 3.5 tonnes, includes Light Goods Vehicles, cars and motorbikes
LGV	Light Goods Vehicle
LNR	Local Nature Reserve
NAQO	National Air Quality Objective as set out in Air Quality Strategy and the Air Quality Regulations
NH_3	Ammonia
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides, generally considered to be nitric oxide and NO_2. The main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles and natural gas used in gas-fired boilers.
NPPF	National Planning Policy Framework
PCM	Pollution Climate Mapping

Abbreviations	Meaning
PM_{10} or $PM_{2.5}$	Small airborne particles less than 10/2.5 µg in diameter
PPG	Planning Practice Guidance
PV	Photovoltaic
Receptor	A location where the effects of pollution may occur
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
ULEV	Ultra-Low Emission Vehicle
WHBC	Welwyn Hatfield Borough Council

Appendix B IAQM Dust Assessment Approach

B1 Step 1: Screen the need for an assessment

B1.1 Step 1 is the screen the need for an assessment against the following criteria:

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

B1.2 Where there are no sensitive receptors within these distances, it can be concluded that the impact is negligible and no further assessment relating to construction dust impacts is required.

B2 Step 2: Assess the risk of dust impacts

B2.1 The risk of dust at sufficient quantum to cause annoyance/health/ecological impacts should be based on:

- The scale and nature of the works (potential dust emission magnitude) (**Table B.1**); and
- The sensitivity of the area to dust impacts based on the matrices shown in **Table B.2** and **Table B.3**.

B2.2 These factors are then combined to determine the risk of dust impacts without mitigation applied for each of the four activities (Demolition, Earthworks, Construction and Trackout) following the matrices shown in **Table B.4**, **Table B.5** and **Table B.6**.

Table B.1: Potential Dust Emission Magnitude

Size	Definition
Demolition	
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.
Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level.
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.
Earthworks	
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.
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.
Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height.
Construction	
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching.
Large	Total building volume >100, 000 m^3, on site concrete batching, sandblasting.
Trackout	
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 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.
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.

Table B.2: Sensitivity of the Area to Dust Soiling Effects on People and Property

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
	<10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B.3: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<350
High	>32 µg/m³ [a]	>100	High	High	High	Low
		10-100	High	High	Medium	Low
		<10	High	Medium	Low	Low
	28-32 µg/m³ [b]	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		<10	High	Medium	Low	Low
	24-28 µg/m³ [c]	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		<10	Medium	Low	Low	Low
	<24 µg/m³ [d]	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
Medium	>32 µg/m³ [a]	>100	High	Medium	Low	Low
		10-100	Medium	Low	Low	Low
		<10	Medium	Low	Low	Low
	28-32 µg/m³ [b]	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
	24-28 µg/m³ [c]	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
	<24 µg/m³ [d]	>100	Low	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table B.4: Risk of Impacts – Demolition

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

Table B.5: Risk of Impacts – Earthworks and Construction

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

Table B.6: Risk of Impacts – Trackout

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

B3 Step 3: Site-specific Mitigation

B3.1 Based on the outcome of Step 2, appropriate mitigation measures are recommended. The guidance includes a list of mitigation measures for Low, Medium and High Risk sites but final recommendations should be based on professional judgement and take into account particular site sensitivities and differences in risk for different activities or areas of the site. The mitigation recommended in the guidance are shown in **Table B.7**.

Table B.7: Mitigation Measures

Mitigation Measure	Low Risk	Medium Risk	High Risk
Communications			
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H	H	H
3. Display the head or regional office contact information.	H	H	H
Dust Management			
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	D	H	H
Site Management			
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H	H	H
6. Make the complaints log available to the local authority when asked.	H	H	H
7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.	H	H	H
8. Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	N	N	H
Monitoring			
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	D	D	H

Mitigation Measure	Low Risk	Medium Risk	High Risk
10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	H	H	H
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H	H	H
12. Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	N	H	H
Preparing and maintaining the site			
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	D	H	H
16. Avoid site runoff of water or mud.	H	H	H
17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H
18. 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.	D	H	H
19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H
Operating vehicle/machinery and sustainable travel			
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	H	H	H
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H

Mitigation Measure	Low Risk	Medium Risk	High Risk
23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced 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).	D	D	H
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	H	H
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	N	D	H
Operations			
26. 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.	H	H	H
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H	H	H
28. Use enclosed chutes and conveyors and covered skips.	H	H	H
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H
30. 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.	D	H	H
Waste Management			
31. Avoid bonfires and burning of waste materials.	H	H	H
Demolition			
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	D	D	H
33. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H	H	H
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H
35. Bag and remove any biological debris or damp down such material before demolition.	H	H	H

Mitigation Measure	Low Risk	Medium Risk	High Risk
Earthworks			
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	N	D	H
37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	N	D	H
38. Only remove the cover in small areas during work and not all at once.	N	D	H
Construction			
39. Avoid scabbling (roughening of concrete surfaces) if possible.	D	D	H
40. 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.	D	H	H
41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	N	D	H
42. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D
Trackout			
43. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	D	H	H
44. Avoid dry sweeping of large areas.	D	H	H
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H
46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H
47. Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H
50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H
51. Access gates to be located at least 10 m from receptors where possible.	N	H	H

(H = Highly Recommended, D = Desirable and N = Not Recommended)

B4 Step 4: Determine Significant Effects

B4.1 Recommended mitigation measures should be sufficient to ensure that the impact is normally 'not significant'. There may at times be limitations to appropriate mitigation measures (such as a lack of water) and therefore, an assessment should always be made based on the characteristic of each site and the surrounding area.

B5 Step 5: Dust Assessment Report

B5.1 The dust assessment report should include enough detail to ensure that the basis for the determination of emission magnitude and sensitivity of the area, and therefore the site risk, are clear. The required mitigation so also be set out within the report, along with a description of the mechanism that will ensure that the appropriate level of mitigation will be implemented (such as through a planning condition).

Appendix C Background Calibration

C1.1 To ensure that annual mean background concentrations used in this assessment reflect real-world conditions as accurately as possible, a calibration exercise has been carried out, utilising NO_2 data measured in 2019 at the WH2 diffusion tube monitoring site (see **Figure 4-1** and **Table 4-1**).

C1.2 Measured annual mean NO_2 concentrations have been compared against Defra background annual mean NO_2 concentration predictions for each pollutant **(Defra, 2020b)** at the same location in order to provide a NO_2 calibration factor for the monitoring site. Background input data and calculated calibration factors are presented in **Table C.1**.

Table C.1: Background Calibration

Pollutant	NO_2
Monitor	WH2
Measured Concentration (µg/m³)	22
Data Capture (%)	92
Mapped Concentration (µg/m³)	14
Calibration Factor	1.54 [a]

Concentrations are rounded as appropriate taking into consideration the level of accuracy of the data sources.
[a] Based on unrounded number.

C1.3 The calibration factors suggest that mapped annual mean NO_2 background concentrations for the area are lower than measured annual mean NO_2 background concentrations in the area. Mapped annual mean background NO_2 concentrations have, therefore, been calibrated by the calculated calibration factor for the purposes of this assessment.

C1.4 No suitable nearby background PM_{10} or $PM_{2.5}$ monitoring is undertaken in close proximity to the Site. As such, mapped annul mean PM_{10} and $PM_{2.5}$ background concentrations have not been calibrated.