CAMDEN TOWN HALL

LENDLEASE CONSULTING (EUROPE) LTD ON BEHALF OF LONDON BOROUGH OF CAMDEN

AIR QUALITY ASSESSMENT

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lendlease

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Air Quality Assessment

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1 Introduction

Ove Arup & Partners Limited (Arup) has been commissioned by Lendlease, to undertake an air quality assessment for the refurbishment of the Camden Town Hall. The report has been prepared in support of the planning and listed building consent application for the part change of use and refurbishment of the Grade II listed building.

This air quality appraisal report includes: a summary of relevant air quality legislation; describes the existing air quality conditions in the vicinity of the site; the methods used to assess likely significant effects; an assessment of the potential impact; and recommended mitigation.

1.1 Description of the Development

The Camden Town Hall (CTH), formerly St Pancras Town Hall, was built between 1934-37 to designs by AJ Thomas. It is a Grade II listed building, bounded by Judd Street, Euston Road, Tonbridge Walk and Bidborough Street. It is located in the King's Cross Conservation Area, and on the boundary of the Bloomsbury Conservation Area. It has been the primary public building and focus of the civic and democratic functions of the London Borough of Camden.

The site is bounded to the north by Euston Road, a major road with fast flowing traffic. Directly to the north of the site is St Pancras Station and Chambers and the St Pancras Renaissance Hotel. Adjacent to this, on either side, are the Grade I listed British Library and Kings Cross Station. To the west of the site, on Judd Street, are office buildings and student accommodation; the offices of the Royal National Institute for the Blind are located to the south-west of the site. Directly south of the site on Bidborough Street are the Queen Alexandra Manson Block, a 5-7 storey residential block. At the end of Bidborough Street is the Argyle Primary School. Directly to the east of the site, on Tonbridge Walk is the old Town Hall Annex, which is being converted into a hotel.

The proposals seek to improve and upgrade the Grade II listed building, while finding new uses to operate alongside the remaining Town Hall functions. The application seeks a part change of use from Sui Generis Town Hall to B1 office space (Basement, Second and Third floor), retention of the civic and democratic uses at Ground and First floor and the change of use of the Camden Centre from Sui Generis to Events Use.

The proposals include works to improve the Judd Street entrance and reception, reorganisation of the registry and marriage suites, and technological improvements to the Council Chamber alongside sensitive conservation repairs to the most historically significant spaces.

A new commercial office entrance is proposed on the Bidborough Street elevation to provide access to the Second and Third floors which will be converted to commercial office and the basement which will be converted to a space for small and medium-sized companies.

The Camden Centre will be let commercially to a new events company who will continue to operate the space putting on a range of commercial events.

The location of the proposed development is shown in Figure 1.

Figure 1: Location of the proposed development site

2 Air Quality Legislation

2.1 European Air Quality Management

In 1996 the European Commission published the Air Quality Framework Directive on ambient air quality assessment and management (96/62/EC)[1]. This Directive defined the policy framework for 12 air pollutants known to have harmful effects on human health and the environment. Limit values (*pollutant concentrations not to be exceeded by a certain date*) for each specified pollutant were set through a series of Daughter Directives, including Directive 1999/30/EC (the 1st Daughter Directive)[2] which sets limit values for nitrogen dioxide (NO_2) and particulate matter (PM_{10}) (amongst other pollutants) in ambient air.

In May 2008 the Directive 2008/50/EC[3] on ambient air quality and cleaner air for Europe came into force. This Directive consolidates the previous Directives (apart from the 4th Daughter Directive) and provides a new regulatory framework for $PM_{2.5}$ and makes provision for extended compliance deadlines for NO_2 and PM_{10}.

The Directives were transposed into national legislation in England by the Air Quality Standards Regulations 2010[4]. The Secretary of State for the Environment has the duty of ensuring compliance with the air quality limit values.

2.2 Environment Act 1995

Part IV of the Environment Act 1995[5] places a duty on the Secretary of State for the Environment to develop, implement and maintain an air quality strategy with the aim of reducing atmospheric emissions and improving air quality. The national air quality strategy (NAQS) for England, Scotland, Wales and Northern Ireland provides the framework for ensuring compliance with air quality limit values based on a combination of international, national and local measures to reduce emissions and improve air quality. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of local air quality management and declare Air Quality Management Areas (AQMAs) where necessary.

2.3 Air Quality Objectives and Limit Values

Air quality limit values and objectives are quality standards for clean air. Some pollutants have standards expressed as annual mean concentrations due to the chronic way in which they affect health or the natural environment (i.e. effects occur (long-term) after a prolonged period of exposure to elevated concentrations)

[1] Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management
[2] Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air
[3] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
[4] The Air Quality Standards Regulations 2010, SI 2010/1001.
[5] Environment Act 1995, Chapter 25, Part IV Air Quality

and others have standards expressed as 24-hour, 1-hour or 15-minute average concentrations (short-term) due to the acute way in which they affect health or the natural environment (i.e. after a relatively short period of exposure). Some pollutants have standards expressed in terms of both long-term and short-term concentrations. Table 1 sets out the air quality standards (EU air quality limit values and national air quality objectives) for the pollutants relevant to this study (NO_2 and particulate matter).

Table 1: Air quality standards

Pollutant	Averaging period	Limit value/objective
Nitrogen dioxide (NO_2)	1 hour mean	200µg/m^3, not to be exceeded more than 18 times a year (99.79th percentile)
	Annual mean	40µg/m^3
Particulate matter (PM_{10})	Daily mean	50µg/m^3, not to be exceeded more than 35 times a year (90.4th percentile)
	Annual mean	40µg/m^3
Fine particulate matter ($PM_{2.5}$)	Annual mean	25µg/m^3

2.3.1 Dust Nuisance

Dust is the generic term that the British Standard document BS 6069 (Part Two) used to describe particulate matter in the size range 1 – 75 µm (micrometers) in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990, dust nuisance is defined as a statutory nuisance.

There are currently no standards or guidelines for dust nuisance in the UK, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology, and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. In law, complaints about excessive dust deposition would have to be investigated by the local authority and any complaint upheld for a statutory nuisance to occur. However, dust deposition is generally managed by suitable on-site practices and mitigation rather than by the determination of statutory nuisance and/or prosecution or enforcement notice(s).

3 Policy and Guidance

3.1 National Policy and Guidance

The land-use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality consideration that relates to land-use and its development can be a material planning consideration in the determination of planning applications, dependent on the details of the proposed development.

3.1.1 National Planning Policy Framework (2019)

The National Planning Policy Framework (NPPF)[6] was updated in February 2019 with the purpose of planning to achieve sustainable development. Paragraph 181 of the NPPF on air quality states that:

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

In addition, paragraph 103 states that:

> *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."*

Paragraph 170 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. In relation to air quality, NPPF notes that this can be achieved by:

> *"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable*

[6] Ministry of Housing, Communities & Local Government, National Planning Policy Framework, February 2019
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf

levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

3.1.2 Planning Practice Guidance (2014)

Planning Practice Guidance (PPG) on various topics was published[7]. However, the PPG in relation to air quality has not yet been updated to reflect the changes in the latest NPPF published in July 2018 as outlined above. The current version of the guidance refers to the significance of air quality assessments to determine the impacts of proposed developments in the area and describes the role of local and neighbourhood plans with regard to air quality. It also provides a flowchart method to assist local authorities to determine how considerations of air quality fit into the development management process.

3.1.3 Local Air Quality Management Policy and Technical Guidance

The 2016 policy guidance note from Defra, LAQM.PG(16)[8], provides additional guidance on the links between transport and air quality and guidance on the links between air quality and the land-use planning system. It summarises the main ways in which the land-use planning system can help deliver compliance with the air quality objectives. This guidance is relevant to any external organisations who may wish to engage with the local authority to assist in the delivery of their statutory duties on managing air quality.

The LAQM Technical Guidance, TG(16)[9] is designed to support local authorities in carrying out their duties to review and assess air quality in their area. LAQM TG(16) is published at the UK level and is relevant to England, Scotland, Wales and Northern Ireland with the exception of London. It provides detailed guidance on how to assess the impact of measures using existing air quality tools. Where relevant, this guidance has been taken in to account in this assessment.

3.2 Regional Policy and Guidance

3.2.1 The London Plan

The London Plan, consolidated with alterations in 2016[10], forms part of the development strategy for the Greater London Authority (GLA) until 2036 and integrates all economic, environmental, transport and social frameworks. This has been amended to be consistent with the NPPF. Specifically, for new development

[7] Department for Communities and Local Government (2014) Planning Practice Guidance: Air Quality
[8] Defra (2016) Local Air Quality Management Policy Guidance. PG(16)
[9] Defra (2016) Local Air Quality Management Technical Guidance.TG(16).
[10] Greater London Authority (2016) The London Plan: The Spatial Development Strategy for London Consolidated With Alterations Since 2011

proposals the London Plan looks at air quality by proposing the following measures:

- minimise increased exposure to existing poor air quality and make provisions to address local problems of air quality, through means such as design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans;
- promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following best practice guidance;
- developments should be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs);
- ensure that where provision is needed to reduce emissions from a development, this is usually made on-site; and
- where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations.

These policies have been considered throughout this air quality assessment.

3.2.2 The London Environment Strategy

The London Environment Strategy (LES)[11] was published in May 2018 and sets out the Mayor's vision for London's environment in 2050. It is a strategy that brings together approaches from multiple aspects of London's environment in an integrated document. In relation to planning, the LES proposes new large-scale developments in London to be 'air quality positive'. It aims for larger development to go further than being 'air quality neutral' and implement effective design and integration to surrounding area to boost local air quality. The key aim is to ensure that emissions and exposure to pollution are reduced and air quality positive emphasises the importance of considering air quality very early in the design process.

3.2.3 Sustainable Design and Construction Supplementary Planning Guidance

Supplementary Planning Guidance (SPG) for Sustainable Design and Construction[12] was published in April 2014 by the GLA. Section 4.3 of the SPG focuses on air pollution and provides guidance on when assessments should be undertaken and how intelligent design can help to minimise the effect of a development on local air quality. The primary way in which the guidance aims to minimise air quality impacts is by setting an 'air quality neutral' policy for buildings, as well as emissions standards for combustion plants. The air quality neutral policy sets benchmarks against which the annual emissions of nitrogen

[11] Greater London Authority (2018) The London Environment Strategy
[12] Greater London Authority (2014) Sustainable Design and Construction Supplementary Planning Guidance

oxides (NOx) and PM_{10} from combustion plant of a proposed development should be assessed.

Emission standards for combustion plants are also outlined in the SPG for individual and/or communal gas boilers and for biomass boilers and CHP plants with a thermal input greater than 50kW_{th}.

For smaller combustion plant the GLA SPG guidance states that:

> *"Where individual and/or communal gas boilers are installed in commercial and domestic buildings they should achieve a NOx rating of <40 mgNOx/kWh."*

3.2.4 The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance

The Control of Dust and Emissions during Construction and Demolition SPG[13] was published in July 2014 by the GLA. It seeks to reduce emissions of dust, PM_{10} and $PM_{2.5}$ from construction and demolition activities in London. It also aims to manage emissions of NO_x from construction and demolition machinery by means of a new non-road mobile machinery (NRMM) ultra-low emissions zone (ULEZ).

3.2.5 London Local Air Quality Management Technical Guidance

The London Local Air Quality Management technical guidance (LLAQM.TG(16))[14] applies only to London's 32 boroughs (and the City of London), while LAQM.TG(16) applies to all other UK local authorities. Although the LLAQM.TG(16) technical guidance has many common elements with the updated national guidance LAQM.TG(16), it does incorporate London-specific elements of the LAQM system.

This guidance is designed to support London authorities in carrying out their duties to review and assess air quality in their area. Where relevant, this guidance has been taken into account in this assessment.

3.3 Local Policy and Guidance

3.3.1 The London Borough of Camden

The London Borough of Camden (LBC)'s 2016 Local Plan[15], adopted in 2017, sets out the Council's planning policies and replaces the Core Strategy and

[13] Greater London Authority (2014) The Control of Dust and Emissions during Construction and Demolition, Supplementary Planning Guidance
[14] Greater London Authority (2016) London Local Air Quality Management Technical Guidance TG (16).
[15] Camden Local Plan (2017) adopted 2017, https://www.camden.gov.uk/documents/20142/4820180/Local+Plan.pdf/ce6e992a-91f9-3a60-720c-70290fab78a6 [accessed March 2019]

Development Policies planning documents (adopted in 2010). It ensures that Camden continues to have robust, effective and up-to-date planning policies that respond to changing circumstances and the borough's unique characteristics and contribute to delivering the Camden Plan and other local priorities. The Local Plan will cover the period from 2016-2031. The Local Plan discussed air quality in several policies:

Policy A1 Managing the impact of development

> *"The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity."… "The factors we will consider include:" "… odour, fumes and dust;"*

Policy CC4 Air Quality

> *"The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.*
>
> *The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.*
>
> *Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.*
>
> *Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan."*

The LBC also provides further details on their website of when an AQA is deemed necessary and the information that is expected to be included. For a basic AQA, this includes:

- a review of air quality around the development site using existing air quality monitoring and/or modelling data;
- an assessment of the impact on air quality during the construction phase and detailed mitigation methods for controlling dust and pollution emissions associated with plant and vehicles;
- an indication of the number of receptors that will be exposed to poor air quality as a result of the development, with the locations shown on a map;

- the significance of air pollution exposure should be quantified in accordance with the "Air Quality Impact Significance Criteria – New Exposure" outlined in the NSCA Guidance Note; and
- 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. Where a proposed development is in an area of poor air quality it is essential to demonstrate that from the earliest stages, the building has been designed to reduce occupant exposure. This includes consideration of orientation, elevation of residences, and the use of green infrastructure such as green walls, screens and trees.

In addition, for a detailed AQA, the following should be included:

- air quality dispersion modelling data carried out in accordance with the London Councils Air Quality and Planning Guidance[16];
- an indication of the number of receptors that will be exposed to poor air quality as a result of the development, with their locations shown on a map;
- the significance of air pollution exposure should be quantified in accordance with the "Air Quality Impact Significance Criteria – New Exposure" outlined in the NSCA Guidance Note; and
- 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. Where a proposed development is in an area of poor air quality it is essential to demonstrate that from the earliest stages, the building has been designed to reduce occupant exposure. This includes consideration of orientation, elevation of residences, and the use of green infrastructure such as green walls, screens and trees.

The air quality planning checklist provided by LBC, is shown in Appendix A, with point by point responses showing how the requirements have been implemented in this assessment.

3.3.2 Camden Planning Guidance (CPG)

The Council has prepared the Camden Planning Guidance (CPG)[17] on air quality to support the policies in the Camden Local Plan 2017. This guidance is therefore consistent with the Local Plan and forms a Supplementary Planning Document (SPD) which is an additional "material consideration" in planning decisions.

Paragraph 2.5 states that

[16] London Councils, 2007. Air Quality and Planning Guidance. Accessed: June 2018. Available at: https://www.londoncouncils.gov.uk/our-key-themes/environment/air-quality/london-councils-air-quality-and-planning-guidance

[17] Camden Planning Guidance (2018) Draft, https://www.camden.gov.uk/documents/20142/4823269/Air+quality+CPG.pdf/2660c2af-1782-7f0c-4e76-ab87adc4fdbb [accessed March 2019]

"A number of policies in the Local Plan actively supports the improvement of air quality in the borough. The key focus of policy CC4 in the Local Plan is to improve local air quality by:

- *mitigating the impact of development on air quality; and*
- *reducing exposure to poor air quality."*

Paragraph 2.6 states that

"The Council's overarching aim for developments is to be 'air quality neutral' in operation, not to lead to further deterioration of existing poor air quality, and, where possible, to improve local air quality ('air quality positive') through additional measures on and off site. Impacts can arise during both the construction and operational stages of a development as a result of increased NO_2 and particulate ($PM_{2.5}$ and PM_{10}) emissions."

Paragraph 4.15 states that

"Gas boilers are a large source of NO_x emissions in Camden. In order to minimise NOx emissions arising from heating and hot water systems the Council requires boilers fitted in new development to achieve a NO_x emission of <40 mg/m3 and an energy efficiency rating >90%."

3.4 Other Relevant Policy and Guidance

3.4.1 Institute of Air Quality Management Dust Guidance

The Institute of Air Quality Management (IAQM) guidance[18] provides guidance to development consultants and environmental health officers on how to assess air quality impacts from construction. The IAQM guidance provides a method for classifying the significance of effects from construction activities based on the 'dust magnitude' (high, medium or low) and proximity of the proposed development to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. Experience has shown that once the appropriate mitigation measures are applied, in most cases the resulting dust impacts can be reduced to negligible levels.

The method outlined for dust assessment is the same as in the GLA Control of Dust and Emissions during Construction and Demolition SPG[10] and therefore both the IAQM methodology and GLA method has been considered in this assessment.

3.4.2 EPUK/IAQM Land-use Planning and Development Control

The 2017 Land-Use Planning & Development Control guidance document[19] produced by Environmental Protection UK (EPUK) and the IAQM provides a

[18] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)
[19] EPUK/IAQM, (2017) Land-Use Planning & Development Control: Planning for Air Quality

framework for professionals operating in the planning system to provide a means of reaching sound decisions, with regard to the air quality implications of development proposals.

The document provides guidance on when air quality assessments are required by providing screening criteria regarding the size of a development, changes to traffic flows/composition energy facilities or combustion processes associated with the development.

4 Methodology of Assessment

4.1 Scope of Assessment

The overall approach to the air quality assessment comprises:

- A review of the existing air quality conditions at, and in the vicinity of, the proposed development;
- An assessment of the potential changes in air quality arising from the construction and operation of the proposed development;
- Air quality neutral assessment as required by the Greater London Authority (GLA) Supplementary Planning Guidance (SPG);
- Formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised; and
- Completion of the Camden air quality assessment checklist (Appendix A).

4.2 Methodology of Baseline Assessment

Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

A desk-based review of the following data sources has been undertaken to determine baseline conditions of air quality in this assessment:

- Local authority review and assessment reports and local air quality monitoring data[20, 21, 22, 23, 24, 25];
- London Atmospheric Emissions Inventory[26] (LAEI);

[20] London Borough of Camden (2018) Annual Status Report, https://www.camden.gov.uk/documents/20142/1458280/Air+quality+status+report+2017.pdf/326282c9-7b97-58d6-75f9-577f86406259 [Accessed March 2019]
[21] Camden Council. https://opendata.camden.gov.uk/Environment/Air-Quality-Monitoring-Diffusion-Tube/gy6e-i4w6/data [Accessed March 2019]
[22] London Borough of Islington (2018) Annual Status Report, https://www.islington.gov.uk/-/media/sharepoint-lists/public-records/environmentalprotection/information/adviceandinformation/20182019/20190103islingtonairqualityreport171.pdf [Accessed March 2019]
[23] Westminster City Council (2018) Annual Status Report, https://www.westminster.gov.uk/sites/default/files/asr_london_2017_final_westminster_city_council_002.pdf [Accessed March 2019]
[24] City of London (2018) Annual Status Report, https://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/air-quality-annual-status-report-2017.pdf [Accessed March 2019]
[25] London Borough of Hackney (2018), Annual Status Report, https://www.hackney.gov.uk/air-pollution [Accessed March 2019]
[26] LAEI 2013 https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory-2013

- London Air website[27];
- The Defra Local Air Quality Management website[28];
- The UK Air Information Resource website[29]; and
- The Environment Agency website[30].

This review identified the main sources of air pollution within 2km of the proposed development, the local air quality monitoring data for recent years and local background pollutant concentrations.

4.3 Methodology of Construction Phase Assessment

The development will include demolition and construction of buildings. The IAQM[18] and GLA dust guidance[13] have been used to assess the impacts from dust on local sensitive receptors.

Construction-related traffic has the potential to impact local concentrations of pollutants. Therefore, the traffic volumes have been screened using EPUK criteria[19] to determine an appropriate level of assessment.

4.3.1 Construction Dust Assessment

The effects from construction have been assessed using the qualitative approach described in the latest guidance by the IAQM[18] and GLA[12].

An 'impact' is described as a change in pollutant concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during construction of the proposed development are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from NRMM and vehicles accessing the site.

The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new buildings and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises

[27] LondonAir website, https://www.londonair.org.uk/LondonAir/Default.aspx; [Accessed: March 2019]
[28] Defra Local Air Quality Management website; http://laqm.defra.gov.uk/; [Accessed: March 2019]
[29] Defra, http://uk-air.defra.gov.uk, [Accessed March 2019]
[30] Environment Agency website; https://environment.data.gov.uk/public-register/view/search-industrial-installations; [Accessed: March 2019]

when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the public road network.

For each of these dust-generating activities, the guidance considers three separate effects:

- Annoyance due to dust soiling;
- Harm to receptors; and
- The risk of health effects due to a significant increase in PM_{10} exposure.

The receptors can be human or ecological and are selected based on their sensitivity to dust soiling and PM_{10} exposure. Sensitive receptors are defined as those properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction of the proposed development.

The methodology takes into account the scale on which the above effects are likely to be generated (classed as small, medium or large), the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of impacts from the site.

There are five steps in the assessment process described in the IAQM guidance. These are summarised in Figure 2 and further description is provided in the following paragraphs.

Step 1: Need for Assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary (*for ecological receptors this is 50m*) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the site entrance(s).

Step 2: Assess the Risk of Dust Impacts

This step is split into three sections as follows:

- 2A. Define the potential dust emission magnitude;
- 2B. Define the sensitivity of the area; and
- 2C. Define the risk of impacts.

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria shown in Table 22 (Appendix B1).

The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Table 23 and Table 25

(Appendix B2-Appendix B4) show the criteria for defining the sensitivity of the area to different dust effects.

The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table 26, Appendix B5) and an overall risk for the site derived.

Step 3: Determine the Site-Specific Mitigation

Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

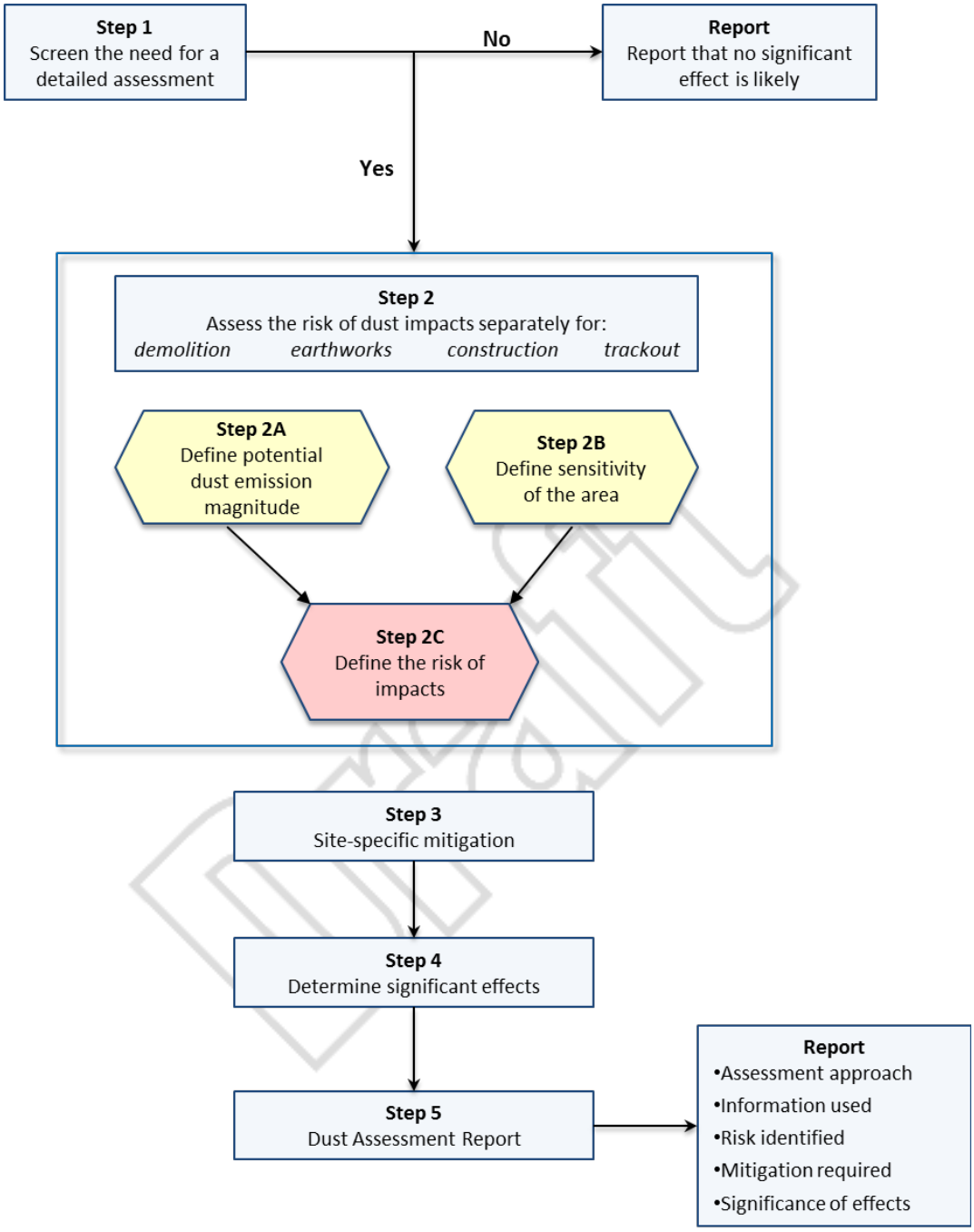
Step 4: Determine any Significant Residual Effects

Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a Dust Assessment Report

The last step of the assessment is the preparation of a dust assessment report. This forms part of this report (see Section 6).

Figure 2: IAQM dust assessment methodology



4.4 Construction Traffic

The proposed development lies in an AQMA, so the following criteria have been used to determine whether a detailed air quality assessment is likely to be considered necessary for construction traffic:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT); and
- A change of Heavy Duty Vehicle (HDV) flows of more than 25 AADT.

Meeting either of the criteria would indicate that detailed dispersion modelling of the road traffic emissions would be necessary.

Data provided by Lendlease confirms that vehicle movements[31] during the construction phase are below the EPUK screening criteria of 25 HGV movements. Therefore, it is considered the impact from HGV movements will have a negligible impact and an assessment of emissions associated with construction traffic accessing the site has been scoped out of the assessment.

4.5 Method of Operational Phase Assessment

Operational air quality impacts from the proposed development may arise as a result of traffic changes along the local road network.

4.5.1 Operational Traffic Emissions

The roads surrounding the proposed development have the potential to impact air quality as a result of operational traffic exhaust emissions of NO_x and fine particulate matter. A screening assessment has been undertaken using the indicative criteria contained in the EPUK/IAQM land-use guidance[19] to determine the potential local air quality effects associated with the potential trip generation as a result of the operational phase on the proposed development.

The screening criteria for AQMAs are defined in section 4.4.

The development will have no car parking spaces and the majority of trips to and from the development will be using public transport.

Data provided by Lendlease confirms that the changes in traffic flow on local roads are below the threshold of 100 AADT and therefore assessment of road traffic emissions has been scoped out of the assessment.

4.5.2 Combustion Emissions

The proposed works do not include the installation of any on-site combustion. The works will however allow space for a future tenant to install a heating unit which could have emissions to air. No details of what may be installed in future are available at this stage of assessment therefore no assessment of on-site emissions has been included.

It is recommended that a design condition be provided for the development for any future tenants to provide evidence to LBC of what will be installed and to confirm, if there are emissions to air, that they will meet the requirements detailed in the GLA SPG[12].

[31] One movement on a road link is equivalent to an AADT of one

4.6 Methodology of the Air Quality Neutral Assessment

An Air Quality Neutral (AQN) Assessment has been undertaken as required by the Sustainable Design and Construction SPG[12].

Transport Emission Benchmarks (TEBs) and Building Emission Benchmarks (BEBs) have been set for NO_x according to the land-use classes of the Development. This proposed development does not include any on-site emissions. If a tenant installed any boilers or CHP units these would need to be reviewed and the AQN calculations updated.

In order to calculate the emissions from the proposed development and apply the TEBs, the following information is required:

- Gross floor area (GFA) (m^2);
- Proposed development trip rates (trips/dwelling/annum); and

NO_x and PM_{10} emissions (kg/annum) for each land-use class in a development need to be calculated and summed to give the total transport emissions. The TEBs for the development are then subtracted from the total transport emissions for the development. Should the outcome be negative, the transport emissions from the development are within the benchmark, thus no mitigation or offsetting would be required.

The SPG notes that it was not possible to derive benchmarks for each land use type, which includes D2 (event space). As it is not possible to derive a TEB, a comparison has been made based on the trip rates. Similarly, to the TEBs, if the trip rate comparison is lower for the proposed development no mitigation is required. Benchmark rates have been set for office use (B1).

Benchmark trip rates have been set for each land use type and each area of London: Controlled Activities Zone (CAZ), inner and outer. These are presented in Table 2. The proposed development is located in the CAZ, benchmarks for the CAZ are included in Table 2.

The TEB for B1 are provided in Table 3.

Table 2: Benchmark trip rates (trips/m^2/annum) for land-use classes

Land use	CAZ	Inner	Outer
Institutional (D2)	5.0	22.5	49.0

Table 3: Transport emission benchmarks (g/m^2/annum)

Land use	CAZ	Inner	Outer
Office (B1) NOx	1.3	11.4	68.5
Office (B1) PM_{10}	0.2	2.0	11.8

5 Baseline Assessment

5.1 Sources of Air Pollution

5.1.1 Industrial Processes

Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met, and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, and are regulated through the Pollution Prevention and Control (PPC) system[32,33]. The larger, more polluting processes are regulated by the Environment Agency (EA), and the smaller less polluting ones by the local authorities. Local authorities focus on regulation for emissions to air, whereas the EA regulates emissions to air, water and land.

There are no regulated Part A processes with releases to air relevant to this assessment within 2km of the proposed development listed on the EA website[33]. The impact of Part A and B processes further from the proposed development are assumed to be included in the LAEI background concentrations used (Section 5.4).

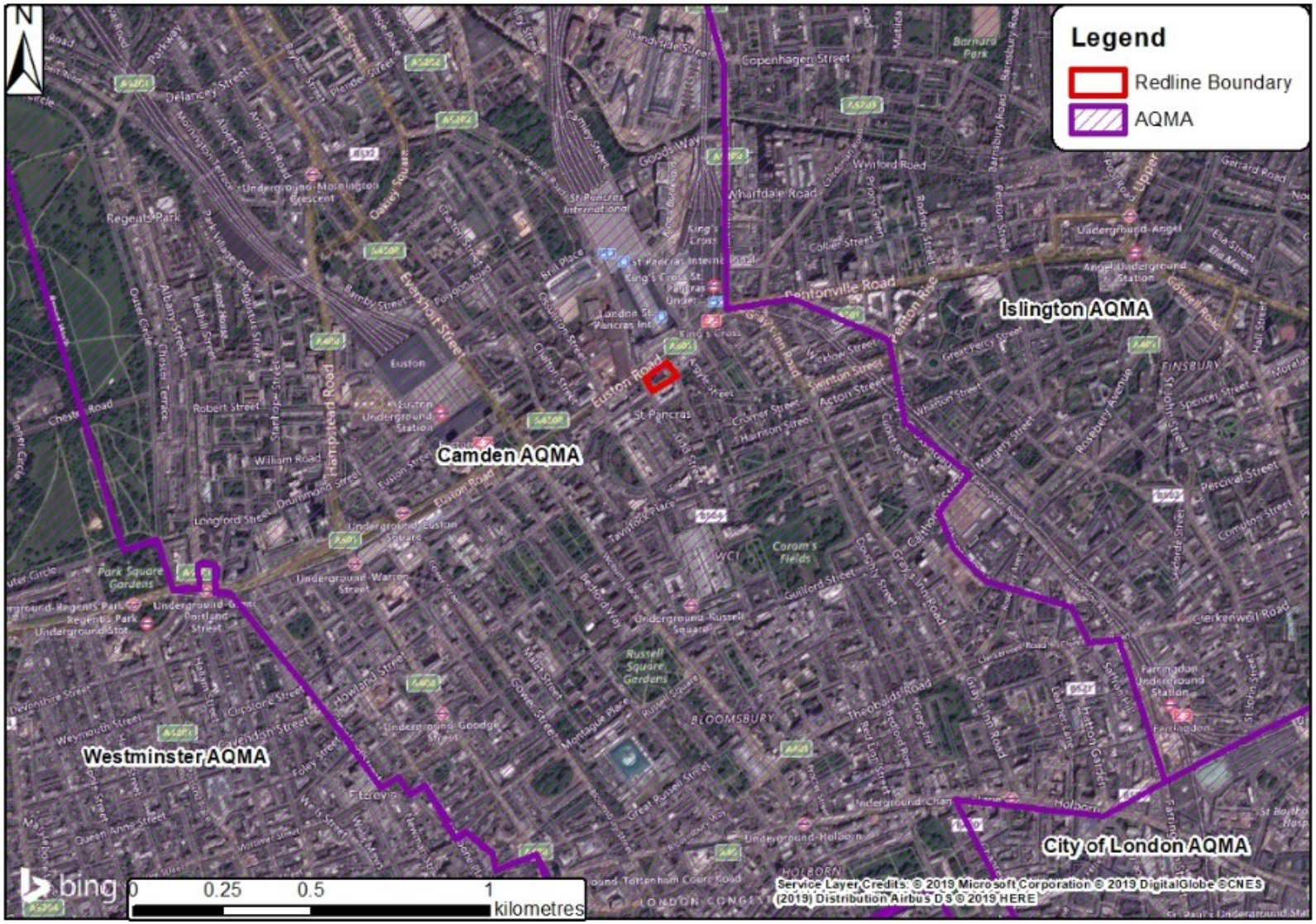
5.2 Local Air Quality

The Environment Act 1995 requires local authorities to review and assess air quality with respect to the air quality objectives for the pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an Annual Status Report (ASR) of their area every three years. If the ASR identifies potential hotspot areas likely to exceed air quality objectives, then a detailed assessment of those areas is required. Where objectives are not predicted to be met, local authorities must declare the area as an Air Quality Management Area (AQMA). In addition, local authorities are required to produce an Air Quality Action Plan (AQAP) that includes measures to improve air quality in the AQMA.

As part of the review and assessment process, LBC declared the whole borough an AQMA in 2000 due to exceedances of the annual mean objective for NO_2 and the daily mean objective for PM_{10}. Figure 3 shows the declared LBC AQMA.

[32] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
[33] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

Figure 3: LBC AQMA



5.3 Local Monitoring

LBC undertakes both automatic and passive monitoring. All monitoring in a 2km radius of the proposed development is described in the sections 5.3.1 and 5.3.2. This includes monitoring in LBC, London Borough of Islington (LBI), City of Westminster, City of London and London Borough of Hackney.

5.3.1 Automatic Monitoring

Automatic or continuous monitoring involves continuously drawing air in through an analyser to obtain near real-time pollutant concentration data. A review of the relevant ASRs[20, 21, 22, 23, 24, 25] and of the London Air website[27] showed that within 2km of the proposed development there are three automatic monitors, Euston Road (CD9) and Shaftesbury Avenue(CD3), both roadside site and London Bloomsbury (LB), an urban background site. The details of these automatic monitoring sites are presented in Table 4, and their locations are shown in Figure 4.

Recent NO_2 monitoring results from 2014 to 2017 are shown in Table 5. The annual mean objective was exceeded at all sites in all years for which there is data, with the exception of 2017 at the LB urban background site. At CD9 the annual mean was over twice the annual mean objective (83.0µg/m^3) in 2017. The data shows annual mean concentrations are high, even at background locations.

There were no exceedances of the NO_2 1 hour mean at LB or CD3, but the objective was exceeded each year at CD9. In 2014 there were 221 exceedances of the hourly threshold at CD9 compared to the permitted 18 exceedances. The number of exceedances has decreased each year since 2013 and in 2017 25 exceedances were recorded.

Table 4: Details of automatic monitoring sites within 2km of the proposed development

Site ID	Site location	OS grid reference		Site type	Distance to kerb of nearest road (m)
		X	Y		
LB	London Bloomsbury	530120	182034	Urban background	27
CD9	Euston Road	529878	182648	Roadside	0.5
CD3	Shaftesbury Avenue	530060	181290	Roadside	1.0

Table 5: Automatic annual mean NO_2 monitoring results 2014 - 2017

Site ID	Site location	NO_2 annual mean concentration ($\mu g/m^3$)				NO_2 1-hour mean exceedances			
		2014	2015	2016	2017	2014	2015	2016	2017
LB	London Bloomsbury	**45.0**	**48.0**	**42.0**	38.0	0	0	0	0
CD9	Euston Road	**98.0**	**90.0**	**88.0**	**83.0**	**221**	**54**	**39**	**25**
CD3	Shaftesbury Avenue	**69***	-	-	-	2	-	-	-
Air quality objective		40 $\mu g/m^3$				200 $\mu g/m^3$, not to be exceeded more than 18 times a year (99.79th percentile)			
Note: Exceedances are highlighted in bold. *Shaftesbury Avenue monitoring station ceased collecting NO_2 data in 2015 due to a technical fault.									

Table 6 presents the recent PM_{10} monitoring results from 2014 to 2017. There were no exceedances of the PM_{10} annual mean air quality objective or the 24-hour objective at any of the sites.

Table 6: Automatic annual mean PM_{10} monitoring results 2014 - 2017

Site ID	Site location	PM_{10} annual mean concentration ($\mu g/m^3$)				PM_{10} 24-hour mean exceedances			
		2014	2015	2016	2017	2014	2015	2016	2017
LB	London Bloomsbury	20	22	20	19	11	6	9	6
CD9	Euston Road	29	18	24	20	5	5	10	3
CD3	Shaftesbury Avenue	25	22	18	-	16	4	-	-
Air quality objective		40 $\mu g/m^3$				50 $\mu g/m^3$, not to be exceeded more than 35 times a year (90.4th percentile)			

Table 7 presents the recent $PM_{2.5}$ monitoring results from 2014 to 2017. There were no exceedances of the $PM_{2.5}$ annual mean air quality objective at either of the sites LB or CD9. $PM_{2.5}$ was not monitored at CD3.

Table 7: Automatic annual mean $PM_{2.5}$ monitoring results 2014 - 2017

Site ID	Site location	$PM_{2.5}$ annual mean concentration ($\mu g/m^3$)			
		2014	2015	2016	2017
LB	London Bloomsbury	15	11	12	13
CD9	Euston Road	21	17	17	14
Air quality objective		25 $\mu g/m^3$			

5.3.2 Diffusion Tube Monitoring

Within 2km of the proposed development, there are 12 diffusion tubes monitored by LBC and LBI. Details of these diffusion tubes are provided in Table 8.

Table 8: Details of diffusion tube sites within 2km of the proposed development

Site ID	Site location	OS grid reference		Site type	Distance to kerb of nearest road (m)
		X	Y		
London Borough of Camden					
CA4	Euston Road	530110	182795	Roadside	1
CA6	Wakefield Gardens	530430	182430	Urban background	18
CA10	Tavistock Gardens	529880	182334	Urban background	35
CA11	Tottenham Court Road	529568	181728	Kerbside	4
CA20	Brill Place	529914	183147	Roadside	9
CA21	Bloomsbury Street	529962	181620	Roadside	4
CA23	Camden Road	529173	184129	Roadside	5
London Borough of Islington					
BIS005/03	Caledonian Road	530721	183584	Roadside	<1
BIS005/02	Roseberry Avenue	530721	183584	Roadside	<1
BIS005/04	Percy Circus	531336	182599	Roadside	1
BIS005/05	Myddleton Square	530901	182855	Urban background	1
IS005/04	Upper Street (Waterloo Terrace)	531317	182998	Urban background	1

Monitored NO_2 concentrations from 2014 to 2017 are reported below in Table 9. Exceedances of the NO_2 annual mean objective were recorded at all the roadside and kerbside sites and at three out of four of the urban background sites. The short-term NO_2 objective is likely to have been exceeded at five of the roadside and kerbside sites as the surrogate statistic of 60µg/m^3 was exceeded.

In 2017 the NO_2 annual mean objective was exceeded at six sites. The maximum concentration in 2017 was recorded at CA4 on Euston Road (92.5µg/m^3), a roadside site. At the two urban background sites operational in 2017, Myddleton Square (BIS005/05) and Upper Street (Waterloo Terrace) (IS005/04), concentrations were just less than the objective (39.0µg/m^3 at both)..

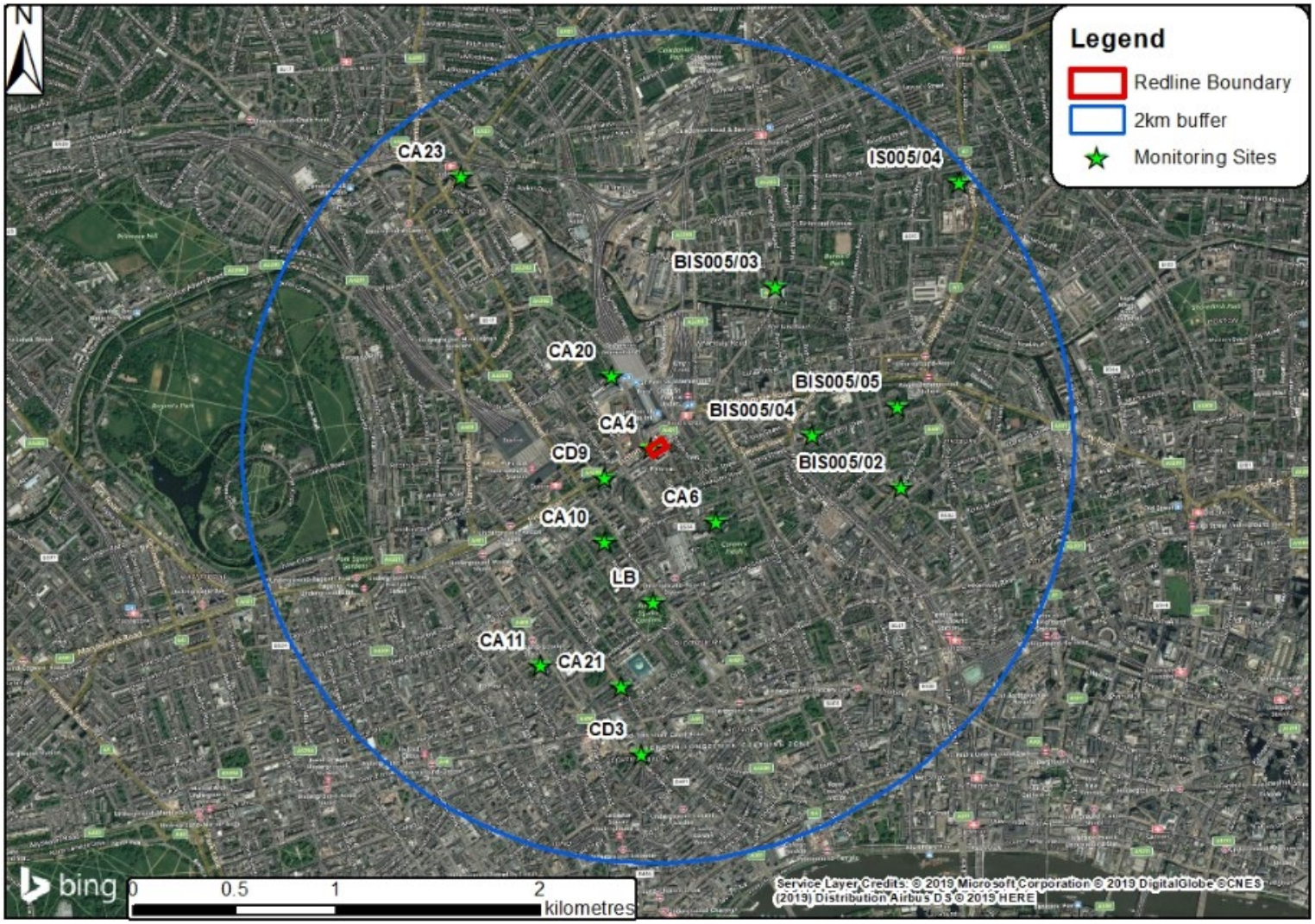
Table 9: Passive annual mean NO_2 monitoring results 2014-2017

Site ID	Site location	NO_2 annual mean concentration (µg/m^3)			
		2014	2015	2016	2017
CA4	Euston Road	**89.7**	**86.8**	**82.7**	**92.5**
CA6	Wakefield Gardens	36.4	35.8	31.3	-
CA10	Tavistock Gardens	**46.5**	**44.6**	39.7	-
CA11	Tottenham Court Road	**86.6**	**85.6**	**83.6**	-
CA20	Brill Place	**52.3**	**48.9**	**47.55**	**57.3**
CA21	Bloomsbury Street	**80.8**	**71.4**	**72.2**	**80.7**
CA23	Camden Road	**72.2**	**63.3**	**61.7**	**75.4**
BIS005/03	Caledonian Road	**51.0**	**58.0**	**53.0**	**43**
BIS005/02	Roseberry Avenue	**58.0**	**62.0**	**62.0**	**54.0**
BIS005/04	Percy Circus	40.0	**45.0**	**46.0**	40.0
BIS005/05	Myddleton Square	39.0	39.0	38.0	39.0
IS005/04	Upper Street (Waterloo Terrace)	37.0	40.0	39.0	39.0

Note: Exceedances are highlighted in bold. NO_2 annual means in excess of 60µg/m^3, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

The results of the monitoring within 2km of the proposed development show that concentrations of NO_2 are high at roadside locations and are currently just below the annual mean objective at background locations. The site closest to the proposed development is CA4, which exceeds the annual mean objective for annual mean NO_2 each year from 2014 to 2017. The location of the proposed development on the Euston Road means concentrations are very likely to be exceeding the annual mean and short term NO_2 objectives at the façade of the building.

Figure 4: Monitoring sites within 2km of the proposed development site



5.4 Background Concentrations

This section considers background concentrations at the proposed development site. Source data for the background assessment has been taken from the Defra website[29] and the London Atmospheric Emission Inventory (LAEI) data[26].

The Defra website[29] includes estimated background concentrations for NO_2, NO_x, PM_{10} and $PM_{2.5}$ for each 1km by 1km OS grid square. Table 10 shows the estimated Defra background concentrations for the OS grid square containing the proposed development and the closest urban background monitor (Site ID LB) to the proposed development (530500, 182500) in 2017. Urban background monitoring site LB is 0.7km to the south of the proposed development.

The estimated Defra background concentration exceeds the air quality objectives for annual mean NO_2 (40µg/m^3). The estimated Defra background concentrations are below the air quality objectives for PM_{10} (40µg/m^3) and for $PM_{2.5}$ (25µg/m^3).

The 2017 monitored NO_2 concentrations measured at the urban background site LB was 38µg/m^3, which is lower than the estimated Defra background concentration for the same grid square (43µg/m^3).

The percentage difference between the monitored concentrations and the Defra background concentrations is provided in Table 11 below. There is 11.6% difference between the estimated Defra background concentration and the measured concentration at LB for NO_2.

Table 10: Defra's estimated 2017 background pollutant concentrations

Location	OS grid square		Annual Mean Concentrations (µg/m^3)			
	X	Y	NO_x	NO_2	PM_{10}	$PM_{2.5}$
Proposed development and Urban background Site LB	530500	182500	76.0	**43.0**	21.0	13.0

Table 11: Comparison between monitored NO_2 and Defra 2017 background concentrations

Pollutant	Estimated Defra background concentration (µg/m^3)	Measured concentration at LB (µg/m^3)	Difference (µg/m^3)	Difference (%)
NO_2	43.0	38.0	5	11.6

The LAEI includes estimated background concentrations for NOx, NO_2, PM_{10} and $PM_{2.5}$ for each 20m by 20m grid square across London for specific years including 2013 and 2020. Background pollutant concentrations for each 20m x 20m grid square across the 1km Defra grid square which includes the proposed development have been calculated for 2013 and 2020 which are the two years of background concentrations available from the LAEI. The distribution of background concentrations of NO_2 can be seen in Figure 5 and Figure 6.

The 2017 concentrations have been calculated from these datasets by linear interpolation. Table 12 shows the estimated LAEI background concentrations for the OS grid square containing the proposed development and the closest urban background monitor to the proposed development in 2017.

LAEI background concentrations in 2017 have been compared to Defra background concentrations for the location of the LB automatic monitor and the proposed development (see Table 13).

Table 12: LAEI (2017) background pollutant concentrations

Description	OS grid square		Annual mean concentrations (µg/m^3)			
	X	Y	NOx	NO_2	PM_{10}	$PM_{2.5}$
Proposed development	530100	182780	123.8	**60.7**	27.7	18.0
	530160	182840	191.3	**80.1**	**48.7**	19.6
	530180	182800	83.2	**46.0**	18.6	16.9
	530120	182760	88.8	**48.3**	19.8	17.1
Urban background Site LB	530120	182040	87.7	**45.2**	16.5	14.2

Table 13: Comparison between LAEI and Defra predicted NO_2 concentrations

OS grid square		LAEI mapped 2016	Defra mapped 2016	Difference	Difference (%)
X	Y	NO_2	NO_2		
530120	182040	45.2	43.0	2.2	5.1%

The Defra modelled background concentrations are 2.2µg/m^3 higher using the LAEI modelled concentrations for 2017. The LAEI modelled concentrations are modelled at a higher grid resolution (20m x 20m) than the Defra backgrounds (1km by 1km) and have been requested for use by the EHO. The LAEI modelled concentrations are considered representative of background concentrations at the proposed development site and have been used in this assessment.

Figure 5: 2013 LAEI predicted NO_2 background concentrations

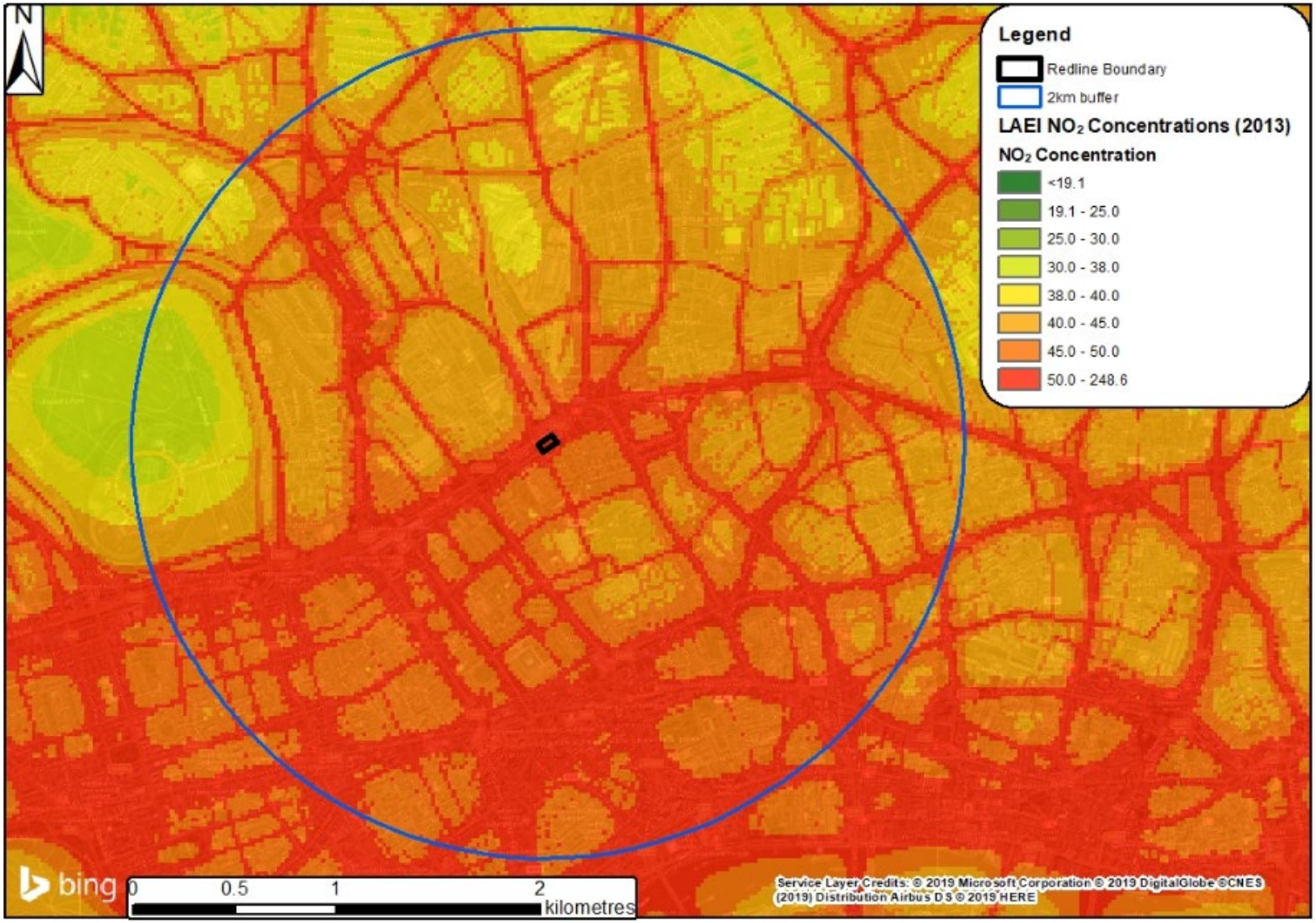
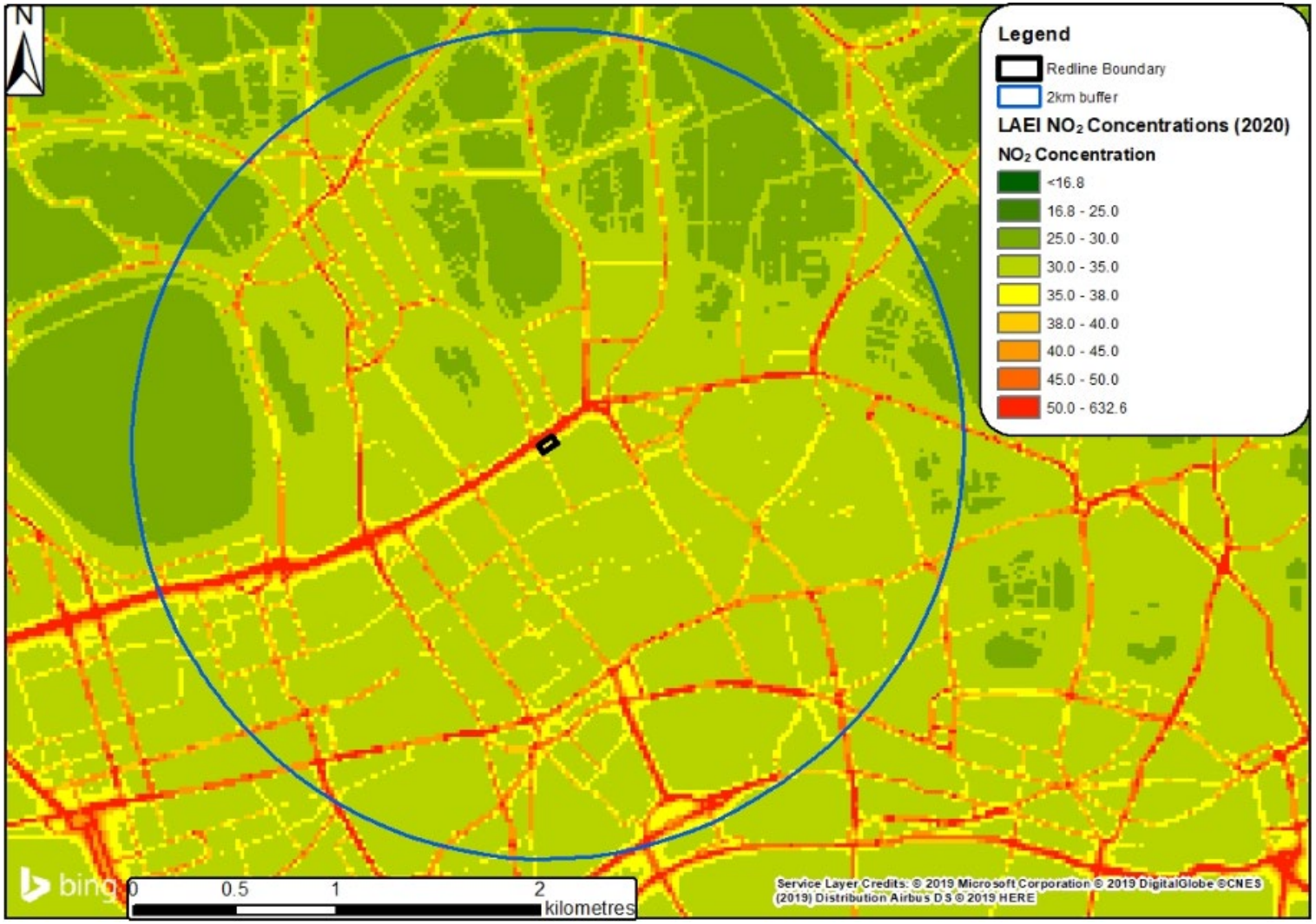


Figure 6: 2020 LAEI predicted NO_2 background concentrations



6 Construction Phase Assessment

6.1 Construction Dust Assessment

The proposed development will require demolition and construction at the site and so demolition, construction, trackout, construction vehicle emissions and NRMM emissions standards have been considered in the following sections. There will be no earthworks activities taking place therefore earthwork activities have been scoped out.

6.1.1 Sensitive Receptors

Sensitive receptors are defined as those residential properties, schools or hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction and operation of the proposed scheme.

Sensitive receptors close to the proposed development have been identified. There are more than 100 sensitive receptors within 50m of the site boundary (Figure 7); these are mainly residential dwellings and Argyle Primary School. Their sensitivity to dust soiling and PM_{10} exposure has been classified as *high* according to the IAQM guidance.

There are no ecological designated sites sensitive to dust soiling and PM_{10} exposure within 50m of the proposed scheme. Impacts on ecological receptors have therefore not been considered further in this assessment. Camley Street Nature Park, a local nature reserve (LNR), is located 500m north of the proposed development and so ecological receptors have not been considered further.

6.1.2 Dust Emission Magnitude

Following the methodology outlined in Section 4.3, each dust-generating activity has been assigned a dust emission magnitude as shown in Table 14.

Table 14: Dust emission magnitude for all activities

Activity	Dust emission magnitude	Reasoning
Demolition	Small	Total building volume <20,000m^3, No on-site crushing and screening.
Construction	Small	Total building volume < 25,000m^3, low potential for dusty construction material.
Trackout	Small	< 10 HDV (>3.5t) outward movements in any one day.

6.1.3 Sensitivity of the Area

There will be more than 100 high sensitivity receptors (Argyle Primary School) within 50m of the scheme boundary. As such, the areas sensitivity to dust soiling has been classified as *High* in accordance with the IAQM guidance.

The worst-case LAEI PM_{10} background concentration in the grid squares where the scheme is located (OS Grid Ref.: 530160, 182840) is 48.7µg/m^3, which exceeds the 32µg/m^3 threshold. The sensitivity of the area to human health has therefore been assigned as *High* as there are more than 100 high sensitivity receptors within 50m of the proposed scheme boundary.

6.1.4 Risk of Impacts

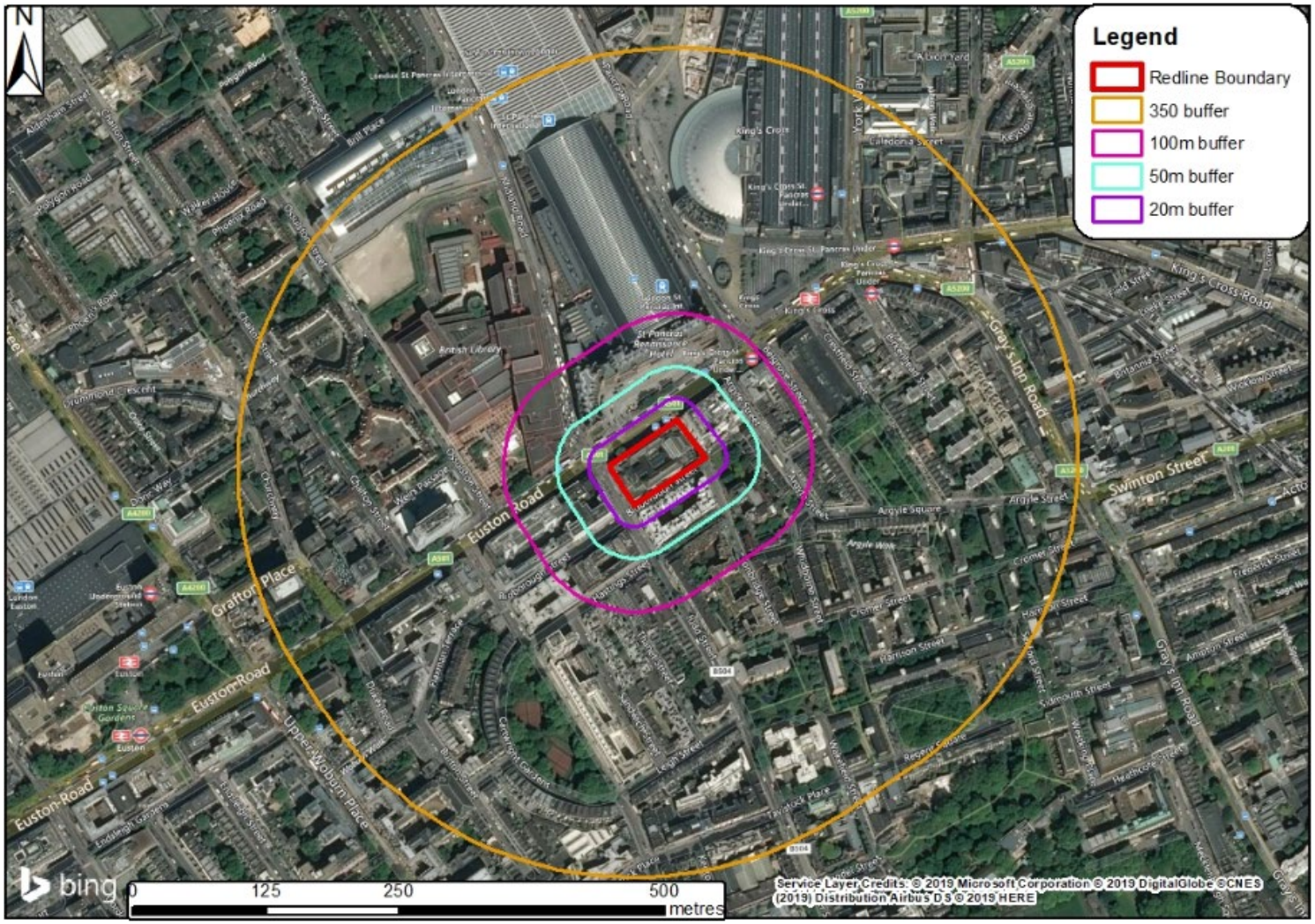
Taking into consideration the dust emission magnitude and the sensitivity of the area, the scheme has been classified as *Low* risk to dust soiling and human health impacts from construction and trackout. The scheme has been classified *Medium* risk to dust soiling and human health impacts from demolition (Table 15). Specific mitigation to minimise the risk of dust soiling and human health impacts of the proposed scheme is described in Section 8.

Table 15: Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Demolition	Medium risk	Medium risk
Construction	Low risk	Low risk
Trackout	Low risk	Low risk

Following the implementation of appropriate mitigation for medium risk sites, the effects of dust soiling and on human health should be negligible and the impacts would therefore be not significant.

Figure 7: Construction dust buffers



6.2 Construction NRMM emissions

The proposed works are in the NRMM Low Emissions Zone (LEZ) that came in to force in September 2015. This means all NRMM used (of net power between 37kW and 560kW) is required to meet Stage IIIB of the EU Directive[34] as a minimum. Further information and guidance can be found on the NRMM website[35].

The contractors are required to provide information to the GLA prior to commencement of works. All eligible NRMM should meet the standards unless it can be demonstrated that the machinery is not available or that a comprehensive retrofit to meet both NO_x and PM_{10} emissions is not feasible. The following steps are required:

- A written statement of the commitment and ability to meet the standards should be provided; and
- An inventory of all NRMM should be kept on-site stating emission limits for all equipment. All machinery should be regularly serviced and logs kept on-site for inspection. This information should be available for local authority officers as required.

[34] EU Directive on emissions from non-road mobile machinery (Directive 97/68/EC and subsequent amendments)
[35] NRMM website (https://nrmm.london/) [accessed December 2017]

7 Operating Conditions

7.1 Air Quality Neutral Assessment

The following sections describe the calculation of the benchmarks discussed in the air quality neutral assessment method. The calculation of emissions from the proposed development are then compared to these benchmark values.

7.1.1 Transport Emissions

The proposed development is classed as land use type B1 – office and D2 – event space. Both the TEB and development trip rate have been used to determine if the proposed development is AQN.

Trip generation rates for the proposed development were provided by the transport consultant Tyrnes. The following points detail how the traffic numbers were calculated and the annual trips per land use type are provided in Table 16.

- Commuters are the major car users, so it has been assumed 75% of the trips are carried out during the periods between 07:00-09:30 and 16:30-19:00.
- Office total trips rates for 07:00-09:30 and 16:30-19:00 are 7.3 trips/100m^2;
- The Town Hall has a similar use as the office, so the same trip rates has been used;
- Both Town Hall and Office operate mainly on weekdays so a factor of 5.5*weekday trips per week has been applied;
- On average there are 208 events a year at Camden Town Hall; and
- Each event is half of the max capacity (450 people including Staff).

Table 16: Annual trips per land use

Planning class		Daily Vehicle Trips	Yearly Vehicle Trips
Office B1	Office	11	4300
	Town Hall	9	3333
Event space D2	Camden Centre	32 (per event)	6552
		Total	14185

The calculated trip generation rates for the land-uses are detailed in Table 17.

Table 17: Development trip generation rates for the proposed development (trips/m^2/annum)

Land-use	Development trip rate (trips/m^2/annum)
Office B1	1
Event space	4

The benchmark trip rates and development trip rates for event space are compared in Table 18.

Table 18: Comparison of the benchmark trip rates and the dev trip generation rates (trips/m^2/annum) for residential institutions

Land-use	Benchmark trip rates (trips/m^2/annum)	Dev trip rate (trips/m^2/annum)	Difference (trips/m^2/annum)	Outcome
Event space – D2	5	3.7	-1.3	Within benchmark

The TEB for residential dwellings are shown in Table 19 as kg/annum. The Total Transport Emissions (TTE) have been calculated using the office space in m^2 and average distance travelled by car per trip and emission factors for CAZ London, as shown in Table 20.

Table 19: Calculation of the TEB for office (kg/annum)

Land-use	NOx (kg/annum)	PM_{10} (kg/annum)
Office – B1	11	2

Table 20: Calculation of the TTE for office (kg/annum)

Land-use	NOx (kg/annum)	PM_{10} (kg/annum)
Office – B1	10	2

Table 21 compares the TEB with the TTE, and shows that NOx and PM_{10} transport emissions for the proposed development are below the AQN benchmarks.

Table 21: Comparison of the Transport Emission Benchmark and Total Transport Emissions (TTE) for residential dwellings (kg/annum)

Pollutant	TEB (kg/annum)	TTE (kg/annum)	Difference (TEB – TTE) (kg/annum)	Outcome
NOx	11	10	-2[a]	Within benchmark
PM_{10}	2	2	0	Within benchmark
a – rounded change				

7.1.2 Summary of AQN

It is currently unknown if CHPs or boilers will be provided for the development, so no building emissions are calculated for the AQN assessment.

Table 18 and Table 21 compare the transport benchmarks with the calculated development trips. Mitigation/offsetting is not required for transport emissions and the development is air quality neutral.

8 Mitigation

8.1 Construction Dust Mitigation

The dust-emitting activities assessed in Section 6 can be greatly reduced or eliminated by applying the site specific mitigation measures for *medium risk* sites according to the IAQM guidance. The following measures from the guidance are relevant and should be included in the Construction Management Plan for the proposed development.

General

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan, which will include measures to control other emissions, approved by the local authority.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be require to endure compliance with the Mayor Of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site and the action taken to resolve the situation in the log book.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary. Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority, when asked.

- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Site maintenance

- 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 that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.

Operating vehicle/machinery and sustainable travel

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.
- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on un-surfaced haul roads and work areas.
- Implement a Travel Plan than supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.

- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use the fine water sprays on such equipment wherever appropriate.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure equipment is readily available on site to clean and dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

Demolition-specific measures

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Construction-specific measures

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bundled areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

9 Conclusions

This report presents the air quality assessment for the proposed development at Camden Town Hall, London. A review of current legislation and planning policy and a baseline assessment describing the current air quality conditions in the vicinity of the proposed development have been undertaken. Likely local air quality impacts during construction of the proposed development have been assessed.

The proposed development is located in the London Borough of Camden AQMA. Monitoring data within 2km of the site shows that nine out of the 12 monitoring sites exceeded NO_2 air quality objectives between 2014-2017 LAEI background concentrations in the area were above the air quality standard for NO_2 in 2017.

Effects of construction dust have been assessed using the qualitative approach described in the IAQM guidance and it was concluded there is a *medium* risk from the dust-generating activities on site if adequate mitigation is not implemented. With the appropriate good practice mitigation measures in place there are likely to be no significant effects from dust emissions during construction.

An AQN assessment has been undertaken as required by the GLA Sustainable Design and Construction SPG. The results indicate the emissions meet the AQN criteria and therefore no mitigation is required.

Appendix A

Camden air quality planning checklist

A1 Camden Air Quality Planning Checklist

Air Quality Planning Checklist

This document is to be completed for all developments that are subject to an Air Quality Assessment (AQA).

Travel and Transport

[1] If there will be parking in the development, will electric vehicle charging points be included?

There are only 2 disabled parking facilities at the proposed development.

[2] Will secure cycle storage be provided for users of the building?

There is cycle storage at the proposed development in the north-east corner, comprising long and short stay storage.

Energy

[3] If a CHP is to be included, did you ensure that this technology is suitable for the energy requirements of the building? Please see Camden's Boiler Guidance Manual B for more information.

No CHP is to be included in the proposed development at the time of writing. If any CHP is proposed at a later stage, then this will be assessed.

[4] If CHP is to be included, was this included within the air quality modelling in the AQA?

No CHP is to be included in the proposed development at the time of writing. If any CHP is proposed at a later stage, then this will be assessed.

[5] If CHP will be included and the final technology agreed, have you ensured that it is the best in class in terms of NOx emissions?

No CHP is to be included in the proposed development at the time of writing. If any CHP is proposed at a later stage, then this will be assessed.

Exposure

[6] If located in an area of poor air quality and/or next to a busy road or diesel railway line, does the AQA include details of the way in which the building has been designed to reduce the exposure of occupants (e.g. through orientation, greening, placement of residential properties, or, only for developments in areas of very poor air quality, mechanical ventilation?)

A screening assessment was carried out for the traffic associated with the proposed development and it was found that no detailed dispersion

modelling was necessary. The proposed development is not situated next to a diesel railway line.

No CHPs or gas boilers are included in the proposed development, so no dispersion modelling or stack height assessment was necessary.

Construction Dust

[6] Does the project have a Construction Management Plan written in accordance with the recommendations in the Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, including an assessment of the risk? And, if the risk is High, a real time monitoring proposal?

Yes, the proposed development has a construction dust assessment within the AQA – see section 6.

Camden Planning Checklist November 2013

Appendix B

Construction dust assessment methodology – supporting material

B1 Dust Emission Magnitude

Table 22: Dust emission magnitude

Small	Medium	Large
Demolition		
• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • demolition during wetter months	• total building volume 20,000 - 50,000m^3 • potentially dusty construction material • demolition activities 10 - 20m above ground level	• total building volume >50,000m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20m above ground level
Earthworks		
• total site area <2,500m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <4m in height • total material moved <10,000 tonnes • earthworks during wetter months	• total site area 2,500m^2 - 10,000m^2 • moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • formation of bunds 4 - 8m in height • total material moved 20,000 - 100,000 tonnes	• total site area >10,000m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >8m in height • total material moved >100,000 tonnes
Construction		
• total building volume <25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 25,000 - 100,000m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume >100,000m^3 • on-site concrete batching • sandblasting
Trackout		
• <10 HDV (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50m	• 10 – 50 HDV (>3.5t) outward movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50 – 100m;	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m

B2 Sensitivity of the Area to Dust Soiling Effects

Table 23: Sensitivity of the area to dust soiling effects

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 350
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

B3 Sensitivity of the Area to Human Health Impacts

Table 24: Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)				
		< 20	< 50	< 100	< 200	< 350
High receptor sensitivity						
> 32µg/m³	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m³	> 100	High	High	Medium	Low	Low
	10 – 100		Medium	Low		
	< 10					
24 – 28µg/m³	> 100	High	Medium	Low	Low	Low
	10 – 100					
	< 10	Medium	Low			
< 24µg/m³	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10					
Medium receptor sensitivity						
> 32µg/m³	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
28 – 32µg/m³	>10	Medium	Low	Low	Low	Low
	1 -10	Low				
24 – 28µg/m³	>10	Low	Low	Low	Low	Low
	1 -10					
< 24µg/m³	>10	Low	Low	Low	Low	Low
	1 -10					
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

B4 Sensitivity of the Area to Ecological Impacts

Table 25: Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	< 20	< 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

B5 Risk of Dust Impacts

Table 26: Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible