Former Archway Methodist Church

Air Quality Assessment

On behalf of **Heathview Estates**

Project Ref: 30726/3002 | Rev: Issued | Date: September 2014

Office Address: 10 Queen Square, Bristol, BS1 4NT
T: +44 (0)117 928 1560 F: +44 (0)117 928 1570 E: bristol@peterbrett.com

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	Name	Position	Signature	Date
Prepared by:	Celine Bouvet	Graduate Air Quality Scientist		June 2014
Reviewed by:	Graham Harker	Senior Associate		June 2014
Approved by:	Anthony Russell	Partner		June 2014
For and on behalf of Peter Brett Associates LLP				

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1 Introduction

1.1 Proposed Development

1.1.1 Heathview Estates has commissioned Peter Brett Associates LLP (PBA) to undertake an air quality assessment to support the outline planning application for the proposed residential development of the former Archway Methodist Church site, London Borough of Islington.

1.1.2 The proposed site is bounded by Archway Road and St John's Way, and existing residential properties. The proposed development will retain the existing building, with a remodelled roof area. It will provide commercial and community space at ground floor level and 18 residential units on the upper floors. The development will be car free.

1.2 Scope

1.2.1 This report describes existing air quality within the study area, considers the suitability of the site for residential development, and assesses the impact of the construction activities on air quality in the surrounding area. The site will not generate any additional traffic, and therefore the effect of development related traffic has been scoped out of the assessment. The main air pollutants of concern related to construction are dust and fine particulate matter (PM_{10}), whilst for road traffic they are nitrogen dioxide and fine particulate matter (PM_{10}).

1.2.2 There is no CHP or biomass system proposed for the development. All dwellings will be served by low NO_x gas boilers. As such, no assessment of combustion plant emissions has been undertaken.

1.2.3 The assessment has been prepared taking into account relevant local and national guidance and regulations.

2 Legislation and Policy

2.1 The Air Quality Strategy

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

2.1.2 Part IV of the Environment Act 1995 introduced a system of Local Air Quality Management (LAQM). This requires local authorities to regularly and systematically review and assess air quality within their boundary, and appraise development and transport plans against these assessments. The relevant NAQOs for LAQM are prescribed in the Air Quality (England) Regulations 2000 and the Air Quality (Amendment) (England) Regulations 2002.

2.1.3 Where an objective is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the objectives within its AQMA.

2.1.4 The Local Air Quality Management Technical Guidance 2009 (LAQM.TG(09); Defra, 2009) issued by the Department for Environment, Food and Rural Affairs (Defra) for Local Authorities provides advice as to where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year). Thus, for example, annual mean objectives apply at the façades of residential properties, whilst the 24-hour objective (for PM_{10}) would also apply within the garden. They do not apply to occupational, indoor or in-vehicle exposure.

2.2 EU Limit Values

2.2.1 The Air Quality Standards Regulations 2010 implements the European Union's Directive on ambient air quality and cleaner air for Europe (2008/50/EC), and includes limit values for NO_2. These limit values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and the legal responsibility for ensuring that they are complied with. The compliance date for the NO_2 EU Limit Value was 1 January 2010, five years later than the date for the NAQO.

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

2.2.3 Despite many areas of the UK not being compliant with the annual average NO_2 limit value, the UK has decided not to seek an extension to the compliance date for this pollutant. This was on the basis that it could not be guaranteed that the UK would be compliant by the latest date allowable under the Directive (1 January 2015).

2.2.4 The Directive limit values are applicable at all locations except:

- Where members of the public do not have access and there is no fixed habitation;
- On factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and

- On the carriageway of roads; and on the central reservations of roads except where there is normally pedestrian access.

2.3 Planning Policy

National Policy

2.3.1 The National Planning Policy Framework was published in March 2012. This sets out the Government's planning policies for England and how they are expected to be applied. In relation to conserving and enhancing the natural environment, paragraph 109 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."*

2.3.2 Paragraph 124, also 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."

2.3.3 Paragraph 203 goes on to say:

"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."

2.3.4 National Planning Practice Guidance (NPPG) was published in March 2014 to support the NPPF. Paragraph 001, Reference 32-001-20 of the NPPG provides a summary as to why air quality is a consideration for planning:

"…Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit….The local air quality management (LAQM) regime requires every district and unitary authority to regularly review and assess air quality in their area. These reviews identify whether national objectives have been, or will be, achieved at relevant locations, by an applicable date….If national objectives are not met, or at risk of not being met, the local authority concerned must declare an air quality management area and prepare an air quality action plan…..Air quality can also affect biodiversity and may therefore impact on our international obligations under the Habitats Directive…..Odour and dust can also be a planning concern, for example, because of the effect on local amenity."

2.3.5 Paragraph 002, Reference 32-002-20140306, of the NPPG concerns the role of Local Plans with regard to air quality:

"….Drawing on the review of air quality carried out for the local air quality management regime, the Local Plan may need to consider:

- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments;*

- *the impact of point sources of air pollution..; and*

- *ways in which new development would be appropriate in locations where air quality is or likely to be a concern and not give rise to unacceptable risks from pollution. This could be through, for example, identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable."*

2.3.6 Paragraph 005, Reference 32-005-20140306, of the NPPG identifies when air quality could be relevant for a planning decision:

"….When deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

- *Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*

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

- *Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*

- *Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.*

- *Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites."*

2.3.7 Paragraph 007, Reference 32-007-20140306, of the NPPG provides guidance on how detailed an assessment needs to be:

"Assessments should be proportionate to the nature and scale of development proposed and the level of concern about air quality, and because of this are likely to be locationally specific."

2.3.8 Paragraph 008, Reference 32-008-20140306, of the NPPG provides guidance on how an impact on air quality can be mitigated:

"Mitigation options where necessary will be locationally specific, will depend on the proposed development and should be proportionate to the likely impact….Examples of mitigation include:

- *the design and layout of development to increase separation distances from sources of air pollution;*

- *using green infrastructure, in particular trees, to absorb dust and other pollutants;*
- *means of ventilation;*
- *promoting infrastructure to promote modes of transport with low impact on air quality;*
- *controlling dust and emissions from construction, operation and demolition; and*
- *contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development."*

2.3.9 Paragraph 009, Reference 32-009-20140306, of the NPPG provides guidance on how considerations about air quality fit into the development management process by means of a flowchart. The final two stages in the process deal with the results of the assessment:

"Will the proposed development (including mitigation) lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or national objectives for pollutants or fail to comply with the requirements of the Habitats Regulations." If Yes:

"Consider how proposal could be amended to make it acceptable or, where not practicable, consider whether planning permission should be refused."

The London Plan

2.3.10 The London Plan[1] provides strategic planning guidance for Greater London. Each Borough's development plans must be in 'general conformity' with it.

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

- 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;
- Where biomass boilers are included, set out a detailed air quality assessment that should forecast pollutant concentrations. Permission should only be granted if no adverse impacts from biomass are identified; and
- Aim to be 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs).

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

- Seek reductions in levels of pollutants referred to in the Government's National Air Quality Strategy having regard to the Mayor's Air Quality Strategy; and
- Take account of the findings of the Air Quality Review and Assessments and Action Plans, in particular where AQMAs have been designated.

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

[1] Available at: www.london.gov.uk/priorities/planning/londonplan

2.3.14 Supplementary Planning Guidance (SPG) on Sustainable Design and Construction has recently been adopted (April 2014) as part of the Implementation Framework for the London Plan[2]. For air pollution, the Mayor's Priorities are stated as:

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

2.3.15 The Sustainable Design and Construction SPG requires that air quality assessments are prepared for major developments where the development:

- is located within an AQMA;
- is likely to result in a new air pollution exceedence;
- is likely to exacerbate an existing air pollution exceedence;
- is located within 150 metres of a sensitive receptor (schools, hospitals, care homes, nurseries, residential development);
- will bring sensitive receptors into an area of poor air quality;
- includes biomass boilers and/or combined heat and power; or
- involves waste management/treatment activities, mineral extraction or any other general industrial combustion process.

2.3.16 For major developments that meet the above criteria, an air quality assessment is required to be submitted with the planning application and include:

- a review of air quality around the development site using existing air quality monitoring and/or modelling data;
- air quality dispersion modelling data carried out in accordance with the London Councils Air Quality and Planning Guidance;
- an indication of the number of people (receptors) which will be exposed to poor air quality as a result of the development, and show their location on a map;
- an assessment of the impact on air quality during the construction phase and detailed mitigation methods for controlling dust and pollution emissions in line with the emerging revised SPG on *The control of dust and emissions from construction and demolition*; and

[2] Available at: www.london.gov.uk/priorities/planning/consultations/draft-sustainable-design-and-construction

- an outline and justification of mitigation measures associated with the design, location and operation of the development in order to reduce air pollution and exposure to poor air quality; and
- a maintenance regime for any combustion equipment or mitigation measures.

2.3.17 The Sustainable Design and Construction SPG provides guidance on:

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

2.3.18 'Air quality neutral' applies across London as a whole and emission benchmarks have been proposed in terms of buildings' operation and transport emissions in order to meet this criteria. It is understood that the benchmark should be capable of being met without the need for significant additional mitigation. The emission benchmarks are summarised in **Appendix C** along with emissions standards for combustion plant for smaller developments. If the particular combustion equipment is not known at the time of the planning application, developers are required to provide a written statement of their commitment and ability to meet the emissions standards within their Air Quality Assessments.

2.3.19 Where developments do not meet the air quality neutral benchmarks, it is suggested that appropriate on-site mitigation measures will be required to off-set any excess in emissions. Measures could include:

- green planting/walls and screens;
- upgrade or abatement work to combustion plant;
- retro-fitting abatement technology for vehicles and flues; and
- exposure reduction.

2.3.20 In addition, a draft SPG on The Control of Dust and Emissions During Construction and Demolition has been published in September 2013 for consultation as part of the Implementation Framework for the London Plan[3]. The draft SPG provides guidance for:

- the preparation of an Air Quality Statement for construction and demolition activities, including air quality (dust) risk assessments;
- the stages of development the Air Quality Statement is to cover, that is for demolition, earthwork, construction stages and trackout (vehicles leaving the site) stages of the works;
- the identification of the potential scale (large, medium, small) of dust emissions for each stage of work;

[3] Available at: www.london.gov.uk/priorities/planning/consultations/draft-the-control-of-dust-and-emissions-during-construction-and-demolition

- the identification of the level of risk due to the scale of dust emissions on health, soiling (dirt) and the natural environment, depending on activities, their intensity and the sensitivity of receptors;
- best practice methods for controlling dust on-site and to prevent trackout;
- recommendations for monitoring; and
- early notification of new 2015 and 2020 standards for non-road mobile machinery.

2.3.21 If adopted, the draft SPG would require an Air Quality Statement to be submitted at the time of a planning application; with a detailed dust risk assessment prepared at the time of detailed construction and logistics planning for the site, and submitted prior to the commencement of works.

Mayor's Air Quality Strategy

2.3.22 The Mayor's Air Quality Strategy[4] (2010) sets out policies to improve air quality in London and includes the following measures:

- Ensuring that public transport becomes cleaner;
- Reducing traffic growth by improving public transport and encouraging developers to make easy access to public transport in new developments;
- Introduction of Phase 3 of the Low Emission Zone (LEZ) in 2012 to cover PM_{10} emissions from minibuses and heavier Light Goods Vehicles (LGVs), and a LEZ nitrogen oxides (NO_x) standard from 2015.

2.3.23 Policy 7 on 'Using the planning process to improve air quality' aims to ensure that no new development has a negative impact on air quality in London. It states that the Mayor will use his planning powers to:

- Develop a check list to guide boroughs and developers in the assessment of potential emissions from new developments;
- Minimise increased exposure to existing poor air quality, particularly in AQMAs and where developments are to be used by large numbers of vulnerable people;
- Ensure air quality benefits are realised through planning conditions and Section 106 agreements; and
- A package of non-transport policy measures is also proposed to reduce localised pollution sources.

Local Policy

2.3.24 Islington's Local Plan sets out the plans and policies to guide future development within the borough, and is the framework against which planning applications are assessed. It comprises a number of documents, including the Core Strategy (adopted February 2011), which sets out the strategic vision for the borough up to 2025. The Core Strategy highlights that air quality issues in the borough are linked to transportation, and that an integrated approach to sustainable transport is required to bring about improvements.

[4] Available at: www.london.gov.uk/sites/default/files/Air%20Quality%20Strategy%20v3.pdf

2.3.25 The Development Management Policies document was adopted in 2013 and will be used alongside the Core Strategy to determine applications. Policy DM6.1, Healthy Development, (Parts E and F), states:

"Developments in locations of poor air quality should be designed to mitigate the impact of poor air quality to within acceptable limits. Where adequate mitigation is not provided and/or is not practical planning permission may be refused.

Developments should not cause significant harm to air quality, cumulatively or individually. Where modelling indicates significant harm would be caused this shall be fully addressed through appropriate mitigation."

2.3.26 Islington's Local Plan also comprises the Development Management Policies Development Plan Documents (DPD), adopted in June 2013, which contains policies aimed at achieving development that helps deliver the vision and objectives set out in Islington's Core Strategy, to bring forward sustainable development.

2.3.27 Policy DM6.1 – Healthy development of the Development Management Policies DPD states that:

"E. Developments in locations of poor air quality should be designed to mitigate the impact of poor air quality to within acceptable limits. Where adequate mitigation is not provided/or is not practical planning permission may be refused.

F. Developments should not cause significant harm to air quality, cumulatively or individually. Where modelling indicates significant harm would be caused this shall be fully addressed through appropriate mitigation."

2.3.28 Policy DM8.2 – Managing transport impacts from this document also states that:

"A. (…) Where the council considers that a development is likely to have a significant negative impact on the operation of transport infrastructure, this impact must satisfactorily mitigated. In order for developments to be considered acceptable they are required to:

vi) have no significant negative impacts from transport arrangements on the local and wider environment."

The impact on the local and wider environment *"may include impacts that would affect amenity, air quality and noise".*

Islington Air Quality Strategy 2014-2017

2.3.29 The Islington Air Quality Strategy 2014-2017 replaces the Air Quality Action Plan published in 2003. The Strategy sets out measures which the Council has committed to implementing in order to reduce pollution levels within the borough. The measures relate to road traffic and traffic management, industrial emissions and domestic emissions, and include raising awareness, the promotion of sustainable travel options, reducing congestion, managing freight and improving energy efficiency.

3 Methodology

3.1 Existing Conditions

3.1.1 Information on existing air quality has been obtained by collating the results of monitoring carried out by Islington. Background concentrations for the site have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid (Defra, 2014).

3.2 Construction Impacts

3.2.1 During demolition and construction the main potential effects are dust annoyance and locally elevated concentrations of PM_{10}. The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source.

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

3.2.3 The Institute of Air Quality Management (IAQM, 2014) has issued revised guidance on the assessment of dust from demolition and construction. The IAQM guidance recommends that the risk of dust generation is combined with the sensitivity of the area surrounding the site to determine the risk of dust impacts from construction and demolition activities. Depending on the level of risk (high, medium, low or negligible) for each activity, appropriate mitigation is selected.

3.2.4 In accordance with the IAQM 2014 guidance, the dust emission magnitude is defined as either high, medium or low (**Table 3.1**) taking into account the general activity descriptors on site and professional judgement.

3.2.5 The sensitivity of the study area to construction dust impacts is defined based on the examples provided within the IAQM 2014 guidance (**Table 3.2**), taking into account professional judgement.

Table 3.1: Risk Criteria for Dust Emission Magnitude

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

Table 3.2: Area Sensitivity Definitions

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

3.2.6 Based on the dust emission magnitude and the area sensitivity, the risk of dust impacts is then determined (**Table 3.3**), taking into account professional judgement.

Table 3.3: Risk of Dust Impacts

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

3.2.7 Based on the risk of dust impacts, appropriate mitigation is selected from the IAQM 2014 guidance using professional judgement.

Significance Criteria

3.2.8 The construction impact significance criteria are based on the IAQM 2014 guidance. The guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

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

3.3 Road Traffic Impacts

Sensitive Locations

3.3.1 Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, the proposed residential properties are considered to be sensitive receptors.

3.3.2 23 locations on the façade of the proposed buildings have been chosen as receptors (**Figure 3)**. Receptors were modelled at a height of 5.1m, 7.95m, 10.8m and 13.65m, representing residential exposure at first floor to fourth floor levels.

3.3.3 Concentrations have also been predicted at the Archway Close diffusion tube monitor located in close proximity to the site, in order to verify the modelled results (see **Appendix D** for further details on the verification method).

Impact Predictions

3.3.4 Predictions have been carried out using the ADMS-Roads dispersion model (v3.2.4.0). The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of heavy duty vehicles (HDVs), road characteristics (including road width and street canyon height, where applicable), and the vehicle speed. It also requires meteorological data. The model has been run using 2013 meteorological data from the London City monitoring station, which is considered suitable for this area.

3.3.5 Annual Average Daily Traffic (AADT) flows, and the proportions of Heavy Duty Vehicles (HDVs), for roads within 250m of the proposed development site have been taken from the London Atmospheric Emissions Inventory (LAEI). Traffic data used in this assessment are summarised in **Appendix E**.

3.3.6 Emissions were calculated using the Emission Factor Toolkit (EFT) v5.2c, which utilises NO_x emission factors taken from the European Environment Agency COPERT 4 (v8.1) emission tool. The traffic data were entered into the EFT, along with speed data to provide combined emission rates for each of the road links entered into the model. In order to take account of uncertainties relating to future year vehicle emissions, an assessment has been carried out assuming that the development is occupied in 2013, utilising 2013 emission factors and background concentrations, thus assuming no improvement in vehicle emissions or concentrations.

Assessment Criteria

3.3.7 The NAQOs for NO_2 and PM_{10} set out in the Air Quality Regulations (England) 2000 and the Air Quality (England) (Amendment) Regulations 2002, are shown in **Table 3.4**.

Table 3.4: Nitrogen Dioxide and PM_{10} Objectives

Pollutant	Time Period	Objective
Nitrogen dioxide (NO_2)	1-hour mean	200µg/m^3 not to be exceeded more than 18 times a year
	Annual mean	40µg/m^3

Particulate matter (PM_{10})	24-hour mean	50µg/m^3 not to be exceeded more than 35 times a year
	Annual mean	40µg/m^3

3.3.8 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004, respectively, and continue to apply in all future years thereafter. Analysis of long term monitoring data suggests that if the annual mean nitrogen dioxide concentration is less than 60µg/m^3 then the one-hour mean nitrogen dioxide objective is unlikely to be exceeded where road transport is the main source of pollution. This concentration has been used to screen whether the one-hour mean objective is likely to be achieved (Defra, 2009).

Significance

3.3.9 There is no official guidance in the UK on how to assess the significance of air quality impacts of existing sources on a new development. The approach developed by the Institute of Air Quality Management[5], and incorporated in Environmental Protection UK's guidance document on planning and air quality[6], has therefore been used.

3.3.10 This guidance states that the assessment of significance should be based on professional judgement, taking into account the factors set out in **Table 3.5**, with the overall air quality impact of the scheme described as either 'not significant' or of 'minor', 'moderate' or 'major' significance.

Table 3.5: Factors to be taken into Account in Assigning Significance

Factors to be taken into account in assigning significance
Number of people affected by increase and/or decreases in concentrations and a judgement on the overall balance.
Where new exposure is being introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant.
Uncertainty, including the extent to which worst-case assumptions have been made.
The extent to which an objective or limit value is exceeded e.g. an annual mean NO_2 of 41µg/m^3 should attract less significance than an annual mean of 51µg/m^3.

[5] Institute of Air Quality Management, 2009. Position on the Description of Air Quality Impacts and the Assessment of their Significance, November 2009. The IAQM is the professional body for air quality practitioners in the UK.

[6] EPUK, 2010. Development Control: Planning for Air Quality (2010 Update)

4 Baseline Conditions

4.1 LAQM

4.1.1 LB Islington has investigated air quality within its area as part of its responsibilities under the LAQM regime. A whole borough Air Quality Management Area (AQMA) has been declared due to exceedences of the annual and hourly mean nitrogen dioxide objectives, and the daily mean PM_{10} objective.

4.2 Monitoring

4.2.1 LB Islington carried out monitoring of nitrogen dioxide concentrations at a number of locations across the borough. The closest and most representative is the Archway Close site, which is located within a few metres of the site (**Figure 1**). Data for this site are presented in **Table 4.1**.

Table 4.1: Measured Nitrogen Dioxide Concentrations, 2010-2013

Site Name	Site Type	Annual Mean (µg/m^3)			
		2010	2011	2012	2013
Archway Close	R	**54**	**57**	**63**	**51**
Objective		**40**			

Exceedences highlighted in bold.
R=Roadside; UB=Urban Background.
2010 – 2012 data taken from the 2013 Air Quality Progress Report provided by LB Islington. 2013 data provided by the Council.

4.2.2 Measured concentrations have been above the objective in recent years, and have shown no significant change over the 2010-2013 period.

4.3 Background Concentrations

4.3.1 In addition to these measured concentrations, estimated background concentrations for the site have been obtained from the national maps provided by Defra (**Table 4.2**; Defra, 2014). The background concentrations are all below the relevant objectives.

Table 4.2: Estimated Annual Mean Background Concentrations (µg/m^3)

Year	NO_x	NO_2	PM_{10}
2013	57.1	32.8	20.4
Objectives	**-**	**40**	**40**

5 Impact Assessment

5.1 Construction Impacts

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

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

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

5.1.3 Based on the IAQM criteria (**Table 3.1**), the risk of dust emissions is considered to be low. The study area is considered to be of high sensitivity (**Table 3.2**), due to the area being mainly residential. Appropriate mitigation corresponding to a low risk site is therefore required during the construction phase (**Table 3.3**).

5.2 Road Traffic Impacts

5.2.1 Predicted concentrations at the 23 modelled receptors are presented in **Appendix F**. Concentrations were predicted at a height of 5.1m for the first floor, and an additional 2.85m for subsequent floors at all receptors locations, where appropriate (see **Figure 2**). These represent residential exposure from first floor level to fourth floor level.

5.2.2 There are no predicted exceedences of the annual or daily mean objective for PM_{10} at any receptor, including those at first floor level. For NO_2, concentrations exceed the objective for receptors at first and second floor level. At third and fourth floor level, there are no exceedences of the annual mean objective for NO_2.

5.2.3 Predicted concentrations are well below 60µg/m^3 across the proposed development, and therefore the hourly mean objective is unlikely to be exceeded at any location.

Uncertainty

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

5.2.5 A disparity between the national road transport emission projections and measured annual mean concentrations of nitrogen oxides and NO_2 has been identified in recent years[7]. Whilst projections suggest that both annual mean nitrogen oxides and nitrogen dioxide concentrations from road traffic emissions should have fallen by around 15-25% over the past 6 to 8 years, at many monitoring sites levels have remained relatively stable, or have even shown a slight increase. Monitoring data compiled for this assessment indicate that measured nitrogen dioxide concentrations have remained stable in recent years.

5.2.6 In order to take account of uncertainties in future year vehicle emission factors, the assessment has been carried out for 2013, utilising 2013 emission factors and background concentrations. This is considered to provide a conservative assessment of concentrations on site.

[7] Carslaw, D, Beevers, S, Westmoreland, E and Williams, M, 2011. Trends in NO_x and NO_2 emissions and ambient measurements in the UK. Available at: http://uk-air.defra.gov.uk/library/reports?report_id=645

6 Mitigation

6.1 Construction

6.1.1 The following standard low risk mitigation measures from the IAQM 2014 guidance are recommended. These should be included within a Construction Environmental Management Plan (CEMP) and agreed with Local Authority.

Communication

- Display the name and contact details of persons accountable on the site boundary; and
- Display the head or regional office information on the site boundary.

Management

- Record all dust and air quality complaints, identify causes and take measures to reduce emissions;
- Record exceptional incidents and action taken to resolve the situation;
- Carry out regular site inspections to monitor compliance with the dust management plan and record results;
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken;
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible;
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site;
- Avoid site run off of water or mud;
- Remove potentially dusty materials from site as soon as possible;
- Ensure all vehicles comply with the London Low Emission Zone and the NRMM standards, where applicable;
- Ensure all vehicles switch off engines when stationary;
- Avoid the use of diesel or petrol powered generators where possible;
- Produce a Construction Logistics Plan to manage the delivery of goods and materials;
- Only use cutting, grinding and sawing equipment with dust suppression equipment;
- Ensure an adequate supply of water on site for dust suppressant;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate; and

- No on-site bonfires and burning of waste materials on site.

Demolition

- Ensure effective water suppression is used during demolition operations;
- Avoid explosive blasting; and
- Bag and remove any biological debris or damp down such material before demolition.

6.2 Operation

6.2.1 Mechanical ventilation should be provided for units within the development from first floor to second floor level where the annual mean air quality objective for NO_2 is predicted to be exceeded. Inlets for these properties should be located such that they draw air from outside of the area of predicted exceedence, either on the non-road side of the development or higher up the buildings.

6.2.2 In addition, it is recommended that residents should be provided advice regarding when air is most likely to be poor and when it would be advisable to close windows.

7 Conclusions

7.1.1 The air quality impacts associated with the proposed development of the former Archway Methodist Church, Islington have been assessed.

7.1.2 A whole borough Air Quality Management Area (AQMA) has been declared in Islington due to exceedences of the annual and hourly mean nitrogen dioxide objectives, and the daily mean PM_{10} objective.

7.1.3 The construction works have the potential to create dust. During construction it is recommended that a package of mitigation measures is put in place to minimise the risk of elevated PM_{10} concentrations and dust nuisance in the surrounding area.

7.1.4 Annual mean NO_2 concentrations are predicted to exceed the annual mean objective at several future receptor locations on the first and second floors. It is recommended that mechanical ventilation is provided to draw from at least third floor level to ventilate the apartments. There are no exceedences of the PM_{10} objectives at any of the future receptor locations.

7.1.5 With the proposed ventilation strategy, the impact of poor air quality on future residents is considered to be insignificant. This is based on the fact that all properties can be ventilated with air of an acceptable quality.

Appendix A Glossary

Appendix A: Glossary

AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
CAZ	Central Activity Zone
Diffusion Tube	A passive sampler used for collecting NO_2 in the air
EFT	Emission Factor Toolkit
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes Includes HGVs and buses
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides, generally considered to be nitric oxide and NO_2. Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
PM_{10}	Small airborne particles less than 10μm in diameter
Receptor	A location where the effects of pollution may occur
TEA	Triethanolamine

Appendix B References

Appendix B: References

Carslaw, D., Beevers, S., Westmoreland, E. and Williams, M. (2011). *Trends in NO_x and NO_2 emissions and ambient measurements in the UK*. Available: http://uk-air.defra.gov.uk/library/reports?report_id=645.

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Statutory Instrument 2002, No 3034, *The Air Quality (England) (Amendment) Regulations 2002*, HMSO, London.

Statutory Instrument 2007, No. 64, *The Air Quality Standards Regulations 2007*, HMSO, London

Appendix C Benchmarks

Table C.1: 'Air Quality Neutral' Emissions Benchmarks for Buildings (BEBs)

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

The gross floor area (GFA) is used to define the area.

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

Land Use	CAZ	Inner	Outer
NO_x (g/m^2/annum)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NO_x (g/dwelling/annum)			
Residential (C3)	234	558	1553
PM_{10} (g/m^2/annum)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM_{10} (g/dwelling/annum)			
Residential (C3,C4)	40.7	100	267

Appendix D Verification

Nitrogen Dioxide

Most nitrogen dioxide is produce in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emission of nitrogen oxides (NO_x = NO + NO_2). The model has been run to predict the 2013 annual mean road-NO_x contribution at the Archway Close roadside diffusion tube (identified in **Table 4.1**), which is the most representative of the proposed development.

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

An adjustment factor was determined as follows:

- Measured NO_2:51.00µg/m^3
- Measured road-NO_x: 44.07µg/m^3
- Modelled road-NO_x = 34.04µg/m^3
- Road-NO_x adjustment factor: 44.07/34.04 = 1.2946

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

PM_{10}

No monitoring of PM_{10} is carried out in proximity adjacent to the road network in proximity to the development site. The primary adjustment factor calculated for nitrogen dioxide concentrations has therefore been applied to the modelled road-PM_{10} concentrations.

Appendix E Traffic Data

Location	2013	
	AADT	%HDV
Archway Road	23,836	10.29
St. John's Way	4,721	12.52
Holloway Road	29,744	8.47
Junction Road	15,907	8.54
Highgate Hill	18,171	11.87
Roundabout – Highgate Hill to Archway Rd	20,391	10.50
Roundabout – Archway Rd to St. John's Rd	19,047	10.60
Roundabout – St. John's Rd to Holloway Rd/Junction Rd	27,116	9.20
Roundabout – Holloway Rd/Junction Rd to Highgate Hill	23,677	9.70

Appendix F Predicted Concentrations

Table F.1: Predicted Annual Mean NO_2 Concentrations at Proposed Receptors, 2013

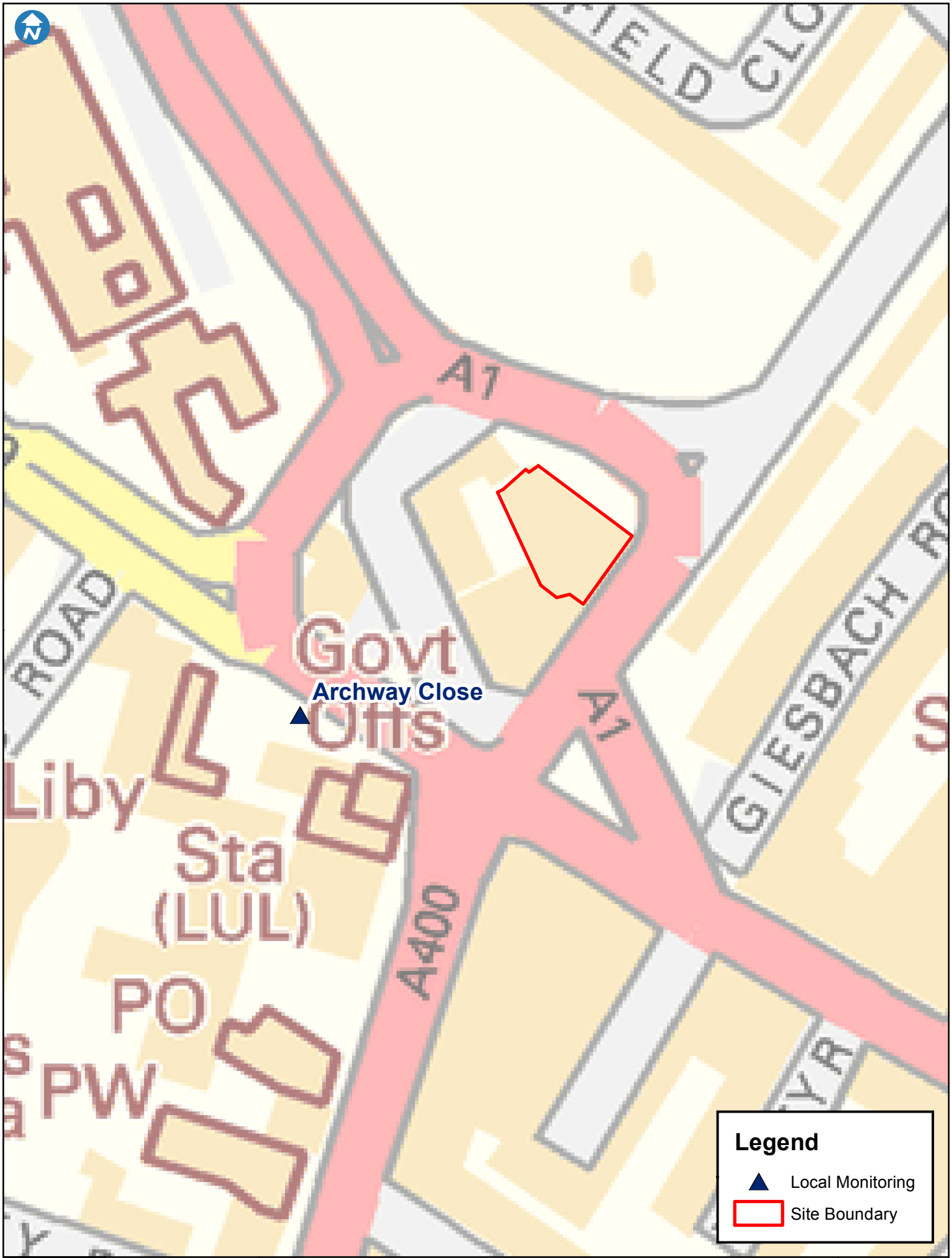
Type of Receptor	Receptor	Annual Mean (µg/m^3)			
		First Floor (5.1m)	Second Floor (7.95m)	Third Floor (10.8m)	Fourth Floor (13.65m)
Residence	R1	**44.2**	**41.9**	**-**	**-**
	R2	**44.9**	**41.9**	**-**	**-**
	R3	**45.1**	**41.9**	**-**	**-**
	R4	**47.0**	**42.0**	**-**	**-**
	R5	**46.7**	**42.4**	**-**	**-**
	R6	**-**	**-**	39.4	37.4
	R7	**-**	**-**	39.2	37.3
	R8	**-**	-	39.3	37.3
	R9	**-**	-	39.2	37.3
	R10	**-**	**-**	39.2	37.3
	R11	**-**	-	39.3	37.4
	R12	-	-	39.4	37.5
	R13	-	-	39.4	37.5
	R14	-	-	39.5	37.5
Terrace	T1	**44.4**	**-**	-	-
	T2	**44.9**	**-**	-	-
	T3	**45.2**	**-**	-	-
Balcony	B1	**46.4**	**42.2**	-	-
	B2	**-**	**41.9**	-	-
	B3	**-**	**41.9**	-	-
	B4	**-**	**-**	39.4	37.5
	B5	-	-	39.2	37.3
	B6	-	-	39.5	37.5
Objective		**40**			

Table F.2: Predicted PM_{10} Concentrations at Proposed Receptors, 2013

Type of Receptor	Receptor	Annual Mean ($\mu g/m^3$)	Number of days >50 $\mu g/m^a$
Residence (5.1m)	R1	21.5	5
	R2	21.6	6
	R3	21.6	6
	R4	21.8	6
	R5	21.8	6
	R6	21.0	5
	R7	21.0	5
	R8	21.0	5
	R9	21.0	5
	R10	21.0	5
	R11	21.0	5
	R12	21.0	5
	R13	21.0	5
	R14	21.0	5
Terrace (5.1m)	T1	21.5	6
	T2	21.6	6
	T3	21.6	6
Balcony (7.95m)	B1	21.7	6
	B2	21.3	5
	B3	21.3	5
Balcony (10.8m)	B4	21.0	5
	B5	21.0	5
	B6	21.0	5
Objectives		**40**	**35**

[a] The number of days with PM_{10} concentrations greater than $50\mu g/m^3$ have been estimated from the relationship with the annual mean concentrations described in Defra, 2009.

Appendix G Figures



pba peterbrett
Offices throughout the UK and Europe
www.peterbrett.com
Peter Brett Associates LLP
BRISTOL
Tel: 0117 928 1560 Fax: 0117 928 1570

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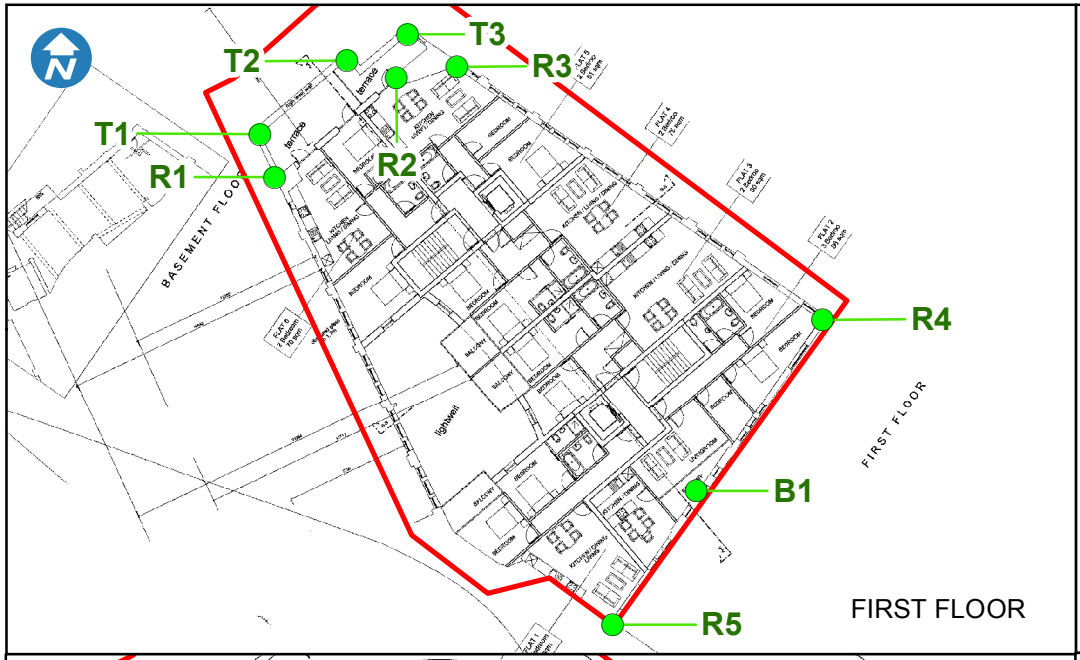
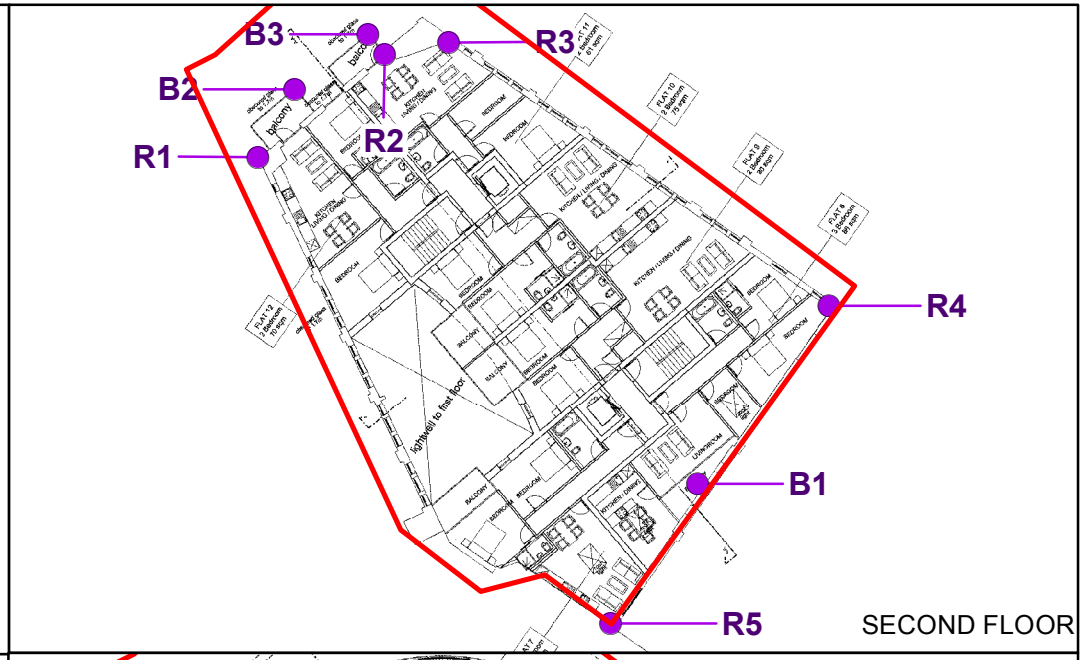
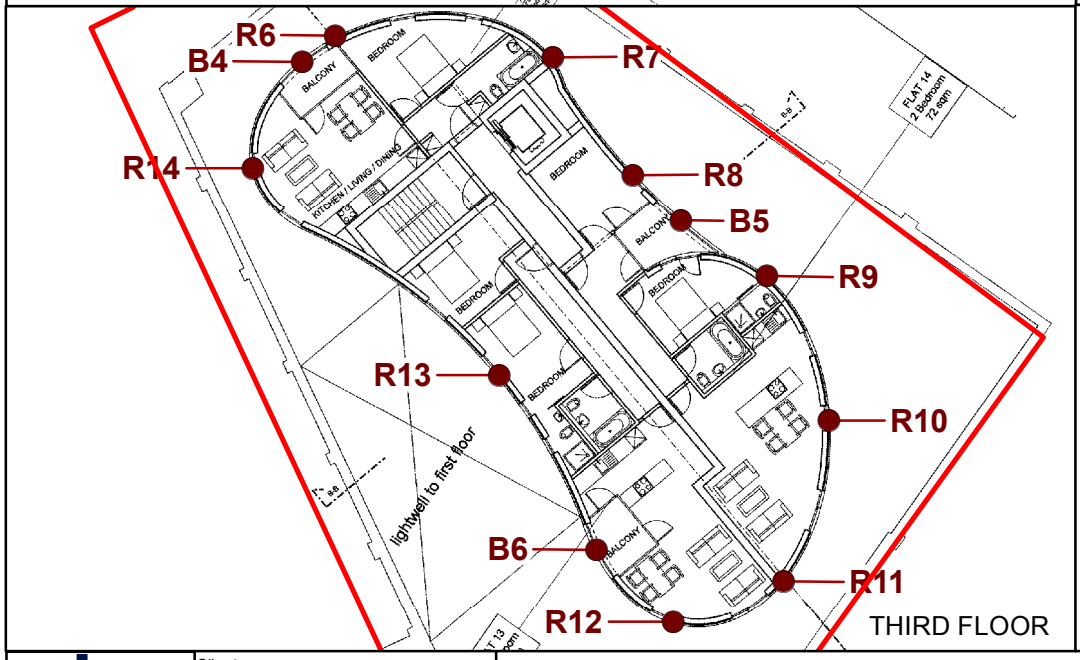
Former Archway Methodist Church

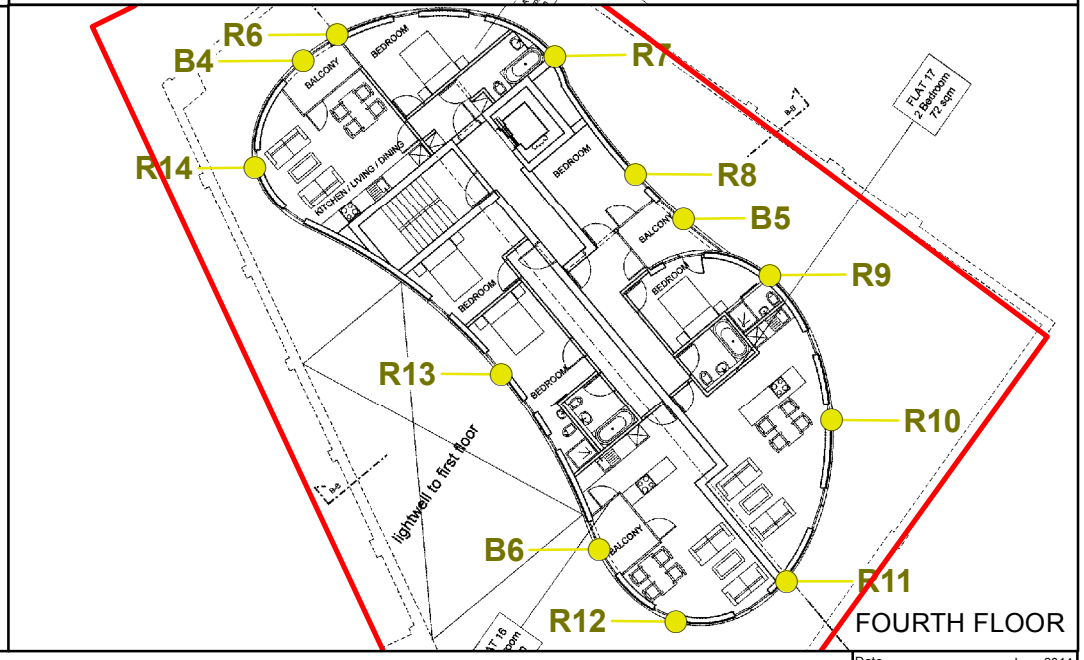
Site Location

Date	June 2014
Scale	N.T.S.
Drawn By	ZR
Checked By	CB
Figure Number	**Figure 1**









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Receptors

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