



Air Quality Assessment: Inglewood Mansions, Camden

August 2018



Experts in air quality
management & assessment



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1 Introduction

- 1.1 This air quality note has been prepared to support the application for a mansard roof extension to the Inglewood Mansions at West End Lane in Camden. The proposals involve the addition of a roof extension to create a new 4th floor to the existing building. This note has been prepared by Air Quality Consultants Ltd (AQC) on behalf of Hodkinson Consultancy.
- 1.2 This note examines the current air quality conditions at Inglewood Mansions, with an aim to identify whether or not there is an exceedance of any air quality objectives¹ at the site. The analysis focusses upon the annual mean objective for nitrogen dioxide, which is set as a concentration limit of 40 µg/m³ (micrograms per cubic meter), as this is the principal pollutant and objective of concern at the site.
- 1.3 The professional experience of the consultants responsible for the preparation of this report is provided in Appendix A1.

2 Policy Context

London Plan

- 2.1 The London Plan (GLA, 2016a) sets out the spatial development strategy for London consolidated with alterations made to the original plan since 2011. It brings together all relevant strategies, including those relating to air quality.
- 2.2 Policy 7.14, 'Improving Air Quality', addresses the spatial implications of the Mayor's Air Quality Strategy and how development and land use can help achieve its objectives. It recognises that Boroughs should have policies in place to reduce pollutant concentrations, having regard to the Mayor's Air Quality Strategy.
- 2.3 With relevance to this assessment, Policy 7.14 describes that:

"Development proposals should...minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within AQMAs or where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)".

¹ The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

2.4 Consultation on a draft new London Plan (GLA, 2017) closed on 2 March 2018, with an examination in public to follow. The current timescale is that the new London Plan will be adopted in Autumn 2019. However, the draft London Plan is a material consideration in planning decisions, which will gain more weight as it moves through the process to adoption. Policy SI1 on 'Improving Air Quality' states that "*London's air quality should be significantly improved and exposure to poor air quality, especially for vulnerable people, should be reduced*". It goes on to detail that development proposals should not:

- *“lead to further deterioration of existing poor air quality*
- *create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits*
- *reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality*
- *create unacceptable risk of high levels of exposure to poor air quality”.*

Camden Local Plan

2.5 The London Borough of Camden Local Plan was adopted on the 3rd July 2017 (Camden Council, 2017). Included within this is Policy CC4 on Air Quality which states that:

“The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan”

3 Air Quality at Inglewood Mansions

Site Description

- 3.1 Inglewood Mansions is situated adjacent to West End Lane in the London Borough of Camden. The existing building is a four-storey property, which is set back from West End Lane by around 6 m. The property currently provides a mix of uses, comprising office (B1), residential (C3) and HMO accommodation (sui generis). The proposed mansard roof extension will add an extra storey to the building to allow an increase in capacity of the building as an HMO, through the provision of 13 bedsit units.
- 3.2 Inglewood Mansions lies within an Air Quality Management Area (AQMA) declared by Camden Council for exceedances of the annual mean air quality objective for nitrogen dioxide and the 24-hour mean objective for fine particulate matter (PM₁₀).

Local Air Quality Monitoring

- 3.3 Camden Council monitors air quality throughout its borough using a mixture of automatic air quality monitoring stations and diffusion tube monitors for nitrogen dioxide. There is only one monitoring site in close proximity to Inglewood Mansions, which is located at Emmanuel Primary School on Mill Lane (just off West End Lane), approximately 170 m to the northwest of Inglewood Mansions. The monitoring site is located ~2 m above ground level outside the school, only 1 m from the kerb of Mill Lane.
- 3.4 Annual mean measured nitrogen dioxide concentrations for the diffusion tube site at Emmanuel Primary School are presented in Table 1 and the location of the monitoring site in relation to Inglewood Mansions is shown in Figure 1.

Table 1: Nitrogen Dioxide Monitoring at Emmanuel Primary School 2013 – 2017^{a,b}

Site ID	Location	Annual Mean Nitrogen Dioxide Concentrations (µg/m ³)				
		2013	2014	2015	2016	2017
CA25	Emmanuel Primary School	57.9	48.4	47.7	52.2	47.4
Objective		40				

^a Exceedances of the annual mean objective of 40 µg/m³ are shown in bold.

^b Data obtained from Camden Council's 2016 Air Quality Progress Report (London Borough of Camden, 2016).

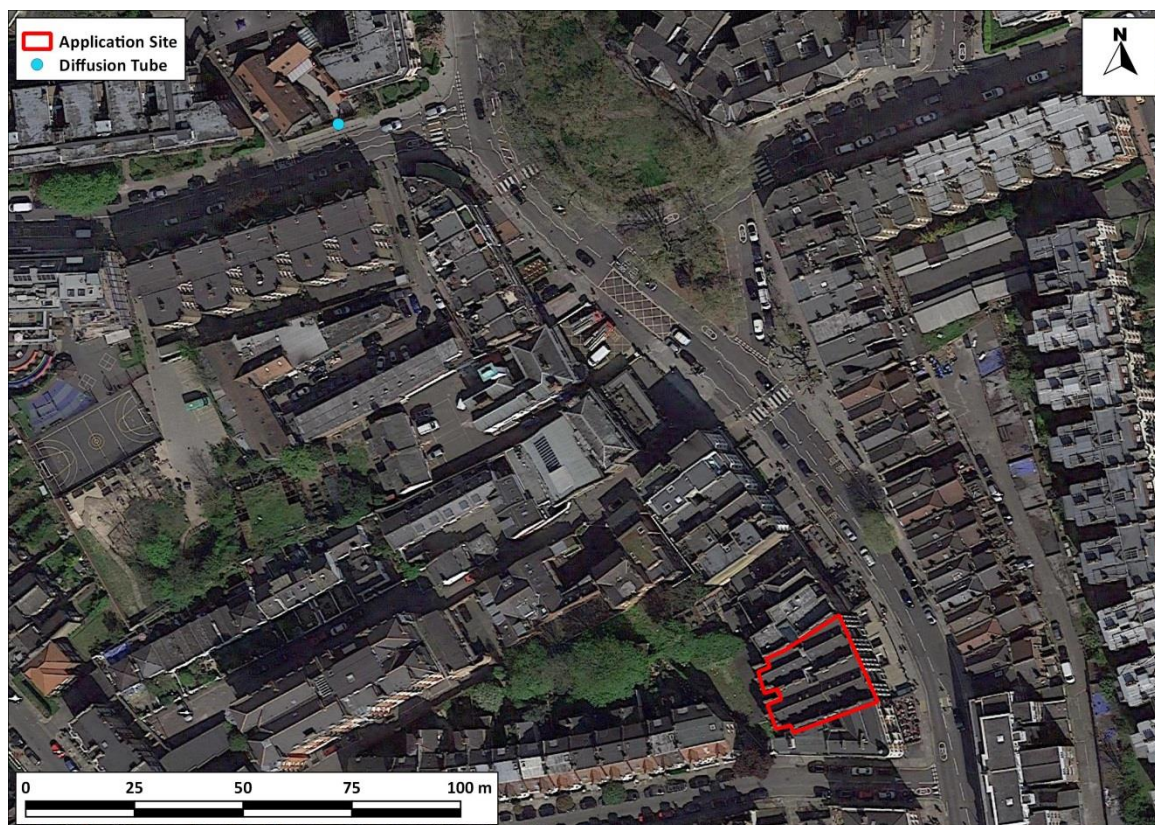


Figure 1: Inglewood Mansions and Emmanuel Primary School Diffusion Tube Monitoring Site

Imagery ©2018 Google

- 3.5 Annual mean nitrogen dioxide concentrations measured at Emmanuel Primary School have been consistently above the objective of $40 \mu\text{g}/\text{m}^3$ in recent years. There is no clear trend in the monitoring results over the past few years, suggesting that the expected reductions in roadside nitrogen dioxide concentrations brought about by cleaner vehicles and various local, regional and national air quality improvement measures are not yet materialising in this location.

Background Concentrations

- 3.6 Nitrogen dioxide concentrations at Inglewood Mansions are affected by direct contributions from road traffic on West End Lane, and the contribution of other local and regional sources, which make up the background concentrations at the site. Background nitrogen dioxide concentrations are available from the Defra background pollutant maps (Defra, 2018), which provide background concentrations across the UK on a $1\text{km} \times 1\text{km}$ grid. The background nitrogen dioxide concentrations at Inglewood Mansions are presented in Table 2. The concentrations for 2017 are shown, which aligns with the most recent year of monitoring at Emmanuel Primary School shown in Table 1. The background concentrations are well below the objective.

Table 2: Nitrogen Dioxide Background Concentrations 2017

Grid Square (x,y)	Nitrogen Dioxide Background Concentration ($\mu\text{g}/\text{m}^3$)
525500,185500	29.0
Objective	40

Local Factors Affecting Air Quality

Traffic Flows

- 3.7 The primary source of nitrogen dioxide affecting Inglewood Mansions and Emmanuel Primary School is road traffic. The London Atmospheric Emissions Inventory (LAEI) (GLA, 2016b) includes modelled road traffic for major roads in London including West End Lane and Mill Lane. The LAEI estimates Annual Average Daily Traffic (AADT) of around 7,500 vehicles on West End Lane at Inglewood Mansions, and around 13,000 vehicles on Mill Lane outside Emmanuel Primary School. It is therefore likely that the monitoring site at Emmanuel Primary School reflects nitrogen dioxide concentrations resulting from emissions from almost twice the traffic volume as travels past Inglewood Mansions.

Street Canyon

- 3.8 Inglewood Mansions form part of a street canyon on West End Lane. A street canyon is a street with tall unbroken façades on both sides of the road, which cause a canyon-like urban topography. Inglewood Mansions is a 4-storey building, approximately 13 – 15 m in height and the opposite buildings are 3-storey buildings, approximately 10 m in height.
- 3.9 Within a street canyon, dispersion of exhaust emissions from road traffic is restricted as air can become trapped between the buildings and recirculates rather than being immediately flushed away. This generally causes elevated annual mean nitrogen dioxide concentrations compared to locations that are not street canyons (for example where façades line only one side of a road).
- 3.10 The diffusion tube site at Emmanuel Primary School is within a street canyon formed by buildings on Mill Lane, although it is also very close to the junction between Mill Lane and West End Road, which is very open and not street canyon-like. However, the close proximity of the diffusion tube to the junction also means concentrations are likely to be elevated due to increased emissions associated with queuing and stop-start traffic at the junction. Overall, nitrogen dioxide concentrations measured at the Emmanuel Primary School diffusion tube site are therefore broadly representative of concentrations in a street canyon environment.
- 3.11 The proposed mansard roof extension of Inglewood Mansions will not be within the street canyon, because at 15 m in height it is taller than the opposite buildings (10 m tall), which means at that elevation above the road there is plenty of unrestricted space in which for emissions to disperse.

Concentrations at the mansard roof extension will therefore likely be lower than at lower floor levels in the existing Inglewood Mansions, which are within a street canyon.

Height above Ground

- 3.12 Nitrogen dioxide concentrations at locations adjacent to roads reduce with height above ground level. Analysis of nitrogen dioxide monitoring at building facades adjacent to roads carried out by AQC (Gellatly, 2015) demonstrates that concentrations reduce with height above ground in both street-canyon and non-street canyon environments, although the drop-off is more pronounced in non-street canyons.
- 3.13 The degree of change is dependent on a number of factors, such as the background concentrations, the traffic volumes on the adjacent road and the specific urban topography, but the monitoring suggests reductions of several micrograms per cubic metre with only a few (10 -15 m) increase in height. It is not expected that the background concentrations reduce with height above ground and therefore the changes are driven by reductions in the contribution from road traffic on the adjacent road.

Analysis and Discussion

- 3.14 There is no air quality monitoring on West End Lane and therefore nitrogen dioxide monitoring at Emmanuel Primary School, 170 m to the northwest of Inglewood Mansions has been used to indicate current nitrogen dioxide concentrations at Inglewood Mansions. The monitoring site at Emmanuel Primary School is adjacent to Mill Lane, which handles nearly twice the volume of traffic as West End Lane. The tube is located much closer to the kerb of Mill Lane (1 m) than Inglewood Mansions are to the kerb of West End Lane (~6 m). Overall, it is judged that the concentrations at ground-floor level at Inglewood Mansions will be lower than those measured at Emmanuel Primary School.
- 3.15 To provide an estimate of how much lower concentrations may be at Inglewood Mansions compared to Emmanuel Primary School, an approximation can be made based on the difference in traffic volumes between Mill Lane and West End Lane, taking account of the background concentrations. The background concentrations are 29.0 (see Table 2) and therefore the direct road traffic contribution from the 13,000 vehicles per day on Mill Lane is around 18.4 $\mu\text{g}/\text{m}^3$ (i.e. the 2017 measured concentration of 47.4 $\mu\text{g}/\text{m}^3$ minus the background concentration of 29.0 $\mu\text{g}/\text{m}^3$). Based on a linear relationship between traffic volumes and nitrogen dioxide concentrations, the direct road traffic contribution from the 7,500 vehicles per day on West End Lane will be around 10.6 $\mu\text{g}/\text{m}^3$, which results in an equivalent concentration at Inglewood Mansions of 39.6 $\mu\text{g}/\text{m}^3$, when the background concentration is added. This is close to the annual mean objective.
- 3.16 It is important to acknowledge that there are variables other than traffic volumes that play a role in the difference in concentrations between Emmanuel Primary School and Inglewood Mansions,

such as vehicle speeds and vehicle types, distance to the road and orientation relative to the road. As discussed in paragraph 3.10, vehicle speeds will likely be lower at Emmanuel Primary School due to close proximity to the junction with West End Lane, and the vehicle types on each road are similar, based on the fleet composition provided in the LAEI (GLA, 2016b). The Emmanuel Primary School site is closer to the road than Inglewood Mansions, so overall, it is likely that concentrations at the façade of Inglewood Mansions will be several micrograms per cubic metre lower than those at Emmanuel Primary School and are likely to be close to or below the annual mean objective.

- 3.17 The proposed mansard roof extension is 15 m above ground level, on the 5th floor of Inglewood Mansions. As discussed in paragraph 3.12, concentrations reduce with height above ground floor level and as such ought to be lower at the mansard roof extension than at the ground floor. Based on the discussion provided in paragraph 3.15, it is estimated that nitrogen dioxide concentrations at the façade of Inglewood Mansions will be close to or below the annual mean objective, and therefore it is anticipated that concentrations at the mansard roof extension will be below the objective.
- 3.18 Reductions in roadside nitrogen dioxide concentrations are expected in the future due to improvements in vehicle emissions technologies, the increased uptake of ultra-low emission vehicles such as electric vehicles (which will be accelerated by the introduction of the London Ultra-Low Emission Zone in 2019), and by the delivery of measures through national, regional and local policy aimed at improving air quality and meeting the air quality objectives. It is therefore expected that air quality for residents within the proposed mansard roof extension at Inglewood Mansions will improve in coming years and there is no requirement for mitigation for the proposed scheme.

4 Conclusions and Recommendations

- 4.1 The assessment set out in this note has examined the potential for air quality impacts at the proposed mansard roof extension at Inglewood Mansions on West End Lane.
- 4.2 The assessment has identified that annual mean nitrogen dioxide concentrations are likely to be below the air quality objective at the roof extension. The air quality impacts are therefore judged to be not significant and therefore there is no requirement for mitigation in accordance with Policy 7.14 of the London Plan and Policy CC4 of the Camden Local Plan.
- 4.3 It is expected that concentrations at Inglewood Mansions will reduce in the near future, through the continued infiltration of cleaner vehicles into the London vehicle fleet (especially zero-emission electric vehicles) as well as through the implementation of measures set out in local, regional and national air quality plans and policies.

5 References

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6 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
GLA	Greater London Authority
IAQM	Institute of Air Quality Management
LAEI	London Atmospheric Emissions Inventory
$\mu\text{g}/\text{m}^3$	Microgrammes per cubic metre
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

7 Appendices

A1	Professional Experience.....	12
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A1 Professional Experience

Dr Ben Marner, BSc (Hons) PhD CSci MEnvSc MIAQM

Dr Marner is a Technical Director with AQC and has twenty years' experience in the field of air quality. He has been responsible for air quality and greenhouse gas assessments of road schemes, rail schemes, airports, power stations, waste incinerators, commercial developments and residential developments in the UK and abroad. He has been an expert witness at several public inquiries, where he has presented evidence on health-related air quality impacts, the impacts of air quality on sensitive ecosystems, and greenhouse gas impacts. He has extensive experience of using detailed dispersion models, as well as contributing to the development of modelling best practices. Dr Marner has arranged and overseen air quality monitoring surveys, as well as contributing to Defra guidance on harmonising monitoring methods. He has been responsible for air quality review and assessments on behalf of numerous local authorities. He has also developed methods to predict nitrogen deposition fluxes on behalf of the Environment Agency, provided support and advice to the UK Government's air quality review and assessment helpdesk, Transport Scotland, Transport for London, and numerous local authorities. He is a Member of the Institute of Air Quality Management and a Chartered Scientist. Dr Marner is a member of Defra's Network of Evidence Experts and a member of Defra's Air Quality Expert Group.

Laurence Caird, MEarthSci CSci MEnvSc MIAQM

Mr Caird is an Associate Director with AQC, with 12 years' experience in the field of air quality including the detailed assessment of emissions from road traffic, airports, heating and energy plant, and a wide range of industrial sources including the thermal treatment of waste. He has experience in ambient air quality monitoring for numerous pollutants using a wide range of techniques and is also competent in the monitoring and assessment of nuisance odours and dust. Mr Caird has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers and process operators. He is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Full CVs are available at www.aqconsultants.co.uk.