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LOCAL AIR QUALITY ASSESSMENT

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1. INTRODUCTION

1.0.1 Ramboll UK Limited (Ramboll), has been commissioned by Stadium Capital Holdings (the Applicant) to undertake a Local Air Quality Assessment to accompany the planning application for a proposed student accommodation development in Finchley Road, Camden, London. The location of the site, hereafter referred to as the "Application Site", is shown in Figure 1.

1.0.2 This report has been prepared by Ramboll solely for the benefit of Stadium Capital Holdings. It shall not be relied upon or transferred to any third party, without the prior written authorisation of Ramboll, with the exception of its use in connection with the planning application which this report supports.

1.1. Site Description

1.1.1. The Application Site is centred approximately at Grid Reference 526089, 184872 within the London Borough of Camden (LBC).

1.1.2. The Application Site is triangular in shape and is approximately 0.16ha in area. It is bounded by railway lines to the north and the south. Finchley Road (A41) at the eastern boundary is elevated by approximately 7m above the western corner of the site. A shopping centre is located beyond the railway lines immediately south of the site. Other commercial businesses and residential properties are located along Finchley Road.

1.1.3. The Application Site is currently largely vacant and consists mainly of shrub-like vegetation and grasses. There are two National Rail owned huts on the site. There are also several sets of steps leading down to the railway lines.

1.2. Proposed Development

1.2.1. The Proposed Development is for student accommodation comprising approximately 140 units, including shared facilities such as communal lounges. 10% of the student accommodation units have disabled access and another 10% will be studio units. Level 2 of the basement floor (the lowest level) is proposed to be studio office units.

1.2.2. The development will span five storeys plus two basement floors. Construction of facilities including refuse areas and a lobby have been proposed at the east of the site which fronts on to Finchley Road. The Proposed Development includes the use of solar powered heating and natural gas-fired boilers.

1.2.3. Due to the nature of the Proposed Development, no car parking facilities have been proposed on site and therefore there is not expected to be any significant increase in traffic movements as a result of the development. The site is well located for public transport and access to numerous education establishments.

1.3. Scope of Assessment

1.3.1. The following issues have been considered within this report:

i. Existing and future air quality at the Application Site and in the surrounding area;
ii. The processes of demolition and construction and the potential for dust nuisance to occur; and
iii. A qualitative assessment of the suitability of air quality the site for the intended use.

1.3.2. The scope and methodology of this assessment have been agreed in consultation with the Senior Sustainability Officer (Air Quality) at the LBC.

1.3.3. Solar powered heating and natural gas fired boilers have zero and very low emissions to air respectively. These have not been considered further in the assessment.

1.3.4. The Application Site is bounded by railway lines. The lines adjacent to the Proposed Development are only trafficked by electric trains and the nearest proposed building façade is approximately 50m from the tracks. There are no significant emissions to air from electric trains and this has not been considered further in this assessment.

1.4. Potential Impacts

Construction Phase

1.4.1. During the construction phase, activities on the Application Site could give rise to dust, which, if transported beyond the Application Site boundary, could have an adverse effect on local air quality. Dust is comprises particles typically in the size range of 20 to 80µm in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials.

1.4.2. Dust can cause nuisance when settled particles show up as deposits on clean surfaces such as cars and window ledges.

Operational Phase

1.4.3. There will not be any significant emissions to air from the Proposed Development once operational. However operation of the development will introduce users of the Proposed Development to air quality in a busy urban area of Camden. This has been assessed within this report.

2. PLANNING POLICY

2.1. Background

2.1.1. Local air quality is monitored and managed under a range of national and international legislation which sets out procedures, guidelines and standard limits for specific, commonly occurring, air pollutants. Legislation is based upon the effects of air pollutants to human health and safety, the environment, ecosystems, and effects to buildings and structures.

2.2. Control of Dust Associated with Construction

Environmental Protection Act

2.2.1. Under the Environmental Protection Act 1990, dust which is prejudicial to health or a nuisance can be a statutory nuisance. Local authorities and individuals can take action to secure the abatement of such nuisance. Dust can also be a public nuisance which is a crime punishable by law, and a private nuisance for which compensation or damages can be sought.

Acceptable Levels

2.2.2. There are no statutory or universal standards that define what level of dust constitutes a nuisance. 'Acceptable levels' can be a controversial term, in that what is deemed acceptable to one person may not be deemed acceptable to another. The issue is further complicated by the varied methods available to quantify the amount of dust present on a surface, for example, the mass of particles or the visual impact.

2.2.3. Land uses which are the most sensitive to the effects of dust[1] are: hospitals and clinics; retirement homes; high tech industries; painting and furnishing; and food processing due to the high standards of cleanliness required for these facilities. Other land uses which are also considered to be sensitive to dust deposition include schools, residential properties, food retailers, offices, cemeteries, abattoirs, greenhouses and nurseries.

2.3. The European Air Quality Framework Directive and Daughter Directives

2.3.1. The European Air Quality Framework Directive (Directive 96/62/EC) establishes a strategic framework for setting European-wide limit values for twelve pollutants. Limit values for each pollutant are established by a series of Daughter Directives[2] and based on recommendations made by the World Health Organisation (WHO).

2.3.2. These directives have been transposed into legislation and implemented in England by the Air Quality Standards Regulations 2010[3]. Overall responsibility for achieving the limits lies with the Secretary of State however local authorities have a role through their duties to work towards meeting the national air quality objectives (detailed in **Section 2.5**) which are similar, or in some cases more stringent than the EU limit values.

2.4. Air Quality Strategy for England, Scotland, Wales and Northern Ireland

2.4.1. The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS) most recently updated in July

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1 Ireland M. (1992) "Dust: Does the EPA go far enough?", Quarry Management, August 1992, pp23-24
2 1999/30/EC, 2000/69/EC, 2002/3/EC, 2004/107/EC, 2008/50/EC
3 The Air Quality Standards Regulations 2010, Statutory Instrument 2010 No 1001

2007[4]. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK.

2.4.2. The AQS covers ten air pollutants. These are ammonia (NH_3), benzene (C_6H_6), 1, 3 butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), oxides of nitrogen (NOx) (including nitrogen dioxide NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3), and polycyclic aromatic hydrocarbons (PAHs).

2.4.3. The AQS sets standards and objectives for the ten listed pollutants. Standards are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects on human health (including sensitive sub-groups) or ecosystems. In general these are concentration limits above which sensitive members of the public (eg children, the elderly and the unwell) might experience adverse health effects. Objectives are policy targets often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedences within a specified timescale.

2.4.4. For some pollutants, there is both a long-term (eg annual mean) standard and a short-term (eg one hour mean) standard, to reflect the varying impacts on health of differing exposures to pollutants. Long-term standards are generally lower than short-term standards owing to the chronic health effects associated with exposure to low concentrations of pollutants for longer periods of time.

2.5. Air Quality (England) Regulations

2.5.1. Many of the objectives in the AQS were made statutory in England with the Air Quality (England) Regulations 2000[5] and the Air Quality (England) (Amendment) Regulations 2002[6] for the purpose of Local Air Quality Management (LAQM). The objectives for NO_2 and PM_{10} which are relevant to this assessment are as follows:

i **For NO_2**
The long-term objective is an annual mean concentration of 40µg/m^3 to be achieved by 31 December 2005; and

The short-term objective is a one-hour mean concentration of 200µg/m^3 not to be exceeded more than 18 times per year to be achieved by 31 December 2005.

ii **For PM_{10}**
The long-term objective is an annual mean concentration of 40µg/m^3 to be achieved by 31 December 2004; and

The short-term objective is a 24-hour mean concentration of 50µg/m^3 not to be exceeded more than 35 times per year to be achieved by 31 December 2004.

2.5.2. Objectives included in the Air Quality (England) Regulations are generally more stringent than those included within EU legislation and other English regulations. Throughout this report, reference to statutory standards or objectives means those included within the Air Quality (England) Regulations.

2.5.3. The objectives apply at locations where members of the public would be exposed over the relevant exposure period. For example the annual mean objective applies at the building facades of residential properties, schools, hospitals, care homes etc, but does not apply in gardens of residential properties, at the building facades of offices or other places of work, at hotels unless people live there as their permanent residence or at kerbside locations where public exposure would be short term. The one hour mean

[4] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland - Defra - July 2007
[5] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No 928
[6] The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No 3043

objective would apply at all the locations where the annual mean objective applies and any outdoor location where members of the public might reasonably be expected to spend an hour or longer.

2.5.4. With regard to the proposed student accommodation within the development, guidance from Defra[7] does not specifically cover student accommodation. However, the annual mean objective is likely to apply at the accommodation and short-term objectives would also apply.

2.6. Local Air Quality Management (LAQM)

2.6.1. Part IV of the Environment Act 1995 requires local authorities to periodically review and assess the quality of air within their administrative area. The reviews have to consider the present and future air quality and whether any air quality objectives prescribed in regulations are being achieved or are likely to be achieved in the future.

2.6.2. Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate an Air Quality Management Area (AQMA).

2.6.3. For each AQMA the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

2.6.4. DEFRA has published technical guidance for use by local authorities in their review and assessment work[7]. This guidance, referred to in this report as LAQM.TG(09), has been reviewed and used, where appropriate, within the assessment.

Local Air Quality Management in the London Borough of Camden

2.6.5. The whole of Camden has been declared an AQMA due to elevated concentrations of NO_2 and PM_{10} caused primarily by emissions from road traffic.

The London Borough of Camden Air Quality Strategy

2.6.6. The London Borough of Camden's Air Quality Strategy[8] sets out a range of actions the Borough intends to take to reduce NO_2 and PM_{10} concentrations. These are primarily aimed at reducing emissions from road traffic, new developments, gas boilers and industrial processes. It considers transport schemes, low emission vehicles, parking policy, changes in attitudes and behaviour, the use of renewable fuels, reducing diesel train emissions, controlling emissions from new developments (including construction sites) and giving advice on energy efficiency. A full list of the measures is given in Table 1.

Table 1 The London Borough of Camden's Air Quality Action Plan

Objective	Description
1	Reducing traffic and encouraging the use of sustainable transport - Reducing car journeys through parking enforcement and transport planning policies, promoting walking and cycling by constructing, improving and maintaining facilities, Camden's Travel Awareness Programme which provides information to the public to increase awareness of sustainable forms of travel and the promotion of a car sharing scheme.

[7] Department for Environment, Food and Rural Affairs (DEFRA): Part IV The Environment Act 1995 Local Air Quality
[8] The London Borough of Camden Air Quality Strategy 2009-2012

Objective	Description
2	Encouraging the use of low emission vehicles – Commissioning Life Cycle Analyses of fuels, supporting the use of electric vehicles by providing recharging points, supporting the use of bio – methane and hydrogen fuel cells, emission based parking charges and increasing awareness and encouraging the use of low emission vehicles amongst businesses.
3	Encouraging changes in driver behaviour – Reducing idling vehicles and encouraging smarter driving.
4	Reducing the impact of freight vehicles – Introduction of a freight consolidation centre which minimises the amount of trips made, encouraging the use of bicycles and promoting clean vehicles and smarter driving.
5	Supporting initiatives promoted by the Mayor of London –Implementation of a low emission zone (LEZ), encouraging changes to public transport for example hybrid buses and funding low carbon technologies for taxis.
6	Reducing diesel train emissions – Requiring rail companies to provide an action plan outlining measures to reduce emissions.
7	Reducing the Council's own transport emissions – Adopting clean vehicle fuels and alternative technology such as electric vans and the use of bio-methane, providing smarter driving training, establishing a corporate travel plan and reducing emissions from contractors' vehicles.
8	Determining impacts of new developments on air quality – Air Quality Impact Assessments must be submitted with planning applications which have the potential to have a negative impact on air quality.
9	Reducing emissions at construction sites – Developers must comply with Best Practice Guidance and developers may be required to submit a Construction Management Plan.
10	Reducing transport emissions at new developments – encourage designs which reduce reliance on private car journeys and encourage the use of public transport through planning conditions and obligations.
11	Reducing gas boilers emissions at new developments – Promoting London Plan Energy Hierarchy for example encouraging the use of CHP and requiring high standards of sustainable building design and construction (BREEAM and Code for Sustainable Homes).
12	Controlling emissions from biomass heating appliances – Air Quality Impact Assessments are required for new developments planning to use biomass heating appliances and planning conditions and obligations may be set to reduce emissions.
13	Providing advice regarding energy efficiency and promoting fuel saving measures – Initiatives to improve energy efficiency and affordable warmth including grant schemes, working with schools and raising awareness. Also promotes energy saving schemes in private sector homes.
14	Reducing the Council's gas boiler emissions – Improving energy efficiency in Council homes, buildings and offices, increasing supply of renewable heat and reducing emissions associated with contractors' buildings.
15	Controlling industrial air pollution emissions – Ensuring that Part B Installations maintain high standards of controlling polluting emissions.
16	Provision of air quality information – Distributing information to the public through the internet, maintaining Camden's Air Quality Monitoring Network and conducting air quality research.
17	Strengthen promotional work relating to air pollution and health – Improving understanding of the effects of air pollution, providing information for walking routes which are not exposed to the poorest air quality and promotion of the Air Pollution Alert System.
18	Working with the community – Raising awareness of air quality issues and climate change, working with schools and showcasing educational exhibitions.

2.7. Planning Policy and Guidance

The National Planning Policy Framework (NPPF)

2.7.1. The NPPF[9] sets out the Government's planning policies for England and how these are expected to be applied.

2.7.2. The NPPF advises that the planning system prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of air pollution.

The London Plan

2.7.3. Planning Policy in respect of development planning and air quality management is also presented in the London Plan[10]. Policy 4A.19: 'Improving air quality', states:

> "*The Mayor will, and Boroughs should, implement the Mayor's Air Quality Strategy and achieve reductions in pollutant emissions and public exposure to pollution by:*
>
> *i. improving the integration of land use and transport policy and reducing the need to travel, especially by car;*
>
> *ii. promoting sustainable design and construction;*
>
> *iii. promoting sustainable construction to reduce emissions from the demolition and construction of buildings;*
>
> *iv. ensuring at the planning application stage, that air quality is taken into account along with other material considerations, and that formal air quality assessments are undertaken where appropriate, particularly in designated Air Quality Management Areas;*
>
> *v. seeking to reduce the environmental impacts of transport activities by supporting the increased provision of cleaner transport fuels, including hydrogen, particularly with respect to the refuelling infrastructure; and*
>
> *vi. working in partnership with relevant organisations, taking appropriate steps to achieve an integrated approach to air quality management and to achieve emissions reductions through improved energy efficiency and energy use.*
>
> *The Mayor will work with strategic partners to ensure that the spatial, transport and design policies of this plan support his Air Quality Strategy."*
>
> *Clearing the Air: The Mayor's Air Quality Strategy 2010*

2.7.4. Regarding new developments, the Strategy plans to make use of the existing planning system to ensure that no new development has a negative impact on air quality in London. It also aims to implement the Construction Best Practice Guidance[11] on all construction sites across London.

2.7.5. The Strategy identifies a small number of sites in London which are most at risk of exceeding the EU daily mean limit value for PM_{10} in 2011. These priority locations (which do not include the location of the Proposed Development) will be the focus of targeted actions that the Mayor, TfL and London Boroughs will introduce to improve air quality. These actions include the following measures:

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9 National Planning Policy Framework Department for Communities and Local Government (March 2012)

10 The London Plan, Spatial Development Strategy for Greater London Consolidated with Alterations since 2004 (2008)

11 The Control of Dust and Emissions from Construction and Demolition Best Practice Guidance, Produced in partnership by the Greater London Authority and London Councils, November 2006

i. Road cleaning and the application of dust suppressant;
ii. No-idling enforcement;
iii. Changing timings and removing signals;
iv. Capture benefits of new powers to manage road works;
v. Construction site vehicle cleaning; reduced stacking of construction delivery vehicles to reduce idling;
vi. Regular weekend road closures to promote walking and cycling;
vii. Deployment of lower emission buses;
viii. Integrating air quality improvements in planned public realm schemes; and
ix. Managing the flow of traffic to improve air quality.

The London Borough of Camden Local Development Framework

2.7.6. The London Borough of Camden's Local Development Framework[12], Section 2 includes four Core Strategies (CS) related to air quality as follows:

- CS9 Achieving a successful Central London – The Council is developing and promoting schemes to encourage walking and cycling within the Borough to further improve air quality;
- CS11 Promoting sustainable and efficient travel – The Council is currently embarking on projects to improve public transport networks, promoting sustainable travel (including private travel) and encouraging the sustainable movement of freight;
- CS13 Tackling climate change through higher environmental standards – The Council requires development and construction to meet the highest environmental standards and promotes local energy generation; and
- CS16 Improving Camden's health and wellbeing – The Council recognises that Camden has poor air quality and as a result, the whole Borough has been designated an AQMA. An Air Quality Action Plan has been produced and the Council recognises the impact of poor air quality on human health.

The London Borough of Camden's Development Policies[13]

2.7.7. Camden's development policies are part of their Local Development Framework and outline detailed planning criteria which are used in order to determine planning permissions.

2.7.8. There are seven development policies which relate to the Proposed Development which are outlined in Table 2 below:

Table 2 The London Borough of Camden's Development Policies

Policy	Description
DP2 – Making full use of Camden's capacity for housing	The Council will seek to maximise the use of land which is underused or vacant for the construction of new homes, including self-contained accommodation and bedsits. This is in conjunction with Core Strategy Policy CS6 which outlines the Council's need to maximise the number of homes within the Borough.
DP9 – Student housing, bedsits and other housing with shared facilities	The Council seeks to promote a diverse range of housing, including appropriate accommodation for students. This is in line with CS6. DP9 shows the Council will support the development of housing with shared facilities. DP9 indicates that housing should be accessible the institutions it is serving, provide accommodation for higher education institutions within Camden or adjacent boroughs and include a range of flat layouts. Furthermore, the Council recognises that the construction of student accommodation will relieve the pressure on private rented homes in the area.

[12] Camden Core Strategy 2010
[13] Camden Development Policies 2010-2025. London Borough of Camden, November 2010

Policy	Description
DP17 – Walking, cycling and public transport	This policy sets out to promote the use of public transport and reduce the number of private vehicles on the road. The Council points out that it will resist developments that will be dependent on private transport. DP17 states that developments should make necessary provisions for cyclists and pedestrians.
DP22 - Promoting sustainable design and construction	Promoting sustainability is a key concept of Camden's core strategy. DP22 states that the Council will require developments to incorporate sustainable design. Developments of over 5 dwellings or more should address the sustainable design principles and should consider, for example: layout, optimising natural ventilation, bicycle storage, level of insulation, source of energy used and educational elements.
DP26 – Managing the impact of development on occupiers and neighbours	The Council states that it will protect the quality of life of surrounding occupiers and neighbours to a proposed development. DP26 notes factors that will be taken into consideration include: overshadowing and outlook, noise and vibration and odour, dust and fumes. The Council acknowledge the poor air quality within Camden and aims to promote developments which will prevent occupants being exposed to pollutants.
DP27 – Basements and lightwells	DP27 notes that developments with basement levels will need to demonstrate structural stability, have no impact on the risk of flooding and not cause any loss of local amenity. However, the Council recognises that basement floors of a development help to utilise the limited amount of land available for development within Camden.
DP32 – Air quality and Camden's clear zone	Where development could cause adverse harm to air quality, as indicated by an Air Quality Impact Assessment, planning permission will be refused unless the effects are mitigated. In the growth area of West Hampstead (as highlighted in the Core Strategy), developments will need to be "well protected against air and noise pollution".

2.7.9. In addition to the development policies outlined in Table 2 above, Camden's Air Quality Action Plan and Progress Report 2010 gives advice on Air Quality Planning Policies. It points out that the Council will try to reduce the impact of new developments on air quality by requesting car free housing, cycle storage, a construction management plan which should include measures to reduce air emissions and emission mitigation measures for CHP plants.

The London Borough of Camden's Planning Guidance[14]

2.7.10. Within the Amenity Section of this Guidance, planning guidance for air quality is covered. The guidance states that Camden aims for all development to have a neutral impact on air quality and 'not lead to further deterioration of air quality'.

2.7.11. It is outlined within the guidance that exposure of occupants to poor air quality should be minimised from the design of structures. In addition to this, mitigation measures for reducing the impact of development on air quality should be included.

2.7.12. An air quality assessment is only likely to be required should it be expected that the development will have a significant negative impact upon air quality.

The London Councils' Air Quality and Planning Guidance

2.7.13. This guidance[15] is aimed at developers, their consultants and local authorities. It provides technical advice on how to deal with planning applications that could have an impact on air quality. This guidance has been used, where appropriate within this assessment.

[14] London Borough of Camden (2011). Camden Planning Guidance CPG6 Amenity
[15] The London Councils Air Quality and Planning Guidance Revised Version January 2007

3. METHODOLOGY

3.1. Scope of the Assessment

3.1.1. The scope of the assessment has been determined by consideration of the following:

i A review of the development proposals;
ii Consultation with the Senior Sustainability Officer (Air Quality) at the LBC;
iii A review of the local air quality data surrounding the Application Site, including data from local authorities and the UK-AIR: Air Information Resource by DEFRA; and
iv Desk study to confirm nearby sources of emissions to air.

3.1.2. The assessment of existing baseline conditions has been undertaken utilising the following sources of information:

i Local authority websites and local air quality reports;
ii DEFRA website[16]; and
iii Environment Agency website[17].

3.2. Construction Phase

3.2.1. An assessment of the impacts of dust emissions during construction has been undertaken by considering relevant guidance[18] and the availability and applicability of dust control measures.

3.2.2. The guidance describes the factors which affect the potential for dust to be created and released from the Application Site during construction activities and to migrate to, and be deposited on surfaces and cause nuisance. These factors are as follows:

i The activities being undertaken (demolition, numbers of vehicles and plant etc);
ii Duration of these activities;
iii Size of the site;
iv Proximity of receptors to the activity;
v The adequacy of the mitigation measures applied to reduce or eliminate dust;
vi Meteorological conditions; and
vii The sensitivity of the receptors to dust.

3.2.3. The likelihood of dust nuisance to occur has been assessed by consideration of each of the factors above and following IAQM Guidance.

3.3. Significance Criteria

3.3.1. An assessment of the effects of local air quality on future users of the development has been completed against the current statutory standards and objectives for NO_2 and PM_{10} as set out in Section 2.5.

3.3.2. Guidance has been published by the London Councils[19] which introduced the concept of Air Pollution Exposure Criteria (APEC). Table 3 provides details of this planning tool.

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16 http.uk-air.defra.gov.uk sourced October 2012
17 www.environment-agency.gov.uk sourced October 2012
18 IAQM (2011) Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance
19 London Councils (January 2007) Air Quality and Planning Guidance

Table 3 London Councils' Air Pollution Exposure Criteria (APEC)

	Applicable Range Nitrogen Dioxide Annual Mean	Applicable Range PM_{10}	Recommendation
APEC – A	>5% below national objective	**Annual Mean:** >5% below national objective **24 hr:** >1-day less than national objective	No air quality grounds for refusal; however, mitigation of any emissions should be considered.
APEC – B	Between 5% below or above national objective	**Annual Mean:** Between 5% above or below national objective **24 hr:** Between 1-day above or below national objective.	May not be sufficient air quality grounds for refusal; however appropriate mitigation must be considered eg maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised.
APEC – C	>5% above national objective	**Annual Mean:** >5% above national objective **24 hr:** >1-day more than national objective.	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/ industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.

3.3.3. In addition to the quantitative criteria above, the Environmental Protection UK guidance[20] also outlines a method for assessing the significance of a proposal. The method uses textual descriptors to identify the differing levels of relative priority which should be afforded to the air quality considerations of a development proposal in the planning process. A summary of the assessment method is given below in Table 4 below.

Table 4 Summary of the Environmental Protection UK Method for Assessing the Significance of Air Quality Impacts

Effect of Development	Outcome
Development would lead to a breach or significant worsening of a breach of an EU Limit Value. This could include introduction of new exposure to cause breach.	Air quality an overriding consideration
Development would lead to a breach or significant worsening of an AQ objective, or cause a new AQMA to be declared, or introduce new exposure into an exceedence area.	Air quality a high priority consideration
Development would interfere significantly with or prevent the implementation of actions within an AQ Action Plan.	Air quality a high priority consideration

[20] Development Control: Planning for Air Quality (2010 Update), Environmental Protection UK, April 2010

Effect of Development	Outcome
Development would interfere significantly with the implementation of a local Air Quality Strategy.	Air quality a medium priority consideration
Development would lead to a significant increase in emissions, degradation in air quality or increase in exposure, below the level of a breach of an objective.	Air quality a medium priority consideration
None of the above.	Air quality a low priority consideration

3.3.4. Where the term significant is used it is based on the professional judgement of the Local Authority Officer.

3.3.5. Furthermore, the EPUK guidance outlines the considerations that should be taken into account during the proposal of a new development. It states that it is necessary *"to ensure that air quality considerations are properly addressed during the development process".*

4. BASELINE

4.1. Introduction

4.1.1. The Proposed Development site is located in an urban area where air quality is mainly influenced by emissions from road transport. The whole of the LBC has been designated as an AQMA due to poor air quality. The eastern façade of the Proposed Development fronts on to the A41 Finchley Road where air quality is likely to be heavily influenced from traffic.

4.1.2. There are no industrial sources of air pollution within 1km of the Proposed Development (Installations holding IPPC Environmental Permits)[21].

4.2. UK-AIR Modelled Background Data

4.2.1. The UK-AIR: Air Information Resource[22] operated by DEFRA includes computer modelled predictions of background concentrations of air pollutants over the whole of the UK. Background concentrations are those levels that would be observed away from specific sources such as roads and industry.

4.2.2. Table 5 shows background data from the UK-AIR relating to two Grid References: 525500, 184500 and 526500, 184500. These are located approximately 500m to the south-east and 540m south-west respectively of the Proposed Development, as shown in Figure 2. Two locations have been chosen due to the shape of the site to show more representative data.

Table 5 UK-AIR Annual Mean Background Concentrations (µg/m^3)

Pollutant	Grid Reference	Year						
		2010	2011	2012	2013	2014	2015	2016
NO_2	525500, 184500	35.94	35.09	34.23	33.37	32.52	31.66	30.61
	526500, 185400	40.86	39.91	38.95	37.99	37.04	36.08	34.80
NO_x	525500, 184500	64.99	62.99	61.00	59.01	57.02	55.02	52.80
	526500, 184500	77.21	74.85	72.49	70.13	67.77	65.41	62.58
PM_{10}	525500, 184500	20.30	20.04	19.77	19.51	19.25	18.99	18.83
	526500, 185400	21.76	21.48	21.19	20.91	20.62	20.34	20.17

4.2.3. The AQS objective for annual mean NO_2 concentrations is 40µg/m^3 to be achieved by the end of 2005. Table 5demonstrates exceedences at one of the background locations in 2010 but not in later years or at the other location.

4.2.4. The AQS objective for annual mean PM_{10} concentrations is 40µg/m^3 to be achieved by the end of 2004. Table 5demonstrates that this objective was met at both locations in all years considered.

[21] Environment Agency (2011) Your Right to Know: Public Registers. Accessed 29 October 2012
[22] www.uk-air.defra.gov.uk sourced October 2012

4.2.5. Background concentrations shown in Table 5 assume that ambient concentrations are reducing with time (as industrial and vehicle emission technology improves). However, recent monitoring data collected from the UK and, in particular, within London have demonstrated that the expected improvement in the concentrations is not materialising. Government guidance is that currently there is no robust evidence on which to base revised forecasts for background concentrations. It is acknowledged however that the future predicted background concentrations shown in Table 5 may be an optimistic representation of future air quality.

4.3. Council Measurement Data

4.3.1. There are a number of monitoring stations operated by the LBC as shown in Figure 2. The nearest automatic monitoring stations are Swiss Cottage, Shaftesbury Avenue and London Bloomsbury. Swiss Cottage is approximately 680m south east of the Proposed Development and measures kerbside concentrations at the corner of Finchley Road, College Crescent and Swiss Cottage. It is located at the kerb of the junction of these three busy roads. Shaftsbury Avenue and London Bloomsbury monitoring sites are approximately 5km south east of the Proposed Development and are in central London. Concentrations at all three of these sites can be expected to be significantly higher than those experienced at the Application Site by virtue of them being either on the convergence of several busy roads or are located within central London.

4.3.2. Measured NO_2 and PM_{10} concentrations at these automatic monitoring sites, compared to the relevant standards, are shown in Table 6 and Table 7.

Table 6 Council Measurement Data for NO_2 from Automatic Monitoring Stations

Air Quality Objective	Monitoring Site	Measured Concentration (µg/m³ or No of Periods above Standard)						Objective Achieved?					
		Year						Year					
		2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Annual Mean of 40µg/m³ by 2005	Swiss Cottage - Kerbside	77	75	84	82	71	62	x	x	x	x	x	x
	Shaftsbury Avenue - Roadside	75	78	87	89	-	71	x	x	x	x	-	x
	London Bloomsbury – Urban Background	61	55	54	55	50	44	x	x	x	x	x	x
No More than 18 times above 200µg/m³ by 2005	Swiss Cottage - Kerbside	113	70	151	128	77	16	x	x	x	x	x	✓
	Shaftsbury Avenue - Roadside	24	9	11	21	-	9	x	✓	✓	x	-	x
	London Bloomsbury – Urban Background	6	0	2	1	0	0	✓	✓	✓	✓	✓	✓

4.3.3. The objective for annual mean NO_2 concentrations is 40µg/m³ to be achieved by the end of 2005. Concentrations measured at all of the monitoring sites consistently exceeded the objective from 2007 to 2012 (to date).

4.3.4. The objective for hourly mean NO_2 concentrations is that there should be no more than 18 exceedances of 200µg/m³ per year, by the end of 2005. The objective has been exceeded consistently at Swiss Cottage kerbside; however the short term objective has

been met in this location during 2012 to date. The objective has consistently been met at London Bloomsbury between 2007 and 2012. At Shaftesbury Avenue, the objective has been met on occasion.

Table 7 Council Measurement Data for NO_2 – Diffusion Tube Sites

Location	Site Type	Position Relative to Site	Measured NO_2 Concentrations ($\mu g/m^3$)				
			07	08	09	10	11
CA7 – Frognal Way	Urban Background	655m northeast	28.7	30.5	33.9	29	*31.5*
CA15 - Finchley Road	Kerbside	680m southeast	81.5	68.1	82.6	74	*76.3*
CA17 - 47 Fitzjohn's Avenue	Roadside	453m northeast	63.6	55.5	63	73	*58.4*

4.3.5. The results demonstrated in Table 7 above show that annual mean concentrations of NO_2 exceeded the annual objective at both Finchley Road and 47 Fitzjohn's Avenue, however there were no exceedences of the objective at Frognal Way between 2007 and 2011. The monitoring data collected from Finchley Road is most representative of the east end of the Application Site which fronts on to Finchley Road. However, the interior of the site is set back from the main road and it is thought that the results shown from the monitoring site at Frognal Way are more representative of the site interior.

Table 8 Council Measurement Data for PM_{10} from Automatic Monitoring Stations

Air Quality Objective	Monitoring Site	Measured Concentration ($\mu g/m^3$ or No of Periods above Standard)						Objective Achieved?					
		Year						Year					
		2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Annual Mean of 40µg/m³ by 2004	Swiss Cottage - Kerbside	30	26	25	26	27	23	✓	✓	✓	✓	✓	✓
	Shaftsbury Avenue - Roadside	33	29	32	29	32	29	✓	✓	✓	✓	✓	✓
	London Bloomsbury – Urban Background	26	23	19	18	23	19	✓	✓	✓	✓	✓	✓
No more than 35 days above 50µg/m³ by 2004	Swiss Cottage - Kerbside	37	12	8	11	27	18	x	✓	✓	✓	✓	✓
	Shaftsbury Avenue - Roadside	32	20	19	5	31	17	✓	✓	✓	✓	✓	✓
	London Bloomsbury – Urban Background	22	10	9	2	17	10	✓	✓	✓	✓	✓	✓

4.3.6. Table 8 shows that concentrations measured at all of the monitoring sites were within the objective between 2007 and 2012.

4.3.7. The objective for annual mean PM_{10} concentrations is $40\mu g/m^3$ to be achieved by the end of 2004. The results in Table 8 show that concentrations measured at all of the monitoring sites were within the objective between 2007 and 2012.

4.3.8. The short-term objective for 24-hour mean PM_{10} concentrations is $50\mu g/m^3$ not to be exceeded more than 35 times per year, to be achieved by 31 December 2004. The

results demonstrated in Table 8 show that concentrations measured at all of the monitoring sites, except Swiss Cottage in 2007, were within the objective between 2007 and 2012 (to date).

4.3.9. Measured NO_2 data from the LBC operated diffusion tube sites between 2007 and 2010 are shown in Table 7. The locations of these are shown in Figure 2.

4.4. Council Modelled Data[23]

4.4.1. Council modelled data for annual mean NO_2 from 2009 across Camden shows that areas in the south of Camden will exceed the 40µg/m^3 objective without intervention. The modelling undertaken by the London Borough of Camden council shows that main roads, including the A41 Finchley Road, are likely to exceed NO_2 air quality objectives.

4.4.2. The modelled data shows that concentrations of NO_2 for the extreme west and extreme east of the Proposed Development are likely to range between 35µg/m^3 and 48µg/m^3 respectively. PM_{10} concentrations are likely to range between 22µg/m^3 and 32µg/m^3 from the west to the east of the Proposed Development.

4.5. Local Air Quality Management Areas

4.5.1. The LBC has designated an AQMA which encompasses the whole of the Borough (including the Application Site) due to exceedances of NO_2 and PM_{10}.

4.6. Summary of Baseline Data

4.6.1. Modelled background data show that exceedences of the objectives for annual mean NO_2 and PM_{10} concentrations are not likely to occur at background locations close to the development currently or in the opening year. Background concentrations of NO_2 are however likely to approach the annual mean objective of 40µg/m^3.

4.6.2. Measured council data show that annual mean NO_2 concentrations measured at several monitoring locations within 700m of the Application Site exceeded the objective of 40µg/m^3 in recent years. The sites where these exceedances were measured are roadside and kerbside sites close to busy roads in generally more built up areas than the Application Site. These data show that the eastern edge of the Application Site, adjacent to Finchley Road is likely to experience exceedances of the annual mean objective. Further way from Finchley Road annual mean concentrations will be reduced from this level.

4.6.3. Council modelled data show that annual mean NO_2 concentrations within the Application Site, adjacent to Finchley Road are likely to be in the region of 35µg/m^3 to 48µg/m^3.

4.6.4. Council measured data show that hourly mean concentrations of NO_2 exceed the objective for this averaging time at some locations close to busy roads; however these locations demonstrate a worst case scenario and objectives are likely to meet the objective away from busy roads, and in the immediate vicinity of the Proposed Development.

4.6.5. Both measured and modelled data show that annual and daily mean concentrations of PM_{10} are likely to meet the objectives for this pollutant and these averaging times throughout the Application Site.

[23] The London Borough of Camden (2011). 2011 Air Quality Progress Report for the London Borough of Camden. September 2011

5. EFFECTS APPRAISAL

5.1. Construction Phase

The Nature, Scale and Duration of Activities

5.1.1 The main sources of dust during construction will include:

i. Haulage routes, vehicles and construction plant;
ii. Demolition;
iii. Materials handling, storage, stockpiling, spillage and disposal;
iv. Earthmoving eg cut-and-fill to level site, site preparation and restoration after completion;
v. Construction, fabrication and decommissioning processes; and
vi. Internal and external finishing and refurbishment.

5.1.2 Construction is expected to take approximately 18 months between August 2013 and January 2015.

Dust Control Measures Employed

5.1.3 Dust emissions from the construction phase can be controlled through the adoption of mitigation measures, such as those shown in Table 9.

Table 9 Example Dust Mitigation Measures to be Used During Construction

Activity	Dust Control Measures
Site planning	• Erection of barriers around dusty activities or the site boundary • No bonfires or unauthorised burning of material anywhere on the site • Location of dusty activities and stockpiles away from the site boundary and sensitive receptors • Hard surfacing of haul roads
Construction traffic	• Maintenance of construction traffic and plant in good working order and not left running when not in use • Covering of all loads entering and leaving the site • No site run off of water or mud • Routine use of wheel washing and water spraying to clean vehicles leaving the application site • Use of ultra-low sulphur diesel in all non-road mobile machinery where available • Regularly cleaning and watering of haul roads • Imposition of an appropriate site speed limit • Regular inspection of local highways and site, and cleaning of highways if necessary • Implementation of design controls on construction equipment and vehicles • Use of appropriately designed vehicles for materials handling
Demolition works	• Use water or suitable local exhaust as a dust suppressant • Use of ventilation systems on cutting equipment • Secure covering of skips and minimising drop heights
Site activities	• Minimise dust generating activities • Use water as a dust suppressant where appropriate • Keep stockpiles for the shortest possible time and minimise their surface area, where possible they should be enclosed or securely sheeted • Completed earthworks will be covered or vegetated as soon as is practicable

5.1.4 In addition to those measures given in Table 9, if significant ground contamination is identified during any contaminated land investigations, then additional specific measures to mitigate risks associated with dust from contaminated ground will be employed.

The Local Climate and Meteorology

5.1.5 Dust impacts would be greatest in dry weather following long periods without rain and with the wind blowing towards sensitive receptors.

The Character and Land Use of the Surrounding Area

5.1.6 Depending on wind speed and turbulence it is likely that the majority of dust will be deposited within 100m of the source. A contour showing locations within 100m of the Application Site and which may therefore experience elevated levels of dust deposition are shown in Figure 3.

5.1.7 Properties within 100m of the Application Site boundary include:

i. Commercial properties along Finchley Road;
ii. The O_2 Centre; and
iii. Residential properties along Rosemont Road, Frognal Court, Lithos Road and Broadhurst Gardens.

5.1.8 A breakdown of the relative locations of sensitive receptors at different distances from the site boundary is provided below in Table 10, in line with IAQM guidance.

Table 10 Distances of Sensitive Receptors from Application Site Boundary

Distance from Site Boundary (m)	Number of Sensitive Receptors
< 20	6
20 – 50	30-70
50 – 100	50-150
100 - 200	50-100

5.1.9 There are no designated ecological sites within 1km of the Application Site that may be sensitive to increased dust deposition.

5.1.10 The sensitivity of the area surrounding the development was determined to be medium.

Assessment of Potential Impact

5.1.11 The risk of potential air quality impacts from demolition, earthworks, construction and trackout (the transport of dust and dirt from the site onto the public road network) was assessed according to guidance developed by IAQM. The most significant risk was related to earthworks, which before mitigation was determined to be high, as shown below in Table 11.

Table 11 Dust Summary Risk Effects with no Mitigation

Source	Dust Soiling Effects	Ecological Effects
Demolition	Low risk site	Negligible
Earthworks	High risk site	Negligible
Construction	Medium risk site	Negligible
Trackout	Medium risk site	Negligible

5.1.12 On the basis of the determined level of risk and sensitivity of the area, the overall significance of the effects was deemed to be moderate adverse with no mitigation, and negligible with mitigation in place. This impact will be short-term and temporary for the duration of the construction phase.

5.2 Operational Phase

5.2.1 Potential exceedances of the annual mean objective for NO_2 within the Application Site, both now and in the future means some areas within the Proposed Development may experience annual mean NO_2 concentrations above the objective of 40µg/m^3.

5.2.2 Hourly mean concentrations of NO_2 and daily mean and annual mean concentrations of PM_{10} are likely to meet the relevant objectives within the Application Site.

5.2.3 All of the windows within the Proposed Development will be non-opening due to the nearby railway lines. Therefore ventilation air within the Proposed Development will be taken from the air intakes located on the roof. Air quality on the roof will be better than that closer to Finchley Road due to its distance from the road, and the elevation above the street canyon effect which will aid dispersion and dilution of pollution.

5.2.4 Concentrations on the roof of the Proposed Development have been calculated using Defra's 'NO_2 fall off with distance' calculator. This estimates the annual mean NO_2 concentration at one distance from the road using measurements made at a different distance from the same road. In this case the measurements from the Swiss Cottage Kerbside monitoring station were used.

5.2.5 More complex computerised dispersion models are sometimes used to predict near road concentrations; however there is considerable uncertainly in using these to calculate concentrations in (or close to) a street canyon and on the roof of a five storeys above ground-level building.

5.2.6 The most recent (2011) annual mean NO_2 concentration measured at the nearest automatic monitoring station to the development was 71µg/m^3, at Swiss Cottage. This is a kerb side location at the junction of three busy roads, closer to central London than the Application Site, and is likely to represent higher kerbside concentrations than those that would be experienced closer to the Application Site.

5.2.7 Estimates made using the Defra calculator are likely to be an overestimate of actual concentrations on the roof for the following reasons:

i. The calculator does not take into account the difference in elevation between the roof and the monitor. The increase in elevation of the roof will aid dispersion and reduce concentrations from that predicted with the model.

ii. Concentrations have been predicted for 2011, the latest year when complete annual monitoring data are available. Concentrations in future years may reduce from this level (although also refer to Paragraph 4.2.5).

iii. Concentrations have been calculated based on those measured at Swiss Cottage, which are likely to be higher than those closer to the Proposed Development.

5.2.8 Concentrations were calculated at the roof top air intake located closest to Finchley Road (located approximately 49m from Finchley Road), as the tool is limited to distances within 50m of the road. Concentrations at the other two intakes (located 70m and 98m from Finchley Road) will be reduced from that predicted for the closest intake.

5.2.9 A summary of the calculation is shown below in Table 12.

Table 12 NO_2 Concentration at Rooftop Air Intake Calculation

Parameter	Value
Distance of monitoring site from Kerb	0.1m
Distance of receptor from Kerb	49.38m
Local Annual Mean NO_2 Background Concentration	37.5µg/m^3
Measured Annual NO_2 Concentration	71µg/m^3
Predicted Annual Mean NO_2 Concentration at Receptor	42.4µg/m^3

5.2.10 The annual mean NO_2 concentration predicted at the closest air intake to Finchley Road is 42.4µg/m^3.

5.2.11 This predicted concentration is in line with LBC modelling results which show that annual mean NO_2 concentrations within the Application Site are likely to be within the range 35µg/m - 48µg/m^3.

5.2.12 A concentration of 42.4µg/m^3 puts the site into the London Councils Air Pollution Exposure Criteria C, as shown in Table 3.

5.2.13 The London Council's recommendation with regard to this criteria is that 'Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.'

5.2.14 Mitigation measures that have been incorporated into the design are shown in Section 6.1.

5.2.15 Environment Protection UK guidance[24] advises that the presence of an AQMA is not a block on development within the designated area, as this could sterilise development, rather that greater weight must be given to the consideration of air quality impacts and their mitigation within such areas.

[24] Development Control: Planning for air quality (2010 Update) Environmental Protection UK

6. MITIGATION MEASURES

6.1 Construction Phase

6.1.1 Best practice guidance[25] requires a developer to submit a method statement before work begins and outlines a range of dust control measures. Such a method statement will be prepared prior to construction activity commencing.

6.1.2 A Construction Environmental Management Plan (CEMP) will be developed to minimise the environmental impacts of the Proposed Development during the construction phase. It will include the mitigation and enhancement measures included in this report.

6.1.3 In addition to the dust measures that will be employed during construction, the scheme will be registered with the Considerate Constructors' Scheme[26]. Contractors adhering to this scheme commit to a Code of Practice which comprises:

i Consideration;
ii Environmental awareness;
iii Cleanliness;
iv Being a "good neighbour";
v Respect;
vi Safety;
vii Responsibility; and
viii Accountability.

6.1.4 Detailed mitigation measures to control construction traffic will be discussed with the LBC to establish the most suitable access route for the site traffic. The most effective mitigation will be achieved by ensuring that construction traffic passage along sensitive roads (residential roads, congested roads, or via unsuitable junctions, etc) is minimised and that vehicles are kept clean and sheeted when on public highways through the use of wheel washers, etc. Timing of large-scale vehicle movements to avoid peak hours on the local road network will also be beneficial. Where practicable, site deliveries will be on a just in time basis to reduce vehicle idling emissions.

6.2. Building Design

6.2.1. In accordance with the London Council's Air Quality and Planning Guidance and the LBC's development policies, the following mitigation measures have been incorporated into the design of the development.

6.2.2. There is no parking within the Proposed Development. This will ensure that there will be no significant impact from the development on local road traffic and associated air quality. In addition it will encourage the use of sustainable modes of transport by users of the Proposed Development.

6.2.3. The Proposed Development includes 162 cycle storage spaces located in the lower basement-level of the development.

6.2.4. A travel plan will be produced and implemented. This will further promote the use of sustainable modes of transport by users of the Proposed Development.

[25] The control of dust and emissions from construction and demolition Best practice Guidance, Greater London Authority and London Councils, November 2006
[26] www.consideratecontructorsscheme.org.uk

6.2.5. Heating and energy supply on site will not include the use of CHP or biomass fuelled technology. Initial investigations regarding the possible incorporation of a CHP unit in to the design included screening modelling of emissions to air from the unit. Results from the exercise, summarised in Appendix A, showed that a CHP would have an adverse impact on air quality. CHP was therefore not included in the Proposed Development.

6.2.6. Solar powered heating and hot water has been incorporated into the development. There will be no emissions to air at the point of use from this system.

6.2.7. The site layout reduces the exposure of some areas of the development to high levels of pollutants close to Finchley Road. Non-accommodation facilities including a refuse area and a lobby will be placed at the front of the development on the ground floor which is closest to the road. The majority of student accommodation units are located away from Finchley Road. Some student accommodation will be located on the eastern-edge of the Proposed Development fronting Finchley Road on the first, second and third floors; however not at the ground-floor closest to the road. In addition to this, the whole development is set back from the kerbside by approximately 3m.

6.2.8. The Proposed Development does not include any opening windows. This feature has been incorporated due to the proximity of the railway lines. However, this will also help to improve air quality within the building as all ventilation air will be sourced from the building roof where pollution will be reduced from that at the roadside. Environmental Protection UK Guidance discusses the advantages and disadvantages of opening windows as follows: 'Where mechanical ventilation is provided the issue arises as whether to require non-opening windows. One argument is that windows should be non-openable to ensure that residents are protected from poor air quality. The other argument is that people should be free to choose whether they want to open the window (knowing that they do not have to do so to receive adequate ventilation), not all individuals are sensitive to air pollution and there are times of the day and different days of the week when, even alongside busy roads, pollution levels are not high and open windows would be an acceptable option.' In this case, windows are non-opening due to the adjacent railway lines.

6.2.9. The whole building will be ventilated with a mechanical ventilation system including heat recovery. Air intakes for the living areas will be on the roof of the developments, away from the main road in order to avoid high concentrations of pollutants.

6.2.10. Intake air to the ventilation system will be altered using activated carbon filters[27,28]. These remove NO_2 from ambient air to levels within the NO_2 objective concentration.

6.2.11. There will be no trickle vents on any of the building facades. In addition to this, a kitchen exhaust duct from Basement Level 2 is located to the far east of the site away from the student accommodation units. This will reduce any nuisance from odours or emissions from the kitchen duct.

6.2.12. The Proposed Development includes a green wall on the north façade of the apartment buildings. This may have an effect in reducing pollutant concentrations in the immediate vicinity of the wall[29], although it is not possible to quantify this effect.

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[27] Envirocare Consultancy (2012). Report for the efficiency monitoring of the AAC Tower Bridge Scrubber Unit at Very Low NO_2 Concentrations.

[28] Envirocare Consultancy (2012). Report for the efficiency monitoring of the AAC Swiftpack Scrubber Unit at Very Low NO_2 Concentrations

[29] Pugh T A M, MacKenzie A R, Whyatt J D and Hewitt C N, 2012. Effectiveness of Green Infrastructure for Improvement of Air Quality in Urban Street Canyons, *Environmental Science & Technology*. *46* (14): 7692-7699

7. CONCLUSIONS

7.0.1. This report considers the issues of existing air quality at the Application Site, the impact of construction activity on local air quality and the suitability of the site for the intended use.

7.0.2. The LBC continually monitors and reviews air quality within the Borough. The whole of the Borough has been declared an Air Quality Management Area due to elevated concentrations of NO_2 and PM_{10}.

7.0.3. The Application Site is located in close proximity to the A41 Finchley Road, which, together with the generally elevated pollution concentrations in Camden, will have a strong influence on air quality at the site.

7.0.4. Modelled and measured concentrations show that annual mean NO_2 concentrations in some areas within the Application Site and in close proximity to Finchley Road are likely to exceed the relevant objective for this pollutant. Further away from Finchley Road annual mean NO_2 concentrations will be reduced. Hourly mean concentrations of NO_2 and both daily mean and annual mean concentrations of PM_{10} are likely to meet the relevant objectives within the Application Site.

7.0.5. Annual mean NO_2 concentrations within the Application Site put the site into Air Pollution Exposure Criteria C, in accordance with the London Council's Air Quality and Planning Guidance.

7.0.6. The London Councils recommendations with regard to these criteria are as follows: APEC C: 'Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures.'

7.0.7. Environment Protection UK Guidance puts air quality as a high priority consideration for this development.

7.0.8. Appropriate mitigation measures have been incorporated into the design of the development to ensure that exposure and emissions are reduced. In particular, all windows within the Proposed Development will be non-opening. This is primarily due to the proximity of railway lines; however it will also help to mitigate poor air quality close to Finchley Road. Ventilation air will be taken from the roof where air quality is considerably better than close to Finchley Road. In addition, ventilation air will be filtered using activated carbon filters which will further reduce NO_2 concentrations within the Proposed Development.

7.0.9. The Proposed Development, therefore, would be in accordance with planning policy and guidance relating to air quality impacts, in particular that as far as possible, mitigation measures have been incorporated into the design to prevent occupants being exposed to high pollution concentrations.

FIGURES

FIGURE 1 – SITE LOCATION

NOTES

Key

Site boundary

Rev.	Drawn	Chkd.	Apprvd.	Date	Description
-	LS	CL	HD	02.11.12	

Client

STADIUM CAPITAL HOLDINGS

Project

MIDLAND CRESCENT

Drawing Title

SITE LOCATION

RAMBOLL

tel 023 8081 7500 fax 023 8081 7600 southampton@ramboll.co.uk
www.ramboll.co.uk

scale (at A3)	date	drawn
1:10000	NOV 12	LS

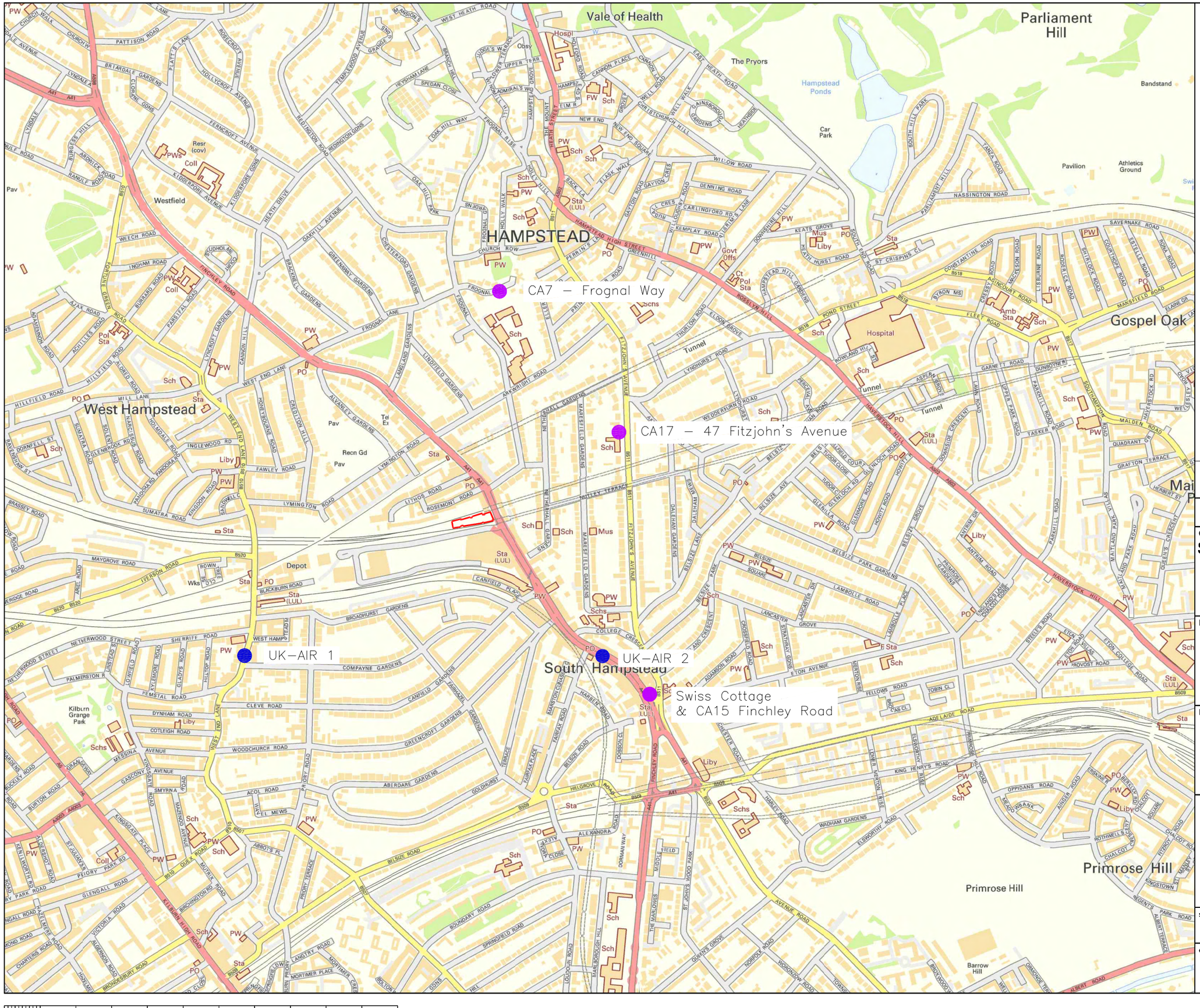
drg. no. FIGURE 1 | rev. -

10 0 10 20 50 100mm NATURAL SCALE

ORIGINAL DRAWING SIZE 420 x 297

FIGURE 2 – AIR QUALITY MONITORING LOCATIONS

\\ukramLONfiler01\ADM\30000\30030 – Midland Crescent\RUK Calcs\AQ\CAD files\Air Quality.dwg – Plot date and time = 02/11/2012 10:36:12



NOTES

Key

- Site boundary
- Air quality monitoring location
- UK–AIR Modelled Background Concentrations

Rev.	Drawn	Chkd.	Apprvd.	Date	Description
-	LS	CL	HD	02.11.12	

Client

STADIUM CAPITAL HOLDINGS

Project

MIDLAND CRESCENT

Drawing Title

AIR QUALITY MONITORING LOCATIONS

RAMBOLL

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www.ramboll.co.uk

scale (at A3)	date	drawn
1:10000	NOV 12	LS

drg. no. FIGURE 2 rev. -

10 0 10 20 50 100mm NATURAL SCALE

ORIGINAL DRAWING SIZE 420 x 297

FIGURE 3 – 100m AREA FROM THE APPLICATION SITE

10 0 10 20 50 100mm NATURAL SCALE

NOTES

Key

Site boundary

100m Contour

Rev.	Drawn	Chkd.	Apprvd.	Date	Description
-	LS	CL	HD	02.11.12	

Client

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Project

MIDLAND CRESCENT

Drawing Title

100m AREA FROM THE APPLICATION SITE

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www.ramboll.co.uk

scale (at A3)	date	drawn
1:10000	NOV 12	LS

drg. no.	rev.
FIGURE 3	-

ORIGINAL DRAWING SIZE 420 x 297

APPENDICES

APPENDIX A - SCREENING MODELLING OF CHP IMPACTS

APPENDIX A

SCREENING MODELLING OF CHP IMPACTS

The impacts of a proposed 55kWth CHP plant on site were modelled using the Breeze Aermod dispersion model. The model parameters assumed are shown in Table 13. It should be noted that CHP is no longer proposed on site and has been replaced with solar-powered heating and water.

Table 13 Model Parameters for a Stack Height of 1m and 5m above Building Height

	Stack Height: 1m above Building Height				Stack Height: 5m above Building Height			
	CHP		Boiler		CHP		Boiler	
Parameter	**Value**				**Value**			
Internal stack diameter	400mm		400mm		400mm		400mm	
Height of stack	1m		1m		5m		5m	
Emission temperature	120-130°C		72°C		120-130°C		72°C	
Emission velocity	2.5m/s				7.5m/s			
Emission rate	NOx	0.015g/s	NOx	0.008g/s	NOx	0.015g/s	NOx	0.008g/s

Initially, a 1m (above building height) high stack with an efflux velocity of 2.5m/s was proposed. This was modelled along with an increased stack height (5m above building height) and a velocity of 7.5m/s with the assumption that this would reduce the impact of the CHP on air quality.

A summary of the **maximum** predicted concentrations is given in Tables 13 and 14 below.

Objective: 40 µg/m^3

Table 14 Predicted Annual Mean NO_2 Concentrations Resulting from the Proposed Development

	Location	Without Development Concentration (µg/m^3)	Impact of Development (µg/m^3)	Total Background Concentration and Development (µg/m^3)	Increase as % of Objective (%)	Magnitude of Change	Impact Descriptor
Stack Height: 1m, Efflux Velocity: 2.5m/s	Grid max	>40 assumed	3.97	>43.97	9.93	Medium	Moderate Adverse
	First-floor front block	>40 assumed	2.98	>42.98	7.45	Medium	Moderate Adverse
Stack Height 5m, Efflux Velocity: 7.5m/s	Grid max	>40 assumed	1.67	>41.67	4.18	Small	Slight Adverse
	First-floor front block	>40 assumed	1.21	>41.21	3.03	Small	Slight Adverse

Objective: 200 µg/m^3 no more than 18 times per year

Table 15 Predicted Maximum and 99.8th Percentile Hourly NO_2 Concentrations Resulting from the Proposed Development

	Location	Assumed Background Concentration (µg/m^3)	99.8th Percentile Concentration (1 Hour) Resulting from Development (µg/m^3)	Total Background Concentration and 99.8th Percentile Concentrations (µg/m^3)	Maximum 1 Hour Concentration (µg/m^3) Resulting from the Development
Stack Height: 1m, Efflux Velocity: 2.5m/s	Grid max	>80 assumed	28.29	>108.29	45.59
	First-floor front block	>80 assumed	23.08	>103.08	41.31
Stack Height 5m, Efflux Velocity: 7.5m/s	Grid max	>80 assumed	11.29	>91.29	25.79
	First-floor front block	>80 assumed	8.60	>88.6	12.66