Air Quality Assessment

Residential Development

2 Gloucester Road, Luton

1st September 2023

ENVIRONMENTAL AND
SUSTAINABILITY CONSULTANTS

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Executive Summary

Encon Associates were Amir Jaffer (the 'Client') to carry out an air quality assessment in connection with the proposed redevelopment of a site at 2 Gloucester Road, Luton (the 'Site'). It is proposed to demolish the existing building and construct a mixed-use building providing commercial use at ground and 1st floor level and residential above.

The Site falls within the administrative boundary of Luton Borough Council (LBC). Due to exceedances of the national air quality annual mean objective for nitrogen dioxide, (NO_2), the Council has declared three Air Quality Management Area (AQMA). The Site does not fall within an AQMA however, Luton AQMA No. 3 is located approximately 0.25 to the southwest. The development proposals have been assessed in respect of local air quality taking into account existing baseline concentrations and the location of the AQMA.

It is inevitable that with any development, demolition and construction activities will cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind can lead to soiling of property including windows, cars, external paintwork and laundry. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of 50 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

Due to the proximity of nearby residential receptors the Site is considered to have a medium risk of impacts with regards to dust soiling during construction but a low risk of impacts during demolition, earthworks, construction and trackout. The site is considered to have a low risk with regards to PM_{10}

concentrations from construction but a negligible risk associated with all other activities and phases. However, following the implementation of appropriate mitigation measures impacts associated with the construction of the development are likely to be insignificant.

The baseline assessment has concluded that pollution levels at the Site are currently meeting the relevant air quality objective limits for NO_2, PM_{10} and $PM_{2.5}$. Impacts in terms of exposure will therefore be negligible.

The development will not provide any onsite parking and will therefore be car free. Operational impacts on local air quality will be negligible.

The proposed development would meet current national and local planning policy and based on the results of this assessment air quality does not pose a constraint to development of the Site for the proposed use.

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1 Introduction

1.1 General

Encon Associates were commissioned by CLIENT (the 'Client') to carry out an air quality assessment in connection with the proposed redevelopment of a site at 2 Gloucester Road, Luton (the 'Site'). It is proposed to demolish the existing building and construct a mixed-use building providing commercial use at ground floor level and residential above.

The Site falls within the administrative boundary of Luton Borough Council (LBC). Due to exceedances of the national air quality annual mean objective for nitrogen dioxide, (NO_2), the Council has declared three Air Quality Management Area (AQMA). The Site does not fall within an AQMA however, Luton AQMA No. 3 is located approximately 0.25 to the southwest. The development proposals have been assessed in respect of local air quality taking into account existing baseline concentrations and the location of the AQMA.

A glossary of common air quality terminology is provided in Appendix A.

1.2 Scope of Assessment

The development will include demolition of the existing building and the construction of a new 8-storey mixed-use building. The potential impacts of the operational development have been assessed in accordance with current air quality planning guidance published by the Institute of Air Quality management (IAQM)[1].

Air quality at the Site has also been assessed to determine the suitability of the Site for residential development. The assessment has concentrated on nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm and 2.5 µm (PM_{10} and $PM_{2.5}$), the pollutants most associated with traffic emissions and which can be harmful and cause discomfort to humans.

[1] EPUK & IAQM (2017) Land-use Planning & Development Control: Planning for Air Quality

An assessment of air quality impacts associated with the construction of the proposed development has been undertaken following the methodology set out within the Institute of Air Quality Management (IAQM) guidance[2].

The scope of the assessment has been discussed and agreed with Andrew Loosley, Technical Officer (Environmental Protection) at LBC via email correspondence dated 22nd June 2023.

[2] IAQM (January 2014) Guidance on the Assessment of Dust from Demolition and Construction. Version 1.1

2 Site Description

2.1 The Existing Site

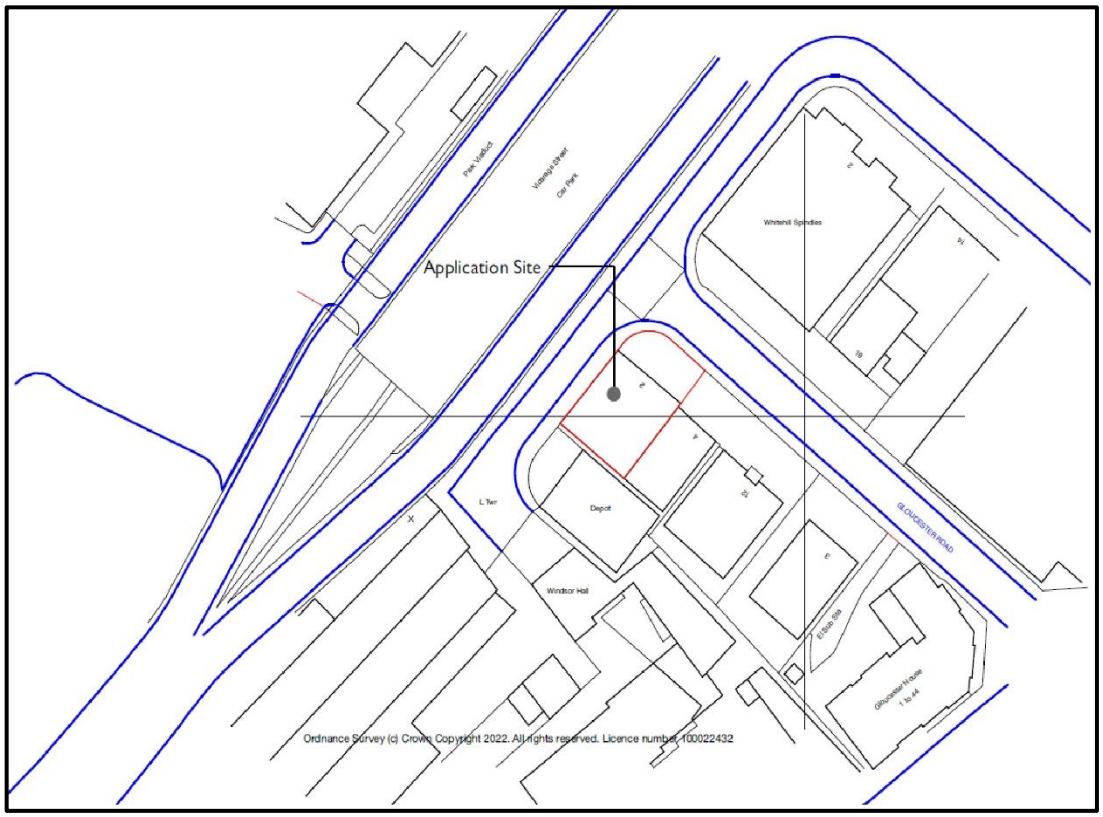
The Site is located at 2 Gloucester Road, Luton, on the corner with Bolton Road, approximately 10 m from the A505.

The Site currently houses the Redeemed Christian Church of God, a two-storey single building with parking for 2-3 cars accessed from Gloucester Road.

The Site is surrounded by commercial premises however there are residential dwellings in the wider area, the nearest being the student flats, part of the student village at Wenlock Court, Manor Road, approximately 16m to the south-west, to the rear of 2-10 Boulton Road. Further residential flats are located within Gloucester House on the corner of Gloucester Road and Manor Road, 50m to the south-east.

The site extends to approximately 430 m^2 in area and the location of the Site is presented in red in Figure 2.1.

Figure 2.1: Location of proposed development site



2.2 Proposed Development

The proposed application is for the demolition of the existing building and the construction of an 8-storey building providing 2 no. business units at ground and 1st floor and 15 no. residential flats at 1st floor up to 8th floor. The proposals also include for 38 cycle storage spaces, external communal amenity space at 6th floor level and a green roof.

An indicative site layout of the Site is shown in Figures 2.2 and 2.3.

Figure 2.2: Layout of Proposed Development at Ground Floor Level

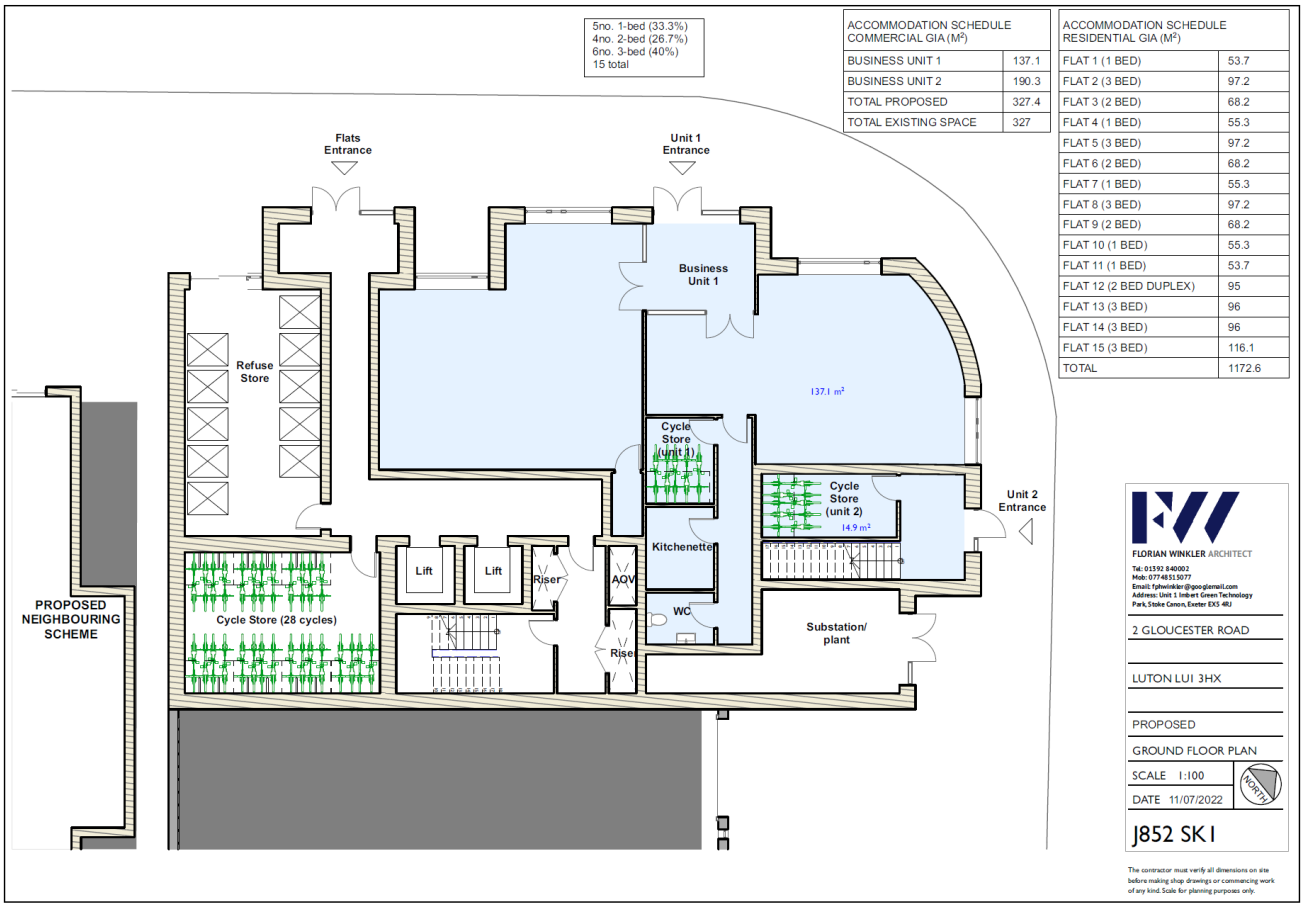
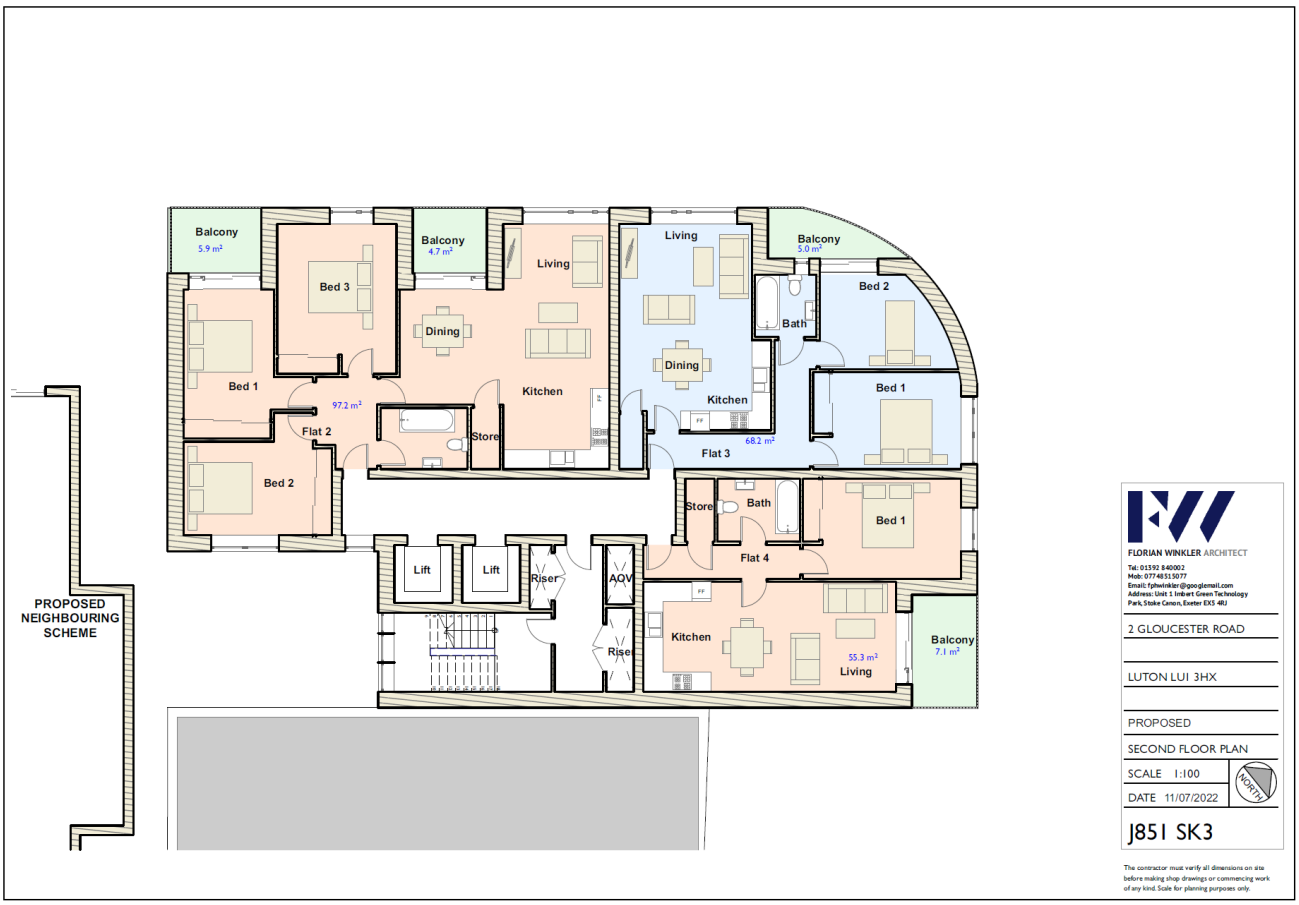


Figure 2.2: Layout of Proposed Development at 2nd Floor Level



3 Policy Context

3.1 National Legislation and Policy

3.1.1 Air Quality Regulations

The Air Quality Standards Regulations 2010[3] and Air Quality EU Exit Regulations 2019[4] set out a series of limit values for the protection of human health and critical levels for the protection of vegetation. The UK is currently exceeding the objective limits for NO_2 and PM_{10} within London and a number of other air quality zones within the UK.

3.1.2 The UK Air Quality Strategy

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007[5], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

The AQS sets standards and national air quality objectives (NAQO) for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), oxides of nitrogen (NO_x), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

[3] Air Quality Regulations 2010 – Statutory Instrument 2010 No. 1001
[4] Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 – Statutory Instrument 2019 No. 74
[5] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007

The air quality objectives are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Of the pollutants included in the AQS, NO_2 and PM_{10} would be particularly relevant to this project as these are the primary pollutants associated with road traffic. The current statutory standards and objectives for NO_2 and PM_{10} in relation to human health are set out in Table 3.1.

The NAQO's for NO_2 and PM_{10} were to have been achieved by 2005 and 2004 respectively, but also continue to apply in all future years thereafter.

In relation to $PM_{2.5}$ the 2019 Clean Air Strategy[6] includes a commitment to set '*new, ambitious, long-term targets to reduce people's exposure to $PM_{2.5}$'* which the proposed Environment Bill 2019-2021 commits the Secretary of State to setting. New legal targets are set out in the recently published Environmental Improvement Plan (EIP) 2023[7] and recently published Statutory Instrument '*The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023*[8] . These have yet to be set in legislation. For the purposes of this assessment the limit value for $PM_{2.5}$ (as provided in Table 3.1) is considered to be appropriate to apply for this assessment. However, the new targets set out in the EIP are also provided in Table 3.1 and given consideration within the report.

[6] Defra. (2019). Clean Air Strategy. London: HMSO
[7] HM Government, Environmental improvement Plan 2023, First Revision of the 25 Year Environment Plan
[8] The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 – Statutory Instrument 2023 No.96

Table 3.1: Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As	Date to be Achieved by
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m^3	Annual mean	31 December 2005
Particulate Matter (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004
Particulate Matter ($PM_{2.5}$)	20 µg/m^3	Annual Mean	31 December 2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3 (Long-term Target)	Annual Mean	31 December 2040
	12 µg/m^3 (Interim Target)	Annual Mean	31 January 2028

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))[9] issued by the Defra for Local Authorities, on where the

[9] Defra (2022) Local Air Quality Management. Technical Guidance LAQM.TG(22)

NAQOs apply as detailed in Table 3.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

Table 3.2: Locations Where Air Quality Objectives Apply

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

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

The National Air Quality Plan[10] was written as a joint venture between the Defra and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO_2 in the UK. It includes a

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

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. The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values 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 LA may need to consider implementation of a Clean Air Zone (CAZ) 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.

3.1.4 Road to Zero Strategy

The 'Road to Zero' strategy[11] sets out the government's plans to encourage zero emissions vehicles. These include the aim that by 2040 all new cars and vans will have zero tailpipe emissions and by 2050 almost every car will have zero emissions. Measures within the Strategy are aimed at encouraging the uptake of the cleanest vehicles and supporting electric charging infrastructure.

3.1.5 Clean Air Strategy

The Clean Air Strategy[12] sets out policies to lower national emissions of pollutants in order to reduce pollution and human exposure. It aims to create a strong framework to tackle air pollution and to

[11] HM Government. (2018). Road to Zero Strategy. London: HMSO
[12] Defra. (2019). Clean Air Strategy. London: HMSO

reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 µg/m^3 by 50% by 2025.

3.1.6 Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[13] states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

- *'any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and*
- *'any accumulation or deposit which is prejudicial to health or a nuisance'.*

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the proposed development, the main potential for nuisance of this nature would arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

3.2 Planning Policy

3.2.1 National Planning Policy

The National Planning Policy Framework (NPPF)[14] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and

[13] Secretary of State, The Environment Act 1990 HMSO

[14] Ministry of Housing, Communities and Local Government: National Planning Policy Framework (July 2021)

policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*'

Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 174) requires that *'planning policies and decisions should contribute to and enhance the natural local environment by …preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality.*'

In dealing specifically with air quality the NPPF (paragraph 186) states 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.*'

Paragraph 188 states that *'the focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or*

emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively'.

3.2.2 Local Planning Policy

Luton Local Plan 2011-2031

The Luton Local Plan[15], adopted November 2017, sets out the vision, objectives and spatial planning strategy for the whole of Luton Borough Council's area for the period up to 2031. The relevant local planning policy in respect of air quality is Policy LLP38 – Pollution and Contamination, which states:

'Pollution

Evidence on the impacts of development will need to demonstrate whether the scheme (individually or cumulatively with other proposals) will result in any significantly adverse effects with regard to air, land or water on neighbouring development, adjoining land, or the wider environment. Where adverse impacts are identified, appropriate mitigation will be required. This policy covers chemical, biological, and radiological contamination and the effects of noise, vibration, light, heat, fluid leakage, dust, fumes, smoke, gaseous emissions, odour, explosion, litter and pests.

A. Development should provide for the satisfactory disposal of surface water to deliver water quality improvements to receiving water courses and aquifers where feasible and, together with wastewater disposal, should not be detrimental to the management and protection of water resources. In all

[15] Luton Borough Council (2017) Luton Local Plan 2011-2031, November 2017

cases, development must be carefully built, operated and closed in such a manner so as to ensure there are no long-term pollution problems.

B During construction and operation, appropriate measures will be required to prevent the deposit of mud or other debris on or within public highways and water bodies from vehicles using the site.

3.3 Air Quality Guidance

3.3.1 DEFRA Technical Guidance

LAQM.TG(22) sets out detailed guidance on how air quality should be assessed and monitored by local authorities. The document provides useful guidance on how air quality from specific sources should be screened and the approaches that should be used to undertake detailed assessment where potentially significant emissions are identified, including details on model verification and consideration of monitoring data for use in assessments.

3.3.2 IAQM Land Use Planning and Development Control: Planning for Air Quality

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published joint guidance on the assessment of air quality impacts for planning purpose. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts. The scope of the operational impact and exposure assessment within this report are based on the guidance set out in this document.

3.3.3 IAQM Guidance on the Assessment of Dust from Demolition and Construction

Guidance produced by the IAQM on assessing impacts from construction and demolition activities includes a methodology for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

4 Methodology

4.1 Baseline Assessment

A baseline assessment of air quality in the vicinity of the Site and the surrounding area has been carried out through a review of monitoring data available within the LBC air quality review and assessment reports, most notably the LBC 2022 Air Quality Annual Status Report (ASR)[16]. Additional data has been obtained from the UK Air Information Resource (UK-AIR) background pollution maps[17]. 2022 monitoring results have been provided by LBC as raw data, which has been appropriately adjusted/bias corrected in accordance with the recommended approach set out in TAQM.TG(22).

The results of the baseline assessment have been used to determine the suitability of the Site for residential development and identify whether any mitigation measures are required to reduce exposure.

4.2 Construction Phase

4.2.1 Construction Traffic

During construction of the proposed development, lorries will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10}.

It is anticipated that during the construction phase there would be no more than 10 heavy duty vehicles (HDV) accessing the Site in any given day. Criteria set out in the EPUK/IAQM planning guidance indicate that significant impacts on air quality are unlikely to occur where a development results in less than 25 HDV movements per day within an AQMA and less than 100 per day elsewhere. It is therefore anticipated that construction traffic generated by the proposed development would result in a negligible impact on local NO_2 and PM_{10} concentrations and has not been considered any further in this assessment

[16] WBC (2021) 2021 Air Quality Annual Status Report (ASR)
[17] https://uk-air.defra.gov.uk/data/laqm-background-home

4.2.2 Construction/Fugitive Dust

Construction phase activities associated with the Proposed Development may result in the generation of fugitive dust emissions (i.e. dust emissions generated by site-specific activities that disperse beyond the construction site boundaries).

If transported beyond the site boundary, dust can have an adverse impact on local air quality. The IAQM has published a guidance document for the assessment of demolition and construction phase impacts[18].The guidance considers the potential for dust nuisance and impacts to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition (removal of existing structures).
- Earthworks (soil-stripping, ground-levelling, excavation and landscaping).
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

A qualitative assessment of air quality impacts due to the release of fugitive dust and particulates (PM_{10}) during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance.

The assessment takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels, thus enabling a level of risk to be assigned. Risks are described in terms of there being a low, medium or high risk of dust impacts.

Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined.

A summary of the IAQM assessment methodology is provided in Appendix B.

[18] IAQM (June 2016) Guidance on the assessment of dust from demolition and construction Version 1.1

4.3 Operational Phase

4.3.1 Operational Traffic Impact

The air quality planning guidance published by IAQM sets out criteria for establishing when there is a risk of significant impacts on local air quality as a result of traffic generated by a proposed development. The guidance states that where the following criteria are exceeded a more detailed assessment is required:

- An increase in LGV of more than 100 vehicles per day within or adjacent to an AQMA, and increase of more than 500 per day elsewhere.
- An increase in HGV or more than 25 vehicles per day within or adjacent to an AQMA, an increase of more than 100 per day elsewhere.

Anticipated trip generation from the operational development has assessed against the above criteria. Where this criterion is exceeded then a detailed assessment of operational impacts may be required.

5 Baseline Assessment

5.1 Luton Review and Assessment of Air Quality

LBC has completed a number of detailed assessments of air quality in the city and as a result has declared three AQMAs due to exceedences of the annual mean NO2 objective. The AQMAs are:

- Luton AQMA No.1 – 24 residential properties on either side of the M1 Motorway near junction 11.
- Luton AQMA No.2 – 431 residential properties on either side of the M12 Motorway, near Junction 11; and
- Luton AQMA No.3 – from Dunstable Road by Kenilworth Road through to Stuart Street and Chapel Viaduct by Latimer Road, including Castle Street to Holly Street and Telford Way.

The Site is not located within an AQMA but is approximately 0.25 km to the north-east of Luton AQMA No.3 as detailed in Figure 5.1.

5.2 Air Quality Monitoring

5.2.1 NO_2 Concentrations

LBC currently operates one automatic monitoring station, LN60/HB007 Dunstable Road East, a roadside site located within the AQMA No. 3, approximately 1km to the south-west of the Site. There are further automatic sites located within the district operated by London Luton Airport Operations Ltd. However, there are non-automatic monitoring sites located in closer proximity to the Site which are considered more representative of air quality in the vicinity of Gloucester Road. The automatic sites have not therefore been used to inform the baseline assessment of NO_2.

LBC undertook monitoring of NO_2 using non-automatic sites (diffusion tubes) at 51 sites during 2022. Those located closest and considered most relevant to the baseline assessment are set out Table 5.1 and their locations shown in Figure 5.1.

Table 5.1: NO_2 Diffusion Tube Monitoring Results 2018-2022 (µg/m³)

Site	Classification	Year				
		2018	2019	2020[1]	2021[1]	2022[2]
LN64 – Park Viaduct Park Street	R	28.1	31.2	21.9	22.2	21.6
LN65 – Park Viaduct Queens Close	R	23.3	24.0	175	19.6	19.2
LN66 – Park Viaduct	R	32.9	36.7	27.6	28.6	28.5
LN70 – Crawley Green Road	R	30.8	32.8	24.1	26.8	25.5

Data in **bold** shows an exceedance of the annual mean objective

UB-Urban Background, R-Roadside, K-Kerbside and S-Suburban

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

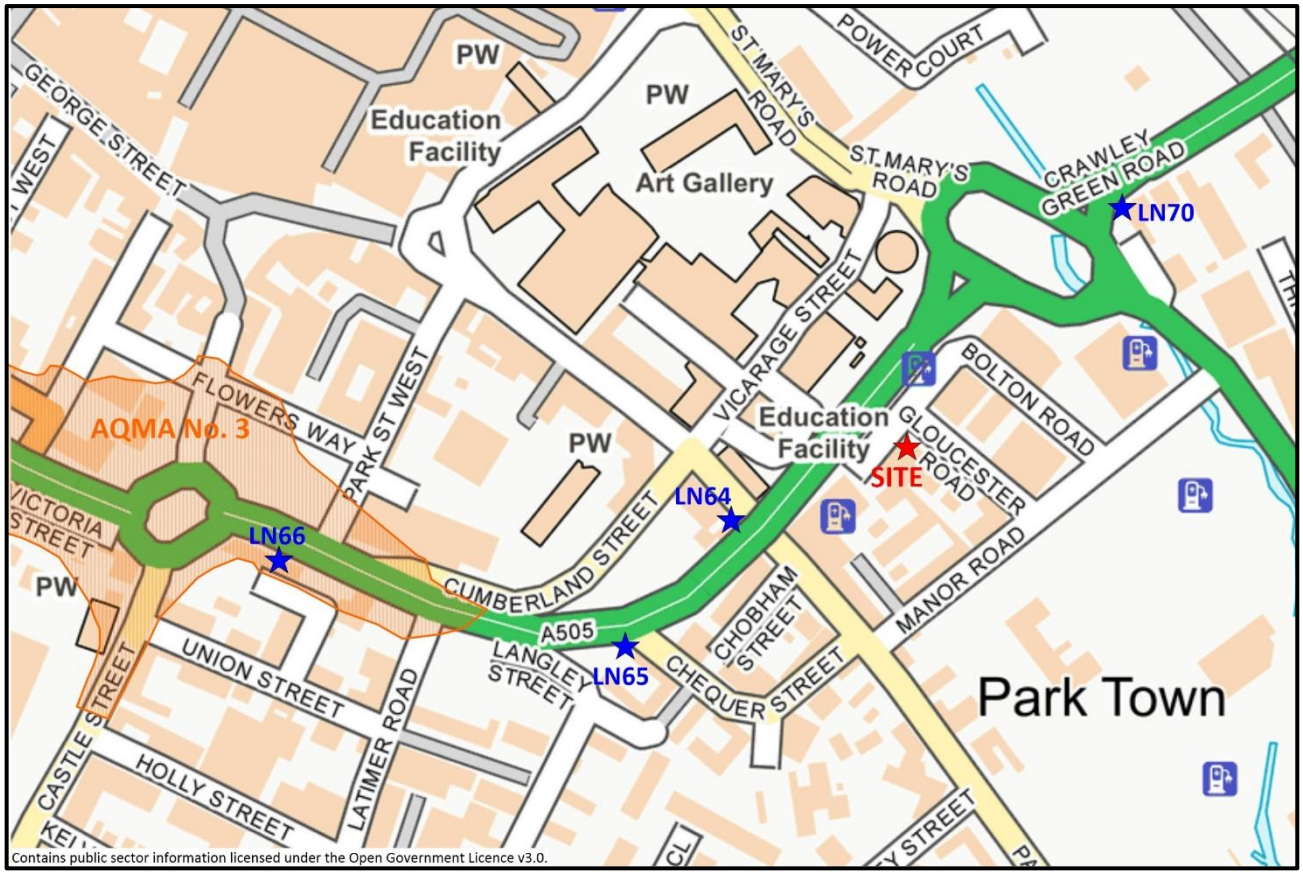
[2] raw data provided by LBC, bias corrected using a locally derived correction factor using automatic site HB007

The monitoring data presented in Table 5.1 shows annual mean NO_2 concentrations below the objective limit of 40µg/m^3 at all four sites since 2018. Data from 2022 shows that NO_2 concentrations at locations immediately adjacent to the A505 (LN64 and LN65) both within and outside the AQMA are at less than 70% (well below) the objective limit of 40 µg/m^3.

The data indicates an overall downward trend in concentrations over the five year period presented. Diffusion tubes cannot monitor short-term NO_2 concentrations, however, research[19] has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. Based on monitoring data presented in Table 5.1, it is unlikely that the short-term objective is being exceeded.

[19] D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003).

Figure 5.1: Location of Monitoring Sites



5.2.2 Particulate Matter (PM_{10} and $PM_{2.5}$

PM_{10} concentrations are monitored at three locations within the borough; the LBC operated roadside site on Dunstable Road East and two sites at Luton Airport operated by London Luton Airport Operations Ltd. All three sites are more than 1km from the development site.

$PM_{2.5}$ concentrations are monitored at the Dunstable Road East site and at one location at the airport.

PM_{10} concentrations recorded since 2018 are presented in Table 5.2 and $PM_{2.5}$ concentrations set out in Table 5.3.

Data set out in Table 5.2 shows annual mean PM_{10} concentrations well below the objective limit of 40 µg/m^3 at all three monitoring sites since 2018, although the data shows no significant upward or downward trend in concentrations over this period.

All three sites have recorded exceedances of the 24-hour limit of 50 µg/m^3, however as the objective allows for up to 35 exceedances in any given year, the objective has been met at both sites since 2018.

Table 5.2: PM_{10} Concentrations Recorded at Luton Monitoring Sites (µgm^{-3})

Site	Year				
	2018	**2019**	**2020[1]**	**2021[1]**	**2022[2]**
Annual Mean (µg/m^3)					
LN60 (HB007) – Dunstable Road East	15.6	15.8	13.8	15.0	15.0
LA08 (HB006) – London Luton Airport	17.3	16.3	13.7	12.0	15.0
LA001 – London Luton Airport Future LuToN	-	13.5	11.7	10.3	9.0
Number of Exceedances of the 1 hour Mean					
LN60 (HB007) – Dunstable Road East	1	8	0	2	3
LA08 (HB006) – London Luton Airport	1	1	0	0	0
LA001 – London Luton Airport Future LuToN	-	0 (196)	1 (23.1)	0	0

Data in **bold** shows an exceedance of the annual mean objective

Where data capture is less than 75%, the 90.4th percentile is presented in brackets

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

[2] data has been obtained from the Hertfordshire and Bedfordshire - Air Quality monitoring service (airqualityengland.co.uk)

Data presented in Table 5.3 shows $PM_{2.5}$ concentrations below the annual mean objective limit of 20µg/m^3. Data from 2022 also shows concentrations are currently below the 2028 interim and 2040 long-term EIP targets of 12 µg/m^3 and 10 µg/m^3, respectively.

Table 5.3: $PM_{2.5}$ Concentrations Measured at Luton Monitoring Sites

Site	Year				
	2018	**2019**	**2020[1]**	**2021[1]**	**2022[2]**
LN60 (HB007) – Dunstable Road East	**9.6**	10.0	8.3	9.0	9.0
LA001 – London Luton Airport Future LuToN	**-**	11.6	10.1	9.4	8.0

Data in **bold** shows an exceedance of the annual mean objective

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

[2] data has been obtained from the Hertfordshire and Bedfordshire - Air Quality monitoring service (airqualityengland.co.uk)

5.3 Defra Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the Defra background maps provided on the UK-AIR, the Air Quality Information Resource (http://uk-air.defra.gov.uk/). Estimated air pollution concentrations for oxides of nitrogen (NO_x), NO_2, PM_{10} and $PM_{2.5}$ have been extracted from the 2018 background pollution maps for the UK, which were published in August 2020. These maps are available in 1 km x 1 km grid squares and provide an estimate of concentrations between 2018 and 2030. The average concentrations for the grid square representing the Site have been extracted for the 2023 base year. The data is provided in Table 5.4.

Table 5.4: Annual Mean Background Air Pollution Concentrations in 2019

Location (OS Grid Squares)	Annual mean concentrations (μgm^{-3})		
	Nitrogen dioxide	**PM_{10}**	**$PM_{2.5}$**
509500, 221500	16.4	15.4	10.4

The data set out in Table 5.4 indicates that existing background concentrations are estimated to be meeting the NO_2, PM_{10} and $PM_{2.5}$ objectives in the vicinity of the Site. It is noted that $PM_{2.5}$

background concentrations in the area are estimated to be meeting the 2026 interim EIP target but just above the 2040 long-term target.

5.4 Air Quality at the Development Site

The proposed development is located approximately 10 m from the A505 viaduct. The A505 is the main traffic route through Luton and experiences a significant amount of vehicle movements per day compared to the surrounding roads. The main source of emissions influencing air quality at the Site will be traffic emissions along the A505.

It is noted that the A505 viaduct is elevated at about 6-7m above ground level between the Crawley Green Road roundabout and Chequers Street, and is therefore elevated above the Site on Gloucester Road. Pollution levels at ground level at the Site are therefore expected to be lower than at kerbside locations along the A505. However, based on data recorded at Site LN64, which is closest to Gloucester Road and located adjacent to Park Street, below the A505, annual mean NO_2 concentrations at the Site are expected to be well below the objective limit.

The development proposals include for an 8-storey building locating residential properties at 1st up to 7th floor level. Those properties at floors 3 up to 5 would be located at a similar elevation to the A505 viaduct and are therefore likely to experience higher pollution levels than properties at ground and 1st floor level. However, monitoring sites LN65 and LN66 are located at the same elevation as the A505. Data recorded at both these sites shows NO_2 concentrations well below the annual mean objective at roadside locations along the A505. Due to the higher separation distance between the proposed residential receptors and the A505 viaduct (10m) compared to sites LN65 and LN64, which are within 2-3 m of the A505, NO_2 concentrations at the facades of residential units at floors 3 to 5 are expected to be well below the objective limit.

As annual mean NO_2 concentrations at the Site are below 60 µg/m^3, the 1-hour objective is also being met at the Site.

Based on monitoring of both PM_{10} and $PM_{2.5}$ carried out across the borough, concentrations of both pollutants are expected to be below the relevant objective limits and the EIP target levels across the Site.

The proposed development will not introduce new receptors into a location of poor air quality therefore impacts in terms of new exposure will be negligible.

6 Construction Assessment

6.1 Assessing the Risk of Dust Effects

6.1.1 Site and Surroundings

A summary of the proposed development is provided in Section 2 of this report.

The Site covers an area of approximately 430 m^3. There are residential receptors within 100 m of the Site. An assessment of impacts on human receptors has therefore been carried out.

Significant impacts on ecologically sensitive receptors are unlikely to occur beyond 50 m from any construction activities. A review of data held on the Defra MAGIC website[20] shows no sites designated as important for wildlife within 50 m of the Site therefore impacts on ecological receptors has not been considered any further within this assessment.

A review of background data published by Defra within the 2023 background maps, indicates background concentrations at the Site in the region of 15-16 µg/m^3, at 43 % of the annual mean objective (Table 5.4). It is therefore expected, based on professional judgement, that concentrations at roadside locations are unlikely to be higher than 24 µg/m^3, making the surrounding area low in sensitivity to human health impacts.

The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

A windrose from the Luton Meteorological Station for 2022 is provided below in Figure 6.1, which shows that the prevailing wind is predominantly from the southwest. Areas most consistently affected by dust are influenced by prevailing winds that are generally located downwind of an emission source. Therefore, the highest risk of impacts would occur at receptors to the northeast of

[20] http://magic.defra.gov.uk/

the Site. This includes the commercial/light industrial units along Gloucester Road which are of low sensitivity to dust effects.

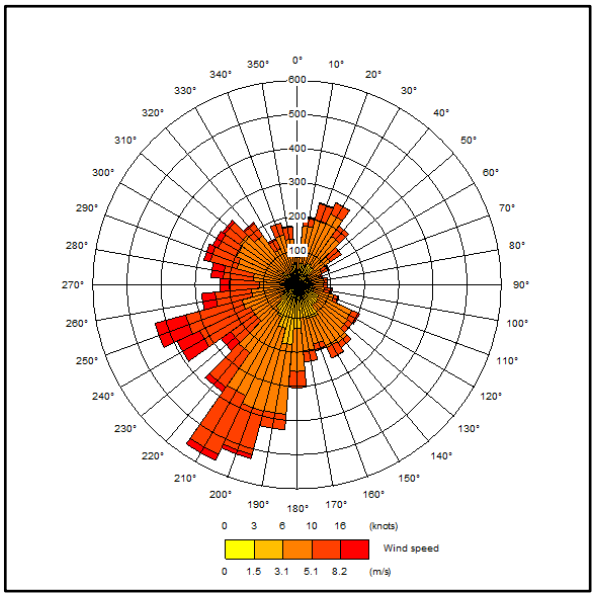


Figure 6.1: Windrose from Luton Meteorological Site (2022)

6.1.2 Risk Assessment of Dust Impacts

Defining the Dust Emission Magnitude

With reference to the criteria detailed in Appendix B, the dust emission magnitude for each of the categories demolition, earthworks, construction and trackout have been determined. These have been summarised in Table 6.1.

Table 6.1: Dust Emission Magnitude for each Activity

Activity	Criteria	Magnitude
Demolition	The existing building will be demolished prior to construction. The total building volume is approximately 1680-2000 m^3	Small
Earthworks	Site area approx. 4300m^2, 1-2 HDV on site, relatively small amount of excavation with material not required for the build being removed as soon as practicable and being stored in bunds of less than 2-3 m in height.	Small
Construction	Total build volume 34,000-40,000 m^3, brick and concrete (potentially high dust generating materials)	Medium
Trackout	<10 HDV per day	Small

Sensitivity of Surrounding Area

Using the criteria set out in Tables B1 to B3, Appendix B, the sensitivity of the surrounding area to impacts from dust emissions has been determined and are set out in Table 6.2.

Dust Soiling

The nearest residential properties are located approx. 15m to the south-west. It is estimated that there are 10-15 residential flats (student rooms) within 20 m of the Site. The sensitivity of the surrounding area to dust effects is therefore considered to be 'medium'.

It is expected that there will <10 HDV (>3.5t) movements per day during the construction phase which are expected to travel to and from the Site along Manor Road and Bolton Road from Windmill Lane (A505). There are no sensitive receptors located along this route with adjacent buildings being commercial/industrial units. The sensitivity of the area to dust soiling effects from trackout is therefore considered to be 'low'.

PM_{10} Effects

As previously discussed, annual mean PM_{10} concentrations in the vicinity of the Site are expected to be below 24 µg/m^3. Based on the proximity of sensitive receptors to the site boundary and the local concentrations of PM_{10} the sensitivity of the surrounding area is considered to be low with regards human health impacts.

Table 6.2: Sensitivity of Surrounding Area

Source	Dust Soiling	Human health
Demolition	Medium	Low
Earthworks	Medium	Low
Construction	Medium	Low
Trackout	Low	Low

Defining the Risk of Impacts

The dust emission magnitude, as set out in Table 6.1, is combined with the sensitivity of the area (Table 6.2) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures applied at site. The risk of impacts associated with each activity is provided in Table 6.3 below and has been used to identify site-specific mitigation measures, which are discussed in Section 6.2 and set out in Appendix C.

Table 6.3: Summary of Risk Effects to Define Site Specific Mitigation

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

6.2 Determining Appropriate Mitigation

The control of dust emissions from construction site activities relies upon management provisions and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

An overall medium risk of impacts is predicted at adjacent receptors during construction of the proposed development, but a low risk for demolition and earthwork activities. Appropriate mitigation measures for the Site have been identified following the IAQM guidance and based on the risk effects presented in Table 6.3. It is recommended that the measures set out in Appendix C are incorporated into a DMP and approved by prior to commencement of any work on site.

Based on the risk effects identified during each of the four types of activities and following implementation of the recommended mitigation measures, the significance of residual impacts during construction of the proposed development will be **negligible.**

7 Operational Impacts

The proposals include for the demolition of the existing buildings and the construction of a new 8-storey building. No on-site parking will be provided and therefore the operational development is considered to be ‘car-free’. Trips associated with the operational development will therefore fall below the IAQM screening criteria and operational impacts on local air quality associated with traffic will be negligible.

8 Conclusion

Encon Associates were commissioned by CLIENT (the 'Client') to carry out an air quality assessment in connection with the proposed redevelopment of a site on Michigan Drive, Milton Keynes (the 'Site'). It is proposed to construct a commercial warehouse (use class B8) with ancillary office space.

It is inevitable that with any development, demolition and construction activities will cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind can lead to soiling of property including windows, cars, external paintwork and laundry. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of 50 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

Due to the proximity of nearby residential receptors the Site is considered to have a medium risk of impacts with regards to dust soiling during construction but a low risk of impacts during demolition, earthworks, construction and trackout. The site is considered to have a low risk with regards to PM_{10} concentrations from construction, but a negligible risk associated with all other activities and phases. However, following the implementation of appropriate mitigation measures impacts associated with the construction of the development are likely to be insignificant.

The baseline assessment has concluded that pollution levels at the Site are currently meeting the relevant air quality objective limits for NO_2, PM_{10} and $PM_{2.5}$. The Site is therefore considered suitable for residential and employment use and impacts in terms of new exposure would be negligible.

The development will not provide any on-site parking and therefore operational impacts will be negligible. No mitigation is therefore considered necessary in terms of air quality.

The proposed development would meet current national and local planning policy and based on the results of this assessment air quality does not pose a constraint to development of the Site for the proposed use.

Appendix A
Glossary of Terminology

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
μgm^{-3} micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of $1ug/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the

Term	Definition
	closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

Appendix B
IAQM Construction Impact Assessment Procedure

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- demolition (removal of existing structures).
- earthworks (soil-stripping, ground-levelling, excavation and landscaping).
- construction (activities involved in the provision of a new structure); and
- trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

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

Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume >50,000m^3, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities >20m above ground level.
- Medium: total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- Small: total building volume <20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >10,000m^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, total material moved >100,000 tonnes;
- Medium: Total site area 2,500 m^2 – 10,000m^2, moderately dusty soil (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4m – 8m in height, total material moved 20,000 tonnes- 100,000 tonnes; and
- Small: Total site area <2,500m^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: The important issues here when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume >100,000m^3, on site concrete batching, sandblasting.
- Medium: Total building volume 25,000m^3 – 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m.
- Medium: 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m; and
- Small: <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length >50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM_{10}) and ecological receptors. The sensitivity of the area takes into account the following factors:

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

Table B1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables B2 to B4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table B1: Examples of Factors Defining Sensitivity of an Area			
Sensitivity of Area	**Dust Soiling**	**Human Receptors**	**Ecological Receptors**
High	Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics or value of their property would be diminished by soiling' 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. E.g. dwellings, museums and other important collections, medium and long term car parks and car showrooms.	10 – 100 dwellings within 20 m of site. Local PM_{10} concentrations close to the objective (e.g. annual mean 36 -40 $\mu g/m^3$). E.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. E.g. A Special Area of Conservation (SAC).
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. The appearance, aesthetics or value of their property could be diminished by soiling 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. E.g. parks and places of work.	Less than 10 receptors within 20 m. Local PM_{10} concentrations below the objective (e.g. annual mean 30-36 $\mu g/m^3$). E.g. office and shop workers but will generally not include workers occupationally exposed to PM_{10} as protection is covered by the Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. 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. E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car [parks and roads.	Locations where human exposure is transient. No receptors within 20 m. Local PM_{10} concentrations well below the objectives (less than 75%). E.g. public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. E.g. Local Nature Reserve with dust sensitive features.

Table B2: Sensitivity of the Area to Dust Soiling 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
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from 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

Table B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**				
			<20	**<50**	**<100**	**<200**	**<350**
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table B4: Sensitivity of the Area to Ecological Impacts		
Receptor Sensitivity	**Distance from the Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables B5 to B7 indicate the method used to assign the level of risk for each construction activity. The identified level of risk is then used to determine measures for inclusion within a site-specific Construction Management Plan (CMP) aimed at reducing dust emissions and hence reducing the impact of the construction phase on nearby receptors. The mitigation measures are drawn from detailed mitigation set out within the IAQM guidance document.

Table B5: Risk of Dust Impacts from Demolition			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B6: Risk of Dust Impacts from Earthworks/ Construction

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B7: Risk of Dust Impacts from Trackout			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix C
Construction Mitigation Measures

It is recommended that the following measures are incorporated into a DMP and approved by LBC prior to commencement of any work on site. The measures set out below summaries the measures set out within the IAQM guidance

This guidance should be read in conjunction with this report to obtain full details of all the measures that should be applied on site.

- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager).
- display the head or regional office contact information on the site boundary.
- record all dust and air quality complaints, identify cause, 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 emissions, either on- or off- site and the action taken to resolve the situation in the log book.
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to LBC when asked.
- increase frequency of site inspection 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 periods of dry or windy conditions.
- 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.
- keep site fencing, barriers and scaffolding clean using wet methods.

- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- avoid site runoff of water or mud.
- 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 100m of site boundary, with cleaning to be provided if necessary.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- 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.
- 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 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.
- ensure equipment is readily available on site to clean any dry pillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- avoid bonfires and burning of waste materials.
- ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it

is needed. In addition, a high volume water suppression system, 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;
- bag and remove any biological debris or damp down such material before demolition;

Desirable Measures

- remove materials that have a high potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used cover as described below;
- cover, seed or fence stockpiles to prevent wind whipping;
- 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 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;
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
- record all inspections of haul routes and any subsequent action in a log book;
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site.