

Air Quality Assessment
Blackburn Road, Camden

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Narrowpack Ltd

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Executive Summary

ENVIRON UK Ltd ('ENVIRON') has been commissioned by Narrowpack Ltd ('the applicant') to undertake an air quality assessment to support a planning application for a proposed development to be located between Blackburn Road and Billy Fury Way footpath ('the site').

The development proposals include the demolition of a modern warehouse building for the construction of seven new residential houses with access from Blackburn Road, and the retention of a Victorian warehouse for conversion to two residential units above and flexible non-residential space at ground floor level. Access to the site would from Blackburn Road. The proposed development is located within the area covered by the London Borough of Camden (LBC) which has designated the whole of its borough an Air Quality Management Areas (AQMA).

The review of existing monitoring data has indicated that air quality would be expected to meet all of the relevant air quality objectives at the residential receptors of the proposed development.

An assessment of construction dust impacts arising from the proposed development has indicated that the demolition and construction activities will have a medium risk of causing impacts at adjacent receptors in the absence of suitable mitigation. However, on the assumption that best practice dust management techniques are employed, which it is recommended are delivered through a Dust Management Plan to be agreed with LBC, the potential for residual effects would be sufficiently reduced to ensure that no significant residual effects arise.

Significant direct emissions from the development are not anticipated and therefore these impacts do not require mitigation.

The development will be car free, and will encourage the use of sustainable transport modes through providing secure bicycle storage.

1 Introduction

1.1 Overview

ENVIRON UK Ltd ('ENVIRON') has been commissioned by Narrowpack Ltd ('the applicant') to undertake an air quality assessment to support a planning application for a proposed development to be located between Blackburn Road and Billy Fury Way ('the site').

The development proposals include the demolition of a modern warehouse building for the construction of seven new residential houses and the retention of a Victorian warehouse for conversion to two residential units above and flexible non-residential space at ground floor level. Access to the site would from Blackburn Road.

The proposed development is located within the area covered by the London Borough of Camden (LBC) which has designated the whole of its borough an Air Quality Management Areas (AQMA).

This assessment has been completed to determine both the impact of the proposed development on air quality and to provide assurance to the LBC council that due consideration has been given to air quality within the design of the proposed development.

1.2 Scope

The proposed development will be car free with no car parking spaces provided for the residential occupants, thus the impact on pollutant emissions from road traffic is considered to be negligible.

However the development will introduce residential receptors into a location where air quality may exceed the annual mean nitrogen dioxide (NO_2) air quality objective. Whilst the objectives relate to external air, external concentrations will impact internal air quality. Information is therefore provided on the mitigation measures that have been included within the design of the development to reduce the exposure of residents to high concentrations of external pollutants.

Consideration has also been given to the potential for emissions of dust to arise during the construction phase. A qualitative assessment of the risk of dust impacts has been carried out using the Institute of Air Quality Management guidance to identify the appropriate level of mitigation that should be applied to ensure impacts can be effectively mitigated.

In summary, the assessment includes:

- Establishment of baseline air quality;
- Assessment of dust impacts during the construction phase; and
- Assessment of the need for a mitigation strategy to limit residents exposure to elevated concentrations of air pollutants.

The site is located between two overground railway lines. Guidance provided by the Department for Environment Food and Rural Affairs (Defra) in Technical Guidance LAQM.TG(09)[1] has indicated that significant impacts to air quality from rail movement will

[1] Department for Environment, Food and Rural Affairs (2009) Local Air Quality Management Technical Guidance

only arise where there are high levels of diesel powered train movements with correspondingly high background concentrations of air pollution. The rail line passing adjacent to the north and south of the proposed development has not been identified in LAQM.TG(09) as a rail line with significant numbers of diesel trains and thus impacts from rail movements on air quality have not been considered further.

2 Site Description

2.1 Site Location

The development site, which covers an area of approximately 0.86 hectares, is bound by a railway line to the north, Asher House office building is situated to the south-east and a range of residential and commercial uses from the street frontage along Blackburn Road to the south. To the west, there are a range of commercial uses, including retail and offices along West End Lane, with West Hampsted Station located directly to the west of the site, as shown in Figure 2.1.

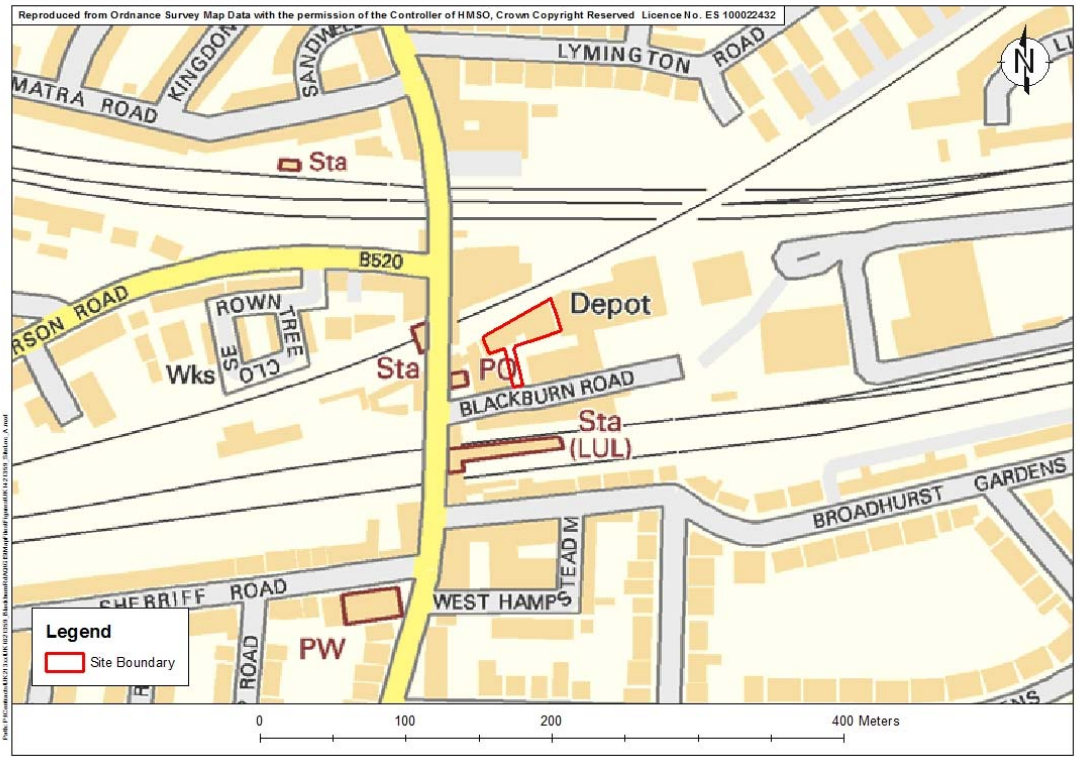

Figure 2.1: Site Location

2.2 The Existing Site

The development site is currently occupied by two existing warehouse buildings; one Victorian and second more recently constructed, which are currently used by sculptors as artist studio space. The site also constitutes a driveway and a small forecourt area used for informal parking which is accessed from Blackburn Road to the south.

The nearest existing sensitive receptors to air quality are considered to be as follows;

- residential properties immediately west of the site along Blackburn Road;
- residential properties from 20 m west adjacent to the B510 (West End Lane);
- residential properties from 60 m west off Iverson Road; and
- residential properties from 70 m south on Broadhurst Gardens.

2.3 The Proposed Development

The proposed development will comprise demolition of a warehouse building and construction of seven new residential apartments in addition to the refurbishment of the other existing warehouse to provide two residential units, and a small element of non-residential flexible space (potentially used for artist space) on the ground floor (with a Gross External Area of 165 m2).

The general ground floor arrangement of the site is set out in Figure 2.2.

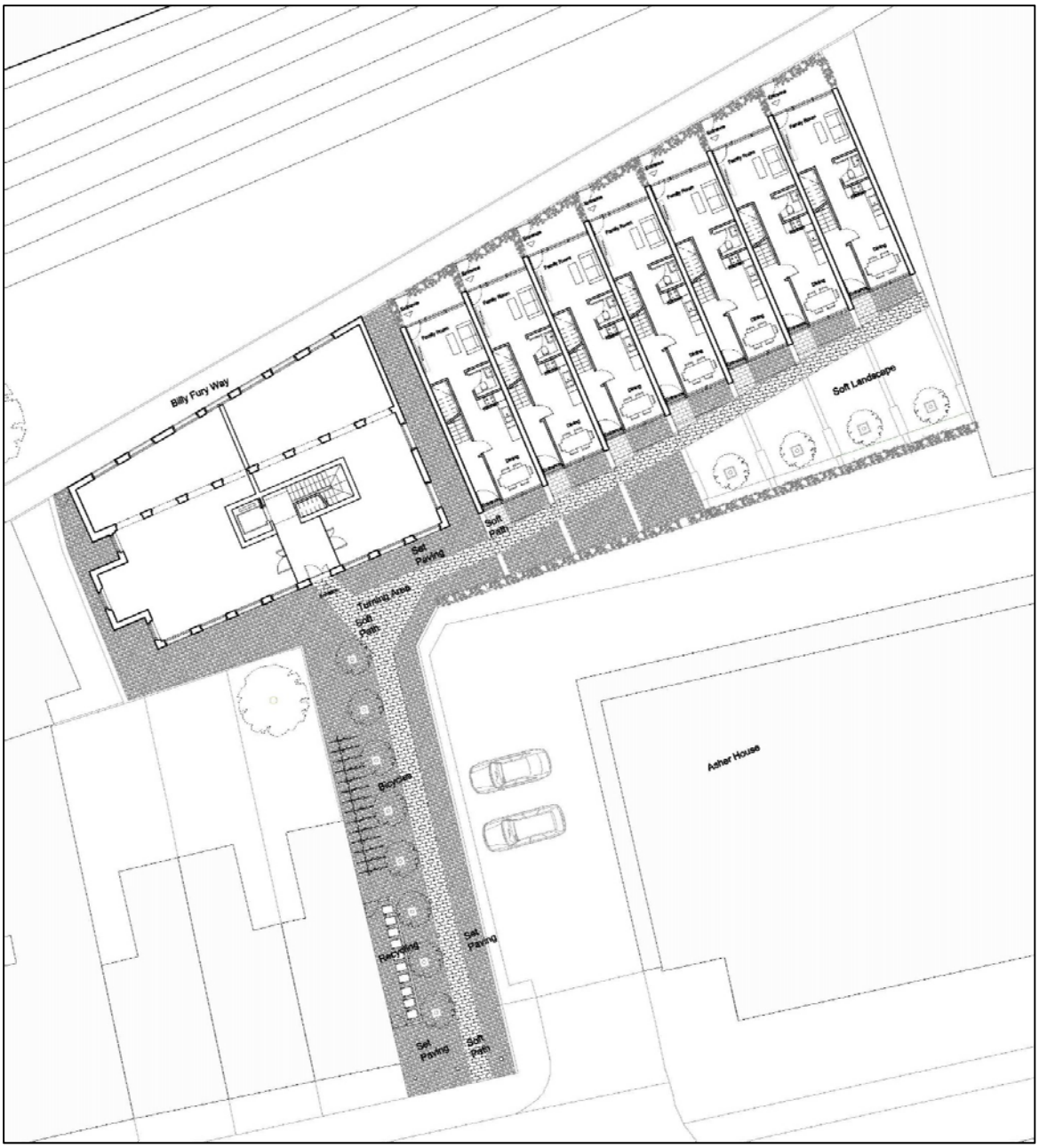

Figure 2.2: Proposed General Arrangement Plan

3 Policy Context

3.1 International Legislation and Policy

EU Directive 2008/50/EC[2] on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for NO_2 and PM_{10}, to be achieved by the 1st January 2010 and 2005 respectively . The Air Quality Standards Regulations 2010[3] implements the requirements of the Directive into UK legislation.

The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation.

3.2 Local Air Quality Management

Part IV of the Environment Act 1995[4], requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality in their areas. This is known as Local Air Quality Management (LAQM).

The 2007 Air Quality Strategy[5] establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (NAQOs) for the protection of human health and vegetation for eleven pollutants. Those NAQOs included in LAQM are prescribed in the Air Quality (England) Regulations 2000[6] and the Air Quality (Amendment) (England) Regulations 2002[7]. Table 3.1 presents the NAQOs for NO_2 and PM_{10}.

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within Local Air Quality Management Technical Guidance 2009 (LAQM.TG (09)) issued by the Defra for Local Authorities, on where the NAQOs apply as detailed in Table 3.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

[2]Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

[3]Secretary of State, 2010. Statutory Instrument 2010 No. 1001, Air Quality Standards Regulations 2010. HMSO.

[4]Secretary of State, 1995. The Environment Act 1995, Part IV Air Quality. HMSO.

[5]Department for Environment, Food and Rural Affairs, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland. HMSO.

[6]Secretary of State, 2000.Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations, 2000. HMSO.

[7]Secretary of State, 2002. Statutory Instrument 2002 No. 3043, The Air Quality (England) (Amendment) Regulations 2002. HMSO.

Table 3.1: Objectives included in the Air Quality Regulations (England) 2000 for the Purpose of Local Air Quality Management			
Pollutant	**Report Table Heading Centre**		
	Concentrations	**Measured As**	**Date to be achieved by**
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times per year	1 hour mean	31 December 2005
	40 µg/m^3	Annual mean	31 December 2005
Particles (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times per year	24 hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004

Table 3.2: Locations Where Air Quality Objectives Apply		
Averaging Period	**Objectives should apply at:**	**Objectives should generally not apply at:**
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, libraries etc.	Building façades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24 hour mean	All locations where the annual mean objective would apply. Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1 hour mean	All locations where the annual mean and 24 hour mean objectives apply. Kerbside Sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations where the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Where a local authority's review and assessment of its air quality identifies that air quality is likely to exceed the NAQOs, it must designate these areas as AQMA and draw up an Air Quality Action Plan (AQAP) setting out measures to reduce pollutant concentrations with the aim of meeting the NAQOs.

The LBC latest AQAP for 2013 to 2015[8] has the following overarching aims;

- continue to meet the EU objectives for Carbon Monoxide, Sulphur Dioxide, Benzene, 1,3-Butadiene, Lead and PM_{10};
- continue to reduce concentrations of PM_{10}; and
- to meet the EU Objective for NO_2.

The plan includes the following key objectives to:

- encourage reductions in fossil fuel use, the adoption of clean fuels and technology and promote energy efficiency;
- raise awareness about air quality in Camden and promote lifestyle changes which can help reduce levels of air pollution and exposure to air pollution;
- improve the health and well-being of the local population;
- work in partnership with national and regional bodies, and with local public and private organisations, to foster improvements in air quality;
- lead by example and reduce NO_2 and PM_{10} emissions associated with the Council's own buildings and transport services; and
- ensure actions which serve to reduce NO_2 and PM_{10} emissions complement actions to mitigate CO_2 emissions, and vice-versa.

3.3 Planning Policy

3.3.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[9] published in March 2012 sets out the Government's planning policies for England. Planning law requires that applications for planning permission must be determined in accordance with the development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It states that the purpose of the planning system is to contribute to the achievement of sustainable development; and that planning decisions on individual applications must reflect relevant EU obligations and statutory requirements. Specifically, in terms of air quality, it requires the planning system to prevent development from contributing to, or being put at unacceptable risk from unacceptable levels of air pollution.

Planning policies should promote compliance with or contribute towards achievement of EU limit values and national air quality objectives (NAQOs), taking into account the presence of AQMAs and the cumulative impacts on air quality from individual sites in local areas.

[8] London Borough of Camden, Camden's Clean Air Action Plan 2013-2015

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

Planning decisions should ensure that new development within an AQMA is consistent with the Local Air Quality Action Plan (AQAP).

The NPPF is supported by a series of Planning Practice Guidance. The guidance[10] in relation to air quality provides guiding principles on how planning can take account of the impact of new development on air quality.

3.3.2 The London Plan, Spatial Development Strategy for Greater London, 2011

The following policies of the London Plan[11] are of relevance to this assessment:

- Policy '5.3 - Sustainable design and construction' which states that development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.
- 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 is likely to be used by large numbers of those particularly vulnerable to poor air quality (such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3);*
  - *promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions 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 Air Quality Management Areas (AQMAs); and*
  - *ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches.*

3.3.3 Revised Early Minor Alterations to the London Plan, 2013

In October 2013, the GLA published the REMA to the London Plan[12] aimed at ensuring that the London Plan is fully consistent with the NPPF. As such paragraph 7.51, which supports Policy 7.14, is amended to provide for the following:

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[10] http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/

[11] Greater London Authority, 2011. The London Plan Spatial Development Strategy for Greater London. London. London. GLA

[12] Greater London Authority, October 2013. Revised Early Minor Alterations to the London Plan. London. GLA.

- Avoid the introduction of new sensitive receptors in locations where they will be affected by existing sources of air pollution;
- Where adverse air quality impacts arise from new development mitigation will be required and could include on-site design solutions, buffer zones and sustainable travel measures; and
- Where on-site measures are impractical or inappropriate, off site mitigation measures can be implemented.

3.3.4 Further Alterations to the London Plan, 2015

The FALP to the London Plan[13] introduce no additional policies with regard to air quality.

3.3.5 Clearing the Air, The Mayor's Air Quality Strategy, 2010

The Mayor of London has set out a detailed air quality strategy[14] for Greater London in order to deliver the required reductions in PM_{10} and NO_2 concentrations to meet the EU limits. The policies and measures within the strategy are divided into transport and non-transport measures. With regard to the proposed development the key policies are as follows:

- Policy '6 - Reducing emissions from construction and demolition sites' which states that the Mayor will work with the London Council to review and update the Best Practice guidance for construction and demolition sites and create supplementary planning guidance to assist implementation;
- Policy '7 - Using the planning process to improve air quality - new developments in London as a minimum shall be 'air quality neutral'', which states that the Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy; and
- Policy '9 - Energy efficient buildings' which states that the Mayor will set CO_2 reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions.

3.3.6 Sustainable Design and Construction Supplementary Planning Guidance, 2014

The Sustainable Design and Construction SPG was published 2014[15]. The following guidance on air quality is provided in Section 4 of the Guidance:

- Developers should design schemes to be air quality neutral;
- Developments should be designed to minimise the generation of air pollutants;

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[13]Greater London Authority, January and July 2014. The Draft Further Alterations to the London Plan. London. GLA.

[14]Greater London Authority, 2010. Clearing the Air - The Mayors London Air Quality Strategy. London. GLA

[15]Greater London Authority, 2014. Sustainable Design and Construction Supplementary Planning Guidance. London. GLA

- Developments should be designed to minimise exposure to poor air quality;
- Developers and contractors should follow the relevant guidance on minimising impacts from construction and demolition.

The SPG states that where developers are unable to meet the 'air quality neutral' benchmark, consideration should be given to off-site NO_x and PM_{10} abatement measures.

3.3.7 Mayor of London Supplementary Planning Guidance, the Control of Dust and Emissions from Construction and Demolition 2014

This guidance[16] updates the previous London Council's guidance to control dust and emissions from construction and demolition activities by identifying appropriate levels of mitigation. The methodology proposed and mitigation outlined is broadly in line with that provided by the Institute for Air Quality Management (IAQM), which is discussed in further detail below.

3.3.8 Local Policy

There are three development policies contained within LBC Local Development Framework[17] which are relevant to air quality:

- Policy DP22 - Promoting sustainable design and construction, requires development to incorporate sustainable design and construction measures to be resilient to climate change and to reduce air pollution.
- Policy DP26 - Managing the impact of development on occupiers and neighbours states that planning permission will only be granted for development that does not cause harm to amenity. Factors that would be considered as potentially impacting amenity include emissions of odour, fumes and dust.
- Policy DP32 - Air quality and Camden's Clear Zone, states that the council will require an air quality assessment for all development which could potentially cause significant harm to air quality, and that mitigation measures will be expected in developments that are located in areas of poor air quality.

3.4 Additional Guidance

3.4.1 Environmental Protection UK Guidance

Environmental Protection UK has produced 'Development Control: Planning for Air Quality (2010 Update)[18] which provides guidance on when an air quality assessment is required. It also incorporates guidance on operational significance criteria produced by the Institute of Air Quality Management (IAQM).

[16]Greater London Authority, 2014. The Control of Dust and Emissions During Construction and Demolition, Supplementary Planning Guidance.

[17]London Borough of Camden, 2010, Local Development Framework – Camden Core Strategy 2010-2025.

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

3.4.2 Institute of Air Quality Management Guidance

The IAQM has produced 'Guidance on the assessment of dust from demolition and construction'[19] to assist in the assessment of air quality impacts from construction activities.

[19] Institute of Air Quality Management, February 2014, Guidance on the assessment of dust from demolition and construction

4 Methodology

4.1 Baseline

In order to establish baseline air quality in the vicinity of the site, relevant monitoring data was reviewed and assessed. Data was obtained from the following sources:

- LBC Review and Assessment of Air Quality Reports; and
- Department of Environment, Food and Rural Affairs (Defra).

No additional site specific air quality monitoring was carried out.

4.2 Construction Impacts

The primary assessment used within this study follows the guidance published by the Institute of Air Quality Management (IAQM) on the assessment of the impacts of construction on air quality.

The IAQM assessment methodology considers 3 separate dust effects and defines their significance according to the sensitivity of the surrounding area, as follows:

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

Within this report, the assessment has been carried out in a number of steps:

- Step 1, the need for a construction assessment has been screened;
- Step 2, the risk of dust effects has been assessed;
- Step 3, site specific mitigation has been determined; and
- Step 4, the significance of the dust effects, after applying the site-specific mitigation, has been assessed.

4.3 Receptors

In line with the IAQM construction dust guidance, receptors have been screened, upon the following criteria:

- A human receptor within
  - 350 m of the boundary of the site; or
  - 50 m of the routes used by construction vehicles on the public highway, up to 500 m from the site entrance.

There are no ecological receptors within either 50 m of the site boundary or 500 m from the site entrances along routes used by construction vehicles.

4.4 Traffic Impacts

The following in regards to traffic impacts from the proposed development is stated in the applicants transport statement provided by TTP Consulting:

- *A car free development is proposed and an appropriate level of cycle parking is provided for.*

- *The replacement of commercial floorspace with residential use can generally be considered to reduce the likely trip generation and servicing demand of a site and so it is not expected that the proposals will result in any additional demand on the surrounding transport network.*
- *The proposed scheme is consistent with relevant transport policy guidance and will not give rise to any material transport related impacts.*

4.5 Background Concentrations

Background NO_2 and PM_{10} concentrations have been obtained from the Defra maps of predicted background pollutant concentrations, which have been produced to aid local authorities in carrying out their Review and Assessment of Air Quality work. The background concentrations used in the assessment are provided below in Table 4.1.

Table 4.1: 2014 Annual Average Background Concentrations µg/m^3

x	y	Total NO_2	Total PM_{10}
525500	184500	31.7	21.9

4.6 Significance Criteria

4.6.1 Demolition and Construction Impacts

Using the IAQM guidance and on the assumption that appropriate dust mitigation measures are applied commensurate with the risk of potential dust impacts, the potential for residual effects to arise during the construction phase will be reduced to at worst slight adverse.

5 Baseline Assessment

5.1 Air Quality Monitoring

The only automatic monitoring within close proximity to the site is located at Swiss Cottage at the Kerbside of A41 approximately 1.1 km south east of the site. Both NO_2 and PM_{10} concentrations are recorded at this site. In addition, LBC monitor NO_2 concentrations using diffusion tubes at multiple locations throughout its borough. A summary of the results from the Swiss Cottage automatic station and nearby diffusion tubes are shown in Tables 5.1, 5.2 and 5.3, and their locations in Figure 5.1.

Table 5.1: Recorded NO_2 Concentrations at the Automatic Monitoring Station (µg/m^3)

Site	Distance from site	Objective	Years				
			2009	2010	2011	2012	2013
Swiss Cottage – 3 m from Kerbside (Kerbside)	1.1 km south east	Annual mean (µg/m^3)	**84**	**82**	**71**	**70**	**63**
		Hours > 200 µg/m^3	**217**	**128**	**79**	**43**	**28**

Note:

Bold: exceedance

Table 5.2: Recorded Annual Mean NO_2 Concentrations at Diffusion Tube Sites (µg/m^3)

Site	Distance from site	Years				
		2009	2010	2011	2012	2013
Swiss Cottage – <1 m from Kerbside (Kerbside)	1.1 km south east	**87.5***	**71**	**73.2**	**72.7**	**83**
47 Fitzjohn's Road – 5 m from Kerbside (Roadside)	1 km north east	**62.9**	**73**	**58.4**	**61.2**	**65.2**
Emmanuel Primary – 1 m from Kerbside (Roadside)	570 m north west	N/a	N/a	**41.5**	**45.9**	**57.9***
Frognal Way – 30 m from Kerbside (Urban Background)	980 m north east	33.9	29	31.5	28.9	32

Note:

Bold: exceedance

Bold underlined: annual mean > 60 µg/m^3, indicating a potential exceedance of the NO_2 hourly mean objective

*: treat with caution

Table 5.3: Recorded PM_{10} Concentrations at the Automatic Monitoring Stations (µg/m³)							
Site	**Distance from site**	**Objective**	**Years**				
			2009	**2010**	**2011**	**2012**	**2013**
Swiss Cottage - 3 m from Kerbside (Kerbside)	1.1 km south east	Annual mean (µg/m³)	25	26	27	23	21
		Days > 50 µg/m³	25	26	31	21	8
Note: No exceedances							

Figure 5.1: Air Quality Monitoring Locations

5.2 Assessment of Monitoring Data

The Swiss Cottage automatic monitoring data indicates that air quality at the kerbside of the A41 consistently exceeds both the long and short term NO_2 objectives. The A41 is a heavily trafficked road with traffic volumes far greater than those expected at roads close to the development site West End Lane. Thus concentrations recorded at this monitoring site would not be representative of site conditions.

An assessment of the diffusion tube monitoring data indicates that concentrations of annual mean NO_2 concentrations meet the target objective of 40 µg/m³ at the Frognal Way urban background site, whilst exceedance is recorded for all years at all other roadside diffusion

tube sites. This clearly demonstrates the influence of vehicles on NO_2 concentrations. Annual mean NO_2 concentrations in excess of the objective are a common problem throughout London, with significant exceedances recorded in many areas close to major roads. Concentrations decrease rapidly away from the road side, as demonstrated by the results recorded at Frognal Way urban background site.

The PM_{10} concentrations recorded at the Swiss Cottage automatic station indicates that air quality comfortably meets the annual mean objective for all years. The short term objective is also met in all years.

5.3 Air Quality at the Proposed Development

The development site is set back from the roadside and is located 20 m from the B510. NO_2 concentrations decrease rapidly away from the roadside, As such it is considered that the Frognal Way monitoring site is most representative of site conditions. Given the distance from the B510 lower pollution concentrations would be expected on the development site than are recorded at the Emmanuel Primary school site which is located in a kerbside location.

Pollutant concentrations would therefore be expected to meet all relevant air quality objectives throughout the site.

6 Construction Impacts

6.1 Introduction

In the absence of mitigation, there are 2 potential significant sources of emissions that could affect air quality during demolition and construction works:

- coarse and fine dust from construction activities including excavation, earthmoving, materials storage and movement of construction vehicles; and
- construction plant, both mobile and stationary (e.g. cranes and generators), which emit a mixture of exhaust gases.

There are numerous residential properties within 350 m of the site and through using the IAQM guidance, a detailed assessment of demolition and construction impacts is required.

6.2 Assessment of Impacts

Using the evaluation criteria within the IAQM's Guidance the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 6.1 below.

Table 6.1: Dust Emission Magnitude for Each Construction Phase

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Total building volume to be demolished is less than 20,000 m^3 (proposed demolition is less than 2500 m^3)
Earthworks	Small	Although site area is approximately 0.86 hectares, the majority is the access road and warehouse which is to be retained, thus earthworks will be limited predominantly to less than half of the site. Site area is less than 2,500 m^2
Construction	Small	Building volume is less than 25,000 m^3 (proposed is less than 5,000 m^3)
Trackout	Medium	The maximum HDV movements are predicted to be between 10 and 50 heavy duty vehicle outward movements in any one day.

The next stage of the process is to define the sensitivity of the assessment area to dust soiling, human health impacts and ecological receptors. This process combines the sensitivity of the receptor with the distance from the source to determine the overall sensitivity. The sensitivity of the area to dust impacts is provided in Table 6.2.

Table 6.2: Sensitivity of Area to Dust Impacts (taking into account distance to construction activity)

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts	Sensitivity to Ecological Receptors
High – Between 10-100 residential properties within 20 m of the site.	**Low** – existing PM_{10} concentrations less than 24 $\mu g/m^3$, 10-100 receptors within 20 m.	**NA** – no ecological receptors sensitive to dust within 50 m of the site or within 50 m of the route

		used by construction vehicles for a distance of 500 m.

The dust emission magnitude determined in Table 6.1 has been combined with the sensitivity assessment in Table 6.2 to define the risk of impacts for each phase of development in the absence of mitigation as shown in Table 6.3

Table 6.3: Risk of Dust Impacts in the Absence of Mitigation

		Dust Emission Magnitude for Each Phase			
		Demolition (Small)	**Earthworks (Small)**	**Construction (Small)**	**Trackout (Medium)**
Sensitivity of the surrounding area	**Dust Soiling (High)**	Medium Risk	Low Risk	Low Risk	Medium Risk
	Human Health (Low)	Negligible	Negligible	Negligible	Low Risk

The IAQM guidance only considers impacts from construction vehicles on PM_{10} concentrations. Consideration should also be given to potential impacts on NO_2 concentrations.

The EPUK guidance indicates significant impacts to air quality are only likely to arise when HDV movements are increased by more than 200 per day when averaged over a year. As the number generated by the construction work is significantly lower than this, the potential for NO_2 concentrations to be impacted by construction vehicles is considered negligible and has therefore not been considered further within this assessment.

6.3 Mitigation

The control of dust emissions from construction sites relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the highly recommended and desirable mitigation measures recommended in the IAQM guidance to reduce impacts from medium risk sites is provided below in Table 6.4. It is assumed that these will be implemented through inclusion within a dust management plan as part of the site's construction environmental management plan which will be secured through an appropriately worded planning condition.

Table 6.4: Dust Mitigation Measures for Medium Risk Sites

Phase	**Level of Recom-mendation**	**Measure**
Communications	H	Implement a stakeholder communication plan. Display name and contact details of responsible person for dust issues on Site boundary in addition to head/regional office contact information.
Dust Management Plan	H	Develop and implement a Dust Management Plan (DMP), to be approved by the Local Authority.
Site Management	H	Record all complaints and incidents in a site log.

Table 6.4: Dust Mitigation Measures for Medium Risk Sites		
Phase	**Level of Recom-mendation**	**Measure**
		Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log. Make the complaints log available to the Local Authority if requested. Record any exceptional dust incidents on or off site.
Monitoring	H	Carry out regular inspections to ensure compliance with the DMP and record results in the site log book. Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather.
	D	Undertake daily on and off site visual inspections where there are nearby receptors.
Preparing and Maintaining the Site	H	Plan site layout to locate dust generating activities as far as possible from receptors. Use solid screens around dusty activities and around stockpiles. Avoid site runoff of water and mud. Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Keep site fencing barriers and scaffolding clean using wet methods. Remove dusty materials from site as soon as possible. Minimise emissions from stockpiles by covering, seeding, fencing or damping down.
Operating Vehicle/Machinery and Sustainable Travel	H	Ensure vehicles switch of engines when stationary. Avoid use of generators where possible. Produce a Construction Logistics Plan to manage the sustainable delivery of materials.
	D	Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas. Implement a sustainable travel plan for site workers
Operations	H	Cutting, grinding or sawing equipment only to be used with suitable dust suppression equipment or techniques. Ensure adequate water supply for effective dust and particulate matter suppression. Use enclosed chutes, conveyors and covered skips. Minimise drop heights of materials. Ensure suitable cleaning material is available at all times to clean up spills.
Waste Management	H	Avoid bonfires.
Measures Specific to Demolition	H	Ensure effective water suppression is used, preferably through the use of hand held sprays. Avoid explosive blasting. Bag and remove biological debris or damp down material prior to demolition.
	D	Where practical, soft strip inside buildings before demolition of external walls and windows.
Measures Specific to Earthworks	D	Re-vegetate earthworks and exposed areas/soil stockpiles as soon as practicable.

Table 6.4: Dust Mitigation Measures for Medium Risk Sites		
Phase	**Level of Recom-mendation**	**Measure**
		Use hessian, mulch or trackifiers where it is not possible to re-vegetate or cover with topsoil. Only expose small areas of ground or stockpile when working.
Measures Specific to Construction	H	Ensure aggregates are stored in bunded areas and are not allowed to dry out.
	D	Avoid concrete scabbling where possible. Ensure bulk cement and other fine powder is delivered in tankers and stored in silos with suitable emission control. Smaller supplies of fine powder material to be in sealed containers and stored appropriately.
Measures Specific to Trackout	H	Use water-assisted dust sweepers to clean access and local roads. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving the site are appropriately covered. Inspect on-site haul roads for integrity and repair as necessary. Inspections of haul roads to be recorded in site log, including any remedial action taken. Implement a wheel washing system.
H = Highly Recommended D = Desirable		

6.4 Residual Impacts

On the assumption that the mitigation measures detailed above are implemented effectively the potential for significant residual effects to arise during the construction phase is considered to be negligible.

7 Mitigation

Significant direct emissions from the development are not anticipated and therefore these impacts do not require mitigation.

Whilst the assessment of existing monitoring data has indicated that existing air quality would be expected to meet the relevant air quality objectives, the following measures have been incorporated within the design of the development to reduce the exposure of future residents to poor air quality:

- the development will be car free, and will encourage the use of sustainable transport modes through providing secure bicycle storage; and
- if the flexible space is used for activities that may require mechanical ventilation to maintain indoor air quality, a suitable local extract ventilation system would be installed to remove poor air from the workspace whilst not increasing the exposure of future residents, immediately above, to poor air quality.

8 Conclusions

The review of existing monitoring data has indicated that air quality be expected to meet all relevant air quality objectives at the residential receptors within the proposed development.

An assessment of construction dust impacts arising from the proposed development has indicated that the development proposals will have a medium risk of causing impacts at adjacent receptors in the absence of suitable mitigation. However, on the assumption that best practice dust management techniques are employed, which it is recommended are delivered through a Dust Management Plan to be agreed with LBC, the potential for residual effects would be sufficiently reduced to ensure that no significant residual effects arise.

Significant direct emissions from the development are not anticipated and therefore these impacts do not require mitigation.

The development will be car free, and will encourage the use of sustainable transport modes through providing secure bicycle storage.