Belmont Street Site, Camden
Air Quality Assessment

October 2020

Vistry
Partnerships

Belmont Street, Camden

Air Quality Assessment

On behalf of **Vistry Group Plc**

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Executive Summary

The air quality impacts associated with the proposed residential development at Belmont Street, Camden have been assessed. The Site is located within the administrative boundary of the London Borough of Camden.

The assessment describes the existing baseline air quality in proximity to the Site, considers the suitability of the Site for the proposed development and assesses the impact of the construction of the development on local air quality. The main air pollutants of concern related to construction are dust and particulate matter (PM_{10}), and for road traffic they are nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).

The construction phase assessment identified appropriate mitigation to employ against construction dust impacts in accordance with the requirements of the Greater London Authority's Supplementary Planning Guidance (SPG) on 'The Control of Dust and Emissions during Construction and Demolition'. With mitigation in place the construction impacts are judged as being not significant

The number of additional vehicle trips associated with the operation of the development are below the indicative criteria, developed by Environmental Protection UK and the Institute of Air Quality Management, which are used to determine when a detailed air quality assessment is required. Therefore, the effect of development-related traffic on local air quality has been scoped out of the assessment. An assessment to evaluate whether the proposed development is 'air quality neutral' in terms of transport emissions has been undertaken. The assessment has shown that the development can be considered 'air quality neutral' in terms of transport emissions and no further site-specific mitigation is required.

There are no exceedances of the national air quality objectives within the Site. Therefore, as per the relevant requirements of the National Planning Policy Framework (NPPF) and the New London Plan, the Site is considered to be suitable for the proposed residential development.

Overall, the proposed development is considered to be in accordance with the requirements of the NPPF, London Plan (and accompanying SPG), Camden Local Plan, Camden Clean Air Action Plan, and National and European regulations regarding air quality.

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1 Introduction

1.1 Proposed Development

1.1.1 Stantec UK Ltd has been commissioned by Vistry Group Plc to produce an air quality assessment to support the detailed planning application for the proposed residential development at Belmont Street, on the previous Charlie Ratchford Resource Centre site. The proposed development site ('the Site') is located within the administrative boundary of the London Borough of Camden (LBC).

1.2 Scope of Assessment

1.2.1 This report describes existing air quality within the study area, assesses the impact of the construction of the proposed development on air quality in the study area, and considers the suitability of the Site for the proposed end-use. An assessment to evaluate if the proposed development is 'Air Quality Neutral' in terms of transport emissions has also been undertaken.

1.2.2 The proposed development is predicted to generate 31 vehicle trips a day. Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced guidance on 'land-use planning and development control: planning for air quality' which provides indicative criteria for when a detailed air quality assessment is required. Within an Air Quality Management Area (AQMA) a detailed assessment may be required when a development is predicted to result in an increase of 100 or more total vehicle movements per day, or 25 Heavy Duty Vehicle (HDV) movements per day (EPUK IAQM, 2017). As the number of predicted additional vehicle movements generated by the proposed development is well below this figure, the effect of vehicle emissions associated with development traffic on local air quality has been scoped out of the assessment. This report therefore focuses on the potential effects of existing road traffic emissions on air quality within the proposed development site.

1.2.3 Air Source Heat Pumps (ASHPs) are proposed to provide low-temperature hot water for the development and there are no emissions associated with these. An emergency backup generator is also proposed to provide electricity supply in the event of a power failure and will be tested on a monthly basis. As insufficient details are available regarding the type and size of the equipment to be used at this stage, it is recommended that a suitably worded condition be applied to the planning permission for the proposed development, requiring an assessment of the generator impacts to be carried out at the detailed design stage.

1.2.4 The main air pollutants of concern during the construction period are emissions of dust and fine particulate matter (PM_{10}) associated with on-site demolition and construction activities and off-site trackout. The main air pollutants of concern during the operational period are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$) emissions associated with existing road traffic.

1.2.5 The assessment has been prepared taking into account relevant local and national guidance, policy and legislation.

2 Relevant Legislation, Policy and Guidance

2.1 National Air Quality Objectives

2.1.1 National Air Quality Objectives (NAQOs) are defined by the Air Quality Standards (Amendment) Regulations 2016, which implement the European Union's Directive on ambient air quality and cleaner air for Europe (2008/50/EC).

2.1.2 Directive 2008/50/EC consolidated the previous framework directive on ambient air quality assessment and management and its first three daughter directives. The limit values remained unchanged, but it now allows Member States a time extension for compliance, subject to European Commission (EC) approval.

2.1.3 The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 amend the Air Quality Standards Regulations 2010 to reflect the administrative consequences of the UK's departure from the EU

2.1.4 The NAQOs for NO_2 and PM_{10} are shown in **Table 2-1**.

Table 2-1 NO_2 and PM_{10} Objectives

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual mean	40 µg/m^3
Particulate Matter (PM_{10})	24-hour mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual mean	40 µg/m^3

2.1.5 The NAQO's for NO_2 and PM_{10} were to have been achieved by 2005 and 2004, respectively, but also continue to apply in all future years thereafter.

2.1.6 In relation to $PM_{2.5}$, the Air Quality Strategy 2007 (Defra, 2007) includes an exposure reduction target comprising an annual mean target of 25 µg/m^3 by 2020 and an average urban background exposure reduction target of 15% between 2010 and 2020.

2.1.7 The EU Directive (2008/50/EC) also includes a national exposure reduction target, a target value and a limit value for $PM_{2.5}$, shown in **Table 2-2.** The UK Government transposed this new directive into national legislation in June 2010.

Table 2-2 $PM_{2.5}$ Objectives

	Time Period	Objective	To be Achieved by
UK Objectives	Annual mean	25 µg/m^3	2020
	3-year running annual mean	15% reduction in concentrations measured at urban background sites	Between 2010 and 2020
European Obligations	Annual mean	Target value of 25 µg/m^3	2010

	Time Period	Objective	To be Achieved by
	Annual mean	Limit value of 25 µg/m^3	2015
	Annual mean	Stage 2 indicative Limit value of 20 µg/m^3	2020
	3-year Average Exposure Indicator (AEI) (a)	Exposure reduction target relative to the AEI depending on the 2010 value of the 3-year AEI (ranging from a 0% to a 20% reduction)	2020
	3-year Average Exposure Indicator (AEI)	Exposure concentration obligation of 20 µg/m^3	2015

(a) The 3-year annual or AEI is calculated from the $PM_{2.5}$ concentration averaged across all urban background monitoring locations in the UK e.g. the AEI for 2010 is the mean concentration measured over 2008, 2009 and 2010.

2.2 The Air Quality Strategy

2.2.1 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK (Defra, 2007). The primary objective of the Air Quality Strategy is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Air Quality Strategy sets out the NAQOs and Government policy on achieving these.

2.2.2 Part IV of the Environment Act 1995 (Environment Act, 1995) introduced a system of Local Air Quality Management (LAQM) which requires Local Authorities (LAs) to regularly and systematically review and assess air quality within their boundary and appraise development and transport plans against these assessments.

2.2.3 Where a NAQO is unlikely to be met, the local authority must designate an AQMA and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the NAQO's within its AQMA.

2.2.4 The London Local Air Quality Management Technical Guidance 2019 (LAQM.TG (19); Greater London Authority, 2019a), issued by the Greater London Authority for Local Authorities in London provides advice as to where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the NAQO (which vary from 15 minutes to a year) as summarised in **Table 2-3**.

Table 2-3 Relevant Public Exposure

Averaging Period	Relevant Locations	NAQO's should apply at:	NAQO's don't apply at:
Annual mean	Where individuals are exposed for a cumulative period of 6 months in a year	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences

			Kerbside sites
1-hour mean	Where individuals might reasonably expect to spend one hour or longer	As above together with locations of regular access, car parks, bus stations etc.	Locations not publicly accessible or where occupation is not regular
15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15-minutes or longer		

2.3 Clean Air Strategy 2019

2.3.1 The Clean Air Strategy (2019a) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy will create a stronger and more coherent framework for action to tackle air pollution (Defra, 2019a).

2.4 National Air Quality Plan for Nitrogen Dioxide (NO_2) in the UK, 2018

2.4.1 The national Air Quality Plan (Defra, 2018) sets out how the Government plans to deliver reductions in NO_2 throughout the UK, with a focus on reducing concentrations to below the EU Limit Values throughout the UK within the shortest possible time. Measures outlined within the plan include investment in ultra-low emission vehicles (ULEVs), including charging infrastructure, investment in public transport (including funding for new buses, bus retrofits and ULEV taxis), an Air Quality Grant to support LAs in improving air quality, investment in walking and cycling infrastructure and funding for Highways England (HE) to help to improve air quality on its network.

2.4.2 The plan requires all LAs in England which are expected to have exceedances of the Limit Values in their areas past 2020 (as identified by national modelling) to develop local plans to improve air quality at identified 'air quality hotspots' within their areas, to be reviewed by the Government before being approved as final. The plans produced by the LAs should identify measures to deliver reduced emissions, with the aim of meeting the Limit Values within their area within "*the shortest time possible*", and are advised to consider measures such as changing road layouts, encouraging public and private ULEV update, the use of retrofitting technologies and new fuels and encouraging public transport. In cases where these measures are not sufficient to bring about the required change within "*the shortest time possible*" then LAs may consider implementing access restrictions on vehicles (e.g. Clean Air Zones (CAZs)). A CAZ is defined within the plan as being "*an area where targeted action is taken to improve air quality and resources are prioritised and coordinated in a way that delivers improved health benefits and supports economic growth*" and may be charging or non-charging.

2.5 The Road to Zero Strategy, 2018

2.5.1 The 'Road to Zero' strategy (DfT, 2018) sets out the Government's ambitions regarding zero emission vehicles[1], including the ambition for all new cars and vans to be effectively zero emission by 2040 and for almost every car and van to be zero emission by 2050. Measures to achieve this ambition are set out in the Strategy, and include measures intended to reduce emissions from vehicles already on the UK road network, to drive update of the cleanest vehicles, to reduce emissions from Heavy Goods Vehicles (HGVs) and freight, to put the UK at the forefront of the design and manufacture of zero emissions vehicles, to support the

[1] Whilst the term 'zero emission vehicles' is used in the strategy, it should be noted that this refers to tailpipe emissions only, and that 'zero emission vehicles' will still generate emissions from other sources (e.g. brake and tyre wear, road abrasion etc.).

development of one of the best electric vehicle infrastructure networks in the world and to support local action.

2.6 Planning Policy

National Policy

2.6.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government, 2019). The following paragraphs are considered relevant from an air quality perspective.

2.6.2 Paragraph 102 on promoting sustainable transport states:

"*Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*
…
d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; …"

2.6.3 Paragraph 103 continues to state:

"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."

2.6.4 Paragraph 170 on conserving and enhancing the natural environment states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land stability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans, and…"

2.6.5 Paragraph 180 within ground conditions and pollution states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2.6.6 Paragraph 181 states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.6.7 Paragraph 182 states that:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".

Planning Practice Guidance

2.6.8 Planning Practice Guidance (PPG) (Planning Practice Guidance, 2019) was first published in March 2014 to support the National Planning Policy Framework.

2.6.9 Paragraph 005, Reference 32-005-20191101 (revision date 01.11.2019), of the PPG provides guidance on how considerations regarding air quality can be relevant to the development management process as follows:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

Where air quality is a relevant consideration the local planning authority may need to establish:

- *The 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- *Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*

2.6.10 Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019), of the PPG identifies what specific air quality issues need to be considered in determining a planning application:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; and significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*

- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*

- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*

- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations; and*

- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

2.6.11 Paragraph 007, Reference 32-007-20191101 (revision date 01.11.2019), of the PPG provides guidance on the contents of the air quality assessment:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific."

and

"The following could form part of assessments:

- *a description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;*

- *sensitive habitats (including designated sites of importance for biodiversity);*

- *the assessment methods to be adopted and any requirements for the verification of modelling air quality;*

- *the basis for assessing impacts and determining the significance of an impact;*

- *where relevant, the cumulative or in-combination effects arising from several developments;*

- *construction phase impacts;*

- *acceptable mitigation measures to reduce or remove adverse effects; and*

- *measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached."*

2.6.12 Paragraph 008, Reference 32-008-20140306 (revision date 01.11.2019), of the PPG provides guidance on how an impact on air quality can be mitigated;

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.

Examples of mitigation include:

- *maintaining adequate separation distances between sources of air pollution and receptors;*
- *using green infrastructure, trees, where this can create a barrier or maintain separation between sources of pollution and receptors;*
- *appropriate means of filtration and ventilation;*
- *including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);*
- *controlling dust and emissions from construction, operation and demolition; and*
- *contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development."*

The London Plan

2.6.13 The London Plan Consolidated with Alterations since 2011 provides strategic planning guidance for Greater London (Greater London Authority, 2016). Each Borough's development plans must be in 'general conformity' with it.

2.6.14 The Plan includes Policy 7.14 (Improving Air Quality) which states that development proposals should:

"*Minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs)) and where development in likely to be used by large numbers of people vulnerable to poor air quality, such as steps to promote greater use of sustainable transport modes;*

Promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the Greater London Authority and London Councils 'The control of dust and emissions from construction and demolition';

Be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs);

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

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

2.6.15 Boroughs and others with relevant responsibilities should also have policies that:

"Seek reductions in levels of pollutants referred to in the Government's National Air Quality Strategy having regard to the Mayor's Air Quality Strategy; and

Take account of the findings of the Air Quality Review and Assessments and Action Plans, in particular where AQMAs have been designated."

2.6.16 The Mayor will work with strategic partners to ensure the spatial, transport and design policies of the London Plan support his Air Quality Strategy.

2.6.17 The Plan also includes Policy 8.2 (Planning Obligations) which states that the Mayor will provide guidance for boroughs and other partners on the preparation of frameworks for negotiations on planning obligations reflecting strategic priorities including the improvement of Air Quality.

Draft New London Plan (Intend to Publish)

2.6.18 The Mayor published the Intend to Publish version of the Plan in December 2019 (GLA, 2019a) and Secretary of State issued their response with required Directions in March 2020 (Ministry of Housing, Communities and Local Government, 2020). The Draft New London Plan runs from 2019 to 2041 in order to provide a longer-term view of London's development to inform decision making. The following section outlines policies contained within the Draft New London Plan which are relevant to air quality.

2.6.19 Policy Planning for Good Growth 3 (Policy GG3) on creating a healthy City states:

- *"To improve Londoners' health and reduce health inequalities, those involved in planning and development must:*
- *… DB seek to improve London's air quality, reduce public exposure to poor air quality and minimise inequalities in levels of exposure to air pollution..."*

2.6.20 The New Plan includes Policy Sustainable Infrastructure 1 (SI1) Improving Air Quality which aims to:

- *"...ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality. This means that new developments, as a minimum, must not cause new exceedances of legal air quality standards, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits".*

2.6.21 Policy SI1 'Improving Air Quality' states that:

A. "Development plans, through relevant strategic, site-specific and area-based polices 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 proposal 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 retrofitted mitigation measures.

c) Major development proposal 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 the development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emission cannot be further reduced by on-suite 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."

2.6.22 Paragraph 9.1.8 defines Air Quality Focus Areas (AQFA) as:

"*Air Quality Focus Areas (AQFA) are locations that not only exceed the EU annual mean limit value for nitrogen dioxide (NO_2) but are also locations with high human exposure. AQFAs are not the only areas with poor air quality but they have been defined to identify areas where currently planned national, regional and local measures to reduce air pollution may not fully resolve poor air quality issues. There are currently 187 AQFA's across Lon*don."

2.6.23 Paragraph 9.1.2A defines 'Poor Air Quality':

"*Where this policy refers to 'existing poor air quality' this should be taken to include areas where legal limits for any pollutant, or World Health Organization targets for Particulate Matter, are already exceeded and areas where current pollution levels are within 5% of these limits*"

2.6.24 Paragraph 9.1.6C provides advice on the interpretation of the results of 'Air Quality Neutral' Assessments:

"*For most minor developments achieving Air Quality Neutral will be enough to demonstrate that they are in accordance with Part B1 of this policy. However, where characteristics of the development or local features raise concerns about air quality, or where there are additional requirements for assessments in local policy, a full Air Quality Assessment may be required*."

2.6.25 The New London Plan seeks the application of an 'air quality positive approach' to the design of developments; however, it does recognise that this is both site and development specific (para 9.1.6E):

"*Delivery of an air quality positive approach will be project specific and will rely on the opportunities on site or in the surrounding area to improve air quality*."

2.6.26 Policy D3 'Optimising Site Capacity through Design-led Approach' states that *"…Development proposals should…help prevent or mitigate the impacts of…poor air quality…*".

2.6.27 Policy D8 'Public Realm' states that "*Development Plans and development proposals should…reduce exposure to air pollution…*".

London Environmental Strategy

2.6.28 The London Environmental Strategy, published in May 2018, evaluates the current condition of London's environment at a city-wide level (Mayor of London, 2018). This is the first strategy to bring together approaches to every aspect of London's environment, integrating the following areas:

- air quality;
- green infrastructure;
- climate change mitigation and energy;
- waste;
- adapting to climate change;
- ambient noise; and
- low carbon circular economy.

2.6.29 The Strategy aims, among other objectives, "*for London to have the best air quality of any major world city by 2050, going beyond the legal requirement to protect human health and minimise inequalities"*.

2.6.30 Chapter 4 on Air Quality includes a series of objectives, policies and proposals to improve air quality. Several key issues have been highlighted to be addressed in the Strategy:

- 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.

- Further reductions are needed in PM_{10} and $PM_{2.5}$, particularly from transboundary pollution, tyre and brake wear, and wood burning.

2.7 Local Policy

Camden Local Plan

2.7.1 The Camden Local Plan sets out LBC's planning policies and covers the period from 2016-2031 (LBC, 2017). The Local Plan contains Policy CC4 on Air Quality which states:

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

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

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

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

Camden Clean Air Action Plan 2019-2022

2.7.2 A borough-wide AQMA has been declared by LBC due to exceedances of the annual mean NO_2, and 24-hour mean PM_{10} NAQOs. As a result of this declaration, LBC has the responsibility to produce an AQAP. The Camden Clean Air Action Plan 2019-2022 details the actions LBC will take to improve air quality in Camden (LBC, 2019a). The Action Plan measures are categorised into the following themes: reducing construction emissions; reducing building emissions; reducing transport emissions; supporting communities and schools; reducing emissions from delivery, servicing and freight; continuing public health and awareness raising; lobbying.

2.8 Assessment Guidance

2.8.1 The primary guidance documents used in undertaking this assessment are detailed below.

The Greater London Authority's 'London Local Air Quality Management Technical Guidance (LLAQM.TG (19))'

2.8.2 LLAQM.TG (19) was published for use by London local authorities in their LAQM review and assessment work (Greater London Authority, 2019b). The document provides key guidance in aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

EPUK IAQM 'Land-Use Planning & Development Control: Planning for Air Quality

2.8.3 EPUK and the IAQM have together published guidance to help ensure that air quality is properly accounted for in the development control process (EPUK IAQM 2017). It clarifies when an air

quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

The Greater London Authority's 'Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance'

2.8.4 The Supplementary Planning Guidance (SPG) on 'the control of dust and emissions during construction and demolition' has been published by the GLA (Greater London Authority, 2014a). The SPG is based up on the IAQM's guidance on the assessment of dust from demolition and construction. The SPG provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in

2.8.5 The SPG follows the IAQM's approach in that an 'impact' is described as a change in pollutant concentrations or dust deposition and an 'effect' is described as the consequence of an impact.

The Greater London Authority's 'Sustainable Design and Construction Supplementary Planning Guidance'

2.8.6 The SPG on 'Sustainable Design and Construction', adopted in April 2014, forms part of the Implementation Framework for the London Plan (Greater London Authority, 2014b). For air pollution, the Mayor's priorities are stated as:

- Developers are to design their schemes so that they are at least 'air quality neutral'.
- Developments should be designed to minimise the generation of air pollution.
- Developments should be designed to minimise and mitigate against increased exposure to poor air quality.
- Developers should select plant that meets the standards for emissions from combined heat and power and biomass plants set out in Appendix 7 (of the document).
- Developers and contractors should follow the guidance set out in the SPG on 'The control of dust and emissions during construction and demolition' when constructing their development (Greater London Authority, 2014b).

2.8.7 The SPG provides guidance on:

- Minimising air quality emissions from location, transport, construction and demolition, and design and occupation.
- Protecting internal air quality.
- What is meant by 'air quality neutral'.
- Emissions standards for combustion plant.
- Offsetting provisions.

2.8.8 'Air quality neutral' applies across London as a whole and emission benchmarks have been proposed in terms of buildings' operation and transport emissions in order to meet these criteria. It is understood that the benchmark should be capable of being met without the need for significant additional mitigation. Where developments do not meet the air quality neutral benchmarks, it is suggested that appropriate on-site mitigation measures will be required to off-set any excess in emissions.

3 Methodology

3.1 Introduction

3.1.1 The assessment methodology detailed in the following sections has been applied to ascertain the suitability of the Site for the proposed end-use so that compliance with policy and regulatory requirements (outlined in **Section 2** of this report) can be demonstrated, or whether additional mitigation is required to achieve compliance.

3.1.2 This assessment first outlines the existing air quality within the study area, then considers the suitability of the Site for the proposed end-use. It also assesses the impact of construction activities on air quality and sensitive receptors in the study area.

3.2 Baseline Air Quality

3.2.1 Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by LBC. Background concentrations for the study area have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid (Defra, 2019b).

3.3 Construction Dust Impacts

3.3.1 During demolition and construction, the main potential impacts are dust soiling (associated with annoyance effects) and locally elevated concentrations of PM_{10} (associated with human health effects)

3.3.2 The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source.

3.3.3 Separation distance is also an important factor. Large dust particles (greater than 30µm), responsible for most dust annoyance, will largely deposit within 100 m of sources. Intermediate particles (10-30µm) can travel 200 – 500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10µm) are deposited slowly and may travel up to 1km; however, the impact on the short-term concentrations of PM_{10} occurs over a shorter distance. This is due to the rapid decrease in concentrations with distance from the source due to dispersion.

3.3.4 The Greater London Authority's SPG on 'the control of dust and emissions during demolition and construction' (GLA, 2014b) has been used to inform the assessment methodology. The assessment methodology considers three separate potential dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM_{10}; and
- harm to ecological receptors.

3.3.5 The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the scheme; defined as the study area. No further assessment is required if there are no receptors within the study area.

3.3.6 The assessment of potential risk is determined by considering the risk of dust impacts arising from four activities in the absence of mitigation:

- demolition;
- earthworks;
- construction; and
- trackout.

3.3.7 In accordance with the SPG, the dust emission magnitude is defined as either large, medium or small in **Table 3-1** taking into account the general activity descriptors on site and professional judgement.

3.3.8 The sensitivity of the study area to construction dust impacts is defined as high, medium and low in **Table 3-2**, taking into account professional judgement.

Table 3-1 Indicative Criteria for Dust Emission Magnitude

Dust Emission Magnitude	Activity
Large	**Demolition** >50,000m^3 building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >20m above ground level
	Earthworks >10,000m^2 site area, dusty soil type (e.g. clay), >10 earth moving vehicles active simultaneously, >8m high bunds formed, >100,000 tonnes material moved
	Construction >100,000m^3 building volume, on site concrete batching, sandblasting
	Trackout >50 HDVs out / day, dusty soil type (e.g. clay), >100m unpaved roads
Medium	**Demolition** 20,000 - 50,000m^3 building demolished, dusty material (e.g. concrete) 10-20m above ground level
	Earthworks 2,500 - 10,000m^2 site area, moderately dusty soil (e.g. silt), 5-10 earth moving vehicles active simultaneously, 4 m – 8m high bunds, 20,000 -100,000 tonnes material moved
	Construction 25,000 - 100,000m^3 building volume, on site concrete batching
	Trackout 10 - 50 HDVs out / day, moderately dusty surface material, 50 -100m unpaved roads

Dust Emission Magnitude	Activity
Small	**Demolition** <20,000m^3 building demolished, non-dusty material, <10 m above ground level, work in winter
	Earthworks <2,500m^2 site area, non-dusty soil, <5 earth moving vehicles active simultaneously, <4 m high bunds, <20,000 tonnes material moved
	Construction <25,000m^3, non-dusty material
	Trackout <10 HDVs out / day, non-dusty soil, < 50m unpaved roads

Table 3-2 Indicative Area Sensitivity Definitions

Area Sensitivity	People and Property Receptors	Ecological Receptors
High	>100 dwellings, hospitals, schools, care homes within 50 m 10 – 100 dwellings within 20 m Museums, car parks, car showrooms within 50 m PM_{10} concentrations approach or are above the daily mean objective.	National or Internationally designated site within 20 m with dust sensitive features / species present
Medium	>100 dwellings, hospitals, schools, care homes within 100 m 10 – 100 dwellings within 50 m < 10 dwellings within 20 m Offices/shops/parks within 20 m PM_{10} concentrations below the daily mean objective.	National or Internationally designated site within 50 m with dust sensitive features / species present Nationally designated site or particularly important plant species within 20 m
Low	>100 dwellings, hospitals, schools, care homes 100 - 350m away 10 – 100 dwellings within 50 – 350 m < 10 dwellings within 20 – 350 m Playing fields, parks, farmland, footpaths, short term car parks, roads, shopping streets PM_{10} concentrations well below the daily mean objective.	Nationally designated site or particularly important plant species 20 – 50 m Locally designated site with dust sensitive features within 50 m

3.3.9 Based on the dust emission magnitude and the area sensitivity, the risk of dust impacts is then determined (**Table 3-3**, **Table 3-4** and **Table 3-5**), taking into account professional judgement.

Table 3-3 Risk of Dust Impacts - Demolition

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

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

Table 3-4 Risk of Dust Impacts - Earthworks and Construction

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

Table 3-5 Risk of Dust Impacts - Trackout

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

3.3.10 Based on the risk of dust impacts, appropriate mitigation is selected from the SPG using professional judgement.

Significance Criteria

3.3.11 The construction impact significance criteria are based on the SPG on 'the control of dust and emissions during construction and demolition'. The guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

3.3.12 With appropriate mitigation in place, the residual effect of construction impacts on air quality is assessed as being not significant.

3.4 Site Suitability Assessment

Sensitive Receptors

3.4.1 Concentrations of pollutants (NO_x, PM_{10} and $PM_{2.5}$) have been modelled at a range of worst-case sensitive locations of relevant human health exposure within the proposed development to allow comparison with the NAQO's and, based on this, assessment of the suitability of the Site for the proposed end-use. Relevant sensitive human health locations are places where members of the public might be expected to be regularly present over the averaging period of the NAQOs. Relevant sensitive locations in relation to the NO_2, PM_{10} and $PM_{2.5}$ annual mean NAQOs, the 1-hour mean NO_2 NAQO and 24-hour mean PM_{10} NAQO will include the proposed dwellings.

3.4.2 Based on the criteria outlined above, three locations within the Site have been identified as receptors for the assessment. The locations of the selected receptors have been chosen to represent those where impacts from existing road traffic are likely to be the greatest. These locations are described in **Table 3-1** and shown in **Figure 1, Appendix G**. Receptors have been

modelled at heights of 1.5 m to represent ground floor exposure. Concentrations have also been predicted at one diffusion tube monitoring site (CA16) located on Kentish Town Road in order to verify the modelled results (see **Appendix C** for further details on the verification method).

Table 3-6 Receptor Locations Description

Receptor	Description	X Coordinate	Y Coordinate	Height (m)
PR1	Proposed residential apartment – southwest corner	528248.2	184460.0	1.5
PR2	Proposed residential apartment – western facade	528256.3	184484.0	1.5
PR3	Proposed residential apartment – northwest corner	528255.5	184504.5	1.5

Impact Predictions

3.4.3 Emissions from road vehicles have been predicted using the ADMS-Urban dispersion model (v4.1). The model requires the user to provide various input data, including the traffic flows (in Annual Average Daily Traffic (AADT) format), vehicle composition (i.e. the proportion of HDVs) road characteristics (including road width and gradient, where applicable) and vehicle speed. Baseline traffic data (including AADT flows and the proportions of HDVs) for roads within the study area have been obtained from the London Atmospheric Emission Inventory (LAEI), however LAEI data were not available for Crogsland Road and therefore data for this road link have been provided by the Project's transport consultants, Stantec. Traffic data used in this assessment are summarised in **Appendix E**.

3.4.4 The model also requires meteorological data and has been run using 2018 meteorological data from the Heathrow Airport meteorological station (approximately 22km from the Site), which are considered suitable for this area. **Appendix D** provides further details on the model inputs. Although London City Airport meteorological station is the closest to the Site (approximately 14km away), data from this station are not considered suitable due to local factors affecting meteorological conditions at this location.

3.4.5 Traffic emissions were calculated using the Emission Factor Toolkit (EFT) v9.0 which utilises NO_x emission factors taken from the European Environment Agency COPERT 5 emission tool. The traffic data were entered into the EFT to provide emission rates for each of the road links entered into the model. Road vehicular emissions are primarily associated with exhaust emissions but also include particles generated from abrasion (of tyres, brakes and road). The EFT allows users to calculate road vehicle pollutant emission rates for NO_x, PM_{10}, (exhaust and brake, tyre and road wear) and $PM_{2.5}$ (exhaust and brake, tyre and road wear) for a specified year, road type, vehicle speed and vehicle fleet composition.

3.4.6 The EFT provides pollutant emission rates for 2017 through to 2030 and takes into consideration the following information available from the National Atmospheric Emissions Inventory (NAEI):

- Fleet composition data for motorways, urban and rural roads in London and rest of the UK.
- Fleet composition based on European emission standards from pre-Euro I to Euro 6(a-d)/VI.
- Scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting.
- Technology conversions in the national fleet.

3.4.7 As a result of this the road vehicle exhaust emissions are projected to decrease year-on-year due to technological advances and improvements to the fleet mix i.e. penetration of Euro VI HGVs. Whilst there is current uncertainty over NO_x emissions from vehicle exhausts (particularly from Euro 5 and 6 Light Duty Vehicles (LDVs)) it is important to note the EFT is not based on the Euro emission standards. Specifically, the latest version of the EFT (v9.0) includes updated NO_x and PM speed emission coefficient equations for Euro 5 and 6 vehicles taken from the European Environment Agency (EEA) COPERT 5 emission calculation tool, reflecting emerging evidence on the real-world emission performance of these vehicles.

3.4.8 Generally, air quality throughout the UK is anticipated to improve in the coming decades; as such, in most cases, the earlier the year that is assessed, the more worst-case the assessment is. In order to take account of uncertainties relating to future year vehicle emissions, an assessment has been carried out utilising 2018 emission factors and background concentrations, thus assuming no improvement in vehicle emissions or concentrations.

Significance Criteria

3.4.9 The relevant NAQOs are set out in Table 2-1 and **Table 2-2**. There is no official guidance in the UK on how to assess the significance of air quality impacts of existing sources on a new development. The assessment has been limited to predicting air quality at the Site and the significance of this is based on whether the NAQOs for each pollutant are exceeded or not.

3.5 Assumptions and Limitations

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

3.5.2 There has been an acknowledged disparity between national road transport emissions projections and measured annual mean concentrations of nitrogen oxides (NOx) and NO_2 for many years. Recent monitoring has shown that reductions in concentrations are now being measured in many parts of the country (Air Quality Consultants Ltd., 2019), however, there is still some uncertainty regarding the rate at which emissions will reduce in the future and therefore some consideration must be given the accuracy of any projection and to appropriately respond to this.

3.6 Air Quality Neutral Calculations

3.6.1 The Air Quality Neutral calculations have been undertaken following the methodology described in the 'Air Quality Neutral Planning Support Update: GLA80391' guidance (Air Quality Consultants, 2014).

4 Baseline Environment

4.1 Site Context and Study Area

4.1.1 The Site is bound to the north, east and west by residential development off Crogsland Road and Belmont Street. To the south of the Site lies an area of mixed-use development including commercial units, residential properties and a hotel. The Site is located approximately 70m north of the A502 Chalk Farm Road, and approximately 110m south of Prince of Wales Road.

4.1.2 For the construction phase assessment, the study area (based on the Greater London Authority's SPG on 'the control of dust and emissions during construction and demolition') is defined as up to 350m from the site or 50m from the route of construction vehicles (up to 500m from the site entrance).

4.1.3 For the operational phase assessment, the study area (based on EPUK IAQM, 2017 guidance) is defined as all roads within 250m of the Site.

4.2 Ambient Air Quality

EU Limit Values

4.2.1 The Site is within the 'Greater London Urban Area' zone which Defra have reported to the EU as exceeding the annual average EU limit value for NO_2 and forms part of Defra's Air Quality Action Plan for NO_2.

4.2.2 A wide range of methods are being applied by Defra, the Greater London Authority and local authorities to reduce emission of air pollutants (as summarised in the **Section 2**) and of particular relevance to the development are controls relating to emissions from road traffic within London.

4.2.3 The London Low Emission Zone (LEZ) incorporates the Site and currently requires compliance (or pay a daily access charge) with the Euro IV standard for particulate matter (PM) for HGV and the Euro 3 for vans. The Euro IV emission standards for PM and NOx are 0.02 g/kWh and 3.5g/kWh respectively.

4.2.4 From October 2020, this will be toughened to require compliance (or pay a £100-£300 daily access charge) with the Euro VI standard for both NOx and particulate matter. The Euro VI emission standards for PM and NOx are 0.01 g/kWh and 0.4 g/kWh respectively; this has the potential to lead to a significant decrease in NOx emissions from HGV traffic in the Study Area.

4.2.5 Subsequently the London ULEZ is scheduled to be extended to encompass the Site in October 2021; the ULEZ also sets compliance requirements for cars and private hire vehicles (Euro 4 for petrol and Euro 6 for Diesel) and should lead to further significant reductions in traffic related emission in the Study Area.

LAQM

4.2.6 LBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. A borough-wide AQMA has been declared due to exceedances of the annual mean NO_2 and the 24-hour mean PM_{10} NAQOs.

4.2.7 The Site is not within an AQFA. The closest of AQFA is on Camden High Street (from Mornington Crescent to Chalk Farm), located approximately 280m southeast of the Site.

Local Monitoring Data

NO_2

4.2.8 LBC carries out monitoring at one automatic monitoring site, whilst the Environment Agency also carries out monitoring at two automatic urban and rural network (AURN) monitoring sites in the Borough. In 2018, LBC also deployed NO_2 diffusion tubes at fourteen locations across the Borough. Results for monitoring sites within 2km of the Site are provided in **Table 4-1** and **Table 4-2**, and their locations are shown in **Figure 2, Appendix G**.

Table 4-1 Measured Annual Mean NO_2 Concentrations

Site ID	Site Type	Within AQMA	Annual Mean (µg/m³)				
			2014	2015	2016	2017	2018
Automatic Site							
CD1 - Swiss Cottage AURN	Kerbside	Yes	**66**	**61**	**66**	**53**	**54**
Diffusion Tubes							
CA15 – Swiss Cottage	Kerbside	Yes	**74**	**69**	**74**	**-**	**66[a]**
CA16 – Kentish Town Road*	Roadside	Yes	**58**	**64**	**59**	**75**	**55**
CA17 – 47, Fitzjohn's Road	Roadside	Yes	**60**	**56**	**56**	**-**	**48**
CA23 – Camden Road	Roadside	Yes	**72**	**63**	**62**	**75**	**56**
CA24 – Chetwynd Road	Roadside	Yes	**45**	**47**	**42**	**55**	**40**
NAQO			**40**				

Exceedances of the NAQO are highlighted in bold.
2014 – 2018 data taken from the LBC Air Quality Annual Status Report for 2018 (LBC, 2019b).
NO_2 annual means in excess of 60 µg/m³, indicating a potential exceedance of the NO_2 hourly mean NAQO are shown in bold and underlined.
[a] Low data capture.
* Used for model verification.

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

Site ID	Number of Hours >200µg/m³				
	2014	2015	2016	2017	2018
CD1 – Swiss Cottage AURN	14	11	**37**	1	2
NAQO		**18 (hours >200µg/m³)**			

Exceedances highlighted in bold.
2014 – 2018 data taken from the LBC Air Quality Annual Status Report for 2018 (LBC, 2019).

4.2.9 **Table 4-1** shows that measured concentrations at the closest monitoring location to the Site, CA16 on Kentish Town Road, approximately 960m away, have been above the annual mean NAQO between 2014-2018. Furthermore, exceedances of the hourly mean NAQO are considered likely at monitoring location CA16 in 2015 and 2017 as the measured concentration in these years exceeds 60 µg/m³. **Table 4-1** also shows that there were also exceedances at the remaining monitoring locations within 2km of the Site between 2014-2018. There is no clear trend over time, however concentrations in 2018 are lower than in 2014 at all monitoring locations shown in **Table 4-1**.

4.2.10 **Table 4-2** shows that the hourly mean NO_2 objective was exceeded in 2016 at the closest automatic monitoring station to the Site, approximately 945m away.

PM_{10} and $PM_{2.5}$

4.2.11 The results of the PM_{10} and $PM_{2.5}$ monitoring at monitoring location CD1 (Swiss Cottage AURN)

are shown in **Table 4-3**.

Table 4-3 Measured PM_{10} Concentrations, 2014 – 2018

Site ID	Annual Mean PM_{10} (µg/m^3)				
	2014	**2015**	**2016**	**2017**	**2018**
CD1 – Swiss Cottage AURN	22	20	21	20	21
NAQO	**40**				
Number of Days >50µg/m^3					
CD1 – Swiss Cottage AURN	12	8	7	8	4
NAQO		**35 (days >50 µg/m^3)**			

2014 – 2018 data taken from the LBC Air Quality Annual Status Report for 2018 (LBC, 2019b).

Table 4-4 Measured $PM_{2.5}$ Concentrations, 2014 – 2018

Site ID	Annual Mean $PM_{2.5}$ (µg/m^3)				
	2014	**2015**	**2016**	**2017**	**2018**
CD1 – Swiss Cottage AURN	-	12	15	16	11
NAQO	**25**				

2014 – 2018 data taken from the LBC Air Quality Annual Status Report for 2018 (LBC, 2019b).

4.2.12 Measured PM_{10} and $PM_{2.5}$ concentrations have been below the relevant NAQOs since 2014.

4.3 Predicted Background Concentrations

4.3.1 In addition to these measured concentrations, estimated background concentrations for the Site and monitoring site used for verification have been obtained from the national maps provided by Defra (Defra, 2019b). The mapped background concentrations have been calibrated against background concentrations measured at the London Bloomsbury AURN monitor (see **Appendix F** for further details). The calibrated Defra background concentrations for the Site are provided in **Table 4-5**.

4.3.2 The background concentrations are all well below the relevant objectives.

Table 4-5 Estimated Annual Mean Background Concentrations

Year	Location	Annual Mean (µg/m^3)		
		NO_2	**PM_{10}**	**$PM_{2.5}$**
2018	528_184 [a]	26.7	15.8	9.4
	529_185 [b]	25.5	15.8	9.5
2020	528_184 [a]	23.6	15.3	9.1
	529_185 [b]	22.4	15.3	9.2
NAQOs		**40**	**40**	**25**

[a] Development Site.
[b] Location of monitoring site used for verification.

5 Predicted Impacts

5.1 Construction Dust Impacts

5.1.1 The main potential effects during construction are dust deposition and elevated PM_{10} concentrations. The following activities have the potential to cause emissions of dust:

- Site preparation including delivery of construction material, erection of fences and barriers.
- Demolition of existing car park.
- Earthworks including digging foundations and landscaping.
- Materials handling such as storage of material in stockpiles and spillage.
- Construction and fabrication.
- Disposal of waste materials off-site.

5.1.2 Typically, the main cause of unmitigated dust generation on construction sites is from demolition and vehicles using unpaved haul roads, and off-site from the suspension of dust from mud deposited on local roads by construction traffic. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.

5.1.3 Based on the Greater London Authority's SPG on 'the control of dust and emissions from construction and demolition' criteria (**Table 3-1**), the potential dust emission magnitude for the phases of construction are as follows:

- For demolition, the emissions magnitude is classified as 'small' as the building volume to be demolished is less than 20,000m^2 and demolition is not expected take place more than 10m above ground.
- For earthworks, the emissions magnitude is classified as 'medium' as the total area to be developed is greater than 2,500m^2.
- For construction activities, the dust emission magnitude is considered to be 'medium' as the total building volume to be constructed is greater than 25,000m^3.
- For trackout, the dust emission magnitude is considered to be 'small' as there are anticipated to be less than 10 HDV movements out per day.

5.1.4 The study area is considered to be of 'high' sensitivity to potential dust soiling impacts (**Table 3-2**) as there are more than 10 residential properties within 20m of the Site.

5.1.5 The study area is considered to be of 'low' sensitivity to potential PM_{10} impacts (**Table 3-2**), as baseline PM_{10} concentrations are well below the 24-hour mean NAQO (**Table 4-5**).

5.1.6 There are no sensitive ecological receptors within 50m of the Site and therefore the study area is not considered to be sensitive to potential dust or PM_{10} impacts on ecological receptors.

5.1.7 The overall risk of dust soiling and human health impacts, in accordance with **Table 3-3**, **Table 3-4** and **Table 3-5** is shown in **Table 5-1**. Appropriate mitigation measures corresponding to the level of risk identified for each activity are therefore required during the construction phase of the development (see **Section 6.1**).

Table 5-1 Construction Dust Risk Summary

Potential Impact	Risk			
	Demolition	Construction	Earthworks	Trackout
Dust Soiling	Medium	Medium	Medium	Low
Human Health	Negligible	Low	Low	Negligible

5.2 Site Suitability

5.2.1 Predicted concentrations at the three modelled worst-case receptor locations within the Site are presented in **Table 5-2**. Details of the proposed receptors are shown in **Table 3-6** and shown in **Figure 1, Appendix G**.

Table 5-2 Predicted Annual Mean Concentrations within the Site in 2018 (µg/m^3)

Receptor	NO_2	PM_{10}	$PM_{2.5}$
PR1	29.6	16.2	9.7
PR2	29.7	16.3	9.7
PR3	29.8	16.3	9.7
NAQO	**40**	**40**	**25**

5.2.2 There are no predicted exceedances of the annual mean NO_2, PM_{10}, or $PM_{2.5}$ NAQOs at any of the proposed receptors locations (PR1-PR3). The Site is therefore considered to be suitable for the proposed residential development.

5.3 Air Quality Neutral

Transport Emissions

5.3.1 The 'air quality neutral' calculations for the proposed development's transport emissions are described in **Table 5-3**.

Table 5-3 Development Land Use and Trip Generation

Land Use Class	Number of Units	Trips/Day	Trips/Annum
Residential (C3)	115	31	11,315

5.3.2 A comparison between the developments benchmarked and total emissions are shown in **Table 5-4**. The inner London transport emissions factors have been used, and the proposed development's emissions have been compared against the inner London Transport Emission Benchmarks (TEBs).

Table 5-4 Development Transport Emissions Air Quality Neutral Benchmarks

Land Use Class	Benchmarked Emissions		Development Emissions		Comparison to Benchmarked Emissions	
	NOx	PM_{10}	NOx	PM_{10}	NOx	PM_{10}
Residential (C3)	64.2	11.5	15.5	2.8	-48.7	-8.7

5.3.3 The total transport NOx and PM_{10} emissions of the proposed development are approximately 76% below the benchmark requirements of the Greater London Authority's SPG on 'sustainable design and construction'. The proposed development is therefore in accordance with the requirements of the SPG.

6 Mitigation

6.1 Construction

6.1.1 The following standard mitigation measures from the Greater London Authority's SPG on 'the control of dust and emissions during construction and demolition' (Greater London Authority, 2014b) are recommended, taking into account the outcomes of the construction dust risk assessment.

Communication

- Develop and implement a stakeholder communications plan.
- Display the name and contact details of persons accountable on the Site boundary.
- Display the head or regional office information on the Site boundary.

Management

- Develop and implement a dust management plan.
- Record all dust and air quality complaints, identify causes and take measures to reduce emissions.
- Record exceptional incidents and action taken to resolve the situation.
- Carry out regular site inspections to monitor compliance with the dust management plan and record results.
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.
- Agree dust monitoring locations with the local authority and instigate monitoring 3 months in advance of works commencing in the area.
- Plan Site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the Site boundary at least as high as any stockpile on-site.
- Fully enclose Site or specific operations where there is a high potential for dust production and the Site is active for an extensive period.
- Avoid site run off of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove potentially dusty materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles comply with the London Low Emission Zone and the NRMM standards, where applicable.

- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators where possible.
- Produce a Construction Logistics Plan to manage the delivery of goods and materials.
- Only use cutting, grinding and sawing equipment with dust suppression equipment.
- Ensure an adequate supply of water on-site for dust suppressant.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.
- Ensure equipment is readily available on-site to clean up spillages of dry materials.
- No on-site bonfires and burning of waste materials on-site.

Demolition

- Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure water suppression is used during demolition operation.
- Avoid explosive blasting, using appropriate manual and 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.
- Only remove the cover in small areas during work and not all at once.

Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emissions control systems.

Trackout

- Use water assisted dust sweepers on the Site access and local roads.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the Site are covered to prevent escape of materials.
- Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.

- Install hard surfaced haul routes which are regularly damped down.
- Install a wheel wash with a hard-surfaced road to the Site exit where site layout permits.

6.2 Operation

6.2.1 Air quality within the Site is considered to be acceptable for the proposed residential development and no additional mitigation is required.

7 Conclusions

7.1.1 The air quality impacts associated with the proposed residential development at Belmont Street, Camden have been assessed. The Site is located within the administrative boundary of the London Borough of Camden.

7.1.2 LBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. A borough-wide AQMA has been declared due to exceedances of the annual mean NO_2 NAQO and the 24-hour mean PM_{10} NAQO.

7.1.3 There are no exceedances of the NAQOs within the Site. Therefore, as per the relevant requirements of the NPPF and London Plan, the Site is considered to be suitable for the proposed residential development.

7.1.4 The construction works have the potential to create dust. During construction, it is recommended that in accordance with the requirements of the SPG on 'the control of dust and emissions during construction and demolition' a package of mitigation measures is put in place to minimise the low risk of elevated PM_{10} concentrations and dust nuisance in the surrounding area. With mitigation in place the construction impacts are judged as being not significant.

7.1.5 This assessment has shown that the development can be considered as 'air quality neutral' in terms of transport emissions and no further site-specific mitigation is required.

7.1.6 The proposed development is therefore considered to be in accordance with the requirements of the NPPF, London Plan (and accompanying SPG), Camden Local Plan, Camden Clean Air Action Plan, and National and European regulations regarding Air Quality.

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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQFA	Air Quality Focus Area
AQMA	Air Quality Management Area
ASHP	Air Source Heat Pump
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube	A passive sampler used for collecting NO_2 in the air
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
HE	Highways England
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LBC	London Borough of Camden
LEZ	Low Emission Zone
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO_2	Nitrogen Dioxide
NOx	Nitrogen oxides, generally considered to be nitric oxide and NO_2. Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
NPPF	National Planning Policy Framework
$PM_{10}/PM_{2.5}$	Small airborne particles less than 10/2.5 µm in diameter
PPG	Planning Practice Guidance

Receptor	A location where the effects of pollution may occur
SPG	Supplementary Planning Guidance
TEB	Transport Emission Benchmark
ULEZ	Ultra-Low Emission Zone
WHO	World Health Organisation

Appendix B Air Quality Neutral Benchmarks

Two Transport Emissions Benchmarks (TEBs) have been defined, one for NOx and one for PM_{10}, for Retail (A1 and A2), Commercial (B1) and living accommodation (C3). The TEBs are based on a limited range of land-use categories to match the London Travel Demand Surveys (LTDS) data as closely as possible.

The following table provides the Transport Emissions Benchmarks based on the gross floor area and the location of the development.

Table B.1: 'Air Quality Neutral' Emissions Benchmarks for Transport (TEBs)

Land Use	CAZ	Inner	Outer
NO_x (g/m²/annum)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NO_x (g/dwelling/annum)			
Residential (C3)	234	558	1553
PM_{10} (g/m²/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

Where a specific TEB has not been calculated, it is possible to shown that a development would meet the benchmark if the scheme-generated trip rate for a particular land-use class does not exceed the benchmark trip rate, derived from Trip Rate Assessment Valid for London (TRAVL). If the scheme-generated trip rate exceeds the benchmark trip rate, it is not possible at this stage to derive the excess emissions, and it will be for the developer to suggest an alternative approach.

Benchmark trip rates for those land-use classes where it was not possible to derive trip lengths are shown in **Table B.2**

Table B.2: Average Number of Trips per Annum for Different Development Categories

Land Use	Number of Trips (trips/m²/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 Model Verification

NO_2

Most NO_2 is produced in the atmosphere by the reaction of nitric oxide (NO) with 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 2018 annual mean road-NOx contribution at the Kentish Town Road diffusion tube (CA16) (identified in **Table 4-1**), which is the closest to, and most representative of the proposed development. The automatic monitoring site at Swiss Cottage (CD1) has not been used as conditions at this location are not considered to be representative of those at the Site.

The model output of road-NOx has been compared with the 'measured' road-NOx, which was determined from the measured NO_2 concentration using the NOx from NO_2 calculator and the adjusted background NO_2 concentrations from the Defra background map.

An adjustment factor was determined as follows:

- Measured NO_2: 54.7 µg/m^3
- Measured road-NOx: 75.8 µg/m^3
- Modelled road-NOx: 37.8 µg/m^3
- Road-NOx adjustment factor: 75.8 / 37.8 = 2.0*

*Based on unrounded numbers.

This factor implies that the model is under-predicting the road-NOx contribution. This is a common experience with this and most other models.

Particulates (PM_{10} and $PM_{2.5}$)

The closest automatic monitoring station to the Site measuring PM_{10} and $PM_{2.5}$ is at Swiss Cottage (CD1). However, as this monitoring location is not considered to be representative of the Site, it has not been used for model verification and the adjustment factor calculated of NO_2 has been applied to the modelled road-PM_{10} and road-$PM_{2.5}$ concentrations.

Appendix D Model Inputs and Results Processing Tools

Meteorological Data	2018 hourly meteorological data from the Heathrow Airport meteorological station has been used in the model. The wind rose is shown in **Figure C.1**.
ADMS	Version 4.1.1
Time Varying Emission Factors	Based on Department for Transport statistics. Table TRA0307. Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2018.
Latitude	51º
Surface Roughness	A value of 1.5 for 'large urban areas' was used to represent the modelled area. A value of 0.3 for 'agricultural areas' was used to represent the meteorological station site.
Minimum Monin-Obukhov length	A value of 100 for 'large conurbations >1 million' was used to represent the modelled area. A value of 30 for 'mixed urban/industrial' was used to represent the meteorological station site.
Street Canyon	ADMS Advanced Street Canyon module was used to represent the effect of trapping and recirculating pollutants. Building heights were assumed to be 3m per floor. Canyons have been included on Crogsland Road and on Kentish Town Road.
Emission Factor Toolkit (EFT)	V9.0, April 2019.
NO_x to NO_2 Conversion	NO_x to NO_2 calculator version 7.1, April 2019
Background Maps	2017 reference year background maps

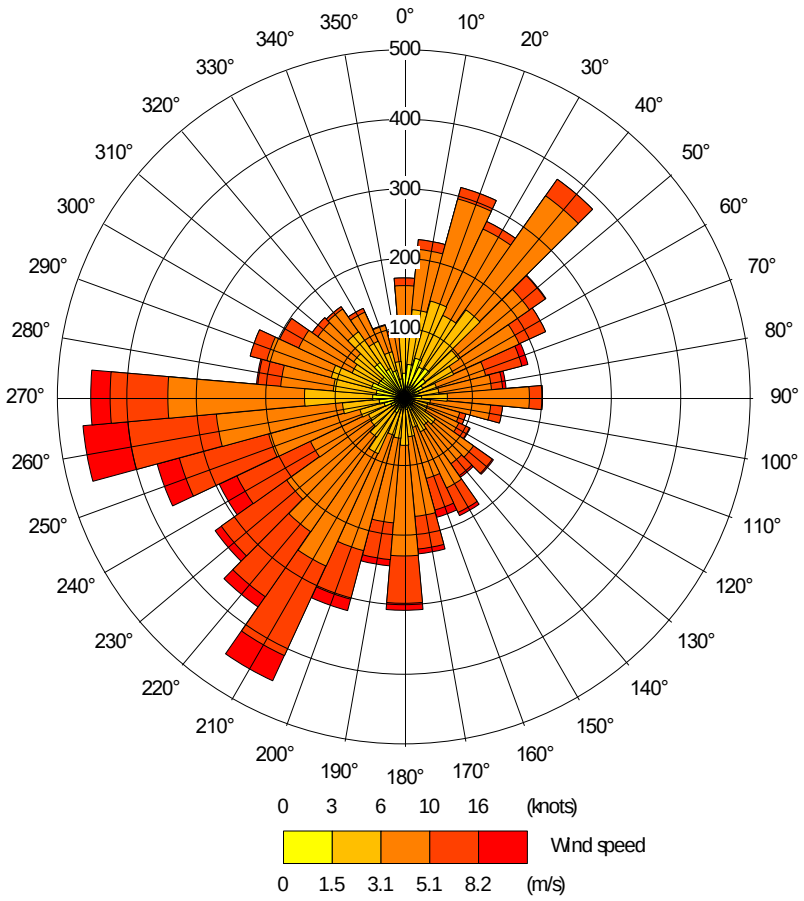


Figure C.1: 2018 Heathrow Wind Rose

Appendix E Traffic Data and Road Network

Location	2018 Baseline		
	AADT	HDVs	HDV (%)
A502 Chalk Farm Road (East of Ferdinand Street)	16,167	1,696	10.5
A502 Chalk Farm Road (East Crogsland Road)	15,653	1,182	7.6
A502 Chalk Farm Road (east of Juniper Crescent)	15,716	1,245	7.9
A502 Chalk Farm Road (west of Crogsland Road)	15,653	1,182	7.6
Prince of Wales Road (west of Crogsland Road)	15,016	1,195	8.0
Ferdinand Street (north of Ferdinand Place)	7,543	714	9.5
Kentish Town Road (north of Leighton Road)	13,627	2,149	15.8
Highgate Road	20,002	1,319	6.6
Crogsland Road	701	42	6.0
Prince of Wales Road (east of Crogsland Road)	15,016	1,195	8.0
Prince of Wales Road (east of Malden Road)	10,212	997	9.8
Malden Road	25,674	1,792	7.0
A502 Haverstock Hill	15,245	773	5.1
B509 Adelaide Road	15,970	1,340	8.4
Kentish Town Road (south of Leighton Road)	13,798	2,320	16.8
Leighton Road	7,334	535	7.3
Ferdinand Street (south of Ferdinand Place)	8,075	1,246	15.4
Fortess Road	12,979	1,501	11.6

Appendix F Background Concentrations

Defra publish details of estimated background concentrations of pollutants for each 1km grid square across the country. The Environment Agency operates an urban background AURN monitoring site approximately 3km southeast of the Site at London Bloomsbury. In order to more accurately reflect background concentrations across the study area, Defra mapped background concentrations at the London Bloomsbury AURN site have been compared against concentrations measured at the Site in 2018 to produce a calibration factor which is applied to background concentrations across the study area.

NO_2

Defra mapped NO_2 = 40.7 µg/m^3

Measured NO_2 = 36 µg/m^3

Calibration Factor = 36/40.7 = 0.88

PM_{10}

Defra mapped PM_{10} = 19.6 µg/m3

Measured PM_{10} = 17 µg/m^3

Calibration Factor = 17/19.6 = 0.87

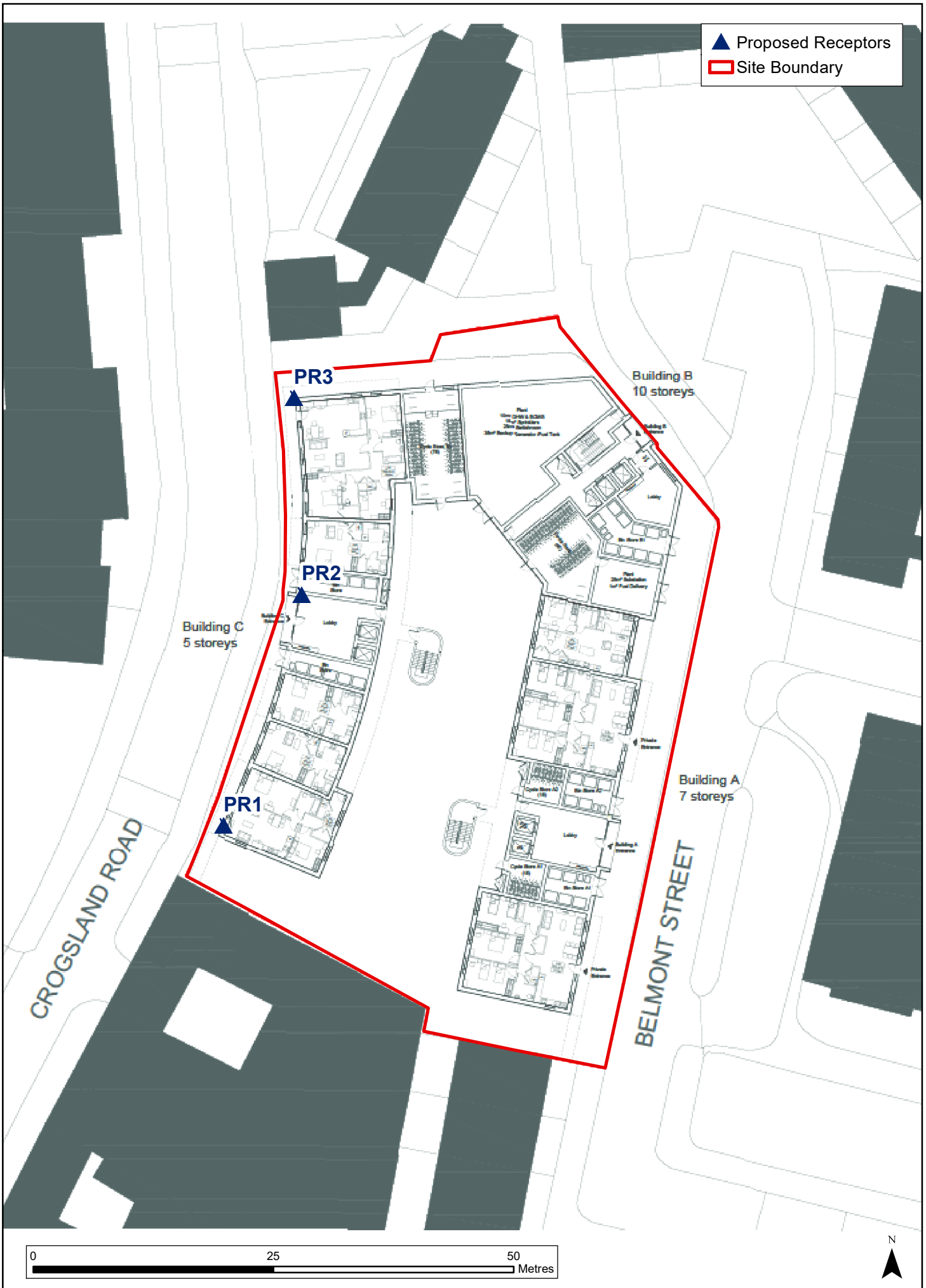
$PM_{2.5}$

Defra mapped $PM_{2.5}$ = 13 µg/m^3

Measured $PM_{2.5}$ = 10 µg/m^3

Calibration Factor = 10/13 = 0.77

Appendix G Figures



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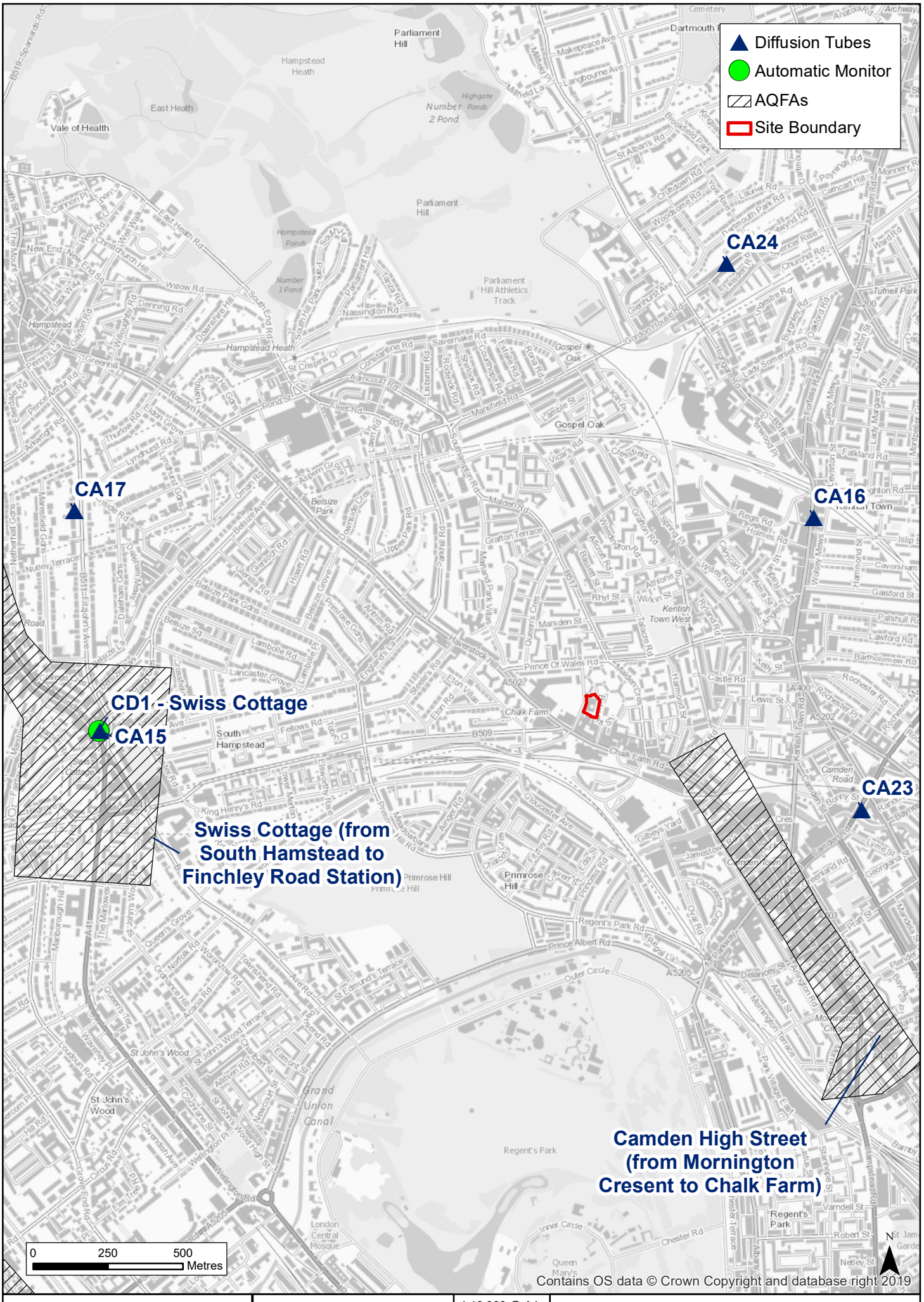
Belmont Street, Camden

Proposed Air Quality Receptor Locations

Figure 1 | Rev A



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Belmont Street, Camden

Air Quality Monitoring Locations

Figure 2 | Rev A