79 CAMDEN ROAD
& 86-100 ST PANCRAS WAY

air quality assessment

November 2013

Rev	Date	Details	Prepared by	Checked by	Approved by
1	October 2013	Draft	**Joanna Woof** Assistant Air Quality Specialist	**Fergus Boughton** Air Quality Consultant	**David Deakin** Associate
2	November 2013	FINAL	**Joanna Woof** Assistant Air Quality Specialist	**Fergus Boughton** Air Quality Consultant	**David Deakin** Associate

URS Infrastructure & Environment Limited
12 Regan Way
Chetwynd Business Park
Chilwell
Nottingham
NG9 6RZ

Telephone: +44 (0)115 907 7000

Fax: +44 (0)115 907 7001

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1. INTRODUCTION

1.1 Brief

URS Infrastructure & Environment Limited (URS) has been appointed to assess the compliance of a proposed residential development located in the London Borough of Camden (LBC) to relevant air quality legislation and policy. The proposals include: the redevelopment of the site to create 166 residential units (Class C3), including affordable housing, following the demolition of all existing buildings on the site (Class B1), construction of a new building ranging from 5 to 7 floors in height and a Combined Heat and Power plant (CHP), together with associated works to create a lower ground floor, landscaping and public realm improvements.

The proposed development site is located at 79 Camden Road, in the LBC situated in inner London. The site is located 140 metres north east of Camden Road Underground station.

The whole Borough of Camden is an Air Quality Management Area (AQMA). The AQMA was declared due to annual mean concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) being in exceedance or at risk of exceeding the air quality objectives for each pollutant.

The potential effects of the proposed development with proposed mitigation, on local air quality sensitive receptors, are considered with respect to existing planning policies. Mitigation measures have been recommended where appropriate, to minimise the potential for adverse residual effects being experienced by sensitive receptors during the construction and operational phases of the proposed development.

1.2 Scope of Work

This assessment considers the impact of the proposed development on local receptors sensitive to changes in air quality, and also considers the suitability of the site itself for residential use.

The proposed development does not include for the provision of any car parking spaces or any other means by which vehicle movements would increase significantly beyond baseline levels. Although the proposed residential re-development would not lead to a significant increase in traffic on the local highway network, quantification of baseline NO_2 concentrations has been undertaken to assess the suitability of the site for residential use.

During the construction phase of the proposed development, there is the potential for construction activities to generate fugitive emissions of particulate matter (dust and PM_{10}). There is the risk of such emissions giving rise to significant adverse effects on amenity or health at receptors located within 100 metres of the source of emissions (IAQM, 2012) unless appropriate mitigation measures are adopted. There are receptors located within 100 metres of the site boundary and therefore an assessment of the significance of effects from fugitive emissions of dust and PM_{10} from the site has been undertaken. The assessment includes consideration of the risk of adverse effects associated with the potential track out of material at receptors located within 50 metres of roads, extending up to 200 metres from the site access.

The quantity and type of site plant likely to be used in the construction works of the proposed development are unlikely to have any significant effect on local air quality, due to the size and scale of the proposals. As such, consideration of the effects of construction phase related site plant has been scoped out of this assessment.

The nearest nationally or internationally designated ecological site is the Hampstead Heath Woods Site of Special Scientific Interest (SSSI) which is located 3.2 kilometres north west of the proposed development site. Therefore, it is considered highly unlikely that the proposed works could emit dust, transport or Combined Heat and Power (CHP) emissions with the potential to significantly affect the nearest ecological receptor sites and the risk to such sites is not considered further in this assessment.

The concentrations of particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide (NO_2) at the proposed development have been considered specifically for the following scenarios:

- Baseline 2012 and 2016; and
- Operational Scenario of 2016 (indicative opening year)

The air quality assessment uses baseline traffic flows prepared by SKM Traffic Consultants as set out in Appendix B. The indicative opening year of 2016 has been identified as the earliest possible time the development could be completed and occupied.

A CHP Plant is also included in the development proposals and the associated emissions of NO_x have been considered for the operational scenario of 2016.

Baseline measurements of nitrogen dioxide concentrations are currently being collected and analysed at locations near to the application site. The assessment includes the results from two months of monitoring. A third month of monitoring is still to be collected; on completion of the monitoring the third month will be used to confirm and refine the results of this report.

2. LEGISLATION AND POLICY

2.1 Air Quality Legislation

The Clean Air for Europe (CAFE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC (Council of European Communities, 1996), its associated Daughter Directives 1999/30/EC (Council of European Communities, 1999), 2000/69/EC (Council of European Communities, 2000), 2002/3/EC (Council of European Communities, 2002), and the Council Decision 97/101/EC (Council of European Communities, 1997) with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Council of European Communities, 2008).

Directive 2008/50/EC (Council of European Communities, 2008) is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010 (H.M. Government, 2010), which came into force on 11th June 2010. These limit values are binding on the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

2.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF) published in March 2012 (Department for Communities and Local Government, 2012a), paragraph 109 of the NPPF states that:

"The planning system should contribute to and enhance the natural and local environment by:

preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability…"

Annex 2 of the NPPF defines 'Pollution' as *"Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or* *general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light".*

There are both national and local policies for the control of air pollution and local action plans for the management of local air quality in the London Borough of Camden. The effect of the proposed development on the achievement of such policies and plans are matters that may be a material consideration by planning authorities, when making decisions for individual planning applications. Paragraph 124 of the NPPF states that:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

The NPPF is accompanied by Technical Guidance to the National Planning Policy Framework (NPPF-TG) (Department for Communities and Local Government, 2012b). The NPPF does not include any specific guidance for the assessment of air quality impacts from retail developments, but does provide some broader guidance on assessments of dust impacts from mineral extraction site that have been cited in the construction methodology of this assessment.

2.3 National Air Quality Strategy

The UK National Air Quality Strategy (Defra, 2000) was initially published in 2000, under the requirements of the Environment Act 1995 (H.M. Government 1995). The most recent revision of the strategy (Defra, 2007) sets objective values for key pollutants as a tool to help Local Authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objective values have subsequently been laid out within the Air Quality (England) Regulations 2000 (H.M. Government, 2000) and later amendments (H.M. Government, 2002).

The air quality objective values referred to below have been set down in regulation solely for the purposes of local air quality management. Under the local air quality management regime, LBC has a duty to carry out regular assessments of air quality against the objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. Consequently it is not unusual for the boundary of an AQMA to include within it, relevant locations where air quality is not at risk of exceeding an air quality objective.

The UK's national air quality objective values for the pollutants of relevance to this assessment are displayed in Table 1.

Table 1: Air Quality Objective Values

Pollutant	Averaging period	Value	Maximum Permitted Exceedances	Target data
Nitrogen Dioxide (NO_2)	Annual Mean	40 µg/m^3	None	31/12/05
	Hourly Mean	200 µg/m^3	18 times per year	31/12/05
Particulate Matter (PM_{10})	Annual Mean	40 µg/m^3	None	31/12/04
	24-hour	50 µg/m^3	35 times per year	31/12/04
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	25 µg/m^3	None	2020

2.4 Local Planning Policy

2.4.1 *London Wide Air Quality Policy*

In the London Plan (GLA, 2011), Policy 7.14 'Improving air quality' states that:

"Development proposals should:

a 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;

b 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 Council's 'The control of dust and emissions from construction and demolition.';

c 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);

d 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; and

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

Under the requirements of the Greater London Authority Act 1999, the Mayor of London produced an Air Quality Strategy in 2002 (GLA, 2002), setting out how the National Air Quality Strategy would be implemented in London as a whole. A replacement Mayor's Air Quality Strategy was published in December 2010 (GLA, 2010). Policies that are applicable to a new development include:

“Reducing emissions from construction and demolition sites through the review and full implementation of the Best Practice Guidance; and

Using the planning process to improve air quality by requiring new developments as a minimum to be ‘air quality neutral’.”

Other regional planning policy that related to this assessment and applies to LBC includes:

- The London Councils’ ‘*Air Quality and Planning Guidance*’ (APPLE ,2007), which provides an overview of the planning system, justification as to when air quality assessments should be undertaken and also takes into consideration the determination of significance criteria;
- The Mayor of London’s ‘*The Control of Dust from Construction and Demolition in London*’ (GLA, 2006), which provides a consistent approach to dust control and emissions from construction and demolition activities; and
- The Guide for Contractors Working in Camden (London Borough of Camden, 2008), which provides a consistent approach to dust control and emissions from construction and demolition activities in the London Borough of Camden.

2.4.2 *Local Planning Guidance*

The LBC’s Core Strategy commented on the environment, transport and mixed used development of the area (London Borough of Camden, 2010a) by stating:

“Parts of Camden have some of the poorest air quality levels in London.”

“Road traffic can harm local air quality and, through this, the health of those living in the borough, although in recent years, the amount of road traffic in Camden has been reducing.”

“Mixed use developments… can reduce commuting and the need for some other journeys, helping to cut congestion in the borough and improve air quality”.

Objectives relating to air quality within LBC’s Core Strategy (2010) include:

CS9: *“The Council will support and promote the Central London area of Camden as a successful and vibrant part of the capital to live in, work in and visit. We will:*

k) continue to designate Central London as a Clear Zone Region to reduce congestion, promote cycling and improve air quality.”

CS16 *“The Council will seek to improve health and well-being in Camden. We will:*

e) recognise the impact of poor air quality on health and implement Camden’s Air Quality Action Plan which aims to reduce air pollution levels.”

The planning section of the LBC’s online resource also states that:

“In dealing with planning applications, consideration should be given to the site and area characteristics. This is particularly relevant as the whole of Camden has been declared an Air Quality Management Area for breaching of the annual mean air quality standards for particulate matter (PM_{10}) and nitrogen dioxide (NO_2). Some schemes may be more sensitive to air pollution than others, for example children’s play areas and housing should be located away from busy roads where air pollution levels are highest.”

"The impact on air quality of the construction and demolition phases of a development should be taken into account in planning applications and covered in construction management plans. Controlling dust emissions is important both in terms of preventing nuisance complaints by local residence, and reducing the impact of dust emissions on local PM_{10} concentrations."

LBC has produced a guide for contractors, which includes dust mitigation measures that should be implemented during construction works. These measures are described in more detail in Appendix C.

2.5 Local Air Quality Management

Under the requirements of Part IV of the Environment Act (1995) (H.M. Government, 1995), LBC has carried out a phased review and assessment of local air quality within their district.

Camden's first Air Quality review and assessment was carried out in 1999 and determined that two of the Government's air quality objectives would fail to be achieved on time. These were the annual mean air quality objective for nitrogen dioxide (NO_2) and the daily mean air quality objective for particulate matter (PM_{10}). Road transport was identified as the main source of NO_x and PM_{10} emissions. The Council subsequently declared the whole borough an Air Quality Management Area in 2000 and produced an Air Quality Action Plan in 2002 (London Borough of Camden, 2009).

Since 2002, the Council has continued to monitor and assess air pollution levels against the air quality objectives. Monitoring has indicated that larger parts of the Borough continue to breach the air quality objectives for NO_2 and PM_{10} (London Borough of Camden, 2009).

The most recent air quality report is the 2010 Air Quality Progress Report (London Borough of Camden, 2010b). The report summarised that in 2010 Camden complied with the air quality standards for benzene, butadiene, lead, sulphur dioxide, carbon monoxide, particulate matter and ozone, However, Camden continues to fail the long and short term air quality objectives for nitrogen dioxide. Even though PM_{10} monitoring has revealed that Camden no longer breaches the air quality objectives for this pollutant, the Council does not intend on changing their Air Quality Management Order. The situation will be reviewed over the next five years in line with future trends in PM_{10} concentrations (London Borough of Camden, 2010b). Local Air Quality Action Plan

The 2013 AQAP Report (2013-15) is the most current report concerning Air Quality (London Borough of Camden, 2013). In the most recent London Atmospheric Emissions Inventory (LAEI) data for Camden in 2008 which details the sources of NO_X emissions in the Borough it was conceded that road transport was the largest source of NO_X emissions (44%), followed by domestic gas use (19%), Commercial Gas Use (19%), Rail (16%) and Large Scale Boilers (2%). The London Atmospheric Emissions Inventory (LAEI) data for Camden also detailed the sources of particulate matter (PM_{10}) emissions it was conceded that road transport was the largest sources of PM_{10} emissions (60%) , followed by Rail (14%), Small Industrial Processes (Part B) (8%), Large Scale Boilers (8%), Commercial Gas use (7%) and Domestic Gas Use (3%).

The 2013 AQAP, Section 2: Reducing emissions associated with new development, is particularly important in this assessment. Actions outlined in this section include:

"Action 14: Require developers to undertake an air quality assessment (AQA) in circumstances where a new development could have a negative impact on air quality, and provide an air pollution mitigation plan where necessary;

Action 15: Require developers to submit Construction Management Plans (CMP) in accordance with the London Best Practice Guidance to Control Dust and Emissions from Construction and Demolition. Through onsite pollutant monitoring, ensure that large development are adhering to the CMP requirements; and

Action 18: Require development sites to meet the Mayor of London's energy hierarchy, with high standards of sustainable building design and construction, and consideration of CHP and renewables. Developers must ensure that best practice requirements for controlling NO_X and PM_{10} emissions from biomass boilers and CHP are met (Camden Borough Council, 2013)."

The 2013 AQAP, Section 3: Reducing emissions from gas boilers and industrial processes, is particularly important in this assessment.

"Action 19: Camden will promote the adoption of fuel saving measures to residents through the Green Camden campaign;

Action 20: Camden will promote the adoption of fuel saving measures to businesses through the Camden Climate Change Alliance; and

Action 25: Ensure that all Part B Installations in the borough maintain the highest standards of air pollution emission control (Camden Borough Council, 2013)."

3. METHODOLOGY

3.1 Overview

There is currently no statutory guidance on the method by which an air quality impact assessment should be undertaken. Several non-statutory bodies have published their own guidance for air quality and development control (EPUK, 2010) or to the assessment of the significance of air quality effects (IAQM, 2009).

This section will explain the methods used to assess the significance of the:

- impact of fugitive emissions of particulate matter from construction phase activities;
- the impact of road traffic exhaust emissions on the proposed development; and
- the impact of emissions from the CHP Plant included in the residential development proposals.

Air quality sensitive receptors that may be affected by the proposed development have been identified for the construction and operation phases. The methods used to determine the significance of effect associated with air quality impacts are described in Section 3.6.

3.1.1 *Fugitive Emissions of Particulate Matter*

Fugitive emissions of airborne particulate matter are readily produced through the action of abrasive forces on materials and therefore a wide range of site preparation and construction activities have the potential to generate this type of emissions, including:

- demolition work;
- earthworks, including the handling, working and storage of materials;
- construction activities; and

- the transfer of dust making materials from the site onto the local road network.

'Dust' is defined in BS 6069:1994 (BSI, 1994) as particulate matter in the size range 1µm - 75µm in diameter, and is primarily composed of mineral materials and soil particles. This definition is also referred to in NPPF technical guidance (Department for Communities and Local Government, 2012b) in the context of dust impacts from mineral extraction operations and has been adopted in this assessment.

Respirable particulate matter (PM_{10}) is composed of material with an aerodynamic diameter of less than 10 micrometers (µm) in diameter, and includes the size fractions of greatest concern to impacts on human health. The majority of construction dust is larger than 10 µm in diameter and, therefore, increased levels of dust in the air do not necessarily equate to an increase in levels of PM_{10}. In general, construction dusts rarely represent an adverse risk to human health and are more typically associated with the consequences of material depositing onto property.

Particulate matter may have an impact whilst airborne or as a result of its deposition onto a solid or liquid surface. Consequently the nature of the impact requiring assessment varies between different types of receptor. In general receptors associated with higher baseline dust deposition rates are less sensitive to impacts, such as farms, light and heavy industry or outdoor storage facilities. In comparison some hi-technology industries or food processing plants operate under clean air conditions and increased airborne particulate matter concentrations may have an increased economic cost associated with the extraction of more material by the plants air filtration units.

Table 2 provides some generic examples of the type of impacts that may result from fugitive emissions of particulate matter. The sensitivity of receptor types is listed for selected impacts, with sensitivity being described as 'high' for receptors that are especially sensitive to the specified impact. For example, industrial painting operations are consider to be more sensitive to the impact of material becoming soiled by depositing material, than residential properties or schools are.

Table 2: Types of Impacts from Emissions of Particulate Matter

Nature of Impact	Receptor Types Affected	Relative Sensitivity
Change in 24 hour mean PM_{10} concentrations	Residential properties Schools Hospitals and clinics	Receptor sensitivity was considered when Air Quality Objective Value was set.
Change in rate at which air filtration units require maintenance	Hospitals and clinics	High
	Hi-tech industries	High
	Food processing industries	High
Change in the rate at which material accumulates on glossy surfaces, such as glass or paint work	Painting and furnishing operations	High
	Residential properties	Medium
	Schools	Medium
	Food retailers	Medium

Nature of Impact	Receptor Types Affected	Relative Sensitivity
	Offices	Medium
	Museums and Galleries	Medium
	Glasshouses	Medium
Change in the rate at which property or products becomes soiled by deposited material	Food processing industries	High
	Painting and furnishing operations	High
	Museums and Galleries	High
	Residential properties	Medium
	Food retailers	Medium
	Offices	Medium
	Horticultural Land	Medium
Change in the rate at which mineral material is deposited onto vegetation	Ecological sites	Medium - Low
Change in chemical composition of mineral material deposited	Ecological sites	Medium - Low
	Outdoor Storage	Medium - Low
	Horticultural Land	Low
	Agricultural Land	Low

This construction assessment is consistent with the overarching approach to the assessment of the impacts of construction as set out in current guidance from the Institute of Air Quality Management (IAQM, 2012). The method adopted for this assessment differs from the IAQM's guidance in taking a more conservative, site specific approach to assigning the significance of potential effects. The assessment considers the significance of potential effects with standard mitigation in place (i.e. measures required by legislation) and recommends additional mitigation measures appropriate to the identified risks to receptors.

3.1.2 *Road Traffic Emissions*

The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and sulphur dioxide (SO_2), carbon monoxide (CO), PM_{10} and $PM_{2.5}$ in exhaust emissions. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form NO_X, mainly in the form of nitric oxide (NO), which is then converted to NO_2 in the atmosphere. NO_2 is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

Although SO_2, CO, benzene and 1,3-butadiene are also present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this proposal. Road traffic emissions of these substances have been reviewed by LBC and nowhere within the administrative area is at risk of exceeding these objectives. The development proposals would not be capable of compromising the achievement of the relevant air quality objectives for the protection of human health. Emissions of SO_2, CO, benzene and 1, 3-butadiene from road traffic are therefore not considered further within this assessment.

Therefore, the focus of the assessment for road traffic in relation to the suitability of the site for residential use, will be the key pollutants of NO_2, PM_{10} and $PM_{2.5}$. To undertake the assessment of road traffic emissions during the current baseline (2012) and future baseline (2016) years for the proposed development, the latest version of dispersion model software 'ADMS-Roads' (V3.1) has been used to quantify pollution levels. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (CERC, 2009).

3.1.3 *Energy Plant Emissions*

The proposals include for the installation of a CHP energy plant at the proposed development.

As the CHP would be fuelled by natural gas, the main pollutant of concern would be emissions of NO_X. As is the case of vehicle engines and exhausts, at the high temperatures and pressures found within the plant and its stack, some of the nitrogen in the air and the fuel is oxidised to form NO_x, mainly in the form of nitric oxide (NO), which is then converted to NO_2 in the atmosphere. It also considers the impact of the energy plant on long term and short term concentrations of NO_2.

This assessment also considers the combined impact of the energy plant and road traffic emissions on long term pollutant concentrations at the proposed development site and local air quality sensitive receptors.

3.2 Use of Measurement Data

The LBC undertakes extensive monitoring and measurement of concentrations of NO_2 and PM_{10} within its administrative area, in support of its local air quality management review and assessment process. None of these automatic or passive monitoring and measurement sites are located near Camden Road. In the absence of existing monitoring and measurement data on Camden Road, URS have set up a NO_2 diffusion tube survey in the vicinity of the proposed development site. Three diffusion tube sampling locations were set up on the 1st of August 2013, with triplicate tubes at each site. The diffusion tubes will be changed over a monthly basis for a total of three months. The location of the NO_2 diffusion tube sampling points is displayed in Figure 1.

Two of LBC's automatic monitoring sites that monitor PM_{10} are located within 2.5km of the proposed development site. These are located on Bloomsbury Street and Shaftesbury Avenue (London Borough of Camden, 2010). London Bloomsbury automatic monitoring site is an urban background station and provides an indication of background PM_{10} concentrations within the study area. Shaftsbury Avenue automatic monitoring site is a roadside site, which is representative of concentrations of PM_{10} at locations adjacent to busy roads. All of these sites are at a large distance from the proposed development therefore their results have not been discussed further.

3.3 Air Quality Sensitive Receptors

3.3.1 *Receptors Potentially Affected by Emissions from Construction Phase Works*

When assessing the impact of dust emissions generated during construction works, receptors are defined as the nearest potentially sensitive receptor to the boundary of the site in each direction. These receptors have the potential to experience impacts of greater magnitude due to emissions of particulate matter generated by the works, when compared with other more distant receptors, or less sensitive receptors. Residential receptors located in the vicinity of 79 Camden Road include those on Bernard Shaw Court, Hogarth Court, Bessemer Court, Rochester Place and Wilmot Place.

3.3.2 *Receptors Potentially Affected by Operational Emissions*

The air quality objective values for pollutants associated with road traffic have been set by the Expert Panel of Air Quality Standards at a level below the lowest concentration at which the more sensitive members of society have been observed to be adversely affected by exposure to each pollutant. Therefore all receptors that represent exposure of the public are of equal sensitivity as any member of the public could be present at those locations.

Impacts from emissions associated with the proposed development (i.e. operational CHP emissions) are quantified at three representative receptors near the proposed development (R1 to R3). Pollutant concentrations arising from the proposed development are also quantified at three potential worst case locations of residential exposure in the operational (with CHP emissions)scenario (P1 to P3). The receptors are opposite the main routes (Camden Road and St Pancras Way). Details of these sites are listed in Table 3 and their location is displayed in Figure 1 in Appendix A.

The concentration of road traffic emitted pollutants at the existing and proposed sensitive receptors is influenced by a number of factors. These include background pollution levels and the amount of traffic emissions, which is dictated by traffic flow rates, composition and speed.

All receptors have been modelled to include baseline road traffic emissions and operational CHP Plant pollutant contributions.

Table 3: Air Quality Sensitive Receptors

Receptor	Description	Grid reference		Indicative Floor Level	Height Modelled (metres)
		X	Y		
P1A	Proposed Receptor on Camden Road	529262	184336	Ground	1.5
P2A	Proposed Receptor on St. Pancras Way (East end of Development)	529238	184332	Ground	1.5
P3A	Proposed Receptor on St. Pancras Way (West end of Development)	529204	184355	Ground	1.5
P1B	Proposed Receptor on Camden Road	529262	184336	First	5.5
P2B	Proposed Receptor on St. Pancras Way (East end of Development)	529238	184332	First	5.5
P3B	Proposed Receptor on St. Pancras Way (West end of Development)	529204	184355	First	5.5
P1C	Proposed Receptor on Camden Road	529262	184336	Second	8.5
P2C	Proposed Receptor on St. Pancras Way (East end of Development)	529238	184332	Second	8.5

P3C	Proposed Receptor on St. Pancras Way (West end of Development)	529204	184355	Second	8.5
P1D	Proposed Receptor on Camden Road	529262	184336	Third	11.6
P2D	Proposed Receptor on St. Pancras Way (East end of Development)	529238	184332	Third	11.6
P3D	Proposed Receptor on St. Pancras Way (West end of Development)	529204	184355	Third	11.6
P1E	Proposed Receptor on Camden Road	529262	184336	Fourth	14.7
P2E	Proposed Receptor on St. Pancras Way (East end of Development)	529238	184332	Fourth	14.7
P3E	Proposed Receptor on St. Pancras Way (West end of Development)	529204	184355	Fourth	14.7
R1	Existing Receptor on Rochester Mews	529249	184388	Ground	1.5
R2	Existing Receptor on Rochester Place	529236	184398	Ground	1.5
R3	Existing Receptor on St. Pancras Way	529198	184323	Ground	1.5

3.4 Prediction of Construction Phase Impacts

At present, there are no statutory UK or EU standards relating to the assessment or control of nuisance dust. The emphasis of the control of demolition and construction dust should therefore be the adoption of good working practices on site. Good design practice is a process that is informed by impact assessments and is able to avoid the potential for significant adverse environmental effects at the design stage. This approach assumes that mitigation measures, beyond those inherent in the proposed design, that are identified as being necessary in the impact assessment, will be applied during works (e.g. legal requirements) to ensure potential significant adverse effects do not occur.

Examples of accepted good site practice include guidelines published by the LBC (2008), the Building Research Establishment (Building Research Establishment, 2003), the Greater London Authority (Greater London Authority, 2006) and considerate contractor schemes. A summary of the dust control measures described in the LBC guidance is provided in Appendix C.

A qualitative assessment has been undertaken to assess the significance of any effects on sensitive receptors. The steps in the assessment process are to consider potential sources of emissions on the basis of the four main activity groupings of Demolition, Earthworks, Construction and Track-out (IAQM, 2012). For each activity group the same steps are applied with respect to the potential impacts at identified receptors, before coming to an overall conclusion about the significant of the effects predicted.

The steps are:

- identify the nature, duration and the location of activities being carried out;

- establish the risk of significant effects occurring as a result of these activities;
- review the proposed or embedded mitigation against good site practice;
- identify additional mitigation measures, if necessary, to reduce the risk of a significant adverse effect occurring at receptors; and
- summarise the overall effect of the works with respect to fugitive emissions of particulate matter and then report the significance of the effects.

3.4.1 *Construction Phase Road Traffic Emissions*

The construction phase of the proposed development is likely to lead to a small increase in the number of vehicles on the local highway network, for the duration of the construction works only. Environmental Protection UK (EPUK) (EPUK, 2010) set out criteria to establish the need for an air quality assessment for the construction phase of a development as being:

"Large, long-term construction sites that would generate large HGV flows (>200 per day) over a period of a year or more."

It is unlikely that a development of this size would lead to this number of vehicle movements. The additional number of vehicle movements is not considered to be high enough to have the potential to cause a significant adverse effect at any local air quality sensitive receptor. Construction phase road traffic emissions are not considered further and the effect on local air quality sensitive receptors will not be significant.

3.5 Future Baseline Phase Road Traffic Emissions

Whilst the proposed development would not lead to an increase in vehicle movements and associated emissions beyond baseline conditions, it would introduce sensitive receptors into an area where air quality could potentially be in excess of the national air quality objectives for NO_2 and PM_{10} as a result of existing high traffic flows.

Upon completion of the two months of NO_2 diffusion tube survey, a modelling assessment has been undertaken to quantify the concentrations of NO_2 at the proposed air inlet locations. This has been undertaken using the current version of the Advanced Dispersion Modelling Software ADMS-Roads.

3.6 Prediction of Air Quality Impacts

This assessment has used the latest version of dispersion model software 'ADMS-Roads' to quantify pollution levels at the proposed development. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (CERC, 2009).

The assessment has also used the latest version of ADMS (ADMS v5) to predict emissions from the CHP Plant included as part of the proposed development in the opening year. It has been assumed that the CHP Plant will be in operation 24 hours a day, seven days a week. In reality the total time in operation will be lower due to the need to shut down for essential maintenance. Consequentially by assuming operation to be 100% of the year, the dispersion modelling will provide a conservative assessment as emissions over an annual period are likely to be overestimated.

3.6.1 *ADMS-Roads Dispersion Model Input Data and Model Conditions*

Details of general model conditions input to ADMS Roads are provided in Table 4.

Table 4: General ADMS-Roads Model Conditions

Variables	Model Input
Surface roughness at source	1.5 m
Surface Roughness at Met Site	0.3m
Latitude	51º
Minimum Monin-Obukhov length for stable conditions	100 m
Terrain types	Flat
Receptor location	X, Y coordinates determined by GIS (See Table 3)
Emissions	NO_x, PM_{10}, $PM_{2.5}$
Emission factors	EFT Version 5.2 emission factor dataset
Meteorological data	1 year (2012) hourly sequential data from Heathrow Airport Meteorological station
Receptors	Selected receptors only (see Table 3)
Model output	Long-term annual mean NO_x concentrations Long-term annual mean PM_{10} concentrations Long-term annual mean $PM_{2.5}$ concentrations

3.6.2 *Traffic Data*

The baseline traffic data used within this assessment has been supplied by SKM Traffic Consultants (SKM Traffic Consultants, 2013) and is set out in Appendix B. Due to uncertainties in year-on-year improvements, emission factors for 2012 have been used for both the 2012 and 2016 scenarios. No significant increase in traffic flows are expected due to the exclusion of non-wheelchair parking on-site.

3.6.3 *ADMS 5 Dispersion Model Input Data and Model Conditions*

Details of general model conditions input to ADMS 5 are provided in Table 5.

Table 5: General ADMS 5 Model Conditions

Variables	Model Input
Surface roughness at source	1.5 m
Surface Roughness at Met Site	0.3 m
Latitude	51º
Minimum Monin-Obukhov length for stable conditions	100 m
Terrain types	Flat
Receptor location	X, Y coordinates determined by GIS (see Table 3)
Emissions	NO_X: 0.032 g/s
Stack Height	2 m
Stack Diameter	0.5 m
Stack Location	529233, 184364
Velocity	26.8 m/s
Exit Temperature	130 ºC
Meteorological data	1 year (2012) hourly sequential data from Heathrow Airport Meteorological station
Model output	Long-term annual mean NO_x concentrations 99.79th percentile NO_X concentrations

3.6.4 *ADMS 5 Model input Data*

The input data used within this assessment has been supplied by Ener-G (Ener-G, 2013) and is set out in Table 5 above.

3.6.5 *Meteorological Data*

One year (2012) of hourly sequential observation data from Heathrow Airport meteorological station has been used in this assessment. The station is located approximately 23 kilometres south west of the site and experiences meteorological conditions that are representative of the conditions experienced on Camden Road, in the LBC.

3.6.6 *Background Data*

LBC does not undertake measurements in the vicinity of the site. As there is no local source of background data for NO_2, PM_{10} and $PM_{2.5}$, concentrations have been sourced from Defra's 2012 background maps (Defra, 2013) for receptors within each of the nearest 1km-by-1km cell.

Due to uncertainty in year-on-year improvements in air quality, all 2016 scenarios have been modelled assuming that there are no improvements in background pollutant concentrations. Therefore 2012 background data for NO_2, PM_{10} and $PM_{2.5}$ have been used for the current 2012 baseline and the 2016 year of operation scenario. Table 6 sets out the background concentrations used in this assessment.

Table 6: Annual Mean Background Concentration Data for 2012

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
P1	35.3	21.6	15.0
P2	35.3	21.6	15.0
P3	35.3	21.6	15.0
R1	35.3	21.6	15.0
R2	35.3	21.6	15.0
R3	35.3	21.6	15.0

3.6.7 *Bias Adjustment of Road Contribution Pollutant Concentrations*

Model verification has been informed by the first two months baseline NO_2 survey that was undertaken by URS, commencing on 1st of August 2013. All the sites have 100% data capture for the monitoring period to date.

All the diffusion tube sites performed similarly and therefore were used to create a general adjustment factor to be applied to all results within the study area. Details of the sites are shown in Table 7 below.

Table 7: Summary of Bias Adjustment Process

Diffusion Tube Location	Monitored Road NO_X (µg/m^3)	Modelled Road NO_X (µg/m^3)	Adjusted Modelled Road NO_X (µg/m^3)
DT1	20.1	10.0	38.6
DT2	98.1	28.3	108.9
DT3	130.7	29.7	114.4

The model bias was accounted for by applying the adjustment factor of 3.85 to the model results for all receptors.

In the absence of PM_{10} and $PM_{2.5}$ monitoring data from within the air quality study area, the factors applied to the primary pollutant NO_2 has been applied to these primary pollutants also.

3.6.8 *NO_x to NO_2 Conversion*

To accompany the publication of the guidance document LAQM TG(09), a NO_X to NO_2 converter was made available as a tool to calculate the road NO_2 contribution from modelled road NO_X contributions (Defra, 2009b). The tool comes in the form of an MS Excel spreadsheet and uses Borough specific data to calculate annual mean concentrations of NO_2 from dispersion model output values of annual mean concentrations of NO_X. This tool was used to calculate the total NO_2 concentrations at receptors from the modelled road NO_X contribution and associated background concentration. Due to the location of the proposed development, “all London traffic” setting has been selected.

NO_X emissions from the CHP Plant have been converted into NO_2 concentrations utilising the following relationships taken from the Environment Agency H1 Guidance document (Environment Agency, 2011):

- Short Term NO_X emissions: Assume 50% of NO_x is converted into NO_2; and
- Long Term NO_X emissions: Assume 70% of NO_x is converted into NO_2.

3.6.9 *Predicting the Number of Days in which the PM_{10} 24hr-mean Objective is Exceeded*

The guidance document LAQM TG(03) set out the method by which the number of days in which the PM_{10} 24-hr objective is exceeded can be obtained based on a relationship with the predicted PM_{10} annual mean concentration. The most recent guidance: LAQM.TG(09) (Defra, 2009a) suggests no change to this method. As such, the formula used within this assessment is:

$$\text{No. of } Exceedances = 0.0014 * C^3 + \frac{206}{C} - 18.5$$

Where C is the annual mean concentration of PM_{10}.

3.6.10 *Predicting the Number of Days in which the NO_2 Hourly Mean Objective is Exceeded*

Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner (2003) and (AEAT, 2008)) have concluded that the hourly mean NO_2 objective is unlikely to be exceeded if annual mean concentrations are predicted to be less the 60 µg/m^3.

In 2003, Laxen and Marner concluded:

“…local authorities could reliably base decisions on likely exceedences of the 1-hour objective for nitrogen dioxide alongside busy streets using an annual mean of 60 µg/m^3 and above.”

The findings presented by Laxen and Marner are further supported by AEAT (2008) who revisited the investigation to complete an updated analysis including new monitoring results and additional monitoring sites. The recommendations of this report are:

"Local authorities should continue to use the threshold of 60 µg/m^3 NO_2 as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective."

Therefore this assessment will evaluate the likelihood of exceeding the hourly mean NO_2 objective for roads modelling predictions by comparing predicted annual mean NO_2 concentrations at all receptors to an annual mean equivalent threshold of 60 µg/m^3 NO_2. Where predicted concentrations are below this value, it can be concluded that the hourly mean NO_2 objective (200 µg/m^3 NO_2 not more than 18 times per year) will be achieved.

In addition to the above, short term emission from the CHP Plant have been modelled exclusively to consider the risk of exceedances for the short term objectives for NO_2 and PM_{10}.

3.7 Method for Assessment of Significance

3.7.1 *Construction Phase Emissions Assessment of Significance*

For amenity effects (including that of dust), the aim is to bring forward a scheme, including mitigation measures if necessary, that does not introduce the potential for additional complaints to be generated as a result of the proposed development.

Table 8: Descriptors Applied to the Predicted Adverse Effects of Fugitive Emissions Particulate Matter

Significance of Effect at Single Receptor	Description
Substantial	A significant effect that is likely to be a material consideration in its own right.
Moderate	An significant effect that may be a material consideration in combination with other significant effects, but is unlikely to be a material consideration in its own right
Slight	An effect that is not significant but that may be of local concern
Negligible	An effect that is not significant change

The scale of the risk of adverse effects occurring due to each group of activities, with mitigation in place is described using the terms high, medium and low risk. The basis for the choice of descriptor is set out for each section. Experience in the UK (IAQM, 2012) is that good site practice is capable of mitigating the impact of fugitive emissions of particulate matter effectively. So that in all but the most exceptional circumstances, effects at receptors (Table 8) can be controlled to ensure effects are of negligible or slight adverse significance at worse.

3.7.2 *Operational Emissions Assessment of Significance*

With regard to CHP plant emissions, the change in pollutant concentrations with respect to baseline concentrations has been described at receptors that are representative of exposure to impacts on local air quality within the study area. The absolute magnitude of pollutant concentrations in the baseline and with development scenario is also described and this is used to consider the risk of the air quality limit values being exceeded in each scenario.

For a change of a given magnitude, the Institute of Air Quality Management have published recommendations for describing the magnitude of impacts at individual receptors (Table 9) and describing the significance (Table 10) of such impacts (IAQM, 2009).

Table 9: Magnitude of Changes in Ambient Annual Average Pollutant Concentrations of NO_2

Magnitude of Change	Annual Mean Concentrations of NO_2 (µg/m^3)
Large	Increase/decrease > 4
Medium	Increase/decrease 2 - 4
Small	Increase/decrease 0.4 - 2
Imperceptible	Increase/decrease < 0.4

A change in predicted annual mean concentrations of NO_2, or PM_{10} of less than 0.4 µg/m^3 is considered (IAQM, 2009) to be so small as to be imperceptible. A change (impact) that is imperceptible, given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant.

Table 10: Air Quality Impact Descriptors for Changes in Ambient Annual Average Pollutant Concentrations of NO_2

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value *With* Scheme (>40 µg/m^3)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value *With* Scheme (36-40 µg/m^3)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value *With* Scheme (30-36 µg/m^3)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value *With* Scheme (<30 µg/m^3)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value *Without* Scheme (>40 µg/m^3)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value *Without* Scheme (36-40 µg/m^3)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value *Without* Scheme (30-36 µg/m^3)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value *Without* Scheme (<30 µg/m^3)	Negligible	Negligible	Slight Beneficial

The magnitude of the change in the predicted number of exceedances of the 24-hour objective is directly derived from the predicted annual mean value using the relationship defined in LAQM.TG(03) (Defra, 2003). The magnitude descriptors in the table above are as proposed by Environmental Protection UK (EPUK, 2010).

All relevant receptors that have been selected to represent locations where people are likely to be present are based on impacts on human health. The air quality objective values have been set at concentrations that provide protection to all members of society, including more vulnerable groups such as the very young, elderly or unwell. As such the sensitivity of receptors was considered in the definition of the air quality objective values and therefore no additional subdivision of human health receptors on the basis of building or location type is necessary.

For receptors that are predicted to experience a perceptible change, the effect of the change on local air quality and the risk of exceeding the air quality objective value is summarised in Table 10. A small increase in annual mean concentrations, at receptors exposed to baseline concentrations that are just below the objective value (36 $\mu g/m^3$ to 40 $\mu g/m^3$) is considered to have a slight adverse effect as there is a slight increase in the risk of exceeding the objective value. However, a small increase in annual mean concentration at receptors exposed to baseline concentrations that are below or well below (< 36 $\mu g/m^3$) is not likely to affect the achievement of the objective value and is therefore not a significant effect (negligible).

Short term results are assessed against the short term air quality objective. Environment Agency Guidance concerning 'headroom' has also been discussed. In this headroom approach, the maximum short term contribution should ideally not exceed 20% of the 'headroom' (the short term mean Objective of 200 $\mu g/m^3$ minus double the local background concentration of 35.3 $\mu g/m^3$). The headroom is therefore 129.4 $\mu g/m^3$, 20% of this is 25.9 $\mu g/m^3$.

For the combined impact of CHP and baseline road emissions on short term NO_2, in order to account for local road contributions the maximum modelled road contribution at any receptor has been included in the calculation of headroom (short term mean Objective of 200 $\mu g/m^3$ minus double the local background concentration of 35.3 $\mu g/m^3$, minus maximum predicted road contribution).

3.7.3 *Assessment of Significance*

The significance of all the reported impacts is then considered for the development in overall terms. The potential for the scheme to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principle focus is any change in the likelihood of future achievement of the air quality objective values set out in Table 1 for the following pollutants:

- Annual mean nitrogen dioxide (NO_2) concentration of 40 $\mu g/m^3$;
- Annual mean particulate matter (PM_{10}) concentration of 40 $\mu g/m^3$;
- Annual mean fine particulate matter ($PM_{2.5}$) concentrations of 25 $\mu g/m^3$;
- 24-hour mean PM_{10} concentration of 50 $\mu g/m^3$ not to be exceeded on more than 35 days per year; and
- 1-hour mean NO_2 concentration of 200 $\mu g/m^3$ not to be exceeded on more than 18 times per year.

The achievements of local authority goals for local air quality management are directly linked to the achievement of the air quality objective values described above and as such this assessment focuses on the likelihood of future achievement of the air quality objective values.

In terms of the significance of the consequences of any adverse impacts, an effect is reported as being either 'not significant' or as being 'significant'. If the overall effect of the development on local air quality or on amenity is found to be 'moderate' or 'substantial' this is deemed to be 'significant'. Effects found to be 'minor' are considered to be 'not significant', although they may be a matter of local concern. 'Negligible' effects are considered to be 'not significant'.

4. POTENTIAL BASELINE AIR QUALITY IMPACTS

4.1 Local Dust Conditions

A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity.

Residents currently experience dust deposition at a rate that is determined by the contributors of local and distant sources. This baseline rate of soiling is considered normal and varies dependent on prevailing climatic conditions. The tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

Existing local sources of particulate matter include windblown dust from exhaust emissions of energy plant and road vehicles, break and tyre wear from road vehicles and the long range transport of material from outside the study area.

4.2 Local Monitoring Data

Monitoring and measurement data gathered by LBC over the past few years has shown that the national air quality standard for annual mean concentrations of NO_2 (40µg/m^3) is regularly exceeded at locations across the Borough. Annual mean concentrations exceed 60 µg/m^3 there is also the risk that the hourly mean air quality objective for NO_2 (200 µg/m^3 not to be exceeded 18 times or more in a year) is exceeded. Monitoring undertaken by the LBC is outside the study area for this proposed development. Therefore, URS have set up a NO_2 diffusion tube survey in the vicinity of the proposed development site. Three diffusion tube sampling locations were set up on the 1st of August 2013. At each NO_2 diffusion tube site there are three tubes, therefore URS conducted triplicate NO_2 diffusion tube monitoring at three sites. The diffusion tubes will be changed over a monthly basis for a total of three months. The location and average results of the first two months of NO_2 diffusion tube monitoring is displayed in Table 11 below:

Table 11: Results for One Month of NO_2 Diffusion Tube Monitoring Conducted by URS

Tube ID	Tube Description	Grid Reference		Average of two Months NO_2 concentration ($\mu g/m^3$)*
		X	Y	
DT1	On the A5205 South West Edge of 79 Camden Road	529184	184359	**48.4**
DT2	On Camden Road North East of 79 Camden Road	529275	184348	**77.8**
DT3	South of Saint Pancras Way on Camden Road	529210	184231	**85.2**

*Month 1 NO_2 diffusion tubes were put up on the 1st of August 2013 and were changed on the 29th of August 2013. Month 2 NO_2 diffusion tubes were changed on 26th September. **The bold denotes that each of the diffusion tube NO_2 concentrations are above the annual mean objective for NO_2.**

4.2.1 *Predicted Baseline Traffic Pollutant Concentrations*

Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, and the number of days exceedance of the 24-hr 50 $\mu g/m^3$ PM_{10} air quality objective, at the selected receptors during the baseline scenario, are listed in Table 12.

Table 12: Air Quality Statistics Predicted for Baseline Scenario in 2012 and 2016

Receptor	Annual Mean Concentration ($\mu g/m^3$)			No. Days PM_{10} >50$\mu g/m^3$
	Annual Mean NO_2 ($\mu g/m^3$)	Annual Mean PM_{10} ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)	
R1	46.6	23.3	16.2	9
R2	44.0	22.8	15.9	8
R3	49.8	23.8	16.5	10
Objective Value	**40**	**40**	**25**	**35**

Receptors P1 – P3 are not present in these scenarios

In the 2012 and 2016 baseline scenario predicted annual mean concentrations of NO_2 are above the annual mean national objective at all receptors within the study area. As these concentrations are below the annual mean equivalent value (60 $\mu g/m^3$) for the hourly mean NO_2 objective, exceedances of the hourly objective are unlikely within the study area.

Similarly, in the 2012 baseline scenario annual mean concentrations of PM_{10} and $PM_{2.5}$ are also predicted to be below the air quality objective for that pollutant at all locations within the air quality study area. The number of exceedances of the 24-hr PM_{10} objective is also below the relevant air quality objective.

The results are the same for the baseline scenario in 2016 because no extra traffic is expected through traffic growth in this area (SKM Traffic Consultants, 2013).

4.2.2 *Baseline Dust Climate*

A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can be affected by long range transport of dust from distant sources into the local vicinity.

Residents currently experience dust deposition at a rate that is determined by the contributions of local and distant sources. This baseline rate of soiling is considered normal and varies dependent on prevailing climatic conditions. The tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

Existing local sources of particulate matter includes exhaust emissions from energy plant and road vehicles, break and tyre wear from road vehicles and the long range transport of material from outside the study area.

5. PREDICTED IMPACTS

5.1.1 *Construction Dust Emissions*

Construction of the proposed development will consist of three broad phases:

- Phase One - securing of the site, initial site set up and the demolition of the existing building.
- Phase Two - substructure works, lower ground floor slab and frame and ground floor slab.
- Phase Three - all superstructure works, internal fit out and external works

Phase one of the works will involve structural demolition, and phase two will involve excavations, earthworks and temporary stockpiling of potentially dusty materials. These activities are likely to be the principle sources of dust during these early phases. During the later of phase two and phase three, when the buildings are erected, the principle sources of dust are likely to be from the cutting and grinding of materials and the movement of construction related road vehicles. Phase three, when the majority of the buildings and infrastructure are complete, will involve the landscaping and finishing works. During this phase, the principal sources of dust will include the storage, handling and movement of materials generated during the associated earthworks.

The receptors located close enough to the application site to potentially be adversely effected by the works, are residential properties located in close proximity to the proposed development. These residential receptors include Bernard Shaw Court, Hogarth Court, Bessemer Court and residential properties on Rochester Place. In addition there is a potentially sensitive commercial property at 102 St Pancras Way.

The potential impacts considered at the residential properties are:

- effects on Amenity and Property including changes to the rate of deposition of particulate matter onto glossy surface and other property; and
- changes in 24 hour mean concentrations that might increase the risk of exposure to PM_{10} at levels that could exceed the 24-hr air quality objective.

Demolition

The proposals include the demolition of the existing building at the site. Given the size of the existing building (approximately 54,600 m^3), the demolition works are considered to be large in scale. The nearest receptors are located on Rochester Place and St Pancras Way which is less than 20 metres from the site boundary. With good site practice the proposed development would represent a high risk of dust soiling to the nearest receptors.

Mitigation measures considered good practice include (also refer to Appendix C):

- Agree lines of communication between local authority pollution control officer and contractor(s) prior to commencement of works and procedure for reporting dust events or complaints from local residents;
- Required demolition works to be undertaken in a phased and controlled manner;
- Regular inspections of works for visible signs of emissions of dust and early application of measure to minimise emissions at source; and
- Considerate location of temporary storage of dusty materials and material transfer operations so that it is as far from the nearest sensitive receptors as practicable.

With good site practice the demolition works would have a slight adverse effect on amenity and short-term PM_{10} concentrations at all receptors.

Earthworks

Site clearance works, the digging of trenches for foundations and utilities and temporary stockpiling of material represent the principle activities that may generate emissions of particulate material.

The potential for stockpiles of materials to generate dust depends on the nature of the material. Earth is soft and friable compared to hardcore. However, hardcore generally has a lower moisture content than soil, and consequently they can both be a potential source of dust.

Mitigation measures considered good practice include (also refer to Appendix C):

- agree lines of communication between local authority pollution control officer and contractor(s) prior to commencement of works and procedure for reporting dust events or complaints from local residents;
- minimise drop heights and chutes where practicable;
- during extended periods of dry weather (especially over holiday periods) plan for additional mitigation measures to avoid windblown dust issues both within and outside normal working hours; and
- avoid long term stockpiles of material on site without application of measures to stabilise the material surface, such as application of suppressants or, seeding.

The risk of amenity effects and the amount of mitigation effort required is strongly influenced by weather conditions at the time of the works. The nearest residential receptor is located on Rochester Place less than 20 metres away. The approximate area of the proposed development is 2730 m^2 therefore the dust emission class is medium, therefore the site is of high risk of dust soiling in relation to earthworks, with no mitigation. With good site practice the earthworks could have a slight adverse effect on short term PM_{10} concentrations and amenity at all receptors (IAQM, 2012).

Construction

Dust emissions during construction can give rise to elevated dust deposition and PM_{10} concentrations. These are generally short-lived changes over a few hours or days, which occur over a limited time period of several weeks or months.

Placing activities which are a potential source of PM_{10} such as cutting and grinding of materials and cement mixing (if there is any) away from boundaries would minimise the possibility of exposure to PM_{10} at receptors within 30 m of the site boundary. If this measure is implemented, then impacts on PM_{10} concentrations at local receptors are capable of being reduced to a negligible level.

Good site practice measures during this phase of the project are similar to those described above. These additional measures should also be considered (also refer to Appendix C):

- construction of site roads early enough to avoid the use of haul routes on site; and
- adoption of mobile booths for cutting and grinding operations if work cannot be undertaken away from sensitive receptors.

The nearest residential receptor is located on Rochester Place less than 20 metres from the proposed development and the dust emission class is large and the dust emission class is medium, therefore the site is of high risk of dust soiling in relation to construction, with no mitigation. With good site practice the earthworks could have a slight adverse effect on short term PM_{10} concentrations and amenity at all receptors (IAQM, 2012), depending on the nature, location and duration of activities on site, and prevailing meteorological conditions.

Trackout of Material

Facilities for the washing of vehicles and vehicle wheels might provide an appropriate means of minimising the potential for material to be transferred onto the local road network. However, the use of washing also leads to wetting of local roads near the access and can, if not carefully managed, spread material further along the local road network.

Once on-site roads have been constructed, wheel washing provides less benefit and is not recommended. However regular inspection of the local roads within 200 m of the site access point(s) should be undertaken and street cleaning applied as necessary.

The effect of track-out of material can be minimised by limiting the amount of material transferred onto local roads and by removal of any transferred material from the roads.

At this time it is not known how many HGVs will be accessing the development per day. However, It is assumed that on average the number of HGV's visiting the site will be <25 per day. The nearest residential receptor is located less than 20 metres away on Rochester Place. Therefore the dust emission class for track-out is small. With good site practice (refer to Appendix C) the trackout of material could have a negligible effect on short term PM_{10} concentrations and amenity at all receptors (IAQM, 2012).

The conclusions of the construction dust assessment are summarised in Table 13. Overall the effects of the construction phase activities are considered to be slight adverse (IAQM, 2012).

Table 13: Summary of Construction Phase Emissions Significance, with Mitigation

Source	Effects on Amenity and Property	Ecological Effects	Exposure to PM_{10} at levels that could exceed the 24-hr air quality objectives
Demolition	Slight Adverse	N/A	Slight Adverse
Earthworks	Slight Adverse	N/A	Slight Adverse
Construction	Slight Adverse	N/A	Slight Adverse
Track-out	Negligible	N/A	Negligible
Overall Significance			Slight Adverse

5.1.2 *Operational CHP Plant Emissions*

Predicted short term mean concentrations of NO_2 from the CHP Plant at the selected air quality sensitive receptors in the year of full operation (2016), are listed in Table 14.

Table 14: Process Contribution Short Term 99.79th percentile NO_2 Air Quality Statistics Predicted – Operational Combined Heat and Power Emissions

Receptor	Short Term Mean Process Concentration ($\mu g/m^3$)
	99.79^{th} percentile 1 hr NO_2 ($\mu g/m^3$)
P1A	+ 0.6
P2A	+< 0.1
P3A	+< 0.1
P1B	+ 0.6
P2B	+< 0.1
P3B	+< 0.1
P1C	+ 0.6
P2C	+< 0.1
P3C	+< 0.1
P1D	+ 0.6
P2D	+< 0.1
P3D	+< 0.1
P1E	+ 0.6
P2E	+< 0.1

Receptor	Short Term Mean Process Concentration (µg/m^3)
	99.79th percentile 1 hr NO_2 (µg/m^3)
P3E	+< 0.1
R1	+ 0.6
R2	+< 0.1
R3	+ 0.6
Objective Value	**200**

All of the locations are experiencing increases in short term NO_2 concentration that are less than 10% of the objective value, and are therefore insignificant. All of the locations are also experiencing changes of less than 20% of the available headroom.

The changes in pollutant concentrations that are predicted to occur as a result of the CHP Plant are listed in Table 15.

Table 15: Process Contribution to Annual Mean Air Quality Statistics Predicted in 2016 – CHP Plant Emissions

Receptor	Change in Annual Mean Concentration (µg/m^3)
	Annual Mean NO_2 (µg/m^3)
P1A	+ 0.1
P2A	+< 0.1
P3A	+< 0.1
P1B	+ 0.1
P2B	+< 0.1
P3B	+< 0.1
P1C	+ 0.1
P2C	+< 0.1
P3C	+< 0.1
P1D	+ 0.1
P2D	+< 0.1
P3D	+< 0.1
P1E	+ 0.1

Receptor	Change in Annual Mean Concentration (µg/m^3)
	Annual Mean NO_2 (µg/m^3)
P2E	+< 0.1
P3E	+< 0.1
R1	+ 0.4
R2	+< 0.1
R3	+ 0.2

The above changes are considered to be imperceptible for all but one receptor (R4) which has a small change. The significance of these changes is discussed in the section 5.1.4 which combines the impacts from both road emissions and the CHP Plant.

5.1.3 *Future Baseline Road Traffic Emissions*

Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the 24-hr 50 µg/m^3 air quality objectives, at the selected air quality sensitive receptors and proposed receptors in the future baseline year (2016), as a result of Future Baseline Road Traffic Emissions are listed in Table 16.

Table 16: Annual Mean Air Quality Statistics Predicted in 2016 – Road Traffic Emissions

Receptor	Annual Mean Concentration (µg/m^3)			No. Days PM_{10} >50µg/m^3
	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)	
P1A	74.0	28.5	20.2	23
P2A	61.5	25.9	18.1	15
P3A	49.0	23.7	16.4	10
P1B	62.3	26.0	18.3	15
P2B	55.0	24.7	17.2	12
P3B	46.1	23.2	16.0	9
P1C	52.1	24.1	16.9	11
P2C	48.7	23.6	16.4	10
P3C	43.3	22.8	15.8	8
P1D	45.4	23.0	16.1	9
P2D	43.8	22.8	15.9	8
P3D	41.1	22.4	15.6	8

Receptor	Annual Mean Concentration (µg/m^3)			No. Days PM_{10} >50µg/m^3
	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)	
P1E	41.4	22.4	15.6	8
P2E	40.7	22.3	15.5	7
P3E	39.5	22.1	15.4	7
R1	46.6	23.3	16.2	9
R2	44.0	22.8	15.9	8
R3	49.8	23.8	16.5	10
Objective Value	**40**	**40**	**25**	**35**

As in the baseline scenario, predicted annual mean concentrations of NO_2 with the development in place (future baseline road traffic) are above the objective value at both existing and proposed receptors, in all locations apart from P3E (a proposed receptor on the 5th floor of the development), which is just below the objective. Concentrations at the majority of receptors are below the annual mean equivalent value (60 µg/m^3) for the hourly mean NO_2 objective. At receptors P1A, P2A and P1B, exceedances of the hourly objective are predicted as the annual mean equivalent value for the hourly mean NO_2 objective is exceeded.

5.1.4 *Future Baseline Road Traffic and Operational CHP Plant Emissions*

Predicted annual mean concentrations of NO_2, PM_{10}, and $PM_{2.5}$ and the number of exceedances of the 24-hr 50 µg/m^3 air quality objectives, at the selected air quality sensitive receptors in the year of full operation (2016), as a result of Future Baseline Road Traffic Emissions combined with the Operational CHP Plant Emissions are listed in Table 17.

Table 17: Annual Mean Air Quality Statistics Predicted for the Operational Scenario in 2016 – Combined Road and CHP Emissions

Receptor	Annual Mean Concentration (µg/m^3)			No. Days PM_{10} >50µg/m^3
	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)	
P1A	74.1	28.5	20.2	23
P2A	61.5	25.9	18.1	15
P3A	49.0	23.7	16.4	10
P1B	62.4	26.0	18.3	15
P2B	55.0	24.7	17.2	12
P3B	46.1	23.2	16.0	9

Receptor	Annual Mean Concentration (µg/m^3)			No. Days PM_{10} >50µg/m^3
	Annual Mean NO_2 (µg/m^3)	Annual Mean PM_{10} (µg/m^3)	Annual Mean $PM_{2.5}$ (µg/m^3)	
P1C	52.2	24.1	16.9	11
P2C	48.7	23.6	16.4	10
P3C	43.3	22.8	15.8	8
P1D	45.5	23.0	16.1	9
P2D	43.8	22.8	15.9	8
P3D	41.1	22.4	15.6	8
P1E	41.5	22.4	15.6	8
P2E	40.7	22.3	15.5	7
P3E	39.5	22.1	15.4	7
R1	47.0	23.3	16.2	9
R2	44.0	22.8	15.9	8
R3	50.1	23.8	16.5	10
Objective Value	**40**	**40**	**25**	**35**

As in the baseline scenario, predicted annual mean concentrations of NO_2 with the development in place (future baseline road traffic and operational CHP plant emissions combined) are above the objective value at both existing and proposed receptors in all locations, except for at proposed receptor P3E where it is below the annual mean objective value. Concentrations at the majority of receptors are below the annual mean equivalent value (60 µg/m^3) for the hourly mean NO_2 objective. Predicted concentrations of pollutants at the proposed sensitive receptors are discussed in detail in the section on Site Suitability below.

For short term impacts, to calculate the available headroom when accounting for road traffic impacts, the maximum annual mean road contribution combined with twice the background concentration has been used. The headroom has therefore been calculated as 55.3 µg/m^3 (200 µg/m^3 minus twice the local background of 35.1 µg/m^3, minus the maximum predicted total road concentration at any receptor of 74.1 µg/m^3), 20% of this is 11.1 µg/m^3. The maximum change in short term mean concentration is 0.6 µg/m^3, at R13, which is well below 20% of the available headroom.

Annual mean concentrations of PM_{10} and $PM_{2.5}$ are predicted to be below their respective objectives at all existing and proposed receptors. The number of days exceedance of the 24-hr PM_{10} objective are also predicted to be below the objective.

The changes that are predicted to occur as a result of the proposed development, in relation to the without development conditions for each of the sensitive receptors are listed in Table 18.

Table 148: Change in Annual Mean NO_2 Air Quality Statistics Predicted in 2016

Receptor	Annual Mean NO_2 Concentration ($\mu g/m^3$)
R1	+ 0.4 (S)
R2	+< 0.1 (I)
R3	+ 0.2 (I)

Magnitude of change displayed in Parenthesis: (I) = Imperceptible (S) = Small (M) = Medium (L) =Large.

With regards to annual mean concentrations of NO_2, the proposed development is predicted to have a small impact at receptors R1. At receptors R2 and R3 an imperceptible impact is predicted. At receptor R1 annual mean concentrations of NO_2 are above the objective therefore the change is of slight adverse significance.

In summary, the impact of the proposed development would have an overall negligible adverse effect on surrounding receptors, as only imperceptible to minor changes in NO_2 are predicted, with insignificant changes to short term NO_2 concentrations and no change is anticipated for particulate concentrations.

5.1.5 *Site Suitability*

Three proposed worst case receptor locations have been considered as part of this assessment, at 5 different elevations that represent the different floors of the development.

Predicted annual mean concentrations of NO_2 with the development in place (operational road traffic and the CHP plant emissions combined) are above the annual objective value at the proposed receptors in all locations, except for proposed receptor P3E (a receptor on the 5th floor of the proposed development) where it is below the annual mean objective value. Concentrations at the majority of receptors are below the annual mean equivalent value (60 $\mu g/m^3$) for the hourly mean NO_2 objective. At receptors P1A, P2A and P1B, exceedances of the hourly objective are predicted as the annual mean equivalent value for the hourly mean NO_2 objective is exceeded.

It is therefore considered that given the concentrations of NO_2 predicted at the façade of the proposed development the site would not be suitable for the proposed development without mitigation.

In order for the proposed site to be suitable for its intended use, mitigation measures that could be considered include the following:

- Extract ventilation which brings in air from higher up the building, or on a less sensitive façade where concentrations of NO_2 below the annual mean objective.

The traffic data provided for use in this assessment does not allow for the determination of concentrations at the likely least sensitive façade as no data is available for Rochester Place or Wilmot Place. It is therefore proposed that further monitoring using NO_2 diffusion tubes could be completed, as part of a planning condition, in order to establish an appropriate location for the air inlet.

6. CONCLUSIONS

In general, construction activities have the potential to generate fugitive dust emissions as a result of demolition, construction, earthworks or track-out of material. For the proposed development, the emission of any airborne particulate matter generated by these activities would be controlled using on site management practices to the extent that the proposed development should give rise to effects of negligible significance on dust deposition rates at the nearest sensitive receptors. The impact of fugitive emissions of PM_{10} at these receptors, with proposed receptors, with proposed mitigation applied would be temporarily slight adverse. Overall the effect of fugitive emissions of particulate matter (dust and PM_{10}) from the proposed works with mitigation is considered to be not significant with respect to potential effects on health and amenity.

The advanced dispersion model ADMS-Roads has been used to establish baseline conditions at and around the proposed development. The advanced dispersion model ADMS 5 has been used to quantify the additional contribution to pollutant concentrations at the proposed development and existing surrounding receptors, from the proposed CHP plant in the with development scenario.

In the proposed opening year, annual mean nitrogen dioxide is predicted to be above the national objective value both with and without the development in place. Annual mean particulate matter and fine particulate matter concentrations are predicted to be below the national objective value both with and without the development in place. There is a maximum of 23 predicted days at any receptor where the 24 hour PM_{10} concentration is anticipated to be above $50 \mu g/m^3$.

The impact of the proposed development would have an overall negligible effect on surrounding receptors, as only imperceptible to minor changes in NO_2 are predicted, with insignificant changes to short term NO_2 concentrations and no change anticipated for particulate concentrations.

The suitability of the site for residential use has also been considered. Annual mean concentrations of NO_2 are above the objective, at the worst case locations considered for the site. Parts of the site are therefore considered to require mitigation measures for residential use. For example, with the use of extract ventilation to take in air from a less sensitive façade. It is proposed that further monitoring, using passive NO_2 diffusion tubes is undertaken, as a planning condition, in order to establish an appropriate location for the air inlet.

In conclusion the overall impact of the proposed development on surrounding sensitive receptors is considered to be negligible. With the implementation of mitigation, for site suitability, the proposed development is considered to be consistent with relevant regional and local planning policy for air quality.

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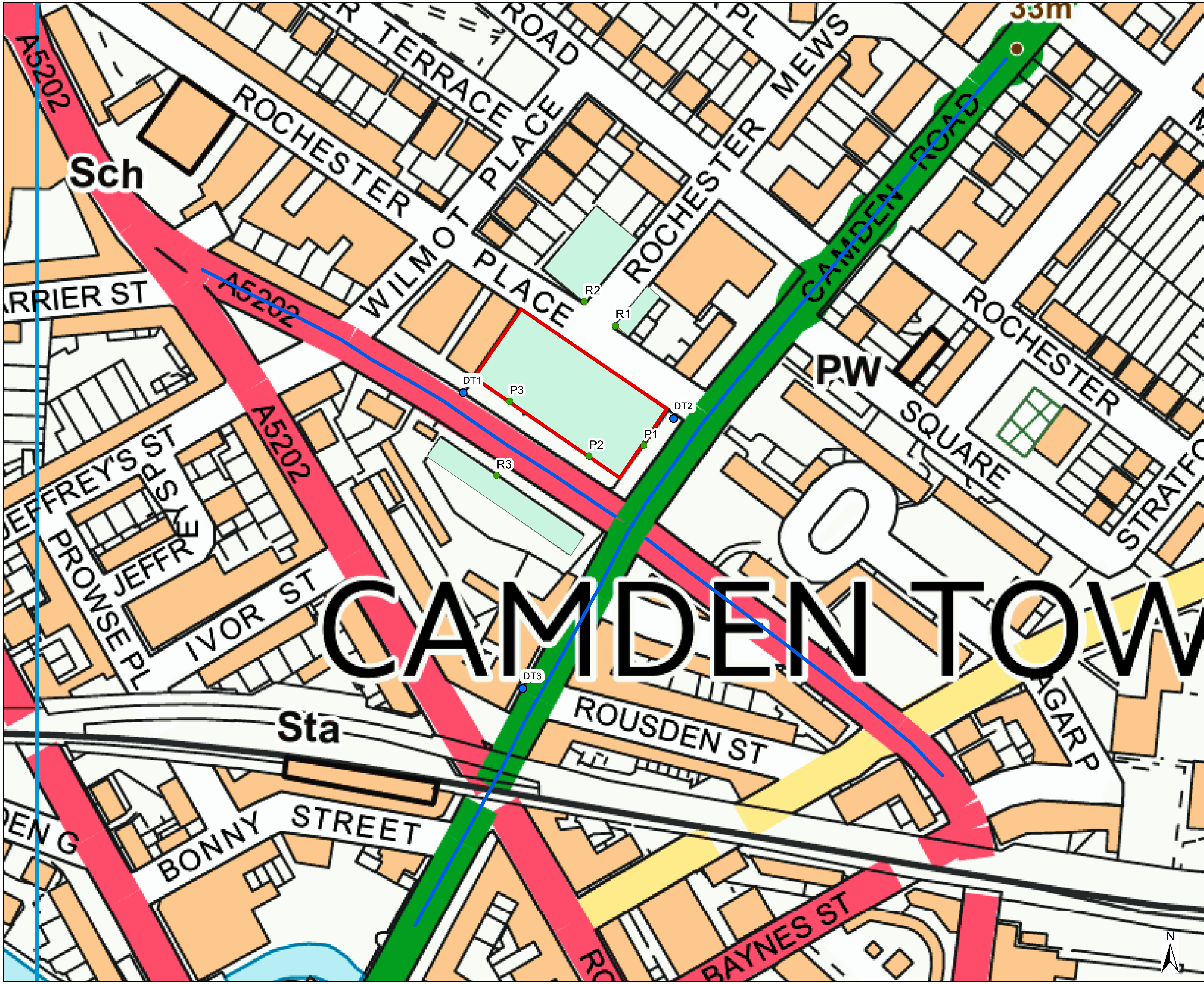
APPENDIX A: FIGURE 1



NOTES

- Model Network
- Receptors
- Diffusion Tubes
- Approximate Red Line Boundary
- Buildings Included in ADMS 5

Final	Revision Details					
	FB	14/10/13	DDe	14/10/13	DDe	14/10/13
Rev #	Revision Details					
	Drawn By	Date	Checked By	Date	Approved By	Date
Stat	Purpose of Issue				Date	App'd

Job Title

79 Camden Road

Drawing Title

Air Quality Study Area

URS Internal Project Number	Zone/Mileage	Suitability
47067825	--	--

Designed	Drawn	Stage 1 check	Stage 2 check	Approved
--	FB	DDe	--	DDe

Scale at A3	Originated	Date
1:1,500	3341	14/10/13

Barratt Homes West London

URS Infrastructure & Environment UK Limited
12 Regan Way,
Chetwynd Business Park,
Chilwell,Nottingham,
NG9 6RZ
Telephone +44(0)115 907 7000
www.ursglobal.com

Drawing Number

Figure 1

Date Saved: 17/10/2013

APPENDIX B: TRAFFIC DATA

Table B1: Summary of Traffic Data

Link	Scenario	AADT (veh/day)	%HDV	Speed (kph)
A503 Camden Road	2013B	30,644	11	48
	2016DM	30,644	11	
	2016DS	30,644	11	
A5202 St Pancras Way	2013B	5,992	12	48
	2016DM	5,992	12	
	2016DS	5,992	12	

*assumed no growth in traffic from the baseline and future year scenarios.

APPENDIX C: SUMMARY OF APPLICABLE DUST MITIGATION DESCRIBED WITHIN LONDON BOROUGH OF CAMDEN'S GUIDANCE

General

"You must implement BPM (Best Practice Means) in order to mitigate dust emissions from construction sites, this can be achieved as follows:

A. *Carry our demolition and construction work in accordance with the Best Practice Guidance Note 'The control of dust emissions from construction and demolition' (2006). This outlines BPM to effectively manage construction work in order to mitigate air pollution emissions;*

B. *When carrying out demolition or construction work during periods of dry or windy weather, there can often be dust problems on sites bordered by homes. You must take measures to reduce the formation and spread of dust. You must control dust at source by using a continuous fine-water spray. You must provide a suitable water supply, and make sure there are enough hoses to reach all parts of the site and a way of getting rid of wastewater;*

C. *There must be adequate screening and damping down during all demolition activities, sandblasting, clearance work, breaking up of existing ground services and other site preparations and activities. You must use existing features of the site, such as boundary walls to provide screening where practicable;*

D. *You must enclose scaffolding with appropriate sheeting material;*

E. *You must provide easy-to-clean hard-standing for vehicles;*

F. *You must keep heavily used areas clean by brushing vehicles and spraying them with water regularly;*

G. *You must control the cutting or grinding of materials on site;*

H. *You must provide a suitable water supply (you may need special authorisation from Thames Water);*

I. *Buildings or structures that are being demolished, or small areas of land that are being prepared for development must be dampened down using high-pressure hoses*

J. *You must use water bowsers on large areas;*

K. *On sites where a large amount of dust has been produced and is laying on the ground, you must use a specialist vehicle to remove dust (by vacuuming) before you damp down the site;*

L. *Major haul routes on the site must be watered as necessary to reduce dust. Where practical, you must compact the route to reduce the amount of soil and other material that is moved around the site. This applied especially near to exits. If machinery movements produce dust, you must set effective speed limits and reschedule work if necessary. If the development involves machinery moving across open land, you must create a suitable track to reduce the amount of dust produced;*

M. *You must enclose materials at all times, and damp down dusty materials using water sprays during dry weather;*

N. *All materials that create dust, including soil, must be stored away from the site boundary screened to prevent wind spreading the dust and damped down where practical. You will need to consider the size and shape of stockpiles to reduce dust;*

O. *Paved roads near to exits must be kept clean. Vehicles transporting materials onto or off the site must be suitably covered where necessary to prevent dust;*

P. *You must use rubble chutes and skips where appropriate. There must be an effective close-fitting cover over the skip to contain all the dust and other rubbish. The chutes must be continuous until they reach the skip, with no gaps, and maintained in good condition;*

Q. *You must not allow rubbish and waste materials to build up on site;*

R. *You must plant, turf or securely cover completed earthworks to stabilise the surface;*

S. *Reducing dust, fumes or other nuisance or environmental effects, which may cause offence to the local community or environment; and*

T. *Reduce environmental effects which may cause offence to the local community by promoting proactive community relations."*

Air Pollution Emissions (Fumes and Smoke)

"Adopting the following mitigation measures will ensure air pollution emissions are effectively controlled:

A. *Before work starts, you must take all necessary precautions to prevent machinery and vehicles from producing smoke and fumes. Petrol and diesel engines used to power equipment and machinery must not produce dark smoke once the running temperature of the engine has been reached, and you must regularly check and maintain them to prevent smoke and fumes;*

B. *You must not light bonfires on the site at any time. You must spray any rotten timber with a suitable fungicide or insecticide before it is taken off the site in a covered skip or lorry;*

C. *You must aim to locate haul routes away from sensitive sites such as houses, schools or hospitals;*

D. *Engines of stationary machinery on or off site, including lorries, must be well maintained and regularly serviced to reduce the amount of visible smoke they produce;*

E. *Engines must not be left running unnecessarily. Machinery and vehicles must not be parked in a positions which could cause a nuisance from exhaust fumes;*

F. *You must position exhausts at a height to disperse fumes;*

G. *You must take precautions to prevent stored fuel oil producing fumes for safety and potential nuisance reasons;*

H. *Contractors must carry out a regular air quality-monitoring programme where there is evidence of volatile or airborne materials and take necessary corrective action;*

I. *Use alternative fuels in contraction vehicles such as LPG, CNG or bio-methane;*

J. *Ensure construction vehicles meet the current Euro Standards thereby reducing NO_x and PM_{10} emissions;*

K. *Use low emissions fuels in vehicles and on site power generators. At a minimum you must use ultra-low sulphur diesel (ULSD) where practicable. The government has a programme to reduce the* *sulphur content in red diesel and ULSD is now available from main suppliers when ordered in bulk. You must also consider options such as natural gas or liquid petroleum gas for power generators;*

L. *Fit abatement technology to machinery such as diesel particle traps and oxidation catalysts to reduce exhaust emissions."*

Sandblasting

"We recommend that you adopt the best practicable means when sandblasting by doing the following:

A. *Close sheeting the work area before work begins to reduce dust nuisance from grit;*

B. *Using water sprays to damp plaster or wall finishes before hacking or blasting it off;*

C. *Not sweeping up dry blast;*

D. *Keeping skips sheeted at all times;*

E. *Carrying out routine checks to make sure that the sheeting continues to be sealed during the work;*

F. *Making sure the working platform is properly sheeted or sealed to contain dust;*

G. *Using non-siliceous grit to avoid the long-term irreversible lung damage from silica dust;*

H. *Protecting any structure that has been painted with lead-based paint;*

I. *Preventing all grit from falling into canals or rivers (Water Resource Act); and*

J. *Follow the requirements of the Environment Agency and Thames Water Utilities Ltd when using water for large scale cleaning and blasting projects."*

Cleanliness

"Dust carried on wheels and the body of road vehicles can deposit on the road and once re-suspended contribute to poor air quality. You must thus put in place strict measures to reduce this problem. This will include, but is not necessary limited to the following:

A. *You must ensure that the site, footpaths and the surrounding area affected by the work are clear from mud, spillage, litter and any unnecessary rubbish;*

B. *You must provide facilities for washing wheels to prevent dirt and dust from being spread onto roads near the site. It is important to locate these facilities away from sensitive local sites.;*

C. *You must provide easy-to-clean hard standings for vehicles that enter and leave the site, and the developer must provide suitable wheel-washing and vehicle spraying equipment at site entrances and exits. Washing and spraying must be carried out in an area with suitable drainage to avoid creating large amounts of mud. The Culture and Environment Directorate can provide street cleaning and power-washing services at competitive rates;*

D. *You must also meet the requirements relating to dust outlined in Section 4.5a; and*

E. *You must make sure that you get rid of any water that has come into contact with any contaminated materials in line with the Water Resource Act 1989 and Water Industry Act 1991 and any other relevant legislation and regulations."*

Managing Resources to Avoid Pollution

“Managing the way you use resources using design which considers the environment. You can also do the following:

- *A. Use design which considers the environment;*
- *B. Carefully choose and use materials and substances, manage resource use, and carefully manage materials so that they produce as little waste as possible;*
- *C. Reuse as much material as possible and recycle the waste that is produced;*
- *D. Monitor all machinery that needs authorisation or licensing to make sure that it meets the appropriate process guidance notes to reduces environmental nuisance and pollution;*
- *E. Make sure that all dangerous substances on site, including oil drums or containers, are controlled in line with ‘Control of Substances Hazardous to Health’ (COSHH) regulations and that no oil and other contaminants are allowed to reach water courses (rivers, streams, and canals) or ground water; and*
- *F. Make sure that you take steps to protect people who use nearby buildings and passers-by from nuisance or harm, and protect buildings from damage.”*