Aether

Air Quality Assessment for the proposed development at 158 Finchley Road, Camden

Report to DP9

April 2019

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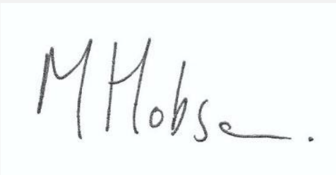
Signature	
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Addendum

Aether completed an air quality assessment in October 2016 for the proposed development at Frognal Court Estate, 158 Finchley Road in Camden, hereafter referred to as 'the assessment'. The development will consist of an additional floor on all of the existing blocks, providing eight residential units. The existing car parking spaces will be reduced in order to make way for additional bicycle parking and a lift entrance[1]. No air polluting on-site energy generation is planned. Therefore, the assessment and its conclusions are focused on exposure to currently elevated levels of pollutant concentrations, rather than assessing the impacts of the development per se.

The development plans have been updated to incorporate comments from the London Borough of Camden; this include the mansard to be in zinc, reduced windows and shallower pitched mansard slope with the side elevations also sloped. The front block of the building remains the same, with the exception of the introduction of the revised roof slope/ pitch. In addition, the revised site plans are not expected to impact the assumptions on traffic generation or energy generation applied in the assessment. This addendum provides a summary of the assessment in the context of the revised site plans and the latest air quality monitoring data.

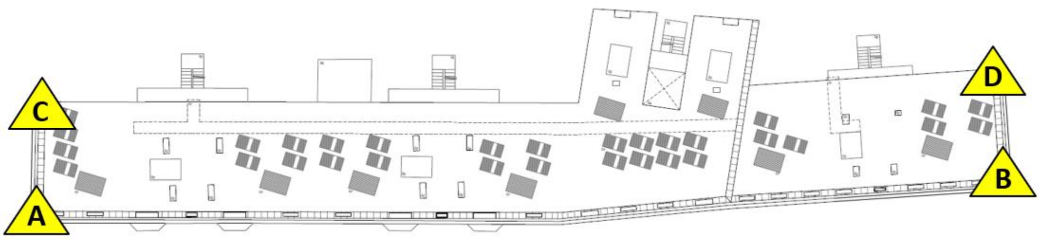
The original air quality assessment is provided below.

Site Plans

Figure 1: (a) Site plans at the time of the original assessment in 2016 and (b) revised site plans as of April 2019

a)

b)



The location of the building, and its proximity to the road has not been altered (**Figure A.1**). In addition, there will be a reduction in car parking spaces. Therefore, the updated site plans will not

[1] Note: Previously only 2 car parking spaces were to be provided and therefore the impact of the development on local traffic flows was deemed to be negligible.

alter the original modelled input data. The 2016 air quality assessment predicted that in 2019 (the expected first full year of occupation), annual mean NO_2 concentrations to be below (by < 5 %) the annual mean NO_2 objective at all locations. Given the inherent uncertainties in the modelling, background pollutant concentrations and vehicle fleet emission factors were maintained at 2015 levels in the development year scenarios to provide a conservative estimate. The previous report concluded that no mitigation was required as the air quality objectives were predicted to be met.

Monitoring Data

The Camden Swiss Cottage automatic monitoring site, located approximately 680 m from the development, was used to verify the model in the assessment. The 2015 monitoring data was used to verify the model as it was the latest available data at the time of conducting the assessment. **Table 1** provides the monitoring data for Camden Swiss Cottage between 2015 and 2018. The 2015 – 2017 data has been taken from Camden's 2018 Annual Status Report[2], the 2018 data has been taken from the London Air site[3] and is provisional. The data shows that NO_2 concentrations have declined since 2018. On this basis, if the assessment was re-run using the latest available monitoring data, it is expected that lower concentrations would be predicted at the site compared to the 2016 assessment.

Table 1: Monitoring results for Camden Swiss Cottage, the site used for model verification in the 2016 air quality assessment, 2015-2018

Objective	Site Name	2015	2016	2017	2018
Annual mean NO_2 ($\mu g/m^3$)	Camden Swiss Cottage *	**61**	**66**	**53**	**50^P**
Hourly mean NO_2 (no. exceedances)	Camden Swiss Cottage *	11	**37**	1	NA
Annual mean PM_{10} ($\mu g/m^3$)	Camden Swiss Cottage *	20	21	20	21^P
Daily mean PM_{10} (no. exceedances)	Camden Swiss Cottage *	8	7	8	NA

*Note: Values exceeding the objectives are shown in bold, annual mean NO_2 values above 60 $\mu g/m^3$ are also underlined, * automatic monitor, NA – data unavailable, ^{P} provisional data*

Summary

Taking these aspects into account, the findings of the 2016 assessment are considered to remain valid in relation to the revised development plans and no air pollutant mitigation is required. No further assessment is required.

[2] https://www.camden.gov.uk/documents/20142/1458280/Air+quality+status+report+2017.pdf/326282c9-7b97-58d6-75f9-577f86406259
[3] http://www.londonair.org.uk/LondonAir/Default.aspx

Air Quality Assessment for the proposed development at 158 Finchley Road, Camden

Contents

1 Introduction

Aether has been commissioned to undertake an air quality assessment for the proposed development at 158 Finchley Road, Camden. The development will consist of an additional floor on all of the existing blocks, providing eight residential units. The existing car parking spaces will be reduced in order to make way for additional bicycle parking and a lift entrance. No air polluting on-site energy generation is planned. As such, this assessment focuses on the impact of existing air quality on new residents, rather than the direct impact of the new development on local air quality.

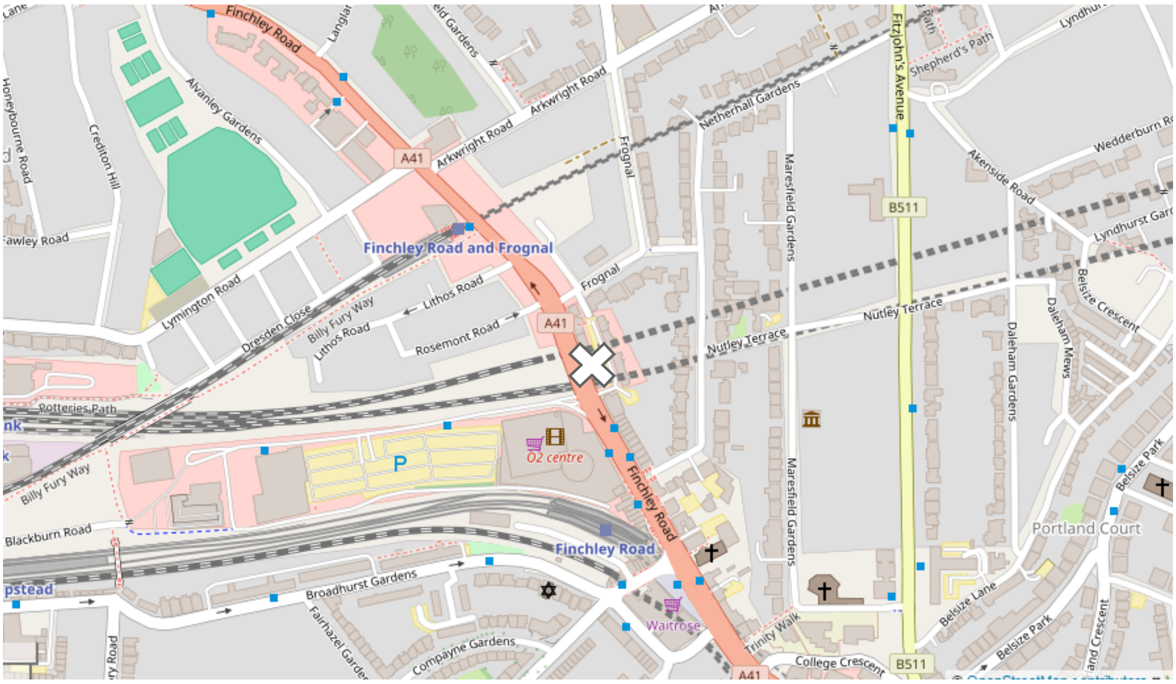
The development falls within the London Borough of Camden, which suffers from elevated levels of air pollution, primarily due to high levels of traffic. It is therefore important to assess whether there will be an exceedance of the air quality objectives for particulate matter (PM_{10}) or nitrogen dioxide (NO_2) at the proposed site and then advise whether any action is required to reduce the residents' exposure to air pollution. The assessment utilises ADMS-Roads, a comprehensive dispersion modelling tool for investigating air pollution problems due to small networks of roads and industrial sources. The short term impact of any construction work is also considered.

The expected completion date of the proposed development is 2018. The assessment has therefore been completed for 2019, the expected first full year of occupation.

1.1 The Location of the Development

The proposed development is located on the A41 (Finchley Road) in Camden as shown in Figure 2.

Figure 2: Location of the development site



Source: OpenStreetMap

1.2 Assessment Criteria

A summary of the air quality objectives relevant to the Finchley Road development, as set out in the UK Air Quality Strategy[4], is presented in Table 2 below.

Table 2: 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}.

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[5].

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; and
- 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. The hourly objective will apply at all

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

locations where members of the public could reasonably be expected to spend that amount of time. Therefore, in this assessment the hourly objectives will also apply.

1.3 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).

The London Borough of Camden declared an AQMA[6] in 2002 covering the whole Borough for the annual mean NO_2 and 24 hour PM_{10} objectives. The proposed development site therefore falls within the AQMA. A new Clean Air Action Plan[7] has been produced, identifying a number of actions to improve air quality, as well as some higher level objectives to lobby local and central government on policies and issues.

1.4 The ADMS-Roads Method

Local air quality has been assessed using ADMS-Roads, a comprehensive dispersion model that can be used to predict concentrations of pollutants in the vicinity of roads and small industrial sources. The model has been used for many years in support of planning applications for new residential/commercial developments.

ADMS-Roads is able to provide an estimate of air quality both before and after development, taking into account important input data such as background pollutant concentrations, meteorological data, traffic flows and on-site energy generation (if applicable). The model output can be verified against local monitoring data to increase the accuracy of the predicted pollutant concentrations and this approach has been followed in this assessment.

The use of dispersion modelling enables estimates of concentrations to be made at varying heights. As a result, suggestions for appropriate mitigation measures can be made where necessary, taking into consideration the identification of worst-case locations.

The most recent version of ADMS-Roads (v4.0 SP1) was issued in September 2016 and requires the following information to assess the impact at sensitive receptor locations:

- Setup: General site details and modelling options to be used;
- Source: Source dimensions and locations, release conditions, emissions;
- Meteorology: hourly meteorological data;
- Background: Background concentration data;
- Grids: Type and size of grid for output; and
- Output: Output required and sources/groups to include in the calculations.

[6] https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=331

[7] https://www.camden.gov.uk/ccm/cms-service/stream/asset/?asset_id=3478895&

2 Methodology

2.1 Local Pollutant Concentrations

It is good practice to include up-to-date local background pollutant concentrations in the assessment model, and also to verify modelled outputs against local monitoring data where available. This section provides an overview of the local data available for use in the assessment.

Local monitoring data

The London Borough of Camden undertakes both automatic monitoring and passive monitoring through deployment of diffusion tubes across the Borough. There is a single automatic monitor within close proximity to the development site, which has diffusion tubes co-located. Another two diffusion tubes lie within close proximity to the development site, one roadside location and one that is representative of urban background conditions. Details of the monitoring sites near to the development site are given in Table 3.

Monitoring results have been taken from the Council's latest Annual Status Report (ASR)[8].

Table 3: Monitoring sites in Camden

Site Name	Site Type	Pollutant(s)	Grid Reference	Distance to Kerb (m)	Approx. Distance to development site (m)
Camden Swiss Cottage*	K	NO_2, PM_{10}	526633, 184392	1.5	680
Frognal Way	UB	NO_2	526213, 185519	30	570
Camden Swiss Cottage	K	NO_2	526633, 184392	1.5	680
47 Fitzjohn's Rd	R	NO_2	526547, 185125	5	360

*Note: K = kerbside, R = roadside, * automatic monitor.*

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. Camden has applied a bias adjustment factor (0.98) to their 2015 diffusion tube results.

Monitoring results are presented in Table 4. The data shows that all nearby roadside sites have shown exceedances of the annual mean NO_2 objective. No exceedances (above the 18 allowed) of the 1 hour mean NO_2 objective have been recorded at the automatic monitor since 2013. 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

[8] At the time of completing this report, the 2016 ASR was not publicly available. Other air quality reports can be found at: https://www.camden.gov.uk/ccm/content/environment/air-quality-and-pollution/air-quality/twocolumn/policies-reports-and-research.en?page=2#section-2

[9] As described in Box 5.2 of LAQM Technical Guidance (TG16).

considered unlikely where the annual mean was below 60 µg/m^3. Therefore, hourly mean NO_2 exceedances are considered possible at the Camden Swiss Cottage, and Fitzjohn's Avenue monitors.

No exceedances of either the annual or daily PM_{10} objective have been recorded at the automatic monitoring site in the past three years.

Table 4: Monitoring results for sites close to the proposed development site, 2013-2015

Objective	Site Name	2013	2014	2015
Annual mean NO_2 (µg/m^3)	Camden Swiss Cottage *	**63**	**66**	**61**
	Frognal Way	32	29	28
	Camden Swiss Cottage	**83**	**74**	**69**
	47 Fitzjohn's Av	**65**	**60**	**56**
Hourly mean NO_2 (no. exceedances)	Camden Swiss Cottage *	**28**	13	11
Annual mean PM_{10} (µg/m^3)	Camden Swiss Cottage *	21	22	20
Daily mean PM_{10} (no. exceedances)	Camden Swiss Cottage *	8	12	8

Note: Values exceeding the objectives are shown in bold, annual mean NO_2 values above 60 µg/m^3 are also underlined, * automatic monitor

Background mapped data

Background pollutant concentration maps are available from the Defra LAQM website[10] and data has been extracted for Camden for this assessment. These 2013 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 estimated mapped background NO_x, NO_2 and PM_{10} concentrations around the development site are 57 µg/m^3, 34 µg/m^3 and 20 µg/m^3 respectively in 2015 (the baseline year used in the assessment). The background maps also provide projections to future years. For 2019 (the first estimated year of occupation), the concentrations obtained for the same pollutants are 43 µg/m^3, 29 µg/m^3 and 19 µg/m^3 respectively.

The mapped background concentrations are higher than the results from the Frognal Way background monitor. As this is a single diffusion tube, and in order to provide a conservative estimate the mapped background concentrations have been applied in the air quality modelling. For the same reason, the projected improvements in background air quality by 2019 have not been used in the dispersion modelling.

[10] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

2.2 Traffic data

Average annual daily traffic (AADT) count data for 2015 (the selected baseline year) has been obtained for Finchley Road from Department for Transport (DfT) Traffic Counts[11], which provides data for major roads. In the absence of any other data being available, for the minor roads, estimates are based upon average values for *an 'urban minor road, London'* from the DfT National Road Traffic Survey, 2016[12] except for the B525 and Fitzjohn's Avenue where a higher AADT estimate was considered more applicable. Therefore, there will be uncertainty in the model input. All roads within 200 metres of the modelled receptors have been included in the assessment. The values are shown in Appendix B.

For the purpose of this assessment, it has been assumed that the flows in 2019 remain the same as the data for 2015. It is possible to use the RTF[13] model to project traffic growth; however this projects a traffic increase, whereas the most recent data from the DfT traffic counts shows traffic to be variable, or slightly declining for the modelled roads. Therefore, zero growth is considered to be more applicable.

The proposed development will result in a small decrease in car parking provision by two spaces. It is considered that this will have no accountable impact on modelled concentrations. Results (Section 3 of this report) therefore refer to concentrations modelled in 2019 regardless of whether the development takes place or not. As a result, the assessment and its conclusions are focused on the exposure of residents to elevated levels of pollutant concentrations, rather than assessing the impacts of the development per se.

An average speed of 18.2 kph has been assumed on all surrounding roads, which is the average traffic speed for Inner London during PM peak hours[14]. This provides a worst-case scenario, as it is the slowest time period reported, resulting in highest exhaust emissions.

Queuing Traffic

Special consideration has been given to notable junctions modelled in this assessment. CERC note 60[15] has been used for estimating emissions from queuing traffic. This defines a representative AADT for queuing traffic to be 30,000 at 5 kph, assuming an average vehicle length of 4m. These figures, along with the traffic composition of the corresponding roads were then input into the Emission Factor Toolkit (EFT)[16] to calculate emission rates. The emission rates were then used within the dispersion model as separate road sources of pre-defined length representing each queue with time-varying emission profiles applied to represent busy periods.

2.3 Model input data

Hourly meteorological data from Heathrow for 2015 has been used in the model. The wind-rose diagram (Figure 3) presents this below. Data from Heathrow has been used as this has been found to be the most representative data available for the development site location.

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[11] http://www.dft.gov.uk/traffic-counts

[12] http://www.dft.gov.uk/statistics/series/traffic/

[13] http://laqm.defra.gov.uk/documents/RTF-Automated-Traffic-Growth-Calculator-v3-1.xls

[14] Travel in London Report 7: http://www.tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports

[15] Cambridge Environmental Research Consultants Ltd, Modelling Queuing Traffic – note 60, 20th August 2004

[16] Latest version 7.0, http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

Figure 3: Wind-rose diagram for Heathrow meteorological data, 2015

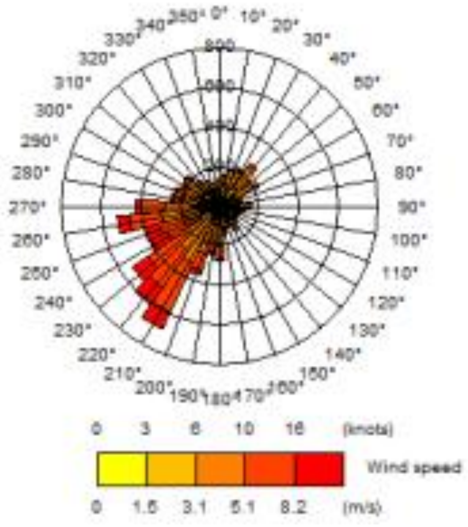
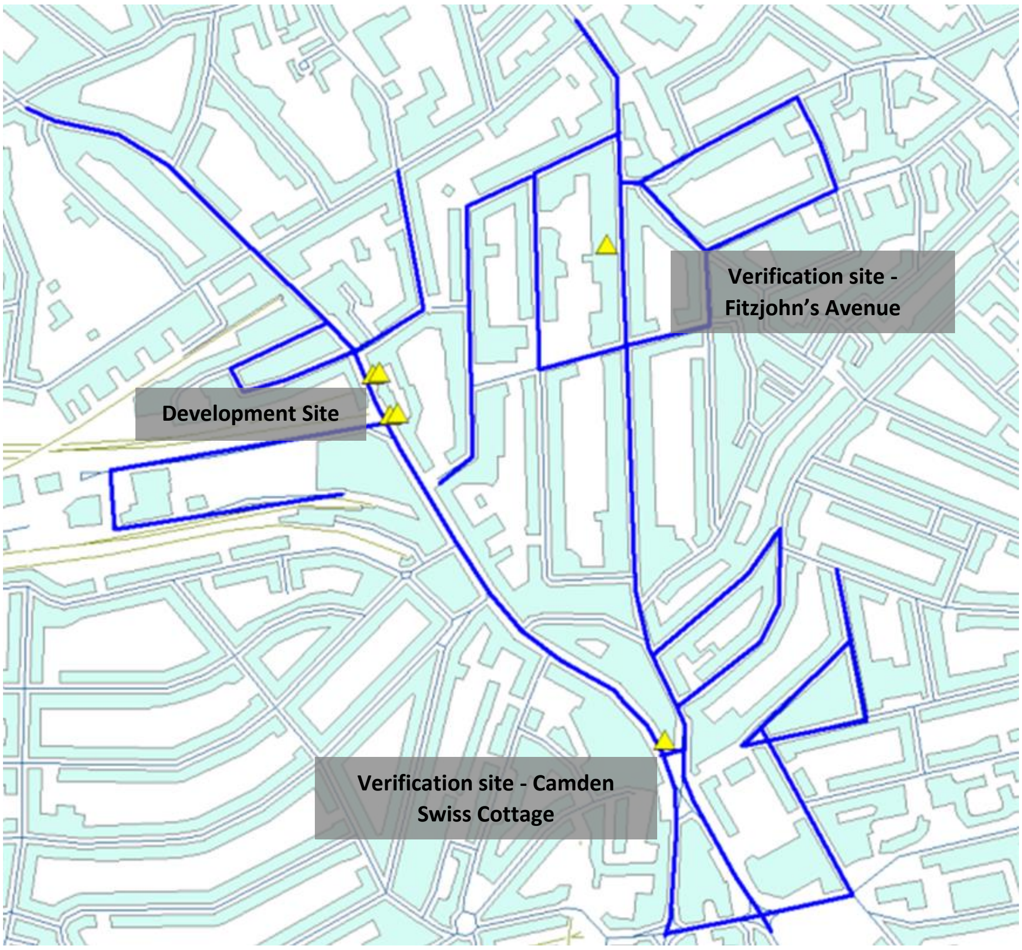


Figure 4: Road sources and receptors



Contains Ordnance Survey data © Crown copyright and database right [2016]

ArcMap software has been used to model the road source locations (blue lines) that are within 200 metres of the receptor locations (yellow triangles). This data can then be automatically uploaded to ADMS-Roads. This generates an accurate representation of the surrounding area to be assessed in the model in terms of the length of roads and distances between sources and receptors. This is shown in Figure 4 above. It is assumed that the contribution of other sources to NO_2 and PM_{10} is included in the background concentrations.

Four sensitive receptor locations have been selected for the assessment:

- A: North end of the site, located at the façade of Finchley Road
- B: South end of the site, located at the façade of Finchley Road
- C: North end of the site, set back from Finchley Road
- D: South end of the site, set back from Finchley Road

These sites have been chosen to reflect the extremities of the site and their proximity to road traffic sources. The architects plans (Figure 5) show the development site in more detail with receptor locations highlighted (yellow triangles). Exposure has been assumed to be represented at the mid-point of the new residential units, derived from the architect's plans.

Figure 5: The locations of the receptors used in the modelling

2.4 Conversion of NO_x to NO_2

Recent evidence shows that the proportion of primary NO_2 in vehicle exhaust has increased[17]. This means that the relationship between NO_x and NO_2 at the roadside has changed from that currently used in the ADMS model. A NO_x to NO_2 calculator (Published in June 2016) [18] has therefore been developed and has been used in conjunction with the ADMS model to obtain a more accurate picture of NO_2 concentrations.

2.5 Model Verification

Model verification refers to checks that are carried out on model performance at a local level. This involves the comparison of predicted versus measured concentrations. Where there is a disparity, the first step is to check the input data and the model parameters in order to minimise the errors. If required, the second step will be to determine an appropriate adjustment factor that can be applied.

In the case of NO_2, the model should be verified for NO_x as the initial step and should be carried out separately for the background contribution and the source (i.e. road traffic). Once the NO_x has been verified and adjusted as necessary, a final check should be made against the measured NO_2 concentration.

For this project, modelled annual mean road-NO_x estimates have been verified against the concentrations measured at the Camden Swiss Cottage automatic monitor only. The model was also run for the Fitzjohn's Avenue diffusion tube site, however this site was found to be an outlier, and without reliable traffic count data available for this road, it was considered that including this site for model verification would not have a beneficial impact on overall model uncertainty (see Appendix A). Ideally, three verification sites would have been used, but no other sites were deemed suitable due to their distance from the development site.

3 Results

3.1 Results of the Dispersion Modelling

Table 5 below provides the estimated pollutant concentrations in the development year (2019). Given the inherent uncertainties in the modelling, background pollutant concentrations and vehicle fleet emission factors have been maintained at 2015 levels in the development year scenarios to provide a conservative estimate.

Table 5: Estimated pollutant concentrations in 2019 (µg/m³)

Receptor	Annual mean NO_2 concentration (µg /m³)	Annual mean PM_{10} concentration (µg /m³)
A - 10.5m	37	21
B - 10.5m	37	21
C - 10.5m	38	21
D - 10.5m	38	21

17 http://uk-air.defra.gov.uk/assets/documents/reports/aqeg/primary-no-trends.pdf
18 http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc

The model predicts annual mean NO_2 concentrations to be below (by <5 %) the annual mean NO_2 objective at all locations. The model results highlight the significant drop-off with height from ground level to the point where concentrations are estimated to be approximately 10% above the 34 $\mu g/m^3$ background level. There is no significant difference at this height between the roadside façade, and the receptors that are set back from the road.

The Guidance states that authorities may assume exceedances of the hourly mean NO_2 objective are only likely to occur where annual mean concentrations are 60 $\mu g/m^3$ or above. Therefore, it is considered highly unlikely that this objective will be exceeded at any of the receptors.

The model estimates no exceedance against either the annual or daily mean PM_{10} objectives. Potential exceedances of the daily mean PM_{10} objective can be estimated based on the annual mean[19], such that:

$$No. 24 - hour\ mean\ exceedances = -18.5 + 0.00145 \times Annual\ Mean^3 + \left(\frac{206}{Annual\ Mean}\right)$$

On this basis, it is estimated that in 2016 there will be 4 exceedances of the daily mean PM_{10} limit value. Therefore, the daily mean PM_{10} objective would be met as 35 exceedances of limit value are allowed per year.

3.2 Mitigation Measures

Based on the ADMS results for estimated NO_2 concentrations, mechanical ventilation is not considered appropriate in this case, where there is estimated to be little variation in pollutant concentrations between the road facing façade and the rear of the building.

The developer is instead encouraged to consider further mitigation measures in order to minimise the use of private vehicles by residents. Such measures include: providing secure and covered cycle storage, promoting car share schemes, and installing electric charging points.

3.3 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'[20] 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

[19] Paragraph 7.92 of LAQM TG(16)

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

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

The use of the outlined IAQM methodology for assessing the impacts of dust from demolition/ construction is considered to be current best practice. Therefore, 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 August 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 Non-Road Mobile Machinery Low Emission Zone (NRMM LEZ) combining standards to address both nitrogen oxide (NO_x) and particulate matter (PM) emissions[21].

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 become more stringent.

[21] https://nrmm.london/

4 Summary and Conclusions

An air quality assessment has been undertaken for a proposed residential development, providing an additional floor at 158 Finchley Road, Camden. The Borough has declared a single AQMA covering the whole Borough for the annual mean nitrogen dioxide (NO_2) and daily mean particulate matter (PM_{10}) objectives. The proposed development therefore lies within an AQMA.

A conservative approach has been taken within the air quality model, in that no improvement in the pollutant background concentrations or road transport emission factors has been assumed between the base year (2015) and the first year of occupation (2019). With expected improvements to the traffic fleet, improvements in pollutant concentrations may however materialise.

An air quality assessment has been carried out using the ADMS-Roads dispersion model to determine the impact of emissions from road traffic on sensitive receptors. Predicted concentrations have been compared with the air quality objectives. The results of the assessment indicate that annual mean NO_2 concentrations are likely to be below the objective. Concentrations of PM_{10} are also predicted to be below the annual mean objective in 2019. Based on the evidence it is also estimated that there will be no exceedances of either short term objective for NO_2 or PM_{10}.

Although annual mean NO_2 concentrations are estimated to be within 10 % of the objective level, the installation of mechanical mitigation is not recommended as little variation is estimated between concentrations found at the roadside façade and the façade set back from the road. Instead, other measures such as providing secure and covered cycle storage, car share schemes, and installing an electric charging point, should be considered to reduce the emissions arising from the development. In addition, the developer is encouraged to refer to the IAQM's 'Guidance on the assessment of dust from demolition and construction' in order to minimise the impact of the construction phase on local air quality.

Appendix A – Model Verification

In order to verify modelled pollutant concentrations generated in the assessment, the model has been run to predict the annual mean road-NO_x concentration during 2015 at the automatic monitoring site (Camden Swiss Cottage).

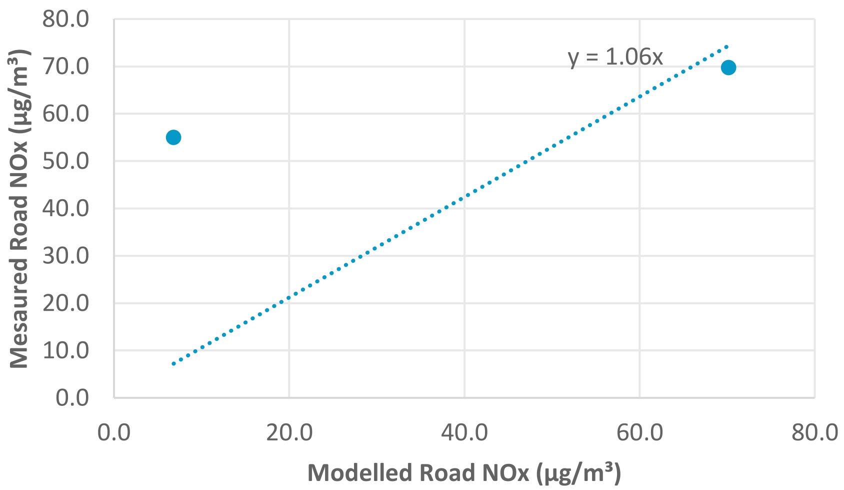
The model output of road-NO_x has been compared with the 'measured' road-NO_x. Measured NO_x for the monitoring sites was calculated using the NO_x to NO_2 calculator[18].

A primary adjustment factor was determined to convert between the 'measured' road contribution and the model derived road contribution (Figure A.1). This factor was then applied to the modelled road-NO_x concentration for each receptor to provide adjusted modelled road-NO_x concentrations. Total NO_2 concentrations were then determined by combining the adjusted modelled road-NO_x concentrations with the 2015 background NO_2 concentration.

The results imply that the model was in line with measured data once traffic queues were accounted for. Initially, the model was also run for the diffusion tube at 47 Fitzjohn's Avenue, however this site was found to be an outlier, and without reliable traffic count data available for this road, it was considered that including this site for model verification would not have a beneficial impact on overall model uncertainty (Figure A.1).

With the outlier removed, the primary adjustment factor applied in the model was 0.99.

Figure A.1: Comparison of Measured road-NO_X to unadjusted modelled road-NO_X concentrations



RMSE

The root mean square error (RMSE) is used to define the average error or uncertainty of the model. The following RMSE values have been calculated:

NO_x: 0.3

If the RMSE values are higher than ±25 % of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. In this case the model is being assessed against the annual mean objectives, which is 40 µg/m^3 for both NO_2 and PM_{10}. RMSE values of less than 10 µg/m^3 are obtained and therefore the model behaviour is acceptable.

Appendix B – Traffic Data

Table B.1: Traffic data for 2015 (and applied for 2019)

Development / verification site	Road links	Annual Average Daily Traffic (AADT)	% Heavy Duty Vehicles (HDV)	Speed (kph)
Development site	A41 Finchley Rd	46,617	7.8	18.2
	A41 Traffic queues	30,000	7.8	5
	Minor roads	2,200	2.4	18.2
Verification sites	Fitzjohn's Avenue	10,000	2.4	18.2
	B525	10,000	2.4	18.2
	Minor roads	2,200	2.4	18.2

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