Air Quality Assessment:
Ornan Court, Camden

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Experts in air quality
management & assessment

Document Control

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Executive Summary

The air quality impacts associated with the development of a basement extension to Ornan Court, comprising two new residential apartments, have been assessed.

The site lies within an Air Quality Management Area declared by the London Borough of Camden for exceedences of the annual mean nitrogen dioxide and 24-hour mean PM_{10} objectives.

The development comprises of only two new dwellings and any air quality impacts associated with increased traffic generation has been screened out, and are not significant.

There is a potential for concentrations of nitrogen dioxide at the Haverstock Hill-facing façade of the proposed development to be close to the annual mean objective, but no windows or doors are proposed for this façade, and concentrations are likely to be lower on the Ornan Road-facing side of Ornan Court. Overall, it is unlikely that future residents will be exposed to poor air quality and as such the impacts are judged to be not significant.

Contents

1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed basement extension at Ornan Court, Camden. The assessment has been carried out by Air Quality Consultants Ltd on behalf of Hodkinson Consultancy.

1.2 The proposed development will consist of two new disabled access apartments at lower ground floor level at the existing Ornan Court building. Ornan Court lies within an Air Quality Management Area (AQMA) declared by the London Borough (LB) of Camden for exceedences of the annual mean nitrogen dioxide and 24-hour mean PM_{10} objectives. The new residential properties may therefore experience poor air quality. The main air pollutants of concern in relation to Ornan Court are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The Greater London Authority's (GLA's) London Plan (GLA, 2015) requires certain developments to be assessed in terms of their air quality neutrality. The Supplementary Planning Guidance (SPG) on Sustainable Design and Construction (GLA, 2014a) details the methodology for this assessment. However, the SPG makes clear that only 'major' developments need to be assessed, which are defined in the London Plan as being developments of more than ten residential units. This scheme is for two residential units and it is, therefore, not a major development.

1.4 GLA has also released Supplementary Planning Guidance on the Control of Dust and Emissions from Construction and Demolition (GLA, 2014b). The SPG outlines a risk assessment approach for construction dust assessment and helps determine the mitigation measures that will need to be applied. However, the SPG makes clear that only 'major' developments need to prepare a dust risk assessment, and, as set out in Paragraph 1.3, this scheme is not a major development.

1.5 This report has been prepared taking into account all relevant local and national guidance and regulations.

2 Policy Context and Assessment Criteria

Air Quality Strategy

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

Planning Policy

National Policies

2.2 The National Planning Policy Framework (NPPF) (2012) sets out planning policy for England in one place. It places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. One of the twelve core planning principles notes that planning should *"contribute to…reducing pollution"*. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location. The NPPF states that the effects of pollution on health and the sensitivity of the area and the development should be taken into account.

2.3 More specifically the NPPF makes clear that:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan".

2.4 The NPPF is now supported by Planning Practice Guidance (PPG) (DCLG, 2014), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that *"Defra carries out an annual national assessment of air quality using*

modelling and monitoring to determine compliance with EU Limit Values" and *"It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit".* The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans "*identify measures that will be introduced in pursuit of the objectives*".

2.5 The PPG states that:

"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)".

2.6 The PPG sets out the information that may be required in an air quality assessment, making clear that *"Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality"*. It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that *"Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".*

The London Plan

2.7 The London Plan (GLA, 2015) 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.

2.8 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.

2.9 Policy 7.14B(c), requires that development proposals should be "*at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as designated Air Quality Management Areas (AQMAs))*". Further details of the London Plan in relation to planning decisions are provided in Appendix A1.

The Mayor's Air Quality Strategy

2.10 The revised Mayor's Air Quality Strategy (MAQS) was published in December 2010 (GLA, 2010). The overarching aim of the Strategy is to reduce pollution concentrations in London to achieve compliance with the EU limit values as soon as possible. The Strategy commits to the continuation

of measures identified in the 2002 MAQS, and sets out a series of additional measures. These additional measures and the role of the Low Emission Zone are described in Appendix A1.

2.11 The MAQS also addresses the issue of 'air quality neutral' and states that the "*GLA will work with boroughs to assist in the development of methodologies that will allow an accurate assessment of the impacts of the emissions of new developments*" (Para 5.3.19).

GLA SPG: Sustainable Design and Construction

2.12 The GLA's SPG on Sustainable Design and Construction (GLA, 2014a) provides details on delivering some of the priorities in the London Plan. Section 4.3 covers Air Pollution. It defines when developers will be required to submit an air quality assessment, explains how location and transport measures can minimise emissions to air, and provides emission standards for gas-fired boilers, Combined Heat and Power (CHP) and biomass plant. It also sets out, for the first time, guidance on how Policy 7.14B(c) of the London Plan relating to 'air quality neutral' (see Paragraph 2.9, above) should be implemented.

Local Policies

2.13 Camden Council's Draft Local Plan (Camden Council, 2016) includes a whole section on air quality. Within this, Policy CC4 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".

2.14 Until the new Local Plan is adopted the Council's Local Development Framework from 2010 remains the relevant set of planning policy documents. The Local Development Framework Core Strategy (Camden Council, 2010) includes Policy CS16 on improving Camden's health and well-being, where it is stated that:

"The Council will seek to improve health and well-being in Camden. We will… recognise the impact of poor air quality on health and implement Camden's Air Quality Action Plan which aims to reduce air pollution levels".

2.15 The Core Strategy is supported by the Camden Development Policies document (Camden Council, 2010). Policy DP32 sets out how Camden will expect developments to reduce their impact on air quality:

"The Council will require air quality assessments where development could potentially cause significant harm to air quality. Mitigation measures will be expected in developments that are located in areas of poor air quality".

2.16 Camden Council has also prepared a Supplementary Planning Document - Camden Planning Guidance (CPG) 6 Amenity (Camden Council, 2011), which provides further guidance on air quality. It includes information on when an air quality assessment will be required, what an air quality assessment should cover and what measures can reduce air quality emissions and protect public exposure. The Council's overarching aim is for new development to be 'air quality neutral' and not lead to further deterioration of existing poor air quality. Mitigation and offsetting measures to deal with any negative air quality impacts associated with the development proposals may be required. The development should be designed to minimise exposure of occupants to existing poor air quality. It states that the Council requires assessments for:

"development that could have a significant negative impact in air quality. This impact can arise during both the construction and operational stages of a development as a result of increased NOx and PM_{10} emissions".

2.17 This assessment is written taking account of the contents of the CPG on Amenity.

Air Quality Action Plans

National Air Quality Plans

2.18 Defra has produced Air Quality Plans to reduce nitrogen dioxide concentrations in major cities where exceedences of the EU limit values for nitrogen dioxide have been forecast in 2020 and beyond (Defra, 2015). Along with a suite of national measures, the Air Quality Plans identify the need to establish Clean Air Zones within five Zones (Birmingham, Leeds, Southampton, Nottingham and Derby). The precise nature of these Clean Air Zones is still to be decided. In Greater London, Defra will continue to support and monitor the delivery of the Mayor's plans for improving air quality to meet the EU limit value for nitrogen dioxide by 2025. Ornan Court lies within the Greater London zone.

2.19 There is currently no practical way to take account of the effects of these Air Quality Plans on the assessment presented in this report, which is for assessment against the air quality objectives.

Local Air Quality Action Plan

2.20 Camden Council has declared an AQMA for nitrogen dioxide and PM_{10} that covers the whole Borough, and has developed an Air Quality Action Plan (Camden Council, 2014a). This identifies actions and mitigating measures necessary to improve air quality in the borough. It sets out objectives to reduce transport emissions and any emissions associated with new development. Key objectives associated with new development include identifying the impact of new development on air quality and controlling emissions from construction sites.

Assessment Criteria

2.21 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, Statutory Instrument 928 (2000) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002).

2.22 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 $\mu g/m^3$ (Defra, 2009). Similarly, measurements have also shown that the 24-hour PM_{10} objective could be exceeded where the annual mean concentration is above 32 $\mu g/m^3$ (Defra, 2009). Annual mean concentrations can therefore be used as a proxy to determine the likelihood of exceedences of the 1-hour mean nitrogen dioxide and 24-hour mean PM_{10} objectives. Where annual mean nitrogen dioxide concentrations are below 60 $\mu g/m^3$, it is unlikely that the 1-hour mean objective will be exceeded and where annual mean PM_{10} concentrations are below 32 $\mu g/m^3$ it is unlikely that the 24-hour mean objective will be exceeded.

2.23 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2009). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor

eating locations and pavements of busy shopping streets. All of these objectives apply to future residents of Ornan Court.

2.24 The European Union has also set limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$. The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one (Directive 2008/50/EC of the European Parliament and of the Council, 2008). In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded.

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

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

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

[a] A proxy value of 32 μg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedences of the 24-hour mean PM_{10} objective are possible (Defra, 2009).

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

Descriptors for Air Quality Impacts and Assessment of Significance

2.26 There is no official guidance in the UK in relation to development control on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)[1] (EPUK & IAQM, 2015) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement, taking account of the impact descriptors. Full details of the EPUK/IAQM approach are provided in Appendix A2. The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix A3.

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

3 Assessment Approach

Impacts of the Development on Existing Air Quality

3.1 The scale of the proposed development is minor, and as such, the potential for air quality impacts associated with emissions generated by the development have been assessed qualitatively, using the screening criteria set out in the IAQM/EPUK planning guidance (EPUK & IAQM, 2015). These screening criteria are summarised in Appendix A2.

Impacts on Future Residents of the Development

3.2 Existing sources of emissions within the study area have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2016a) and the Environment Agency's website 'what's in your backyard' (Environment Agency, 2016). Local sources have also been identified through examination of the Council's Air Quality Review and Assessment reports.

3.3 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. Background concentrations have been defined using the national pollution maps published by Defra (2016b). These cover the whole country on a 1x1 km grid.

4 Impact Assessment

Impacts of the Development on Existing Air Quality

4.1 Air quality guidance published by EPUK and IAQM (EPUK & IAQM, 2015) includes screening criteria to determine when a development may require an assessment of potential impacts on local air quality. The first stage of screening, as described in paragraph A2.8 in Appendix A2, states that an assessment need only be required where a development involves 10 or more residential units, or more than 0.5 Ha (equal to 5,000 m^2) of residential use.

4.2 The proposed development comprises two new residential dwellings, covering approximately 172 m^2. These are well below the EPUK/IAQM criteria and as such, no assessment of the air quality impacts of the proposed development on existing air quality is required. The impacts will be not significant.

Impacts on Future Residents of the Development

Site Description

4.3 The proposed development will provide a basement extension to Ornan Court, an existing 5-storey residential building located at the junction of Ornan Road and the A502 Haverstock Hill.

4.4 Ornan Road is a quiet residential street; Haverstock Hill is a busier road with approximately 15,000 vehicles per day. There is a bus stop on the southbound side of Haverstock Road, almost immediately adjacent to the northeast elevation of Ornan Court.

4.5 The northeast-facing façade of Ornan Court is set back 11 m from Haverstock Hill; the southwest-facing façade is set back 7.5 m from Ornan Road. The existing ground-floor level at Ornan Court is elevated a few meters above the road level.

Industrial sources

4.6 A search of the UK Pollutant Release and Transfer Register (Defra, 2016a) and Environment Agency's 'what's in your backyard' (Environment Agency, 2016) websites has not identified any significant industrial or waste management sources that are likely to affect the proposed development, in terms of air quality.

Air Quality Review and Assessment

4.7 Camden Council has investigated air quality within its area as part of its responsibilities under the LAQM regime. The entire borough was declared an AQMA in 2002 for exceedences of the annual mean nitrogen dioxide objective and the 24-hour mean PM_{10} objective.

Local Air Quality Monitoring

4.8 Camden Council currently operates five automatic monitoring stations within its area, one of which is located at Swiss Cottage, 1 km southwest of Ornan Court. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko (using the 50% TEA in acetone method). These include one deployed at Fitzjohn's Avenue, 600 m west of Ornan Court, and one deployed at Frognal Way, 950 m to the northwest. Results for the years 2009 to 2014 are summarised in Table 2 and the monitoring locations are shown in Figure 1.

Table 2: Summary of Nitrogen Dioxide (NO_2) Monitoring (2009-2014) [a b]

Site No.	Site Type	Location	2009	2010	2011	2012	2013	2014
Automatic Monitor - Annual Mean (µg/m^3)								
CD1	Kerbside	Swiss Cottage	**84**	**82**	**71**	**70**	**63**	**66**
Objective			**40**					
Automatic Monitor - No. of Hours > 200 µg/m^3								
CD1	Kerbside	Swiss Cottage	**217**	**128**	**79**	**43**	**28**	13
Objective			**18**					
Diffusion Tubes - Annual Mean (µg/m^3) [c]								
CA7	Background	Frognal Way	34	29	31	29	32	30
CA15	Roadside	47 Fitzjohn's Avenue	**63**	**73**	**59**	**61**	**65**	**63**
Objective			**40**					

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

[b] Data for 2009-2013 obtained from LB Camden annual progress report 2014 (Camden Council, 2014b). Data for 2014 have been provided by Camden Council.

[c] Data have been bias adjusted.

4.9 Annual mean nitrogen dioxide concentrations have exceeded the objective at both the Swiss Cottage automatic monitoring site and Fitzjohn's Avenue diffusion tube site in all years for which data are presented. Annual mean concentrations at both sites also exceed 60 µg/m^3 which represents a risk of exceedences of the 1-hour mean objective. This is corroborated by the results of automatic monitoring at Swiss Cottage, where exceedences of the 1-hour mean objective were recorded in 2009-2013. The 1-hour mean objective was, however, met in 2014 and the data presented in Table 2 suggests a clear downward trend in recent years.

4.10 Annual mean nitrogen dioxide concentrations at the background site at Frognal Way are well below the objective and concentrations have remained relatively consistent between 2009 and 2014.

4.11 The Swiss Cottage automatic monitoring station also measures PM_{10} or $PM_{2.5}$ concentrations. Results for the years 2009 to 2014 are presented in Table 3.

Table 3: Summary of PM_{10} and $PM_{2.5}$ Automatic Monitoring (2009-2014) [a]

Site No.	Site Type	Location	2009	2010	2011	2012	2013	2014
PM_{10} Annual Mean (µg/m^3)								
CD1	Kerbside	Swiss Cottage	25	26	27	23	21	22
Objective			**40**					
PM_{10} No. Days >50 µg/m^3								
CD1	Kerbside	Swiss Cottage	25	26	31	21	8	12
Objective			**35**					
$PM_{2.5}$ Annual Mean (µg/m^3)								
CD1	Kerbside	Swiss Cottage	17	17	16	13	16	15
Objective			**25 [b]**					

[a] Measurements made using an EU reference equivalent monitoring method (FDMS).

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

4.12 There have been no exceedences of the PM_{10} or $PM_{2.5}$ objectives measured at Swiss Cottage between 2009 and 2014. The data presented in Table 3 suggests a slight downward trend in PM_{10} or $PM_{2.5}$ concentrations between 2009 and 2014.

Figure 1: Site Location and Monitoring Locations Plan

Exceedences of EU Limit Value

4.13 There are several AURN monitoring sites within the Greater London Urban Area that have measured exceedences of the annual mean nitrogen dioxide limit value. Furthermore, the national map of roadside annual mean nitrogen dioxide concentrations (Defra, 2016c), used to report exceedences of the limit value to the EU, identifies exceedences of this limit value in 2014 along many roads in London, including the A502 Haverstock Hill, which bounds Ornan Court to the northeast. The Greater London Urban Area has thus been reported to the EU as exceeding the limit value for annual mean nitrogen dioxide concentrations. Defra's mapping for 2020, which takes account of the measures contained in its 2015 Air Quality Action Plan (Defra, 2015), does not identify any exceedences on the A502 Haverstock Hill. Defra has not published predictions for interim years and therefore it is not known in which specific year the annual mean nitrogen dioxide limit value is expected to be first met at Haverstock Hill.

Background Concentrations

4.14 In addition to these locally measured concentrations, estimated background concentrations in the study area have been determined for 2014 (Table 4) using Defra's background maps (Defra, 2016b). These cover the whole country on a 1x1 km grid and are published for each year from 2011 until 2030.

Table 4: Estimated Annual Mean Background Pollutant Concentrations in 2014 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2014	30.7	21.7	14.9
Objectives	**40**	**40**	**25** [a]

n/a = not applicable.

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

4.15 The background annual mean nitrogen dioxide concentration obtained from the Defra background maps and shown in Table 4 correlates well with the 2014 background concentration measured at the Frognal Way diffusion tube monitoring site (see Table 2).

Discussion on Potential Air Quality Impacts for Future Residents

4.16 Nitrogen dioxide monitoring at roadside locations near to Ornan Court (specifically at Swiss Cottage and Fitzjohn's Avenue) has measured substantial exceedences of the annual mean objective in recent years. Ornan Court, by comparison to these sites, lies adjacent to quieter roads and is set back a greater distance from the carriageway; Ornan Court is 11 m from Haverstock Hill, whereas the monitoring site at Fitzjohn's Avenue is less than 5 m from the kerb (Camden Council, 2014b), and the Swiss Cottage monitoring site is less than 1 m from the kerb. Concentrations at the façade of Ornan Court are expected to be much lower than at the two monitoring sites, as traffic flows on the adjacent roads (Haverstock Hill and Ornam Road) are much lower[2], and the greater distance from the road will enhance the dilution and dispersion of pollutants. Nonetheless, there remains a slight risk that the annual mean nitrogen dioxide objective may be exceeded at Ornan Court.

4.17 It is judged very unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded at Ornan Court.

4.18 With respect to PM_{10} and $PM_{2.5}$, monitoring has not measured any exceedences in recent years, and it is judged to be highly unlikely that the objectives will be exceeded at Ornan Court.

[2] Annual average daily traffic flows in 2015 on the A41 at Swiss Cottage = 47,000, on Fitzjohn's Avenue = 17,500 and on Haverstock Hill = 16,500 according to data in the London Atmospheric Emissions Inventory (GLA, 2010). No traffic flow data for Ornan Road is available as this is a minor road.

4.19 Overall, it can be concluded that there is a slight risk of exceedences of the annual mean nitrogen dioxide objective at the proposed Ornan Court apartments, but the 1-hour mean nitrogen dioxide objective as well as the PM_{10} and $PM_{2.5}$ objectives will be met at the site.

Assessment of Significance

4.20 There is a slight risk of exceedences of the annual mean nitrogen dioxide objective at the façade of the proposed development, associated with traffic emissions from the adjacent A502 Haverstock Hill. However, Ornan Court is set well back from both Ornan Road (>7 m) and Haverstock Hill (>11 m), and any exceedence at the façade is likely to be marginal. In addition, the façade fronting Haverstock Hill will not include any doors, windows or other openings. The proposed development represents a small addition to existing residential exposure at Ornan Court, the risk of the objective being exceeded at other facades is considered to be low, and the overall impacts are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A2.

5 Mitigation

5.1 The assessment has demonstrated that the scheme will not cause any air quality impacts and as such no mitigation is required.

5.2 In terms of the proposed development there is a slight risk of exceedences of the annual mean nitrogen dioxide objective at the façade facing Haverstock Hill. This façade will not include any doors or windows, thus reducing the risk of exposure of future residents to poor air quality.

5.3 Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation. In addition, measures to improve air quality throughout Camden are being delivered by the Council via its Air Quality Action Plan (Camden Council, 2014a).

6 Conclusions

6.1 The air quality impacts associated with the development of two new residential apartments, as part of a basement extension to Ornan Court at Ornan Road in Camden, have been assessed.

6.2 The proposed development is a minor (2 dwellings), will not include any car parking provision, and does not involve centralised heating plant; as such, the impacts of the proposed development on existing air quality have been screened out as not significant.

6.3 In terms of air quality for future residents of the proposed apartments, there is a slight risk of exceedences of the annual mean nitrogen dioxide objective at the façade of the proposed development, associated with traffic emissions from the adjacent A502 Haverstock Hill. However, Ornan Court is set well back from both Ornan Road (>7 m) and Haverstock Hill (>11 m), and any exceedence at the façade is likely to be marginal. In addition, the façade fronting Haverstock Hill will not include any doors, windows or other openings. The proposed development represents a small addition to existing residential exposure at Ornan Court, the risk of the objective being exceeded at other facades is considered to be low, and the overall impacts are judged to be 'not significant'.

7 References

Camden Council (2010) *Camden Core Strategy 2010-2025*.

Camden Council (2010) *Camden Development Policies 2010 - 2025, Local Development Framework*.

Camden Council (2011) *Camden Planning guidance - Amenity*.

Camden Council (2014a) *Air quality action plan 2013 - 2015*, [Online], Available: http://www.camden.gov.uk/ccm/content/environment/air-quality-and-pollution/air-quality/filestorage/air-quality-action-plan-2009-2012.en.

Camden Council (2014b) *2014 Air Quality Progress Report for London Borough of Camden*.

Camden Council (2016) *Camden Local Plan Submission Draft*.

DCLG (2014) *Planning Practice Guidance*, [Online], Available: http://planningguidance.planningportal.gov.uk/blog/guidance/.

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

Defra (2009) *Review & Assessment: Technical Guidance LAQM.TG(09)*, Defra.

Defra (2015) *Air quality in the UK: plan to reduce nitrogen dioxide emissions*, [Online], Available: https://www.gov.uk/government/publications/air-quality-in-the-uk-plan-to-reduce-nitrogen-dioxide-emissions.

Defra (2016a) *UK Pollutant Release and Transfer Register*, [Online], Available: prtr.defra.gov.uk.

Defra (2016b) *Defra Air Quality Website*, [Online], Available: http://laqm.defra.gov.uk/.

Defra (2016c) *UK Ambient Air Quality Interactive Map*, [Online], Available: http://uk-air.defra.gov.uk/data/gis-mapping.

Directive 2008/50/EC of the European Parliament and of the Council (2008).

Environment Agency (2016) *'what's in your backyard'*, [Online], Available: http://www.environment-agency.gov.uk/homeandleisure/37793.aspx.

EPUK & IAQM (2015) *Land-Use Planning & Development Control: Planning For Air Quality*, IAQM.

GLA (2010) *London Atmospheric Emissions Inventory (LAEI) 2010*.

GLA (2010) *Mayor's Air Quality Strategy: Cleaning the Air*.

GLA (2014a) *Sustainable Design and Construction Supplementary Planning Guidance*, [Online], Available: https://www.london.gov.uk/sites/default/files/Revised%20SD%26C%20SPG_0.pdf.

GLA (2014b) *The Control of Dust and Emissions from Construction and Demolition SPG*, [Online], Available: https://www.london.gov.uk/sites/default/files/Dust%20and%20Emissions%20SPG%208%20July%202014_0.pdf.

GLA (2015) *The London Plan: The Spatial Development Strategy for London Consolidated with Alterations Since 2011*, [Online], Available: http://www.london.gov.uk/sites/default/files/London%20Plan%20March%202015%20%28FALP%29.pdf.

National Planning Policy Framework (2012), DCLG.

The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO.

The Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000), HMSO.

8 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CPG	Camden Planning Guidance
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
EPUK	Environmental Protection UK
Exceedence	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
FDMS	Filter Dynamics Measurement System
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LB	London Borough
LDV	Light Duty Vehicles (<3.5 tonnes)
LEZ	Low Emission Zone
µg/m^3	Microgrammes per cubic metre
MAQS	Mayor's Air Quality Strategy
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
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
PHV	Private Hire Vehicle
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
SPG	Supplementary Planning Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide
ULEZ	Ultra Low Emission Zone

9 Appendices

A1 London-Specific Policies and Measures

London Plan

A1.1 The London Plan sets out the following points in relation to planning decisions:

"Development proposals should:

a) 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);

b) promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils "The control, of dust and emissions form construction and demolition";

c) be at least "air quality neutral" and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs));

d) ensure that where provision needs to made to reduce emissions from a development, these usually are made on site. Where it can be demonstrated that on-sire provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches;

e) where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified."

The Mayor's Air Quality Strategy

A1.2 The Mayor's Air Quality Strategy commits to the continuation of measures identified in the 2002 MAQS, and sets out a series of additional measures, including:

Policy 1 – Encouraging smarter choices and sustainable travel;

Measures to reduce emissions from idling vehicles focusing on buses, taxis, coaches, taxis, PHVs and delivery vehicles;

Using spatial planning powers to support a shift to public transport;

Supporting car free developments.

Policy 2 – Promoting technological change and cleaner vehicles:

Supporting the uptake of cleaner vehicles.

Policy 4 – Reducing emissions from public transport:

Introducing age limits for taxis and PHVs.

Policy 5 – Schemes that control emissions to air:

Implementing Phases 3 and 4 of the LEZ from January 2012

Introducing a NOx emissions standard (Euro IV) into the LEZ for Heavy Goods Vehicles (HGVs), buses and coaches, from 2015.

Policy 7 – Using the planning process to improve air quality:

Minimising increased exposure to poor air quality, particularly within AQMAs or where a development is likely to be used by a large number of people who are particularly vulnerable to air quality;

Ensuring air quality benefits are realised through planning conditions and section 106 agreements and Community Infrastructure Levy.

Policy 8 – Creating opportunities between low to zero carbon energy supply for London and air quality impacts:

Applying emissions limits for biomass boilers across London;

Requiring an emissions assessment to be included at the planning application stage.

Low Emission Zone (LEZ)

A1.3 A key measure to improve air quality in Greater London is the Low Emission Zone (LEZ). This entails charges for vehicles entering Greater London not meeting certain emissions criteria, and affects older, diesel-engined lorries, buses, coaches, large vans, minibuses and other specialist vehicles derived from lorries and vans. The LEZ was introduced on 4th February 2008, and was phased in through to January 2012. From January 2012 a standard of Euro IV was implemented for lorries and other specialist diesel vehicles over 3.5 tonnes, and buses and coaches over 5 tonnes. Cars and lighter Light Goods Vehicles (LGVs) are excluded. The third phase of the LEZ, which applies to larger vans, minibuses and other specialist diesel vehicles, was also implemented in January 2012. As set out in the 2010 MAQS, a NOx emissions standard (Euro IV) is included in the LEZ for HGVs, buses and coaches, from 2015.

Ultra Low Emission Zone (ULEZ)

A1.4 The Mayor has confirmed the introduction of the Ultra Low Emission Zone (ULEZ) in the Capital on 7 September 2020. The ULEZ will operate 24 hours a day, 7 days a week in the same area as the current Congestion Charging zone. All cars, motorcycles, vans, minibuses and Heavy Goods Vehicles will need to meet exhaust emission standards (ULEZ standards) or pay an additional daily charge to travel within the zone. The ULEZ standards are Euro 3 for motorcycles; Euro 4 for petrol cars, vans and minibuses; Euro 6 for diesel cars, vans and minibuses; and Euro VI for HGVs, buses and coaches.

A2 EPUK & IAQM Planning for Air Quality Guidance

A2.1 The guidance issued by EPUK and IAQM[3] (EPUK & IAQM, 2015) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

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

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

Recommended Best Practice

A2.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

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

A2.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

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

A2.4 The good practice principles are that:

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

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;
- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A2.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

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

A2.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

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

Screening

Impacts of the Local Area on the Development

A2.7 The guidance sets out when an air quality assessment maybe required to determine the impacts of local emissions on a proposed development site itself:

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

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

Impacts of the Development on the Local Area

A2.8 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the follow apply:

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

Coupled with any of the following:

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

A2.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, the criteria for which are set out below. The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria is likely to be more appropriate.

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights, or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor;
- the development will have one or more substantial combustion processes where the combustion unit is:
  - any centralised plant using bio fuel;
  - any combustion plant with single or combined thermal input >300 kW; or
  - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
- the development will have a combustion unit of any size where emissions are at a height that may give rise to impacts through insufficient dispersion, e.g. through nearby buildings.

A2.10 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area.

A2.11 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A2.12 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed by EPUK and IAQM[4] (EPUK & IAQM, 2015) has therefore been used. The guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact of the scheme described as either significant or not significant. In drawing this conclusion, the following factors should be taken into account:

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

A2.13 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant.

A2.14 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A3.

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

A3 Professional Experience

Stephen Moorcroft, BSc (Hons) MSc DIC MIEnvSc MIAQM CEnv

Mr Moorcroft is a Director of Air Quality Consultants, and has worked for the company since 2004. He has over thirty-five years' postgraduate experience in environmental sciences. Prior to joining Air Quality Consultants, he was the Managing Director of Casella Stanger, with responsibility for a business employing over 100 staff and a turnover of £12 million. He also acted as the Business Director for Air Quality services, with direct responsibility for a number of major Government projects. He has considerable project management experience associated with Environmental Assessments in relation to a variety of development projects, including power stations, incinerators, road developments and airports, with particular experience related to air quality assessment, monitoring and analysis. He has contributed to the development of air quality management in the UK, and has been closely involved with the LAQM process since its inception. He has given expert evidence to numerous public inquiries, and is frequently invited to present to conferences and seminars. He is a Member of the Institute of Air Quality Management.

Laurence Caird, MEarthSci CSci MIEnvSc MIAQM

Mr Caird is a Principal Consultant with AQC, with ten 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.