Appendix 5

Air Quality Assessment Addendum

ARDENT | CONSULTING ENGINEERS

ST GEORGE WEST LONDON LIMITED

CAMDEN GOODS YARD, CHALK FARM, CAMDEN
JULY 2020 SECTION 73 APPLICATION

AIR QUALITY ASSESSMENT ADDENDUM

REPORT REFERENCE NO. 196121-02

PROJECT NO. 196121

JULY 2020

Camden Goods Yard, Chalk Farm Road, Camden

Air Quality Assessment Addendum

Ardent Consulting Engineers
3rd Floor
The Hallmark Building
52-56 Leadenhall Street
London
EC3M 5JE
Tel: 02076804088
Enquiries@ardent-ce.co.uk

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REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	Final	FKL	FKL	SJH	July 2020

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1.0 INTRODUCTION

Proposed Development

1.1 Ardent Consulting Engineers Ltd have been commissioned by St George West London Limited (the 'Applicant') to carry out an updated air quality assessment of impacts relating to the proposed development for the Camden Goods Yard site ('the application site'). This Air Quality Assessment Addendum has been prepared to accompany the submission of a planning application pursuant to Section 73 of the Town and Country Planning Act (the 'S73 application') for the application site to the local planning authority, the London Borough of Camden (LBC).

1.2 The application site benefits from an extant planning permission (2017/3847/P) granted in June 2018 (the 'June 2018 consented scheme') subsequently amended by:

- 06 February S96A 2019 application to make minor changes to the wording of planning conditions 47, 48 and 49 attached to the June 2018 consented scheme.
- 04 July 2019 S96A application to make minor changes to planning conditions 29, 50 and 60 attached to the June 2018 consented scheme.

1.3 In December 2019, the Applicant submitted a S96A non-material amendment application to amend the proposed development description relating to the Petrol Filling Station (PFS) Parcel of the June 2018 consented scheme. This was followed in January 2020 by a S73 application for a minor material amendment to the June 2018 consented scheme (the 'January 2020 S73 application') relating to the PFS Parcel. The amendments to the PFS Parcel were in respect of the construction start date; the construction method of the temporary store; the operation period of the temporary store; car parking provision; and, delivery access arrangements. The January 2020 S73 application was granted consent on 5 May 2020 resulting in the 'May 2020 consented scheme'.

1.4 The July 2020 S73 application seeks permission to amend the May 2020 consented scheme. The proposed amendments for the July 2020 S73 MMA application relate to the Morrisons Supermarket (MS) Parcel of the May 2020 consented scheme.

Scope

1.5 An assessment of the June 2018 consented scheme was previously carried out and submitted as part of planning application reference 2017/3847/P (report reference 160630-13A). The application was also accompanied by an Environmental Statement (the '2017 ES') including an air quality assessment.

1.6 For the May 2020 consented scheme the potential changes in air quality impacts were assessed. Based on the scale and type of changes to the scheme, it was concluded that these did not alter the conclusions of the air quality assessment carried out for the 2017 ES.

1.7 The purpose of this report is to address the relevant changes that have occurred since these assessments were carried out, including changes to the amended proposed development plans as well as changes that have occurred in legislation, guidance and baseline data since the original assessments were carried out. Relevant changes considered within this assessment are set out, below.

Changes in Development Plans

1.8 This current application is for an optimisation of the May 2020 consented scheme. The 'July 2020 amended proposed development' makes amendments predominantly to Blocks A, B, C and F, including inserting additional storeys as a result of reducing floor-to-ceiling heights to 2.5m, inserting extra storeys in addition, as well as alterations to floorplans and reconfiguration of internal layouts. The scheme will deliver 71 additional homes, to give a revised total of 644 new homes. There is a slight reduction to the commercial floorspace, but this is relatively minor. Principal amendments are as follows:

- Delivery of up to 71 additional residential units to the 573 residential units consented. Predominantly accommodated through optimisation to massing of consented scheme with a small amount of additional height.
- Changes to landscaping to ensure compliance in line with additional residential units which comprises:
    - 3 additional disabled car parking spaces;
    - Additional play and open space.
- Reduction in number of Morrisons Foodstore basement car parking spaces.
- All resident amenities moved to Block A.
- Redistribution of some commercial space between the blocks, mostly to accommodate resident amenity changes.
- Update to energy strategy which includes accommodating the additional energy requirements of the additional units.

1.9 In terms of air quality, these amendments result in:

- Changes to the predicted traffic flows used in the previous air quality assessment.
- Changes to energy emissions.

1.10 The development plans incorporate photovoltaic (PV) cells and air source heat pump (ASHP) technology, which do not result in local emissions to air. These are supplemented by Low NOx, gas powered boilers. As the majority of the heat and hot water for the development is provided by PV and ASHP, the potential impact of increased demand is limited to that portion which is provided by the gas boilers. The proposed boilers will meet the London requirements for Low NOx boilers (<40 mg/kwh) and therefore, with appropriate flue specifications, impacts from these boilers will not be significant. Building emissions relating to these boilers will alter the assessment of whether the amended proposed development meets the requirements of air quality neutral guidance.

Changes in Policy and Guidance

1.11 In London, an "intend to publish" draft New London Plan has been prepared. Details of the relevant policies contained within this document are set out in **Section 2.0** for completeness, however, the publication of this document does not alter the assessment approach or conclusions drawn in the previous assessment.

Changes in Baseline

1.12 Since the previous assessment was carried out there have been a number of changes to the baseline data. These include:

- More recent measured concentrations; and
- Updates to emissions and other data published by Defra which were utilised within the assessment.

1.13 Defra have updated their tools and emissions, (most recently updated in April 2019) including:

- Revised emissions (incorporating changes in predictions surrounding the London LEZ);
- Revised background concentrations; and
- Updated NOx from NO_2 tool.

1.14 These changes in baseline were not considered significant and have not been updated within the previous S73, however, they are relevant to the remodelling which has been carried out to demonstrate the impact of changes in traffic on local air quality. For this reason, the updated background data are presented here and incorporated into the model in order to ensure that an appropriate assessment is carried out.

Scope for Addendum

1.15 Based on the changes to the May 2020 consented development, legislation and guidance and baseline as set out above, the following scope has been identified.

Demolition and Construction Stage

1.16 The demolition and construction dust assessment is unaltered. The dust emission magnitude for demolition and construction is the only element which could be liable to change as a result of the slight increase in building height, however, this was already considered to be large and therefore no change is necessary. The demolition and construction mitigation measures recommended based on the outcome of that assessment are incorporated into this report for completeness. The amendment to the construction programme would not affect the demolition and construction assessment.

1.17 Consideration has been given to the potential impacts of the altered demolition and construction traffic on local air quality.

Completed Development Stage

1.18 In terms of the completed development stage, this report includes updated description of existing air quality within the study area and consideration of both the suitability of the site for the proposed development and the potential impact of the development on local air quality during the completed development stage. This takes into account changes in baseline data and traffic generation.

1.19 An energy centre is included within the May 2020 consented scheme and the required heat outputs of this are altered in the July 2020 proposals. ASHPs do not result in local emissions and need not be considered further. The proposed boiler plant which will supplement the ASHP will meet the requirements to emit less than 40 mg /kwh and be more than 90% efficient. Further assessment of energy centre plant emissions is therefore excluded from this assessment.

1.20 An updated assessment has been carried out to determine whether the July 2020 amended proposals are "air quality neutral" in terms of transport and building emissions.

1.21 The revised elements of this assessment have been prepared taking into account relevant local and national guidance, policy and legislation.

1.22 This air quality assessment report is a Technical Appendix to the July 2020 EIL and informs its findings. Accordingly, these two reports should be read in conjunction with each other. This air quality assessment report should also be read in conjunction with the following:

- June 2017 Environmental Statement (ES) Volume 1 Main ES Report, Chapter 8 Air Quality; and
- January 2020 Environmental Implications Letter (EIL) that accompanied the January 2020 S73 application.

1.23 The air quality impact of the July 2020 amended proposed development has been assessed in its entirety in this air quality assessment. The significance of any impacts has been compared against the conclusions drawn in the 2017 ES as updated by the January 2020 EIL.

Consultation

1.24 Consideration has been given in this assessment to the comments provided at the time of the original assessment in response to formal EIA Scoping Opinion and AQA scoping and by the LBC and consultees in respect of the consented development. Consultation was carried out at that time with the LBC Sustainability Officer. Detailed response was received from the LBC sustainability officer who agreed with the originally proposed methodology and added some key considerations which are summarised in **Table 1-1** alongside updated responses.

Table 1-1: Consultation Response

Comment	Response
Implications for any relevant non-residential uses proposed should be considered in addition to residential uses, particularly where possible short term exceedances apply.	Whilst the impacts on short term concentrations at non-residential locations are considered, the development site is located away from busy, congested roads and therefore, there is not considered to be a high risk of exceeding short-term objectives.
Detailed dispersion modelling will need to be undertaken following the London Council's Air Quality Planning Guidance and LAQM TG.	Modelling has been carried out following this guidance as well as the IAQM guidance and the recent Camden Planning Guidance on air quality.
Model verification should be based on latest LAQM TG.	The model has been verified following best practice guidance.
Local monitoring data as well as background data should be used.	The mapped background concentrations have been calibrated using local background monitoring data and the model has been verified using local roadside monitoring data.
If a transport plan is prepared this should be incorporated into the assessment.	Whilst a transport plan has been prepared, it is not expected that this will result in immediate improvements and therefore, the precautionary approach has been taken of excluding these from the traffic data used in the assessment.
Time-varying traffic movements can be based on local information.	Sufficient data is not available with which to create a time varying profile for all modelled roads and therefore creating a profile from partial information would create a bias,

Comment	Response
	particularly given the distance between the development site and verification sites. A time-varying emissions profile has been created based on national statistics which take into account different types of road and vehicle type.
A detailed contour plot of the existing and predicted pollutant concentrations and scale of air quality change with sensitive receptors plotted on the map should be provided.	Changes in concentrations are not significant at the worst case locations modelled. For this reason, extending the model to create contours to incorporate locations where impacts will be smaller will not add useful information.
Any plume dispersion impacts of the development should be considered.	There are no local plume impacts related to Air Source Heat Pumps. Details of the proposed gas fired boilers which will support the heat pumps have yet to be determined and these cannot therefore be modelled, however, boilers will be specified which meet the criteria of <40mg NOx/kwh and 90% efficiency.
Non-road mobile machinery (NRMM) should be included in the construction impacts.	Noted. This is included in the list of recommended construction mitigation measures.
Real time monitoring will be required to monitor construction impacts.	

2.0 LEGISLATION, POLICY AND GUIDANCE

2.1 Details of legislation, Policy and Guidance which have been released or updated since the previous assessment was carried out, are provided, below. As already noted, only the Camden Planning Guidance document (London Borough of Camden, 2019) materially alters the assessment, however, other updates are included for completeness.

National Air Quality Policy

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

2.2 The National Air Quality Plan (Defra and DfT, 2017) was written as a joint venture between the Defra and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO_2 in the UK. It includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.

2.3 The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in *"the shortest time possible".* These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the LA may need to consider implementation of a Clean Air Zone (CAZ) which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

The Road to Zero Strategy

2.4 The 'Road to Zero' strategy (HM Government, 2018) sets out the government's aims regarding zero emissions vehicles. These include the aim that all new cars and vans have zero tailpipe emissions by 2040 and for almost every car to be zero emission by 2050. Measures are aimed at encouraging uptake of the cleanest vehicles and support electric charging infrastructure.

Clean Air Strategy

2.5 The Clean Air Strategy (Defra, 2019) sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 $\mu g/m^3$ by 50% by 2025.

Planning Policy

Regional Policy and Guidance

2.6 In London, an 'intend to publish' draft New London Plan has been developed (Mayor of London, 2019). This includes a number of references to air quality, however, these are incorporated into policy SL1: Air Quality, which states:

A. Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

B. To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1. Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) create unacceptable risk of high levels of exposure to poor air quality.

2. In order to meet the requirements in Part 1, as a minimum:

a) development proposals must be at least Air Quality Neutral

b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures

c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.

C. Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

> *a) how proposals have considered ways to maximise benefits to local air quality, and*
>
> *b) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.*

D. In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

E. Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development.

2.7 Whilst the draft New London Plan has not yet been published, it is considered that it will carry material weight at this time.

2.8 The London Environmental Strategy (Mayor of London, 2018) considers policies aimed at improving the environment in London, across a number of different areas such as air quality, noise and climate change. There are a number of objectives but notable in relation to air quality is the objective: *"for London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities."*

2.9 Chapter 4 of the Environmental Strategy relates specifically to air quality and identifies a number of key issues to be addressed:

- Achieving legal compliance as quickly as possible;
- Diesel vehicles, especially cars and vans;
- Tackling all sources of pollution;
- Government action;
- Maximising co-benefits between air quality and climate change policies; and
- Further reductions are needed in PM_{10} and $PM_{2.5}$, particularly from transboundary pollution, tyre and brake wear and wood burning.

3.0 METHODOLOGY

3.1 The methodology set out in the following sections has been identified as being the most appropriate approach to identifying whether the potential impacts associated with the amended proposed development are different to those identified within the June 2018 consented scheme and whether these impacts are acceptable, along with any required mitigation. The approach has been to identify updated baseline[1] conditions (based on mapped backgrounds, existing concentrations as measured by the local authority, the presence of any AQMAs or exceedances of the EU Limit Values and modelling of current conditions), future conditions without either the consented or amended proposed development in place and future conditions with the amended proposed development in place (both based on modelled predictions). This allows an assessment to be carried out as to the suitability of the site for the proposed use, as well as the impact of the amended proposed development on local air quality.

Baseline Air Quality

3.2 Information regarding baseline air quality has been obtained by collating the results of monitoring carried out by LBC and referring to maps of AQMAs, Focus Areas and exceedances of the EU Limit Values. Background concentrations have been defined based on the national pollution maps published by Defra (Defra, 2020). In addition, concentrations of pollutants in 2018 have been modelled at a number of locations, following the methodology set out under 'Detailed Assessment', below.

Demolition and Construction Road Traffic Impacts

3.3 The potential for new or altered impacts relating to the change in demolition and construction stage traffic generation has been assessed qualitatively, taking into account the type and scale of the changes as well as other model inputs.

Completed Development Road Traffic Impacts

3.4 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted for a range of worst case locations for human health exposure. These locations include existing and proposed future properties sensitive to changes in air quality.

3.5 The locations of these receptors are largely unchanged from those in the original assessment, however, some have been moved slightly to ensure that they remain worst case when taking into account the advanced street canyon module now included within the ADMS Roads model. The locations of these receptors are shown in **Table 3-1** and **Figure 3-1**.

[1] The baseline year for the purposes of this assessment has been taken to be 2018 as this is the most recent year for which annual mean monitoring data are available.

3.6 In addition, concentrations have been modelled at two diffusion tube monitoring sites for use in model verification. Further details of model verification are provided in **Appendix E**.

Table 3-1: Receptor Locations

Receptor	Description	X coordinate	Y coordinate	Height (m)
Existing Receptors				
R1	Flat above 16 Chalk Farm Rd	528656	184207	4.5*
R2	Flat above 24 Chalk Farm Rd	528656	184207	4.5*
R3	Flat above 34 Chalk Farm Rd	528608	184243	4.5*
R4	Flat above 36 Chalk Farm Rd	528560	184268	4.5*
R5	Flat above 49 Chalk Farm Rd	528523	184282	4.5*
R6	Flat above 74 Chalk Farm Rd	528440	184308	4.5*
R7	Flat above 80 Chalk Farm Rd	528314	184346	4.5*
R8	69-78 Jupiter Crescent	528274	184363	1.5**
R9	85 Jupiter Crescent	528403	184234	1.5**
Proposed Receptors				
A1	Block A	528378	184167	1.5**
A2	Block A	528345	184161	1.5**
A3	Block A	528358	184138	1.5**
A4	Block A	528333	184134	1.5**
B1	Block B	528432	184197	1.5**
B2	Block B	528474	184155	1.5**
B3	Block B	528437	184119	1.5**
B4	Block B	528398	184160	1.5**
C1	Block C	528493	184176	1.5**
C2	Block C	528530	184170	1.5**
C3	Block C	528533	184153	1.5**
C4	Block C	528494	184139	1.5**
D1	Block D	528539	184143	1.5**
D2	Block D	528547	184122	1.5**
D3	Block D	528528	184125	1.5**
D4	Block D	528484	184116	1.5**
E1	Block E	528459	184114	1.5**
E2	Block E	528478	184098	1.5**

Receptor	Description	X coordinate	Y coordinate	Height (m)
E3	Block E	528464	184087	1.5**
E4	Block E	528447	184106	1.5**
E5	Block E	528444	184101	1.5**
E6	Block E	528454	184086	1.5**
E7	Block E	528395	184060	1.5**
E8	Block E	528402	184052	1.5**
F1	Block F	528391	184149	1.5**
F2	Block F	528426	184104	1.5**
F3	Block F	528387	184071	1.5**
F4	Block F	528350	184115	1.5**
G1	Block G	528394	184300	1.5**
G2	Block G	528420	184277	1.5**
G3	Block G	528387	184268	1.5**
G4	Block G	528361	184294	1.5**

* Representing exposure at ground floor
** Representing exposure at first floor

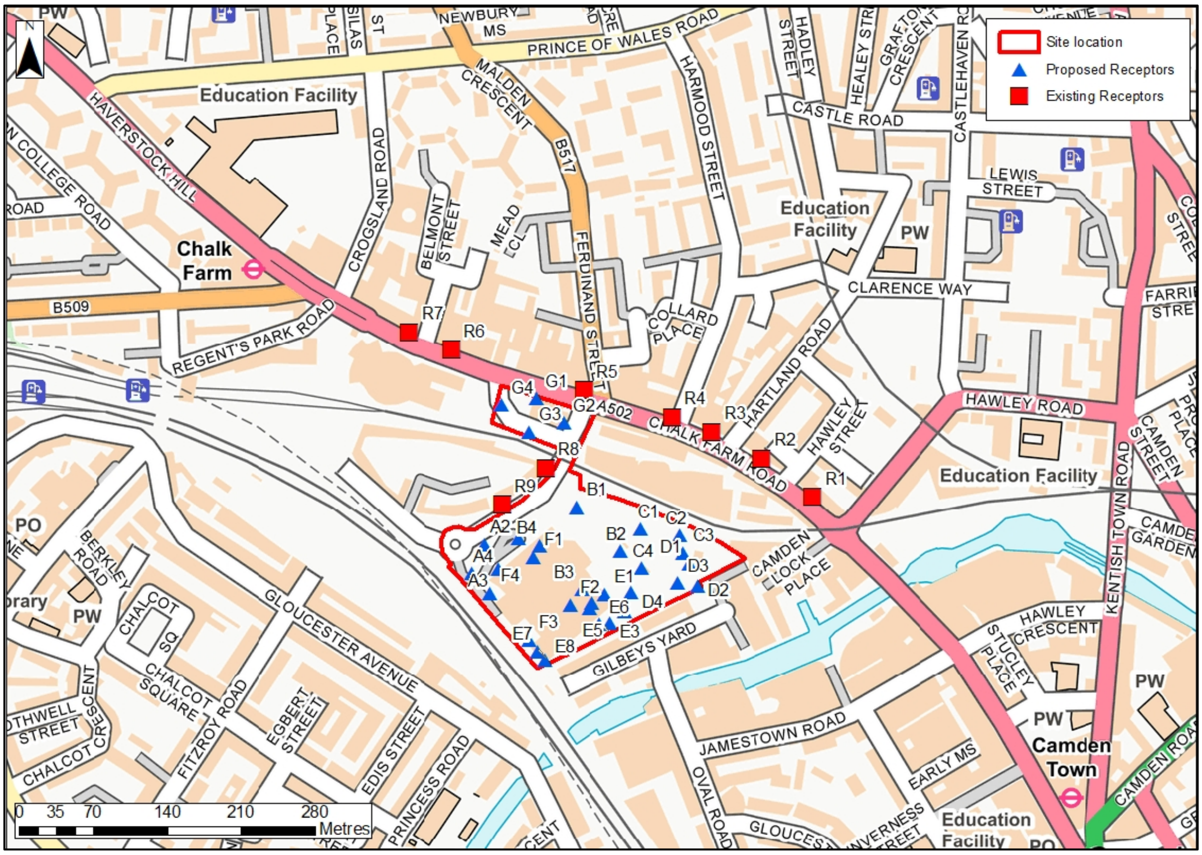

Figure 3-1: Receptors

3.7 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the identified receptors have been modelled using the ADMS-Roads dispersion model (v5). This model requires a number of inputs including traffic flow (AADT), composition (proportion of HDVs) and speed as well as road characteristics such as width, gradient and street canyons as applicable.

3.8 The model also requires meteorological data and inputs. The model has been run utilising 2018 data from the Heathrow Airport meteorological station which is considered suitable for the study area. **Appendix E** provides additional information on the meteorological inputs.

3.9 AADT flows and the proportion of HDVs have been provided by the project transport consultants, ACE, for Chalk Farm Road, Juniper Crescent and Ferdinand Street. Traffic for the remaining roads in the study area, including for the monitoring sites used for model verification was taken from the London Atmospheric Emissions Inventory (LAEI). For those roads where data was available from both ACE and the LAEI (Chalk Farm Road and Ferdinand Street), a combination of sources have been used in order to provide a conservative assessment. Details of the traffic data used in this assessment is provided in **Appendix F**.

3.10 Traffic emissions have been calculated using the Emissions Factor Toolkit (EFT) v9.0 (Defra, 2019). This utilises emissions factors taken from the COPERT 5 emission tool, along with data relating to the fleet and vehicle turnover in the UK. Traffic data were entered into the EFT to provide emissions rates for each of the road links modelled, for a specified year, road type, vehicle fleet composition and speed. Whilst NOx emissions rates are related specifically to exhaust, emissions rates for PM_{10} and $PM_{2.5}$ also include increments for road, tyre and break wear.

Assumptions and Limitations

3.11 There are many components that contribute to the uncertainty in predicted concentrations. The model used in this assessment is dependent on the traffic data that have been input which will have inherent uncertainties associated with them. There is then uncertainty as the model is required to simplify real-world conditions into a series of algorithms.

3.12 The model relies on meteorological data for 2018 which may not represent conditions in the future. Whilst our understanding of climate change indicates that future conditions are likely to be more unsettled, which is likely to lead to better dispersion, this general trend may not be representative of conditions in the specific area or year of assessment.

3.13 Per-vehicle exhaust emissions are predicted to reduce year-on-year, due to technological advances and changes to the vehicle mix such as uptake of Euro VI/6 vehicles as well as Low and Ultra Low emission technology. Whilst there has been uncertainty regarding the accuracy of these predictions in the past, evidence (Air Quality Consultants, 2020) suggests that the current emissions factor predictions reflect real world conditions as long as appropriate verification processes are followed. It is therefore considered appropriate to use emissions factors as provided by the EFT for this assessment without adjustment beyond appropriate verification. Following the LBC guidance (London Borough of Camden, 2019), the decision has been made to use baseline emissions to represent future years. This is considered to be a precautionary approach.

3.14 The baseline year has been chosen to reflect the most recent year for which sufficient data are available with which to model the verification site and carry out model verification. 2018 is the most recent year for which annual mean monitoring data for LBC have been published and therefore has been identified as the baseline year.

3.15 As emissions are expected to reduce over time, it is considered a conservative approach to utilise emissions factors for the baseline year (2018) to represent future year (2027) conditions, thus assuming no improvements in per vehicle emissions. Whilst the projects transport consultants (ACE) have concluded that there is not expected to be any growth in baseline traffic between the baseline year (2018) and the amended proposed development completion year (2027), additional movements associated with both the amended proposed development and committed developments have been included in modelled traffic flows. The assessment of significance is based on a comparison between a future baseline (2027 without either the consented development or the amended proposed development in place) and a future scenario with the amended proposed development in place. Whilst the consented development does have planning permission and therefore impacts associated with the previous scheme could be considered to be part of the committed developments, a precautionary approach has been taken to exclude the consented scheme from the future baseline.

Air Quality Impacts Significance Criteria

3.16 As there is no official guidance in the UK on how to assess the significance of the air quality impacts of a new development, the approach developed by the IAQM and EPUK (Institute of Air Quality Management and Environmental Protection UK, 2017) has been followed in this assessment. This is unchanged from the previous assessment but restated here for reference.

3.17 The IAQM/EPUK approach considers the predicted change in air quality as a result of the development on existing receptors, taking into account the absolute concentrations in comparison to the objectives. This guidance sets out three stages of assessment:

1) Determine the magnitude of change at each receptor as a percentage of the objective / Limit Value;

2) Describe the impact at each receptor, taking into account the sensitivity of the receptor to changes in concentration (based on the average concentration in the assessment year); and

3) Assess the overall significance.

3.18 The first two steps are set out **Table 3-2.**

Table 3-2: Impact Descriptors for Individual Receptors [a]

Concentration [b]	% Change [c]			
	1[d]	2-5	6-10	>10
> 110 % [e]	Negligible	Negligible	Slight	Moderate
> 102% - ≤110% [f]	Negligible	Slight	Moderate	Moderate
>95%-≤102% [g]	Slight	Moderate	Moderate	Substantial
>75%-≤95% [h]	Moderate	Moderate	Substantial	Substantial
≤75% [i]	Moderate	Substantial	Substantial	Substantial

[a] Where concentrations increase, the impact is described as adverse and where it decreases, it is described as beneficial.
[b] Long term average concentration at receptor in assessment year
[c] In relation to Objective / Limit Value
[d] % change rounded to nearest whole number. Where the change is 0 (i.e. <0.5) the impact will be Negligible.
[e] NO_2 or PM_{10} annual mean >44μg/m^3; $PM_{2.5}$ annual mean >27.5μg/m^3; PM_{10} daily mean >35.2μg/m^3 annual mean
[f] NO_2 or PM_{10} annual mean >40.8-≤44μg/m^3; $PM_{2.5}$ annual mean >25.5-≤27.5μg/m^3; PM_{10} daily mean >32.64-≤35.2μg/m^3 annual mean
[g] NO_2 or PM_{10} annual mean >38-≤40.8μg/m^3; $PM_{2.5}$ annual mean >23.75-≤25.5μg/m^3; PM_{10} daily mean >30.4-≤32.64μg/m^3 annual mean
[h] NO_2 or PM_{10} annual mean >30-≤38μg/m^3; $PM_{2.5}$ annual mean >18.75-≤23.75μg/m^3; PM_{10} daily mean >24-≤30.4μg/m^3 annual mean
[i] NO_2 or PM_{10} annual mean ≤30μg/m^3; $PM_{2.5}$ annual mean ≤18.75μg/m^3; PM_{10} daily mean ≤24μg/m^3 annual mean

3.19 The assessment of overall significance (step 3) is made based on professional judgement, taking into account factors such as:

- The number of properties affected by different levels of impacts;
- The magnitude of any changes and descriptors (as identified in stage 1 and 2);
- Whether a new exceedance of an objective or limit value is predicted to arise or an existing exceedance removed or an existing exceedance substantially increased or reduced;
- The level of uncertainty, including the extent to which worst case assumptions have been made; and
- The extent of any exceedance of an objective or limit value.

3.20 When considered at individual receptors, moderate or substantial impacts at individual receptors may be considered significant and negligible or slight impacts not significant. Consideration of the overall effect on air quality needs to incorporate consideration of impacts as a whole, including the extent to which receptors represent sensitive locations and whether this wider impact is significant or not.

3.21 In the absence of official guidance on the assessment of the potential for existing emissions sources to impact the proposed development, this assessment has been limited to a comparison of predicted concentrations within the amended proposed development, against the objectives.

Air Quality Neutral

3.22 The approach set out within the Air Quality Neutral Planning Support Update (Air Quality Consultants, 2014) has been followed in order to assess whether the amended proposed development is air quality neutral.

4.0 BASELINE CONDITIONS

Application Site Context and Study Area

4.1 The area surrounding the application site is largely unchanged since the previous assessment. The application site is located approximately 70 m south of Chalk Farm Road, which is the closest busy road. The application site is formed of two adjoining parcels of land spatially separated by elevated railway line but connected by a portion of an access road which runs underneath the railway line. The northern parcel of the application site is occupied by a Morrisons Petrol Filling Station ('the PFS parcel'). The southern parcel is occupied by a Morrisons Supermarket and associated car park ('the MS parcel'). The application site is surrounded by railway tracks to the north, northeast and southwest, and residential dwellings to the west and southeast.

4.2 The study area for this addendum in relation to air quality has been defined as:

- Receptors adjacent to roads expected to exceed the screening criteria set out in the previous assessment.
- For the assessment of site suitability, the study area has been identified as the area within the boundary of the application site and sources which will influence this area.

EU Limit Values

4.3 The application site is within the 'Greater London Urban Area' which has been reported to the EU as exceeding the NO_2 Limit Value. This area is included in Defra's Air Quality Action Plan for NO_2.

LAQM

4.4 LBC has assessed air quality within its area as part of its responsibilities under LAQM. A whole borough AQMA has been declared due to exceedances of the 24-hour mean PM_{10} objective and annual mean NO_2 objective. Part of Chalk Farm Road has also been designated as an Air Quality Focus Area (AQFA). The application site is within this AQMA but is not within the AQFA.

Monitoring

4.5 LBC carried out NO_2 monitoring at 3 automatic and 14 diffusion tube monitoring sites in 2018. The closest and most representative locations are identified in **Figure 4-1** and results for the last 5 years are shown in **Table 4-1** and **Table 4-2**.

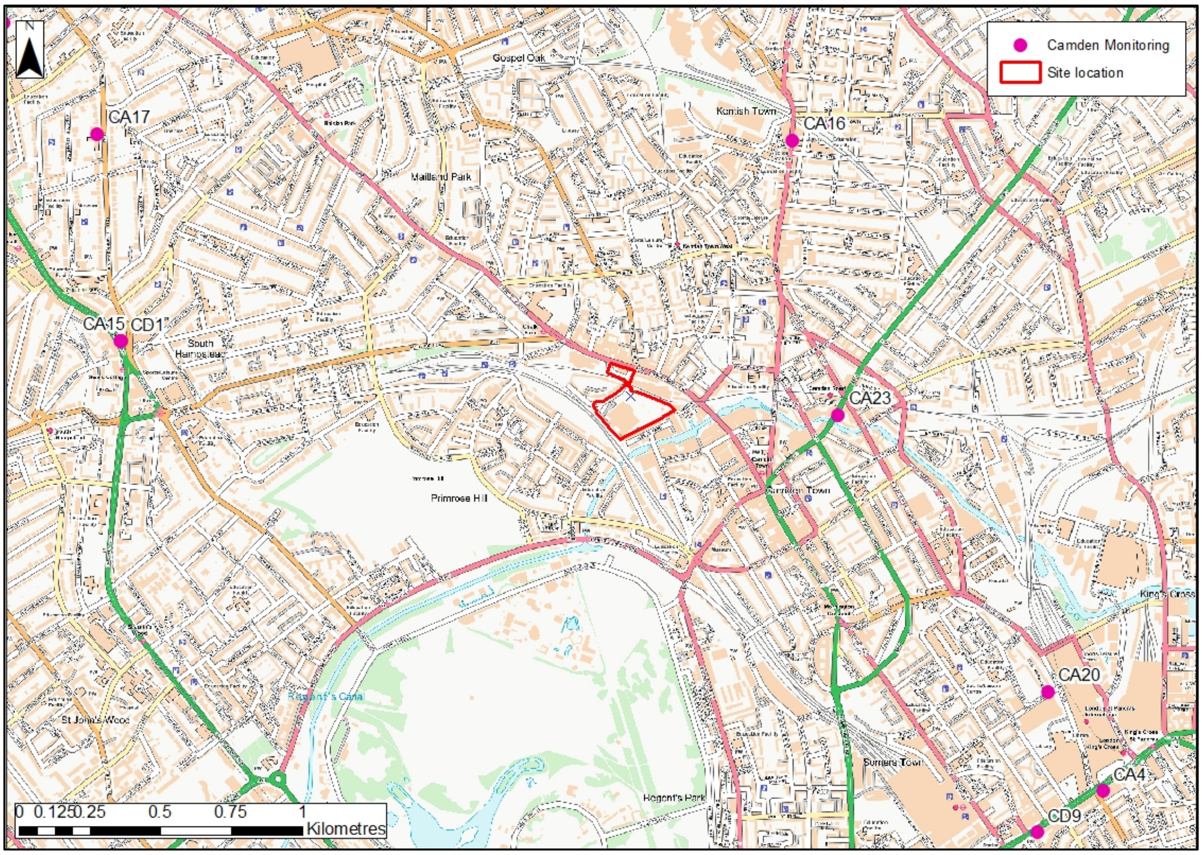

Figure 4-1: Local Monitoring Locations

Table 4-1: Measured Annual Mean NO_2 Concentrations (µg/m³)

Site ID	Site Name	Site Type	2014	2015	2016	2017	2018
Automatic Sites							
CD1	Swiss Cottage	Kerbside	**66**	**61**	**66**	**53**	36
CD9	Euston Road	Roadside	**98**	**90**	**88**	**83**	**82.3**
Diffusion Tube Sites							
CA4	Euston Road	Roadside	**89.7**	**86.8**	**82.7**	**92.5**	**69.2**
CA15	Swiss Cottage	Kerbside	**74.3**	**69.3**	**73.9**	**-**	**62.3**
CA16*	Kentish Town Road	Roadside	**57.8**	**63.6**	**58.7**	**74.9**	**54.7**
CA17	47 Fitzjohn's Road	Roadside	**60.3**	**55.8**	**56.4**	**-**	**48.1**
CA20	Brill Place	Roadside	**52.3**	**48.9**	**47.3**	**57.3**	**41.1**
CA23*	Camden Road	Roadside	**72.2**	**63.3**	**61.7**	**75.4**	**55.6**
Objective			**40**				

Exceedances of the annual mean Objective highlighted in **BOLD**, concentrations exceeding 60 µg/m³ which indicates a risk of exceeding the hourly mean objective **UNDERLINED**
* Used for model verification
2014 – 2018 data taken from (London Borough of Camden, 2019)

Table 4-2: Measured Exceedances of the Hourly Mean NO_2 Objective

Site ID	Site Name	Site Type	Number of Hours >200 µg/m³				
			2014	2015	2016	2017	2018
CD1	Swiss Cottage	Kerbside	14	11	**37**	1	2
CD9	Euston Road	Roadside	**221**	**54**	**39**	**25**	18
Objective			**18**				

Exceedances of the objective highlighted in **BOLD**
2014 – 2018 data taken from (London Borough of Camden, 2019)

4.6 Concentrations of NO_2 at the monitoring locations closest to the application site have been above the objective over the past five years, with the exception of Swiss Cottage in 2018. In addition, concentrations at a number of sites have been consistently above 60 µg/m³, suggesting that the 1-hour objective has not been met. This indication is confirmed at the two closest monitoring locations, which have both shown exceedances of the hourly objective. There is a general downward trend in concentrations over this time, with the exception of concentrations from 2017, which were notably higher at most sites shown than both 2016 and 2018.

4.7 LBC also measured PM_{10} and $PM_{2.5}$ concentrations at the Swiss Cottage and Euston Road monitoring sites. Results of these measurements are shown in **Table 4-3**.

Table 4-3: Measured PM_{10} and $PM_{2.5}$ Concentrations

Site ID	Site Name	Site Type	2014	2015	2016	2017	2018
Annual Mean PM_{10} (µg/m³)							
CD1	Swiss Cottage	Kerbside	22	20	21	20	21
CD9	Euston Road	Roadside	29	18	24	20	22.6
Objective			**40**				
PM_{10} Number of Days >50 µg/m³							
CD1	Swiss Cottage	Kerbside	12	8	7	8	4
CD9	Euston Road	Roadside	5	5	10	3	2
Objective			**35**				
Annual Mean $PM_{2.5}$ (µg/m³)							
CD1	Swiss Cottage	Kerbside	-	12	15	16	11
CD9	Euston Road	Roadside	-	17	17	14	15.6
Objective			**25**				

2014 – 2018 data taken from (London Borough of Camden, 2019)

4.8 Annual mean concentrations of PM_{10} and $PM_{2.5}$ at the Swiss Cottage and Euston Road monitoring sites have been below the objective over the past five years. Furthermore, there have been fewer than 35 exceedances of 50 µg/m³ as a daily mean and therefore the 24-hour mean objective has been met. There is no clear trend in concentrations over this time.

Predicted Background Concentrations

4.9 Predicted background concentrations for 2018 have been obtained from national maps provided by Defra (Defra, 2020). The mapped backgrounds were compared against concentrations recorded at local background monitoring sites and the resultant factor used to calibrate the Defra maps to reflect local conditions. Details of the calibration are shown in **Appendix E**. The calibrated backgrounds used in this assessment are shown in **Table 4-4**.

4.10 The predicted background concentrations are all well below the relevant objectives at the application site.

Table 4-4: Predicted Annual Mean Background Concentrations (μg/m³)

Year	Grid Square	NO_2	PM_{10}	$PM_{2.5}$
2018	528500, 184500	25.7	15.8	9.4
	529500,184500	26.9	16.3	9.7
	529500,185500	24.6	15.8	9.5
Objectives		**40**	**40**	**25**

Predicted Baseline Concentrations

4.11 The ADMS-Roads model has been used to predict baseline NO_2, PM_{10} and $PM_{2.5}$ concentrations at each of the existing receptor locations identified in **Table 3-1** for both the baseline scenarios (2018 and 2027). The results of these predictions are shown in **Table 4-5**.

Table 4-5: Predicted Annual Mean Baseline Concentrations (μg/m³)

Receptor	NO_2		PM_{10}		$PM_{2.5}$	
	2018	**2027**	**2018**	**2027**	**2018**	**2027**
R1	**41.0**	**41.5**	18.3	18.4	11.0	11.1
R2	39.0	39.5	18.3	18.4	11.0	11.1
R3	39.4	39.9	18.0	18.1	10.8	10.9
R4	**40.1**	**40.6**	18.1	18.1	10.9	10.9
R5	38.3	38.6	18.2	18.3	11.0	11.0
R6	37.4	37.6	18.2	18.3	11.0	11.0
R7	38.6	38.9	18.0	18.1	10.9	10.9
R8	28.5	29.0	18.0	18.1	10.9	10.9
R9	28.1	28.6	16.3	16.4	9.8	9.8
Objectives	**40***		**40**		**25**	

* It should be noted that LBC aim to have NO_2 concentrations below 38 μg/m³ across the borough by 2030.

4.12 Predicted concentrations of NO_2 are above the annual mean objective at two receptors in both 2018 and 2027. A further five receptors are close to the objective in both years. There is a predicted increase between 2018 and 2027 which is related to developments which already have planning permission and are assumed to complete in this time.

4.13 The predicted annual mean PM_{10} and $PM_{2.5}$ concentrations meet the relevant objectives in both 2018 and 2027.

4.14 Predicted annual mean concentrations of NO_2 are below 60 $\mu g/m^3$ and therefore, it is unlikely that there would be exceedances of the hourly mean objective. Similarly, concentrations of PM_{10} are predicted to be below 32 $\mu g/m^3$ and therefore, it is expected that the daily-mean objective will be met.

5.0 PREDICTED IMPACTS

Demolition and Construction Phase Road Traffic Impacts

5.1 The transport assessment addendum has identified that the traffic generation related to the demolition and construction stage of the development is notably higher than that previously assessed. The traffic generation associated with the demolition and construction stage shows an overall reduction in trips when compared to the baseline traffic. This is likely to be related to the temporary closure of the main store. A more detailed comparison shows that the number of HDVs on surrounding roads is increased during the demolition and construction stage, compared to the baseline. Whilst emissions from HDVs are higher than from cars, the overall emissions (taking into consideration the relative change in vehicles and their relative emissions) are considered to be similar to baseline. Furthermore, emissions during demolition and construction are considered to be lower than those modelled for the completed development scenario. The change in demolition and construction traffic is therefore not considered to be significant and the impacts are unchanged from those previously assessed.

Site Suitability

5.2 Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2027 have been predicted at a number of receptors within the application site (as identified in **Table 3-1** and **Figure 3-1** in order to identify whether the site is suitable for the proposed uses. Concentrations at these worst case receptors are presented in **Table 5-1**.

Table 5-1: Predicted Annual Mean Concentrations Within the Application Site (µg/m³)

Receptor	NO_2	PM_{10}	$PM_{2.5}$
A1	28.1	16.2	9.7
A2	29.9	16.4	9.9
A3	27.8	16.1	9.6
A4	33.4	16.6	10.0
B1	27.4	16.1	9.6
B2	26.9	16.0	9.6
B3	26.7	16.0	9.6
B4	27.1	16.0	9.6
C1	27.0	16.0	9.6
C2	27.1	16.0	9.6
C3	27.0	16.0	9.6
C4	26.8	16.0	9.6
D1	26.9	16.0	9.6
D2	26.8	16.0	9.6
D3	26.8	16.0	9.6
D4	26.7	16.0	9.6
E1	26.6	16.0	9.6

E2	26.6	15.9	9.6
E3	26.5	15.9	9.6
E4	26.6	15.9	9.6
E5	26.6	15.9	9.6
E6	26.5	15.9	9.6
E7	26.4	15.9	9.5
E8	26.4	15.9	9.5
F1	27.1	16.0	9.6
F2	26.6	15.9	9.6
F3	26.5	15.9	9.6
F4	27.3	16.0	9.6
G1*	39.6	18.3	11.0
G2*	29.7	16.5	9.9
G3*	27.6	16.1	9.7
G4*	27.3	16.1	9.6
Objectives	**40****	**40**	**25**

* No residential exposure is present within the petrol filling station site and therefore the annual mean NO_2 concentration for these receptors should be compared against 60 µg/m^3 and the PM_{10} concentration against 32 µg/m^3 which represent concentrations above which the hourly- and daily-mean objectives (respectively) are at risk of exceedance.
** It should be noted that LBC aim to have NO_2 concentrations below 38 µg/m^3 across the borough by 2030.

5.3 The highest modelled concentrations were found to be at the petrol filling station site, adjacent to Chalk Farm Road. This site is considered relevant for the short-term objectives only and concentrations of all pollutants are therefore well below the relevant objectives. Whilst not all receptors within the main site are residential, they have been compared against both long- and short-term objectives as a conservative assessment.

5.4 There are no predicted exceedances of the annual mean objectives anywhere within the main site and concentrations are predicted to be below 90% of the relevant objective. Furthermore, concentrations of NO_2 in residential areas are well below 38 µg/m^3 which LBC have stated to be the annual mean limit value that they are aiming to meet by 2030. No additional mitigation of air quality within the site is required.

5.5 Based on the predicted concentrations onsite and taking into consideration the conservative nature of the assessment, it is considered that air quality for future residents of the site will be good and the site is considered suitable for the proposed use. There are no new or altered impacts relating to on-site exposure.

Road Traffic Impacts

5.6 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted at existing receptors in 2027, both with and without the amended proposed development in place. The identified receptors are described in **Table 3-1** and shown in **Figure 3-1.** Predicted concentrations, the proportional change and impact at each receptor are shown in **Table 5-2**, **Table 5-3** and **Table 5-4** for NO_2, PM_{10} and $PM_{2.5}$, respectively.

Table 5-2: Predicted Annual Mean Concentrations of NO_2 (µg/m^3), % Change and Impact at each Receptor

Receptor	2027 Without Development	2027 With Development	Change (%)	Impact
R1	**41.5**	**41.7**	0.4	Negligible
R2	39.5	39.7	0.4	Negligible
R3	39.9	**40.1**	0.4	Negligible
R4	**40.6**	**40.8**	0.4	Negligible
R5	38.6	38.8	0.4	Negligible
R6	37.6	37.8	0.4	Negligible
R7	38.9	39.0	0.4	Negligible
R8	29.0	29.1	0.3	Negligible
R9	28.6	28.7	0.3	Negligible
Objective	**40**		**-**	

Table 5-3: Predicted Annual Mean Concentrations of PM_{10} (µg/m^3), % Change and Impact at each Receptor

Receptor	2027 Without Development	2027 With Development	Change (%)	Impact
R1	18.3	18.3	<0.1	Negligible
R2	18.0	18.0	<0.1	Negligible
R3	18.0	18.1	<0.1	Negligible
R4	18.2	18.2	<0.1	Negligible
R5	18.1	18.1	<0.1	Negligible
R6	17.9	18.0	<0.1	Negligible
R7	17.9	18.0	<0.1	Negligible
R8	16.3	16.4	<0.1	Negligible
R9	16.3	16.3	<0.1	Negligible
Objective	**40**		**-**	

Table 5-4: Predicted Annual Mean Concentrations of $PM_{2.5}$ (µg/m^3), % Change and Impact at each Receptor

Receptor	2027 Without Development	2027 With Development	Change (%)	Impact
R1	11.0	11.0	<0.1	Negligible
R2	10.8	10.8	<0.1	Negligible
R3	10.9	10.9	<0.1	Negligible

R4	10.9	10.9	<0.1	Negligible
R5	10.9	10.9	<0.1	Negligible
R6	10.8	10.8	<0.1	Negligible
R7	10.8	10.8	<0.1	Negligible
R8	9.8	9.8	<0.1	Negligible
R9	9.8	9.8	<0.1	Negligible
Objective	**25**		-	

5.7 Annual mean NO_2 concentrations are predicted to be above the objective in 2027 at two receptors without the amended proposed development in place and three receptors with the amended proposed development in place. Predicted concentrations are predicted to be within 10% of the objective at an additional 5 receptors without the development in place and 4 receptors with the development in place meaning that there are a total of 7 modelled receptors predicted to be above or within 10% of the NO_2 objective both with and without the development in place. Annual mean concentrations are below 60 $\mu g/m^3$ in all locations, suggesting that the hourly-mean objective is likely to be met.

5.8 Annual mean PM_{10} and $PM_{2.5}$ concentrations in 2027, both without and with the amended proposed development in place, are below the relevant objectives at all existing receptor locations. Furthermore, predicted annual mean PM_{10} concentrations are below 32 $\mu g/m^3$, therefore exceedances of the short term objectives for PM_{10} are unlikely.

5.9 The changes in annual mean NO_2 concentrations range from 0.3-0.4%. Using the criteria set out in **Table 3-2**, these impacts are described as being negligible at all receptors.

5.10 The changes in PM_{10} and $PM_{2.5}$ concentrations are <0.1% at all receptors and therefore, PM_{10} and $PM_{2.5}$ impacts are considered to be negligible at each receptor.

5.11 The overall impact on existing receptors has been assessed, taking into account:

- the impacts at individual, modelled receptors;
- the number of properties represented by each modelled receptor;
- the conservative nature of the assessment;
- the predicted concentrations and how close these are to relevant objectives; and
- the potential for any change to impact an existing AQMA or result in the declaration or extension of an AQMA.

5.12 Taking these factors into account, the overall impact of the amended proposed development on local air quality is considered to be 'not significant'. There are no new or altered impacts relating to road traffic emissions.

Air Quality Neutral Calculations

5.13 Air quality neutral calculations have been carried out following the methodology set out in the Air Quality Neutral Planning Support Update (Air Quality Consultants, 2014).

Building Emissions

5.14 Annual NOx emissions for the amended proposed development have been estimated based on the predicted annual energy use in kwh (as provided by the project energy consultants) and the maximum emissions per kwh as set out within the Sustainable Design and Construction SPG (Greater London Authority, 2014). The calculated annual development emissions are shown in **Table 5-5** and the benchmark emissions in **Table 5-6**. **Table 5-7** compares the development and benchmarked emissions and shows that development emissions are below the benchmark. The development is therefore considered to be air quality neutral in terms of building emissions.

Table 5-5: Proposed Building Emissions

Energy Use (kWh/annum)	Emissions (g NOx/kWh)	Annual Emissions (kg/annum)
1,011,000	0.040	40.44

Table 5-6: Proposed Development Building Benchmarks

Land use/Class	GIA (m^2)	Benchmark Emissions ($g/m^2/annum$)	Benchmark Emissions (kg/annum)
A1 (Retail)*	20,111	22.6	454.5
B1 (Office/Workshops and Workspace)	12,806	30.8	963.0
C3 (Residential)	56,510	26.2	1,480.6
D2 (Community Centre)	74	90.3	6.7
Total			**2,904.8**
* Use class is A1-A3, to be determined for 2,396 m^2, therefore A1 has been used as this is worst case			

Table 5-7: Comparison against Benchmarked Building Emissions

Development Emissions (kg/annum)	Benchmark Emissions (kg/annum)	Comparison (kg/annum)
40.4	2,904.8	-2,864.3

Transport Emissions

5.15 The air quality neutral calculations for transport emissions for the amended proposed development are described in **Table 5-8**, **Table 5-9**, **Table 5-10** and **Table 5-11**.

Table 5-8: Development Trip Generation

Land use/Class	Trips/day	Trips/annum	Distance travelled/trip (km)	Distance Travelled/annum (km)
A1-A3* (Retail)	3,702	1,351,230	5.9	7,972,257
B1 (Office)	60	21,900	7.7	168,630
C3 (Residential)	241	87,965	3.7	325,471
* Use class is A1-A3, to be determined for 2,396 m^2, therefore A1 has been used				

Table 5-9: Proposed Development Transport Emission Calculation

Land use/Class	Emissions Factors*		Annual transport Emissions **	
	NOx	PM_{10}	Nox	PM_{10}
A1-A3 Retail	0.3700	0.0665	2,949.7	530.2
B1 (Office)			62.4	11.2
C3 (Residential)			120.4	21.6

* g/vehicle-km
** kg/annum

Table 5-10: Transport Benchmark Calculation

Land use/Class	No. Dwellings/GIA	Transport Benchmark*		Development Transport Benchmark**	
		NOx	PM_{10}	NOx	PM_{10}
A1-A3 Retail	20,111	0.22	0.04	4,404.3	790.4
B1 (Office)	12,806	0.01	0.002	146.0	26.3
C3 (Residential)	644	0.56	0.10	359.4	64.4
* kg/dwelling/annum for residential use and kg/m^2/annum for all other uses ** kg/annum					

Table 5-11: Comparison of Benchmarked and Development Emissions (kg/annum)

Land use/Class	Benchmarked Emissions		Proposed Development Emissions		Comparison to Benchmarked Emissions	
	NOx	PM_{10}	NOx	PM_{10}	NOx	PM_{10}
A1-A3 Retail	4,404.3	790.4	2,949.7	530.2	-1,454.6	-260.2
B1 (Office)	146.0	26.3	62.4	11.2	-83.6	-15.0
C3 (Residential)	359.4	64.4	120.4	21.6	-238.9	-42.8
Total	**4,909.6**	**881.0**	**3,132.6**	**563.0**	**-1,777.1**	**-318.0**

5.16 The total transport NOx and PM_{10} emissions are below the transport emissions benchmark. The July 2020 amended proposed development is therefore considered to be air quality neutral in terms of transport emissions.

6.0 MITIGATION

Construction Dust

6.1 The following standard mitigation measures have been identified as being appropriate for a medium risk site, as this site was identified to be within the previous assessment. This is based on the recommendations within the SPD on 'The Control of Dust and Emissions during Construction and Demolition' (Greater London Authority, 2014). An Air Quality and Dust Management Plan should be submitted to LBC prior to works commencing on site.

Site Management

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site
- Develop and implement a Dust Management Plan (DMP).
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Record and respond to all dust and air quality pollutant emission complaints.
- Make the complaints log available to the local authority when asked.
- Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by those accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Record any exceptional incidents that cause dust and air quality pollutant emissions, either on- or off- site, and the action taken to resolve the situation in the log book.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary. (Desirable)

- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
- Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Carry out regular dust soiling checks of buildings within 100 m of site boundary and cleaning to be provided if necessary. (Desirable)
- Agree monitoring locations with the Local Authority.
- Where possible, commence baseline monitoring at least three months before phase begins.
- Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.

Operating vehicle/machinery and sustainable travel

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.
- Ensure all non-road mobile machinery (NRMM) comply with the standards set out within the SPG.
- 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.

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). (Desirable)

- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.

- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.

- Use enclosed chutes and conveyors and covered skips.

- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

- Reuse and recycle waste to reduce dust from waste materials.

Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). (Desirable)

- Ensure water suppression is used during demolition operations.

- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

- Bag and remove any biological debris or damp down such material before demolition.

Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. (Desirable)
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil. (Desirable)
- Only remove the cover in small areas during work and not all at once. (Desirable)

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible. (Desirable)
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. (Desirable)
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. (Desirable)

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

- Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site. (Desirable)

Operation

6.2 The amended proposed development impact is expected to be not significant and no further mitigation of potential impacts is therefore required.

6.3 Air quality for future residents is considered to be good and no additional mitigation is required, however, mechanical ventilation will be utilised within the amended proposed development. It is recommended that air intakes are located at the highest point practicable, and away from any flue or air extract.

6.4 The amended proposed development is considered to be air quality neutral in terms of building and transport emissions and therefore, no additional mitigation or damage cost is considered necessary.

7.0 CONCLUSIONS

7.1 The potential air quality impacts associated with the July 2020 amended proposed developments at Camden Goods Yard have been assessed.

7.2 The application site is located within the LBC AQMA but outside of any Air Quality Focus Area.

7.3 There is the potential for dust and PM_{10} impacts during the construction phase, however, with the proposed mitigation measures in place, these impacts will be not significant.

7.4 The impact of local air quality on future residents of the amended proposed development has been considered. It is considered that air quality for future residents will be good and no further mitigation is necessary.

7.5 The impacts of additional traffic, associated with the amended proposed development, on local air quality have been assessed. Changes in concentrations at worst case existing receptors are considered to be negligible and the overall impact on local air quality is considered to be not significant.

7.6 The July 2020 amended proposed development is considered to be air quality neutral.

7.7 Overall, it is concluded that there are no air quality constraints to the July 2020 amended proposed development which is in accordance with local, regional and national policy and guidance. There are no new or altered impacts related to the amended proposed development and the conclusions of the 2017 Environmental Statement remain valid.

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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
ACE	Ardent Consulting Engineers
ADMS	Air Dispersion Modelling System
APIS	Air Pollution Information System
AQAP	Air Quality Action Plan
AQA	Air Quality Assessment
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
BEB	Building Emission Benchmark
CAZ	Central Activity Zone
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube (DT)	A passive sampler used for collecting NO_2 in the air
EA	Environment Agency
EC	European Commission
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
GIA	Gross Internal Area
GLA	Greater London Authority
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes, includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LBC	London Borough of Camden
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
m^3	Square Metres
NAQO	National Air Quality Objective as set out in Air Quality Strategy and the Air Quality Regulations
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides, generally considered to be nitric oxide and NO_2. The main source is from combustion of fossil fuels, including petrol and

	diesel used in road vehicles and natural gas used in gas-fired boilers.
NPPF	National Planning Policy Framework
NRMM	Non-road mobile machinery
PM_{10} or $PM_{2.5}$	Small airborne particles less than 10/2.5 µg in diameter
PPG	Planning Practice Guidance
Receptor	A location where the effects of pollution may occur
SPG	Supplementary Planning Guidance
SSSI	Site of Special Scientific Interest
TEA	Triethanolamine
TEB	Transport Emission Benchmark
TEMPRO	Trip End Model Presentation Programme
UNECE	United Nations Economic Commission for Europe

Appendix B Air Quality Neutral Benchmarks

B1 Air Quality Neutral Benchmarks for Buildings

B1.1 **Table B.1** shows the Building Emissions Benchmarks (BEBs) set out within the Air Quality Neutral guidance **(Air Quality Consultants, 2014)**, based on the gross internal floor area for each type of development class.

Table B.1: 'Air Quality Neutral' Building Emission Benchmarks (BEBs)

Land Use Class	NOx ($g/m^2/annum$)	PM_{10} ($g/m^2/annum$)
Class A1	22.6	1.29
Class A3 – A5	75.2	4.32
Class A2 and Class B1	30.8	1.77
Class B2 – B7	36.6	2.95
Class B8	23.6	1.90
Class C1	70.9	4.07
Class C2	68.5	5.97
Class C3	26.2	2.28
D1 (a)	43.0	2.47
D1 (b)	75.0	4.30
Class D1 (c – h)	31.0	1.78
Class D2 (a – d)	90.3	5.18
Class D2 (e)	284	16.3

Gross Internal Area (GIA) is used to define the area.

B2 Air Quality Neutral Emissions Benchmarks for Transport

B2.1 Transport Emission Benchmarks (TEBs) have been defined within the Air Quality Neutral Guidance **(Air Quality Consultants, 2014)** for NOx and PM_{10}, for Retail (A1 and A2), Commercial (B1) and living accommodation (C3) use classes. These are set out in **Table B.2**, below.

Table B.2: 'Air Quality Neutral' Transport Emissions Benchmarks (TEBs)

Land Use Class	Benchmark		
	CAZ	Inner	Outer
NOx ($g/m^2/annum$)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NOx (g/dwelling/annum)			
Residential (C3,C4)	234	558	1,553
PM_{10} ($g/m^2/annum$)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM_{10} (g/dwelling/annum)			

Residential (C3,C4)	40.7	100	267

Gross Internal Area (GIA) is used to define the area.

B2.2 The emission for comparison against the TEB is calculated for each land-use category as:

trips/annum * average distance per trip * emission rate

B2.3 The average distance per trip and emissions rates should be those set out within the guidance and are shown in **Table B.3** and **Table B.4**.

Table B.3: Average Distance Travelled by Car per Trip

Land Use Class	Distance (km)		
	CAZ	Inner	Outer
Retail (A1)	9.3	5.9	5.4
Office (B1)	3.0	7.7	10.8
Residential (C3,C4)	4.3	3.7	11.4

Table B.4: Emissions Factors

Pollutant	Distance (km)		
	CAZ	Inner	Outer
NOx	0.4224	0.370	0.353
PM_{10}	0.0733	0.0665	0.0606

B2.4 Where TEBs have not been calculated, the air quality neutrality of a proposed development can be shown through comparison against trip numbers set out in **Table B.5**.

Table B.5: Benchmark Trips per Annum

Land Use	Number of Trips (trips/m^2/annum)		
	CAZ	Inner	Outer
A3	153	137	170
A4	2.0	8.0	-
A5	-	32.4	590
B2	-	15.6	18.3
B8	-	5.5	6.5
C1	1.9	5.0	6.9
C2	-	3.8	19.5
D1	0.07	65.1	46.1
D2	5.0	22.5	49.0

Appendix C Emissions Standards

C1.1 As well as setting out the requirement that developments are 'air quality neutral' and the emissions limit of 40 mgNOx/kWh, the Sustainable Design and Construction SPG **(Greater London Authority, 2014)** set of emission standards for biomass and CHP plant. As areas with higher existing pollutant concentrations are considered to be more sensitive to additional emissions, development area is placed into a Band to identify appropriate set of emissions standards. The criteria for each band are set out in **Table C.1**and the emissions standards are set out in **Table C.2** and **Table C.3**.

Table C.1: Band

Band	Applicable Range	
	Baseline Annual Mean NO_2 and PM_{10}	Baseline 24-hour mean PM_{10}
Band A	> 5% below national objective	>1-day less than national objective
Band B	Between 5% below or above national objective	1 day below or above national objective

Table C.2: Emission Standards for Solid Biomass Boilers and CHP Plant (50kWth – 20MWth) in Band A

Combustion Appliance [a]	Pollutant / Parameter	Emission Standard at reference O_2 (mg/Nm^3)	Equivalent Concentration at 0% O_2 (mg/Nm^3)	Likely Technique Required to Meet Emission Standard
Spark ignition engine (natural gas/biogas)[b]	NOx	250	329	Advanced lean burn operation (lean burn engines) NSCR (rich burn engines)
Compression ignition engine (diesel/bio-diesel)[b]	NOx	400	526	SCR
Gas Turbine[c]	NOx	50	177	None above standard technology for modern turbines
Solid biomass boiler (including those involved in	NOx	275	386	Modern boiler with staged combustion and automatic control
	PM	25	35	Modern boiler with staged combustion and automatic

CHP applications)[d]				control including cyclone/multicyclone
All (stack heat release less than 1MW)[e]	Stack discharge velocity	10 m/s	n/a	Appropriate design of stack discharge diameter to achieve required velocity
All (stack heat release greater than or equal to 1MW)[e]	Stack discharge velocity	15 m/s	n/a	Appropriate design of stack discharge to achieve required velocity

[a] Combustion appliances operating less than 500 hours per annum are exempt from these standards
[b] Emission standard quoted at reference conditions 273K, 101.3kPa, 5% O_2, dry gas
[c] Emission standard quoted at reference conditions 273K, 101.3kPa, 15% O_2, dry gas
[d] Emission standard quoted at reference conditions 273K, 101.3kPa, 6% O_2, dry gas
[e] The stack heat release can be calculated as per equation (3) in the D1 guidance note:

$$Q = \frac{v\left(1 - \frac{283}{T}\right)}{2.9}$$

Where:
Q = Stack heat release (MW)
V = Volume flow of stack gases at discharge conditions (Am^3/s)
T = Discharge temperature (K)

N.B. Stacks should discharge vertically upward and be unimpeded by any fixture on top of the stack (e.g. rain cowels)

Table C.3: Emission Standards for Solid Biomass Boilers and CHP Plant (50kWth – 20MWth) in Band B

Combustion Appliance [a]	Pollutant / Parameter	Emission Standard at reference O_2 (mg/Nm^3)	Equivalent Concentration at 0% O_2 (mg/Nm^3)	Likely Technique Required to Meet Emission Standard
Spark ignition engine (natural gas/biogas)[b]	NOx	95	125	SCR (lean burn engines) NSCR (rich burn engines)
Compression ignition engine (diesel/bio-diesel)[b]	NOx	400	526	SCR

Gas Turbine[c]	NOx	20	71	Latest generation DLN burners and / or SCR
Solid biomass boiler (including those involved in CHP applications)[d]	NOx	180	252	Modern boiler with staged combustion, automatic control and / or SNCR
	PM	5	7	Fabric/ceramic filter
All (stack heat release less than 1MW)[e]	Stack discharge velocity	10 m/s	n/a	Appropriate design of stack discharge diameter to achieve required velocity
All (stack heat release greater than or equal to 1MW)[e]	Stack discharge velocity	15 m/s	n/a	Appropriate design of stack discharge to achieve required velocity

[a] Combustion appliances operating less than 500 hours per annum are exempt from these standards
[b] Emission standard quoted at reference conditions 273K, 101.3kPa, 5% O_2, dry gas
[c] Emission standard quoted at reference conditions 273K, 101.3kPa, 15% O_2, dry gas
[d] Emission standard quoted at reference conditions 273K, 101.3kPa, 6% O_2, dry gas
[e] The stack heat release can be calculated as per equation (3) in the D1 guidance note:

$$Q = \frac{v\left(1 - \frac{283}{T}\right)}{2.9}$$

Where:
Q = Stack heat release (MW)
V = Volume flow of stack gases at discharge conditions (Am^3/s)
T = Discharge temperature (K)

N.B. Stacks should discharge vertically upward and be unimpeded by any fixture on top of the stack (e.g. rain cowels)

Appendix D IAQM (London SPG) Dust Assessment Approach

D1 Step 1: Screen the need for an assessment

D1.1 Step 1 is the screen the need for an assessment against the following criteria:

- 'Human receptor' within:
    - 350 m (50 m in London) of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- 'Ecological receptor' within:
    - 50 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

D1.2 Where there are no sensitive receptors within these distances, it can be concluded that the impact is negligible and no further assessment relating to construction dust impacts is required.

D2 Step 2: Assess the risk of dust impacts

D2.1 The risk of dust at sufficient quantum to cause annoyance/health/ecological impacts should be based on:

- The scale and nature of the works (potential dust emission magnitude) (**Table D.1**); and
- The sensitivity of the area to dust impacts based on the matrices shown in **Table D.2**, **Table D.3** and **Table D.4**.

D2.2 These factors are then combined to determine the risk of dust impacts without mitigation applied for each of the four activities (Demolition, Earthworks, Construction and Trackout) following the matrices shown in **Table D.5**, **Table D.6** and **Table D.7**.

Table D.1: Potential Dust Emission Magnitude

Size	Definition
Demolition	
Small	Total building volume <20,000 m^3, construction material with low potential for dust release (eg metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months.

Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level.
Large	Total building volume >50,000 m^3, potentially dusty construction material (eg. Concrete), on-site crushing and screening, demolition activities >20 m above ground level.
Earthworks	
Small	Total site area <2,500 m^2, soil type with large grain size (eg sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes earthworks during wetter months.
Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (eg silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes.
Large	Total site area >10,000 m^2, potentially dusty soil type (eg clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height.
Construction	
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (eg metal cladding or timber).
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (eg concrete), on site concrete batching.
Large	Total building volume >100, 000 m^3, on site concrete batching, sandblasting.
Trackout	
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (eg high clay content), unpaved road length 50 m – 100 m.
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (eg high clay content), unpaved road length >100 m.

Table D.2: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350

High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	<10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table D.3: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<350
High	>32 µg/m³ [a]	>100	High	High	High	Low
		10-100	High	High	Medium	Low
		<10	High	Medium	Low	Low
	28-32 µg/m³ [b]	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		<10	High	Medium	Low	Low
	24-28 µg/m³ [c]	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		<10	Medium	Low	Low	Low
	<24 µg/m³ [d]	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		<10	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low
	-	1-10	Medium	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table D.4: Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table D.5: Risk of Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk

Low	Low Risk	Low Risk	Negligible

Table D.6: Risk of Impacts – Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table D.7: Risk of Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

D3 Step 3: Site-specific Mitigation

D3.1 Based on the outcome of Step 2, appropriate mitigation measures are recommended. The guidance includes a list of mitigation measures for Low, Medium and High Risk sites but final recommendations should be based on professional judgement and take into account particular site sensitivities and differences in risk for different activities or areas of the site. The mitigation recommended in the guidance are shown in **Table D.8**.

Table D.8: Mitigation Measures (H = Highly Recommended, D = Desirable and N = Not Recommended)

Mitigation Measure	Low Risk	Medium Risk	High Risk
Site Management			
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H
Develop and implement a Dust Management Plan (DMP).	D	H	H
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H	H	H
Display the head or regional office contact information	H	H	H
Record and respond to all dust and air quality pollutant emission complaints.	H	H	H

Make the complaints log available to the local authority when asked.	H	H	H
Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.	H	H	H
Increase the frequency of site inspections by those accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H	H	H
Record any exceptional incidents that cause dust and air quality pollutant emissions, either on- or off- site, and the action taken to resolve the situation in the log book.	H	H	H
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.	N	N	H
Monitoring			
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	D	D	H
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	N	H	H
Preparing and maintaining the site			
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	D	H	H
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.	N	D	D
Avoid site runoff of water or mud.	H	H	H
Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H
Remove materials from site as soon as possible.	D	H	H
Cover, seed or fence stockpiles to prevent wind whipping.	N	H	H

Carry out regular dust soiling checks of buildings within 100 m of site boundary and cleaning to be provided if necessary.	N	D	D
Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.	N	N	D
Agree monitoring locations with the Local Authority.	N	H	H
Where possible, commence baseline monitoring at least three months before phase begins.	N	H	H
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	N	H	H
Operating vehicle/machinery and sustainable travel			
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	H	H	H
Ensure all non-road mobile machinery (NRMM) comply with the standards set out within the SPG	H	H	H
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H
Impose and signpost a maximum-speed-limit of 15 mph on surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	D	D	H
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	H	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	H	H	H
Operations			
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H	H	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H	H	H
Use enclosed chutes and conveyors and covered skips.	H	H	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D	H	H

Waste Management			
Avoid bonfires and burning of waste materials.	H	H	H
Reuse and recycle waste to reduce dust from waste materials.	H	H	H
Demolition			
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	D	D	H
Ensure water suppression is used during demolition operations.	H	H	H
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H
Bag and remove any biological debris or damp down such material before demolition.	H	H	H
Earthworks			
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	N	D	H
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil.	N	D	H
Only remove the cover in small areas during work and not all at once	N	D	H
Construction			
Avoid scabbling (roughening of concrete surfaces) if possible	D	D	H
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	D	H	H
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	N	D	H
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D
Trackout			
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.	D	H	H
Avoid dry sweeping of large areas.	D	H	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H
Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H

Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H
Access gates to be located at least 10 m from receptors where possible.	N	H	H
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.	N	D	H

D4 Step 4: Determine Significant Effects

D4.1 Recommended mitigation measures should be sufficient to ensure that the impact is normally 'not significant'. There may at times be limitations to appropriate mitigation measures (such as lack of water) and therefore, an assessment should always be made based on the characteristic of each site and the surrounding area.

D5 Step 5: Dust Assessment Report

D5.1 The dust assessment report should include enough detail to ensure that the basis for the determination of emission magnitude and sensitivity of the area, and therefore the site risk, are clear. The required mitigation so also be set out within the report, along with a description of the mechanism that will ensure that the appropriate level of mitigation will be implemented (such as through a planning condition).

Appendix E Model Inputs and Results Processing

E1 Model Inputs and Results Processing Tools

Model Version	ADMS-Roads v5, April 2020
Street Canyons	The ADMS Advanced Street Canyon Module was used to represent the effect of reduced dispersion and recirculating pollutants in street canyons. The canyons are shown in **Appendix F**.
British Summer Time (BST)	Adjustment for BST was made within the model, based on the following dates and times: BST begins – 01:00 on 25/03/2018 BST ends – 02:00 on 28/10/2018
Emission Factor Toolkit (EFT)	V9.0, April 2019
Time Varying Emissions Factors	Based on Department for Transport (DfT) statistics, Table TRA0307: Motor Vehicle Traffic Distributed by Time of Day and Day of the Week on all roads, Great Britain:2018.
Meteorological Data	2018 hourly meteorological data from Heathrow Airport has been used in the model. The wind rose is shown in **Figure E.1**.
Latitude	51°
Surface Roughness	A value of 1.5 m for Large Urban Areas was used to represent the modelled area. A value of 0.3 for Agricultural areas (max) was used to represent the meteorological station site.
Minimum Monin-Obukhov Length	A value of 100 for large conurbations was used to represent the modelled area. A

	value of 30 for mixed urban/industrial was used to represent the meteorological station site.
NOx to NO_2 conversion	NO_2 from NOx calculator version 7.1 **(Defra, 2019)**
Background Maps	2017 reference year background maps **(Defra, 2019)**

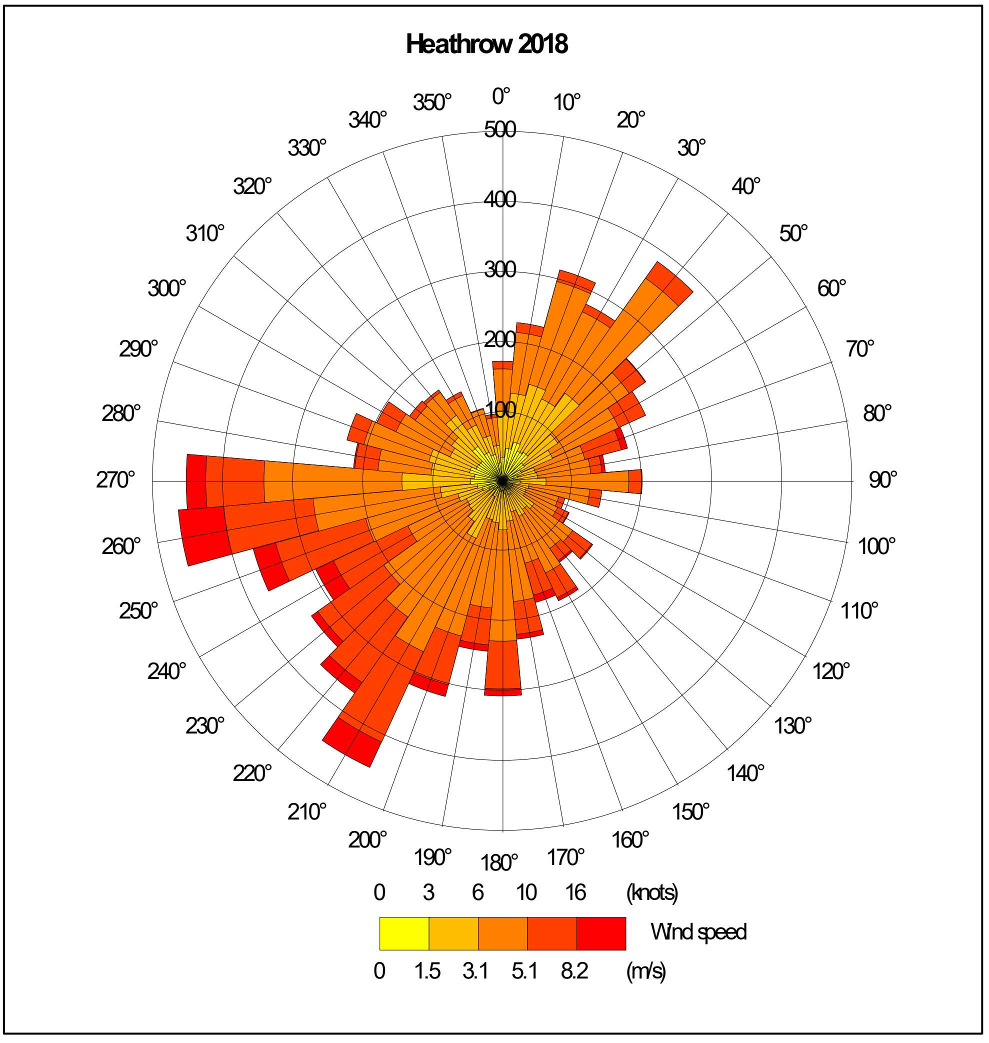

Figure E.1: 2018 Heathrow Airport Wind Rose

E2 Verification

Nitrogen Dioxide

E2.1 Most nitrogen dioxide (NO_2) is produced in the atmosphere by a reaction between nitric oxide (NO) and ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emission of nitrogen oxides (NOx = NO + NO_2). The model has been run to predict the annual mean road-NOx contribution in 2018 at two monitoring locations (identified in **Table 4-1** and **Figure 4-1**). Concentrations have been modelled at a height of 2 m for both sites.

E2.2 The choice of appropriate monitoring sites for verification has been based on:

- Appropriateness of site (roadside rather than background sites, presence of additional emission sources etc);
- Distance from study area; and
- Availability of traffic data for modelling.

E2.3 The model output of road-NOx has been compared with the 'measured' road-NOx, which was calculated from the measured NO_2 concentrations within the NOx from NO_2 calculator.

E2.4 A primary adjustment factor was determined as the slope of the best fit line between the 'measured' road contribution and the modelled road contribution, forced through zero (**Figure E.2**). This factor was then applied to the modelled road-NOx concentrations. The total NO_2 concentrations were then determined by combining the adjusted modelled road-NOx with the predicted background NO_2 concentration within the NOx from NO_2 calculator. A secondary adjustment factor was then calculated as the slope of best fit between the measured NO_2 and primary adjusted, modelled NO_2, forced through zero (**Figure E.3**).

E2.5 The following primary and secondary adjustment factors have been applied to all modelled NO_2 data:

Primary adjustment factor: 1.6592

Secondary adjustment factor: 1.0005

E2.6 The results imply that overall, the model was under-predicting the road-NOx contribution. This is a common experience with this and most other models. The secondary NO_2 adjustment is minor.

E2.7 The Root Mean Square Error (RMSE) has been calculated as 3.5 $\mu g/m^3$ which is within the guideline variance recommended within TG(16) **(Defra, 2016)**.

E2.8 **Figure E.4** compares the adjusted modelled, total NO_2 at each of the modelling sites with the measured total NO_2 and shows the 1:1 relationship as well as ±10% and ±25% of the 1:1 line. Both sites lies within ± 10% of the 1:1 line.

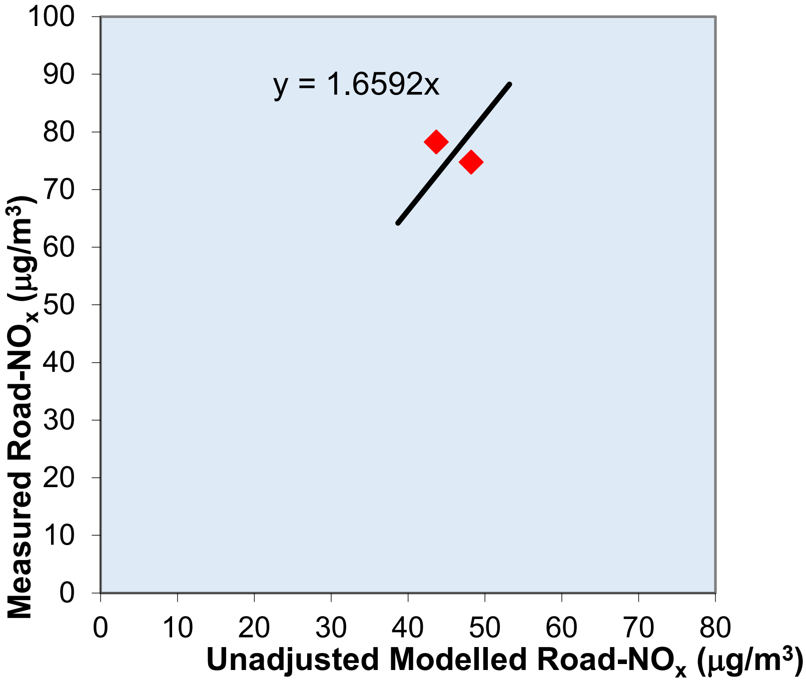

Figure E.2: Measured road-NOx / Modelled road-NOx concentrations

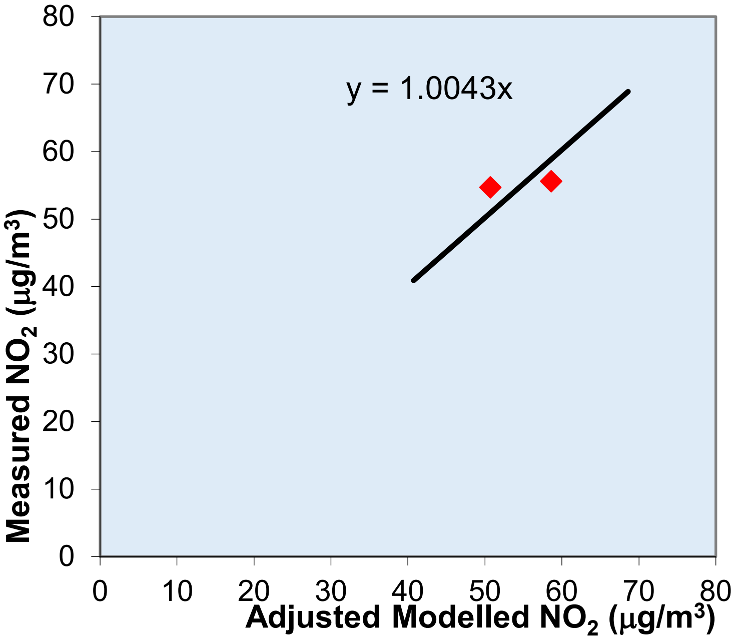

Figure E.3: Measured NO_2 / Primary Adjusted modelled NO_2 concentrations

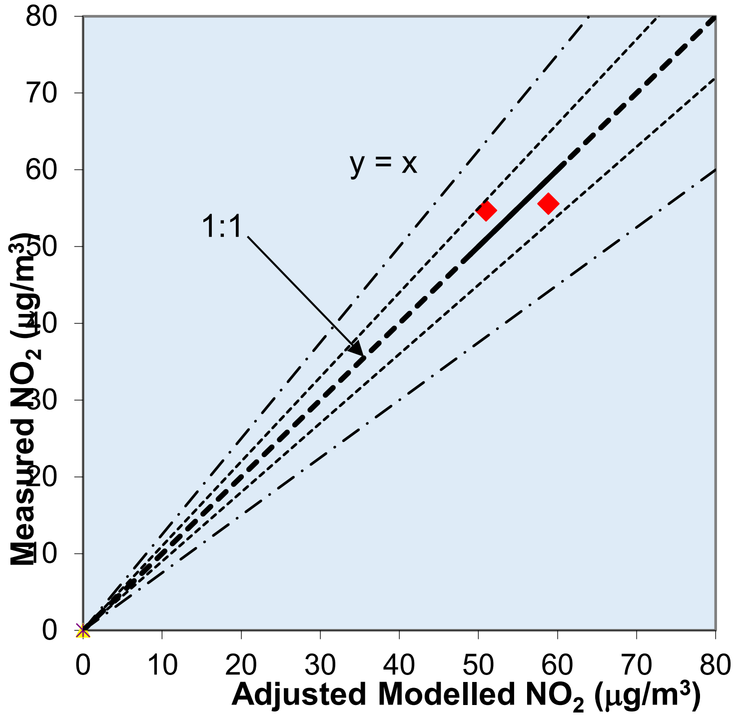

Figure E.4: Measured NO_2 / Fully Adjusted modelled NO_2 concentrations

PM_{10} and $PM_{2.5}$

E2.9 There is no PM_{10} or $PM_{2.5}$ monitoring in close proximity to the proposed development site. Therefore, the primary adjustment factor calculated for NO_2 concentrations has been applied to the modelled road-PM concentrations.

E3 Background Calibration

E3.1 In order to ensure that background concentrations used in this assessment reflect real-world conditions as accurately as possible, a calibration exercise has been carried out, utilising data measured in 2018 at three NO_2 monitoring locations and one PM_{10} and $PM_{2.5}$ locations. Measured concentrations have been compared against Defra predictions at the same locations to provide a calibration factor for each pollutants shown in **Table E.1**.

Table E.1: Background Calibration

	NO_2			PM_{10}	$PM_{2.5}$
Monitor	BLO	CA7	CA10	BLO	BLO
Measured Concentration ($\mu g/m^3$)	36.0	22.1	35.4	17.0	10.0
Data Capture (%)	98	92	92	88	92

Mapped Concentration (μg/m^3)	40.7	27.5	40.9	19.6	13.0
Site Factor	0.884	0.803	0.866	0.868	0.768
Calibration Factor	0.851			0.868	0.768

E3.2 The calibration factors suggest that mapped backgrounds for the area are higher than those measured in the area and mapped background NO_2, PM_{10} and $PM_{2.5}$ have therefore been adjusted by the relevant factors for the purposes of this assessment.

Appendix F Traffic Data and Road Network

F1.1 As noted in the assessment, data for three roads (Chalk Farm Road, Ferdinand Street and Juniper Crescent) was provided by the project transport consultants, ACE. Traffic data for additional links was sourced from the LAEI (based on 2016 flows). For those roads where data was available from both ACE and the LAEI (Chalk Farm Road and Ferdinand Street) it was noted that the LAEI predictions were higher. Whilst the data provided by ACE is likely to be more accurate, it was considered that it would be preferable to overestimate the traffic in the study area as this would be worst case and more appropriate, given that all of the traffic utilised in verification is from the LAEI. Baseline flows are not expected to increase in the area, (as set out within the transport assessment) and therefore, the baseline flows have not been factored to provide future year data. Cumulative and development flows (as provided by ACE) have, however, been added to the baseline flows in order to take into account increases associated with the amended proposed development and additional committed developments in the area. Traffic flows and speeds used in the model are set out in **Table F.1** and the roads modelled, along with speeds and canyons included in the assessment are shown in **Figure F.1**, **Figure F.2** and **Figure F.3**.

Table F.1: Modelled Traffic Data

Road Link	Speed (Average / Slow Sections)	2018 Base		2027 Without Development		2027 With Development	
		AADT	%HDV	AADT	%HDV	AADT	%HDV
Adelaide Rd	32/25	15,527	8.8	15,527	8.8	15,527	8.8
Agar Grove	25	8,943	9.4	8,943	9.4	8,943	9.4
Baynes St	32	1,658	19.9	1,658	19.9	1,658	19.9
Camden High Street	25	9,479	18.8	9,479	18.8	9,479	18.8
Camden Rd	32/20	26,568	9.4	26,568	9.4	26,568	9.4
Camden St	32	17,279	12.3	17,279	12.3	17,279	12.3
Castlehaven Rd	32	14,511	8.6	14,511	8.6	14,511	8.6
Chalk Farm Rd East	25	15,622	10.5	15,902	11.2	16,126	11.1
Chalk Farm Rd West	32/25	15,205	8.0	15,345	8.4	15,595	8.3
Ferdinand St	32/25	7,304	9.5	7,304	9.5	7,304	9.5
Fortress Rd	32	12,678	11.8	12,678	11.8	12,678	11.8
Haverstock Hill	32/25	14,745	5.1	14,745	5.1	14,745	5.1

Hawley Rd	32	14,511	8.6	14,511	8.6	14,511	8.6
Highgate Rd	32	19,413	6.9	19,413	6.9	19,413	6.9
Jupiter Crescent	32/25	3,621	7.5	4,041	11.9	4,342	11.6
Kentish Town Rd	32/20	13,485	17.1	13,485	17.1	13,485	17.1
Leighton Rd	32/25	7,133	7.7	7,133	7.7	7,133	7.7
Randolph St	25	1,410	3.7	1,410	3.7	1,410	3.7
Royal College St	32/25	13,505	10.8	13,505	10.8	13,505	10.8
St Pancras Way	32	6,460	3.9	6,460	3.9	6,460	3.9

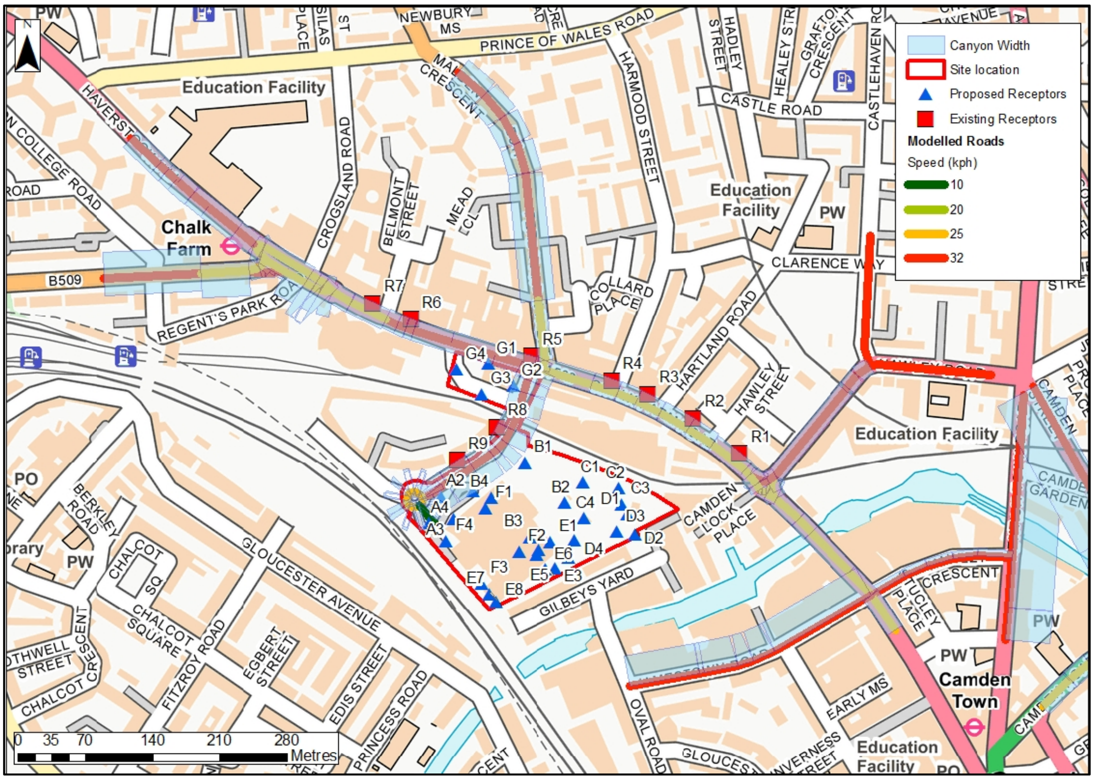

Figure F.1: Modelled road network – Study Area

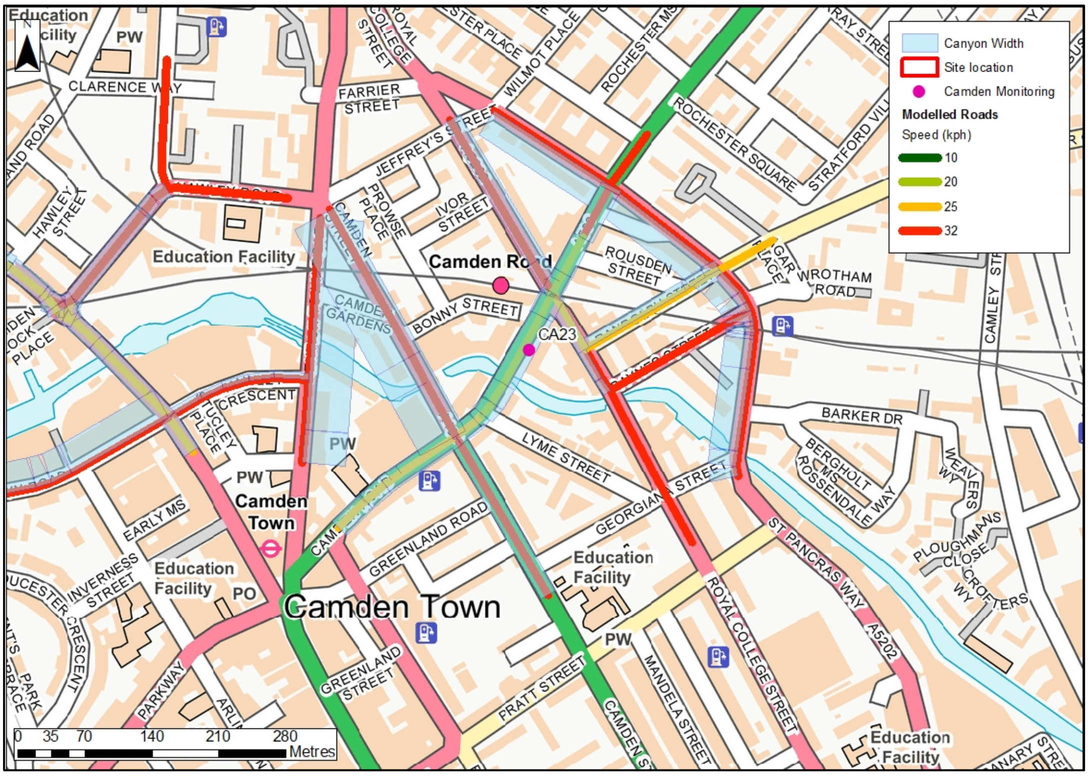

Figure F.2: Modelled road network – Verification Site (Camden Road)

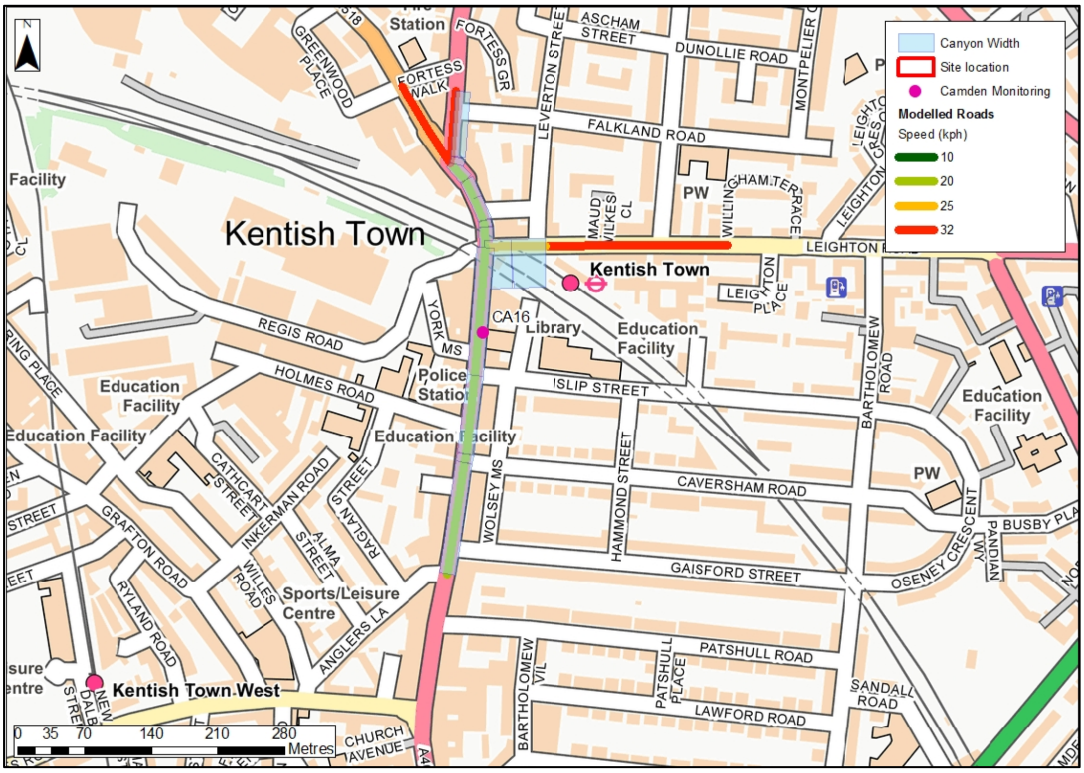

Figure F.3: Modelled road network – Verification Site (Kentish Town Road)