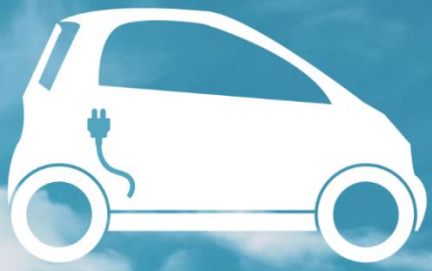

Air Quality Statement for the Proposed Development at 254 Kilburn High Road

Report to NW6 Ltd

February 2023

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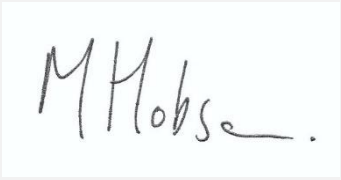
Signature	
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1 Introduction

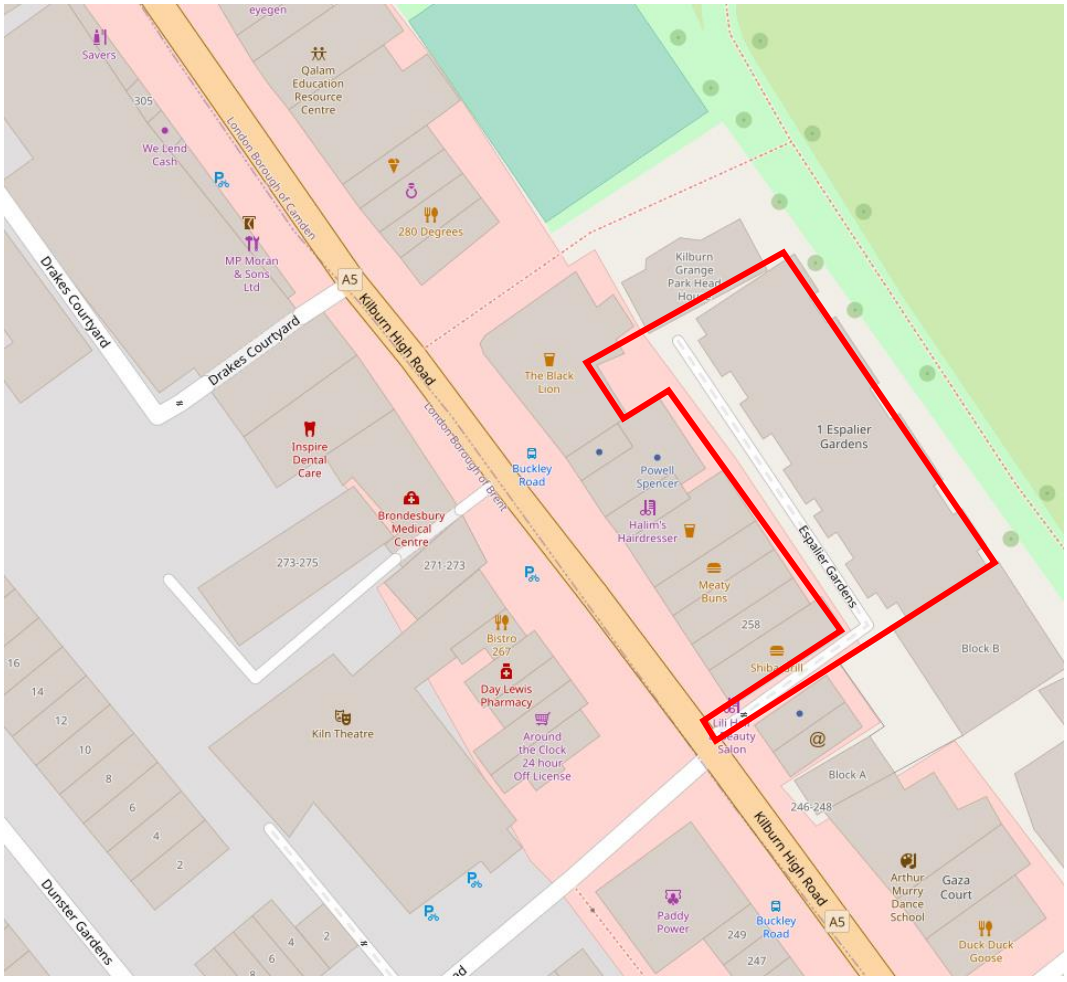
Aether has been commissioned by NW6 Ltd to undertake an air quality statement for the proposed development at 254 Kilburn High Road. The works will consist of the development of the existing unused ground-floor office space (Use Class E) to Class C3 residential space, consisting of 13 new apartments. No increase in traffic levels are expected with the proposed development as the site will be car-free.

The refurbishment falls within the London Borough of Camden, where there have been exceedances of the Government's Air Quality Strategy Objectives for the air pollutants nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}). It is therefore important to assess whether there will be an exceedance of the air quality objectives at the proposed site and then advise whether any action is required to reduce the residents' exposure to air pollution.

1.1 The Location of the Development

The proposed development site is set to the north east of Kilburn High Road, in Espalier Gardens (**Figure 1**).

Figure 1: Location of the refurbishment site, outlined in red



Source: OS Street Map

1.2 UK air quality objectives

A summary of the air quality objectives relevant to the 254 Kilburn High Road development, as set out in the UK Air Quality Strategy[1], is presented in **Table 1** below.

Table 1: UK Air Quality Objectives for NO_2 and PM_{10}

Pollutant	Concentration	Measured as
Nitrogen Dioxide (NO_2)	40 µg/m^3	Annual mean
	200 µg/m^3	Hourly mean not to be exceeded more than 18 times per year (99.8th percentile)
Particulate Matter (PM_{10})	40 µg/m^3	Annual mean
	50 µg/m^3	24 hour mean not to be exceeded more than 35 times a year (90.4th percentile)

The oxides of nitrogen (NO_X) comprise principally of nitric oxide (NO) and nitrogen dioxide (NO_2). NO_2 is a reddish brown gas (at sufficiently high concentrations) and occurs as a result of the oxidation of NO, which in turn originates from the combination of atmospheric nitrogen and oxygen during combustion processes. NO_2 can also form in the atmosphere due to a chemical reaction between NO and ozone (O_3). Health based standards for NO_X generally relate to NO_2, where acute and long-term exposure may adversely affect the respiratory system.

Particulate matter is a term used to describe all suspended solid matter, sometimes referred to as Total Suspended Particulate matter (TSP). Sources of particles in the air include road transport, power stations, quarrying, mining and agriculture. Chemical processes in the atmosphere can also lead to the formation of particles. Particulate matter with an aerodynamic diameter of less than 10 µm is the subject of health concerns because of its ability to penetrate deep within the lungs and is known in its abbreviated form as PM_{10}.

A growing body of research has also pointed towards the smaller particles as a metric more closely associated with adverse health impacts. In particular, particulate matter with an aerodynamic diameter of less than 2.5 micrometres, known as $PM_{2.5}$. Ultimately, Local Authorities in England have a flexible role[2] in working towards reducing emissions and concentrations of $PM_{2.5}$ as there is no specific objective for them as the responsibility sits with national government. On the 31st January 2023 the Government published an Environmental Improvement Plan[3] which includes a legally binding Annual Mean Concentration Target (AMCT) of 10 µg/m^3, to be achieved by 2040. The Plan also includes an interim target of 12 µg/m^3 to be achieved by the end of January 2028.

Further information on the health effects of air pollution can be found in the reports produced by the Committee on the Medical Effects of Air Pollutants[4].

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

[2] LAQM TG22 – paragraph 1.14 and 1.15

[3] Environmental Improvement Plan 2023, Defra, 2023

[4] https://www.gov.uk/government/collections/comeap-reports

As defined by the regulations, the air quality objectives for the protection of human health are applicable:

- Outside of buildings or other natural or man-made structures above or below ground
- Where members of the public are regularly present.

Using these definitions, the annual mean objectives will apply at locations where members of the public might be regularly exposed such as building façades of residential properties, schools and hospitals and will not apply at the building façades of offices or other places of work, where members of the public do not have regular access. The 24 hour objective will apply at all locations where the annual mean objective would apply together with hotels. Therefore, in this assessment the annual mean and 24 hour mean objectives will apply at the development site. The hourly objective will apply at all locations where members of the public could reasonably be expected to spend that amount of time. Therefore, in this assessment the hourly objective will also apply at the development site.

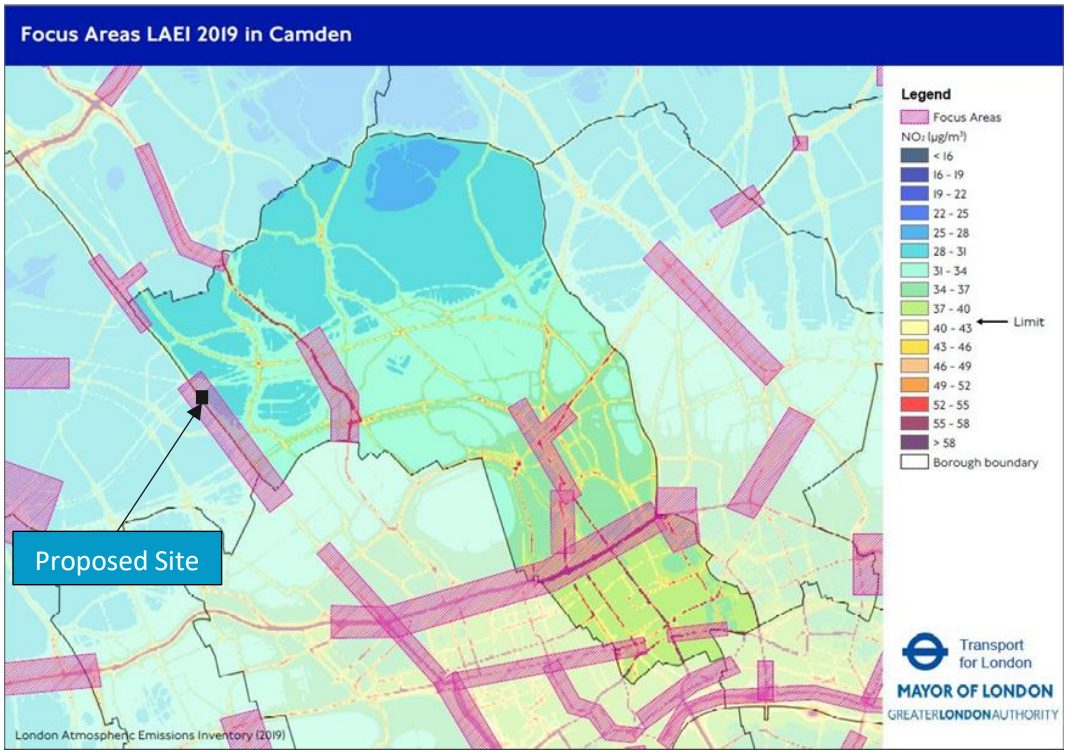
2 Local air quality in Camden

2.1 Local Air Quality Management

Local authorities are required to periodically review and assess the current and future quality of air in their areas. Where it is determined that an air quality objective is not likely to be met, the authority must designate an Air Quality Management Area (AQMA) and produce an Air Quality Action Plan (AQAP) or Air Quality Strategy (AQS).

The site lies in the London Borough of Camden, which declared an Air Quality Management Area (AQMA) in 2002 for exceedances of the annual mean NO_2 and daily mean PM_{10} objectives[5]. The area includes the entirety of the Borough of Camden. The proposed refurbishment, therefore, falls inside of the AQMA, shown in **Figure 2** below.

Figure 2: AQMA declared across the London Borough of Camden, with Focus Areas and proposed site development highlighted



Source: Camden Clean Air Action Plan 2023-2026, page 69.

The latest AQAP[6] was produced in 2023; this outlines the measures that the Council is taking to improve air quality. Measures include ensuring the planning system supports the achievement of air quality improvements in new developments, particularly in areas where the air quality is already poor. In addition, the Camden Clean Air Action Plan defines several Air Quality Focus Areas (AQFA), which represent areas with high levels of pollution and human exposure. These Focus Areas are now embedded in the planning

[5] London Borough of Camden AQMA, available at: https://uk-air.defra.gov.uk/aqma/details?aqma_ref=24#205

[6] Camden Clean Air Action Plan 2023-2026, available at: https://www.camden.gov.uk/documents/20142/0/Camden+Clean+Air+Action+Plan+2023-2026_Final_2022.12.19+%282%29.pdf/ad618e94-0113-696d-5fc6-104d8969ab5a?t=1671619123044

process for the assessment of new developments and the requirement to achieve pollution emissions reductions. The proposed development site falls within the Kilburn High Road AQFA, shown in **Figure 2** above.

2.2 Local Pollutant Concentrations

This section provides an overview of the local air quality data available.

2.2.1 Local monitoring data

The London Borough of Hillingdon has five operational continuous monitoring sites, as of 2021, which measure NO_2; PM_{10} and $PM_{2.5}$ are also monitored at four and three of these sites, respectively. NO_2 concentrations are also measured passively at diffusion tube sites across the Borough. Unfortunately, none of the monitoring sites are in close proximity to the development site. However, details of the closest ones are given in **Table 2**; monitoring results have been taken from the Council's latest Annual Status Report (ASR)[7].

Table 2: Monitoring sites closest to the development site

Site Name	Site Type	Pollutant	Grid Reference	Distance to Kerb (m)	Approx. Distance to development site (m)
Swiss Cottage (Finchley Road)*	K	NO_2, PM_{10}, $PM_{2.5}$	526629, 184391	1.5	1,650
Emmanuel Primary School	R	NO_2	525362,185255	2	1,050
Swiss Cottage	K	NO_2	526633, 184392	<1	1,660
Frognal Way	UB	NO_2	526213, 185519	30	1,750
47 Fitzjohn's Road	R	NO_2	526547, 185125	2	1,780

Note: * = automatic monitoring site, UB = urban background, R = roadside, K = kerbside.

The diffusion tubes were analysed by Gradko International, who participate in the Proficiency scheme[8]. Whilst diffusion tubes provide an indicative estimate of pollutant concentrations, they tend to under or over read. The data is therefore corrected using a bias adjustment factor. There are two types of bias adjustment factor – local and national. The local factor is derived from co-locating diffusion tubes (usually in triplicate) with automatic monitors, whereas the national factor is obtained from the average bias from all local authorities using the same laboratory. The London Borough of Camden has applied a local bias adjustment factor (0.83) to their 2021 diffusion tube results (the latest results available).

Monitoring results are presented in **Table 3**. The data shows that exceedances of the mean NO_2 objective (40 µg/m^3) occurred at the Swiss Cottage (Finchley Road) automatic monitoring site between 2017 and 2021. However, concentrations have declined since the 2017 and 2018 peaks and are now closer to the mean NO_2 objective. The monitoring

[7] The London Borough of Camden Air Quality Annual Status Report, 2021, available at: https://www.camden.gov.uk/documents/20142/0/London+Borough+of+Camden+2021+Air+Quality+Annual+Status+Report.pdf/8f17a472-2204-05a1-c6e0-f1c02069711e?t=1660919396042

[8] This is a national QA/QC scheme.

site closest to the proposed development site, Emmanuel Primary School, recorded an exceedance of the annual mean in 2017 but has since declined to below the mean NO_2 objective. As expected, concentrations were lower in 2020 and 2021 due to the impact of the Covid 19 pandemic.

There were exceedances of the hourly NO_2 objective recorded at the Swiss Cottage (Finchley Road) automatic monitoring site, though this is located 1.6 kilometres away and may not, therefore, accurately reflect the proposed development site. Furthermore, recorded exceedances are substantially below the limit of 18 annual hourly mean exceedances. Diffusion tubes do not provide information on hourly exceedances, but research[9] identified a relationship between the annual and 1 hour mean objective, such that exceedances of the latter were considered unlikely where the annual mean was below 60 µg/m^3. Therefore, it is considered unlikely that there were any exceedances of the hourly mean objective at any of the diffusion tube sites.

Given the pollutant concentrations provided in Table 3, it is expected that compliance with the air quality objectives will be met at the proposed development site.

Table 3: Monitoring results for the sites closest to the proposed development site, 2017 to 2021.

Objective	Site Name	2017	2018	2019	2020	2021
Annual mean NO_2 (µg/m^3)	Swiss Cottage (Finchley Rd)*	**53.0**	**54.0**	**43.0**	33.0	**44.0**
	Emmanuel Primary School	**50.7**	39.8	38.8	31.8	29.7
	Swiss Cottage	N/A	**62.3**	**50.9**	N/A	N/A
	Frognal Way	N/A	N/A	28.3	22.5	17.4
	47 Fitzjohn's Road	**66.3**	**48.1**	**43.5**	34.5	30.0
Hourly mean NO_2 exceedances	Swiss Cottage (Finchley Rd)*	1	2	1	0	2
Annual Mean $PM_{2.5}$	Swiss Cottage (Finchley Rd)*	16.0	11.0	11.0	10.0	9.0
Annual Mean PM_{10}	Swiss Cottage (Finchley Rd)*	20.0	21.0	19.0	16.0	16.0
Number of PM_{10} 24-Hour Mean Exceedances	Swiss Cottage (Finchley Rd)*	8	4	8	3	0

*Note: * = automatic monitoring site; data in bold = exceedances of the annual mean.*

2.2.2 Background mapped data

Background pollutant concentration maps are available from the Defra LAQM website[10] and data has been extracted for the London Borough of Camden for this assessment. These 2018 baseline, 1 kilometre grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites. The projections in the 2018 LAQM background maps are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these maps do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

[9] As described in paragraph 7.97 of the LAQM Technical Guidance (TG22).

[10] LAQM Background Mapping data for Local Authorities, available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

The estimated mapped background NO_X, NO_2, PM_{10} and $PM_{2.5}$ concentrations around the development site are 35.6µg/m³, 23.8µg/m³, 17.8µg/m³ and 11.7µg/m³ respectively in 2019.

The above estimated background concentrations provide further evidence that it is likely that the air quality objectives will not be breached at the proposed development site.

3 Receptors

The proposed development site will be introducing new residential receptors as a result of the 13 new apartments. Therefore, both the annual mean and hourly mean NO_2 objective will apply at the development site. The closest monitoring data and indicative background levels indicate that these objectives are likely to be met.

No increase in traffic levels are expected as the proposed site will be car-free, not accounting for two disabled parking spaces. Therefore, the development is not expected to have any impact on nearby receptor locations.

4 Air Quality Neutral

London Plan Policy SI 1 requires development proposals within Greater London to be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs)[11]. A method for assessing this is outlined in the draft Air Quality Neutral Guidance[12]. The Supplementary Planning Guidance (SPG) outlines building emission benchmarks for NO_X and PM_{10} for all land use classes. This development comes under land use class Residential. The development intends to use the existing local communal gas fired Combined Heat and Power network combined with individual standby gas fired boilers.

In the absence of other information being available, it is assumed that all NOx generation conforms to the ultra-low NOx boiler standard as outlined in Table 3.5 of the AQN Guidance (ie. 40 mg/Kwh). This has been combined with an estimated gas consumption for flats of 100 Kwh/m^2/year[13]. The calculation is provided in the table below:

Table 4: Building AQN input data:

Pollutant	Land use class	BEB (g/NOx/m^2/year)	Development (g/NOx/m^2/year)	Difference
NOx	Residential (CHP + gas boiler network)	7.8	4.0 (100 * 0.04)	-3.8

The results show that the estimated annual NOx emissions from the building are lower than the Air Quality Neutral's Building Emissions Benchmark. **The proposed development therefore meets the air quality neutral requirements for buildings and so no further action is required in this regard.**

Transport emission benchmarks with varying benchmarks across the London zones have also been developed. However, as the development site will be car-free, no additional trips are expected to occur. **Therefore, the proposed development meets the air quality neutral requirements for transport and so no further action is required in this regard.**

[11] https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/london-plan-2021
[12] https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance/air-quality-neutral-aqn-guidance
[13] Figure taken from Figure 2 in: Energy consumption in new domestic buildings 2015 – 2017 (England and Wales).
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/853067/energy-consumption-new-domestic-buildings-2015-2017-england-wales.pdf

5 Mitigating the Impacts of the Construction Phase

Emissions and dust from the construction phase of a development can have a significant impact on local air quality. The Institute of Air Quality Management (IAQM) has produced a document titled 'Guidance on the assessment of dust from demolition and construction'[14] published in May 2015. This guidance contains a methodology for determining the significance of construction developments on local air quality using a simple four step process:

- STEP 1: Screen the requirement for a more detailed assessment
- STEP 2: Assess the risk of dust impacts
- STEP 3: Determine any required site-specific mitigation
- STEP 4: Define post mitigation effects and their significance.

The risk of dust emissions from a demolition/construction site causing loss of amenity and/or ecological impacts is related to a number of factors, including: the activities being undertaken; the duration of these activities; the size of the site; the mitigation measures implemented and meteorological conditions. In addition, the proximity of receptors to the site and the sensitivity of these receptors to dust, impacts the level of risk from dust emissions. Receptors include both 'human receptors' and 'ecological receptors'. The former refers to a location where a person or property may experience adverse effects for airborne dust or dust soiling, or exposure to PM_{10}, over a time period relevant to the air quality objectives (see **Table 1**). Ecological receptors are defined as any sensitive habitat affected by dust soiling, through both direct and indirect effects. Following assessment of the impacts of dust as a result of the development, a qualitative risk impact level can be assigned, ranging from 'negligible' to 'high risk'. Based on the designated risk impact level, the mitigation measures which are appropriate for all sites and are applicable specifically to demolition, earthworks, construction and trackout can be determined. Examples of the general measures include:

- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site
- 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
- Ensure all loads entering and leaving the site are covered
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation

As the development does not include significant construction and/or demolition, an assessment has not been undertaken. However, it is recommended that the developer refers to the relevant IAQM documentation, to help reduce the impact of dust and vehicle exhaust emissions and liaises with the Local Authority to come up with an acceptable dust management strategy.

In addition to the IAQM guidance referred to above, the Mayor of London has introduced standards to reduce emissions of pollutants from construction and demolition activity and associated equipment. In July 2014 the Mayor adopted the Control of Dust and Emissions from Construction and Demolition Supplementary Planning Guidance following extensive consultation. The SPG includes the world's first

[14] http://iaqm.co.uk/guidance/

non-Road Mobile Machinery Low Emission Zone (NRMM LEZ) combining standards to address both nitrogen oxide (NO_X) and particulate matter (PM) emissions[15].

From 1st September 2015, construction equipment used on the site of any major development within Greater London has been required to meet the EU Stage IIIA as a minimum; and construction equipment used on any site within the Central Activity Zone or Canary Wharf has been required to meet the EU Stage IIIB standard as a minimum. Some exemptions are provided where pieces of equipment are not available at the emission standard stipulated or in the volumes required to meet demand in a construction environment as dynamic as London. From September 2020, the requirements became more stringent. Construction equipment used on major development sites within the Central Activity Zone, Canary Wharf and Opportunity Areas must meet EU Stage IV standards and EU Stage IIIB across the rest of London. As Stages IIB and IV have not been defined for machines with constant speed engines, e.g. generators, these machines needed to meet stage V from September 2020 by default.

[15] https://nrmm.london/

6 Summary

This report provides an air quality statement for the proposed development of 254 Kilburn High Road. The works will consist of the development of the existing unused ground-floor office space (Use Class E) to Class C3 residential space, consisting of 13 new apartments. The site is in the London Borough of Camden, which has declared an Air Quality Management Area and the development is in this area.

No increase in traffic levels are expected with the proposed development due to the car-free design. Therefore, the development is not expected to have any impact on nearby residential locations.

As the development site introduces new residential receptors, both the annual mean and hourly mean NO_2 objectives apply. At the nearest monitoring sites, there have been no exceedances of the annual mean objective in recent years. Exceedances of the hourly NO_2 objective have been recorded at the Finchley Road site; however well below the 18 allowed per year. It is worth noting though that this is located 1.6 kilometres away and may not, therefore, accurately reflect the proposed development site. Diffusion tubes do not provide information on hourly exceedances, but research has identified a relationship between the annual and 1 hour mean objective, such that exceedances of the latter were considered unlikely where the annual mean was below 60 µg/m^3. Therefore, it is considered unlikely that there were any exceedances of the hourly mean objective. Therefore, air quality is not deemed to be an issue at the proposed site.

The proposed development has been assessed and found to be compliant with London's 'air quality neutral' guidance for buildings and transport, and so no action is required in that regard. As the development does not include significant construction and/or demolition, an assessment has not been undertaken. However, it is recommended that the developer refers to the relevant IAQM documentation, to help reduce the impact of dust and vehicle exhaust emissions, and liaises with the Local Authority to come up with an acceptable dust management strategy.

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